

**Experiential and Organisational Factors Predicting the
Mental Health of Emergency Paramedics: Beyond the
Trauma**

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Abstract

This research aimed to investigate the prevalence and distribution of mental health conditions across the paramedic workforce, to compare levels with the general population and to assess the association of stressors with scores on measures of mental health.

A survey was constructed to assess general psychological health, depression, anxiety, stress, suicidality, posttraumatic stress disorder, sleep health and the frequency and severity of stressor variables. Impact scores for stressor variables were generated by multiplying frequency and severity scores. Participant and workplace sociodemographic variables were measured. The survey was distributed within Ambulance Victoria in September 2010. Only data from 879 participants that transported emergency patients was analysed.

The ANOVA procedure and chi-square tests were employed to compare means and prevalences of psychological health scores within the paramedic sample according to sociodemographic variables. Independent-sample t-tests and chi-square tests for independence were used to examine means and prevalence rates by comparing this paramedic sample with general population statistics and other paramedic populations. Logistic and multiple regression analyses were conducted to investigate associations between stressor impact scores and mental health conditions.

Key findings were the higher levels of suicidal thinking and planning, PTSD, substandard sleep health and poor general psychological health compared to the general population. The level of PTSD was comparable to other paramedic populations while suicidality was higher: there were mixed findings on the other measures. Regression analyses found that stressors related to the organisation, the broader work context and shift work were significantly associated with measures of mental health while, with the exception of anxiety, emergency work was not. There were no meaningful differences in levels of mental health conditions

within groups across the paramedic workforce except that PTSD caseness was higher outside the major cities and, higher levels of suicidality were reported in three ambulance service regions.

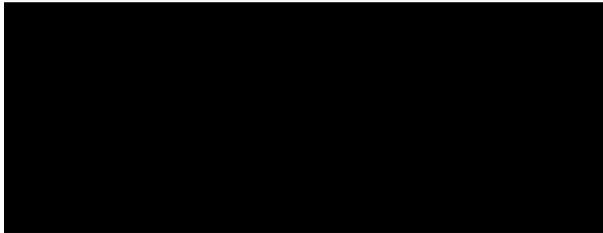
The higher levels of suicidality in this paramedic sample is a new finding although further research is needed to determine its nature and sources. Many stressors associated with mental health are not emergency work related but are instead associated with the organization and aspects of the broader working environment, suggesting that some stressors may be amenable to being managed. The lack of meaningful differences within this paramedic sample indicates that targeting mental health interventions is not practical, and should instead be directed across the entire workforce.

DECLARATION

“I, David Allan Dawson, declare that the PhD thesis entitled, “Experiential and organisational factors predicting the mental health of emergency paramedics: beyond the trauma,” is no more than 80,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work”.

“I have conducted my research in alignment with the Australian Code for the Responsible Conduct of Research and Victoria University’s Higher Degree by Research Policy and Procedures. “

Signature:



02/07/2021 Date:

Dedication

Dedicated to my husband, Graham, who did not survive the quest for this PhD. “The web of our life is of a mingled yarn, good and ill together¹...” Good and ill that arises both from within ourselves and from that which fate and life thrust upon us, whether or not we wish it. Graham was a musician (*viola da gamba*), a poet, and a playwright, and he was quietly proud of his speaking voice. He enjoyed cooking and took pleasure in dining. Graham was diagnosed with cancer and had two years of treatment, at the end of which he could no longer play music, speak with clarity, nor eat. At this point, he declined further treatment and died three months later. “Doesn’t everything die at last, and too soon²...” We were together for thirty-three years and were married four months before he died (when a change in law allowed our marriage).

I miss him.

¹ Shakespeare, W. (1978). *All's well that ends well*. Abbey Library, London. (Original work published in 1603). Act 4, Scene 3.

² From the poem, “The summer day.” Oliver, M. (1992). *New and selected poems*. Beacon Press, Boston.

Acknowledgements

I was the first in my family to go to university. I would like to recognize the role my parents played in enabling me to attend university. It was a long time ago, but this PhD would never have come about if it had not been for that first step.

The men and women in all the emergency services who work with dedication and start every shift not knowing what they might encounter. I stand in astonishment of these people who put their lives at risk to serve, protect and save their communities. They love their work but may not always be given the recognition they merit.

In particular, I would like to acknowledge the participants of this study and say how honoured I feel that they took the time to complete the very large survey upon which this PhD is based. It would have taken a long time for each person to complete all the questions that were asked. A report based on this survey was written some seven years ago and I can only wish that this research was of benefit to you and your paramedic colleagues.

I would like to thank my supervisors, Emeritus Professor Adrian Fisher and Associate Professor Michelle Ball for their wisdom and support. They both provided me with support on many levels, including in my student role and in dealing with some personal travails that arose during the conduct and completion of this PhD. The advice, guidance and support offered by Adrian and Michelle has been nothing less than amazing. I now know that 'patience' is a very big word indeed!

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The work of Robyn Robinson cannot be ignored. She was a pioneer in the study of health and stress in paramedics. Robyn was also instrumental in establishing the Victorian Ambulance Counselling Unit. Many paramedics and their families are indebted to Robyn's work. Much of this PhD could not have happened if not for the foundational work of Robyn Robinson.

I would like to thank Heather Bancroft who was the Clinical Director of the Victorian Ambulance Counselling Unit at the time this study was constructed and conducted. It was a privilege to work with her.

I have found I have friends of great forbearance. They have put up with me talking about this research over the years it took to complete this PhD. I am deeply grateful for their support and patience which has supported me in more ways than I thought possible.

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List of Abbreviations

ABS	Australian Bureau of Statistics
ACPMH	Australian Centre for Posttraumatic Mental Health
ADF	Australian Defence Force
AHA	Australian Healthcare Associates
AIHW	Australian Institute of Health and Welfare
AOTC	Ambulance Officers' Training Centre
APS	Australian Psychological Society
ASGC-RA	Australian standard geographic classification—remoteness area
AV	Ambulance Victoria
BMI	body mass index
CBT	cognitive-behavioural therapy
CCOHS	Canadian Centre for Occupational Health & Safety
CHD	coronary heart disease
CIs	critical incidents
CSF	Comprehensive Soldier Fitness
CVD	cardiovascular disease
DASS-21	Depression Anxiety and Stress Scales
GAS	general adaptation syndrome
GHQ-12	General Health Questionnaire
HADS	Hospital Anxiety and Depression Scale
HFD	Houston Fire Department
IOM	Institute of Medicine
JSS	Job Stress Survey
KSQ	Karolinska Sleep Questionnaire
LIFE	Living is for Everyone

MICA	mobile intensive care paramedics
NASS	Norwegian Ambulance Stress Survey
NCIS	National Coronial Information System
NSMHWB	National Survey of Mental Health and Wellbeing
NSPP	National Suicide Prevention Strategy
NSW	New South Wales
PFC	prefrontal cortex
PSQI	Pittsburgh Sleep Quality Index
PTSD	post-traumatic stress disorder
SES	socio-economic status
SPSS	Statistical Package for the Social Sciences
TAFE	Technical and Further Education
UK	United Kingdom
US	United States
VACU	Victorian Ambulance Counselling Unit
VIF	variance inflation factor
WWI	World War I
WWII	World War II

Chapter One

1. Introduction

1.1. The Context and Nature of Paramedic Work

“You must see some terrible things” (Kennedy, 1999, p. 1) is a truism that most paramedics have heard during their careers. This truism carries with it the widespread belief that the work of paramedics is traumatic, and indeed researchers investigating paramedic health have widely and explicitly assumed that such work is inherently stressful (Young & Cooper, 1997). The aim of this introduction is to clarify that it is not only the traumatic aspects of paramedic work that can affect physical and mental health. The role of more frequent lower level stressors in the form of ‘daily hassles’ arising from other parts of the work environment must also be taken into consideration (Larsson et al., 2016).

This chapter will include a brief synopsis of the observation that both traumatic work and daily hassles contribute to the mental health of paramedics. The sources of daily hassles experienced by paramedics will also be discussed. To provide an overview of the context in which this study was conducted, the ambulance service and the roles performed by its paramedics will be described, and criticisms of previous research on paramedic mental health will be mooted. The chapter will end with a statement of the research questions that will be investigated in the overall project.

Many people believe paramedic work to be traumatic with the implication that negative consequences on the health of paramedics is to be expected. It is true that in some aspects of paramedics’ work, terrible things are seen, and that this traumatic nature of their work can lead to symptoms of mental ill-health (Brough, 2004). A systematic review with a worldwide sample of over 20,000 police officers, firefighters and paramedics reported that the average

prevalence for PTSD for these emergency workers was at least three times that found in the general global population (Berger et al., 2012). Berger et al. also reported that the average prevalence of PTSD for paramedics, at 14%, was at least twice that of firefighters and police officers. It was posited that paramedics experience more pressure and stress, respond to more emergency calls and have closer contact with people needing their help, than do other emergency workers (Berger et al., 2012). The review by Berger et al. adds to the body of work which substantiates the view that paramedic work can be traumatic, and may lead to mental ill-health (e. g. Alexander & Klein, 2001; Clohessy & Ehlers, 1999; Di Fiorino et al., 2004; Durham et al., 1985; Jonsson & Segesten, 2004; Jonsson et al., 2003; Lateef, 2005; Young & Cooper, 1995).

While it is true that the emergency facet of ambulance work can lead to paramedic mental ill-health, it is an incomplete truth. When comparisons are made between traumatic stressors and organisational stressors experienced by paramedics, “organisational stressors appear to have the greater influence” (Hamilton, 2009, p. 212). This is supported by a study of police officers, firefighters and paramedics which found that organisational factors were more important in determining employee well-being than were operational work factors (Burke & Paton, 2006). Burke and Paton (2006) used the term ‘hassles’ to describe negative work-related experiences and reported that these were in the form of the organisations’ management, procedures and structure, and were associated with employee wellbeing. This finding has been supported by other authors. For example, paramedic studies by Van der Ploeg and Kleber (2003) and Bennett et al. (2005) reported that lack of support from supervisors and colleagues, and poor communication within the organisation, were risk factors for poor mental health in the form of burnout and PTSD symptoms, as well as fatigue. Van der Ploeg and Kleber (2003) labelled these chronic sources of stress as the ‘social aspects’ of the work environment.

The paramedic work environment goes beyond that of the employing organisation. The broader social aspects of paramedic work also entails working with patients, their families and bystanders, and the public, as well as the hospital system. Each of these social aspects of the paramedics' work environment can be sources of stress in the form of hassles. These negative experiences can include abuse (or even assault) from patients or their families or from by-standers (Boyle et al., 2007; Suserud et al., 2002). Paramedics also find that people who misuse the ambulance service and insist on being transported, even when it is unnecessary, to be a particularly irritating hassle. Paramedics can have negative experiences with the hospital system when a receiving hospital is placed on bypass, when they perceive that hospital staff do not appreciate their skills, or when they are made to wait to hand over patients (ramping) and which they believe compromises patient care (Perry & Carter, 2017). Paramedic shift work is another aspect of the social environment that can lead to symptoms of fatigue, depression, anxiety, stress and poor sleep quality (Courtney, et.al., 2010, 2013).

Lazarus and Folkman (1984) describe 'daily hassles' as the repeated exposure to events that occur over a long time. Daily hassles are negative experiences but may not always be regarded as important. Nevertheless, Lazarus and Folkman report that the experience of daily hassles is predictive of mental ill-health outcomes as well as somatic symptoms of ill-health. McEwen (2005) similarly stated that chronic exposure to stress events resulted in psychological illness (chronic mood and anxiety disorders) as well as physical ill-health. Maes et al., (2001) reported people experiencing a traumatic event were at greater risk of developing PTSD if they experienced other stressors before or after the event. In short, there is a body of work indicating that chronic exposure to stressors can affect an individual's mental health as well as increase the risk of experiencing the negative consequences of exposure to traumatic experiences.

The social environment of the ambulance organisation as a potential source of stress for paramedics is a theme that has emerged from the literature on paramedic mental health (e.g. Burke & Paton, 2006; Hamilton, 2009; James & Wright, 1993, Mildenhall, 2012; Van der Ploeg and Kleber, 2003). As mentioned previously, the behaviour of people in the organisation (such as colleagues, supervisors and managers) has been reported to be a stressor, and the question arises as to what it is in the culture of the organisation that permits, causes or sustains such behaviour. Thus, it is worth considering the history of the ambulance service and what events or circumstances might have influenced the development of its culture. An investigation of the history of the ambulance services in Australia reveals the historical influence of religion and the military on organisational culture and behaviour. This history and its influence on Australian ambulance service culture is further elaborated in Chapter two.

While all paramedics have been educated to provide emergency care, they perform a number of different roles. These roles include paramedics who provide on-road patient care, mobile intensive care, non-emergency patient services, fixed wing and helicopter air transport, as well as acting as clinical instructors and team managers (Ambulance Victoria, 2012). An enlarged description of the roles performed by paramedics, and the education they receive, is also provided in Chapter two. The work of paramedics can differ by the role they perform and the areas in which they work can range from cities to rural areas all of which can vary according to their socioeconomic status. When the data for this study was collected, Ambulance Victoria (AV) provided non-emergency patient transport services as well as an emergency medical response to more than 5.5 million people across the State of Victoria, which covers an area of some 227,000 square kilometres (Ambulance Victoria, 2012). In addition, AV employed a total of 3003 people, of whom 2611 were on-road clinical transport staff. A succession of annual reports (from 2012 to 2019) generally indicates that Ambulance Victoria is responding to an increasing number of incidents each year.

To encapsulate the preceding paragraphs, it can be said that there are several aspects of the nature of ambulance work and the contexts in which it occurs. These aspects are 1/ the assumption and stereotype of the nature paramedic work ('you must see some terrible things'), 2/ the social environment of the ambulance service, 3/ the health system in which paramedics work, primarily involving hospitals, 4/ the wider social environment where paramedics interact with their patients and the broader public, 5/ the consequences of shift work and 6/ the history which has informed and influenced the development of ambulance service culture. These threads are woven together to form the context in which paramedics work and the context in which this study was conducted.

As ways of understanding and managing paramedic mental health are central to this thesis, Chapter three outlines theories of psychological health and stress. These theories are commonly used within psychology research and applications. They have been presented in an historic sequence, but also because each has terminology and lay understandings which are still used in management.

A criticism of many of the previous studies on paramedic mental health has been that the study samples were flawed because they did not take into account the potential influence of different roles performed by paramedics or the differences between the regions in which they worked (Boudreaux & Mandry, 1996a; Sterud et al., 2006). These shortcomings are further elaborated in a literature review on paramedic mental health presented in chapter three. The present study made determined efforts to address these flaws through the selection of participants and use of data analyses to identify possible differences in mental health associated with the different roles performed by paramedics and the diverse regions in which they worked. A further criticism of a number of previous studies on paramedic health is that it was difficult to draw conclusions about the mental health status of paramedics because of a lack of systematic comparisons with other paramedic populations or with the relevant working population (Sterud et al., 2006). Therefore, comparisons were

made with the general population and with paramedics in other ambulance services in order to contextualise the levels of mental health found in the present study sample. Chapter four provides a review of the literature on paramedic mental health which includes comments on paramedic stressors and addresses criticism of previous studies on paramedic mental health.

In summary, the overarching research question set out to explore the mental health status of paramedics in Ambulance Victoria. Specifically, this thesis endeavoured to appraise differences in mental health status of paramedics across the various sections of the workforce according to sociodemographic variables, to identify the mental health status of paramedics in comparison with the general population and other paramedics, to identify the stressors experienced by paramedics and to assess their association with measures of paramedic mental health.

The research questions for this study are:

1. Are there differences in mental health status between various sections of the AV paramedic workforce?
2. How does the mental health status of the AV paramedic workforce compare with the general population and with other paramedic populations?
3. What are the predictors of mental health in this paramedic population?
4. What comorbidities are associated with PTSD and suicidal ideation in this paramedic population?
5. How are the various sources of stress rated by paramedics and are they associated with paramedic mental health outcomes?

Chapter Two

2. Ambulance Service Origins and The Development of The Paramedic Profession

2.1. Introduction

It is not just exposure to traumatic incidents that can have impacts upon the paramedic experience of stress and on their mental health (Hamilton, 2009). A number of studies have shown that personnel working in the emergency service arena consider the organisational characteristics of their work to make a considerable contribution to their wellbeing (Burke & Paton, 2006). Gaining an understanding of an organisation's characteristics and culture, and their historical development, can provide an insight as to factors which might affect the mental health of the people who work there.

2.2. Organisational Culture

Organisations can be as varied in their cultures as the multitude of nations and societies vary across planet earth (Handy, 1993,). People such as Hofstede (1991, 2001) have devised ways of classifying cultures of countries and societies. Broadly speaking, Hofstede described cultures in terms of cognitive structures that illustrate the way perceptions, beliefs and language are shared and used by members of countries and societies across the globe.

The first researcher to develop a way of classifying the culture of organisations was Harrison (1972), who based his conceptual framework on what he called four, 'organisational ideologies' which he labelled as power orientation, role orientation, task orientation and person orientation. Handy (1993) added to this conceptualisation to describe the four organisation ideologies as power culture, role culture, task culture and person culture. *Power*

culture is an organisation with a central power source that asserts power and authority throughout the establishment. The orthodox view of the *role culture* is that of a bureaucracy which has a culture based in reason and sensibleness with associated departments having clearly defined functions and specialities. The *task culture* is comprised of a network of people exhibiting a team culture where people with appropriate expertise are brought together to accomplish specific tasks or projects. Finally, the organisation with a *person culture* is rare and exists to support the individuals within it; examples include barristers' chambers and specialist professional firms, like architects. Handy (1993) wrote that organisations can have elements of more than one culture and, as can be observed from published information, it could be said that elements of a power, bureaucratic and role culture are present in AV (Ambulance Victoria, 2012, 2016a; Devenish, 2014).

Organisational cultures do not develop in isolation. There are several factors that influence what culture an organisation might develop and how that culture might be expressed (Handy, 1993). One such factor is the organisation's history. A history of centralized authority will tend to lead to a power culture. Describing the ambulance service as a power culture would be consistent with its military underpinnings (which will be further addressed in this chapter). Furthermore, work that is delivered as a series of, "non-continuous, discrete operations," tends to be suited to a power culture (Handy, 1993, p. 194). The work of paramedics is generally conducted in this way as they deal with the discrete cases of individual patients, and their circumstances, as they arise. Each patient attended by paramedics is an individual case which, by the very nature of this work, occurs as discrete units.

Another factor that affects the development of organisational culture is size (Handy, 1993). In essence, a larger size pushes an organisation in the direction of a bureaucratic culture and features of this can be seen in the organisational structure of the current state-wide ambulance service. The organisation's goals are also a factor that influence the

development of a culture. The goal of the ambulance service is to deliver exceptional emergency care to every patient (Ambulance Victoria, 2017). A bureaucratic (role) culture is best suited for an organisation that aims to deliver a service (or product) of consistently high quality (Handy, 1993).

It can be argued that the history, size, discrete nature of paramedic work and the central goal of the ambulance service would lead toward a culture that is some combination of a power culture and a role culture (as exemplified by a bureaucracy). The resulting culture would be expected to influence the behaviours, attitudes and values of the people in the organisation that could, in turn, affect the mental health of ambulance service employees (Leka & Houdmont, 2010).

The role of organisational culture influences the attitudes and behaviours in an organisation (Brown, 1995) which can, in turn, have an impact on psychological health. There is empirical evidence that the culture or social environment of the workplace can have an impact on psychological health: an impact, which should not be ignored. Several studies have found a direct link between the stressors faced by paramedics and the culture of an organisation (Glendon, 2001). Young and Cooper (1997) found that organisation structure and climate was a source of stress for English paramedics. Similarly, van der Ploeg and Kleber (2003) discovered that the social aspects of the work environment were a major source of stress leading to psychological ill health.

That the culture of the ambulance service has been (and is) influenced by its historical military connections is of note for this study. These historical connections indicate that it may be informative to consider both organisational culture and attitudes towards mental ill-health extant in the Australian military in the formative years of the ambulance service and its early development.

2.3. The Victorian Ambulance Service: A Short History

2.3.1. Origins: Jerusalem 600 AD

Most of the modern-day ambulance services in Australia originated in Britain under the aegis of the British St John Ambulance Society, “a league of Victorian gentlemen whose antecedents were warrior monks plying sword and scalpel with equal fervour in the days of the Crusades” (Bell, 2009, p. 126). However, the story begins in AD 600, in the days before the crusades, when Pope Gregory established a hostel for Christian pilgrims visiting Jerusalem (Bell, 2009). By 1070 AD the hostel had been passed to the Benedictine monks when it was reconstructed as a hospital and dedicated to St John the Baptist (Bell, 2009). The purpose of the hospital was to provide accommodation and care to those making a pilgrimage to the Holy Land. In 1113, Pope Paschal II created the Order of St John as a way of recognizing the work of these Benedictines (St John Ambulance Australia SA Inc, 2012). At about the same time, the monks adopted the role of defending all Christians and all others in their care (St John New Zealand, 2016). Thus, the idea of providing medical care to all those that needed it, irrespective of religion and other personal circumstances, was formalized. The modern-day St. John Ambulance version of these ideals is expressed in the motto, ‘*Pro Fide, Pro Utilitate Hominum*’ (‘For the Faith, for the Service of Humanity’) (St John Ambulance Australia SA Inc., 2012, p. 7). In 2017, these ideals were recognizable in the 2017 Ambulance Victoria Strategic Plan (Ambulance Victoria, 2017).

The monks of this Jerusalem-based Order of Benedictine monks were known as the Knights of St John and they went on to develop to build a fortified hospital in Jerusalem that could accommodate 2000 patients (Bell, 2009,). It was from this base that the ‘warrior monks’ “...glorified their deity with medical and charitable acts – the knights further exalting their God by taking up the sword when the hospital or city was threatened” (Bell, 2009, p. 127).

Over time, the fortunes of the Knights of St John declined and by the end of 1792 they had left Jerusalem and their other operations in the Mediterranean and established a base in Rome (Bell, 2009). At this point in time, the Order of St John was much diminished, but not eliminated. The ideal of providing treatment to everyone who needed it was to be revived, and developed to include the idea of transporting people to a place of care (St John Ambulance SA Inc., 2012). Despite the disruptions to the original Order, it had recovered somewhat by the mid 1800s. Supporters of the Order in Great Britain formed the St John Ambulance Association in 1877 and later, in 1887, the St John Ambulance Brigade. These groups of supporters were recognized by Queen Victoria in 1888 and incorporated into The Most Venerable Order of the Hospital of St John of Jerusalem, more simply known as The Order of St John (which also assimilated the St John Ambulance Association and the Brigade [St John Ambulance Australia SA Inc.; St John NZ, 2016]).

2.3.2. Beginnings: State of Victoria 1883 AD

The first St John Ambulance Association in Australia was formed in Melbourne, Victoria, in 1883 (Howie-Willis, 2009). The occupational belief was imbued with the philosophy of The Order of St John (to defend the faith and to serve humanity) and had the aims of teaching first aid, providing home-nursing and to provide relief from suffering (Willis & McCarthy, 1986). It was at this time that the imperative to transport patients to care arose, and in 1887 six 'Ashford Litters' (essentially stretchers on wheels) were purchased and placed at police stations around Melbourne. This was also the origin of the term 'bearer' or 'stretcher bearer' to describe the men who transported patients to hospital: a term that still had currency in Ambulance Victoria into the 1980s (Willis & McCarthy, 1986). The term 'ambulance driver' had been used since 1899 when horse drawn carriages for transporting patients were introduced (and were in service until 1925); motorized vehicles began to be used in 1910 (Howie-Willis, 2009). The terms used to describe ambulance workers changed over time as

this work became professionalised (Howie-Willis, 2009) and these changes are described more fully in sections 2.4 and 2.5.

There were strong connections between the ambulance service in early days of its formation and the military (Howie-Willis, 2009; Willis & McCarthy, 1986). The ambulance service was consequently influenced by military attitudes and values (Willis & McCarthy, 1986), quite possibly including attitudes towards mental ill-health at the time of World Wars I and II (WWI & WWII). The following sections outline these views and how they could have been transmitted to the ambulance service

2.3.3. Military Views Towards Psychological Injuries, World Wars I and II

At the time of WWI, there was a question as to whether an inability to function in battle because of psychological injury was a mental problem or a moral problem (Anon, 1922; Butler, 1943). If it was a moral problem, then the inability to function was thought to be due to a lack of 'moral fibre.' In this case, it was a failure on the part of the soldier due to an inherited weakness or vulnerability and poor character that led to the inability to cope with his duty, rather than being due to the brutality of the trauma experienced as a result of combat (McFarlane, 2015). The military command asserted that soldiers who showed signs of 'shell shock' required urgent disciplinary action because of their failure to manage the dread of battle (McFarlane, 2015). In addition to the perception that poor character explained an inability to cope, strong discipline was seen as a way to manage it, because there was a need to maintain the numbers of a viable fighting force. "Under the stern purpose of Gallipoli," (Butler, 1943, p. 79) medical officers were under pressure to place individual welfare secondary to national survival (MacFarlane, 2015).

History repeated itself during WWII where soldiers who suffered psychological injuries were stigmatized and, again, labelled as having an inadequate moral fortitude when they broke

down from the horrors of battle (Shephard, 2001). At the time of WWII, psychological injuries were described by the terms “war neuroses” or “operational fatigue”. These terms, and “shell shock” would now be known as PTSD (Crocq & Crocq, 2000). Again, in WWII, psychological conditions like PTSD were regarded as a disease of manhood rather than illnesses (McDonald et al., 2017). The views in the military towards psychological injury outlined above were strong and prevalent at the time when there were strong connections between the military and the developing ambulance service in Victoria.

2.3.4. The Ambulance Service and the Influence of Military Culture: From 1903

The military connection with the ambulance service in Victoria was present from when the first St John Ambulance Association was formed in 1883. From then, St John provided first aid training to medical unit troops in Melbourne. By about 1903, the St John Ambulance Brigade had been formed, and had the specific role of patient transportation. At this time, much of the service was provided by volunteers, especially outside Melbourne (Wilde, 1999). In time, the division between volunteers and paid staff would give rise to tensions as the role of the paramedic developed (Willis et al., 2012). The Brigade viewed itself as a military medical ancillary force and maintained strong links with the Army Medical Corps (Howie-Willis, 2009). There was a high degree of cross-membership between the St John Ambulance Brigade and the Army Medical Corps.

The military influence persisted and has been evident until very recent times. Willis and McCarthy (1986) indicated that military experience and background was well regarded by the ambulance service. A senior officer (from the ambulance service based in Melbourne) is reported to have indicated the wars have a positive influence on the ambulance service and this was illustrated by the examples of World War 1 and World War II (Willis & McCarthy, 1986). After both of these wars, considerable numbers of Australian military medic personnel entered the ambulance service and their war experience and expertise was passed on to

their colleagues which noticeably increased the standard of patient care within the workforce.

The military influence can also be observed in the design of ambulance uniforms, which, until the late 20th century, included stripes of rank (Reynolds, 2008). Management style and attitude also appeared to have been influenced by military experience and the way it was valued. Willis and McCarthy (1986) reported, “the early administration appears to have reflected its military background and was reported to be very authoritarian and overbearing by several retired Officers in interviews, dismissals occurring often for the most trivial reasons such as minor driving offenses” (p. 61). The value that ambulance service management placed on military experience was evidenced in the selection processes for new recruits which favoured those with a background in the armed services (Willis & McCarthy, 1986).

Military influence can be observed in socialization of recruits in New South Wales, South Australian, Victorian, and Queensland ambulance services, with some new recruits expressing difficulty in adapting to a “command and control paramilitary culture” (Devenish, 2014, pp. 205, 290 - 292). This military culture was quite pervasive and existed alongside other aspects of ambulance service culture that Devenish describes as being influenced by biblical values of the Good Samaritan, and by medical values as expressed in the adoption of changing (and improved) treatment approaches. The presence of a masculine or male dominated environment was also noted, (Devenish, 2014, Devenish et al., 2016).

It appears that the ambulance service culture in Victoria (and Australia) was influenced by its historic military connections, at least until the last part of the 20th Century and early 21st Century, as evinced by a number of authors (Devenish, 2014; Devenish et al., 2016; Reynolds, 2008; Willis & McCarthy). This didn't just happen in Australia; as the British Empire expanded in the late 19th century, so did the St John Ambulance. During this

expansion, the links with the military were maintained (St John Ambulance of Malaysia Headquarters, n.d.). It would not be unexpected to find that aspects of late nineteenth century military culture were carried with St John Ambulance as it developed into the various corners of the British Empire.

2.4. The Development of Paramedic Education in Victoria

Preparation of recruits for ambulance work has changed significantly in the last three to four decades. Training was largely conducted within each service and on an extemporized basis (Willis et al., 2012). New ambulance service employees largely learned the skills they needed 'on the job.' In 1961, the first formal training programme for ambulance officers in Victoria was delivered by medical and nursing staff at the Geelong Hospital (Wilde, 1999). This course was four days in duration and comprised of morning and evening lectures and afternoon hospital rounds.

The first officially recognized training programme in Victoria was developed under the auspices of the Technical and Further Education (TAFE) system and the first course was delivered in 1978. Graduates attained an accredited qualification known as the Certificate of Applied Science (Ambulance Officer); (Wilde, 1999). It was also at this time that the Ambulance Officers' Training Centre (AOTC) was established and provided training for recruits to all ambulance services in Victoria. Training was conducted over three years with periods of time spent at the training centre followed by on-road experience.

Accreditation for the Certificate of Applied Science (Ambulance Officer) qualification was due to expire in 1987, which provided the opportunity for a review of the course and its curriculum. As a result of this review the Certificate course was largely unchanged, but was upgraded to a diploma-level course known as the Associate Diploma of Paramedic Science (Ambulance Officer); (Wilde, 1999).

A review of the AOTC by the Victorian State Government in 1993 resulted in the recommendation that the Centre be closed and training transferred to, and delivered by, the TAFE sector; a recommendation that was widely believed to be driven by the motivation to reduce costs to the State Government (Wilde, 1999). However, there were also forces concurrently at play to transfer paramedic training to the university sector. The Council of Ambulance Authorities³ had adopted the view that ambulance training should be transferred away from the vocational education sector (Willis et al., 2012, p. 247). An AOTC based response to the review argued that paramedic education should be transferred to the university sector. Consequently, paramedic education conducted by the AOTC in Victoria was transferred to Monash University in 1999 (Wilde, 1999) where a Bachelor level degree was offered. This move to university education occurred in the context of similar changes in paramedic education occurring across Australia (Lord, 2003; Willis et al., 2009).

2.5. The Development of Paramedic Education and Professionalism

The changes in education and the associated development of professionalism since the beginning of the 20th century can be traced terminologically in the semantic shifts in the words used to name paramedics (Howie-Willis, 2009). Ambulance workers were first known by the term 'stretcher bearer' in the early 1900s (Willis & McCarthy, 1986), 'ambulance drivers' in the 1950s-1960s, 'ambulance officers' in the 1970s-1980s, 'paramedics' in the 1990s and 'ambulance professionals' in the 2000s (Howie-Willis, 2009). Howie-Willis notes that the development of paramedic professionalism has not been without cost. Primarily, that people who want to practise as paramedics must be multi-skilled and capable of study at university level; a fervent humanitarian aim of helping people in need of medical care is no longer sufficient. The individual with paramedic ambitions must also be able to afford the

³ The Council of Ambulance Authorities is the peak body for the Australian, New Zealand and Papua New Guinea ambulance sector.

cost of a university education. The costs to be borne extend beyond tuition fees to include income forfeited through attending classes. Another consequence of professionalism is that it has worked to increase the financial costs of providing an ambulance service to the general public (Howie-Willis, 2009). Where the balance lies between the development of paramedic professionalism and associated costs is a matter of opinion and argument.

The changes in paramedic education and the simultaneous advances in skills and professionalism have not occurred in isolation. Willis et al. (2012) write that these changes were propelled by social forces extant in society at the time. These forces included, 1/ industrial unrest brought about by the move from a volunteer-based service with increasing numbers of paid professionals, 2/ the evolution of changes within education, more generally, and 3/ the changes in medical technology. In many ways, the developments driven by these forces in society have resulted in paramedic education and professionalism following similar patterns of development as in other professions, such as nursing. These advances in paramedic education and professionalism are repeating patterns seen in the development other health professions (Willis et al., 2012).

In 2011, at the time this study began, Ambulance Victoria employed 2,801 on road clinical staff (Ambulance Victoria, 2012). Today, the Victorian ambulance service employs some 4,497 paramedics (Ambulance Victoria, 2021). The first two women joined the ambulance service in 1987 (Victorian Health Building Authority, Ambulance Branch, 2017) and the ratio of the sexes is now close to 50:50 (Ambulance Victoria, 2017). Perusal of the Ambulance Victoria's Annual Reports from 2011 to 2021 shows increasing numbers of paramedics with university qualifications gaining employment. Roles have advanced from the stretcher-bearer days and the work of paramedics now includes the following-

1. paramedics who work in on-road emergency ambulance vehicles
2. mobile intensive care paramedics (MICA) provide a higher level of care and can use a wider range of drugs than can a regular emergency ambulance
3. MICA paramedics, who can also work in the Air Ambulance service as flight paramedics
4. adult retrieval, which involves the inter-hospital transfer across the state of critically ill patients
5. emergency management paramedics who manage the response to major incidents and disasters
6. non-emergency patient transport paramedics, who transfer patients who cannot transport themselves to appropriate care or other medical attention.
7. paramedics working in community education and engagement to educate vulnerable communities.

2.6. Current Australian Ambulance Service Attitudes to Mental Health

Paramedics in Australian ambulance services who suffered mental health difficulties or incidents might have been stigmatised in the past, as denoted in the Ambulance Victoria Mental Health and Wellbeing Strategy (Ambulance Victoria, 2016b). However, there are indications that attitudes are changing. The Queensland Ambulance Service, as an example, has introduced a successful employee support programme that has reduced the prevalence of paramedic mental health problems (Scully, 2011; Shakespeare-Finch & Scully, 2005) and Ambulance Victoria has developed a comprehensive mental health strategy to support their staff (Ambulance Victoria, 2016b). Other examples can be found across a number of Australian ambulance services to indicate that there has been a positive change in attitudes towards the psychological health of paramedics.

The introduction of programmes and strategies to support the psychological health of paramedics, as indicated above, demonstrates that these positive changes in attitude are evident at senior levels. It is less certain that the changes have penetrated to all levels of all ambulance services. An inquiry into the mental health of Australian first responders showed that, in recent years, individual paramedics had received very unsympathetic and unsupportive treatment from their supervisors when they reported mental health problems (The Senate Education and Employment References Committee, 2018).

The available evidence denotes that attitudes towards mental health in Australian ambulance services has improved considerably over recent years. However, there are also indications that these positive changes are not universal and have not penetrated to all levels of the ambulance services. There is more to be done.

2.7. Summary

Modern-day ambulance services and their precursor organisations have been subject to the tides of history and the forces at work in society. The history of the ambulance service goes back almost 1500 years, and has been influenced by religious and military ideals. Some of these values, or their remnants, can be seen in modern ambulance services and inform an understanding of ambulance culture which, in turn, informs the understanding of the psychological health of ambulance workers. Organisational culture or environment is one of the threads that influence the mental health of paramedics.

The role of paramedic has changed so that the levels of professionalism and the education required have increased. These changes are similar to those that have occurred in other professions and have been influenced by societal forces. Furthermore, these changes have meant that paramedics now play many roles in in pre-hospital patient care; they have moved on from bearing stretchers.

Chapter Three

3. Theories of Psychological Health

3.1. Psychological Theories: Stress and Health Interactions

Evidence indicates that the social environment in which paramedics work can influence their mental health. This social environment includes the ambulance service, the health system (especially paramedic interactions with hospitals), and paramedic interactions with patients and the broader public. Within this body of literature, there is evidence that shiftwork can influence paramedic mental health. Nevertheless, much of the research into the health and wellbeing of ambulance workers regards such work as stressful and that the outcome of the higher levels of stress experienced by ambulance workers will be higher levels of psychological and physical ill health (Young & Cooper, 1997). To contextualize this and other studies on paramedic stress and its impacts, this chapter outlines the meaning stress and the role of five cardinal theories in explaining how the impacts of stress might arise and how they might be managed. (These central theories are the biological view of stress based on the ideas of Cannon and Selye, Freudianism and the ideas of psychoanalysis, the cognitive-behavioural view, the transactional model of stress and the biopsychosocial model). These theories are presented to demonstrate a range of ways by which stress has been elucidated and to offer views of the interactions between stress and health. These theories of stress are central to understanding the development of stress concepts and are the source of ideas and terminology that are commonly employed in academic and professional settings. There may be a disjunct in the use of these concepts and terms in nonprofessional settings where mental health is discussed, even though their origins may be similar. There needs to be clarity around the use of the relevant terms and ideas when they are used in academic and professional circles.

3.1.1. The Meaning of Stress

The term stress has been in the scientific literature since the 1930s, although it was not until the 1970s that the term became part of the popular vernacular (Rice, 2000). From the 1970s to the present time, there have been changes to the meaning of stress (Becker, 2013).

Walter Cannon and Hans Selye are recognized as early writers on stress, and these authors essentially viewed stress as a response to noxious circumstances (Rice, 2000). In their first publications, these writers described physiological reactions to adverse environmental conditions like heat, hunger and oxygen deprivation and it was these responses that were regarded as stress (Cannon, 1914a, 1914b; Selye 1936)-

A second concept of stress as a stimulus was developed in the 1960s when psychologists examined the effects of personal experience (Rice, 2000). Masuda and Holmes (1967) and Holmes and Rahe (1967) studied what happens when a person experienced stressful changes in their life circumstances. It was these life changes that were regarded as the stress stimulus. These authors found that when people experienced more than a certain amount of stress from their life circumstances (e.g. marriage, divorce), the risk of physical illness increased.

The third view of stress is as a transaction (Rice, 2000) and was described by Lazarus and Folkman (1984). This approach describes stress as a process that involves a series of transactions between a person and their environment. A key element of this approach is the role given to the meaning a person attaches to a situation and the role of appraisal. If a person judges a situation to be dangerous or threatening then it is experienced as an adverse event with consequent negative emotions and behaviours (Caltabiano et al., 2008; Lazarus & Folkman, 1984).

Stress is a distinct construct and is often discussed as the cause of other conditions of psychological ill-health or as being a comorbid condition (e.g., Boudreaux & Mandry, 1996a; Brough, 2005; Gallagher & McGilloway, 2009; Regehr et al., 2002; Feldman et al., 2021). It should be recognized that stress is a construct in its own right, as are other mental health conditions such as depression and anxiety (Lovibond & Lovibond, 1995), PTSD (Elhai et al. 2011) and disturbed sleep (Kecklund & Akerstedt, 1992; Nordin et al., 2013). It is necessary to discuss these and other mental health conditions because, while they can be comorbid with each other, they are also separate states of mental health (with separate constructs).

3.2. Biological Theories of Stress

It is a common human experience to have physiological reactions to stressful events. People are aware that their reactions include things like an increase in heartbeat and breathing rates as well as a trembling in the muscles and nausea (Caltabiano, 2008). Descriptions like this view stress as the response to a situation (the stressor) and focus on the biological aspects of that response. Cannon and Selye were early researchers on the physiological responses to environmental stresses and pain.

3.2.1. Cannon: A Generalized Response to Fear, Rage and Pain

Cannon's work (1914a) focused on the autonomic nervous system in general and, in particular, on the role of the sympathetic nervous system in relation to an animal's reactions of fear and rage in response to threat or pain. Display of these strong emotions can be regarded as demonstrations of stress. In Cannon's work, the release of adrenalin in the body of an animal or human was regarded as a measure of a generalized response to strong emotions and pain. Cannon (1914a) reported that he and a colleague were able to demonstrate that adrenalin was released from the adrenal glands of a cat frightened by a barking dog, and that the same result was found when the sciatic nerve was stimulated (in

an anaesthetized animal; the animal would have experienced great pain if it were not anaesthetized).

There is a limit to the responses caused by the sympathetic nervous system and the release of adrenalin (Cannon, 1914a). If stimulation is continued, the presence of adrenalin eventually disappears. The response is not able to be sustained and a continued response depletes the body's ability to react (Cannon, 1914b). An animal might respond to grave threat by preparing the body for strong action but this generalized response can only be sustained for a limited time.

The central idea in Cannon's work is that there is a generalized response that prepares the organism for action when under dire threat. The organism may express rage and fight to defend itself or fear may be expressed and it will attempt to flee the situation (which is the origin of the term, 'flight or fight'); (Weston et al., 2006). In more general terms, these emotional responses prepare the animal for a struggle (Cannon, 1932). The same generalized response occurs when pain is experienced. All animals will make strenuous efforts to escape from pain, and the effort required is supported by the same reactions that arise when the organism is under threat. Cannon (1914b) cites Darwin and writes, "great pain urges all animals, and has urged them during endless generations, to make the most violent and diversified efforts to escape from the cause of suffering" (Darwin, 1899, p.127).

These efforts to escape pain and reactions to a dire threat have utility in that they increase an animal's chances of survival. They also have the nature of reflexes and that their purpose is either, maintaining the animal's safety or protecting it from harm (Cannon 1914a, p. 361). Cannon further notes that these responses are very quick and not under the control of the will. This response needs to be reflexive in nature so that they are useful to the survival of the organism. Cannon (1914a) identified that this response also occurs in humans in situations of threat. He describes the example of medical students who had been through an

examination they found to be exceptionally testing. In this study, the release of adrenaline was measured by the presence of sugar in the urine. There were nine medical students, none of whom had sugar in their urine prior to the exam but four of the nine students did after the exam. Similar results were found in two other groups of students who had just completed examinations (Cannon, 1927). From the findings of the studies on medical students, plus other studies Cannon (1927) stated, "From the foregoing results it is reasonable to conclude that just as in the cat, dog, and rabbit, so also in man, emotional excitement produces temporary increase of blood sugars" (p. 76). Cannon described a general physiological reaction to stressful circumstances that may occur either through direct involvement, or by merely being present (although with the possibility of involvement, in the case of the football players example).

These descriptions by Cannon of a generalized physiological response to stress are a view of stress that it is a response and that it arises from within the person (or other organism under threat). This is a valuable view of stress (although perhaps incomplete) because it points to some ways in which stress might be managed. In this view of stress, it is the response that must be controlled which could be done through the use of suitable drugs, for example, that might inhibit the response. This view of stress can also be regarded as predictive in that it describes the effects on the organs of the body. This suggests that the impact of stress on these organs may be a fruitful line of research. It is possible that the stress response could influence the health of the organs impacted upon by the stress response and, consequently the health of the person experiencing stress.

However, Cannon never wrote about how the stress response might be managed, nor did he discuss the effects of stress on health. His role was to experiment and describe and it was this work that led to the description of a generalized response to stress and its function in survival.

3.2.2. Selye: Stress and The General Adaptation Syndrome

It is against a background of the work of Cannon that Hans Selye also investigated and described a general response to stress (Selye, 1975). Selye first described what he called “a typical syndrome”, in 1936 (p. 32). This syndrome was explained in an article published in *Nature* with the title, “A Syndrome Produced By Diverse Nocuous Agents” and was later reprinted in the *Journal of Neuropsychiatry* in 1998 (Selye, 1998). In this article, Selye outlines his conclusions from experiments on rats and describes the effects of generally injurious conditions like exposure to cold, injury from surgery, excessive exercise and the administration of a variety of drugs. He explained that a typical syndrome can be observed which is independent of the nature of the damaging or injurious conditions. Selye’s observation and description of the stress response was based on an animal’s response to physical damage or assaults; Cannon’s description was based on an animal’s response to threat and pain.

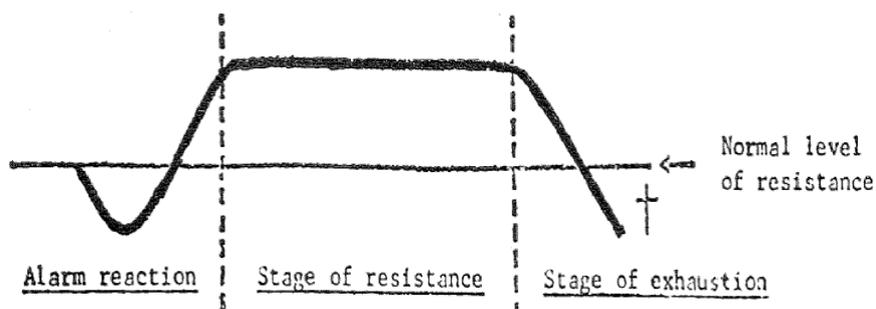
Selye (1936) later described the purpose of these three stages by stating “the syndrome as a whole seems to be a generalized effort of the organism to adapt itself to new conditions” (p. 32). It is for this reason that he called the three stages of the syndrome the ‘general adaptation syndrome’ (GAS). Selye does not mention the word ‘stress’ in his 1936 article. However, he does go on to write about the general adaptation syndrome (GAS) and stress in later publications (e. g. Selye, 1950, 1956, 1973, 1975). In Selye’s publications during the years immediately following his 1936 article, the term ‘stress’ is used to refer to physical agents like infection, extremes of temperature and drugs and the term ‘general adaptation syndrome’ refers to the reaction that occurs when an organism is exposed to agents that cause stress. Later, the meaning of stress was expanded to include emotional responses (or emotional arousal) in reactions to situations experienced by people (Selye, 1973, 1975). The key idea Selye conveyed was that a general physiological reaction occurs whenever an

animal or human is exposed to a stress causing situation, which could be physical or psychological in nature.

The general reaction is the same whether the agent of stress is physical (such as, pain or exposure to drugs) or positive or negative emotions. The effect of an emotional response depends on the intensity of the emotion experienced; the experience might be joy or grief but the GAS will occur if the emotional experience is sufficiently intense (Selye, 1973). The GAS is depicted In Figure 1.

Figure 1

Diagram of the General Adaptation Syndrome



Source: "Implications of stress concept," by Hans Selye, 1975, *New York state journal of medicine*, 75(12), p. 2143

The alarm stage is the initial reaction to a physical or mental challenge (Rice, 2000). An organism cannot stay in the alarm phase for prolonged periods (Selye, 1973). If the alarm phase is survived and the source of the stress continues, a stage of resistance ensues. In essence, this means that the body adapts to the stress by developing the means to maintain a response. This new level of functioning is termed 'heterostasis' (referred to as allostasis in contemporary psychology (Lupien et al., 2006) and indicates that the body is maintaining a steady state but only by placing increasing demands on its homeostatic mechanisms (Selye, 1973). At this stage the body is coping with the demands being made on the individual but it

is also placing pressure on the body's resources. The third stage, the stage of exhaustion, is reached when the body's resources are depleted. The body is no longer able to adapt to the presence of the stressor and it is not possible to return to a normal state of homeostasis. At this point, initial stages of the alarm reappear but the changes are now irreversible and the individual dies (Selye, 1975).

3.2.3. Human Variations in The Response to Stress

The physical consequences of stress may be universal when the experience of stress is a result of a severe physical insult to the organism as Cannon (1914a) and Selye (1956) described. However, when the precipitating situation is not in the nature of a physical assault to the body, the stress reaction is not universally experienced. Cannon described how medical students exposed to the stress of taking examinations and football players exposed to a demanding football match did not all react in the same way. Some players showed evidence of a stress response and some did not. Cannon observed that individuals reacted differently to the same stress situation. Many years after his initial descriptions of the GAS, Selye recognized that not all stress reactions are the same and acknowledged the role of an individual's perception and emotional reactions (Szabo et al., 2012).

Although not all people react to potentially stressful situations in the same way, the biological characteristic of the experience of stress is the same (McEwen, 2007). This response occurs whether the threat is personal violence, a demanding situation (such as public speaking or humiliation), physical injury, being involved in a natural disaster or some other situation that threatens a person's psychological or physical being. Whether or not a situation is interpreted as a threat depends on the role of the brain. It is the brain, "that interprets experiences as threatening or nonthreatening and which determines the behavioural and physiological responses to each situation" (McEwen, 2007, p. 874). In brief, when the brain

interprets a situation as threatening then the physiological responses described by Selye and Cannon occur.

The concept of the 'fight or flight' response is germane to the paramedic context.

Paramedics are more likely than most other workers to encounter events that are regarded as stressful or traumatic (Sterud, 2006; Young & Cooper, 1997; Boudreaux & Mandry, 1996b; Wagner et al., 2020) and which would produce the 'fight of flight' response. The key issue here is that 'flight' is not an option for paramedics as they are obliged to stay and 'fight': they must stay and deal with their patient or patients in the context in which they find themselves. Consequently, it can be argued that paramedics are more likely to experience prolonged exposure to the stress response than are people in most other walks of life. As Selye (1950) noted, the stress response produces physiological changes that cause various forms of damage to the body and its organs. Disease states arising from this damage would therefore be more likely to be found in paramedics.

3.2.4. Limitations of The Biological Theories of Stress

The biological description of the physical responses to stressors is useful in identifying the impact on the organs and tissues of the body. These descriptions provide a guide to health professionals as to what physical ailments to consider when dealing with patients who have potentially stressful lives or occupations (such as paramedics). However, these descriptions do not explain the role of individual appraisal in the response to stress. Moreover, these theories do not include more recent knowledge about the anatomical and physiological changes seen in the brain that accompany mental health conditions like depression, anxiety, PTSD, and the consequences of repeated exposure to trauma (in the absence of diagnosed PTSD); (Fitzgerald et al., 2008; Kim et al., 2011; Levy–Gigi et al., 2014; Shucard et al., 2012). It is important to acknowledge these changes in the brain because they help to

explain the aetiology of mental illness and indicate potential directions for research into prospective therapeutic interventions.

3.3. Freud and Psychological Health

Freud advocated the idea that forgotten events in childhood were the cause of mental ill health (McLeod, 2018). He believed in a topography of the mind that included the conscious, the unconscious and the psyche. The psyche was comprised of the id, the ego and the superego. These ideas by Freud and associated concepts are briefly outlined in this section.

3.3.1. Structure of The Mind

To appreciate Freud's view of states associated with stress, it is necessary to have some understanding of how he viewed the mind. Freud's model of the mind is described by 'structural theory', which indicates that the mind consists of three systems. These three systems are named ego, id and superego (Erwin, 2002). The id is that aspect of the psyche that is concerned with biological needs like hunger, thirst and sex. The id can be said to be concerned with the passions (Erwin, 2002). A feature of the id is that it seeks immediate gratification of these needs. This gratification aims to remove discomfort and, in this sense, the id seeks pleasure. The ego is that part of the psyche that mediates the impulses derived from the id. The ego mediates the demands of the psyche by appreciating the demands of reality and modifying the demands of the id accordingly (Erwin, 2002). The absence of this mediating role of the ego would result in inappropriately impulsive behavior. For example, a person would take food whenever they were hungry, irrespective of how improper it might be in the circumstances, if it were not for the mediating role of the ego. Thus, the ego plays a mediating role but is also driven by the id, the external world and the superego (Erwin, 2002). The superego plays the role of moral guardian. It is where the moral values obtained from one's parents, or upbringing, lie (Erwin, 2002). The superego tries to tell the ego how a

person should behave in particular circumstances. It acts as a censor and restrains the ego so that the person acts according to the morals and values they have been taught (Erwin, 2002). In short, the id is the source of needs that it aims to have satisfied, and the role of the ego is to achieve this in a favourable and safe way by taking the external world into account; the superego may attempt to impose further boundaries (Erwin, 2002).

Accompanying the idea that the psychic structure is comprised of the id, ego and superego are the ideas of the conscious and unconscious. The conscious part contains those thoughts, memories, feelings and desires that a person knows about (in the sense that they are aware of them and can access them), (Erwin, 2002). By far the larger part is the unconscious where dreams, impulses, repressed memories, thoughts and desires are held. The contents of the unconscious cannot usually be accessed and brought to consciousness (Erwin, 2002).

3.3.2. Defence Mechanisms

A further Freudian concept is that of defence mechanisms (Erwin, 2002). The ego is the centre of consciousness and the id is the unconscious realm of the mind. The ego attempts to prevent unpleasant impulses and feelings from entering consciousness through the use of defence mechanisms; the defence mechanisms themselves are unconscious. These defence mechanisms can give rise to feelings and behaviours (or neurotic symptoms) that are not understood by the person experiencing them. It is the role of psychoanalysis to bring these suppressed feelings, experiences and memories into the conscious realm where they may be re-experienced and understood, thereby removing their effects on the psyche and thus effecting a cure (Thompson, Mazer & Witenberg, 1955).

Feelings, memories and experiences may be suppressed through a variety of defense mechanisms that may be categorized as successful or unsuccessful (Erwin, 2002). A

successful defense mechanism will allow the expression of an impulse in a way that is acceptable in the person's social context. Such defense processes are generally described as sublimations. On the other hand, unsuccessful defense mechanisms block expression of the impulse or material that has been suppressed and so are constantly in operation to maintain this state (Erwin, 2002; Reber, 1985).

3.3.3. Producing and Relieving Psychic Pressure

The key aspect of most of the defense processes described by Freud is that they do not eliminate the underlying pressure on the psyche. The material or feelings or impulses that are denied by these mechanisms still have an active existence even though they are at the unconscious level (Reber, 1985). This active existence means that they can become expressed in psychologically uncomfortable or distressing ways (like dreams or neuroses). An apt analogy is the way a heated pressure cooker builds up pressure from the steam being generated inside it. The content of the pressure cooker remains unseen but makes itself known by the sight and sound of steam being released through the escape control valve; as pressure builds in the pressure cooker so does pressure build up in the psyche. The aim of psychotherapy is to release the pressure arising from the actions of the defence mechanisms in keeping material hidden from the conscious and this is achieved by "making conscious of the unconscious" (Balint, 1955, p. 425). Freud believed that careful uncovering of the repressed and hidden material would deprive these internal pressures of their power (King et al., 2009) in a way analogous to that of water leaking from a closed hydraulic system releases a build-up of pressure. The result of relieving this pressure is to alleviate the distressing psychological symptoms experienced by the patient. The key to relieving the psychic pressure causing psychological distress is to access the material hidden in the unconscious and this is the aim of psychoanalysis.

3.3.4. Relieving Psychic Pressure Relieves Psychological Ill Health

Gaining knowledge about the material in the unconscious and understanding its effects leads to understanding the truth about ourselves which, in turn, results in relief from distressing psychological symptoms. This relief may be achieved in a slow, cautious way (King et al., 2009) or it may be achieved in a more explosive way through catharsis which is “the wholesale discharge of pent-up emotions” (Rado, 1955, p. 598). The analogy of the hydraulic systems provides a way of articulating the difference between a gradual reduction in symptomatology and catharsis. A hydraulic system that has a slow leak or some other mechanism (such as steam being gently released from a pressure cooker) is a slower, more measured, way of releasing pressure. A sudden release of pressure (achieved by removing the release valve from the pressure cooker or enabling water to escape all-at-once from a hydraulic system) illustrates the nature of catharsis.

Cathartic venting can be effective in providing relief in the short term but does not sustain a longer-term recovery (Hawkins, 1986; Nichols & Efran, 1985). Catharsis is valuable because it is a first step in helping patients to address their problems (Nichols & Efran, 1985) but cognitive changes, including insight into the reasons for the existence of these emotions, must also occur to achieve longer term positive outcomes (Hawkins, 1986).

3.3.5. Limitations of The Freudian Approach

On balance, the majority of the published evidence does not provide strong support for the psychoanalytic approach (e.g. Eysenck, 1952, 1977, 2004, 2008; Eysenck & Wilson, 1973). This calls into question the value of basing ways of understanding the roots of problems and helping people to resolve the experience and consequences of stress, and other conditions of psychological ill health, through the use of psychoanalysis and associated approaches.

The psychoanalytic approach may be flawed and it might not be helpful in helping to explain or describe how people experience the consequences of stress. However, there is one aspect of the psychoanalytic approach which is perhaps useful as an analogy. This is the idea that pressure can build up over time as it does in a hydraulic system and unreleased pressure can result in psychological distress. In an analogous way, people who are under constant pressure or stress can develop the (negative) psychological sequelae from being under too much pressure. People can suffer psychological ill health from cumulative stress. However, the evidence indicates that psychoanalysis is not the best way release the pressure; other techniques or treatments need to be found for that purpose.

3.4. Cognitive-Behavioural Aspects of Mental Health

Cognitive-behavioural approaches are said to have developed from two broad waves or generations of development in psychology (Hayes, 2004). The first wave was behaviour therapy based on behaviourism and the second wave was cognitive therapy based on cognitive psychology or cognitivism. The second wave assimilated the first and the term cognitive behaviour therapy (CBT) evolved. CBT emerged from these two generations of psychology that allowed for the consideration of observable behaviours as well as a person's beliefs, attitudes and expectations (Micallef-Trigona, 2016). The main steps that led to the emergence of cognitive-behaviourism and some of the key associated concepts are discussed in this section.

3.4.1. The Central Tenet of Behaviourism

The central tenet of the strict behaviourist approach is that only observable and measurable behavior is the proper subject for scientific psychological investigation (Reber, 1985). Many behaviourists believed that feelings and thoughts and any other events that occurred in the mind were unobservable and therefore unmeasurable and unknowable. Consequently, the

only thing that can be safely observed and measured is behavior (Skinner, 1974). The concepts of behaviourism can explain how new behaviors are learned and these behaviours may be adaptive or maladaptive. Behaviourism describes how new behaviours are learned within the two broad categories of classical conditioning and operant conditioning (Westen et al., 2006).

3.4.2. Classical Conditioning

The discovery of what is now known as classical conditioning is commonly attributed to Ivan Pavlov (Miller, 1962). Pavlov started his investigations of classical conditioning by presenting a dog a piece of bread and then giving it to the dog to eat. At first, the dog would only salivate when it was eating the bread. In due course, the dog would salivate upon sight of the bread. However, if the bread was repeatedly shown, but not given to the dog to eat, then the salivation would cease. Salivation at the sight of the bread was a learnt response. Pavlov named this a conditional reflex (or response) because its occurrence was conditional on the earlier association between seeing the bread and then eating it (Miller, 1962). Pavlov found that any arbitrary stimulus, such as a light or the sound of a bell, could be made to produce the salivation. From these observations Pavlov arrived at the procedure now identified as classical conditioning. This can be described in this way “a bell (conditional stimulus) is repeatedly sounded just before food (unconditional stimulus) is placed in the mouth to produce salivation (unconditional response), until eventually the sound of the bell causes salivation (conditional response) before the food is presented” (Miller, 1962).

Classical conditioning has occurred when a new stimulus develops the ability to cause a reflex response to follow. The counterpart of classical conditioning is known as extinction where the conditioned stimulus loses its ability to produce the conditioned response (Thorpe & Olsen, 1997). In the previous example, presenting the bread but not allowing the dog to

eat it results in the cessation of the salivation response at the sight of the bread. The conditioned response is said to have been extinguished.

Classical conditioning has been shown to occur in humans. One well known experiment involved conditioning a child (at 11 months of age) to express fear in the presence of a white rat. This child has since been known as 'Little Albert' and the experiment was conducted by Watson and Raynor in 1920. It was found that Little Albert expressed fear at the sound of a hammer being hit on an iron bar and this was the unconditioned stimulus; the unconditioned response was fear. No fear was at first shown in the presence of a white rat and this was the initial neutral stimulus. Little Albert was shown the white rat at the same time as a loud noise was produced by hitting the hammer on the iron bar. This pairing of exposure to the white rat and the loud noise was repeated twice at each session with each session being repeated once a week over seven weeks.

Little Albert was subsequently exposed to the white rat alone (in the absence of the loud noise) and he expressed "as convincing a case of a completely conditioned fear response as could have been theoretically pictured" (Watson & Raynor, 1920, p. 5). Five days later, the white rat was presented to the child and fear was again expressed. After a period of five days, Little Albert was presented (separately) with the white rat, a white rabbit and a fur coat. He expressed fear at each of these objects and this demonstrates a further aspect of classical conditioning. This aspect is known as stimulus generalization where similar objects or situations produce the conditioned response (Thorpe & Olsen, 1997).

3.4.3. Operant Conditioning

As early as 1898, Thorndike (1898) conducted experiments with cats that demonstrated what he called 'instrumental conditioning' (Thorndike, 1898; Miller, 1962). The cats were put into a cage from which they could escape by operating a latch to open the door. If they

opened the door, they could obtain some food placed outside the cage. At first, they were unable to escape, Thorndike (1898) wrote:

For eight or ten minutes it will claw and bite and squeeze incessantly... The cat that is clawing all over the box in her impulsive struggle will probably claw the string or loop or button so as to open the door. And gradually all the other non-successful impulses will be stamped out and the particular impulse leading to the successful act will be stamped in by the resulting pleasure, until, after many trials, the cat will, when put in the box, immediately claw the button or loop in a definite way (p. 13).

Opening the door was called instrumental conditioning because this response was instrumental in escaping the cage and accessing the food. This was later termed 'operant conditioning' by Skinner (1974).

3.4.4. Operant Conditioning: Behaviour Is Controlled by Its Consequences

The key concept of operant conditioning is that behavior is controlled by its consequences. Skinner (1974) described this simply: "When a bit of behavior has the kind of consequence called reinforcement, it is more likely to occur again" (p. 51). This description is very simple but leaves many things unsaid; information about the nature and patterns of reinforcement (or consequences) and the context in which they occur needs more elaboration. The nature of reinforcement can have several characteristics. Generally speaking, small reinforcements that occur immediately after a behavior are more effective in encouraging the development of new behaviours than large, delayed reinforcements (Thorpe & Olsen, 1997). In the ambulance service context, this means that a long service medal is unlikely to have been influencing a paramedic's behavior. It is more likely that events occurring more often, and more immediately, influenced behavior, such as, recognition from colleagues or gratitude from patients.

Behaviour is also influenced by the kind of consequence that follows specific actions and these fall into the two broad categories of positive and negative reinforcement (Thorpe & Olsen, 1997, pp.61 – 63). Positive reinforcement fosters or strengthens the behaviours it follows. Positive reinforcement is generally seen as rewarding, at least from the subject's perspective. Negative reinforcement occurs when something undesirable is removed with the consequence that the preceding behavior is encouraged. In the paramedic context, successfully treating a patient may be regarded as (positively) reinforcing and could result in an increase in the expression of job satisfaction. Some (few) paramedics may develop an anxiety about approaching a patient and choose to drive the ambulance vehicle to emergency calls. This means that their partner approaches the patient first and begins dealing with the patient. The paramedic driving the ambulance avoids the feelings of anxiety which negatively reinforces the choice to drive the ambulance (and avoid being the first paramedic to attend to the patient).

Behaviour is also influenced by punishment. If a certain behaviour decreases as a result of its consequence, then this can be a situation where punishment is operating (Thorpe & Olsen, 1997). Punishment can also be described as being an aversive stimulus that follows a behaviour (Reber, 1985, p 600). A vehicle driver who is fined as a result of speeding is being punished when the result is that the speeding behavior is diminished. Paramedics who speed when driving an ambulance vehicle are obliged to personally pay fines incurred which acts as a punishment in the ambulance service context. (Paramedics can also be punished by the considerably negative responses of their colleagues.)

Extinction occurs when an acquired (learnt) particular behavior no longer has a consequence; that is, no form of reinforcement or punishment follows the learnt behavior. Paramedics are required to clean and stock the ambulance vehicles when they begin their shift and before they attend to patients. Should paramedics not be recognized by their

supervisors for the efforts in this regard, it is possible the efforts put into maintaining the ambulance vehicles could diminish, (i.e., be subject to extinction), unless there were other negative consequences like not being able to find an item of equipment when it was needed.

A further idea from behavior principles is that of 'discriminative stimuli.' A discriminative stimulus is one that indicates a situation where, should a certain behavior occur, then that behavior will be subject to reinforcement (or punishment) (Thorpe & Olsen, 1997).

Conversely, the absence of the discriminative stimulus indicates that the behavior will not be subject to reinforcement or punishment. An example of a discriminative stimulus is the presence of light that indicates to an animal that a reinforcement (e.g. food) will be delivered if it presses a bar: no food is delivered when the light is off. Almost anything, including people can be a discriminative stimulus. Paramedics (and other first-responders) are known for using black humour, and usually with good reason (Rowe & Regehr, 2010), but it is not appropriate to use black humour in the presence of patients or their families. The only acceptable time for paramedics to express black humour is in the presence of other paramedics. The presence of other paramedics (and the absence of non-paramedics) is a discriminative stimulus that signals that it is acceptable to use black humour; it is likely to be appreciated, and consequently, positively reinforced. Conversely, using black humour in the presence of patients or their families is likely to result in disapproval and possibly punishment.

3.4.5. Differences Between Operant and Classical Conditioning

The differences between classical conditioning and operant conditioning can be characterized by what it is that occurs first (Burton et al., 2012). If the something from the environment comes first then it is classical conditioning; some environmental stimulus elicits the response. If the something that comes first is a behaviour (or operant) then it is operant conditioning. In operant conditioning the behaviours are spontaneously (and randomly)

emitted and produces a change in the environment (as in the cats mentioned above operating a latch to open a door which results in escape and food). Learning (or behavior change) that results from classical conditioning is referred to as respondent behavior and the learning (or new behavior) that comes about from operant conditioning is known as operant behavior.

3.4.6. The Development of Cognitivism

Behaviourism countered the flaws in non-empirical traditions in psychology (Hayes, 2004) but after a time, in the 1960s, researchers began to doubt that an approach based firmly on the study of observable behaviours was sufficient (Westen et al., 2006). These people believed that reference to some internal (brain) processes was necessary. As far back as 1930, Tolman and Honzik showed that learning could occur without the presence of reinforcement as described by behaviourism. Tolman and Honzik conducted an experiment on how rats could learn to navigate a maze. They showed that when a group of rats was allowed to spend time in the maze but were not given reinforcement until the eleventh trial, they quickly came to perform equally as well, in fewer trials, as a second group of rats that had been given reinforcement from the first trial. These two groups of rats performed better on the maze-learning task than a third (control) group of rats not given reinforcement. This result indicated that some kind of learning was occurring in the absence of reinforcement, which is something that could not be explained by a strict application of behaviourist ideas. Tolman and Honzik (1930) suggested that the rats were forming cognitive maps of the maze even in the absence of reinforcement. The term 'latent learning' was developed to describe learning that had occurred, although it was not yet possible to measure the occurrence of observable behavior (that would indicate learning had transpired).

Behaviourism doesn't account for the phenomenon of insight. Insight occurs when a person (or animal) shows an understanding of a problem situation and arrives at a solution without

any intermediary learning steps as would be expected if learning only occurred through operant or classical conditioning (Westen et al., 2006).

Other work has shown that 'expectancy' can influence behavior. A behavior is more likely to occur if a reinforcing consequence is expected to occur (Mischel, 1973). Mischel also explored the idea of internal or external control (in children). He reported that the extent to which children would engage in specific 'goal-directed behaviour' was influenced by degree to which children believed that events were under their control or under the control of external forces. Those with an internal locus of control were more likely to engage in 'goal directed behavior' than those without. This idea of 'locus of control' was also described by Rotter (1990) to develop the idea of generalized expectancies where people who generally believed that they were essentially in control of the world around them were described as having an internal locus of control. This expectancy of being able to control the world around them led people generally to behave in ways consistent with this belief. Conversely, people with low level of internal locus of control would behave in ways consistent with an external control belief.

The importance of expectancy was also explored by Overmeir and Seligman (1967) with their studies on learnt helplessness. These researchers conducted experiments in which harnessed dogs could not escape an electric shock: these dogs eventually gave up trying to escape. In subsequent trials, these dogs were repeatedly given the opportunity to escape but did not ever attempt to escape or learn that they could. Overmeir and Seligman described this as learned helplessness and it was a learned behavior that was difficult to reverse. In a study on reversing learned helplessness, Seligman et al., (1968) found that most (three out of the four experimental) dogs never attempted to escape the electric shock. These animals only learned that they could escape by being forcibly removed from the experimental apparatus (by dragging them from the situation by their leads). Seligman and his colleagues explained that the dogs had developed learnt helplessness because they had

come to expect that they could not escape. Seligman et al. (1968) postulated that these observations could be applied to humans and developed the idea of explanatory style. Explanatory style is the way in which people interpret or make sense of bad events (Weston et al., 2006). People with a pessimistic explanatory style blame themselves for things that happen to them and tend to have poorer physical and psychological health (Peterson, 1988; Peterson & Seligman, 1987).

The idea and role of expectancy and the concepts of locus of control and explanatory style are incorporated within cognitive-social theory (Weston et al., 2006, p. 240). Cognitive-social theory accommodates concepts drawn from behaviourism but includes cognition and social learning. In short, social-learning theory recognizes that there are valid and relevant internal processes occurring that are not recognized by the original and more strict forms of behaviourism.

3.4.6.1. Cognitive Perspectives on Stress.

The ideas positing how cognitive processes mediated behavior change ripened into the ideas of cognitive therapy (Hayes, 2004). The central precept of cognitive therapy is based on the notion that how a person constructs and interprets their experiences subsequently determines their mood and behaviour (Reber, 1985). Constructing and interpreting experiences negatively are believed to cause negative feelings and behaviours: changing the way a person conceptualizes things lies at the core of cognitive therapy process. In short, cognitive therapy aims to change the dysfunctional cognitions believed to produce psychological disorders (Weston et al., 2006). Approaches to cognitive therapy based on the ideas of Aaron Beck and Albert Ellis form the basis of most current cognitive therapeutic approaches that form part of cognitive-behavioural therapy (Weston et al., 2006).

Ellis and Dryden (2007) developed rational-emotive therapy and proposed the, 'ABC theory of psychopathology', in which what people say to themselves about their experiences shapes the way they react to them. A is the activating situation, B is the beliefs and thoughts a person has about the situation and C refers to the emotional consequences. Ellis argues that the event (A) does not lead to the emotional consequences (C). The consequences are determined by the beliefs and thoughts (B) that one has about the event. The central aim of rational emotional therapy is to help people to identify and correct their irrational beliefs and thoughts that lead to psychological distress.

A similar approach known as, 'cognitive therapy,' was developed by Aaron Beck (Scott et al., 1989). In Beck's approach, the therapist and the patient embark on a collaborative exploration to discover dysfunctional patterns of thoughts and behaviours. The key aspect of Beck's cognitive therapy is to challenge and change these cognitive distortions and to find more realistic and adaptive ways of thinking and behaving. The core of both approaches of Ellis and Beck is to challenge cognitive distortions (Westen et al., 2006).

Cognitive Behaviour Therapy has evolved from the strict ideas of behaviourism, where only observed behaviour was permitted to study and explain learning. Ideas of cognitive psychology were added to incorporate the mental processes that could not be directly observed (Hayes, 2004; Weston et al., 2006).

3.4.7. Cognitive and Behavioural Theories and Mental Illness

In its original and strict form, behaviourism has the view that it is the environment that determines behaviour and which, in turn, may influence psychological health. Thus, one should examine the nature of the ambience environment to identify how psychological ill-health might develop. This has application when there are clear and identifiable stimuli from the environment that can demonstrably lead to psychological ill-health. A straightforward

example of this is exposure to traumatic events and the development of posttraumatic stress disorder (PTSD). Some aspects of PTSD are amenable to intervention by treatments based in behaviorism, such as, exposure therapies.

However, there some conditions that are more effectively treated by cognitive approaches. For example, a paramedic who experiences a series of deaths that leave a strong impression could come to believe that he/she is causing people to die. This kind of thinking could result in great distress; it is also clearly irrational. It is in circumstances like this that approaches based in cognitive psychology can be effective in treating such irrational and distressing beliefs. Cognitive Behaviour Therapy offers a range of approaches for understanding mental illness and has an important role to play in the paramedic context.

3.4.8. Limitations of Cognitive and Behavioural Theories

The foremost limitation of the cognitive and behavioural theories is their omission of the biological aspects of the various forms of psychological distress. These theories do not mention the physiological responses to stressors as described by Cannon (1914a; 1914b) and Selye (1936): nor do they acknowledge the accompanying anatomical and biochemical changes in the brain that are associated with various mental health conditions. The influence of genes on mental health is not mentioned. Cognitivism faces the difficulty of working with unobservable processes and must rely on making inference by observing behaviour: direct observation is not possible.

3.5. Lazarus and Folkman's Transactional Model of Stress and Coping

The context in which paramedics work includes aspects of their environment which is comprised of their employing ambulance service, the health system in which they work and the wider social environment which includes interactions with their patients plus the wider

public. A transactional model of stress that specifically recognizes the interaction between paramedics and their environment has the potential to explain how stress and its mental health consequences might arise in the ambulance context.

The physiological description of stress is an important component of how stress is understood. However, it has limited usefulness in understanding the process or processes by which the experience of stress arises. This is because the stress response described by Canon (1914a, 1914b) and Selye (1936) is explained in terms of the (physiological) response to a (stress) stimulus and it is the response that is regarded as the stress. The limitation of this approach is that what is stressful (the stimulus) is delineated in terms of its consequences (the response) (Lazarus, 1999), something is regarded as stressful if it causes a stress response. As Cannon (1914a, 1914b) observed, a response does not always occur: not all people confronting the same event experience a stress response. It therefore becomes necessary to identify the circumstances under which a particular situation acts as a stressor.

Lazarus and Folkman (1984) proposed that it is the relationship between the person and their environment that determines whether or not a particular situation acts as a stressor. This approach takes into account the attributes of the person and the characteristics of the environment. Considering the nature of the person enables the role of the brain to be considered in interpreting what is happening in the environment. In this view, stress is a process that includes stressors but adds the dimension of the relationship of the person with their environment. This dimension recognizes that how a person appraises what is happening in their environment can determine whether external events are expressed as stress.

The stress process is ongoing and comprises constant interactions and adjustments between an individual and their environment (Caltabiano et al., 2008). This continuous

process is called 'transactions' between the person and their environment and is a bidirectional and reciprocal relationship (Lazarus & Folkman, 1984). A central idea in this transactional view of stress is that the person is an active participant in the process who can affect the consequences a stressor might have through their behavioural, cognitive and emotional strategies (Caltabiano, 2008). Briefly, an individual plays an active role in determining outcomes (to stressors) through the processes of cognitive appraisal and coping (Cox & Griffiths, 2010). The following sections describe the transactional view of stress.

3.5.1. The View of Stress as A Transaction

A transactional view of stress leads to stress being defined as "the condition that results when person-environment transactions lead the individual to perceive a discrepancy – whether real or not – between the demands of a situation and the resources of the person's biological, sociological and psychological systems" (Caltabiano, 2008, p. 90). This is consistent with the definition given by Lazarus and Folkman (1984). This definition has four components-

1. the resources a person has for coping
2. the demands of a situation (the potential stressor)
3. the discrepancy that exists when the demands of the situation are appraised as being beyond the resources of the person to cope (or manage the demand)
4. the transactions that occur between the person and the environment (or the source of the potential stressor) as the person makes efforts to respond to the demands from the environment.

3.5.2. Resources for Coping

The first component of the transactional view of stress is that there are biological, psychological and sociological resources to which a person might have access (Caltabiano,

2008). It is the biological resources for adaptation to physical injury that was described by Cannon (1914a, 1914b) and Selye (1936). Good physical health and fitness can ameliorate the response to stress (Edenfield & Blumental, 2010), and this can be recognized as a biological resource in terms of the transactional model. In certain circumstances, it is sensible to focus on biological resources. These circumstances are when the demand is physical in nature, as when a person has a physical injury or has a mental illness such as schizophrenia. Both these situations create a vulnerability and a threat to coping (Lazarus & Folkman, 1984). The stress response can have physiological responses like increased blood pressure, breathing rate and muscle tension and the release of hormones like adrenaline, all of which prepare the body for action. In such circumstances, exercise can help to deal with these responses and act as a coping resource (Caltabiano, 2008).

A person's psychological characteristics form the psychological resources that person has (or might not have) to cope with demanding situations which could be major life changes, for example, divorce or bereavement or the ongoing daily hassles of life, such as, having an argument, work pressure and having too many responsibilities (Lazarus, 1999). Lazarus wrote that the kinds of psychological resources that people might have include personality, a sense of self-efficacy, the ability to think constructively, learned resourcefulness, hardiness and optimism.

Social support involves the multifaceted web of relationships a person has within their social context and can range from societal institutions to nuclear family relationships (Lazarus & Folkman, 1984). The impact of a stressor and the ability to cope is mediated by the person's social and cultural resources (Glanz et al., 2008). The entire range of social institutions, such as education and security systems (e. g., police and social welfare services) provide one level of social resources to which a person might have access. At a personal level, it is the relationship that a person has within their community, workplace and, friends and family, that can provide the social support resources a person might access to help with the exigencies

of daily life. A positive social support system can be a valuable resource to help with life's demands. The key point here is that the personal social environment should be positive. Social support is not positive when it is not of the right or useful kind or when the context encourages negative or unhelpful strategies, such as encouraging drug or alcohol use, criminal behavior or unhealthy eating behaviours (Caltabiano, 2008). Social support in the paramedic context can be especially important given that many sources of stress arise from their social context.

3.5.3. Demands

The second component of the transactional definition of stress is 'demands'. The demand is for the type and amount of resources required by the person to deal with the stressor. The perception of discrepancy is the third component. A discrepancy exists when the demands of the situation are perceived to be beyond the person's resources. The final component of 'transactions' refers to the ongoing process of assessing the demands from the environment and the person's responses to deal with them. An individual's response may have an impact (positive or negative) on the demand and the situation is then reassessed. This process is ongoing and known as the 'transactions' (Caltabiano, 2008, p 90).

3.5.4. Appraisal

A key component in the transactional model of stress is appraisal. The person-environment transaction process is mediated by cognitive appraisal, which influences if a particular situation results in stress (Lazarus & Folkman, 1984). This evaluative process interprets an encounter with a potential stressor as being positive or negative for personal wellbeing. There are two parts to the appraisal process: primary appraisal and secondary appraisal (Lazarus & Folkman, 1984). The primary appraisal evaluates a potential stressor as irrelevant, benign or stressful. The potential stressor may be appraised as being a threat or

that it will result in harm or loss, or as a challenge. A situation that is regarded as a challenge may still make a demand on the person's resources but that the outcome will be positive. It is when the situation is regarded negatively, as a threat, or that harm or loss might result, that the secondary appraisal occurs (Lazarus & Folkman, 1984). The secondary appraisal is concerned with the actions (and resources needed) to cope with the demand. If the outcome is that the person believes that an excessive demand is being upon their resources than the result is the experience of stress (Caltabiano, 2008; Lazarus & Folkman, 1984).

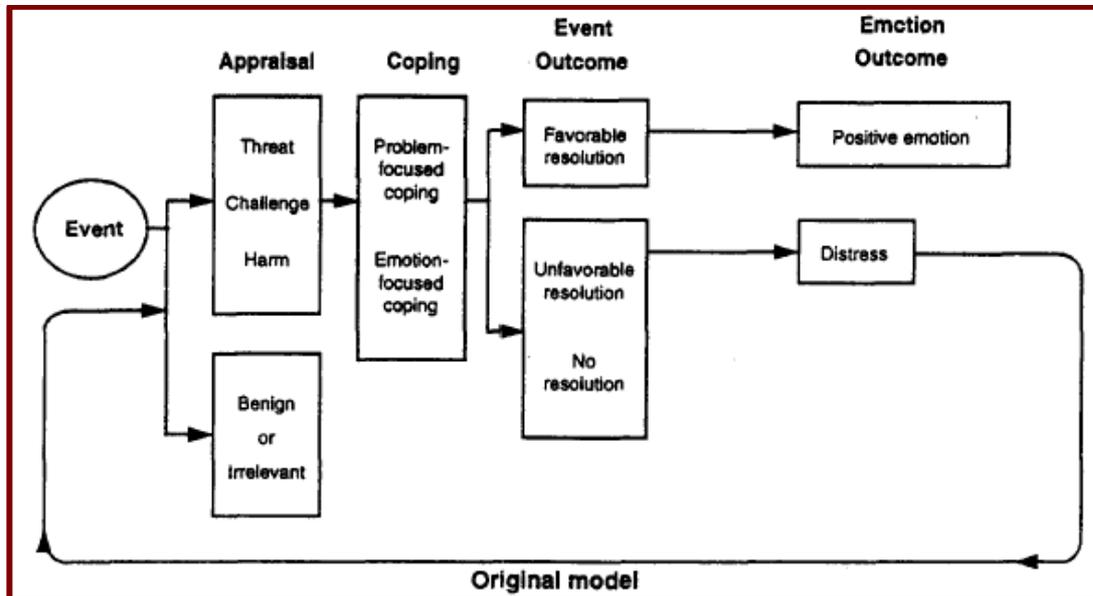
3.5.5. Coping

The efforts a person makes to manage the demands being made upon them are known as coping (Lazarus & Folkman, 1984). The aim of coping is to manage the discrepancy between the demand from the environment and the resources needed to cope (Caltabiano, 2008). This can be achieved by reappraising the situation in a more realistic way so that the demand is seen as more manageable or by increasing the access to the resources needed to manage the demand (Caltabiano, 2008). In general terms, there are two kinds of coping: emotion-focused forms of coping and problem-focused forms of coping (Lazarus & Folkman, 1984). Problem-focused coping can be used when the stress situation is amenable to being managed by the person affected. In this situation the person has some control over the situation and can manage the problem. There are many problem-focused coping strategies that person might use. Examples include clarifying the problem and making a plan of action, searching for solutions and building on previous experience (Caltabiano, 2008). Emotion-focused coping aims to regulate the emotional response to a situation in order to reduce the distress experienced. Emotion-focused coping tends to be used when the person cannot do anything to manage the situation-the aim is to manage one's reactions. In this situation, people can use behavioural techniques, such as, seeking support from friends and family, distracting oneself (e.g. watching television, engaging in activities like sport or other

exercise) or by using cognitive strategies which can include redefining the situation so that it is less threatening, distancing oneself and avoiding the source of the problem (Caltabiano, 2008). The transactional model of the coping process proposed by Lazarus and Folkman is summarized in Figure 2.

Figure 2

The Coping Process



Source: "Positive psychological states and coping with severe stress," by S. Folkman, 1997, *Social Science & Medicine*, 45(8), p. 1217.

3.5.6. Limits to Coping

The transactional model posits that in order to cope with a situation a person can address the cause (stressor) or they can change the way the situation is appraised. Asserting that stress situations can always be thus managed is too simplistic. Some situations are more than a challenge to a person's ability to cope; they are a threat. This limit to a person's coping capacity was recognized by Lazarus (1999,) when he reasoned that people face a great variety of situations, some of which may be threatening and some a challenge. If a situation is too demanding then it will be experienced as threatening, whereas some situations afford the possibility that it is manageable if a person were to persist in the use their capabilities. In this case, the situation is more likely to be experienced as a challenge rather than as a threat. This idea was later reinforced when Lazarus and Folkman (1984)

wrote “Coping should not be equated with mastery over the environment; many sources of stress cannot be mastered, and effective coping under these conditions is that which allows the person to tolerate, minimize, accept, or ignore what cannot be mastered” (p. 140).

The acknowledgement that there are limits to coping is important. Failure to recognize these limits can mean that a person is encouraged to repeatedly attempt to deal with the situation or repeatedly attempt to change their appraisals. In failing to recognize limits to coping leads to the grave possibility of blaming the person for their inability to cope; they feel distressed because they haven't dealt with the stressor or have failed to sufficiently change their appraisal.

Recognizing that there are some situations beyond a person's coping ability is important for people in all walks of life and it is imperative in the context of paramedics. There is a body of evidence that suggests that paramedics are more likely to experience more stressors or 'critical incidents' than are other first-responders (such as police and firefighters) (e.g. Berger et al., 2012). Consequently, paramedics are at an increased risk of being exposed to events that surpass their coping resources. Nevertheless, it is not just 'critical incidents' that can be beyond a paramedic's coping resources. Paramedics have little possibility of coping with some demands from their social environment like ramping at hospitals or abuse from their patients.

3.5.7. Limitations of The Transactional Model

The most substantial shortcoming of the Lazarus and Folkman (1984) transactional model of stress is that it is difficult to operationalize and measure the various elements of the process. Much of the research into this model is cross-sectional in nature and consequently the elements (of stressors, strains and coping) are regarded as fixed concepts and as only moving in one direction (Cooper et al., 2001). The nature of the transactional model is that

its components interact over time in an iterative and multidimensional manner (as indicated in Figure 2). While the transactional models of stress described by Lazarus and Folkman (Lazarus & Folkman, 1984; Folkman, 1997) might be a challenge for researchers in terms of measurement, subsequent work has indicated that these models offer the best way of accounting for the experience of workplace stress (Cox & Griffiths, 2010).

More importantly, the transactional model is silent with respect to the physiological responses to stress and their consequences (although the importance of physical good health is recognized to mediate the ability to cope). This model also recognizes that the social environment mediates the ability to cope (both positively and negatively) but does not specifically recognize that it can also be a source of stress.

3.6. The Biopsychosocial Model of Health

Each of the theories mentioned so far in this chapter contribute important insights but are incomplete and sometimes irreconcilable (Melchert, 2014). The biopsychosocial model is briefly introduced in this section as a model that can accommodate these explanatory theories as well as encompass other ideas that are relevant to psychological health in general and paramedic psychological health in particular. Criticisms and limitation of the biopsychosocial model are also mentioned.

A point has been reached where understanding human psychology “requires a comprehensive systemic framework that fundamentally recognizes the interactions between the biological, psychological and sociocultural levels of natural organization” (Melchert, 2014) and that there is evidence to support this approach. Such an integrated and systemic framework is the biopsychosocial model described first by George Engel in 1977 (Engel, 1977). The biopsychosocial approach enables biological, psychological and social aspects,

and the interactions between them, to be considered when attempting to understand a person's physical and psychological health (Melchert, 2014).

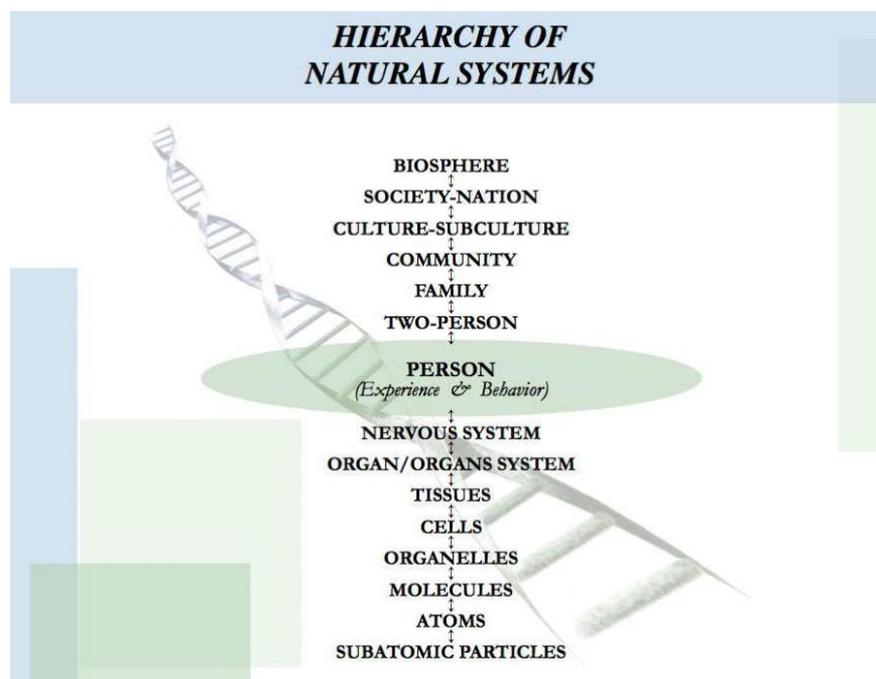
The biopsychosocial model postulates that there is a continuum of biological, psychological and social systems that affect a person's wellbeing (University of Rochester, 2020). This continuum can be divided into three general categories. The biological category contains those elements that are internal to the person and include the anatomical structures and physiological processes. The psychological category is the person and includes the mental components and processes within the person. The social category is the environment inhabited by and external to the person. This component includes a person's family, immediate community, work environment and the broader society in which they live. This may well be a particularly important component given that many paramedic sources of stress arise from their broader working environment. These categories are depicted in Figure 3. Both the biological and social systems and their impacts need to be considered, along with psychological processes, in understanding a person's psychological health.

Other than the work of Cannon and Selye, the theories discussed previously in this chapter allow for a limited consideration of biological aspects to the extent that they describe physiological response to stress. This is valuable and was revelatory at the time they were described. However, the impact of genetic predispositions for mental health and the factors influencing their expression are not included (Melchert, 2014). Also, not included are the anatomical and physiological changes in the brain associated with some conditions of psychological illness such as depression and PTSD (Fitzgerald et al., 2008; Kim et al., 2011; Levy –Gigi et al., 2014; Shucard et al., 2012). The biological component of the biopsychosocial model accommodates consideration of these anatomical and physiological aspects of psychological health.

The environment in which a person operates is omitted from some theories of stress and mental health. A model that enables the various aspects of the environment (as depicted in Figure 3) to be considered would enhance discussion and understanding in relation to the mental health of paramedics.

Figure 3

Biopsychosocial model: a person exists with a continuum of natural systems



Source: “The biopsychosocial model approach” by the University of Rochester, 2020, (<https://www.urmc.rochester.edu/search.aspx?q=biopsychosocial%20model%20approach>)

3.6.1. Criticisms of The Biopsychosocial Model

The strengths of the biopsychosocial model are that it explicitly accommodates the biological, psychological and sociocultural factors and the complexity of their interactions in understanding a person’s mental and physical health. Nevertheless, the biopsychosocial model is not without its critics. Three consistent criticisms are that it is not testable, is too

general and while it requires biopsychosocial information about the patient, it doesn't provide a method for obtaining it (Smith et al., 2013).

3.6.2. The Biopsychosocial Model Is Not Testable

For a model to be regarded as scientific, its propositions must be pitched in a form that enables them to be tested (McLaren, 1998). Aspects of the model are typically cast in the form of hypotheses, each of which is capable of being tested (Babbie, 2007): each of the variables of a hypothesis need to be operationalized so that they can be measured. A number of authors (e.g. McLaren, 1998) claimed that the biopsychosocial model should not be labelled as a 'model' at all because its components are nebulously defined and cannot be operationalized in behavioural terms for the (Smith et al., 2013). This indicates that testable predictions and hypotheses cannot be generated. Consequently, critics claim that the biopsychosocial model should not be regarded as a 'model' or scientific theory.

Melchert (2014) counters this objection by contending that, while much is yet to be discovered, much is known about the interactions between the biological, psychological and sociocultural influences on human growth and development. Melchert (2014) further contended that the precision and rigor supporting the understanding of these influences is such that mental health practice can be informed by an integrated approach afforded by the biopsychosocial model.

3.6.3. The Biopsychosocial Model Is Too General

A common criticism of the biopsychosocial model is that its very inclusiveness of the realms of biology, psychology and the environment results in a very general and imprecise heterogeneous approach where any tactic or practice in medicine or health is accommodated (Henriques, 2015). The result of such generalness is a non-selective

eclecticism where practitioners are free to choose what they think is the best approach for their patients on an ad lib basis (McLaren, 1996).

Others (e. g. McLaren, 1998; Melchert, 2014; Smith, 2013) have contended that the strength and usefulness of the biopsychosocial model is its inclusiveness, which encourages a multifactorial approach to understanding the circumstances of a person's health and wellbeing (Benning, 2015). Furthermore, a model that potentially permits a top-down and a bottom up approach is very useful in mental health through the recognition of many layers of causation in the conceptual models of psychopathology as well as the fluid and "dynamic nature of the relationship between individuals and their environments" (Benning, 2015, p. 349).

3.6.4. The Biopsychosocial Model Cannot Be Operationalized.

Other writers have noted that the biopsychosocial model requires the practitioner to gather, or at least consider, information from each of the biological, psychological and sociocultural levels without specifying a process for obtaining it from the patient (Smith et al., 2013). In other words, there has been no specified method for operationalizing the biopsychosocial model for individuals. However, Smith et al. (2013) contended that this criticism of the biopsychosocial model can be addressed by developing a consistent and reliable method for obtaining the pertinent biological, psychological and social data required to address the needs for each client. This amounts to an individualized and precise representation of Engle's biopsychosocial model for each client. In brief terms, Smith et al. (2013) proposed a structured interview to assess the client's situation which is comprised of closed and open-ended questions; the biological, psychological and sociological aspects of the client's situation are addressed. These authors named this structured interview the, "History of The Present Illness."

Smith et al. (2013) explained that the structured interview approach to gathering data is supported by research and is evidence-based, operationally defined and client centered. They further stated that approach is repeatable, provides a consistent approach which provides a basis for gathering data that are testable (i.e. for the basis of a hypothesis), precise (as opposed to 'too general') and provides a method for gathering information about the patient's condition.

3.6.5. The Biopsychosocial Model and Paramedic Mental Health

Chapter one identified several threads that were woven together to form the context in which paramedics work. Most of these threads were related to the broader social aspects of the paramedic working environment. The biopsychosocial model enables these social contexts to be incorporated when considering paramedic health. Paying attention to the environmental impact on paramedic mental health is important. A number of authors have observed that paramedics find their work to be both rewarding and stressful (Granter et al., 2019; James, 1988) with the stressful component leading to ill-health (Boudreaux & Mandry, 1996a; Sterud et al., 2006; Wagner et al., 2020; Young & Cooper, 1997). However, it is not only the nature of ambulance work that has been found to be demanding; organisational culture and management behavior have also been found to be sources of stress (Reynolds & Wagner, 2007; Young & Cooper, 1997;). Other reported sources include the health care system, and patients and members of the public that paramedics encounter as part of their work.

The potential for the organisation to be a source of stress for paramedics is the negative side of the coin: the positive side is that social support from colleagues and from supervisors has positive effects on paramedics' wellbeing (Van der Ploeg & Kleber, 2003; Sterud et al., 2008b). Positive personal social support has been found to have a positive modifying effect on some psychological conditions such as PTSD (Brewin et al., 2000; Fjeldheim et al., 2014;

Lowery & Stokes, 2005; Yehuda, 2004). There is also evidence that supports the contention that where there are organisational structures designed to offer support to ambulance personnel and which are well-regarded then these have a positive impact on paramedic wellbeing (Scully, 2011; Shakespeare-Finch & Scully, 2005).

It is apparent that the environment impacts on the mental health of paramedics, so it is practical to be able to discuss paramedic mental health with reference to a model that incorporates the social and cultural spheres inhabited by paramedics. It is also helpful to refer to a model that includes the biological aspects related to mental health, like pre-disposing genes and the structures and physiology of the brain that are associated with mental health. The biological aspect also accommodates consideration of medical interventions both to manage psychological ill-health as well as the biological consequences of stress. The third component of the model enables the mental health corollaries of workplace stress to be considered along with psychological interventions to remedy them. The biopsychosocial model serves these purposes.

3.6.6. Biopsychosocial Model: Conclusion.

The biopsychosocial model has been subject to criticism but the central criticisms have been addressed. However, the matter is not concluded; like any conceptual theory the biopsychosocial model has its adherents and its detractors. Nevertheless, the biopsychosocial model provides a useful framework for considering the mental health of paramedics and the circumstances that might maintain good mental health and those that might put their mental health at risk. This is especially pertinent when the sources of stress are likely to be found in the social environment in which they work, beyond dealing with the potentially traumatic demands that some cases present. The social component of the biopsychosocial model enables these various demands from the environment to be considered as well their biological and psychological sequelae. The biopsychosocial model

facilitates consideration of all these aspects of a paramedic's health consistent in a way advised by some authorities (e.g. Australian Centre for Posttraumatic Mental Health, 2013).

3.7. Conclusion

Psychological theories need to explain the aetiology and natural history of mental health conditions, afford the capacity to make predictions about what will lead to mental ill health and what will effectively prevent or treat it, plus provide a basis for fruitful research.

The various theories mentioned in this chapter have contributed to the understanding stress and psychological wellbeing. However, they do not explicitly or comprehensively enable consideration of the biological, psychological and sociocultural aspects of a person's condition. The biopsychosocial model is not without its critics. However, on balance, it provides a framework that allows for considering the psychological health of people in general and paramedics in particular.

Chapter Four

4. Paramedic Psychological Health: Literature Review

Research has consistently shown that humans and other organisms demonstrate adaptive physiological, emotional and behavioural responses when exposed to noxious or threatening stimuli from the environment (Boudreaux & Mandry, 1996b). It has also been observed that when exposure to noxious stimuli is extreme or protracted, the capacity to cope can be overwhelmed and adverse reactions may be seen (Boudreaux & Mandry, 1996b; Turner et al., 2020). These detrimental responses include taking the form of physical illness, mental health conditions or impaired (job) performance (Bavafa & Jónasson, 2020; Bennett et al., 2005; Boudrerax & Mandry 1996a; Turner et al., 2020).

According to this view of stress, people who work in environments that expose them to danger, or require them to face psychologically confronting and distressing situations, are at greater risk of developing reactions detrimental to their psychological and physical health. That ambulance work is psychologically demanding is supported by a body of works as described, for example, by Boudreaux & Mandry, 1996b and Wagner et al., 2020, and these demands place paramedics at greater risk of developing maladaptive reactions. This view has been widespread, and much of the research conducted on the health and wellbeing of paramedics has been conducted with the explicit assumption that ambulance work is inherently stressful (Young & Cooper, 1997), as embodied in the belief that paramedics are commonly exposed to highly distressing circumstances (Kennedy, 1999). This approach has resulted in researchers concentrating on identifying possible sources of stress (or demanding situations) or identifying variables that might moderate the maladaptive responses. Although there are exceptions, little work has been done on placing the health of paramedics into context by making comparisons of health status with the general working

populations from which paramedics were drawn, or with workers in other occupations (Sterud et al., 2006). The paucity of such comparisons makes it uncertain that paramedics are at greater risk of experiencing mental ill-health than other people.

This chapter provides an overview on paramedic mental health. The research on the mental health status of paramedics, how it compares to the general population and varies according to sociodemographic variables (when that information is available), is first reviewed in sections 4.1 – 4.5. Section 4.6 addresses the sources of stress experienced by paramedics and a summary of the methodological flaws that have been reported in some studies on paramedic mental health is reported in section 4.7.

4.1. Review of Paramedic Mental Health

Several mental health conditions have been explored in various paramedic populations.

Those conditions reviewed in this chapter are Posttraumatic Stress Disorder, psychological distress, anxiety and depression, fatigue and sleep problems, and suicidality.

4.2. Posttraumatic Stress Disorder (PTSD)

PTSD is a mental health condition that might arise in people who have been subjected to a traumatic event (American Psychiatric Association, 2013). For most people, these traumatic events may be in the form of a natural disaster, a life-changing accident or the personal threat of death or violence. A person must be exposed to a traumatic event in order to be diagnosed with PTSD but the exposure can be indirect, rather than direct (American Psychiatric Association, 2013). Examples of indirect exposure could include learning about the brutal death of a family member or close friend, and repeatedly observing the abuse of another person (American Psychiatric Association, 2013). Paramedic work involves dealing with confronting situations that are recognised as traumatic, for example, dealing with

severely injured patients, sometimes in hazardous environments, such as, motor vehicle accidents or confined spaces (Berger et al., 2012). Paramedics, and other emergency workers can experience indirect traumatic exposure when abuse is perpetuated against others; seeing the abuse of child is a strong example (American Psychiatric Association, 2020b; Regehr et al., 2002). Whether the traumatic experience is direct or indirect, the experience produces exceptionally strong emotions, for instance, extreme fear, powerlessness or horror (Beyond Blue, 2020b).

In order to obtain a diagnosis of PTSD, a person must have experienced a minimum of one symptom from each of four categories for a minimum period of one month subsequent to trauma exposure (American Psychiatric Association, 2013). The categories of PTSD symptoms with a brief description and examples are listed below-

1. Intrusive thoughts or memories about the traumatic event. These may be experienced in the form of flashbacks, unwelcome and recurrent memories which can appear in the form of intense images and nightmares, often accompanied by sweating, a racing heart or a sense of dread. People can feel that they are reliving the event, sometimes as if they are watching a movie.
2. Avoiding reminders of the event. People do what they can to escape being reminded of the event which might be achieved by avoiding places, people or activities that might bring back painful memories.
3. Negative alterations in cognitions or mood. A person can feel emotionally numb, feel disconnected from family and friends, and unable to experience satisfaction from their usual regular activities. It may be impossible to recall parts of the experience; distorted beliefs about themselves or others in response to the event might arise.
4. Increase in arousal and reactivity. This can be experienced in the form of problems with sleep, behaving in an irritable manner, being startled easily and being constantly alert and looking for danger at every turn.

Emergency workers have an expectation that their role entails exposure to trauma and it is rare for paramedics to report symptoms of PTSD after a single event (McFarlane, 2010b; Phoenix Australia, 2020). It is more common for emergency workers to present in a clinical setting after repeated trauma experiences. Furthermore, rather than the experience of a single incident, it may be that the development of PTSD is more closely related to low level stressors, such as, long shifts, the physical demands of the job and interpersonal conflict in the workplace (Bennett et al., 2005; Phoenix Australia, 2020; van der Ploeg & Kleber, 2003).

The presentation of PTSD symptoms for emergency services workers is inclined to differ from most other people (Phoenix Australia, 2020). Trauma is expected to be associated with the workplace so the initial display of PTSD symptoms may be indirectly expressed, for example, in the form of conflict with supervisors over a combination of operational and disciplinary issues. Furthermore, the individual has often experienced a long period of distress which they have attempted to manage and to ignore; the distress can be unexpectedly displayed in the reaction to a small incident (Phoenix Australia, 2020). Oftentimes, the comradeship and close supportive relationships in emergency service organisations means that the distressed individual can maintain the appearance of normal functioning for a considerable time.

When an emergency worker with potential PTSD presents for help, certain symptoms or issues are more likely to be seen, such as, anger and hostility, and consistent with this is the increased likelihood of interpersonal conflict within the family, including explosions of violence (Meffert et al., 2008; Phoenix Australia, 2020). Comorbid alcohol use is also probable, possibly in an attempt to self-medicate; emotional numbing and a lack of sensitivity towards others is also likely to be evident (Phoenix Australia, 2020). It is possible that emergency workers presenting for help may have been experiencing distress for a period of time so the longitudinal pattern of symptoms should be assessed and taken into

account (Phoenix Australia,2020). Delayed onset of PTSD is a possibility, particularly in the emergency service context, and individuals who have ceased such employment and present for help should be assessed for experiences that have happened in the past (McFarlane, 2010a; Phoenix Australia; 2020; Smid et al., 2009).

Three systematic reviews have been conducted to examine the prevalence of PTSD in paramedics reported in the literature up to 2018 (Berger et al., 2012; Petrie et al., 2018; Sterud, 2006). A fourth review based on the best evidence narrative synthesis approach included the same range of papers published up to 2018 (Wagner et al., 2020) and reported similar findings as the three reviews mentioned here; this latter review includes analyses of some sociodemographic variables which are reported where germane.

The first review conducted by Sterud et al. (2006) investigated the global literature on paramedic PTSD published before the end of 2005 and reported a prevalence of PTSD that ranged from 12% to 21.5%. These authors also reported that the prevalence of PTSD appeared to be higher than the relevant general population when comparisons were made.

The second review was executed by Berger et al. (2012) and reported the global prevalence of PTSD in rescue workers in articles published before the end of September, 2008. Articles in the review were included if they reported on subjects who met the definition of rescue worker, which included paramedics but added occupations where people took actions to free persons or animals from danger to life or well-being (labelled 'other personnel'). Only articles incorporating a methodology that assessed each of the PTSD symptom clusters (of hyper-arousal, intrusive symptoms, negative alterations in mood or cognitions and avoidance symptoms) were included in the review's analysis. The rescue workers role also had to be clearly identified (as ambulance, fire, police and 'other personnel' who met the definition of rescue worker) in order to be included. The key finding of this review was that rescue workers as a group displayed higher levels of PTSD than the general populations from which

they were drawn. The pooled figures for the entire sample was that 10% of rescue workers met the criteria for PTSD which was significantly higher than the pooled level of 1.3% - 3.5% reported for the general populations from the regions of Europe, North America, South America, Asia, Oceania and Africa. Paramedics displayed the highest prevalence of PTSD (14.6%) compared to police (4.7%) and firefighters (7.3%). There was also considerable variation in the prevalence of PTSD in paramedics between the various regions with the lowest level being reported in Oceania (5.7%) and the highest level in Asia (17.9%) and that these levels were higher than the relevant general populations.

The third review was conducted by Petrie et al. (2018) and included global literature related to paramedic PTSD published to March, 2018, and reported a global pooled prevalence of 11% for PTSD in paramedics. They also confirmed that the rate of PTSD was substantially higher than that found in the general population (a range of 1.3% to 2.9%). There are variations in the findings with respect to the prevalence of PTSD in paramedics reported in these three reviews. Nevertheless, the findings indicate that, as an occupational group, paramedics are at a higher risk of developing PTSD than are the general populations from which the study samples were drawn.

Across these reviews there is little clear evidence that the sociodemographic variables of age, sex, years of employment or marital status are strongly associated with the prevalence of PTSD. The Wagner et al. (2020) review, using a best-evidence narrative synthesis approach, reported that nine out of ten studies found no association of PTSD with age and concluded that there was no consistent association. A systematic review and meta-regression analysis by Berger et al. (2012) reported a statistically significant beta value of -0.05, indicating an inverse association between PTSD prevalence and age. However, this finding does not indicate a strong association, as it indicates that each additional year of age results in a small decrease of 0.05 in PTSD scores (Field, 2013).

Most general population based epidemiological studies indicate a higher prevalence of PTSD in females than males (Phoenix, 2020; Tolin & Foa, 2006). However, the review by Wagner et al. (2020) reported that four out of seven studies found no significant association with sex, and the remaining three found the prevalence of PTSD to be higher in females. These authors concluded that there was no consistent association between sex and PTSD prevalence. The review by Berger et al. (2012) reported that sex was not significantly associated with PTSD. Although these findings may appear contrary to what would be expected, they are consistent with studies of similar populations, such as police and military personnel, that failed to find female sex to be a risk factor for PTSD (Lilly et al., 2009). Of note is the fact that there were many more men than women in the reviews' study samples (generally more than 85%) which may have affected the power needed to detect differences related to sex (Berger et al., 2012; Wagner et al, 2020). No studies reported an association between marital status or years of service with PTSD (Berger et al., 2012). Findings with respect to educational level are inconsistent. One study reported no association between PTSD and educational level (Donnelly, 2012) and another study found that the prevalence of PTSD was lower in Polish paramedics with a higher educational level (Rybojad et al., 2016

4.2.1. Factors Associated with Posttraumatic Stress Disorder

PTSD is associated with the experience of traumatic events and has a number of consequences. The next segment gives a synopsis on the exposure dose response effect, neurological changes, and physical and psychological comorbidities associated with PTSD

Ward et al. (2006) studied the rates of exposure to traumatic stressors and PTSD in emergency services personnel in South Africa. These authors made comparisons between paramedics and personnel in other emergency services and reported that the rates of exposure to traumatic stressors and the level of PTSD were generally higher in paramedics. They also reported a significant non-linear association between the level of exposure to

traumatic stressors and PTSD symptoms, indicating a dose-response relationship. There is also evidence of a dose-effect relationship in a study by Misra et al. (2009). These authors compared the presence of probable PTSD in paramedics who were, and were not, involved in the 2005 bombings of the London public transport system. Those paramedics having any involvement with the response to the bombings were more likely to be identified as having PTSD compared to those that were not involved (6% vs. 1%). Those paramedics who were involved and attended the disaster scene were more likely to have PTSD than those who did not (42% at the scene vs. 15% not at the scene). Fifty percent of all PTSD cases were found in those who attended the 'most stressful' location that had the highest number of fatalities, and was a hazardous environment. Collectively, the findings of Misra et al. (2009) are consistent with a dose response relationship between exposure and PTSD. A dose response relationship was also inferred in a more recent study of Polish paramedics (Rybojad et al., 2016). These authors obtained results indicating that PTSD was more likely to occur with exposure to multiple traumatic events.

The relationship between the level of exposure to trauma and PTSD has also been found in other studies. For example, the risk of PTSD in Dutch soldiers who were deployed to the former Yugoslavia as part of the United Nations Protection Force increased as the number of exposures to traumatic events increased (Bramsen, 2000). Results consistent with those of Bramsen et al. have been reported in US Vietnam veterans (Card, 1987). These two studies support the idea of a positive dose-effect relationship between the experience of distressing events and the development of PTSD although they did not study paramedics.

While there might be variation in the findings with respect to the prevalence rates of PTSD in paramedics compared to the general population, there is a body of evidence for a dose-effect relationship between exposure to traumatic stressors and the development of PTSD. This observation is important because it is possible that some groups of paramedics are

more likely to be exposed to traumatic events than their colleagues based upon their operational roles (Sterud et al., 2006) and the general population (Berger et al., 2012).

There is a body of research showing that many biological systems that are affected by PTSD, as well as a range of comorbidities (Pitman et al., 2012). The following paragraphs outline some of these comorbidities with a focus on the associated neurological effects, plus physical and psychological comorbidities.

Brain imaging methods have enabled distinctive changes in brain structure and function to be identified. Particular regions involved in the adaptation to stress and fear conditioning have been shown to be altered in patients with PTSD (Sherin & Nemeroff, 2011). These regions include the hippocampus and amygdala, as well as cortical regions including the anterior cingulate, insula, and orbitofrontal region. The hippocampus is concerned with control of stress responses, declarative memory (or memory of past events and facts) and the contextual aspects of fear conditioning. The amygdala is a structure of the limbic system and plays a key role in the acquisition (or learning) of fear responses. The role the amygdala plays in mediating stress responses and emotional learning implicate its function in the pathophysiology of PTSD (Sherin & Nemeroff, 2011). Subsequent work has shown that reduced volume of the amygdala was associated with the PTSD symptom of re-experiencing the traumatic event (Shucard et al., 2012). In addition to the orbitofrontal cortex, the medial prefrontal cortex (PFC) has also been associated with PTSD. A role of the PFC is to exercise inhibitory control over stress responses and the strength of emotional reactions (which the PFC achieves through its connections with the amygdala; (Sherin & Nemeroff, 2011). Individuals with PTSD show decreased volumes of the frontal cortex and this reduction in volume has been associated with the severity of PTSD symptoms, at least in some studies. Many of these changes in brain structure are related to, and may facilitate, the pathology of PTSD.

PTSD is distinguished by disturbances in concentration and memory, the symptoms of which cause distress for sufferers. Moores et al. (2008) compared the activation of brain regions associated with visual-verbal tasks that involved maintenance or continual updating of word stimuli in working memory. Subjects with PTSD recruited working memory updating networking brain regions that were not normally associated with working memory maintenance operations. Other areas of the brain associated with PTSD showed an abnormal reduction in activity in a manner consistent with a reduced working memory updating. These findings infer that patients must recruit a large area of the cortex to achieve even simple working memory maintenance demands. In turn, this implies difficulties in concentrating and remembering in PTSD which can be associated with managing day to day demands from one's environment. It appears that PTSD is associated with neurological changes that are associated with inefficient use of the brain's resources and which may impact on the ability of an individual to manage day to day demands from their environment.

Traumatic experiences and the ensuing experiencing of PTSD symptoms have been shown to affect brain structures in police officers over a three to four year period. The brain structures examined in this study included the globus pallidus, the amygdala, the thalamus and the hippocampus (Shucard et al, 2012). These authors reported that police who showed elevated levels of re-experiencing traumatic events also demonstrated increased levels of atrophy in parts of the brain associated with PTSD. Furthermore, the impact on the levels of PTSD symptomatology and atrophy of relevant regions of the brain increased with greater numbers of exposure to traumatic events. The finding that the volume of the amygdala was negatively correlated with re-experiencing is consistent with its role in evaluating threat, memory of fear producing situations and in fear conditioning. A similar relationship was found between re-experiencing and volumetric measures of the globus pallidus (which is associated with working memory and filtering information; reduced volume may hinder attentional control and filtering related to re-experiencing) and the thalamus.

These changes in brain circuitry are not confined to first responders with PTSD. Repeated exposure to traumatic experiences may be sufficient to bring about changes in hippocampal volume without an accompanying diagnosis of PTSD (Woon et al., 2010). A meta-analysis was conducted based on 39 studies that compared hippocampal volumes in subjects with PTSD, subjects without PTSD but exposed to traumatic stress, and trauma unexposed subjects (Woon et al. 2010). The results indicated that hippocampal volumes were most reduced in subjects with PTSD, but also reduced in trauma exposed subjects without PTSD compared to subjects unexposed to trauma. These findings indicate that trauma exposure alone, even in the absence of PTSD may be associated with hippocampal volume deficits.

Decreases in hippocampal volume can impact on a person's capacity to recover from PTSD. Deficits in hippocampal volume can result in impaired learning and the way a person uses associations between contextual information and aversive events (Levy-Gigi et al., 2014). In study comparing the ability of non-PTSD subjects who had been exposed to trauma with subjects who had not been exposed to trauma, the former were shown to have an impaired ability to learn that a context previously associated with an aversive situation was later associated with a positive situation. This finding suggests that individuals do not need to be diagnosed with PTSD in order to experience neurological deficits. Indeed, Levy-Gigi et al. (2014) conclude that this impairment may represent a hidden cost for people repeatedly exposed to traumatic stress. Furthermore, this may affect the way in which highly exposed people (without PTSD) interpret and react to their environment.

Traumatic experiences and PTSD have the capacity to change the physiology of the brain and this can be demonstrated through the use of neurological imaging techniques. These physical changes to the brain indicate that the experience of PTSD that accompanies these changes is not imagined. Furthermore, these changes in the brain's circuitry can have real impacts on an individual's ability to recover from traumatic experiences, and can influence

the course of PTSD. These PTSD related neurological findings indicate that PTSD is a real and serious condition that should be recognized and managed.

The connection between stress and the increased risk of physical disease is an old and enduring interest. The effects of stress on the hypothalamic pituitary adrenal axis (HPA) and the autonomic nervous system has a long history of study as described by early authors like Cannon (1914b, 1932) and Selye (1936, 1950, 1973). The demands involved with regulating these systems has been termed “allostatic load” and refers to the cost in terms of damage or changes that occur in the body as a result of repeated cycles of stress. Allostasis refers to the process by which the body attempts to maintain homeostasis as a result of the demands of stress (or the allostatic load) made on the body (McEwen, 2000). The physiological disruption that underpins the allostatic process provides a pathway to disease that can manifest in different ways (McFarlane, 2010b). By the stressful nature of their work, paramedics and other emergency service workers are likely to be exposed to prolonged periods of increased allostatic load when compared to other professions.

There is a distinct relationship between PTSD and coronary heart disease (CHD). A study of veterans found an association between PTSD and CHD (Kubzansky et al., 2007). Interestingly, these authors reported a possible dose-response effect; “...for each SD increase in symptoms, there was a significant increase in the risk of developing CHD” (p. 114). Kubzansky et al. concluded that, “These results are provocative and suggest that exposure to trauma and prolonged stress not only may increase the risk for serious mental health problems but are also cardiotoxic” (p. 115). The impact of PTSD on CHD was also found in a prospective study of early age heart disease in Vietnam veterans (Boscarino, 2008). This study reported that having PTSD was associated with mortality from heart disease (Hazard Ratio = 2.25), and that controlling for depression had little impact on this result thereby supporting the notion that PTSD is an explicit risk for mortality associated with heart disease.

In a study based on the US National Comorbidity Survey it was reported that PTSD was related to hypertension, and that this relationship could explain the associated higher rate of cardiovascular disease (CVD; Kibler et al., 2009). Depression is also associated with CVD but, Kibler et. al. found that PTSD was associated with CVD independently of depression. Several studies have shown that individuals with PTSD have higher mean levels of cholesterol (Kagan et al., 1999; Karlovic et al., 2004; Maia et al., 2008; Solter et al., 2002) which in turn is associated with CVD. These studies were conducted with police personnel and war veterans as subjects, but it is likely that these findings would apply to other populations.

PTSD may be a risk factor for obesity, and obesity is associated with an increased risk for CVD. Studies with military veterans as subjects have reported a significantly increased body mass index (BMI) in those with PTSD (David et al., 2004; Vieweg et al., 2007). The notion that PTSD may be a risk factor for obesity has also been found in samples drawn from the general population. A study of young German adults found a relationship between having a diagnosis of PTSD and having a high BMI (Perkonig et al., 2009). A relationship between PTSD and obesity has also been found in a sample drawn from the general New Zealand population (Scott et al., 2008).

Previous studies have found that individuals diagnosed with PTSD are also more likely to be diagnosed with a range of comorbid psychological conditions (Keane et al., 2007).

Depression, anxiety and substance abuse are among the most common comorbidities reported and are discussed in the following paragraphs.

Of community outpatients diagnosed with PTSD, 92% met the criteria for another psychological disorder (Brown et al., 2001). Of these, 77% of individuals with PTSD were found to have a depressive disorder, 38% were found to have generalized anxiety disorder,

and 31% demonstrated alcohol abuse or dependence. Orsillo et al. (1996) found that veterans with PTSD were more likely to have significantly higher rates of depression and panic disorder. Similar results have been reported by other authors in veterans and the general population (e.g., respectively, Kessler et al., 1995; Kulka et al., 1990). A review of the literature of PTSD in the primary care setting by Greene et al. (2016) found that high comorbidity was found between PTSD and other psychiatric disorders including depression and anxiety. Fjeldheim et al. (2014) reported that paramedic trainees who met the criteria for PTSD had higher rates of depression and perceived stress, but lower rates of social support and resilience and poorer physical health. A more general review of PTSD in first responders and its treatment reported that comorbid symptoms for depression, anxiety (panic disorder) and alcohol abuse were often present as well as physical complaints like nausea (Haugen et al., 2012). It is evident that comorbidities associated with PTSD are not uncommon.

The extent of comorbidity with PTSD is recognized in the Australian guidelines on treating PTSD (Australian Centre for Posttraumatic Mental Health, 2013). These guidelines note that in cases where PTSD has been present for more than three months, the central symptoms seldom exist in isolation. More than 75% of people with PTSD are likely to have another psychological disorder with anxiety, depression and substance use disorders being among the most common presentations. The Australian guidelines address the needs of specific populations and indicate that emergency services personnel are more likely to present with anger, guilt (instead of fear or horror as usually seen in the general population) and substance misuse (Australian Centre for Posttraumatic Mental Health, 2013). First responders are also more likely to present with subsyndromal PTSD symptoms which can impair functioning and are often associated with behaviours like binge drinking.

In summary, modern medical imaging techniques show that there are real changes in the brain associated with PTSD, in some circumstances this can occur when the diagnostic

criteria do not permit a diagnosis. These physical changes can be objectively measured and are not imagined. PTSD is also related to cardiovascular diseases and obesity, and to the psychological conditions of anxiety, depression and substance abuse. These findings indicate that people who are found to have PTSD should also be assessed for a wide range of other psychological and medical conditions, including those functional changes that accompany neurological changes. A wide-ranging assessment is consistent with the current guidelines on assessing people with PTSD in general (Phoenix Australia, 2020). In addition, the guidelines in relation to emergency services personnel recommend assessing for the comorbid conditions mentioned above, as well as obtaining a complete history of traumatic experience as is possible.

4.3. Psychological Distress, Depression and Anxiety

A number of studies have placed depression and anxiety under the more general heading of psychological distress or in combination with it (e.g. Kilkinen et al., 2007; Petrie et al., 2018; Sterud et al., 2006;) and others have specifically referred to, and reported on, psychological distress (Drapeau et al., 2012; Revicki & Gershon, 1996; Sterud et al., 2011). Psychological distress, depression and anxiety are discussed together to maintain consistency with previous work in this area.

Psychological distress may be generally described as group of unpleasant mental and physical symptoms that can accompany fluctuations in mood and is believed to be what is assessed by measures of depression and anxiety (American Psychological Association, 2020). Psychological distress is thus characterised by elevated symptoms of depression and anxiety (Casey, 2011) although, somatic symptoms like insomnia, headaches or a sense of lethargy may be included (Drapeau et. al., 2012). Some authors describe psychological distress more generally as raised levels of non-specific emotional distress that leads to a level of impairment (Petrie et al., 2018). While psychological distress may be comprised of

elements of depression and anxiety, it should be recognized these two conditions are separate and independent constructs (Henry & Crawford, 2005; Lovibond & Lovibond, 1995).

Anxiety is a normal reaction to stressful circumstances and can be useful in that it can help a person to focus on a situation and prepare to deal with it (American Psychiatric Association, 2020a). An example could be a paramedic student preparing for their first clinical placement. However, normal anxiety is typically short lived and associated with specific situations (Beyond Blue, 2020a). People with an anxiety condition do not usually connect it with any particular demanding situation, their focus can instead be on the daily concerns of life, such as, job obligations, dealing with family matters and managing appointments (American Psychiatric Association, 2020a). Anxiety generally has physical, psychological and behavioural features, examples of which are listed below (Beyond Blue, 2020a)-

1. Physical. Increased heart rate, tightness in the chest, rapid breathing or restlessness, feeling tense or edgy.
2. Psychological. Feeling fearful, thinking that bad things are going to happen and fixated thinking.
3. Behavioural. Avoiding situations connected with feelings of anxiety, such as, study, situations at work or social situations.

Most people feel depressed at times. It is part of life to sometimes feel sad, moody or low but is potentially more serious if these feelings are prolonged or intense and result in a person no longer caring about activities they once liked doing (American Psychiatric Association, 2020b; Beyond Blue, 2020b). Depression may be diagnosed when a person has experienced symptoms from three or more categories that last for two or more weeks (Beyond Blue, 2020b). These categories and examples of symptoms are listed below-

1. Behaviours. Not going out anymore, relying on alcohol or sedatives or not taking part in usual enjoyable activities.

2. Feelings. Sadness, irritable, guilty or overwhelmed.
3. Thoughts. Thinking that one is a failure, is worthless or that life is not worth living.
4. Physical. Feeling tired all the time, sleep problems or headaches and muscle pains.

The prevalence of psychological distress across the globe has a wide range of 5% to 27% (Drapeau et al., 2012); it has been reported to be at level of 35% in the general Australian population (in the mild to severe range [Australian Psychological Society, 2015]). A study of rural Australians reported an overall a psychological distress prevalence of 31% above the low range (Kilkkinen et al., 2007) which is slightly less than that reported by The Australian Psychological Society. In 2017-18, 13.0% of Australians over the age of 18 were identified as having high or very high levels of psychological distress and this was quite stable across age groups (Australian Bureau of Statistics [ABS], (2018)). The ABS (2018) also reported that 13.1% of Australians had an anxiety related condition and 10.4% had symptoms indicating depression. Females (17.8%) are more likely to experience depression in their lifetime compared to males (12.2%; ABS, 2007). Similarly, more females 32.0% experience anxiety at some point in their lifetime compared to males (20.4%; ABS, 2007).

There are varied findings on the levels of psychological distress, anxiety and depression in paramedics. Lower levels of psychological distress were reported in Swiss paramedics compared to the general population, as measured by the General Health Questionnaire (GHQ12; Arial et, al., 2011). Depending on the selected cut-off point, the paramedic prevalence of psychological distress was between 15% and 20% compared to between 28% and 34% in the general Swiss population. An American study found that mean state and trait anxiety scores, as measured by Spielberger's State-Trait Anxiety Inventory, were lower for a United States (US) paramedic sample compared to the general US population (Mock et al., 1999). A subsequent US study reported that anxiety was relatively lower in paramedics (6.0%) compared to nurses (22.3% - 54%), physicians (2.2% - 30%) and medical students (28.7%); no comparison was made with the general population (Bentley et al., 2013). A

Canadian paramedic study used the Beck Depression Inventory and reported that 2.3% of respondents reported levels of severe depression (Regehr et al., 2002) which was comparable with the finding of a Canadian community health survey that reported a lifetime prevalence of major depression of 2.7% (Satyanarayana et al, 2009). Sterud et al. (2008a) reported no difference in the prevalences of anxiety and depression cases in Norwegian paramedics when compared with the general population. However, mean anxiety scores were lower for Norwegian male and female paramedics compared to the general population, whereas mean depression scores were lower for male paramedics but the same for females. A study conducted by Courtney et al. (2010) measured anxiety and depression in a sample of Melbourne paramedics using the 21-item version of the Depression Anxiety and Stress Scales (DASS-21). These authors reported that there were significantly higher levels of anxiety and depression compared to three 'non-clinical' samples. Parallel findings have been reported by these authors from a similar study with paramedic participants drawn from rural Victoria (Courtney et al, 2013). Another Australian paramedic study reported higher mean psychological distress scores in Australian paramedics compared to the general population (Shakespeare-Finch & Daley, 2017). Scottish paramedics were found to have a noticeably higher prevalence of psychological distress compared to the general population, 32% and 18%, respectively (Alexander & Klein, 2001). Other studies have also found that paramedics report high levels of psychological distress, depression and anxiety although not all of them have made comparisons with the general population. A large study conducted on Welsh paramedics reported the prevalence of anxiety caseness to be 22% and depression caseness to be 10%, as measured by the HADS (Bennett et al., 2004), levels which have been regarded as high (Sterud et. al., 2006). Two other studies found high levels of psychological distress as measured by the GHQ (Clohessy & Ehlers, 1999; Thompson, 1993).

A systematic review based on 18 studies published between 1988 and 2016 reported estimated prevalences of 27% for psychological distress, 15% for anxiety and 15% for

depression in paramedics (Petrie et al., 2018). These authors compared the World Health Organisation global estimates of 3.6% for anxiety and 4.4% for depression and concluded that the prevalences for these conditions may be higher than found in the general population. However, it was also concluded that there was inadequate evidence to conclude that the level of psychological distress was higher in paramedics compared to other working populations.

It is possibly risky to draw conclusions about the levels of psychological distress, anxiety and depression compared to the general population because the findings on the levels of these condition vary considerably from study to study and between different paramedic populations. This indicates that assuming that all paramedic populations are the same on these mental health measure may result in not recognizing populations at risk. Therefore, individual populations should be assessed to ascertain with more certainty the mental health status of specific groups of paramedics.

In the general population, psychological distress tends to decrease with age from late adolescence (Drapeau et al., 2012). The prevalence of anxiety and depression in the Australian population also tends to decrease with age (Slade et al., 2009). These associations between mental health and with age are not so apparent in paramedic populations. Four paramedic studies reported that there was no association between age and psychological distress (Arial et al., 2011; Chlohesy & Ehlers, 1999; Revicki & Gershon, 1996; Thompson, 1993). A significant but weak (.17) correlation was found between depression and age in a study of Melbourne paramedics (Courtney et al., 2010). However, a best evidence narrative synthesis review found no association between depression and age, but this review also reported a weak association with anxiety (Wagner et al., 2020).

An American study that measured psychological distress in paramedics reported less psychological distress in male paramedics (Revicki & Gershon, 1996). Other studies

reviewed found no difference in the levels of psychological distress in paramedic females and males (Arial et al., 2011; Bennett et al., 2004; Chlohesy & Ehlers, 1999; Sterud et al., 2011). Differences between the sexes were found in Norwegian paramedics with males reporting a prevalence of 9.8% for anxiety and 7.3% for depression while females respectively reported 13.6% and 3.7% (Sterud et al., 2008a). It is perhaps of note that the prevalence of depression was higher in Norwegian male paramedics. Other authors have reported no differences between the sexes for anxiety or depression (Bennett et al., 2004; Courtney et al., 2010). It was reported that there was no association with sex and depression, and anxiety, in paramedics in a best evidence narrative synthesis review conducted by Wagner et al., 2020).

Three reviewed studies assessed the association of years of service as a paramedic with psychological distress and all of them reported that there was no association (Alexander and Klein, 2001; Thompson, 1993; Shakespeare-Finch & Daley, 2017). A negative correlation between years of service and scores on a measure of anxiety was found in one study (Mock et al., 1999) while another found that increasing years of service increased the likelihood of paramedics being classified as anxious or depressed (Bentley et al., 2013). There were varied findings on the effects of education level. A Swiss study reported no association between education and psychological distress (Arial et al., 2011). Conversely, two other studies found educational level to have a positive effect, with higher level of education associated with lower scores on measures of psychological distress and on Speilberger's state and trait anxiety scores (Revicki & Gershon, 1996; Mock et al., 1999). However, a large American study found that more highly qualified paramedics were more likely to be classified as depressed or anxious than were less qualified emergency medical technicians (Bentley et al., 2013). Marital status was found to be unrelated to psychological distress (Arial et al., 2011) but married paramedics were less likely to be classified as depressed or anxious than were paramedics who had separated or never married (Bentley et al., 2013).

Psychological distress is an important measure of mental health because it can be indicative of more serious problems, especially as a person obtains higher scores as measured on almost any assessment instrument (Kessler et al., 2002). Higher scores may also indicate the presence of chronic health problems which have the potential to limit participation in daily activities (Drapeau et al., 2012). People living with psychological distress may find it difficult to deal with the ordinary demands of daily life which can be accompanied by feelings of inferiority and the sensation of losing one's hold on life (Arvidsdottir et al., 2016). Anxiety and depression make a notable contribution to the burden of disease in Australia in their own right (Australian Institute of Health and Welfare, 2020b). Anxiety can be felt as a constellation of constant elevated levels of anxiety and difficult to control worry about what is happening in one's life (Thorpe & Olsen, 1997). These feelings can be accompanied with agitation, difficulties with concentration, muscle tension and disruption to sleep with consequent clear distress and impairment to social function and work life (Thorpe & Olsen, 1997). These are consequences that can cause distress and disrupt a person's life.

Depression is generally described as a negative disturbance to a person's mood that manifests as ongoing and sometimes severe feeling of sadness and hopelessness (Westen et al., 2006). Depression may be accompanied by fatigue, diminished motivation to participate in the normal activities of life and thoughts of suicide can occur (Thorpe & Olsen, 1997). When depression is severe it can impair the things a person needs to do to maintain a normal life, such as, go to work or perform the necessary household chores (Westen et al., 2006). Depression has potential physiological consequences evidenced by the increased the risk of developing physical conditions, such as, diabetes, hypertension, stroke and obesity (Penninx et al., 2013).

The key feature of these conditions is that they have the potential be intrude on one's capacity to function healthily and to live a normal life. Beyond Blue Ltd. (2018) reported that as scores increased on measures of psychological distress, anxiety and depression, so too did the levels of suicidal thinking and planning, although the association was only significant

for psychological distress and depression; there was an insufficient number of responses to draw conclusions related to suicide attempts. There is a body of evidence supporting the contention that higher levels of psychological distress, anxiety and depression can have a substantial impact on one's wellbeing.

4.4. Fatigue and Sleep Problems

Fatigue can be defined as extreme tiredness and is typically thought to be a consequence of physical or mental exertion (Nowack & Deal, 2017). While it is commonly thought of as tiredness, it is also thought of as having low energy or as the consequence of extended physical or mental work, or inadequate sleep (Nowack & Deal, 2017). Fatigue can also include ideas of cognitive impairment and a lack of motivation (Akerstedt et al., 2004). In the present context it is the association of fatigue with sleep problems that is the focus. Sleep problems can be exhibited through a variety of symptoms which can include difficulties falling asleep, waking repeatedly, waking too soon and restless sleep; these are sometimes collectively known as 'disturbed sleep' (Sterud et al., 2008a). Other indicators of sleeping problems are difficulties waking up and not feeling rested when one wakes up (Nordin et al., 2013). Good quality sleep is energizing, and enables one to feel restored and improves one's feeling of vitality, whereas, poor sleep diminishes one's overall sense of wellbeing; poor sleep is also almost universally associated with poor health (Nordin et al., 2013). Paramedic shift work has the potential to negatively affect sleep quality and is associated with physical and mental health problems (Rosa & Colligan, 1997).

Courtney et al. (2010) conducted a study on Melbourne paramedics that included measures of fatigue and sleep problems. The participants in this study were paramedics who worked rotating shifts (two ten-hour day shifts followed by two 14-hour night shifts followed by four days off). Chronic fatigue in paramedics was compared with three other groups of shift workers. It was found that the mean score for fatigue was significantly higher in paramedics

compared to the other groups. Seventy-two percent of paramedics reported poor sleep and the mean score on the scale used to measure poor sleep was significantly higher than the mean scores obtained in a sample of nurses and two community groups. Robinson (2002) reported a high prevalence of sleeping difficulties in Victorian paramedics of 75%, including that 15% of paramedics used sleeping medication at least monthly (compared to 4.5% of the general population using sleeping tablets in the past two weeks; Australian Bureau of Statistics, 2006) and that 29% reported experiencing fatigue in the previous 12 months. It is not possible to make direct comparisons with the general population because of the way these variables were measured but the numbers of paramedics reporting sleeping difficulties, taking sleeping medication and experiencing fatigue seem to be high and are consistent with the findings of poor sleep in paramedics (Courtney et al., 2010). A large US study (N=1854) assessed sleep problems in paramedics and made comparisons with identically qualified individuals who were gainfully employed in a non-paramedic occupation (Pirrallo et al., 2012). This study found that paramedics were more likely to be identified as having excessive daytime sleepiness and at an increased risk of long sleep onset.

A study using a convenience sample of practising paramedics found higher levels of poor quality sleep, daytime sleepiness and fatigue in comparison with normative data (Sofianopoulos et al., 2011). A Swedish investigation found that 30% of both male and female paramedics reported problems with sleep (Aasa et al., 2005). These authors did not make direct comparisons but these paramedics appear to have higher levels of disturbed sleep compared to the level of 12.8% reported in the general Swedish population (Akerstedt et al., 2002). In contrast, a Norwegian study found that the prevalence of disturbed sleep in paramedics was comparable with the general population (Sterud et al., 2008a). Most studies on sleep in paramedics have reported that paramedics report higher levels of problems with sleep than the general population. However, as with some other studies on paramedic psychological health, the findings are not entirely consistent.

The effect of sex and age on fatigue was assessed in two Australian paramedic studies and reported that there was no association (Courtney et al., 2010, 2013). No significant differences on the sociodemographic variables of sex, age or years of service were found for daytime sleepiness (as assessed with the Epworth Sleepiness Scale) or for sleep quality (as assessed with the Pittsburgh Sleep Quality Index; Sofianopoulos et al., 2011). An examination of sex differences in sleep problems found that male paramedics were more likely to report sleep-disordered breathing and excessive daytime sleepiness and females were at greater risk long sleep onset disorder (Pirrallo et al., 2012). A Norwegian study that measured disturbed sleep reported no difference in the mean scores for males and females (Sterud et al., 2008a).

Many paramedics work shifts and shift work is associated with sleep problems and fatigue (Rosa & Colligan, 1997). The vigilance required to perform psychomotor tasks, like driving, is adversely affected by inadequate sleep (Banks & Dinges, 2007). Reduced sleep can result in depressed mood, lapses in attention, affect cognitive functioning and affect working memory; there are also adverse physiological effects on the endocrine system, metabolic functions and inflammatory responses (Banks & Dinges, 2007). Perhaps one of the most concerning effects of sleep loss and fatigue is the resulting increase in the risk of microsleeps, also known as sleep fragments (i.e. briefly falling asleep, usually for less than 15 seconds; Herrmann et al., 2010). In a trial of simulated driving, participants were sleep deprived for 20 hours before the experiment started; recorded observations and ECGs were used to identify and measure the occurrence of microsleeps. Participants were asked to signal when they felt sleepy and believed might fall asleep (Herrmann et al., 2010). These researchers concluded that participants could fall asleep without feeling sleepy and that this implied that driving accidents caused by sleepiness or falling asleep cannot automatically be attributed to individual negligence. Other authors have reported that drivers can be unaware of slipping into microsleeps (Higgins & Fette, 2012). The implications and importance of this, and similar, studies to paramedics and other shift workers are striking.

4.5. Suicidality

Suicide is one of the leading causes of death in Australia and is ranked first as the cause of death for those aged 15-44; it ranks third for those aged 45 – 64 behind coronary heart disease and lung cancer (Australian Institute of Health and Welfare, 2020a, 2021). Suicide is harming oneself with explicit or implicit intent to cause one's own death (Australian Psychological Society, 2011). Suicidality is the risk of suicide (Johnston et al., 2009) which may be expressed by thoughts and behaviours (Department of Health and Aging, 2007). These thoughts and behaviours include suicidal ideation where people genuinely entertain thoughts about taking their own life or make a plan as how to end one's life, and attempts to suicide where the intention is to die (Beyond Blue Ltd, 2018; Freedenthal, 2007, World Health Organization, 2014).

Two recent reports have indicated that the levels of suicide are relatively high for paramedics in Australia. A report of the Coroner's Court of Victoria (Dwyer & Bugeja, 2015) found that the average rate per 100,000 of paramedic suicide was 35.6 in the period from 2008 - 2014, which was three times that of the general population and approximately twice that of related professions (of police, nurses and medical practitioners. A fact sheet from the (Australian) National Coronial Information System (NCIS) (2019) reported that 26 paramedics died by suicide in the 12-year period from 2000. The NCIS report did not provide standardised data so comparisons with the general population were not able to be made. However, percentage of suicides was highest for NSW (34.5%) followed by Victorian paramedics at 23.9% (NCIS, 2019).

In a review of suicidal behaviours and thoughts in first responders, Stanley et al. (2016) found only two studies relating to paramedic suicide. One study (Mitchell & Bray, 1990) reported that three New York paramedics died by suicide in 1992; this study did not report

rates or comparison groups. A second study on the prevalence of suicidal ideation and past suicide attempts in Norwegian paramedics reported levels that were comparable with other human service occupations in Norway (Sterud et al., 2008c). As part of a broader study, Regehr et al. (2002) reported 5.8% of Canadian paramedics had suicidal thoughts and 1.2% had made a suicide attempt. However, the time frame during which these aspects of suicidality occurred was not reported, nor were comparisons made with the general population. A more recent study reported that UK paramedics had a higher risk of dying by suicide than the general population (Mars et al., 2020). The risk was 75% higher for male paramedics; there was insufficient data to calculate reliably the risk for female paramedics.

A more recent nation-wide study by Beyond Blue (Lawrence et al., 2018) on the mental health and wellbeing of emergency workers in Australia included measures of suicidality. This study measured the past year prevalence of suicidal thoughts, suicidal planning, and suicide attempts in paramedics. Beyond Blue reported the prevalence of past year suicidal thoughts to be 6.5%, which was two times higher than the general population; the prevalence of suicidal planning was 3.0% and three times higher than the general population (Lawrence et al., 2018). The prevalence of suicide attempts was 0.5% but a comparison with the general population was not reported.

That just four studies reporting suicidality in paramedics could be found in addition to the two coroners' reports indicates the paucity of the literature in this area. The high level of paramedic suicide in Victoria, Australia, as indicated by coroner's report is clearly a cause for unease, as are the findings in the Beyond Blue report indicating that past-year suicidal thoughts and planning are at least twice as high as the prevalence in the Australian population. These observations, plus the scarcity of information on paramedic suicide indicates there is a clear need for further research into paramedic suicidality.

Only one study, conducted under the auspices of Beyond Blue, reported differences in suicidality related to demographic variables in Australian first responders, which included participants drawn from the police, fire and ambulance services, and the state emergency service (Lawrence et al., 2018). The analysis of sociodemographic differences was conducted on the entire sample, although the different levels of suicidal thoughts and plans, and suicide attempts, in the different services were reported. This study found no significant association between sex, age, and those working in metropolitan or rural areas, and past year suicidal thoughts or plans. However, increasing years of service was associated with more suicidal thoughts in the past year. With respect to marital status, higher levels of suicidal thoughts and plans were obtained for those participants who were separated (compared to those who were married, divorced, in a committed relationship, widowed or single).

Suicidality can have a powerful impact wherever it occurs. The consequences of a suicide or an attempted suicide are personal in that those close to a person who has completed suicide will often blame themselves and the, “combination of grief, guilt and remorse can remain for years,” (Senate Community Affairs References Committee, 2010, p. 7). The after-effects of a suicide spread beyond immediate family and friends and extend to the wider social context. There is a chain of consequences that spreads outward to include co-workers, neighbours as well as the wider community with which the person was involved. The impact can be particularly striking and distressing in the context of an organisation like the ambulance service because of the close and mutually supportive relationships and camaraderie that can exist among first-responder co-workers (Stanley et al., 2016).

4.6. Sources and Impacts of Stress

The work of paramedics can be stressful, but some sources of stress are to be found in the paramedics' working environment (Hamilton, 2009; Young & Cooper, 1997). This section

aims to explore further the relationship between the experience of stressful events and their possible mental health consequences.

4.6.1. The Stressors of Ambulance Work

The events that cause paramedics severe stress are found to be similar across a number of studies, although there is variation in the terminology used to describe each stressor. The stressors listed below are identified as causing the most severe stress, as taken from various studies (Boudreaux & Mandry, Carleton et al., 2020; 1996b; Gallagher & McGilloway, 2008; Regehr et al 2002; Robinson, 2002; Sterud et al., 2008b; Van der Ploeg & Kleber, 2003).

Stressors rated by paramedics as resulting in severe stress-

1. Taking care of seriously injured and dying patients
2. Uncertainty about what you will meet on the scene of accident
3. Incident involving death or serious injury of a colleague, friend or people you know.
4. Death of/seriously injured children
5. Dealing with acting-out and threatening patients
6. Threat of personal injury
7. Driving under difficult conditions

It could be argued that there is no surprise in this list of stressors. Most people would find these situations to be stressful and would expect them to be experienced by paramedics. However, some researchers have found that non-operational workplace related events are rated as stressful as those listed above. Lack of support from co-workers and from managers has been rated by paramedics to be as stressful as those experienced as part of ambulance work (Sterud et al., 2008b).

Severity and frequency of individual stress items can be multiplied together to obtain a measure of impact, or 'stress index score' (Vagg & Spielberger, 1994). When this procedure is applied to the data in the Sterud et al. (2008b) study, lack of co-worker support has an impact similar to dealing with serious operational tasks. Lack of support from leaders has a smaller impact, but is similar to dealing with challenging job tasks. These findings indicate that it not only paramedic work that can impact on psychological health, and that sources of stress from the organisation can also have a significant impact.

Other studies have also found that lack of organisational support or lack of support from managers is a source of stress. While these studies have used a range of methods to assess sources of stress, there is consistency in that management style or attitude has been found to be a source of organisational stress (e. g. Boudreaux & Mandry, Carleton et al. 2020; 1996b; Brough, 2004; Gallagher & McGilloway, 2008; Mahoney, 2001,).

The working environment can have a significant impact on employee stress, wellbeing and mental health (Burke & Paton, 2006; Lawrence et al, 2018). Workplace psychosocial factors are broad, but they all have the potential to influence employee mental health. These factors can include support from managers and colleagues, (e.g. through recognising the work that an employee has done); however a negative team environment and management style can cause employee stress (Lawrence et al, 2018). Consequently, an organisational culture supports a management style, and other organisational behaviours can exist that can become a source of stress for paramedics. Furthermore, this source of stress can have an impact similar to that resulting from the serious operational tasks (emergency work) done by paramedics. This is perhaps concisely expressed by a quote from a paramedic participant from a study conducted by Paula Brough (2005),

"A lot of emphasis is made about the stress of the 'big jobs', but I have only had a couple of jobs upset me. More often it is the little things that annoy me, no lunch/dinner, late finishes when you have plans. The cumulative effect of those things are often worse than any job."

4.6.2. The Experience of Stress and Psychological Health Outcomes

There are many stressors experienced by paramedics and they have many sources. The paramedic experience of stress or demands from the ambulance workplace can have an impact on psychological health. Several studies have found associations between the experience of stress events and psychological mental health (e. g. Boudreaux & Mandry, 1996b; Brough, 2005; Regehr et al., 2002, Wagner et al., 2020). Some researchers have conducted longitudinal studies over various periods of time. These researchers measured the levels of psychological health in paramedics before and after exposure to stressors (e.g. Gallagher & McGilloway, 2009; Sterud et al., 2011). The study by Gallagher and McGilloway (2007) examined the effects of critical incidents on the psychological health and wellbeing of paramedics. Critical incidents (CIs) were defined as, "an incident that is sufficiently disturbing to overwhelm the individual's usual method of coping." All the critical incidents were serious operational tasks that involved attending patients (e. g. injury of a child) or were associated with attending patients (e. g. threat to own life). The aspects of psychological health measured in this study were Posttraumatic Stress Disorder, burnout and health related quality of life. Gallagher and McGilloway concluded, "...that exposure to CIs has a considerable impact on psychological health and wellbeing of EMTs [Emergency Medical Technicians]..." (p.10

In a study of Norwegian paramedics, Sterud et al. (2011) used two instruments to assess the independent variables of the experience of job-related stress (stressors). One instrument was the Job Stress Survey (JSS) and the other was specifically developed for the

ambulance service context and named the, Norwegian Ambulance Stress Survey (NASS); both scales measured the severity and frequency of stress events. The JSS had four scales that measured 'time pressure,' 'challenging job tasks,' 'lack of leader support' and 'lack of co-worker support.' The three scales comprising the NASS were 'non-emergency tasks,' 'serious operational tasks' (which are very similar to critical incidents as described in the previous study), and 'physical demands.' The dependent variables measured included emotional exhaustion, job satisfaction, health complaints and psychological distress. Measurements were taken in April, 2005 (T1) and in May 2006 (T2). The general finding was that exposure to stressors was associated with worse psychological health outcomes. All the stressors, measured at T1, except for serious operational demands, were significantly correlated with the outcome variables. Multiple linear regression analyses were conducted to identify which independent variable measured at T1 predicted the dependent variables; models with no adjustment were reported along with models adjusted for the T1 levels of the relevant dependent variable.

For the adjusted regression models, Sterud et al. (2011) found that there were no significant predictors of low job satisfaction but emotional exhaustion was predicted by severity of time pressure and severity of serious operational demands, while no stressor variables predicted psychological distress. Unadjusted models identified that low job satisfaction (T2) was predicted by frequency of lack of leader support and the severity of challenging job tasks. Emotional exhaustion (T2) was predicted by frequency of lack of leader support, severity and frequency of time pressure, severity of physical demands and severity of operational demands. Psychological distress (T2) was predicted by lack of co-worker support. The findings presented here have been simplified to illustrate the point that paramedics exposed to stress events are at a greater risk of mental ill-health and that these stress events include aspects of the work environment as well as critical incidents.

Together, these studies are important because they provide evidence to support the contention that exposure to stressors can lead to paramedics experiencing various forms of psychological ill health.

4.7. Methodological Flaws in Studies of Paramedic Mental Health

A review of the literature was conducted by Boudreaux and Mandry in 1996 (part 2) and concluded that there were high levels of burnout, stress, depression and PTSD in paramedics. These authors also noted that many studies on paramedic mental health were compromised by problems associated with sample characteristics, the methodology used in assessing psychological health status, problems with study design and criticized the statistical analyses used and their interpretation.

A subsequent literature review on paramedic health was conducted by Sterud et al. in 2006, and reached essentially the same conclusions. As well as reporting on burnout, stress, depression and PTSD, Sterud and his colleagues also appraised articles that had studied anxiety, sleeping problems and 'psychological strain.' Once again, the majority of articles reviewed reported high levels of psychological ill health and, once again, methodological flaws were reported. The authors of both review articles concluded that it was not possible to firmly conclude that ambulance workers experienced more mental health problems than the general working population. Although, a more recent literature review by Wagner (2020) reported elevated levels of mental disorders related to the experience of ambulance work compared to the general population.

Two reviews that considered articles published between 1996 and 2005 identified methodological flaws listed below (Boudreaux & Mandry, 1996a; Sterud et al, 2006)-

1. Small sample sizes.
2. Low response rates.

3. Non-representative samples.
4. Samples not restricted to ambulance workers. Some studies included ambulance paramedics and fire-fighters and did not treat these workers separately.
5. Lack of clarity about the nature of the ambulance work performed. There is a need to distinguish between non-emergency work (like non-emergency patient transport) and emergency work.
6. Regional circumstances need to be considered as they might influence the type of ambulance work performed. Working in a low socioeconomic status (SES) urban area might be different from work performed in high SES or rural areas.
7. No studies in the 2006 (Sterud et al.) review systematically compared the level of symptoms or prevalence of cases in paramedics with normative samples in the general working population. Studies should report means, the number of cases and confidence intervals for both ambulance workers and normative populations.
8. A lack of consistency in assessing and measuring health problems. This makes it difficult to compare risk and prevalence with other occupational groups and makes it difficult to draw clear conclusions about the status of health in the ambulance services.
9. There has been a lack of consistency in measuring personality and coping behaviour or skills and little consensus on how these areas might interact with health outcomes.

4.8. Conclusion

The findings on mental health across separate paramedic populations differ; most paramedic groups appear to have high levels of mental health conditions but some do not. If these differences between paramedic populations are genuine, then the question arises as to why there are such differences. That these differences are observed means that there is a strong imperative and obligation to assess the psychological health of different paramedic groups so that those who are at risk of poor psychological health can be identified and

appropriate measures taken accordingly. There has been insufficient work on investigating potential regional and role differences within individual paramedic work forces (Sterud et al., 2006). Additionally, many studies have not placed their findings on paramedic psychological health into context by making comparisons with the general population or other occupational groups. Two reviews of the literature have reported methodological flaws in studies of paramedic mental health with the consequence that inconsistent and contradictory findings have been reported. A corollary of these shortcomings is that it has been difficult to draw clear conclusions regarding the standing of mental health in paramedic workforces, nor can the role of work-related and individual factors be ascertained (Sterud et al., 2006)

More consistently, there have been higher levels of PTSD reported in paramedics by a number of studies and a systematic review (Berger et al. 2012). It can be more firmly concluded that PTSD is a mental health issue of concern for paramedics. The topic of suicide within paramedics has been largely neglected. However, a recent coroner's report found that the level of reported suicide was high in paramedics in Victoria compared to the general population, other health professionals and other first responders (Dwyer & Bugeja, (2015). A more recent Australian nation-wide study reported similar findings (Lawrence et al., 2018). These studies indicate that suicidality is an emerging concern in relation to paramedics and there is a clear need for further research into suicidal thoughts and behaviours among ambulance workers. Most (five out of six) studies reviewed here reported higher levels of poor sleep health compared to the general population. Problems with sleep also appear to be a mental health concern for paramedics.

There is a body of evidence that paramedics are exposed to a range of stressors and that these can have negative mental health consequences. There are clear indications that this range of stressors is not confined to the traumatic nature of emergency work (e. g. Hamilton, 2009). It is apparent that sociodemographic stressors arising from the organisation and the broader social context of paramedic work can also have mental health consequences.

4.9. Aims and Hypotheses

The purpose of the current project was to contribute to what is known about the mental health of paramedics with the intention of identifying specific concerns and impinging factors. To achieve this purpose, this study aimed to identify the prevalence of psychological ill health in paramedics and to examine the impact that different roles and work environments might have on paramedic health. This study also aimed to place the psychological health of Victorian paramedics into the context of the general Australian population and other paramedics through the use of suitable comparisons. A further aim was to assess the association of predictor variables with mental health outcome variables, and to identify the comorbidities of suicidality and PTSD. The final aim was to examine the association of stressors specifically experienced by paramedics, with mental health outcomes. The variables under study in this project are presented in Figure 5.

It was hypothesised that;

1. Differences in mental health scores would be found according to groupings based on sociodemographic variables across the paramedic workforce.
2. This paramedic population would demonstrate significantly poorer mental health in comparison to the general population.
3. Sociodemographic and sleep health variables would predict scores on measures of mental health within the paramedic sample.
4. Sociodemographic and mental health variables would predict PTSD and suicidal ideation within the paramedic sample.
5. Scores on measures of stressors experienced by paramedics would predict variables measuring mental health outcomes within this sample.

Chapter Five

5. Method

5.1. Participants

A survey was designed to gather sociodemographic and mental health data. It was distributed by email to 2801 paramedics across the State of Victoria in September, 2010, and was available for participants to respond until the end of January 2011. There were 1120 respondents who completed at least part of the survey. As it was a large, voluntary survey, not all participants completed all sections. For the purposes of this thesis, participants selected were paid paramedics whose primary role was to transport patients. Data were available from 879 respondents. This represents a response rate of 31.4% across the available paramedic workforce at the time of data collection. All participants who completed the relevant sections of the survey were included in the various analyses reported in this study with the pertinent numbers and percentages indicated in the findings presented. Sample sizes for individual items or surveys vary slightly due to missing data.

5.2. Participant Demographic Variables Descriptive Information

Overall, 336 females (38.2%) and 542 males (61.7%) (one participant did not specify their sex) completed the sections of the survey measuring mental health. This closely reflects the female to male ratio in the Ambulance Victoria workforce of 35% to 65% at the time of data collection. The mean age of the sample was 37.3 years (SD = 9.9) with a range of 21 to 68 years. The proportions of sex and age groups in the study sample and the general Victorian

population are shown in Table 1. The general Victorian population data is provided for the purposes of comparison.

Table 1

Sex and age distribution of the present sample and the Victorian general population

		Ambulance Sample		General Victorian Population ¹
		<i>N</i>	%	%
Sex	Males	542	61.7%	49.7
	Females	336	38.3%	50.3
Age	20-24	75	9.0	12.2
	25-29	156	18.8	12.5
	30-34	115	13.9	11.6
	35-39	132	15.9	11.7
	40-44	146	17.6	11.8
	45-49	89	10.7	11.2
	50-54	81	9.8	10.7
	54-59	25	3.0	9.6
	60+	10	1.2	8.8

Notes.

1. The proportion of the sexes in the age range 20 – 64 in Victoria was calculated using 2011 data from the Australian Bureau of Statistics (ABS); (2013).

Responses (n = 877) to the question asking about marital status indicated that 16.9% had never married, 6.7% were partnered but not living together, 71.4% were married or living together and 5.0% had been divorced (none were widowed).

The educational qualifications of this sample (n = 878) were as follows: 29.4% Diploma or Certificate, 50.9% Bachelor degree, 18.9% postgraduate level qualification, and 0.8% identified 'other' qualification.

Paramedics in this sample (n = 879) reported a mean of 9.5 years of operational experience (SD = 8.2 years) with Ambulance Victoria. The sample was asked about average time taken to transport patients, and data was provided by 825 participants. As the sample was drawn from metropolitan and rural regions, there was a wide variation reported in the average time this variable. The mean patient transport time was 42.3 minutes with a SD of 53.0 minutes.

Ambulance Victoria employs paramedics in a range of roles and levels. The numbers and percentages of respondents from this sample in these roles are shown in Table 2.

Table 2

Numbers and percentages of paramedics in the sample performing various roles in

Ambulance Victoria

Role Title	<i>n</i>	%
Graduate paramedic (i.e. working with a clinical instructor).	104	11.8
Paramedic.	415	47.2
MICA paramedic.	151	17.2
Senior reserve paramedic.	37	4.2
Clinical instructor.	172	19.6

Notes. N = 879.

Role title designates the types of paramedics in Ambulance Victoria that transport patients (Ambulance Victoria website, 2016). The roles included in this study were 1/ graduate

paramedic, a newly employed paramedic working under the supervision of a clinical instructor, 2/ paramedic, a fully qualified paramedic able to work independently, 3/ MICA paramedic, a qualified paramedic with an advanced skill set and who can perform advanced medical procedures, 4/ senior reserve paramedic, a senior paramedic who provides patient assessment and transport services when required and 5/ clinical instructor, a qualified paramedic responsible for the on road training of graduate paramedics.

As well as the formal role performed, there is the totality of organisational setting in which a paramedic might work. The formal role can have a range of characteristics which are collectively known as a 'role set' (Pettinger, 2000). The role set terms are largely self-explanatory, such as overtime shift, on-call. A paramedic works two days followed by two nights followed by four days off works a rotating shift. This is a standard shift pattern in Ambulance Victoria. A regular shift refers to a paramedic who works a regular shift pattern, such as, 9.00am to 5.00pm, every working day. (Other ambulance services (e. g. in the United States) may have different work patterns and work shifts of 24 hours or more [Brachet et al., 2012]). In the context of this study, the organisational setting includes job characteristics such as shift work, single responder, doing relieving duties and so on. The number and percentages of the paramedic participants in this study whose job has a given role set characteristic are shown in Table 3. Note that these categories are not mutually exclusive.

Table 3

Numbers and percentages of paramedics in sample whose role includes various role set characteristics (N = 879)

Role Set Characteristic	<i>n</i>	%
Rotating Shift work	758	86.2
Regular Shift work	92	10.5
Overtime Shifts	379	43.1
On-Call	122	13.9
Single Responder	112	12.7
Relieving	68	7.7
Communications Centre or Control Room	30	3.4
Team Manager	60	6.8
Clinical Instructor	231	26.3
Clinical support	14	1.6
Air Ambulance – Helicopter	4	0.5
Air Ambulance – Fixed Wing	10	1.1

Participants were drawn from across the regions of Ambulance Victoria. Of the sample, 71.4% were from the Melbourne metropolitan area, and 28.6% was from the remainder of the State. Table 4 shows the sample numbers from each region and the percentage of the sample represented. The six regions of Ambulance Victoria are shown in Figure 4

Table 4

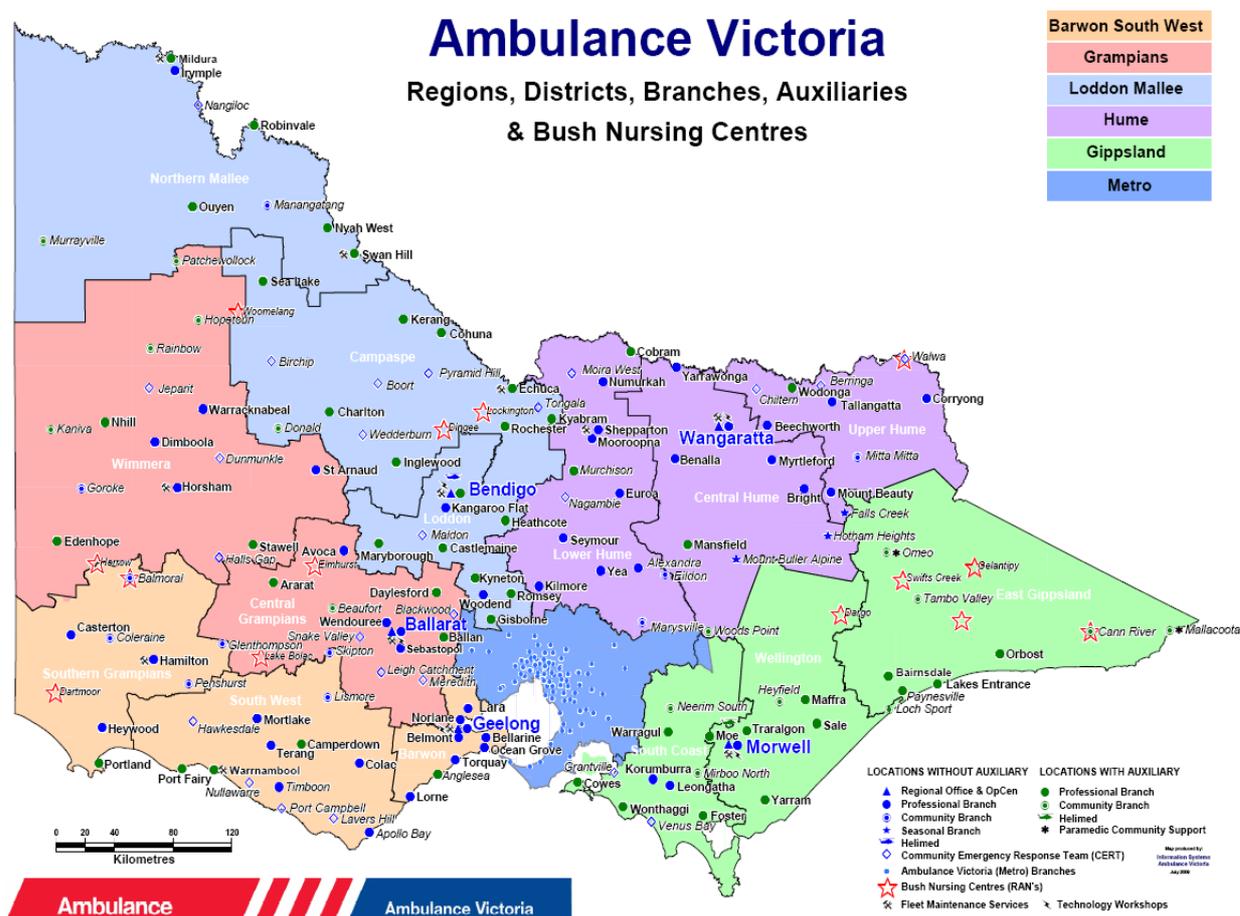
Sample numbers and percentages drawn from each of the Ambulance Victoria regions

Ambulance Victoria Regions	<i>n</i>	%
Barwon South West	52	6.0
Grampians: Central & Wimmera	27	3.1
Lodden-Mallee	74	8.5
Hume	48	5.5
Gippsland	48	5.5
Metropolitan (including Air Ambulance Victoria)	622	71.4

Notes. N = 871.

Figure 4

Map showing the Ambulance Victoria General Regions



Source: "Ambulance Victoria," by G. Leach and G. Hocking, 2013, p. 3, (<https://slideplayer.com/slide/10203750/>).

Paramedics completing the survey were asked to record the postcode or the name of the locality (or branch) where they worked. This information was used to create a variable that recorded the postcode of the location of the Ambulance Victoria branch from which they worked. The Australian Bureau of Statistics (ABS), "Index of Relative Socio-economic Advantage and Disadvantage," (ABS, 2013) was used to assign a socioeconomic value to a postcode. Areas are ranked according to SES and this index assigns areas to a decile where the lowest (or most relatively disadvantaged) 10% of areas are given a decile value of 1 and the least disadvantaged (or most relatively advantaged) area is given a decile value of

10. This index was used in the current project to be consistent with the measure of SES is used by the Australian Institute of Health and Welfare (AIHW) in its publications on health in Australia (AIHW, 2014). The distribution of paramedics drawn from the various locality SES decile classifications is shown in Table 5.

Table 5

Numbers and percentages of paramedics in the sample drawn from the locality SES decile classifications in Victoria

Locality SES	<i>n</i>	%
SES Decile 1 (Most Disadvantaged)	123	15.8
SES Decile 2	76	9.8
SES Decile 3	82	10.5
SES Decile 4	68	8.7
SES Decile 5	42	5.4
SES Decile 6	146	18.8
SES Decile 7	46	5.9
SES Decile 8	59	7.6
SES Decile 9	75	9.6
SES Decile 10 (Least Disadvantaged)	61	7.8

Notes. N = 778.

The AIHW also uses the ABS, “Australian Standard Geographic Classification –Remoteness Area (ASGC-RA) system to classify the remoteness of areas by postcode, (Australian Bureau of Statistics, 2012; Australian Institute of Health and Welfare [AIHW], 2012). There are five remoteness categories based on their distance from an urban centre, “where the population size of the urban centre is considered to govern the range and types of services available,” (AIHW, 2012, p. 49). Areas (and corresponding postcodes) are classified as

Major cities, Inner regional, Outer regional, Remote or Very remote. Each postcode for the Ambulance Victoria branches identified in this study was classified according to the ASGC-RA system and these classifications were recorded in a new variable termed, "Locality Remoteness." There were 778 participants who provided information enabling the remoteness of the area in which they worked to be determined. 73.9% of participants worked in a major city, 19.5% worked in an inner regional area and 6.6% worked in an outer regional area. No participants included in this study were identified as working in an area classified as remote or very remote.

5.3. Materials Used to Assess the Outcome Variables

Data in this survey were collected by use of an online, omnibus survey (see Appendix A for a copy of the survey). The survey included measures of various aspects of psychological health and wellbeing. In addition, demographic information and job roles were recorded. The survey items used to measure mental health symptomatology were based on validated and reliable measures so that comparisons could be made with the general population and normative groups. Some survey items measuring sources of stress were specific to the ambulance service and derived from the work of Robinson, (2002).

The shorter forms of all instruments were chosen when that was possible with the aim of producing a parsimonious survey. The aspects of general and psychological health that were measured in the study were anxiety, depression, stress, general psychological health, posttraumatic stress symptomatology, suicidal ideation, suicidal planning and suicide attempts, sleep quality and use of sleep medication.

5.3.1. Depression, Anxiety and Stress

Depression, anxiety and stress were measured using the 21-item version of the Depression, Anxiety and Stress Scale (DASS21). The DASS21 has three self-report subscales, each comprised of seven items, designed to measure these emotional states (Lovibond & Lovibond, 1995). Respondents are asked to indicate how much each item applied to them in the past week by choosing from the following statements, “Did not apply to me at all,” (score 0), “Applied to me to some degree, or some of the time,” (score 1), “Applied to me a considerable degree, or a good part of the time,” (score 2) and, “Applied to me very much, or most of the time,” (score 3).

The items comprising the sub-scales of the DASS21 are listed in section D2 of the survey placed in Appendix A. Higher scores indicate a higher level of severity for the emotional state concerned: cut-off points for the interpretation of scores are shown in Table 6 (Lovibond & Lovibond, 1995). For the purposes of analyses using the binary logistic regression technique, respondents were classified as ‘cases’ or ‘non-cases’. Cases were identified when respondents score were above the normal range.

Table 6

DASS21 Cut-off Scores for Severity Rating Interpretation

Severity Rating	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	1-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Notes. DASS21 scores are doubled for interpretation. This table shows cut-off points for doubled scores.

5.3.1.1. Depression

The depression sub-scale measures dysphoria, feelings of hopelessness, that life is devalued, self-denigration, loss of interest in things, lack of positive feelings and a sense of inertia. Items that measure depression include, "I felt down-hearted and blue," "I felt I wasn't worth much as a person" and, "I felt that life was meaningless," (Lovibond & Lovibond, 1995).

5.3.1.2. Anxiety

The anxiety sub-scale measures autonomic arousal, musculo-skeletal effects of anxiety, anxiety related to setting, and personal experience of anxious affect. Items that measure anxiety include, "I was aware of dryness in my mouth," "I experienced trembling," "I was worried about situations in which I might panic and make a fool of myself," and, "I felt I was close to panic," (Lovibond & Lovibond, 1995).

5.3.1.3. Stress

The stress scale measures difficulty in relaxing, nervous arousal, proclivity for feeling upset, tendency to overreact to things and sense of impatience. Items that measure stress include, "I found it hard to wind down," "I felt that I was using a lot of nervous energy," "I found myself getting agitated," and, "I was intolerant of anything that kept me from getting on with what I was doing," (Lovibond & Lovibond, 1995).

As previously mentioned, the 21-item version of the DASS was used in this study; the original version was made up of 42 items and published by Lovibond and Lovibond, (1995). Scores on the individual scales of the 21-item scale are totalled then doubled to enable comparison with normative data derived from the 42-item scale (Lovibond & Lovibond, 1995). Work by Henry and Crawford (2005) demonstrated that doubling scores on the 21-

item version of the DASS produced very similar scores derived from the 42-item version and that the levels of validity and reliability were maintained. These findings indicated that the norms derived from the 42-item version of the DASS could be used by doubling the scores of the DASS21.

Reliability data for the DASS21 has been published by Henry and Crawford (2005) who reported Cronbach's alpha for the scales of the DASS21. They obtained values of 0.88 for the depression scale, 0.82 for the anxiety scale and 0.90 for the stress scale. Cronbach's alpha was 0.93 for the total scale

Crawford and Henry (2003) reported convergent validity correlations between the DASS21 and two other measures: the Hospital Anxiety and Depression Scale (HADS) ($r = 0.66$ for depression items and $r = 0.62$ for the anxiety items), and the Personal Disturbance Scale (sAD) ($r = 0.78$ for depression items and 0.72 for the anxiety items). Crawford and Henry (2003) also reported a correlation of 0.67 between the DASS stress subscale and the Negative Affect component of the Positive and Negative Affect Schedule (PANAS).

5.3.2. General Psychological Health

The General Health Questionnaire (GHQ) was developed by Goldberg in 1972 (Stride et al., 2007) to detect minor psychological disorders in the general population. Two broad classes of experiences which are 1/ the inability to conduct one's normal 'healthy' functions and 2/ the appearance of phenomena of a distressing nature (Goldberg & Hillier, 1979).

There are several versions of the GHQ and the 28-item version (GHQ28), developed by Goldberg and Hillier (1979), was used in this study. The GHQ28 distinguishes between four aspects of mental health which are 1/ somatic symptoms, 2/ anxiety and insomnia. 3/ social dysfunction and 4/ severe depression.

Respondents are presented with a series of health-related items and are asked to rate how that aspect of their health has been over the past few weeks. Different ways of rating the items are presented in the questionnaire. One way in which the choices are rated is, “better than usual,” “same as usual,” “worse than usual” and “much worse than usual.” Whichever rating system is used all the items may be scored on a Likert scale that may be in the format of a 0 – 1 – 2 - 3 scale or on a 0 – 0 – 1 - 1 scale (where the first two rating points are scored ‘0’ and the second two ratings are scored ‘1’). For each scoring system, a higher score indicates higher level of morbidity. When the 0-1-2-3 scoring system is used and total scores are calculated, a cut-off score of five or more is used to identify a case of potential morbidity (Goldberg & Hillier, 1979). A cut-off score of two is used to identify potential cases of morbidity on the subscales (calculated using the 0-0-1-1 scoring system) (Goldberg, 1978). Both scoring systems were used in this study depending on the analysis that was being conducted. When analyses making comparisons with other studies were conducted, data from the present study was scored using the same system as the comparison study. The GHQ28 was scored using the 0-1-2-3 system in the present study and, when the binary logistic regression technique was used, cases were identified using a cut off score of five. Examples of items from the GHQ28 are, “Been feeling perfectly well and in good health,” “Lost much sleep over worry,” “Been able to enjoy your normal day-to-day activities” and “Been thinking of yourself as a worthless person.”

Goldberg and Hillier (1979) report concurrent validity data where scores on the GHQ28 subscales were correlated with independent clinical measures. The correlation coefficients ranged from 0.32 (for somatic symptoms) to 0.70 (for anxiety and insomnia). The aim of the GHQ28 is to identify people who might be suffering from psychological distress. Goldberg & Hillier (1979) report that sensitivity is 88% and specificity is 84.2% with a cut-off score of 5 or more using the 0-0-1-1 scoring system; misclassifications were 14.5%.

5.3.3. Posttraumatic Stress (PTSD) Symptomatology

PTSD symptoms were measured with the Short Screening Scale for DSM-IV PTSD, a seven-item screening instrument developed by Breslau et al. (1999). This short scale is derived from the (US) National Institute of Mental Health Diagnostic Interview Schedule (Robbins et al, 1995) and the WHO Composite International Diagnostic Interview, version 2.1 (World Health Organization, 1997). Five of the seven items measure avoidance and numbing symptoms associated with PTSD and the other two items measure symptoms of arousal (Breslau et al., 1999). Items on this screening instrument include, “Avoided being reminded of the experience by staying away from certain places, people or activities,” and “Became jumpy or easily startled by ordinary noise or movements.” The seven items of this scale are provided in section D5 of the survey located in Appendix A.

Participants are asked to indicate if they have experienced each of the seven symptoms in the past month, in the past year, and at any time in the past. The response to each item is ‘yes’ or ‘no.’ A case of probable PTSD is identified when the respondent answers ‘yes’ to four or more items (Breslau et al., 1999). The authors did not report reliability data; however, Breslau et al. (1999) used a cut-off point of four symptoms to indicate the presence of PTSD. This results in a sensitivity of 80.3% and a specificity of 97.3%. They also report a positive predictive value of 71.3% and a negative predictive value of 98.3%.

5.3.4. Suicidality

There can be variation in the terminology used in discussing suicide. Generally, suicidality refers to suicidal thoughts and behaviours. Suicidal thoughts can include thoughts about suicide and planning; behaviours are actions associated with suicide, such as, putting a plan into action, attempting suicide and the act of suicide (Johnston et al., 2009)

Suicidality was measured using a series of five questions from Paykel's Suicidal Feelings in the General Population Questionnaire (Paykel et al., 1974). This instrument was selected because it was used in the only published study on paramedic suicidality (Sterud et al., 2008c) at the time the present study was developed. Using this instrument developed by Paykel et al. (1974) enabled comparisons to be made with the Sterud et al. (2008c) study.

The Paykel et al (1974) questions assess suicide-related thoughts and actions along a continuum ranging from 'feeling that life is not worth living' to having 'attempted suicide.' Although these authors concluded there was a continuum of suicidality, they also noted that suicidal feelings, attempted suicide and completed suicide should not necessarily be equated with each other. Consequently, the responses to these items are not added to form a score; the items are analysed individually by making comparisons with a normative group or a reference group of interest.

The items on this measure of suicidality included, "Have you ever felt that life was not worth living?" and "Have you ever made an attempt to take your life?" The responses to each question are 'yes' or 'no.' For each question, the respondent was asked to nominate a time frame in which the thought or action occurred: 'in the past year' or 'ever, in the past.' The questions developed by Paykel et al. (1974) are shown in section D7 of the survey presented Appendix A.

Paykel et al. (1974) did not report information about reliability but validity was assessed by using a chi-square test to assess the association between the percentage of people experiencing psychiatric symptoms and the percentage of people whose responses indicated the presence of suicidal ideation on his scale. The responses to the suicidal ideation questions were compared with 28 psychiatric symptoms and there was a statically significant association ($p < 0.05$) with 23 of these symptoms.

5.3.5. Sleep Quality

The presence of problems with sleep was measured with items taken from the Karolinska Sleep Questionnaire (KSQ) (Kecklund & Akerstedt, 1992). The KSQ was chosen because items taken from this scale measuring 'disturbed sleep' had been used in a study on Norwegian paramedics (Sterud et al., 2008a). The intention was to enable a direct comparison of sleep quality in this study sample with another paramedic population.

The four items taken from the KSQ to form a subscale used to measure 'disturbed sleep' were 1/ Difficulties falling asleep, 2/ Repeated awakenings, 3/ Premature awakening and 4/ Disturbed/Restless sleep ($\alpha = 0.8$) (Sterud et al. 2008a). Akerstedt et al., (2002) conducted a large study (N = 5720) which employed items from the KSQ and confirmed that presence of a single factor they named as 'disturbed sleep' and which was comprised of the items described above. Akerstedt et al. (2002) also reported a factor which they labelled as 'impaired awakening' which was comprised of two items: 1/ Difficulties awakening and 2/ 'Not well rested on awakening.' These two items were treated as separate dependent variables by Akerstedt et al., (2002) because they were the only items contributing to the 'impaired awakening' factor. Two other items were included in this analysis (by Akerstedt et al.) and were incorporated in the present study. These items were 1/ 'Nightmares' and 2/ 'Heavy snoring.'

Each item from the KSQ is scored (1 -5) on a five-point categorical scale. Respondents are asked to indicate how often they experience the various difficulties associated with sleep. The choices are 1/ never, 2/ seldom-a few times per year, 3/ sometimes-several times per month, 4/ mostly-several days per week and 5/ always-everyday. Sterud et al. (2008a) used a scoring system of 0 – 4 for each item in their study of Norwegian paramedics which is different from that used by Kecklund and Akerstedt (1992). That different scoring systems have been used by different researchers makes it necessary to use the relevant scoring

system when making comparisons with the data on sleep quality from the present paramedic study. Irrespective of the scoring system that is used, higher scores indicate a higher level of severity of the facet of the sleeping problem under consideration.

A score for 'disturbed sleep' is calculated by obtaining the mean of the scores on the four items making up the scale (the mean item score); the cut-off point for determining a case of disturbed sleep was set at 3.5, consistent with the manner in which previous researchers have used these items from the KSQ (Akerstedt et al., 2002). Cases were identified on the remaining four items if a score of 4 or 5 was obtained (also consistent with the process used by Akerstedt et al. [2002]).

Kecklund and Akerstedt (1992) reported validity data by correlations with other measures of health. They reported findings for 1/ psychosomatic health and 2/ mental health in two samples. The correlation coefficients ranged from 0.27-0.49 and all the p-values were less than 0.01. Internal consistency was measured by using Cronbach's alpha, which exceeded 0.80 in two samples. Akerstedt et al. (2002) reported internal consistency for the 'disturbed sleep' KSQ subscale and reported a Cronbach's α value of 0.76; Sterud et al, (2008a) reported a Cronbach's α value of 0.8.

The KSQ items used to measure sleep quality are shown in section C7 of the survey located in Appendix A.

5.3.6. Sleeping Tablet Use

Participants were asked if they had taken sleeping tablets in the previous two weeks. The question was based on a study of paramedic health by Robinson (1984) and the format was derived from the Australian Bureau of Statistics (2007) National Health Survey Of Mental Health And Wellbeing. The question was, "Have you taken sleeping tablets or capsules in

the previous two weeks," with a Yes/No forced choice answer (see section C5 of the survey placed in Appendix A).

5.3.7. Assessing Sources of Stress

Sources of stress were regarded as independent variables and assessed by the 'Sources of Stress in the Ambulance Service Scale'. These scales were devised by Robin Robinson (1984) for her study on stress and health in the Victorian Ambulance Services. (In 1984, there were 16 ambulance services in Victoria). The items comprising this scale were developed through a series of consultations and workshops conducted within the ambulance services. The resulting instrument comprised of 109 items grouped into seven conceptually coherent subscales (Robinson, 2002). These conceptually coherent subscales were Shift work, Driving, Emergency work, Communication within the ambulance service, Communication with other professionals and the public, Organisational and welfare conditions and, Family and personal life. The subscales and their items are listed in section D1 of the survey presented in Appendix A.

The Sources of Stress in The Ambulance Service Scale identifies potentially stressful situations that might be experienced by paramedics. Items include, "Dealing with the death of children," "Fear of disability that would leave me unable to continue in the job."

Participants are asked to rate each item in terms of stressfulness and frequency.

The scoring system in this study differs from that used by Robinson (1984) and is based on that used by the Work Stress Scale (Vagg & Spielberger, 1998). Each stressor item is scored on a nine-point Likert scale that measures the severity of stress experienced in each situation (1= least stressful, 9 = most stressful) and the severity of the stress experienced is assessed by asking on how many days the situation has occurred in the past six months (from 0 days to 9 or more days). Stressor impact scores were calculated by multiplying the

severity and frequency ratings in the manner described by Vagg and Spielberger (1998) to calculate 'stress index scores.' This method of measuring impact was employed because as Vagg and Spielberger (1998) write:

Failing to take into account how often a particular stressor is experienced may underestimate the full impact of a moderately stressful event that frequently occurs while overestimating the effects of highly stressful events that are never experienced in a particular work setting. (p. 298)

An example of a stressor event that might have a frequency of close to zero is seeing a fellow paramedic injured at work but the severity level of the stress experienced is high. Vagg and Spielberger (1998) indicate that it is only by taking the severity and frequency of stressors experienced in the workplace that the total impact of specific events can be satisfactorily measured.

No data directly relating to validity has been published for this Sources of Stress In The Ambulance Service scale. Robinson (1984) provides reliability data for each of the subscales. The Cronbach's alpha coefficients range from 0.83 to 0.94 indicating good internal consistency.

5.4. Procedure

5.4.1. Ethics Approval

This project initially required approval from the Ambulance Victoria (AV) Research Committee. An application was submitted to this committee, which then required the project to be submitted to an external ethics approval authority. The application was subsequently submitted to the Victoria University Human Research Ethics Committee. Ethics approval was formally obtained on 1st September 2010 and data collection began immediately after that date. An extension of approval to continue the project was obtained on 24th April 2013.

A copy of the memo from the Victoria University Human Research Ethics Committee advising that this research project had been approved has been placed in Appendix B.

5.4.2. Distribution of the Survey and Recruitment of Participants

The survey was designed by the graduate research student in association with the Victorian Ambulance Counselling Unit. This researcher was actively involved with collecting and managing the data gathered by the survey. The survey was conducted from September 2010, to January 2011. Participants were recruited by an e-mail invitation from the Victorian Ambulance Counselling Unit and distributed within Ambulance Victoria. The invitation included supporting statements from the Chief Executive Officer of Ambulance Victoria and from the General Secretary of the Ambulance Employees Australia of Victoria (AEAV) union.

The survey was distributed and made available to participants using Qualtrics survey management software. Qualtrics is a company that enables surveys to be entered in electronic format. The survey can then be delivered to potential participants through the internet (usually via a link sent by e-mail).

Printable flyers about the survey produced by the AV marketing department were emailed to paramedics and team managers (supervisors) to inform them of the project. Team managers were invited to display the flyers in their branches as appropriate.

An email was sent to paramedics with a link that took them directly to the survey. An electronic copy of the survey was also attached to provide the option for individual participants to print out a paper copy should they prefer. Participants who chose to print and complete a paper copy of the survey were requested to return the completed documents, in a plain envelope to preserve anonymity, to the Victorian Ambulance Counselling Unit (VACU). Six people chose to complete and return paper copies of the survey. Participants

were offered the opportunity to receive feedback about their scores if that was what they wanted and if they were prepared to identify themselves. The opportunity for feedback was offered because the Clinical director of VACU was concerned to meet 'duty of care' requirements. Names or contact telephone number were provided by 103 participants and feedback letters were subsequently sent to these individuals. This contact information was subsequently deleted from the data file.

The first part of the Qualtrics survey included text from the, "Information to Participants," document which participants were able to read before they commenced answering the formal questions (see Appendix B). The "Information to Participants" document was also attached to the email for those that opted to complete a hard copy of the survey. In all cases, participants were advised that agreeing to continue past the beginning page to the answering the questions provided implied consent. Responses were recorded and the file containing the responses was downloaded to IBM SPSS Statistics (Version 20).

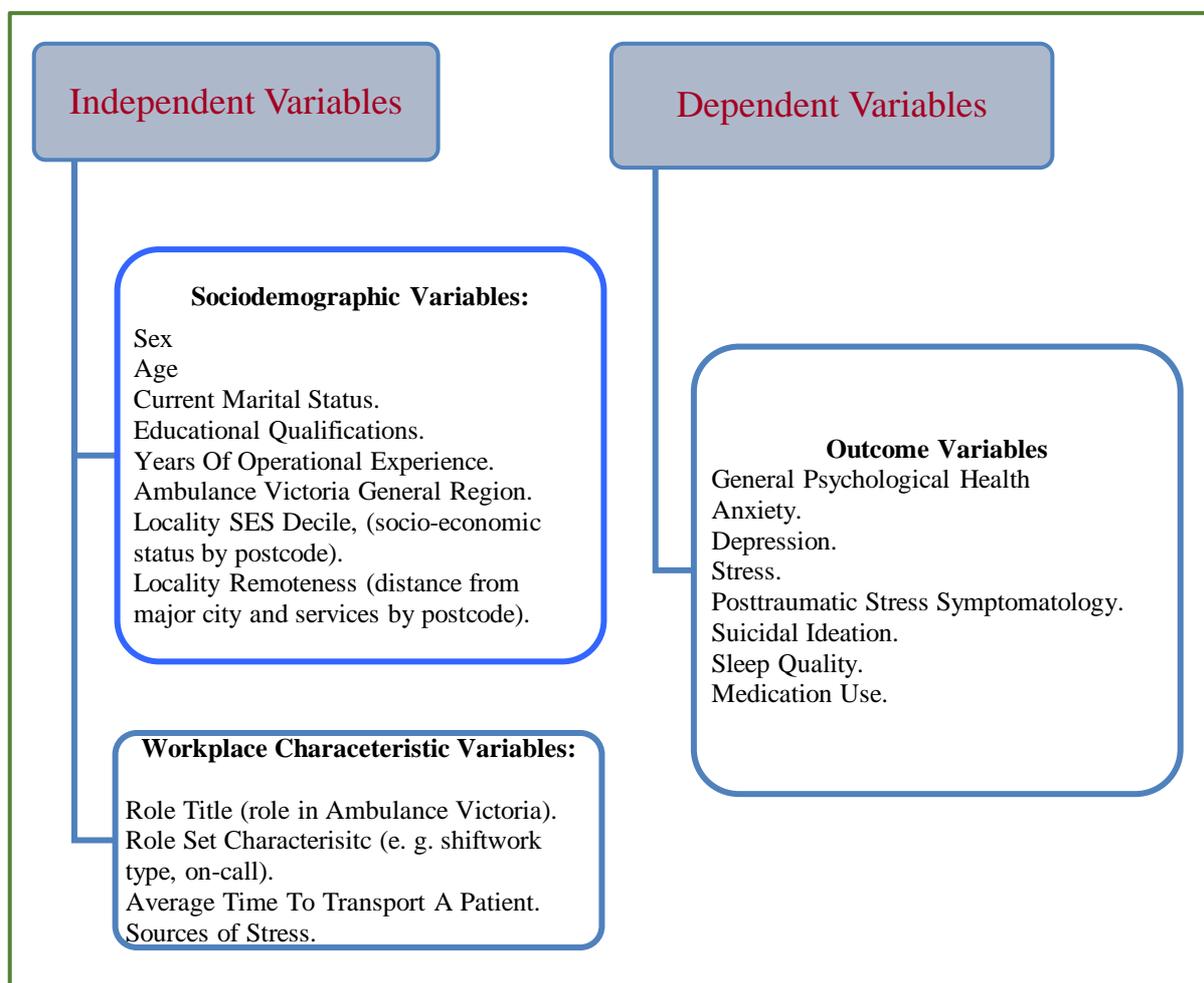
Participants were asked to indicate if they worked in a paid or voluntary capacity and to indicate for what percentage of time they transported patients. For the purposes of this thesis, participants were selected if they were paid paramedics whose role including transporting emergency patients 50%, or more, of the time. Those transporting patients for less than 50% of the time were excluded, as were those who worked as unpaid volunteers.

5.5. Preparing Data for Analysis

The variables used in this study are listed in Figure 5. This section describes how the dataset was prepared prior to use for the analyses, a brief rationale for selecting the various statistical procedures is outlined, followed by the methods of data analysis used in this study. Further detail on preparing the dataset is provided in Appendix C (under the heading, "Preparation and Cleaning of the Dataset").

Figure 5

Variables used in this study



5.5.1. Initial Examination of The Dataset

The dataset was first visually examined and all variables identifying individual participants were deleted. All analyses related to preparation of the dataset were conducted using IBM SPSS (Version 25). Measures were taken to identify incorrectly entered data, missing values and outliers (Pallant, 2011). Minimum and maximum values were inspected to check that they were consistent with the variable in question. Means and standard deviations of continuous data were scrutinised to assess that they were consistent with previous research

related to that variable. Categorical data was checked to identify if that the data fell into legitimate categories.

Minimum and maximum values were assessed to fall within reasonable ranges for all variables. The means of the continuous variables were judged to be consistent with those from other relevant studies, and all categorical data fell into legitimate categories.

The dataset was next examined for missing data. The amount of missing data varied considerably among the variables with (for example) data on Sex missing for two cases and data on the Depression, Anxiety and Stress Scales missing for 361 cases. It appeared that more data was missing from items occurring later in the survey, which was understandable in the context of this study. Participation in this study required the completion of a very large survey, and participation was voluntary so not all participants responded to every item, especially those occurring later in the survey. Missing data was managed by choosing the 'exclude cases pairwise' option in SPSS so that all cases with the data required for a particular analysis were included (Pallant, 2013). Cases with missing data were excluded analysis by analysis and the number of participants whose data was included was reported for each analysis. This was done so that all available data was used in each statistical procedure.

The data was also examined by visual inspection, by conducting data counts for each variable, and by checking the descriptives as stipulated by Pallant (2013). No patterns of concern were found, indicating the data were suitable for analysis

5.6. Data Analysis Procedures

Independent samples t-tests and ANOVAs were used for comparing the mean scores of groups as appropriate (Pallant, 2013). Assumptions of these procedures include normality,

which was assessed by examining skewness and kurtosis values, or the Kolmogorov-Smirnov statistic. Statistical methods for assessing normality are sensitive to sample size and tests for skewness and kurtosis will commonly indicate that a sample is non-normal for large samples (>200); in such situations it is more pragmatic to consider the size of the statistic (Tabachnick & Fidell, 2013). Pallant (2013) indicates that the Kolmogorov-Smirnov statistic is subject to similar constraints.

The sample size for the continuous variables was greater than 700 in this study so the use of frequency histograms was also applicable to assist in the assessment of normality (Tabachnick & Fidell, 2013). Kim (2013) also maintains that one should depend on histograms combined with absolute values of the skewness and kurtosis statistics. Kim (2013) indicates that in sample sizes greater than 300, a skewness value greater than 2 and a kurtosis value greater than 7 should be used as reference values to determine substantial non-normality.

Graphs showing distributions indicate that the scores on some variables appear to depart from normal. However, in the main, the normality statistics fell mostly within the acceptable ranges indicated by Kim (2013). A notable exception was the kurtosis statistic of 12 for the GHQ28 depression scores. However t-test and ANOVA procedures are considered robust and able to deal with departures from normality of the data. The concern about normality of the data with respect to these statistical procedures is further diminished when sample sizes are large (Gravetter & Wallnau, 1985; Tabachnick & Fidell, 2014).

Statistical data on normality for study variables is shown in Table 7.

Table 7

Normality statistics for continuous dependent variables

Variable	Skewness Statistic	Kurtosis Statistic	Kolmogorov-Smirnov Statistic
GHQ28 Total Score	1.068	0.675	0.150**
GHQ28 Somatic Subscale Score	0.628	-0.731	0.184**
GHQ28 Anxiety & Insomnia Subscale Scores	0.778	-0.645	0.214**
GHQ28 Social Dysfunction Score	1.202	0.550	0.241**
GHQ28 Depression Score	3.488	12.699	0.452**
DASS Depression Score	1.495	1.921	0.190**
DASS Anxiety Score	2.062	5.131	0.231**
DASS Stress Score	0.870	0.458	0.113**
KSQ Disturbed Sleep	0.001	-0.643	0.073**
KSQ Difficulty Awakening	0.352	-0.916	0.187**
KSQ Not Well Rested On Awakening	-0.265	-0.626	0.211
KSQ Nightmares	1.021	0.895	0.236**
KSQ Heavy Snoring	0.764	-0.363	0.215**

Notes. GHQ28 = General Health Questionnaire-28; DASS = Depression, Anxiety and Stress Scales; KSQ = Karolinska Sleep Questionnaire.

** Significant at <0.001

Effect sizes of statistically significant differences for t-test and ANOVAs were assessed by calculating eta-squared (η^2) values (Field, 2013; Pallant, 2013).

The nonparametric Chi-Square (χ^2) test for goodness of fit and the χ^2 test of independence were used for comparisons involving categorical independent and dependent variables as appropriate (Gravetter & Wallnau, 1985; Pallant, 2013). The assumption of independent observations was met. The Pearson chi-square is reported (Pallant, 2013). The phi (Φ) statistic was used to gauge the effect size of significant differences found by the χ^2 tests for 2 x 2 tables and Cramer's V was reported for larger tables (Pallant, 2013).

Binary logistic regression was used to explore predictive relationships where outcome variables were dichotomous. It was also used where the distribution of scores was not normal (Pallant, 2013), or where relationships between variables were not linear. Logistic regression does not require assumptions of normality in the predictor variables, and nor is a linear relationship between the predictors and the outcome variables required (Tabachnick & Fidell, 2014). (Note: there were low correlations indicating a poor or no linear relationship between some of the predictor and outcome variables. These can be found in Table D1 in Appendix D).

To check the assumptions for the binary logistic regression analyses, the standardised residuals and the analogue values of Cook's Distances were examined (Field, 2009). Inspection of the data for individual cases that were detected as being a poor fit with the model did not find any abnormalities with respect to their data.

The backward stepwise likelihood ratio method was used to select to the best set of predictor variables when these analyses were exploratory in nature (Field, 2009). In contrast, when the purpose of the analysis was to assess the relative contribution of each predictor variable to the model, all variables were entered simultaneously. To aid interpretation and to simplify comparisons between the model odds ratios, odds ratios less than one were inverted as described by Pallant (2013; where a value of less than one is

divided into one). This inversion process enables all odds ratios to take on values of one or more so that the 'size' of the model parameters can be more directly compared. However, interpretation of the direction of changes also needs to be adapted to accommodate inversion of the relevant odds ratios.

Binary logistic regression was employed to explore the association of independent sociodemographic and work environment variables with a series of dependent variables measuring mental health outcomes. The aims of the logistic regression analyses were to establish which (if any) of the independent variables best classified participants into categories of mental health scores categorized as above the normal range, as well as to explain the effects of the statistically significant independent variables in the regression models. Some variables were dichotomised to facilitate the use of binary logistic regression (Tabachnick & Fidell, 2014). The mental health outcome variables were dichotomised as described in section 5.3. Continuous predictor variables were left unchanged, but categorical predictor variables with more than two categories were dichotomised as follows-

1. Current marital status (originally four categories). Dichotomised to partnered & not partnered.
2. Educational qualifications (originally three categories). Dichotomised to TAFE or university qualification
3. Locality remoteness (distance from major city and services by postcode) (originally three categories). Dichotomised to major city or regional area.
4. Shift work was dichotomised to rotating shift work or not working rotating shifts.

The independent variables of Role title, Ambulance Victoria general region and Locality SES decile were not considered as part of the regression analysis because they contained more than two categories and were not conceptually amenable to dichotomization.

Risk ratios were calculated to compare the proportions from the current sample expressing suicidality with Posttraumatic Stress Disorder caseness, compared to those with no PTSD. That is, how much greater (or less) is the risk of suicidal ideation in people with PTSD compared to those without it. Risk ratios were calculated as described by Kirkwood and Sterne (2003).

Multiple regression was used to explore predictive relationships between the sources of stress experienced by paramedics, and continuous mental health outcome variables (Field, 2013). All predictor variables were entered into the equation simultaneously so that each variable could be evaluated in terms of its contribution to predicting the outcome variable (Pallant, 2013). Information about evaluating the assumptions was sourced from Field (2013) and Pallant (2013).

The following paragraphs explain the assumptions of multiple regression, and how they were dealt with in this study.

1. **Multicollinearity.** This was assessed by examination of the correlation matrix of the independent and predictor variables. The tolerance and the variance inflation factor (VIF) coefficients. Multicollinearity was considered to be present if the tolerance coefficient was less than 0.01 or if the VIF coefficient was greater than 10.
2. **General normality (distributions) of the data.** Assessed by examination of the normal probability plots (P-P) of the regression standardized residuals and the scatterplots of the regression standardized residuals and the regression standardized predicted values.
3. **Outliers.** The presence of outliers was determined by examination of the scatterplots of the regression standardized residuals and the regression standardized predicted values to detect standardized residuals with values of more than 3.3. The values of

the Mahalanobis distances were examined, values above 24.32 identified those cases as outliers.

4. **Undue Influence.** Cases having undue influence on the regression model. Cook's Distance was examined for values greater than one. If such a case were to be found then removal of that case would be considered. Alternatively, Field (2013) asserts that poor model fit was indicated if more than five per cent of standardized residuals had a value outside the range of ± 1.96 ; residual values of three or more are cause for concern and the entered data for these cases was inspected to identify possible abnormalities. This applies to standard multiple regression and logistic regression. However, as also advised by Field (2013) cases with standardized residuals of 1.96 or greater were not eliminated from the analysis in order to make the model fit better. Instead, the number and percentages of these values was reported. Some authors have made the observation that removing outlying cases almost always improves the model fit but that, as sample size increases, it does not substantially influence the model parameters (Sarkar et al., 2011). For the current study these cases were not removed from the analysis, but are reported.

In the multiple regression results presented in this manuscript, all the assumptions were within acceptable limits, although it should be noted that the distributions of the dependent variables were not always normally distributed, as is expected in data related to the distribution of illness in populations (Kirkwood & Stern, 2003). However, as previously noted, concern about departures from normality are diminished when sample sizes are large (Gravetter & Wallnau, 1985; Tabachnick & Fidell, 2014).

Following convention, an alpha level of .05 was used for all statistical analyses.

Chapter Six

6. Results

6.1. Introduction

This research aimed to investigate the association of selected demographic and socioeconomic variables with the mental health of paramedics. The analyses which follow in this chapter are specifically focussed on paramedics whose workload involves attending and transporting emergency patient at least 50% of the time. This constraint was applied to reduce contamination of the sample by paramedics whose work was focussed elsewhere (e.g. on managerial work, education duties

Descriptive statistics based on data obtained from the present study participants are presented in section 6.2. Results examining potential differences in mental health across the paramedic workforce are reported next, in section 6.3; this section addresses potential regional differences, possible differences associated with the roles performed and other differences related to demographics. The mental health of paramedics was compared with the general population, other first responders and other shift workers. These comparisons were to contextualise the mental health of the paramedic participants of this study and the results are presented in section 6.4.

The association of demographic and socioeconomic variables with mental health were investigated and are presented in section 6.5, and an exploration of the comorbidities associated with probable Posttraumatic Stress Disorder and suicidal ideation are presented in section 6.6. Section 6.7 reports on the ambulance-specific sources of stress, rated by the

paramedic participants of this study, and their association with variables measuring negative mental health outcomes.

6.2. Descriptive Information

Cronbach's alpha was calculated for the instruments using continuous data and all values were greater than 0.7, suggesting that the scales used in this study have good internal consistency (Pallant, 2013). Where possible, correlations between independent variables were calculated and generally found to be statistically non-significant or weak. The correlations between the outcome variables were all statistically significant and at least moderate in strength. This finding suggests that there is reasonable convergent validity in this sample (Evans, 1985) for the measurement of psychological health. The descriptive statistics for the categorical and continuous variables were examined and no unexpected values were found. However, as mentioned in the method chapter, some of the continuous data was non-normally distributed.

The following descriptive statistics has been placed in Appendix D.

1. Internal reliability of the instruments that used continuous data to assess mental health symptomatology (Appendix D, Table D1).
2. Correlations between the variables. Correlations were not calculated for non-ordinal categorical variables (Appendix D, Table D2)
3. Descriptive information for continuous dependent variables (Appendix D, Table D3).
4. Descriptive information for categorical dependent variables (Appendix D4).
5. Frequencies of Posttraumatic Stress Disorder symptoms (Appendix D, Table D4)
6. Frequencies of suicidality variables (Appendix D, Table, D5)
7. Frequencies of medications use (Appendix D, Table D6).

6.3. Psychological Health Within the Paramedic Workforce

In part, this research was conducted to assess the association of selected demographic and ambulance service work context variables with the psychological health of paramedics. This section focuses on the research question, “How does the psychological health status differ among various sections of the AV paramedic workforce as identified by selected demographic variables and the paramedic work context?” The mental health outcome variables examined in this section were the scales from GHQ28 General Health, the DASS21 scales, variables from the Karolinska Sleep Questionnaire, past year PTSD caseness, and past year suicidal thoughts and past year suicidal planning. Only statistically significant findings are reported in this section.

6.3.1. Mental Health Status by Sex

Means and standard deviations of the continuous outcome variables for each sex were calculated and are presented in Table 8. T-tests were employed to assess differences between the sexes.

Table 8

Means and Standard Deviations of the Continuous Outcome Variables for Males and Females

Scale/Subscale/Item	Total Sample			Males			Females		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
General Health Questionnaire									
Total Scale Score	679	25.07	11.53	409	25.67	12.26	269	24.22	10.26
Somatic	803	7.24	3.91	490	7.23	4.00	312	7.27	3.76
Anxiety & Insomnia	784	7.94	4.64	481	8.16	4.82	311	7.68	4.29
Social Dysfunction	771	8.10	2.33	470	8.24	2.39	300	7.87	2.21
Depression	788	1.86	3.30	476	2.12	3.56	311	1.48	2.83
Depression, Anxiety & Stress Scales									
Depression	622	4.47	8.30	371	8.15	8.78	250	6.50	7.44
Anxiety	622	4.85	6.00	371	4.87	5.94	250	4.85	6.07
Stress	622	11.81	8.63	371	11.96	8.76	250	11.63	8.43
Karolinska Sleep Questionnaire									
Disturbed Sleep	814	3.12	0.93	493	3.15	0.94	320	3.08	0.92
Difficulty Awakening	817	2.57	1.23	499	2.50	1.20	317	2.69	1.26
Not Well Rested On Awakening	822	3.5	1.01	501	3.48	1.03	320	3.57	0.97

Notes. *M* = mean; *SD* = standard deviation. Some respondents did not identify their sex so numbers may not consistently tally to the total sample number.

Levene's test for the equality of variances indicated that this assumption had not been met for the GHQ and DASS depression variables and the relevant t-test statistic (equal variance not assumed) and degrees of freedom are reported below.

Significant differences between the means for males and females were found for the variables GHQ social dysfunction $t(768) = 2.16, p = .031, \eta^2 = .006$, GHQ depression $t(755.43) = 2.81, p = .005, \eta^2 = .010$, DASS depression $t(587.45) = 2.53, p < .012, \eta^2 = .010$,

and difficulty awakening $t(814) = -2.13, p < .033, \eta^2 = .005$. Perusal of the means indicated that males obtained higher mean scores on GHQ social dysfunction, GHQ depression, and DASS depression, while a higher mean score for females was found for difficulty awakening. No other significant differences were found.

6.3.2. Mental Health Status by Age

For all analyses including age participants were divided into ten-year age groups; the age group 60+ years contained only 3 participants and was therefore excluded from this analysis. Means and standard deviations were calculated and are presented in Table 9. The ANOVA procedure was used to evaluate differences between the age groups.

Table 9

Means and Standard Deviations for Mental Health Status by Age

Scale/Subscale/Item	N	20-29 (N=231)		30-39 (N=247)		40-49 (N=235)		50-59 (N=106)	
		M	SD	M	SD	M	SD	M	SD
General Health Questionnaire									
Total Scale Score	633	24.84	11.41	24.23	10.74	25.66	12.08	26.03	12.54
Somatic	750	7.42	3.81	7.17	3.81	7.19	4.13	7.20	4.10
Anxiety & Insomnia	738	7.18	4.92	7.92	4.61	7.93	4.37	8.22	4.87
Social Dysfunction	718	8.03	2.40	7.95	2.21	8.31	2.44	8.30	2.23
Depression	735	1.88	3.47	1.36	2.59	2.25	3.78	2.07	3.27
Depression, Anxiety & Stress Scales									
Depression	593	6.37	7.61	7.00	7.65	8.34	9.20	8.08	7.74
Anxiety	593	5.34	6.18	4.63	5.78	4.80	5.93	4.58	5.74
Stress	593	11.15	8.06	12.48	8.62	11.82	8.68	11.51	9.47
Karolinska Sleep Questionnaire									
Disturbed Sleep	766	2.96	0.90	3.13	0.92	3.23	0.97	3.26	0.85
Difficulty Awakening	766	2.78	1.21	2.61	1.25	2.62	1.24	2.01	1.00
Not Well Rested On Awakening	770	3.49	0.98	3.59	0.97	3.60	1.02	3.34	1.10

Notes. M = mean; SD = standard deviation.

Levene's statistic indicated that the assumption of equality of variances was not met for the variables GHQ depression and Karolinska Sleep Questionnaire difficulty awakening. Welch's robust test for the equality of means F statistic, degrees of freedom and associated p value are reported here for these variables.

Significant differences between the means of the age groups were found for the variables GHQ depression $F(3, 308.34) = 3.26, p = .022, \eta^2 = .011$, disturbed sleep $F(3, 762) = 3.82, p = .010, \eta^2 = .014$ and difficulty awakening $F(3, 349.07) = 12.01, p < .001, \eta^2 = .034$.

Post-hoc comparisons using the Tukey HSD test showed that the mean GHQ28 Depression score for the 40-49 age group ($M = 2.25, SD = 3.78$) was significantly higher ($p = .027$) than the 30-39 age group ($M = 1.36, SD 2.59$). Post hoc comparisons using the Tukey test showed that the mean score on Disturbed Sleep for the 20-29 year age group ($M = 2.96, SD = 0.90$) was significantly lower than the 40-49 and 50-59 year age groups ($M = 3.23, SD = 0.97, p = .016$ and $M = 3.26, SD = 0.85, p = .041$ respectively). Similar post hoc comparisons indicated that the mean scores on the Difficulty Awakening item were significantly lower for the 50-59 year age group ($M = 2.01, SD = 1.00$) compared to the 20-29, 30-39 and 40-49 year age groups ($M = 2.78, SD = 1.21, p < .001$; $M = 2.61, SD = 1.25, p < .001$ and $M = 2.62, SD = 1.24, p < .001$, respectively).

No other significant differences were found.

6.3.3. Mental Health Status by Marital Status

Of the marital status categories, only two respondents identified themselves as being widowed and were consequently not included in the analyses. Means and standard deviations were calculated and are presented in Table 10.

Table 10

Means and Standard Deviations for Mental Health Status by Marital Status

Scale/Subscale/Item	N	Never Married (N=148)		Partnered – Not Living Together (N=59)		Married or Living Together (N=626)		Separated Or Divorced (N=44)	
		M	SD	M	SD	M	SD	M	SD
General Health Questionnaire									
Total Scale Score	678	24.39	12.57	21.73	10.50	25.27	11.22	28.12	12.52
Somatic	801	7.13	4.12	6.35	4.17	7.29	3.83	8.00	3.96
Anxiety & Insomnia	782	7.40	4.95	6.76	4.46	8.08	4.53	9.41	4.95
Social Dysfunction	770	8.11	2.37	7.85	2.52	8.11	2.29	8.18	2.63
Depression	786	1.96	3.48	2.14	3.92	1.74	3.16	2.71	3.72
Depression, Anxiety & Stress Scales									
Depression	620	8.04	9.32	6.59	8.45	7.17	7.82	10.85	10.12
Anxiety	620	5.87	7.22	4.34	6.27	4.63	5.70	5.21	3.54
Stress	620	10.99	8.67	10.39	8.81	11.98	8.52	14.36	9.44
Karolinska Sleep Questionnaire									
Disturbed Sleep	812	2.92	0.98	3.00	0.86	3.16	0.92	3.36	0.94
Difficulty Awakening	815	2.63	1.30	2.69	1.23	2.55	1.23	2.62	1.03
Not Well Rested On Awakening	820	3.36	1.07	3.37	0.89	3.55	1.00	3.64	1.05

Notes. *M* = mean; *SD* = standard deviation.

Significant differences between the means of the marital groups were found for the variables GHQ28 anxiety and insomnia $F(3, 778) = 3.09, p = .026, \eta^2 = .012$ and disturbed sleep $F(3, 808) = 3.80, p = .010, \eta^2 = .014$.

Post hoc comparisons on the GHQ28 anxiety and insomnia variable using the Tukey test showed that the mean score for separated or divorced paramedics ($M = 9.41, SD = 4.95$) was significantly higher ($p = .044$) than for those who were partnered but not living together ($M = 6.76, SD = 4.46$). Post hoc comparisons indicated that the mean scores on the disturbed sleep variable for those who were never married ($M = 2.92, SD = 0.98$) were significantly lower from those who were married or living together ($M = 3.16, SD = 0.92, p = .027$) and from those who were separated or divorced ($M = 3.36, SD = 0.04, p = .037$).

A chi-square test for independence found a significant association between having thoughts of taking your own life in the past year with marital status ($\chi^2(1, n = 560) = 10.48, p = .015, \phi = .137$). The highest level of past year suicidal thoughts at 40% was reported by separated or divorced paramedics compared to 16.2% for those who were partnered (not living together) and 17.6% for those who were married.

No other significant differences were found.

6.3.4. Mental Health Status by Educational Qualifications

The qualifications held by paramedics were divided into four groups. There were 16 people in the 'Other' category with varying qualifications and these were not included in the analyses presented here.

Means and standard deviations were calculated and are presented in Table 11. The ANOVA procedure was used to evaluate differences between the educational qualification groups.

Table 11

Means and Standard Deviations for Mental Health Status by Educational Qualification

Scale/Subscale/Item	N	Certificate/ Diploma (N=258)		Bachelor Degree (N= 447)		Postgraduate Qualification (N=166)	
		M	SD	M	SD	M	SD
General Health Questionnaire							
Total Scale Score	673	27.25	11.98	24.81	11.74	22.40	9.71
Somatic	796	7.70	4.11	7.24	3.90	6.54	3.58
Anxiety & Insomnia	778	8.59	4.50	7.80	4.79	7.27	4.38
Social Dysfunction	764	8.31	2.30	8.12	2.35	7.74	2.32
Depression	781	2.31	3.46	1.82	3.40	1.31	2.69
Depression, Anxiety & Stress Scales							
Depression	618	8.79	8.89	7.26	8.32	6.09	7.05
Anxiety	618	4.87	6.24	5.18	6.34	3.98	4.40
Stress	618	12.82	9.04	11.91	8.64	10.07	7.81
Karolinska Sleep Questionnaire							
Disturbed Sleep	809	3.35	0.93	3.00	0.90	3.06	0.96
Difficulty Awakening	812	2.59	1.29	2.59	1.21	2.49	1.16
Not Well Rested On Awakening	816	3.62	1.02	3.47	0.98	3.45	1.06

Notes. M = mean; SD = standard deviation.

Levene's statistic indicated that the assumption of equality of variances was not met for the GHQ28 depression variable. Welch's robust test for the equality of means F statistic, degrees of freedom and associated p value is reported here for this variable.

Significant differences between the means of the educational qualification groups were found for the GHQ28 variables of total scores $F(2, 670) = 6.91, p < .001, \eta^2 = .020$, the

somatic subscale $F(2, 793) = 4.10, p = .017, \eta^2 = .010$, the anxiety and insomnia subscale $F(2, 775) = 3.95, p = .020, \eta^2 = .010$, and the depression subscale $F(2, 391.09) = 4.84, p = .008, \eta^2 = .010$.

Post hoc comparisons using the Tukey HSD test and examination of the means revealed the following-

1. the mean GHQ28 total scale score for the Certificate/Diploma group was significantly higher than the Bachelor and Postgraduate degree groups ($p = .044$ and $p = .001$, respectively),
2. the mean GHQ28 somatic scale score for paramedics with a Certificate/Diploma qualification was significantly higher than for those with a Postgraduate degree ($p = .012$),
3. the Certificate/Diploma group had higher mean GHQ28 Anxiety and Insomnia scores than the Postgraduate qualification group ($p = .021$),
4. The mean GHQ28 depression scale score for the Certificate/Diploma group was higher than for the Postgraduate group ($p = .013$).

Significant differences were also found between the educational groups for the DASS21 scale variables of depression $F(2, 615) = 4.02, p = .018, \eta^2 = .013$ and stress ($F(2, 615) = 3.63, p = .027, \eta^2 = .012$). Post hoc comparisons and examination of the means showed that both the mean DASS21 Depression scores and mean DASS21 Stress scores for the Certificate/Diploma group were significantly higher compared to the Postgraduate group ($p = .017$ and $p = .020$, respectively).

The differences in mean disturbed sleep scores were significantly different across the educational groups $F(2, 806) = 11.73, p < .001, \eta^2 = .029$. Post hoc comparisons and examination of the means showed that the mean disturbed sleep score for the

Certificate/Diploma group was significantly higher compared to the Bachelor and Postgraduate Diploma groups ($p < .001$ and $p = .005$, respectively).

No other significant differences were found.

6.3.5. Mental Health Status by Ambulance Victoria General Region

This section assesses psychological health status within the six regions of Ambulance Victoria (AV). Means and standard deviations were calculated and are presented in Table 12. The ANOVA procedure was used to evaluate differences between Ambulance Victoria regions.

Table 12

Means and Standard Deviations for Mental Health Status by Regions of Ambulance Victoria

Scale/ Subscale/Item	<i>N</i>	Barwon South West (<i>N</i> =52) <i>M</i> (<i>SD</i>)	Grampians (<i>N</i> =27) <i>M</i> (<i>SD</i>)	Lodden- Mallee (<i>N</i> =74) <i>M</i> (<i>SD</i>)	Hume (<i>N</i> =48) <i>M</i> (<i>SD</i>)	Gippsland (<i>N</i> =48) <i>M</i> (<i>SD</i>)	Metropolitan Melbourne (<i>N</i> =622) <i>M</i> (<i>SD</i>)
General Health Questionnaire							
Total Scale Score	674	23.10(8.39)	29.90(13.45)	24.37(12.30)	24.09(10.93)	29.08(12.21)	24.94(11.41)
Somatic	796	6.40(3.16)	8.39(4.47)	6.90(4.41)	7.36(4.16)	7.84(4.04)	7.21(3.81)
Anxiety & Insomnia	778	7.51(4.20)	9.65(5.83)	7.09(4.51)	7.88(4.42)	9.00(4.79)	7.91(4.59)
Social Dysfunction	765	7.83(1.70)	8.65(2.31)	7.85(2.69)	8.39(2.56)	8.30(2.20)	8.08(2.32)
Depression	783	1.15(2.39)	4.25(5.55)	2.08(3.34)	2.39(4.00)	2.47(4.09)	1.72(3.08)
Depression, Anxiety & Stress Scales							
Depression	619	6.52(6.30)	11.06(9.09)	7.81(9.31)	9.87(9.28)	9.18(9.90)	7.15(8.14)
Anxiety	619	4.32(4.71)	6.47(8.68)	4.10(5.13)	5.47(7.68)	7.18(9.80)	4.80(5.74)
Stress	619	10.97(7.19)	15.88(10.09)	10.52(9.10)	11.07(9.68)	15.06(9.75)	11.76(8.50)
Karolinska Sleep Questionnaire							
Disturbed Sleep	807	3.18(0.18)	3.54(0.94)	3.06(0.82)	3.01(0.79)	3.02(1.00)	3.11(0.95)
Difficulty Awakening	810	2.50(1.13)	2.84(1.52)	2.46(1.27)	2.44(1.08)	2.48(1.15)	2.60(1.23)
Not Well Rested On Awakening	815	3.68(0.98)	3.92(0.86)	3.31(1.16)	3.37(0.98)	3.14(1.09)	3.54(0.99)

Notes. *M* = mean; *SD* = standard deviation.

The only significant difference between the regions on the continuous variables was found for the scores on not well rested on awakening $F(5, 809) = 3.17, p = .008, \eta^2 = .019$. Post analyses using the Tukey HSD test and examination of the means indicated that the mean score for the Grampians region was higher than that for the Gippsland region ($p = .023$). The effect size for this analysis is small (Pallant, 2013)

A chi-square test for independence indicated a significant association between AV Regions and past year suicidal plans ($\chi^2(5, n = 667) = 32.24, p < .001, \text{Cramer's } V = .241$). The regions of Gippsland and Grampians (Central and Wimmera) reported the highest levels of suicidal planning at 33% and 18% respectively, with the levels in the remaining regions ranging from 0% to 7.7%. Past year suicidal thoughts across the regions of AV was also examined with a chi-square test of independence and the results indicated a significant association ($\chi^2(5, n = 561) p = .024, \text{Cramer's } V = .152$). Again, the highest levels of suicidal thinking were highest in Gippsland and Grampians (Central and Wimmera) at 46% and 37.5% respectively. The next highest region was Hume at 29% and the remaining regions ranged from 14.6% to 18.6%. The effect sizes for these analyses are approximately medium in magnitude (Pallant, 2013).

No other significant differences were found.

6.3.6. Mental Health Status by Locality Socioeconomic Status

The geographic areas of Victoria are divided into locality deciles according to socioeconomic status. The association of socioeconomic status decile of the area in which paramedics work with measures of psychological health was assessed in this section. The means and standard deviations were calculated and are presented in Table 13.

Table 13

Means and Standard Deviations from the Socioeconomic Decile Localities on the Continuous Outcome Variables

Scale/ Subscale/Item		Decile 1 (N=123)	Decile 2 (N=76)	Decile 3 (N=82)	Decile 4 (N=68)	Decile 5 (N=42)	Decile 6 (N=146)	Decile 7 (N=46)	Decile 8 (N=59)	Decile 9 (N=75)	Decile 10 (N=61)
	<i>N</i>	<i>M</i> (<i>SD</i>)									
General Health Questionnaire											
Total Scale Score	602	24.72(11.28)	25.43(12.09)	23.55(11.14)	24.38(10.11)	25.97(11.83)	24.25(11.88)	28.13(14.67)	23.86(9.22)	25.73(10.06)	24.45(10.55)
Somatic	710	7.09(4.10)	7.32(3.52)	6.75(3.39)	6.98(3.92)	7.77(4.53)	6.61(3.85)	7.09(4.03)	7.11(3.50)	7.79(3.72)	7.61(3.78)
Anxiety & Insomnia	693	7.88(4.60)	7.93(4.64)	7.42(4.10)	8.00(4.23)	8.82(4.98)	7.26(4.71)	9.19(5.50)	7.96(5.00)	7.90(3.96)	7.55(4.28)
Social Dysfunction	684	8.03(2.39)	8.39(2.63)	7.80(2.53)	7.75(1.94)	8.29(2.63)	8.18(2.34)	8.82(2.30)	7.82(1.77)	7.88(1.94)	7.96(2.17)
Depression	702	1.94(3.23)	2.29(3.97)	1.8(3.32)	1.40(2.59)	2.97(4.57)	1.66(3.01)	2.80(4.41)	0.96(2.38)	1.46(2.71)	1.51(3.09)
Depression, Anxiety & Stress Scales											
Depression	551	7.86(8.98)	7.29(9.26)	6.31(6.80)	7.09(8.10)	9.13(9.20)	6.72(7.80)	9.33(10.53)	5.95(7.45)	7.00(6.29)	7.78(8.15)
Anxiety	551	6.30(7.18)	4.54(6.10)	3.61(4.95)	4.09(5.25)	5.97(8.02)	4.43(5.69)	6.55(8.59)	4.09(4.94)	4.14(3.90)	4.70(5.40)
Stress	551	11.70(8.72)	10.71(7.87)	10.78(8.05)	11.65(8.46)	14.13(10.03)	10.74(8.56)	12.55(9.59)	11.49(9.78)	11.36(7.35)	13.33(8.01)
Karolinska Sleep Questionnaire											
Disturbed Sleep	724	3.07(0.91)	3.09(0.96)	3.03(0.91)	3.07(0.94)	3.24(0.86)	3.10(0.91)	3.22(0.83)	3.16(0.96)	3.16(0.85)	3.07(1.05)
Difficulty Awakening	725	2.57(1.37)	2.70(1.11)	2.29(1.13)	2.47(1.13)	2.72(1.32)	2.56(1.24)	2.56(1.30)	2.66(1.21)	2.56(1.25)	2.72(1.22)
Not Well Rested On Awakening	731	3.49(1.10)	3.50(0.86)	3.38(0.98)	3.48(1.01)	3.58(1.05)	3.45(1.02)	3.48(1.07)	3.73(0.92)	3.47(1.01)	3.49(1.09)

Notes. *M* = mean; *SD* = standard deviation.

The ANOVA analyses found no significant differences.

6.3.7. Mental Health Status by Years of Service

The effect of years of service on paramedic mental health scores was investigated by reclassifying participants into four groups. Means and standard deviations were calculated and are presented in Table 14.

Table 14

Means and Standard Deviations for the Four Years of Service Groups on the Continuous Outcome Variables

Scale/Subscale/Item	N	0-5 Years (n=351)		6-10 Year (n=233)		11-20 Years (n=186)		20+ Years (N=109)	
		M	SD	M	SD	M	SD	M	SD
General Health Questionnaire									
Total Scale Score	679	24.39	11.66	25.69	11.31	24.19	11.35	27.36	11.70
Somatic	803	7.14	3.93	7.53	3.98	6.78	3.9	7.67	3.74
Anxiety & Insomnia	784	7.62	4.75	8.36	4.56	7.68	4.55	8.40	4.53
Social Dysfunction	771	7.96	2.39	8.20	2.30	7.99	2.28	8.54	2.24
Depression	788	1.75	3.31	1.73	3.03	1.94	3.18	2.40	4.00
Depression, Anxiety & Stress Scales									
Depression	622	6.64	7.86	8.56	8.97	7.11	7.65	8.49	9.04
Anxiety	622	5.11	6.36	4.64	5.66	4.20	5.17	5.51	6.62
Stress	622	11.24	8.27	13.01	8.91	11.27	8.27	12.05	9.63
Karolinska Sleep Questionnaire									
Disturbed Sleep	814	3.00	0.92	3.27	0.94	3.07	0.92	3.28	0.90
Difficulty Awakening	817	2.67	1.22	2.74	1.29	2.35	1.16	2.29	1.14
Not Well Rested On Awakening	822	3.48	1.00	3.65	1.00	3.44	1.01	3.44	1.05

Notes. *M* = mean; *SD* = standard deviation.

A significant difference between the years of service groups was found for disturbed sleep $F(3, 813) = 4.77$, $p = .003$, $\eta^2 = .017$ and difficulty awakening $F(3, 813) = 5.77$, $p = .001$, $\eta^2 = .021$. Post hoc comparisons indicated the mean disturbed sleep score was significantly lower for the 0 – 5 years of service group compared to the 6 – 10 and 20+ years of service groups ($p = .006$ and $p = .047$, respectively).

The mean difficulty awakening mean score for participants with 0 – 5 years of service was significantly higher compared to those with 11 – 20 and 20+ years of service ($p = .028$ and $.038$, respectively). Similarly, the 6 – 10 year group had a higher mean score on difficulty awakening compared to those with 11 – 20 and 20+ years of service ($p = .008$ and $p = .013$, respectively).

No other significant differences were found.

6.3.8. Mental Health Status by Work Locality Remoteness Classification

The means and standard deviations for the three locality locations were calculated and are presented in Table 15.

Table 15

Means and Standard Deviations for Locality Remoteness on The Continuous Outcome Variables and Associated ANOVA Statistics

	<i>N</i>	Major City (<i>N</i> =575)		Inner Regional (<i>N</i> =152)		Outer Regional (<i>N</i> =51)		<i>F</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
GHQ28 Scales								
Total	601	24.62	11.07	25.27	12.41	25.79	10.68	0.32
Somatic	710	7.07	3.71	7.32	4.19	7.20	3.83	0.25
Anxiety & Insomnia	693	7.76	4.52	7.92	4.58	8.30	4.96	0.33
Social Dysfunction	684	8.04	2.19	8.11	2.54	8.30	2.37	0.31
Depression	701	1.66	3.15	2.26	3.77	2.04	3.39	1.84
DASS21 Scales								
Depression	551	6.83	7.94	8.47	8.60	10.56	9.70	3.70
Anxiety	551	4.61	5.69	5.08	6.27	7.20	9.80	1.02 ^a
Stress	551	11.34	8.30	12.09	8.88	13.92	11.16	1.26
KSQ Scales & Items								
Disturbed Sleep	538	3.10	0.93	3.12	0.87	3.11	0.84	0.28
Difficulty Awakening	537	2.61	1.23	2.49	1.23	2.33	1.20	1.47
Not Well Rested On Awakening	543	3.52	1.00	3.44	1.03	3.31	1.12	1.22

a. Levene's statistic indicated that the assumption of equality of variances was not met; Welch's robust test for the equality of means *F* statistic and associated *p* value is reported here.

* *P* < 0.05

A one-way ANOVA revealed a significant difference between the locality remoteness areas for the DASS21 Depression mean scale scores $F(2, 548) = 3.70, p = .025, \eta^2 = .013$. However, Tukey's HSD post hoc comparisons failed to identify which localities significantly differed from each other in terms of these scores. However, examination of the results indicates the mean depression scores show an increase in each step from Major City to Outer Regional localities.

The numbers and percentages of past year probable Posttraumatic Stress Disorder caseness are shown in Table 16. A chi-square test for independence indicated a significant association between probable PTSD caseness in the past year and locality remoteness $\chi^2(2, n = 469) = 8.17, p = 0.017, \text{Cramer's } V = 0.132$. The level of PTSD was two and a half times higher in participants drawn from an outer regional area compared to those drawn from a major city. The level of PTSD in an inner regional area was 1.7 times higher compared to that in a major city.

Table 16

Chi Square Test for Probable Past-year PTSD Caseness by Locality Remoteness

	Major City		Inner Regional		Outer Regional	
PTSD Caseness	N	% in Locality	N	% in Locality	N	% in Locality
Yes	44	12.0	17	20.5	6	30.0
No	322	88.0	66	79.5	14	70.0

The number and percentages of paramedics seriously considering taking their own life in the past year is shown in Table 17.

Table 17

Numbers and Percentages for Seriously Considering Taking your own life in the Past year by Locality Remoteness

Seriously Considering Taking Your Own Life	Major City		Inner Regional		Outer Regional	
	N	% in Locality	N	% in Locality	N	% in Locality
Yes	15	3.9	9	10.5	2	8.3
No	366	96.1	77	89.5	22	91.7

A chi-square test for independence indicated a significant association between locality remoteness and considering a plan to take your own life $\chi^2(2, n = 491) = 6.43, p = 0.040, \text{Cramer's } V = 0.114$. The level of seriously considering taking your own life was 2.6 times higher for paramedics working in Inner Regional areas compared to those working in a Major City and 2.1 times higher in an Outer Regional area.

No other significant differences were found.

6.3.9. Mental Health Status by Role Title

Paramedics whose role involved transporting patients more than 50% of the time operate under several classifications. Means and standard deviations of the health outcome variables for these classifications were calculated and are presented in Table 18.

Table 18

Means and Standard Deviations for Mental Health Status by Paramedic Role Title

Scale/ Subscale/Item	<i>N</i>	Graduate Paramedic (<i>N</i> =104) <i>M</i> (<i>SD</i>)	Paramedic (<i>N</i> =415) <i>M</i> (<i>SD</i>)	MICA Paramedic (<i>N</i> =151) <i>M</i> (<i>SD</i>)	Senior Reserve Officer (<i>N</i> =37) <i>M</i> (<i>SD</i>)	Clinical Instructor (<i>N</i> =172) <i>M</i> (<i>SD</i>)
General Health Questionnaire						
Total Scale Score	679	25.46(14.19)	25.34(11.27)	22.61(10.74)	22.70(9.10)	26.65(11.14)
Somatic	803	7.43(4.04)	7.36(3.92)	6.28(3.50)	6.47(3.78)	7.80(4.05)
Anxiety & Insomnia	784	7.49(5.13)	8.12(4.67)	6.91(4.00)	6.94(4.54)	8.88(4.58)
Social Dysfunction	771	8.22(2.81)	8.19(2.19)	7.75(2.43)	8.23(2.14)	8.08(2.29)
Depression	788	2.11(4.17)	1.92(3.19)	1.49(2.98)	.78(1.58)	2.11(3.44)
Depression, Anxiety & Stress Scales						
Depression	622	7.66(9.76)	7.42(8.00)	6.61(7.83)	6.67(7.57)	8.44(8.81)
Anxiety	622	6.03(7.86)	4.79(5.90)	3.98(5.10)	4.07(4.85)	5.30(5.96)
Stress	622	10.82(9.43)	12.10(8.53)	10.75(7.69)	12.07(10.13)	12.75(8.80)
Karolinska Sleep Questionnaire						
Disturbed Sleep	814	3.05(0.94)	3.12(0.92)	3.04(1.03)	3.00(0.93)	3.26(0.89)
Difficulty Awakening	817	2.64(1.33)	2.56(1.23)	2.33(1.16)	3.14(1.35)	3.26(0.89)
Not Well Rested On Awakening	822	3.49(1.12)	3.55(0.98)	3.40(1.10)	3.46(1.01)	3.53(0.95)

Notes. *M* = mean; *SD* = standard deviation.

ANOVA results showed significant differences between the means for the various role titles for the variables GHQ28 somatic $F(4, 798) = 3.32, p = .01, \eta^2 = .016$ and

GHQ28 anxiety and insomnia $F(4, 779) = 3.93, p = .004, \eta^2 = .020$ and difficulty awakening $F(4, 812) = 3.43, p = .009, \eta^2 = .017$.

Post hoc comparisons using the Tukey HSD test showed that the mean GHQ28 somatic scores for paramedics and clinical instructors were significantly higher compared to MICA paramedics ($p = .046$ and $p = .008$, respectively). The mean GHQ28 anxiety and insomnia scores were found to be lower for MICA paramedics compared to clinical instructors ($p = .003$). In the same way, the mean scores for difficulty awakening were higher for senior reserve paramedics compared to MICA paramedics ($p = .004$).

No other significant differences were found.

6.4. Comparisons of the Mental Health of the Present Paramedic Sample with Other Populations

This section places the mental health of the present cohort of participating Victorian paramedics into context. Comparisons were made with the general population, and with data from other paramedics. Articles were identified by searching the PsychINFO and MEDLINE databases. Those articles selected for the comparisons incorporated appropriate population data on the outcome variables such as Posttraumatic Stress Disorder, suicide, depression, anxiety, stress, suicidality and sleep problems

The published data used for comparison purposes reported results as means or percentages and 95% confidence intervals were sometimes provided. It was accordingly necessary to select appropriate statistical analyses for making comparisons. One-sample t-tests (Kirkpatrick & Feeney, 2013) were used to

compare published means with means arising from the present study and chi-square tests for goodness of fit (Pallant, 2013) were used to compare proportions (percentages) from the present study with published proportions. Findings from the present study are highlighted in the tables in this section.

6.4.1. DASS21 Depression

The comparisons of DASS21 depression mean scores were made with Australian normative samples collected in a similar time period. These are shown in Table 19.

Table 19

One-sample t-tests: Mean DASS Depression Scores Compared with Data from Non-clinical, General Population, Studies

Study	Description of Sample	N	M	SD	t	p
Present Paramedic Study	Data collected 2010 – 2011.	622	7.47	8.30	-	-
Casey, 2012	Australian sample. Data gathered in 2011.	1537	7.69	na	-0.65	0.514
Australian Psychological Society, 2015.	Australian sample, general adult population.	1521	8.10	na	-1.88	0.060

Notes. M = mean; na = not available; SD = standard deviation.

The findings indicate that the DASS21 depression mean score for the present paramedic sample is not significantly different from the mean reported by Casey (2012) or the Australian Psychological Society (2015)

Prevalence comparisons of DASS21 depression scores obtained by the current study with the general Australian population are presented in Table 20.

Table 20

Chi-square Goodness of Fit Test: Comparisons of DASS21 Depression Prevalence with the General Australian Population.

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Scores above the normal range	622	30.7 [27.2, 34.4]		
Scores in severe to extremely severe range	622	8.7 [6.7, 11.2]		
Casey & Matthews, 2011.				
Scores above the normal range	1537 ^a	32.0 [29.7, 35.4] ^b	0.48	.490
Scores in the severe to extremely severe range	1537 ^a	10.0 [8.6, 11.6] ^b	1.20	.273
Casey & Liang, 2014.				
Scores above the normal range	1553	37.0 [34.7, 39.5] ^c	10.57	.001
Scores in the severe to extremely severe range	1553	13.0 [11.4, 14.8] ^c	9.23	.002

Notes. CI = Confidence Interval

a. Number who participated in the total survey. The numbers answering DASS21 depression scores were not provided.

b. 95% CI calculated with data taken from Casey and Mathews, 2011.

c. 95% CI calculated with data taken from Casey and Liang, 2014

As shown in Table 20, the percentage of DASS21 depression scores from the present study falling above the normal range, and in the severe to extremely severe range, were not significantly different from the general Australian population in 2011. The data from these two studies are contemporaneous. However, these percentages were significantly lower for this paramedic sample when compared with data gathered from the general Australian population in 2014.

6.4.2. DASS21 Anxiety

The results of comparing the DASS21 anxiety mean scores obtained by the paramedic participants of the present study are displayed in Table 21.

Table 21

One-sample t-tests: Mean DASS21 Anxiety Scores Compared with Data from Non-clinical, General Population, Studies

Study	Description of Sample	N	M	SD	t	p
Present Paramedic Study	Data collected 2010 – 2011.	622	4.85	5.99		
Casey, 2012	Australian sample. Data gathered in 2011.	1537	5.11	na	-1.07	0.283
Australian Psychological Society, 2015	Australian sample, general adult population.	1521	6.30	na	-6.03	<0.001

Notes. M = mean; na = Not available; SD = standard deviation.

The DASS21 anxiety mean score for the present sample was not significantly different from the general Australian population in 2011 by Casey (2012).

The DASS21 anxiety mean from the present study was significantly lower in comparison to Australian data gathered in 2015 (Australian Psychological Society, 2016).

Prevalence comparisons of DASS21 anxiety scores from the current study with the general Australian population are presented in Table 22.

Table 22

Chi-square Goodness of Fit Test: Comparisons of DASS21 Anxiety Prevalence with the General Australian Population.

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Scores above the normal range	622	23.5 [20.3, 27.0]		
Scores in severe to extremely severe range	622	7.9 [6.0, 10.3]		
Casey & Matthews, 2011.				
Scores above the normal range	1537 ^a	26.0 [23.9, 28.3] ^b	2.06	.151
Scores in the severe to extremely severe range	1537 ^a	9.0 [7.7, 10.5] ^b	0.96	.328
Casey & Liang, 2014.				
Scores above the normal range	1553	27.0 [24.8, 29.2] ^c	3.93	.048
Scores in the severe to extremely severe range	1553	13.0 [11.4, 14.8] ^c	14.23	<.001

Notes. CI = Confidence Interval

a. Number who participated in the total survey. The numbers answering DASS21 depression scores were not provided.

b. 95% CI calculated with data taken from Casey and Mathews, 2011.

c. 95% CI calculated with data taken from Casey and Liang, 2014

As shown in Table 22, the percentage DASS21 anxiety scores falling above the normal range, as well as those in the severe to extremely severe range, were not significantly different from the general population. The collection of data for these studies coincided in time. These prevalences for the current study were significantly lower when compared with Australian data gathered in 2014.

6.4.3. DASS21 Stress

The result of the DASS21 mean stress scores from the present study was compared with three other studies and the results are shown in Table 23. It was not possible to locate any Australian other studies that used the DASS21 stress items and that reported means or percentages based on data that was contemporaneous with the current study and based on a general or non-clinical population. Nor was it possible to find a relevant study that reported percentages of the DASS21 stress severity levels with which the present study could be compared.

The mean DASS21 stress score for the present sample was significantly higher compared to the other studies.

Table 23

Mean DASS21 Stress Scores Compared with Data from Non-clinical Studies

Study	Description of Sample	N	M	SD	t	p
Present Paramedic Study	Data collected 2010 – 2011.	622	11.81	8.63		
Lovibond & Lovibond, (1995)	Normative Australian data.	2914	10.11	7.91	4.91	<0.001
Taylor et al. (2005)	Australian sample, data collected 1999 – 2000.	491	8.18	8.40	10.49	<0.001
Crawford et al., (2011)	Australian sample, data gathered 1995 – 2000.	497	8.10	8.40	10.72	<0.001

Notes. M = mean; SD = standard deviation.

6.4.4. GHQ28

The proportion of participants from the present study identified as having a potential psychiatric problem was 51.7%. Prevalence comparisons with other studies are presented in Table 24. The prevalence of potential psychiatric caseness in the present paramedic sample was significantly higher than each of the comparisons.

Table 24

Chi-square Goodness of Fit Test: Comparisons of GHQ28 Prevalence of Psychiatric Symptoms with Other Populations

Study	Description of Sample	Scoring Method	N	% [95% CI]	χ^2	p
Present Paramedic Study	Data collected 2010 -2011		837	51.7 [48.3, 55.1]		
Taylor et al., (2000). Based on the GHQ28.	South Australians during 1997	Binary scoring system	2501	19.5 [18.0, 21.1] ^a	551.32	<.001
Clohessy & Ehlers (1999). Based on the GHQ28.	Emergency paramedics Oxfordshire, UK ^b .	Not specified	56	22 [12.7, 33.8] ^c	429.00	<.001
Arial et al., 2011. Based on the GHQ12 ^d .	Swiss paramedics. Data collected 2009	0-1-2-3 Likert scale system	333	20 [16.1, 24.7] ^c	462.95	,.001

Notes: CI = Confidence Interval

a. CI taken from Taylor et al., 2000

b. Date of data collection not specified.

c. CI Calculated using data taken from the authors.

d. This study used the GHQ12 and comparisons should be viewed with appropriate prudence. All other studied used the GHQ28.

Based on data gathered in 2003, the mean GHQ28 total score of police in Victoria, Australia, was 21.9 (SD = 14.1); this police study used the 0-1-2-3 Likert scale scoring system (Davidson et al., 2006). Overall GHQ28 scores were calculated in the same way for the present sample with a resultant mean of 25.07 (SD = 11.53) which was significantly higher than the police sample $t(678) = 7.17, p < 0.001$.

6.4.5. Suicidality

Suicidality was considered by asking five questions that were developed to gauge the intensity of suicidal feelings along a continuum as described in section 5.3.4 (Paykel et al., 1974). Where data was available, responses to these five questions from the present study were compared with Norwegian paramedics (Sterud et al., 2008c) and the general Australian population (Johnston et al., 2009) and the results are presented in Tables 25 to 29. It should be noted that Johnston et al. did not use same method of measuring suicidality as was used in the present study which necessitates an appropriate degree of caution in making comparisons.

Where necessary, ninety-five percent confidence intervals (for percentages) were calculated by setting up an Excel spreadsheet with the appropriate formula and entering the relevant data, or were obtained directly from the relevant study (as indicated in Tables 25-29).

Table 25

Chi-square Goodness of Fit Test: Comparisons of life-time and past year prevalence of, "Felt that life was not worth living."

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Lifetime prevalence	606	37.3 [33.5, 41.21]		
Past year prevalence	563	16.5 [13.7, 19.8]		
Sterud et al., 2008c.				
Lifetime prevalence	1168	28.0 [25.4, 30.6] ^a	25.96	<0.001
Past year prevalence	1158	8.3 [6.7, 9.9] ^a	49.65	<0.001

Notes. CI = Confidence Interval

a. 95% CI taken directly from Sterud et al. (2008c)

As shown in Table 25, lifetime prevalence of feeling that life was not worth living is significantly higher in the present paramedic sample compared to the sample of Norwegian paramedics by 1.3 times. The past-year prevalence of feeling that life was not worth living was also significantly higher (and by two times) in the present paramedic sample compared to the Sterud sample.

The lifetime prevalence of the suicidal feeling, "Wished you were dead," is significantly higher (see Table 26) for the present paramedic sample compared to the Norwegian paramedic sample by 1.5 times. The past year prevalence for this aspect of suicidality is also significantly higher for the present paramedic sample compared to the Norway study by 2.2 times.

Table 26

Chi-square Goodness of Fit Test: Comparisons of life-time and past year prevalence of, "Wished you were dead."

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Lifetime prevalence	606	31.5 [28.1, 35.3]		
Past year prevalence	561	13.9 [11.3, 17.0]		
Sterud et al. (2008c).				
Lifetime prevalence	1158	20.7 [18.4, 23.1] ^a	43.20	<0.001
Past year prevalence	1158	6.2 [4.8, 7.6] ^a	57.25	<0.001

Notes. CI = Confidence Interval

a. 95% CI taken directly from Sterud et al. (2008c)

As can be seen in Table 27, the levels of the lifetime and past year prevalence of suicidal ideation is significantly higher for the present paramedic sample than for each of the comparison groups. The levels of lifetime suicidal ideation were 1.7 times higher than in Norwegian paramedics (Sterud et al., 2008c) and three times higher than the Australian population (Johnston et al., 2009). The levels of suicidal ideation in the past year were three and a half times that reported in Norwegian paramedics and 8.7 times higher than in the general Australian population.

Table 27

Chi-square Goodness of Fit Test: Life time and past year prevalence of suicidal ideation in the present paramedic sample compared with other study populations

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Lifetime prevalence	603	39.6 [35.8, 43.6]		
Past year prevalence	562	20.1 [17.0, 23.6]		
Sterud et al. (2008c).				
Lifetime prevalence	1158	22.8 [20.4, 25.2] ^a	97.10	<0.001
Past year prevalence	1158	5.7 [4.4, 7.0] ^a	217.01	<0.001
Johnston et al. (2009).				
Lifetime prevalence	8841	13.3 [12.4, 14.1] ^b	378.24	<0.001
Past year prevalence	8841	2.3 [1.9, 2.7] ^b	793.02	<0.001

Notes. CI = Confidence Interval

a. 95% CI taken directly from Sterud et al. (2008c)

b. 95% CI taken directly from Johnston et al. (2009)

The percentage of participants who reported making suicide plans at some time in their life was significantly higher for the present paramedic sample compared to each of the comparison samples as shown in Table 28. The lifetime prevalence of suicide plans was 1.27 times higher than for Norwegian paramedics and 3.3 times higher compared to the Australian population. The percentage of the present paramedic sample reporting that they had made suicide plans in the past year was significantly higher than for all of the comparison samples (Table 27). The degree of making

suicide plans in the past year was 2.8 times higher than for Norwegian paramedics and nine times higher compared to the general Australian population.

Table 28

Chi-square Goodness of Fit Test: Life time and past year prevalence of suicidal planning in the present paramedic sample compared with other study populations

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Lifetime prevalence	607	13.3 [10.9, 16.3]		
Past year prevalence	558	5.4 [3.8, 7.6]		
Sterud et al. (2008c)				
Lifetime prevalence	1158	10.4 [8.6, 12.1] ^a	5.65	0.017
Past year prevalence	1158	1.9 [1.1, 2.7] ^a	36.18	<0.001
Johnston et al. (2009)				
Lifetime prevalence	8841	4.0 [3.4, 4.5] ^b	138.02	<0.001
Past year prevalence	8841	0.6 [0.4, 0.7] ^b	213.45	<0.001

Notes. CI = Confidence Interval

a. 95% CI taken directly from Sterud et al. (2008c)

b. 95% CI taken directly from Johnston et al. (2009)

Table 29 presents the findings relating to suicide attempts. Lifetime suicide attempts are significantly higher for the present paramedic sample compared to each of the comparison samples. Lifetime suicide attempts were 1.6 times that of Norwegian paramedics and the general Australian population.

Two paramedic participants (anonymously) reported a suicide attempt in the past year. This is a very small number and not suitable for making statistical comparisons with other studies. Past year comparisons are consequently not reported here. Nevertheless, two participants represent 0.4% of the present paramedic sample and is the same as the comparison groups used in this study: both the Australian population and Norwegian paramedics reported a past-year prevalence of 0.4% for attempted suicide in the past year (Johnston et al., 2009; Sterud et al., 2008c)

Table 29

Chi-square Goodness of Fit Test: Life time prevalence of suicide attempts in the present paramedic sample compared with other study populations

Study	N	% [95% CI]	χ^2	<i>p</i>
Present study				
Lifetime prevalence	584	5.0 [3.5, 7.0]		
Sterud et al. (2008c)				
Lifetime prevalence	1142	3.1 [2.1, 4.1] ^a	6.77	0.009
Johnston et al. (2009)				
Lifetime prevalence	8841	3.2 [2.8, 3.7] ^b	5.88	0.015

Notes. CI = Confidence Interval

a. 95% CI taken directly from Sterud et al. (2008c)

b. 95% CI taken directly from Johnson et al, (2009)

6.4.5.1. Comparison of Suicidality for Males and Females

This section compares the prevalence of suicidality in male and female paramedic participants in the present study with the general Australian population and with a sample of Norwegian paramedics. The findings are respectively presented in Tables 30 and 31.

Table 30

Chi-square Goodness of Fit Test: Lifetime and Past Year Prevalence of Paramedic Suicidality by Sex Compared with the Australian Population

Suicidality	Males					Females				
	Present Study N	% [95% CI]	Australian Sample ^a %	χ^2	<i>p</i>	Present Study N	% [95% CI]	Australian Sample ^a %	χ^2	<i>p</i>
Suicidal Ideation										
Lifetime	364	39.3 [34.4, 44.4]	11.5 [10.0, 13.0]	276.1	<.001	238	40.3 [34.3, 46.7]	15.0 [13.7, 16.3]	119.8	<.001
Past Year	330	20.9 [16.9, 25.6]	1.8 [1.3, 2.4]	681.7	<.001	231	19.0 [14.5, 24.6]	2.7 [2.2, 3.3]	235.0	<.001
Suicide Planning										
Lifetime	365	12.1 [9.1, 15.8]	2.9 [2.2, 3.7]	108.6	<.001	241	15.4 [11.3, 20.4]	4.9 [4.1, 5.8]	56.5	<.001
Past Year	329	5.5 [3.5, 8.5]	0.4 [0.3, 0.6]	212.4	<.001	228	5.3 [3.0, 9.0]	0.7 [0.4, 1.0]	68.3	<.001
Suicide Attempt										
Lifetime	353	4.0 [2.4, 6.5]	2.1 [1.5, 2.7]	6.0	.014	231	6.5 [4.0, 10.4]	4.4 [3.7, 5.1]	2.4	.121

Notes. CI = Confidence Interval

a. Percentages and 95% CIs taken directly from Johnston et al. (2009)

The lifetime prevalence of suicidal ideation for paramedic males was 3.4 times that of Australian males and past year prevalence was 11.6 times higher; both differences were statistically significant. Lifetime prevalence of suicidal planning in paramedic males was 4.2 times that of males in the general Australian population and past year prevalence was 13.7 times higher; again, both differences were statistically significant. The lifetime prevalence of attempted suicide was statistically higher (by 1.9 times) in paramedic males compared to Australian males.

The prevalence of lifetime and past year suicidal ideation and suicidal planning were significantly higher for paramedic females than for females in the general Australian population. The prevalence of lifetime suicidal ideation for female paramedics was 2.7 times higher and past year prevalence was 7.0 times higher. Making suicide plans had a lifetime prevalence 3.0 times that of Australian females and past year prevalence was 7.6 times higher. The reported lifetime prevalence of attempted suicide was not statistically difference from that of Australian females.

Table 31

Chi-square Goodness of Fit Test: Lifetime and Past Year Prevalence of Paramedic Suicidality by Sex Compared with Norwegian Paramedics

Suicidality	Males					Females				
	Present Study N	% [95% CI]	Norwegian Paramedics ^a % [95% CI]	χ^2	<i>p</i>	Present Study N	% [95% CI]	Norwegian Paramedics ^a % [95% CI]	χ^2	<i>p</i>
Felt Life Not Worth Living										
Lifetime	365	37.3 [32.5, 42.3]	26.7 [23.8, 26.9]	20.8	<.001	240	37.5 [31.6, 43.8]	32.4 [26.9, 37.9]	2.8	.091
Past Year	332	18.1 [14.3, 22.6]	8.6 [6.5, 10.4]	37.9	<.001	230	14.3 [10.4, 19.5]	7.3 [4.3, 10.5]	16.9	<.001
Wished You Were Dead										
Lifetime	365	30.4 [25.9, 35.3]	19.1 [16.5, 21.7]	30.2	<.001	240	33.3 [27.7, 39.5]	26.1 [20.9, 31.4]	6.5	.011
Past Year	330	15.5 [11.9, 19.7]	5.8 [4.3, 7.4]	56.3	<.001	230	11.7 [8.2, 16.5]	7.5 [4.3, 10.6]	5.9	.015
Suicidal Ideation										
Lifetime	364	39.3 [34.4, 44.4]	22.2 [19.4, 24.9]	61.5	<.001	238	40.3 [34.3, 46.7]	24.9 [19.7, 30.1]	30.3	<.001
Past Year	330	20.9 [16.9, 25.6]	5.5 [4.6, 7.0]			231	19.0 [14.5, 24.6]	6.3 [3.4, 9.2]	63.6	<.001
Suicide Planning										
Lifetime	365	12.1 [9.1, 15.8]	10.1 [8.2, 12.1]	1.5	.215	241	15.4 [11.3, 20.4]	11.1 [7.4, 14.9]	4.4	.036
Past Year	329	5.5 [3.5, 8.5]	1.9 [1.0, 2.8]	22.5	<.001	228	5.3 [3.0, 9.0]	1.9 [1.1, 2.7]	13.8	<.001
Suicide Attempt										
Lifetime	353	4.0 [2.4, 6.5]	2.6 [1.6, 3.7]	2.6	.107	231	6.5 [4.0, 10.4]	4.5 [2.0, 7.0]	2.1	.144

Notes. CI = Confidence Interval

a. Percentages and 95% CIs for Norwegian paramedics taken directly from Sterud et al. (2008c)

Sex comparisons were made with the present paramedic sample and a sample of Norwegian paramedics as shown in Table 31. The prevalence of lifetime and past year of the following aspects of suicidality were significantly higher for paramedic males in the present study: 1/ felt that life was not worth living with lifetime and past year levels respectively 1.4 and 2.1 times higher, 2/ wished you were dead with lifetime and past year levels respectively 1.6 and 2.7 times higher and 3/ suicidal ideation with lifetime and past year levels respectively 1.7 and 3.8 times higher. The reported lifetime prevalence of suicide planning paramedic males in the present study was not significantly different from that of Norwegian male paramedics. However, the prevalence of past year suicide planning was significantly higher at 3.8 times the level of male Norwegian paramedics. The level of lifetime attempted suicide was not significantly different from that of males in the Norwegian sample.

The lifetime prevalence of feeling that life was not worth living for paramedic females was not significantly different from their Norwegian counterparts but past year prevalence was significantly higher at a level of 1.9 times higher. The lifetime and past year prevalence of the suicidal feelings of wishing that you were dead (respectively 1.3 and 1.6 times higher) and suicidal ideation (respectively 1.6 and 3.0 times higher) were significantly higher for paramedic females from the present study in comparison with those in the Norwegian sample. The lifetime and past year prevalence of suicide planning was significantly higher for females from the present sample with levels being respectively 1.4 and 2.8 times that of the Norwegian sample. The prevalence level of lifetime attempted suicide was not significantly different from that of female Norwegian paramedics.

6.4.6. Posttraumatic Stress Disorder

The Short Screening Scale for the Diagnostic and Statistical Manual-IV PTSD was used in this study to identify probable cases of PTSD (Breslau et al., 1999). The studies used here

for comparison purposes did not use this scale so no direct comparisons were possible, and results should be interpreted with caution.

Berger et al., (2012) conducted a systematic review and meta-analysis of PTSD in rescue workers; this study included paramedics, police, fire-fighters and other rescue workers. Articles were included if PTSD was assessed by an instrument or method that reflected the DSM-IV criteria. They intentionally excluded lifetime PTSD prevalence and included samples that met the criteria for current PTSD. Data was pooled from eight paramedic studies from several countries and it was reported that current level of PTSD in paramedics was 14.6%. This figure was compared with the past year PTSD prevalence of 14.4% from the present paramedic sample and no significant difference was found, $\chi^2(1, n = 536) = 0.024, p = .878$.

The Australian Bureau of Statistics (2007) conducted a survey on the mental health of Australians and reported that the past year prevalence of PTSD was 6.4%. The percentage of past year PTSD prevalence in the present paramedic sample (14.4%) was significantly higher, $\chi^2(1, n = 536) = 56.77, p < .001$, and 2.3 times the reported by the Australian Bureau of Statistics.

6.4.7. Sleep Health

Mean Scores for disturbed sleep from the present sample using the Karolinska Sleep Questionnaire for males ($M = 2.1, SD = 0.94$) and females ($M = 2.1, SD = 0.92$) were both significantly higher than for Norwegian paramedics (Male $M = 0.4, SD = 0.8$; Female Mean = $0.4, SD = 0.9$; Sterud et. al, 2008a). For males the result was $t(501, N = 502) = 42.93, p < .001$, and for females $t(319, N = 320) = 34.8, p < .001$. Sterud et al. (2008a) did not report the disturbed sleep mean for the total sample.

The comparisons for prevalence of disturbed sleep between the present sample and the Norwegian study were also investigated and are shown in Table 32. The percentage of cases with disturbed sleep was significantly higher for the total sample compared to the total sample of Norwegian paramedics by 1.3 times. The proportion of males in the present sample was significantly higher and 1.6 times the level Norwegian male paramedics. There was no significant difference between females in the two samples.

Table 32

Prevalence Comparisons of Disturbed Sleep

Disturbed Sleep	N	% [95% CI]	χ^2	<i>p</i>
Present Study				
Total Sample	814	8.2 [6.5, 10.3]		
Males	493	9.3 [7.1, 12.2]		
Females	320	6.6 [4.6, 10.5]		
Norwegian Paramedics^a				
Total Sample	1161	6.3 [4.9, 7.7]	5.1	.023
Males	889	5.9 [4.3, 7.4]	10.4	.001
Females	272	7.8 [4.6, 11.0]	0.7	.409

Notes. CI = Confidence Interval

a. Percentages and 95% confidence intervals of disturbed sleep for Norwegian paramedics was taken directly from Sterud et al. (2008a).

Using data from the Australian Bureau of Statistics, the Australian Institute of Health and Welfare (2006) reported the results of a survey on the mental health of Australians which included a question on the use of sleeping tablets. This survey found that 4.5% of Australians had taken sleeping tablets in the preceding two weeks. The level of sleeping tablet use in the preceding two weeks in the present paramedic sample was 18.2% which is four times and significantly higher than the general Australian population, $\chi^2 (1, N = 180) = 1184.9, p < .001$.

6.5. The Predictive Relationship between Sociodemographic Variables, and Work Environment On Paramedic Mental Health

6.5.1. Introduction

Binary logistic regression was employed to explore the association of independent sociodemographic and work environment variables with a series of dependent variables measuring mental health outcomes, as described in section 5.5.

6.5.2. Results Of Binary Logistic Regression Analyses

6.5.2.1. DASS21 Depression

The logistic regression results are shown in Table 33 and indicate that four variables were identified as significant predictors of DASS21 depression cases. The model containing these predictors was statistically significant indicating that these predictor variables were associated with DASS21 depression caseness $\chi^2(4, N = 496) = 69.41, p < 0.001$. The model as a whole explained between 13.1% (Cox and Snell $R^2 = .131$) and 18.6% (Nagelkerke $R^2 = .186$) of the variance in depression caseness status; 74.4% of the cases were correctly classified.

Table 33

Stepwise Binary Logistic Regression of Variables Predicting Cases of DASS21 Depression

Variable	B	p	OR	OR 95% CI
Not Partnered or Partnered	-0.56	0.023	0.57	0.35, 0.92
Not Well Rested On Awakening	0.53	<0.001	1.70	1.29, 2.24
Major City or Regional Area	0.51	0.040	1.67	1.02, 2.72
Disturbed Sleep	0.12	0.001	1.13	1.05, 1.21
Constant	4.09	<0.001	0.02	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The odds ratio for not partnered or partnered was 0.57 indicating that having a partner decreased the likelihood of being classified as a case of depression. Inverting 0.57 gives a value of 1.75 and indicates that not partnered or partnered is the strongest predictor in this set of variables. Not having a partner increases the odds of depression caseness by 1.75. The next strongest predictor was not well rested on awakening with an odds ratio of 1.70. This indicated that each unit increase in the not well rested on awakening scale increased the odds of experiencing some level of depression by 70%. The next best predictor was whether or not a paramedic worked in a major city or in a regional area with an odds ratio of 1.67; working in a regional area increased the odds of experiencing some level of depression by 67%. The final predictor was disturbed sleep with an odds ratio of 1.13. This variable made a smaller contribution in that a unit increase in the disturbed sleep score increased the odds of depression caseness by 13%.

Data from 496 participants was included in this analysis, of whom 145 (29.23%) were identified as cases. Examination of the standardized residuals found that 29 (5.85%) were outside the ± 1.96 range which included seven residuals with values of three or greater,

indicating that these participants were a poor fit with the model (Field, 2009 pp. 292 – 293). All values of Cook’s Distance were less than one. Inspection of the data for individual cases that were detected as being a poor fit with the model did not find any abnormalities with respect to their data.

6.5.2.2. DASS21 Anxiety

The logistic regression results are shown in Table 34 and show that four variables were significant predictors of DASS21 anxiety cases. The model containing these variables was statistically significant showing that these four predictor variables were associated with DASS anxiety caseness $\chi^2(4, n = 496) = 53.98, p < 0.001$. The variables in the model explained between 10.3% (Cox and Snell $R^2 = .103$) and 15.8% (Nagelkirke $R^2 = .158$) of the variance in DASS depression caseness and correctly classified 78.4% of cases.

Table 34

Stepwise Binary Logistic Regression of Variables Predicting Cases of DASS21 Anxiety

Variable	B	p	OR	OR 95% CI
Not Partnered or Partnered	-0.45	0.090	0.64	1.09, 2.08
Not Well Rested On Awakening	0.41	0.013	1.50	1.10, 2.07
Disturbed Sleep	0.39	0.012	1.48	1.09, 2.00
Difficulty Awakening	0.24	0.021	1.27	1.04, 1.55
Constant	-4.34	<0.001	0.013	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The odds ratio for not partnered or partnered was 0.64 (although with $p = 0.09$, it was not statistically significant) which indicates that having a partner decreased the likelihood of

being classified as a case of anxiety. Inverting 0.64 gives a value of 1.56 which indicates that not having a partner increases the odds of anxiety caseness by 56%; it is also the variable in the model with the largest impact DASS depression caseness. Although the p value for partnered or not partnered was not statistically significant, this variable was included because it makes a contribution to the model in conjunction with the other variables as described by Tabachnick and Fidell (2014). The odds ratio for not well rested on awakening was 1.50 and indicated that each unit increase in this variable increased the odds ratio by 50%. Disturbed sleep was slightly less impactful with an odds ratio of 1.48. This indicated that for each unit increase in the disturbed sleep score respondents were 1.48 times more likely to be classified as a case of depression. Finally, the odds ratio for difficulty awakening was 1.27, which indicates this is how much the odds of being classified as a case of depression increases for a unit increase in scores on this scale.

There were 496 participants included in the analysis of predictors for anxiety with 111 (22.38%) identified as cases falling above the normal range. Examination of the standardised residuals showed that 44 (8.87%) were greater than ± 1.96 with 9 having a value of three or more. All values of Cook's Distance statistics were less than one. Examination of the data for individual cases with high values for the standardised residuals did not identify any abnormalities in the data that had been entered.

6.5.2.3. DASS21 Stress

The logistic regression results are shown in Table 35 and indicate that three variables derived from the Karolinska Sleep Questionnaire formed a model that was statistically significant in predicting stress caseness $\chi^2(3, n = 496) = 72.45, p < 0.001$. The model as a whole explained between 13.6% (Cox and Snell $R^2 = .136$) and 19.5% (Nagelkerke $R^2 = .195$) of the variance in DASS stress caseness and correctly classified 73.2% of cases.

Table 35

Stepwise Binary Logistic Regression of Variables Predicting DASS21 Stress Caseness

Variable	B	p	OR	OR 95% CI
Difficulty Awakening	0.16	0.097	1.72	0.97, 1.14
Not Well Rested On Awakening	0.52	0.001	1.68	1.25, 2.27
Disturbed Sleep	0.47	0.001	1.60	1.20, 2.14
Constant	-4.79	<0.001	0.008	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The 95% confidence interval of the odds ratio for difficulty awakening contains '1' which indicates that this predictor is less useful in classifying stress cases (Field, 2009, p 240) however, it makes a contribution to the total model in conjunction with the other variables (Tabachnick & Fidell, 2014). The odds ratio for not well rested on awakening was 1.68 indicating that a one unit increase in scores on this scale increases the odds of being classified as a case of stress by 68%. The odds ratio for disturbed sleep was 1.20 indicating that this variable made a smaller contribution and that a one unit increase in this scale increased to odds of identifying stress caseness by 20%.

There were 496 participants included in the analysis of predictors for stress with 142 (28.63%) identified as cases of stress. Inspection of the standardized residuals detected 43 instances out of 496 (8.67%) with values outside the range of ± 1.96 ; there were 10 cases with values of three or more. Inspection of the data for these cases did not identify why they might be fitting poorly with the model. Scrutiny of Cook's Distance statistics found that all values were less than one signifying that there were no cases exerting undue influence on the model.

6.5.2.4. GHQ28 Total Scores

The logistic regression analysis identified a group of four variables as being significant predictors of GHQ28 total score caseness as shown in Table 36. The model containing these four predictors was statistically significant $\chi^2(4, n = 642) = 118.76, p < 0.001$, indicating that these variables were associated with GHQ28 total score caseness. The model as a whole explained between 16.9% (Cox and Snell $R^2 = .169$) and 22.5% (Nagelkerke $R^2 = .225$) of the variance in GHQ total score caseness. The proportion of cases correctly classified was 68.1%.

Table 36

Backwards Stepwise Binary Logistic Regression of Variables Predicting GHQ28 Total Score Caseness

Variable	B	p	OR	OR 95% CI
Disturbed Sleep	0.65	< 0.001	1.93	1.52, 2.44
Not Partnered or Partnered	-0.46	0.029	0.63	0.41, 0.95
Not Well Rested on Awakening	0.31	0.010	1.36	1.08, 1.72
Difficulty Awakening	0.23	0.006	1.25	1.07, 1.47
Constant	-3.40	<0.001	0.034	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The strongest predictor of GHQ28 total score caseness was disturbed sleep with an odds ratio of 1.93. This result indicates that each unit increase in GHQ28 scores increases that odds of being classified as a case by 93%. The odds ratio for not partnered or partnered was 0.63 indicating that having a partner decreased the likelihood of being classified as a case on the GHQ28 total scores. Inverting 0.63 gives a value of 1.59 and indicates that this is the second strongest predictor in this set of variables. Not having a partner increases the odds

of GHQ28 caseness by 1.75. The third predictor was not well rested on awakening with an odds ratio of 1.36; a one unit increase on this scale increases the odds of being classified as a GHQ total score case by 36%. The fourth predictor in the equation was difficulty awakening with an odds ratio of 1.25; the odds of being classified as a case increase by 25% with each one unit increase in this scale.

There were 642 participants included in this analysis of whom 314 (48.91%) were identified as cases. Nine (1.40%) of the standardised residuals had a value greater than ± 1.96 ; there were no residuals with a value of three or more. Scrutiny of Cook's Distance statistics found that all values were less than one.

6.5.2.5. Posttraumatic Stress Disorder Caseness In The Past Year

The logistic regression statistics for PTSD are presented in Table 37 and reveal that three variables were the best predictors for identifying cases of PTSD in the past year. The model containing these three variables was statistically significant $\chi^2 (3, n = 427) = 37.73, p < 0.001$ and explained between 8.5% Cox and Snell $R^2 = .085$ and 15.4% Nagelkerke $R^2 = .154$ in the variance of PTSD cases; 86.2% of cases were correctly classified.

The strongest predictor was disturbed sleep with an odds ratio of 2.33 which indicated that for each unit increase of one on this item increased the odds of being classified as a case of probable PTSD in the past year increased by 133%. The next strongest predictor was working rotating shifts which had an odds ratio of 0.45. Inverting 0.45 gives an odds ratio with a value of 2.22 which indicates that not working a rotating shift pattern increases the odds of classification as a PTSD case by 122%. The third predictor, average hours to transport a patient, had an odds ratio of 1.43 indicated and indicated that the odds of being classified with PTSD increased by 43% with each additional hour of average patient transport time.

Table 37

Stepwise Binary Logistic Regression of Variables Predicting Probable PTSD Caseness in the Past Year

Variable	B	p	OR	OR 95% CI
Disturbed Sleep	0.85	<0.001	2.33	1.63, 3.34
Working Rotating Shifts	-0.79	0.030	0.45	0.22, 0.93
Average Hours To Transport A Patient	0.36	0.013	1.43	1.08, 1.89
Constant	-4.34	<0.001	0.013	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

There were 427 participants included in this logistic regression analysis and 58 (13.58%) were identified as cases of probable PTSD; 43 cases (10.07%) had standardised residuals with values greater than 1.96, of which 10 had values of three or more. All the values of Cook's Distance statistics were less than one.

6.5.2.6. Past Year Suicidal Planning

The analysis of predictors for past year suicidal ideation of seriously considering taking one's own life and making a plan are shown in Table 38. Two variables formed a model that was statistically significant $\chi^2(2, n = 444) = 15.57, p < 0.001$ in identifying the suicidal ideation of seriously considering taking one's own life in the past year and which explained between 3.4% Cox and Snell $R^2 = .034$ and 10.9% Nagelkerke $R^2 = .109$ of the variation in classification of cases. 95.3% participants were correctly classified in terms of experiencing suicidal ideation about seriously considering and making plan to takes one's life.

Table 38

Stepwise Logistic Regression of Variables Predicting Seriously Taking One's Life and Making a Plan in the Past Year

Variable	B	p	OR	OR 95% CI
Disturbed Sleep	0.72	0.008	2.06	1.21, 3.51
Average Hours to Transport A Patient	0.49	0.003	1.62	1.18, 2.23
Constant	-5.87	<0.001	0.003	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The odds ratio for disturbed sleep was 2.06 which indicated that the odds of reporting the suicidal ideation of thoughts of taking one's life and making plans increases by 106% by each unit increase in disturbed sleep scores. The odds ratio for average hours to transport a patient was 1.62 which indicated that each hour increase in patient transport time increased the likelihood of being classified with this suicidal ideation increases by 62%.

There were 444 participants included in this analysis with 21 (4.73) being identified as cases of suicidal ideation. The findings revealed that 24 (5.40%) of the standardised residuals had values outside the range of ± 1.96 and 19 with values outside the range of ± 3.0 . One value for Cook's distance was greater than one.

6.6. Comorbidities Of Suicidal Ideation And Probable Posttraumatic Stress Disorder

The intention of this section was to investigate predictors for past-year suicidal ideation and past-year cases of probable PTSD. The process of investigation used here was based on that used by Pirkis et al. (2000) who used data obtained from variables measured in the Australian National Survey of Mental Health and Wellbeing (Australian Bureau of Statistics, 1997). Pirkis et al. included demographic variables and mental health variables that were identified as possible risk factors for suicidal ideation and which had been included in the National Survey of Mental Health and Well Being. The process used to investigate predictors of suicidal ideation was also used to investigate predictors for cases of probable PTSD.

Similarly, the analysis conducted in this section included sociodemographic measures, workplace attributes and measures of psychological health as predictor variables. Binary logistic regression was used to assess the association of these variables with the outcome variables of past-year suicidal ideation and probable past-year PTSD caseness.

The predictor variables that were considered in this section are the same as those used in the previous section and listed in section 6.5.2. However, the GHQ28 subscales of anxiety and insomnia, and severe depression, were not included because the items comprising these subscales were not homogeneous. The anxiety and insomnia subscale included items that assessed anxiety as well as problems with sleep; these items overlapped with those drawn from the Karolinska Sleep Questionnaire and DASS-21 anxiety. The severe depression subscale included items that measured aspects of suicidality which was the outcome variable under consideration.

Consistent with the procedure adopted by Pirkis et al. (2000), lifetime suicidal ideation and other aspects of suicidality were not considered here because it was not regarded as sensible to assess a variable only known to have occurred within the preceding year to

predict an event that had occurred much earlier in life; lifetime PTSD was not considered for the same reason. Past year suicidal planning and attempted suicide were not considered because the number of participants who reported these aspects of suicidality were too few to include in a logistic regression analysis (30 and 2 participants, respectively).

6.6.1. Predictors Of Suicidal Ideation

The backwards stepwise logistic regression procedure was used to identify the most efficient set of predictors and the results are shown in Table 39.

Table 39

Stepwise Logistic Regression of Variables Predicting Past-year Suicidal Ideation

Variable	B	<i>p</i>	OR	95% CI
Not Partnered or Partnered	0.54	.071	1.72	0.95, 3.12
Average Patient Transport Time	0.27	.076	1.31	0.97, 1.76
DASS Depression Score	0.10	<.001	1.10	1.06, 1.14
GHQ28 Somatic Scale Score	0.12	.004	1.23	1.04, 1.22
Constant	-3.46	<.001	0.03	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

A combination of four predictors resulted from the backwards logistic regression which was statistically significant χ^2 (4, *n* = 403) = 83.01, *p* < 0.001 and the model as a whole explained between 19% (Cox and Snell R^2 = .19) and 29% (Nagelkerke R^2 = .29) of the variance in cases of suicidal ideation; 84.4% of cases were correctly classified.

The odds ratio for partnered or not partnered (marital status) indicate that having a partner increased the odds of suicidal ideation by 1.72 times. Each additional hour of time spent in transporting a patient increased the odds of suicidal ideation by 1.31 times. Neither marital status nor average patient transport time were significant predictors (both *p* values were

greater than .05) but they make their contribution in association with the other predictor variables resulting from the backwards regression. The odds ratio of 1.10 for DASS depression indicates that each unit increase in the scores on this scale increase the odds of suicidal ideation by 10% and the odds ratio of 1.23 indicated that each unit increase of scores on the GHQ28 Somatic subscale increase the risk of suicidal ideation by 23%.

Examination of the residual statistics indicated that they were largely within acceptable limits (as described by Field, 2009, pp.292 – 293): 7.9% of the standardized residuals were greater than ± 1.96 with 14 having a value of more than 3, indicating that these cases were a poor fit with the model. All of the values for Cook's distance were less than one. Data for individual cases identified as being a poor fit with the model were inspected but no anomalies were found. No cases were eliminated and the logistic regression procedure was not re-run.

6.6.2. Predictors Of Probable Posttraumatic Stress Disorder

Backwards stepwise binary logistic regression was employed to the most efficient set of predictors for probable PTSD and the results are shown in Table 40. The result of the backwards logistic regression procedure was a statically significant model with five predictor variables, $\chi^2(5, 383) = 76.32, p < 0.001$ and explained between 18% (Cox and Snell $R^2 = .18$) and 33.0% (Nagelkerke $R^2 = 0.33$) of the variance in cases of PTSD; 89.0% of cases were correctly classified.

Table 40

Stepwise Logistic Regression of Variables Predicting Past-year PTSD Probable Caseness

Variable	B	<i>p</i>	OR	95% CI
Working Rotating Shifts	-1.01	.028	0.37	0.15, 0.90
Average Patient Transport Time	0.41	.017	1.50	1.07, 2.10
DASS21 Depression Score	0.05	.065	1.05	1.00, 1.10
DASS21 Stress Score	0.05	.036	1.06	1.00, 1.11
GHQ28 Somatic Scale Score	0.17	.003	1.18	1.06, 1.32
Constant	-4.00	<.001	0.02	

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The strongest predictor was working rotating shifts with an odds ratio of 0.37. This indicates that working a rotating shift reduces the odds of experiencing PTSD in the past year.

Inverting this odds ratio (dividing by one as described by Pallant [2013]) gives a value of 2.70 indicating working a rotating shift reduces the odds of being classified as a case of past-year PTSD by 170%. The odds ratio for average patient transport time was 1.50 which indicates that each additional hour increases the odds of PTSD by 50%. The odds ratio for GHQ28 somatic scale scores was 1.18 signifying that each unit increase (of one) in scores on this scale increase the odds of past year PTSD by 18%. The DASS21 stress and depression score ratios were 1.06 and 1.05, respectively; a result which signifies that each increase of one on these scales increases the odds of being classified as a case of past-year PTSD by 6.0% and 5.0%, respectively.

The residual statistics were largely within satisfactory limits (as described by Field, 2009, pp.292 – 293). 6.79% of the standardized residuals were greater than ± 1.96 and 14 of these had a value of more than three. The values of Cook's distance were all less than one. The data for cases identified as being a poor fit with the model were examined but no

irregularities were detected. No cases were eliminated and the logistic regression procedure was not re-run.

6.6.3. PTSD And The Relative Risk Of Suicidal Ideation

A cross-tabulation of past-year PTSD caseness and the presence of suicidal ideation in the past year are shown in Table 41.

Table 41

Cross-tabulation of past year PTSD and Suicidal Ideation

PTSD	Suicidal Ideation		Total
	Yes	No	
Case	40	35	75
Non-case	65	364	429
Total	105	399	504

The risk ratio of experiencing suicidal ideation for past-year PTSD cases was 3.52. (CI: 2.59, 4.79; z statistic = 8.00; p < .001). This result indicates that participants identified as a case of probable PTSD were 3.52 times more likely to have experienced suicidal ideation in the past year than those who were not identified as having PTSD. The increase in risk of suicidal ideation for PTSD cases compared to PTSD non-cases is 252% $((3.52 - 1)100)$.

6.7. Sources Of Stress Associated with Paramedic Mental Health

The purpose of the analyses conducted in this section are to examine which of the ambulance service sources of stress subscales are the best predictors of the scores on the paramedic mental health outcome variables (Field, 2013; Pallant, 2013). The sources of stress subscales produce scores that are continuous data; the mental health outcome

variables are in the form of continuous and dichotomous data-(Pallant, 2013). Robinson (1984) reported a list of events that caused varying degrees of stress for paramedics and also grouped them into six conceptually coherent sub-scales. These sources of stress subscales were-

1. Shift work
2. Driving
3. Emergency work
4. Communication within the ambulance service
5. Communication with other professionals and the public
6. Organisational and welfare conditions, and
7. Family and personal life

Standard multiple regression enables a set of continuous variables to be examined in terms of how well they predict a given continuous outcome variable and enables the researcher to determine the relative contribution of each of the predictor variables to the outcome variable (Pallant, 2013). The purpose of the analyses here is to identify which of the stress scales identified by Robinson are the best predictors of each of the continuous variables measuring paramedic mental health. Logistic regression was similarly used to explore the contribution of the stress scale variables to the dichotomous outcome variables.

The continuous outcome variables examined in this section were GHQ28 Total scores, DASS 21 Depression, DASS 21 Anxiety, DASS21 Stress and Disturbed Sleep. The binary outcome variables considered were past year probable PTSD and past year suicidal ideation.

In all of the (multiple and logistic) regression analyses that follow, all of the stress sub-scales were entered as predictor variables (forced entry) and examined for their contribution to the outcome score for the specific psychological health issues under examination.

6.7.1. Standard Multiple Regression Analyses

6.7.1.1. Regression Of Sources of Stress Subscales On GHQ28 Total Scores

The results of the multiple regression analysis of the stress events subscales as predictors with the GHQ28 scores as the outcome variable are shown in Table 42.

Table 42

Linear multiple regression model of stress events subscales as predictors on GHQ28 Total Scores

Predictor Variables (Impact Scores)	B	B 95% CI	SE B	β	p
(Constant)	15.83	13.83,17.83	1.018		<.001
Shift work	.122	.05, .20	.039	.147	.002
Driving	.063	-.03, .15	.045	.075	.160
Emergency Work	-.127	-.26, .01	.068	-.108	.063
Communication Within The Ambulance Service	.205	.13, .28	.036	.311	<.001
Communication With Other Professionals And The Public	-.075	-.13, -.02	.028	-.123	.007
Organisational And Welfare Conditions	.127	.63, .19	.032	.198	<.001
Family And Personal Life	.053	-.02, .12	.035	.066	.130

Notes. B = beta values; SE B = standard errors; β = standardised beta values; CI = Confidence Interval

The model as a whole was significant and explained 27% of the variance, $F(7,567) = 29.80$, $p < .001$, $R^2 = .27$. There were four variables that made a statistically significant contribution to the model; most of the contribution came from Communication within the ambulance service followed (in order) by Organisational and welfare conditions, Shift work and Communication with other professionals and the public.

6.7.1.2. Regression Of Sources Of Stress Subscales on DASS21 Depression Scores

The results of the standard multiple regression analysis of the stress events subscales as predictors with the DASS21 depression scores as the outcome variable are shown in Table 43.

Table 43

Linear multiple regression model stress events subscales as predictors on DASS21

Depression Scores

Predictor Variables (Impact Scores)	B	B 95% CI	SE B	β	<i>p</i>
(Constant)	1.104	1.27, 2.47	.697		.114
Shift work	.053	.01, .10	.026	.094	.043
Driving	.041	.02, .10	.031	.069	.188
Emergency Work	-.071	-.16, .02	.046	-.088	.128
Communication Within The Ambulance Service	.156	.11, .20	.025	.341	<.001
Communication With Other Professionals And The Public	-.043	-.08, -.01	.019	-.101	.026
Organisational And Welfare Conditions	0.85	.04, .13	.023	.190	<.001
Family And Personal Life	.033	-.01, .08	.024	.060	.173

Notes. B = beta values; SE B = standard errors; β = standardised beta values; CI = Confidence Interval

The model as a whole was significant and explained 27% of the variance, $F(7,572) = 29.84$, $p < .001$, $R^2 = .27$. There were four variables that made a statistically significant contribution to the model, most of the contribution came from Communication within the ambulance

service followed (in order) by Organisational and welfare conditions, Communication with other professionals and the public and Shift work.

6.7.1.3. Regression Of Sources Of Stress Subscales on DASS21 Anxiety Scores

The results of the standard multiple regression analysis of the stress events subscales as predictors with the DASS21 anxiety scores as the outcome variable are shown in Table 44.

Table 44

Linear multiple regression model of stress events subscales as predictors on DASS21 Anxiety Scores

Predictor Variables	B	B	SE B	β	p
(Impact Scores)	95% CI				
(Constant)	1.496	.44, 2.55	.538		.006
Shift work	.044	.01, .08	.020	.108	.031
Driving	.045	-.01, .09	.024	.105	.061
Emergency Work	-.076	-.15, -.01	.036	-.130	.035
Communication Within The Ambulance Service	.090	.05, .13	.019	.274	<.001
Communication With Other Professionals And The Public	-.026	-.06, -.01	.015	-.087	.076
Organisational And Welfare Conditions	.046	.01, .08	.017	.145	.008
Family And Personal Life	.001	-.03, .04	.019	.003	.948

Notes. B = beta values; SE B = standard errors; β = standardised beta values; CI = Confidence Interval

The model containing the full set of predictor variables was significant, with 16.2% of the variance explained $F(7,572) = 15.77, p <.001, R^2 = .162$. Four of the predictor variables made a statistically significant contribution to explain the DASS21 anxiety scores, most of the contribution came from Communication within the ambulance service followed, in order, by Organisational and welfare conditions, Emergency work and Shift work. The beta value for emergency work was negative indicating that higher scores on this subscale had a protective effect by reducing the DASS anxiety scores or, possibly acting as a suppressor variable (Tabachnick & Fidell, 2014).

6.7.1.4. Regression Of Sources Of Stress Subscales on DASS21 Stress Scores

The results of the standard multiple regression analysis of the stress events subscales as predictors with the DASS21 stress scores as the outcome variable are shown in Table 45.

Table 45

Linear multiple regression model of stress events subscales as predictors on DASS21

Stress Scores

Predictor Variables	B	B	SE B	β	<i>p</i>
(Impact Scores)	95% CI				
(Constant)	3.233	1.86, 4.61	.701		<.001
Shift work	.088	.04, .14	.026	.150	.001
Driving	.076	.01, .14	.031	.124	.014
Emergency Work	-.026	-.12, .07	.047	-.031	.575
Communication Within The Ambulance Service	.107	.06, .16	.025	.225	<.001
Communication With Other Professionals And The Public	-.030	-.07, .01	.019	-.068	.123
Organisational And Welfare Conditions	.063	.02, .11	.023	.137	.006
Family And Personal Life	.092	.04, .14	.024	.161	.001

Notes. B = beta values; SE B = standard errors; β = standardised beta values; CI = Confidence Interval

The model as a whole was significant and explained 31.5% of the variance of the DASS21 stress scores, $F(7,572) = 37.59$, $p < .001$, $R^2 = .315$. Five of the predictor variables made a statistically significant contribution to the model. Communication within the ambulance service made the greatest contribution, followed, in order, by Family And Personal Life, Shift work, Organisational and welfare conditions and Driving.

6.7.1.5. Regression Of Sources Of Stress Subscales on Disturbed Sleep Scores

The results of the standard multiple regression analysis of the sources of stress subscale scores on the Karolinska Sleep Questionnaire (KSQ) disturbed sleep scale scores are presented in Table 46.

Table 46

Linear multiple regression model predictors on KSQ Disturbed Sleep Scores

Predictor Variables	B	B	SE B	β	p
(Impact Scores)	95% CI				
(Constant)	10.369	9.70, 11.04	.340		<.001
Shift work	.049	.024, .074	.013	.194	<.001
Driving	.010	-.019, .040	.015	.039	.495
Emergency Work	-.015	-.059, .029	.023	-.041	.508
Communication Within The Ambulance Service	.009	-.015, .033	.012	.044	.460
Communication With Other Professionals And The Public	-.027	-.046, -.009	.009	-.143	.004
Organisational And Welfare Conditions	.041	.020, .063	.011	.206	<.001
Family And Personal Life	.020	-.003, .043	.012	.081	.092

Notes. B = beta values; SE B = standard errors; β = standardised beta values; CI = Confidence Interval

The regression model was significant and explained 14% of the variance in the KSQ disturbed sleep subscale scores, $F(7,572) = 13.26$, $p < .001$, $R^2 = .140$. Three of the predictor variables made a significant contribution to the scores on the disturbed sleep scale with organisational and welfare conditions making the largest contribution followed by Shift work and Communication with other professionals and the public.

6.7.2. Binary Logistic Regression Analyses

The predictor variables have been listed earlier in this section. The dichotomous outcome variables are PTSD caseness and instances of the suicidal ideation of seriously considering taking one's own life.

6.7.2.1. Binary Logistic Regression On The Sources Of Stress Subscale Scores On Probable Posttraumatic Stress Disorder Caseness In The Past Year

The results of the binary logistic regression of the sources of stress subscales on probable past year PTSD caseness are presented in Table 47.

The model containing all the predictors was statistically significant indicating that the model was able to distinguish between respondents identified with and without probable PTSD caseness in the past year $\chi^2(7, n = 503) = 50.04, p < 0.001$. The model as a whole explained between 9.5% (Cox and Snell $R^2 = .095$) and 16.9% (Nagelkerke $R^2 = .169$) of the variance in PTSD status and correctly classified 86.9% of cases. As shown in Table 46, only two of the seven predictor variables made a unique statistically significant contribution. These variables were Communication within the ambulance service and Organisational and welfare conditions and both contributed equally to predicting past year PTSD and with both having odds ratios of 1.03. This indicates that each increase of one in the scores on these subscales increases the odds of being classified as a case of past year PTSD by 3.0%.

Table 47

Binary Logistic Regression with Stress Events Subscales as Predictors of Probable PTSD Cases in the Past Year

Variable	B	<i>p</i>	OR	OR 95% CI
(Constant)	-2.82	<0.001		
Shift work	0.01	.257	1.01	0.99, 1.02
Driving	0.01	.690	1.01	0.98, 1.03
Emergency Work	-0.04	.056	0.96	0.93, 1.00
Communication Within The Ambulance Service	0.03	.001	1.03	1.01, 1.05
Communication with other professionals and the public	-0.01	.123	.099	0.97, 1.00
Organisational and Welfare Conditions	0.03	.001	1.03	1.01, 1.05
Family And Personal Life	-0.00	.757	1.00	1.00, 1.02

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

6.7.2.2. Binary Logistic Regression Of The Sources Of Stress Subscale

Scores On Probable Suicidal Ideation In The Past Year

The results of the binary logistic regression of the sources of stress subscales on past year suicidal ideation are presented in Table 48.

Table 48

Binary Logistic Regression with Stress Events Subscales as Predictors of Suicidal Ideation Cases in the Past Year

Variable	B	<i>p</i>	OR	OR 95% CI
(Constant)	2.55	<0.001		
Shift work	-0.31	.002	0.97	0.95, 0.99
Driving	-0.01	.119	0.99	0.97, 1.01
Emergency Work	0.03	.119	1.03	0.99, 1.06
Communication Within The Ambulance Service	-0.03	.001	0.97	0.96, 0.99
Communication With Other Professionals And The Public	0.01	.160	1.01	1.00, 1.03
Organisational and Welfare Conditions	<0.01	.689	1.00	0.98, 1.01
Family And Personal Life	<0.01	.879	1.00	0.99, 1.02

Notes. B = beta values; CI = Confidence Interval; OR = Odds Ratio

The model as a whole was statistically significant, denoting that the model was able to discern cases of suicidal ideation in the past year $\chi^2(7, n = 524) = 47.37, p < 0.001$. This model explained between 8.6% (Cox and Snell $R^2 = .086$) and 13.6% Nagelkerke $R^2 = .136$) of the variance in the presence of past year suicidal ideation and correctly classified 79.6% of cases. As can be seen from Table 47, only two predictor variables made a statistically significant unique contribution to the model. These variables were Shift work and Communication within the ambulance service and both had odds ratios of 0.97 indicating that they made an equal contribution to the presence of past year suicidal ideation. It also appears these variables have a small protective effect because the odds ratios are less than 1. An odds ratio value of 0.97 indicates that each increase of one in the scores on these

scales decreases the odds of the presence of past year suicidal ideation by approximately 1%.

Chapter 7

7. Discussion

7.1. Introduction

Key findings were the high levels of suicidality, Posttraumatic Stress Disorder, and problems with sleep in this paramedic sample compared to the general population. A striking result was that it was stressors arising from the organization and the broader work environment that were associated with measures of mental health, while emergency work made only a minor contribution. Generally, the results showed that there was little difference in mental health status across the paramedic workforce studied. However, some significant differences emerged when compared to the general population and other shift workers. These are the findings that are discussed in this chapter.

A central purpose of this project was to establish the mental health status of paramedics employed with Ambulance Victoria and the first two research questions were centred around this aim. Two previous reviews of paramedic mental and physical health made the observation that little research had been conducted to examine health differences among subpopulations of paramedics (Boudreaux & Mandry, 1996b; Sterud et al., 2006). The possibility of differences between subgroups within the paramedic workforce was the objective of the first research question. This was addressed by comparing the levels of mental health symptoms and conditions according to a range of sociodemographic variables within the paramedic workforce studied, which included the different roles performed by paramedics and the characteristics of the locations in which they worked. There were few meaningful differences in the levels of mental health across the paramedic workforce. The differences across the paramedic workforce are discussed in section 7.2.

The mental health status results were then contextualized by making comparisons with the general population and with paramedic employees of other services. This was the purpose of the second research question and is discussed in section 7.3. The results indicated that the levels of suicidality, PTSD and problems with sleep were noticeably higher in this paramedic group compared to the general population; there were variations in the prevalence of these conditions in comparison with other paramedic populations.

The subsequent section (7.4) addressed the third research question which examined the association of a range of sociodemographic predictor variables with paramedic mental health outcomes. A consistent finding across all analyses in this section was the association of sleep problems with all of the outcome variables.

The fourth research question is addressed in section 7.5 and asked what sociodemographic and mental health variables might be comorbid with PTSD and past year suicidal ideation. It was found that there was a positive association between the three variables of time taken to transport a patient, DASS21 depression and GHQ28 somatic subscale scores with both PTSD and suicidal ideation;

The fifth, and final, research question asked how the experience of stress might affect paramedic mental health. The association of various sources of stress for paramedics with mental health outcomes was examined. The results consistently revealed, with one exception, that stressors from the organisation and work environment were significant predictors of mental health outcomes, as opposed to clinical factors or traumatic events. These findings are discussed in section 7.6.

7.2. Mental Health Between Subpopulations of the Paramedic Workforce

For the same reasons as the health of paramedics might differ from that of the general population, there could also be variations within the workforce based on factors such as role, or location of service provision. If variations were to be found across the workforce then this would provide the basis for more precisely targeting mental health interventions. Finding variations could also lead to questions about identifying the causes of such differences. The first hypothesis that differences in mental health scores would be found according to sociodemographic variables across the paramedic workforce was partially supported.

The results of this study indicate that there were few statistically significant differences within the paramedic workforce on measures of psychological health. When statistically significant differences were found, the effect sizes were very small, with usually less than 2% of variation in the data explained by demographic and role-related variables. There were two exceptions to this general finding, which related to the mental health conditions of PTSD and suicidality.

Probable PTSD caseness was related to the locality remoteness of the area in which paramedics worked, and demonstrated a statistically significant association with a small effect size of 0.13. The prevalence of probable PTSD caseness was higher in paramedics working in regional areas compared to those working in a major city. The prevalence of probable PTSD for paramedics working a major city, an inner regional area or an outer regional area was respectively 12.0%, 20.5% and 30.0%. These findings indicate that paramedics working in an inner regional area and those working in an outer regional area were respectively 1.7 times and 2.5 times more likely to be classified as a case of PTSD than those working in a major city. These figures imply that a program aimed at addressing PTSD in the paramedic workforce should consider the needs of paramedics working in regional areas. In particular, there may be a need to address the provision of, and access to, support services for these paramedics. It is known that living and working in regional areas

tends to be a barrier for access to health services compared to those in major cities (Australian Institute of Health and Welfare, 2016). An example of an organisation addressing barriers to accessing mental health service is the Australian Defence Force (ADF; Department of Defence, 2011). While there are differences, the Australian Defence Force may be regarded as an organisation kindred to the ambulance service in terms of PTSD (Australian Centre for Posttraumatic Mental Health, 2007, 2013). As part of the strategy addressing barriers to obtaining mental health care, the ADF has recognized the need to provide online access to mental health support resources for serving personnel and veterans (Department of Defence, 2011). A specific ADF example of online support for PTSD (and available as an application) is 'PTSD Coach Australia' (Open Arms – Veterans & Families Counselling, 2019). Anecdotal feedback on the use of 'PTSD Coach' with Australian veterans has been very favourable, but the fact remains that no systematic evaluation has yet been conducted (Kuhn et al., 2018). However, a more formal evaluation of the use of 'PTSD Coach' by US veterans reported high levels of participant satisfaction, and that they used it to control symptoms of PTSD (Kuhn et al., 2014). Subsequent US research has shown that the use of 'PTSD Coach' as part of a wider remote support strategy (of a fortnightly brief phone call) significantly reduces symptoms of PTSD, improves quality of life and reduces associated depressive symptoms (Tiet et al., 2019). This example is one way of attempting to overcome the barrier to receiving mental health care related to locality remoteness. However it might be achieved, the results of the current study point to the fact that it may be useful for the ambulance service to consider how paramedics working outside major cities might access PTSD support services.

The reasons for the different levels of paramedic PTSD in relation to locality remoteness are not clear. The level of general mental ill-health of Australians is lower inside the major cities (17%) compared to inner and outer regional areas (both with levels of 19%); (Australian Institute of Health and Welfare, 2016), but according to an Australian general population study with 10,600 participants focussing on the levels of PTSD, there was no significant

difference between urban and rural populations (Creamer et al., 2001). The differences in this paramedic subpopulation are much larger when compared to differences in general mental ill-health of Australians, and in stark contrast regarding the levels of PTSD in particular. It is difficult to conclude that the differences found in the present study are due to locality remoteness alone. It may be that some factor associated with working in more remote areas is having an effect. For example, the time to transport patients to care is often longer for these paramedics, and less support may be available (e.g. from MICA paramedics). Paramedics working in rural or remote areas are more likely to deal with patients who are known to them, and this can be a cause of distress (Porter, 2013). The consequence of these circumstances may be that paramedics outside the major cities are at greater risk of exposure to demanding situations for longer periods of time, and this exposure could increase the risk of developing PTSD (Bennett et al., 2005; Burke & Paton, 2006; Hamilton, 2009; Van der Ploeg and Kleber, 2003).

The second exception to the absence of mental health differences across the workforce was the significant difference in the level of past year suicidal thoughts and past year suicidal plans between the regions. Participants from the Gippsland and Grampians regions reported the highest levels of past year suicidal thoughts at 46% and 37.5% respectively. Participants from Hume reported the next highest level at 29% while the remaining regions ranged from 14.6% to 18.6%. The level of participants from Gippsland and Grampians reporting past year suicidal plans was respectively 33% and 18%. The levels of past year suicidal plans in the remaining regions ranged from 0% to 7.7%. The effect sizes of these differences between the regions were approximately medium in magnitude (Pallant, 2013). The findings of this study indicate that there are generally elevated levels of suicidality in this paramedic population and this is discussed more broadly in the next section where comparisons to the general population and other paramedic samples are included. At the same time, an important implication arises from the finding that the regions mentioned here have notably higher levels of suicidality. The risk of paramedic suicide, or suicide attempts, may be

greater in the regions with higher levels of suicidal thinking and planning. This implication arises from other work signifying that both suicidal thoughts and plans are risk factors for suicide attempts; when a plan is present, the risk is intensified (Nock et al., 2008; Pirkis et al., 2000). It would be at least prudent to investigate if suicidality or suicide is higher in those regions and to introduce an evidence based intervention should that prove to be necessary.

The findings with respect to past year suicidal thoughts and past year suicidal planning are of interest, but the reasons for them are not obvious from the available data. Postulating possible reasons for the differences between the regions can only be speculative but should be investigated further. It is possible that there is something different in the nature of the work, or in the organisational climate, in the regions with higher levels of past year suicidal thoughts and plans. Hamilton (2009) investigated the literature regarding the impact of the work of paramedics, and of the nature of the ambulance service environment, on stress and mental ill-health and reported that both of these aspects played a role. The possibility that both of these factors might be affecting mental health in these regions is of potential importance because the consequence may be increased levels of suicidality. A United Kingdom study (based on 15 suicides) found that mental ill-health was risk factor for paramedic suicide (Mars et al., 2020), and research in other populations has shown that suicidal thoughts and planning are risk factors for suicide (Nock et al., 2008; Pirkis et al., 2000). The Mars et al. (2020), study also found that returning to work after a period of absence because of sickness (due to both physical and mental health reasons) was a risk factor for suicide. The mechanism for this relationship is not clear because while mental and physical health reasons were recorded as reasons for taking sick leave, almost half (47%) of staff took leave for unknown reasons. It cannot be inferred that the risk of suicide increases because of sick leave *per se*: it may be that sick leave was a proxy for other life circumstances that increased the risk of suicide. Nevertheless, it may be of interest to ascertain the level of sick leave in the regions mentioned here and to investigate how it

compares with other regions. Notwithstanding issues related to confidentiality, it may also be informative to ascertain the reasons for staff to take sick leave, where this is possible.

The broader findings of the present study indicate that, aside from PTSD, and past year suicidal thoughts and planning, there are few meaningful differences in mental health status between the subpopulations within the paramedic workforce. When there are concerns about other aspects of psychological health then they are likely to be pervasive across the workforce. It is consequently unlikely to be clinically or economically effective to target intervention programmes to manage or improve psychological health to specific subsections of the workforce, and instead addressing psychological health concerns for paramedics in this service will need to be based on a 'whole of paramedic workforce' basis.

7.3. Contextualizing the Mental Health Status of Paramedic Mental Health

Findings in relation to the mental health status of the AV workforce compared with the general population and with two other paramedic samples, and their implications, will be discussed in this section. The second hypothesis that this paramedic population would demonstrate significantly poorer mental health compared to the general population was supported with respect to suicidality, PTSD, problems with sleep and GHQ28 total scores. There were mixed findings with respect to the other outcome variables which were not supported.

7.3.1. Suicidality: Comparisons with Other Groups

A pivotal finding was that the prevalence of suicidal ideation and planning assessed in this paramedic sample was higher in contrast with the comparison groups. Some important differences emerged when the findings from the current project were compared to the study of Norwegian paramedics (Sterud et al., 2008c). The findings of the current study indicated

that the Victorian paramedic sample reported 3.5 times higher levels of past-year suicidal ideation, and 2.8 times higher levels of past-year suicidal planning compared to the Norwegian paramedics. A similar pattern was found for life-time prevalence, with suicidal ideation and planning demonstrating rates that were 1.7 and 1.27 times higher respectively, and for feeling that life was not worth living and wishing one was dead at 2.0 times and 2.7 times higher respectively. These findings are of relevance because of the occupational similarities in the comparison sample and in the methodology used. It is also worth noting that Sterud et al. (2008c) reported that Norwegian paramedics had a level of suicidality that was comparable with the general Norwegian population.

Comparisons with data from the present study were also made with data obtained from the Australian population by Johnston et al. (2009), although it should be noted that these authors used a different method to measure suicidality: they based their analyses on data from the Australian 2007 National Survey of Mental Health and Wellbeing where data was obtained by interview. The different methodology means that comparisons need to be viewed with care. The comparison revealed that paramedic participants in this study reported higher levels of suicidality than the general Australian population. The prevalence of past year suicidal ideation in the present sample was 20.1% which was 8.7 times higher than that reported in the Australian population, and the level reporting making suicide plans in the past year was 2.8 times higher. The lifetime prevalence of suicidal ideation and planning was respectively three and 3.3 times higher compared to the Australian population.

A more contemporary national survey conducted by Beyond Blue of Australian of first responder mental health reported that the level of past year suicidal thoughts (ideation) was at least two times higher than that of the Australian population, and past year suicidal planning was three times higher (Lawrence et al., 2018). This study used a different methodology to assess suicidality than that that used in the present paramedic study, so the same caveat about making comparisons applies as mentioned above. The findings of the

Beyond Blue survey were published several years after completion of the data analyses for the current investigation. Nevertheless, Beyond Blue reported the national level of past year suicidal thoughts in Australian paramedics was 6.5% and that past year suicidal planning was 3.0%. These figures are not as high as those reported in the present study, but they are in same direction in that they are higher than for the Australian population. Notwithstanding the methodological difference used by the Johnston et al. (2009) study, there was convergence and consistency in all the comparisons made, with the current sample showing raised levels of suicidality. This was most evident for the prevalence of both past-year and lifetime suicidal ideation and suicidal planning because these factors could be assessed against each of the comparison groups.

Both past year suicidal ideation and past year suicidal planning are risk factors for suicide attempts (Johnston et al., 2009; Nock et al., 2008). It would be a reasonable expectation that elevated levels of these aspects of suicidality would be associated with an elevated level of suicide attempts and of people who have suicided. This line of reasoning is supported by the findings of a report by the Victorian Coroner's Prevention Unit (Dwyer & Bugeja, 2015) which established that, in Victoria, the level of completed suicide in paramedics is approximately three times higher than that of other emergency workers, medical practitioners and nurses, and four times higher than the employed general Victorian population.

The confluence of evidence drawn from results of this study, the comparison studies, and the Coroner's report, reveal that this sample of paramedics is at an elevated risk for all aspects of suicidality, including suicide attempts. At the very least, these findings lead to the conclusion that suicidality should represent a matter of great disquiet for those concerned with the psychological health and welfare of this population of paramedics.

7.3.1.1. Paramedic Suicidality is Potentially Under-reported

Suicide and self-inflicted injuries contribute significantly to the burden of disease in Australia. Suicide contributes more to the burden of disease for males than for females (at 3.5% and 1.4% of the total disease burden, respectively) with the overall contribution being 2.5% (2011 data; Australian Institute of Health and Welfare, 2016). To place this figure into perspective, coronary heart disease is the leading cause of disease burden with an overall contribution of 7.7%, and suicide is ranked as the 10th leading contributor to the Australian disease burden.

As serious and as distressing as individual deaths by suicide are, they may also represent just a small part of a greater whole; research reveals a larger and possibly more complex problem. For every person who ends their own life, there are 20 – 30 people who make a suicide attempt (Mendoza & Rosenberg, 2010). The Victorian Coroner reported that eight paramedics suicided over a seven-year period (Dwyer & Bugeja, 2015). If the same general population ratio of suicide attempts to completed suicides reported by Lifeline were to apply to the present sample, then this would translate to between 22.8 and 34.3 paramedic suicide attempts per year (or between 160 and 240 attempts over the seven-year period covered by the coroner's report). Although it cannot be known exactly how many people attempted to take their own lives, just two respondents of the present study (0.4%) reported suicide attempts in the year before the survey was conducted. A subsample of this size is not sufficient to conduct any meaningful statistical comparisons with other samples from other populations. However, the number of reported attempted suicides in the past year from this paramedic sample appears to be noticeably fewer than would be expected based on data from the general Australian population. These figures indicate that the attempted suicide rate in this paramedic population may be under-reported.

If it were the case that attempted suicide in this paramedic sample is underreported then this would be consistent with the situation for the reporting of suicide in the general population.

An inquiry of the Australian Senate Community Affairs References Committee (2010) into suicide found that both attempted and successful suicide is likely to be underreported in Australia. A consequence of underreporting is that the true size of the problem is masked. Further consequences are that it is difficult to conduct meaningful research into the risk factors associated with suicide and suicide attempts and to accomplish effective evaluations of prevention programmes (Senate Community Affairs References Committee, 2010). Whatever the true extent of attempted suicide (and perhaps suicide) is in this paramedic sample, the consequences are distressing and pervasive for those connected to the person who attempts suicide or who has died by suicide.

7.3.1.2. Concerns About Elevated Levels of Suicidality

The high level of suicidal ideation in this sample is reason for concern, in part, because it represents a significant health problem in its own right (Johnston et al., 2009). Johnston notes that suicidality occurs on a gradient of suicidal ideation, suicidal planning and suicide attempts. It can be argued that each of these aspects of suicidality are a health burden to the individuals concerned, with each aspect causing its own level of distress. While a number of authors refer to a 'gradient' of suicidality (e.g., Johnston et al., 2009; Paykel et al., 1974), the point is also made that the characteristics of those who move from one point to another along the gradient are different. A person might have ideation without moving on to a plan or an attempt, and the characteristics of those who move from one point to another may be different from those who do not (Klonsky et al., 2016). These characteristics are difficult to determine in the general population (Klonsky et al., 2016) and unknown in paramedics because of the paucity of research on suicidality in this population (Stanley et al., 2016). The presence of ideation is a concern because not only is it a health problem in its own right, it is also a risk factor for making a suicide attempt. Pirkis et al. (2000) reported that 12% of people who experience past-year suicidal ideation go on to make a suicide attempt.

Both suicidal ideation and planning are precursors to suicide attempts (Nock et al., 2008). While suicidal ideation is a risk factor for a suicide attempt, the presence of a plan intensifies the risk. The probability of an attempted suicide with ideation alone is 15.4%, but when both ideation and a plan are present then the probability rises to 56% (Nock et al., 2008). It may then be inferred that the higher prevalence of suicidal ideation and planning indicated higher risk of a future suicide attempt, at the time the data for this study was obtained. This is most concerning because the levels of both past-year suicidal ideation and planning are higher in the present paramedic sample than in the general Australian population and the comparison group of Norwegian paramedics. These observations together signify the presence of a grave risk for future attempted suicide in this paramedic sample. This concern is intensified when the evidence from other studies indicates that, "...whether a plan is present or not, the highest risk of suicide attempt is in the first year after onset of ideation," (Nock et al., 2008, p. 100). The data for this study was gathered several years ago and it may be that the concerns represented these findings are no longer current. A more contemporary investigation would determine if this is the case.

7.3.1.3. Paramedic Suicidal Thinking and Planning

A question arises about the cognitive contents of suicidal ideation or suicidal planning experienced by paramedics. Specific data regarding the nature of suicidal thoughts, or the sort of suicidal plans individuals may have been contemplating, was not collected during the current study. Paramedics experience cases of suicide as part of their work, and a common topic of conversation among paramedics surrounds the cases they are called to in their daily practice (Tangherlini, 2000). Stories about patients who threatened suicide, have attempted suicide, or who have died by suicide would reasonably be expected to form part of paramedics' conversations. It can only be conjecture at this point in time, but it is possible that Paykel's questions for measuring the presence of suicidal thoughts and ideation are

tapping into these conversations about suicide. If paramedics were to discuss the suicide related cases they have attended then it is possible they are more likely to be thinking about suicide and thinking about how it might be attempted. The extent to which participants' responses to Paykel's questions might be influenced by these conversations is unknown. This aspect of paramedic work needs further research in order for conclusions to be drawn with greater clarity.

Research into the suicidal ideation and planning of paramedics is needed for a number of reasons. Only six studies were identified as part of the background literature for the study reported here indicating the scarcity of research on suicidal ideation and suicidal planning in paramedic populations as reported by Stanley et al. (2016). Consequently, there is an absence of information on the range and kinds of suicidal ideation and planning being experienced by paramedics. Understanding the full continuum of suicidality in paramedics is important because the factors concomitant with suicidal ideation are probably distinct from those connected with suicide attempts (Klonsky & May, 2014). One area of future research could be to identify the sources of suicidal thoughts, plans and attempts, and to identify the cognitions that underpin them. This knowledge could contribute to managing these aspects of paramedic suicidality. However, it is necessary to recognize that not all individuals will be able to attribute the aspects of their suicidality to a specific cause, particularly those arising from traumatic or biological causes. As previously stated, it has been reported that 12% of people with past-year suicidal ideation go on to attempt suicide (Pirkis et al., 2000), but the particular characteristics of those people who proceed from ideation to attempted suicide are not entirely clear. Understanding the nature of paramedic suicidal ideation, planning and suicide attempts is imperative for understanding the nature of risk in paramedics and for understanding how interventions might be designed.

7.3.2. Posttraumatic Stress Disorder: Comparisons with Other Populations

There were two main findings relating to the prevalence of PTSD in this paramedic population. The first is that the prevalence is higher than that of the general Australian population (14.4% vs. 6.4%; (Australian Bureau of Statistics, 2007). This finding is consistent with a review conducted by Berger et al. (2012) on the world-wide prevalence of PTSD in first responder workers. PTSD prevalence was assessed in firefighters, police and ambulance personnel across several countries. The pooled prevalence of PTSD in these groups of first responders was 10% which the authors note was higher than the levels of 1.3% - 3.5% described in general populations drawn from a diverse range of countries. In general, the body of data illustrates that first responders have higher levels of PTSD than the general population, and the data from the present paramedic study is consistent with these findings.

The second main finding is that the level of PTSD in the present paramedic sample (14.4%) is not significantly different from the level obtained from the pooled data for paramedics from a diverse range of countries (14.6% for paramedics within first responders; (Berger et al., 2012). These authors also reported that the level of PTSD was higher for paramedics compared to other first responder groups; the level of PTSD for paramedics was 14.6% compared to 7.3% for firefighters and 4.7% for police officers. Berger et al. (2012), reported that ambulance workers were more vulnerable to PTSD than other emergency workers.

The data in the literature and the findings of the present study both indicate that the occupation of paramedic places workers at a greater risk of PTSD compared to other first responders and the general Australian population. This has potential implications for organisations employing paramedics because when there is a reasonably foreseeable risk of psychiatric injury or mental harm, then there is a concomitant obligation on employers to address this risk (Safe Work Australia, 2014). A recent inquiry of the Australian Senate in to

the mental health of first responders also recognized that PTSD was an occupational risk for this group of workers (The Senate Education and Employment References Committee, 2018). The report from this Senate inquiry recommended the establishment of "...a national stakeholder working group, reporting to the Council of Attorneys General, to assess the benefits of a coordinated, national approach to presumptive legislation covering PTSD and other psychological injuries in first responder and emergency service agencies" (The Senate Education and Employment References Committee, 2018, p. 90). Such legislation would have the effect of reversing the burden of proof from first responders claiming psychological injury from PTSD to the employing organisation. This would change the need for first responders to prove that their psychological injury was caused by their work and place the burden on their employer to show that there was a cause other than from their work. To date, two State Governments have made legislative changes that are consistent with this Australian Senate inquiry recommendation. The Tasmanian Government has introduced presumptive liability legislation for government employees with PTSD, and the Victorian Government has launched a pilot programme that enables eligible emergency workers to receive payment for medical expenses, and related services, while their compensation claim is being processed (Senate Education and Employment References Committee, 2020). Implementing this recommendation arising from the Senate inquiry is consistent with the findings of the present study, along with other published evidence previously noted. That PTSD appears to be an occupational hazard for paramedics is an observation that should not be ignored.

7.3.3. Sleep Health: Comparisons with Other Populations

The majority (88%) of paramedics in this sample reported working some form of shift work; shift-workers commonly experience problems with poor quality sleep and with fatigue (Rosa & Colligan, 1997; Yong et al., 2016) and the findings of the present study are consistent with other shift workers.

The burden of disturbed sleep in the general Australian population has been estimated at 5.4% (Bin & Glozier, 2010). Bin and Glozier did not measure disturbed sleep in the same way so a direct comparison with the present study sample cannot be made. However, 30.7% of this paramedic sample was found to meet the criteria for disturbed sleep and, when asked directly, 45% reported that they have problems with sleep. One question in this study asked about the use of medications for sleep and 18.2% of paramedic respondents reported using sleeping tablets in the previous two weeks. This figure can be juxtaposed with a finding that 4.5% of the general population reported using sleeping medication in the two weeks before they were surveyed (Australian Institute of Health and Welfare, 2006). That the level of disturbed sleep is almost six times higher than the general population and the use of sleeping tablets is four times higher indicates that sleep health is a matter of concern for this paramedic sample. These findings are consistent with four other studies on the same paramedic population and support the notion that this group of paramedics is at a higher risk of poor sleep health than is the general Australian population (Courtney et al. 2010, 2013; Robinson, 2002; Sofianopoulos et al., 2011).

The present study used the same questionnaire to assess disturbed sleep that was used in the study on Norwegian paramedics (Sterud et al., 2008a). Comparing disturbed sleep in the present Australian sample with Norwegian paramedics reveals mixed findings. The mean disturbed sleep scores for female and male paramedics in the present sample were significantly higher than the mean scores for Norwegian paramedics of both genders. Further investigation assessing the prevalence of disturbed sleep showed that male paramedics demonstrated a higher level of disturbed sleep than did Norwegian male paramedics. However, there was no significant difference between female paramedics from the two studies in terms of prevalence of disturbed sleep. These results indicate that male paramedics in the present study are at an elevated risk of disturbed sleep compared to other male paramedics.

Taken together, these findings signify that the people who took part in this survey are experiencing difficulties with sleep at a level higher than the general Australian population. This finding is consistent with previous studies on fatigue and sleep problems in Victorian paramedics (Courtney et al., 2010, 2013; Sofianopoulos et al., 2011). Most, but not all, studies on prehospital workers indicate higher levels of fatigue and sleep problems. These findings of the present study place this paramedic sample in a similar context as those other paramedic populations that do shift work and have associated problems with sleep. Problems with disturbed sleep were found to be pervasive in this paramedic sample and this is a cause for concern and present a further psychological health problem that should be managed to improve sleep quality and to reduce fatigue.

There are potentially grave implications arising from the high levels of problems with sleep found in this paramedic study sample. In the general population, poor sleep and the consequent fatigue can have consequences for the workplace, and affect both mental and physical health. A consequence of poor sleep pertinent to the ambulance service is associated with driving, which is a sizable part of the paramedic role. People who have inadequate sleep are both more likely to 'nod off' while driving, and to be involved in an accident (Adams et al., 2017). These authors surveyed Australian adults and found that 20% had fallen asleep while driving, and that 5% had experienced an accident in the past year because they dozed off. A concerning discovery is that sleep deprived people can fall asleep for short periods of time (microsleeps) while driving, even though they might not feel sleepy (Herrmann et al., 2010). Furthermore, drivers may not even be aware that they have experienced a microsleep (Higgins & Fette, 2012). Insufficient sleep is not only associated with driving risks, a US study found that the odds of making a medical error in a three-month period increased by 50% for paramedics experiencing poor sleep compared to those with good sleep (Patterson et al., 2012). In the Patterson et al. study, an example of a medical error was dislodging an endotracheal tube, but other medical errors that could be made by

paramedics are related to equipment use, administration of medication, and in the administration of treatment (Hobgood et al., 2006). The finding of increased errors at work as a consequence of disturbed sleep is consistent with findings related to the general Australian population where 20% of workers have reported that they had made errors from sleepiness, or sleep problems on one or two days in the past three months (Adams et al., 2017). Less alarming, but with financial implications, is absenteeism from employment due to feeling too tired to work. A 2016 survey found that 17% of Australians took time from work in the previous month because they were sleepy, and 17% had fallen asleep on the job (Adams et al., 2017).

Impacts from poor sleep quality have the potential to impact upon work organisations in terms of impaired or disrupted work performance, but there are also impacts on the individual. Poor sleep quality has consequences for cognitive functioning and mental and physical health. Poor sleep is associated with impaired cognitive functioning, as measured on a range of tasks in military personnel and in the general population (Adams et al., 2017; Bonnet, 1986; Hood & Bruck, 1996; Martindale et al., 2017). Problems with sleep are also associated with a number of mental health disorders. Breslau et al., (1996) conducted a longitudinal study on the association between sleep disturbances and psychological disorders and reported that difficulty sleeping was a risk for subsequently developing major depression. This finding is important in the context that sleep disturbance is a criterion for diagnosing depression (American Psychiatric Association, 2020b) and it is necessary to determine if sleep disturbance is arising from the paramedic work environment, or from a form of depression. Another US study found that sleep problems were associated with both anxiety and depressive disorders (Roth et al., 2006). Courtney et al., (2010, 2013) conducted two studies measuring the mental health of Victorian paramedic shift workers and reported higher levels of depression and anxiety compared to non-clinical reference samples. This Courtney et al study measured sleep quality with the Pittsburgh Sleep Quality Index and found that their paramedic samples obtained significantly higher scores than the

reference groups, endorsing higher levels of poor sleep quality. Sleep quality has also been found to be associated with aspects of suicidality. A meta-analysis investigating this association found that the presence of poor quality sleep increased the relative risk for suicidal thoughts and plans, as well as non-lethal attempts (Pigeon et al., 2012). Inadequate sleep also has potential implications for physical health. A systematic review based on data from 5,172,710 participants reported that inadequate sleep increased the risk of being identified as having diabetes, high blood pressure, cardiovascular disorder, coronary disease and obesity (Itani et al., 2017).

Most paramedics whose work involves transporting patients work rotating shifts and this form of shift work has the strongest negative impact on health, although there is not universal agreement on this point (Canadian Centre for Occupational Health and Safety [CCOHS], 2017; Rosa & Colligan, 1997). Of necessity, the ambulance service is available 24 hours per day and cannot operate without some form of shift work. However, perhaps other forms of shift work could be investigated to identify a work pattern that has fewer negative impacts on health. Finding a shift work pattern for a particular workplace requires balancing personal, medical, social and psychological concerns (CCOHS, 2017). Generally speaking, shift patterns that allow workers' circadian rhythms to adjust to consistent working hours (e. g., consecutive night shifts), or cause the least disruption to body rhythms, tend to allow for better sleep and less fatigue. If regular working hours is the preferred option, then personnel should stay on that roster for two to four weeks because it takes seven days for an individual's circadian rhythms to adjust (CCOHS, 2017). Some authorities indicate that rotating shifts have the greatest negative impact on health, sleep and fatigue (Rosa & Colligan, 1997) but others argue that rapidly rotating shifts with longer working days (e. g. 12 hours) cause less disruption to circadian rhythms although the longer hours may result in more fatigue (CCOHS, 2017). The participants of the present project work this rotational shift pattern and other studies have found higher levels of fatigue in this population (Courtney et al., 2010, 2013) consistent with the finding of the present study of elevated levels of sleep

problems. The choice of a shift pattern may well be decided by personal preferences (CCOHS, 2017). However, whatever shift pattern is in operation, individuals can endeavour to maintain their health by trying to get proper sleep, maintaining a healthy diet and managing their stress levels (CCOHS, 2017; Rosa & Colligan, 1997).

The impacts of sleep problems on mental and physical health are known, and potentially pervasive and profound. The paramedic participants of this study reported high levels of problems with sleep and it would be prudent and sensible to monitor these aspects of their health. This could be achieved in the context of an employee support service or by providing information to ambulance service employees about what aspects of their health should be regularly checked. Ambulance Victoria (AV) implemented a mental health strategy in 2016, (Ambulance Victoria, 2016b) after the present investigation was concluded. Part of this strategy is to provide workers with information about managing fatigue and reviewing job design to improve work life balance and reduce fatigue. The provision of support like this is consistent with the guidelines of WorkSafe Victoria (2007) and Safe Work Australia (2019). At the time of writing, it was not possible to determine if the 2016 AV mental health strategy had been evaluated. However, a subsequent 'Mental Health and Wellbeing Action Plan' has been implemented (Ambulance Victoria 2019). These mental health initiatives instigated by AV are important and their effectiveness warrant evaluation, if this has not already occurred.

7.3.4. DASS21 Depression, Anxiety and Stress: Comparisons with the General Australian Population

Comparisons of DASS21 scores with other studies were made with data that was gathered contemporaneously, where possible. Two studies reported mean DASS21 depression scores from data gathered from the general Australian population (Casey, 2012; Australian Psychological Society, 2015). No significant differences were found between the mean depression scores obtained from the present investigation and the two comparison studies.

Similarly, no significant difference was found regarding the prevalence of depression scores falling above the normal range reported by the Casey (2012) study. However, the prevalence of scores falling above the normal range was lower (30.7% compared to another Australian Psychological Society (2014) study (37%). Taken together these findings suggest that depression is not a distinguishable problem for the paramedic workforce studied compared to what would be normally expected.

The DASS21 anxiety mean score for the present sample (4.85) was not significantly different from the general Australian population data (5.11) gathered in 2011 by Casey (2012), but was significantly lower (6.30) compared to data gathered in 2015 by the Australian Psychological Society (2016). There was also no significant difference in prevalence of scores above the normal range compared to the typical Australian sample (Casey, 2012). However, the prevalence was significantly lower compared with the prevalence of 27.0% reported in the Australian population in 2014 (Australian Psychological Society, 2014). There is no significant difference in either the prevalence or mean anxiety scores when comparisons are made with data gathered at close to the same point in time. Overall findings demonstrated that anxiety was not a particular problem for the ambulance paramedics studied, and may have in fact been somewhat lower compared to societal standards. This finding may be consistent with the theory of career choice proposed by Holland (1997) that personality relates to the careers that people choose (Tokar et al., 1998). Mitchell adapted this idea to propose a rescue personality which included traits described as: low anxiety (described as a calm and measured attitude), high extraversion (expressed as being easily bored), high agreeableness (empathic, strong need to rescue others) and high conscientiousness (high standard of performance, pays attention to details; Klee & Renner, 2013; Mitchell & Bray, 1990). If the rescue personality theory is valid then people with low anxiety would be attracted to an occupation like paramedicine with the consequence that this population would have a lower anxiety profile. However, the concept

of the rescue personality is called into question as some have supported this idea (Klee & Renner, 2013), while others have not (Wagner et al., 2005, 2009).

It was not possible to find contemporary Australian studies that measured stress with the DASS21; the comparisons were necessarily made with data that was gathered in 2000 or earlier. Consequently, the comparisons may be spurious. The mean DASS stress score for the present sample (11.81) was significantly higher than each of the Australian comparison groups (respectively, 8.10, 10.11 and 8.18) (Crawford, 2011; Lovibond & Lovibond, 1995; Taylor et al., 2000). However, there were significant correlations ($p < .05$) between DASS stress scores and other measures of mental health that can be regarded as indicators of stress. The GHQ28 (total score) is used to measure psychological distress (Drapeau et al., 2012) and there was a strong correlation with DASS21 stress scores ($r = .69$). Stress is also associated with disturbed sleep (Akerstedt, 2002) and exposure to other (nontraumatic) life stressors can be a predisposing factor for PTSD (Keane et al., 2007, pp 296 – 298). The levels of disturbed sleep and past year PTSD caseness were higher in this paramedic population than in the general population. Also, there were medium correlations of GHQ28 scores with disturbed sleep ($r = .42$) and past year probable PTSD caseness ($r = .38$). Taken together, these findings indicate that stress, in its various forms, is likely to be an issue for at least some in the paramedic workforce studied here.

7.3.5. GHQ28 Comparisons with Other Populations

The GHQ28 assesses the presence of minor psychiatric disorders (Goldberg et al., 1997; Willmott et al., 2004) and 51.7% of participants in the present study were classified as a case of morbidity. However, no Australian findings based on the GHQ28 contemporaneous with the present study were available for comparative purposes. Consequently, the comparisons discussed here should be viewed with caution. Although there are no Australian paramedic findings, one study of Swiss paramedics reporting on data gathered in

2009 reported a case level of 20.0% (Ariel et al., 2011) which was lower than the general Swiss population (34%) and much lower than the present study. This is of interest because the Swiss data is contemporaneous with the present study and based on a paramedic population. That there was a lower level of morbidity in Swiss paramedics compared to the general population provokes the question as to why this might be. As mentioned previously, although in a different context, it can be speculated that there may be differences in the environments in which these two paramedic populations work, with resultant differences in the exposure to organisational stressors and the ensuing experience of mental ill-health (Bennett et al., 2005; Burke & Paton, 2006; Hamilton, 2009; Lazarus & Folkman, 1984; van der Ploeg & Kleber, 2003). An Australian study of Victorian police using data gathered in 2003 reported a mean GHQ28 score of $M=21.9$ (Davidson et al., 2006) compared to $M=25.1$ for the present sample. Going further back in time, an English study of paramedics found a morbidity level of 22% (Clohessy & Ehlers, 1999) which similar to that found in Swiss paramedics but lower than was found in this study. The level of morbidity reported in the South Australian general population in 1999 was 19.5% (Taylor et al., 2000).

When considering the comparison studies reported above, it is important to note that the cutoff scores used to identify cases of morbidity can vary between countries (Furukawa & Goldberg, 1999; Goldberg et al., 1997). Nevertheless, in all comparisons, the levels of scores indicating the presence of minor psychiatric disorders were significantly higher in the present sample. It may also possible that the GHQ28 is detecting the higher levels of mental ill-health measured by some of the other instruments. As previously discussed, this sample of paramedics was found to have higher levels of PTSD, problems with sleep and aspects of suicidality and the correlations between these variables and the GHQ28 somatic and GHQ28 anxiety and insomnia scales are all in the moderate to high range (see Table D1 in Appendix D). Still, the observation remains that the level of minor psychiatric disorders in this study sample is high at 51.7% and should be a matter of concern in its own right.

It may be informative to investigate further the possible overlaps in what is being measured by the GHQ28 and other instruments used in the present study. It may be that the GHQ28 is measuring the same aspects of mental health as the other instruments in this study, a proposition that can be assessed by scrutinizing individual items. To identify a case of minor psychiatric disorder with the GHQ28, a score of two is required using the 0-0-1-1 system or a score of five using the 0-1-2-3 system (Goldberg & Hillier, 1979). There are two items that measure sleep problems ('lost much sleep over worry' and 'had difficulty in staying asleep once you are off') which could be similar to items from the Karolinska Sleep Questionnaire ('difficulties falling asleep' and 'premature awakening'). Similarly, items from the GHQ28 can be regarded as similar to items from the DASS21. (E. g. these four GHQ28 items of 'been getting scared or panicky for no good reason', 'been thinking of yourself as a worthless person', 'felt that life is entirely hopeless', 'been feeling nervous or strung-up all the time, could be correlated respectively with the following four items from the DASS21, 'I felt I was close to panic', 'I felt I wasn't worth much as a person', 'I felt that life was meaningless', 'I found it hard to wind down'). Furthermore, the GHQ28 items of, 'felt that life isn't worth living', and 'thought of the possibility that you might make away with yourself are similar to Paykel's questions on suicide of, 'have you ever felt that life was not worth living', and 'have you ever thought of taking your life, even if you would not really do it'. Further research could be conducted to ascertain how much the items of the GHQ28 are correlated with the other instruments used in this study. If there is a reliably high correlation then the GHQ28 could be used as a screening tool to efficiently assess the presence of mental health disorders in this paramedic population. However, a perusal of the GHQ28 items indicates that the GHQ28 may be uniquely measuring other aspects of paramedic physical and mental health (e. g. the items from the 'somatic' and 'social dysfunction' scales appear to measure aspects of functioning and wellbeing that may not be assessed by the other instruments used in this study). This could add value to the use of the GHQ28 as a screening tool and provide additional information about the health of individual paramedics. Further efficiency value

could be added through the use of the GHQ28 as a single screening instrument that gauges aspects of mental health assessed by a range of other means.

Research with respect to psychological distress (as measured by the GHQ28), depression and anxiety (as assessed by the DASS21) produced inconsistent findings regarding the levels of these mental health conditions in paramedics (as reported in the literature review chapter). The findings of this study also show variation in these conditions and the reason for this is not clear. It is possible that organisational culture plays a role and it can be noted that the history of ambulance services in Australia shows strong connections with the military. It may be that there are aspects of military culture are present the ambulance services which could influence behaviours and attitudes. As reported by Hamilton (2009) there is a body of evidence showing that many of the sources of stress that can affect paramedic mental health arise from the organisation. Cause and effect cannot be determined in the present context but it is a thought-provoking speculation. In any event, there are variations in the mental health of different paramedic populations and it is not clear how to account for these variations. This creates an imperative to assess the mental health status of individual paramedic populations to determine what support services may be needed.

7.4. Predictors of Paramedic Mental Health

The third research question asked which sociodemographic variables and variables measuring sleep health were associated with measures of paramedic mental health. The hypothesis that sociodemographic variables would predict measures of mental health within this sample was supported. Variables measuring sleep health were included in this analysis and played a key role in predicting mental health outcome variables. The logistic regression results of which predictors were found to be statistically significant (unless otherwise indicated) are discussed below and a prominent finding was that disturbed sleep acted as a

predictor for each of the mental health outcomes assessed (although, it was not necessarily the strongest predictor in each analysis). This is consistent with other studies and important because sleep problems are comorbid with a wide range of mental and physical health problems (Adams et al. 2017; Courtney et al. 2010, 2013; Patterson et al., 2012), as well as being associated with an increased risk of medical errors and injuries experienced by paramedics (Patterson et al., 2012; Roth et al., 2006).

The following discussion uses results of the regression analyses undertaken, and includes report of odds ratios in relation to the influence of specific predictor variables upon the criterion variable/s. When considering these it should be borne in mind that the percentage magnitude of increase in odds must be tempered by the fact that any increase is relative to the original value to which it is being compared. For example, if the odds of a thing occurring were .2 (i.e. 1 in 5), then a 75% increase in odds would represent odds of .35, which is approximately equivalent to 1 in 3. It is substantially higher, but arguably not as high as the figure of 75% might conjure in the mind. This is even more stark when you consider odds of .01 (i. e. 1 in 100) which becomes .0175 (or 1.75 out of 100) with a 75% increase. This point should be kept in mind when considering the odds ratios discussed in this section.

7.4.1. DASS21 Depression

The strongest sociodemographic predictor of depression was 'partnered or not partnered'. Not having a partner increased the odds of being classified as a case of depression by 75% (inverted OR = 1.75). This finding is consistent with other work indicating that having a partner offers protection from depression (Plaisier et al., 2008). The variable measuring whether paramedics worked in a 'major city or a regional area' was also a predictor. Working in a regional area increased the odds of depression by 67% (OR = 1.67). These results underscore the importance of an organisation taking into account a person's sociodemographic circumstances when considering risk for depression. The other two

predictors were 'not well rested on awakening' (OR = 1.70) and 'disturbed sleep' (OR = 1.13), with each unit increase in these variables respectively increasing the odds of depression by 70% and 13%. The model with this set of four predictors accounted for between 13.1% and 18.6% of the variance of depression caseness. The relationship between sleep problems and depression is important, for example, one study found that sleep problems predicted depression independently of a history of depression (Breslau, 1996). Another large study (N = 9,000) found that problems with sleep were associated with a range of mood disorders, including major depression (Roth et al., 2006).

The comorbidity of sleep problems and depression is common, with approximately 75% of people with depression reporting at least one form of difficulty with sleeping (Wilson & Nutt, 2008), and infers that any patient, including paramedics, who present with one malady should also be assessed for the presence of the other. The possibility of other physical and mental health conditions should be investigated because as the number of comorbidities increases, so too does the likelihood of depression (Hayashino et al., 2010). There are also implications for treatment because abnormal sleep predicts a lower rate of recovery from depression and is associated with a higher risk of recurrence (Thase et al., 1996). Cognitive-behaviour therapy for depression is less effective when sleep problems are present, and indicates that pharmacological therapy for depression can be helpful for both conditions (Wilson & Nutt, 2008).

7.4.2. DASS21 Anxiety

Although not a significant individual contributor ($p = .09$), the variable 'not partnered or partnered' was a predictor emerging from the backwards logistic regression model between demographic variables and anxiety. Insignificant variables may operate to increase the contribution of other variables and thus contribute to the 'best set' of predictor variables; all the variables in the set contribute to the classification of cases (Heinze & Dunkler, 2017;

Tabachnick & Fidell, 2014). Not having a partner increased the odds of obtaining a score above the normal range of anxiety by 56% (inverted OR = 1.56) which once again underscores the importance of this variable in considering risk for anxiety. This finding is consistent with other studies that have reported having a partner has a protective effect on anxiety (Plaisier et al., 2008). The other three predictors were variables measuring sleep problems. These predictors were 'not well rested on awakening', 'disturbed sleep' and 'difficulty awakening' and, each unit increase in these continuous variables respectively increased the odds of anxiety by 50% (OR = 1.5), 48% (OR = 1.48) and 27% (OR = 1.27). Again, this finding is consistent with other studies where sleep problems have been found to be comorbid with all anxiety disorders including generalized anxiety and PTSD (Roth et al., 2006). Consequently, it is indicated that a paramedic presenting with a sleep or anxiety problem should be assessed for the presence of the other problem. The model with these predictors of anxiety explained between 10.3% and 15.8% of the variance in the classification of anxiety cases.

7.4.3. DASS21 Stress

The three predictors for stress were variables measuring sleep problems. The OR for the variable 'difficulty awakening' was not significant ($p = .08$) but it contributes to the classification of stress cases and is left in the equation for the reasons mentioned the previous section. The model with these three variables explained between 13.6 % and 18.5% of the variance in the classification of stress cases. The three predictors were 'difficulty awakening,' 'not well rested on awakening, and 'disturbed sleep' and each unit increase in the value of these continuous variables respectively increased the odds of obtaining a score above the normal range for stress by 72% (OR = 1.72), 68% (OR = 1.68) and 60% (OR = 1.60). A number of cross-sectional studies have found associations between stress and problems with sleep (Akerstedt, 2006) and the findings presented here are consistent with previous work. However, it is not possible to determine the direction of

causality with cross-sectional studies (Field, 2013). Nevertheless, the physiological arousal caused by stress is often considered to be a precursor to disturbed sleep and other measures of problems with sleep (Akerstedt, 2006). Conversely, disturbed sleep arising from psychological hazards at work (such as, lack of support from supervisors and colleagues) may be thought to be a precursor to stress (WorkSafe Victoria, 2007). The potentially convoluted issue of causality is made more difficult to untangle when the matter of bidirectionality is added to considerations of cause and effect. A prospective study of up to 12 days examined the temporal and bidirectional associations between stress and sleep (Yap et al., 2020). This study found that higher levels of evening stress predicted higher levels of poor sleep quality, and poorer sleep quality predicted higher levels of next-day stress. These findings were made in the context of controlling for previous-night outcomes and potential covariates, such as, the sociodemographic variables of age, sex, age, alcohol and cigarette use, education level and employment status. Yap et al., (2020) went on to report that their results highlighted the malicious cycle between stress and sleep quality with the potential consequences of increasing the risk of mental and physical health ailments.

Whatever the direction of the relationship between sleep problems and stress, they are often strongly associated in the literature (Akerstedt, 2006). The level of sleep disturbance is higher in the present paramedic sample compared to the general population as is likely to be the case for stress. Both poor sleep and stress are important because they can both have important negative mental health consequences. The corollaries of problems with sleep have been discussed more comprehensively earlier in this chapter and include impaired job performance, increased levels of fatigue (which increases the risk of making medical errors and driving accidents), impaired cognitive functioning and an increase in the likelihood of mental ill-health. Higher levels of stress can reduce the practice of good health behaviours with a consequent increase in the probability that people will experience injury or illness (Wiebe & McCallum, 1982). People who experience high levels of stress are more likely to have accidents in all spheres of life, such as, the home, at work, during sporting activities

and while driving a motor vehicle (Johnson, 1982; Quick & Quick, 1984). Raised stress levels can also influence physical health. For example, consistent with possible changes in health behaviours, people experiencing stress are likely to consume more alcohol, cigarettes and coffee than people facing less stress (Baer et al., 1987; Conway et al., 1981). In turn, imbibing these substances is associated with the development of physical illnesses (Caltabiano, 2008).

Stress can affect the cardiovascular system by increasing the risk of coronary heart disease (CHD) and high blood pressure. Manuck (1994) discussed the literature concerning CHD and hypertension and concluded that there was a strong association between stress and the development of these cardiovascular conditions. Sherwood and Turner (1995) and Liu et al. (2017) also discussed the relationship between coronary disorders and stress and reached similar conclusions, and while their focus was on hypertension, they also concluded that it was very likely that coronary heart disease was similarly affected. Stressful stimuli can produce a neuroendocrine response in the body resulting in the release of catecholamines and corticosteroids, and it is these hormones that (through a series of steps) can produce disorders of the cardiovascular system (Adameova et al., 2009). These same stress-produced hormones can also impair the functioning of the immune system which reduces the ability of the body to resist and overcome infection (Padgett & Glasser, 2003). This dysregulation of the immune system can also negatively affect the progression of some cancers, partly through a diminished natural killer cell function (Kiecolt-Glaser et al., 2002). It is apparent that changes in immune system function resulting from stressful stimuli are consequential for human health (Padgett & Glaser, 2003) which has the potential to affect the health of the paramedic participants of the present study.

7.4.4. GHQ28 Total Scores

There were four variables that predicted the total scores on the GHQ28 questionnaire. These were the three variables measuring sleep problems and 'not partnered or partnered'. These four variables accounted for between 16.9% and 22.5% in the variation in the classification of having a psychiatric disorder. 'Not having a partner' increased the odds of being classified as a case of experiencing a psychiatric disorder at some level by 59% (inverted OR = 1.59) and is consistent with findings drawn from the general population (Plaisier et al., 2008). The remaining three predictors were 'disturbed sleep', 'not well rested on awakening' and 'difficulty awakening,' and each unit increase in the value of these continuous variables respectively increased the odds of being classified as a case having a psychiatric problem by 93% (OR = 1.93), 36% (OR = 1.36) and 25% (OR = 1.25). These results indicate that having a partner has a protective effect on the odds of be classified as a person experiencing a psychiatric disorder. The importance of problems with sleep on paramedic mental health is shown by the finding that they are associated with having a psychiatric problem at some level. As mentioned previously, sleep problems have been found to be comorbid with all the anxiety and mood disorders described by DSM-IV (Roth et al., 2006). This is particularly pertinent in the context of other results showing a high level of caseness on the GHQ28 and the high level of sleeping problems.

7.4.5. Probable PTSD Caseness in the Past Year

PTSD was predicted by three variables. The resulting predictor set accounted for between 8.5% and 15.4% of the variation in the classification of probable PTSD. The variable making the strongest contribution to predicting caseness was 'disturbed sleep'. The OR for this predictor was 2.33 indicating that unit increase in the score on this scale increased the odds of probable PTSD caseness by 133%. The next strongest variable was 'working rotating shifts' which had an OR of 0.45 which is somewhat counter intuitive because it indicates that working a rotating shift reduces the odds of probable PTSD. The size that the contribution

'working a rotating shift' makes to PTSD is important because inverting 0.45 gives an OR value of 2.22, which indicates this dichotomous variable contributes 122% to the classification of PTSD. It is not clear why 'working a rotating shift' appears to have a protective effect. It can only be conjectured that this variable is perhaps capturing some other quality, such as working with a partner on shift, and this provides a type of support that offers protection against PTSD. The participants for this study were selected on the basis that their work involved transporting patients at least 50% of the time (irrespective of any other specific variations in their role) and were therefore likely to be working rotating shifts.

Further examination of the data shows that 89% of paramedics were working rotating shifts and doing so with a partner: few were working as single responders (11%). It can be conjectured that this predictor is behaving as a proxy for social support, at least in part. Working with a partner provides the opportunity to talk about cases that have been attended and to 'debrief' and be supportive. This is a viable (but not provable) possibility because social support has been shown to be protective of PTSD (Fjeldheim et al., 2014; van der Ploeg & Kleber, 2003). The third significant predictor was 'average hours to transport a patient' with an OR of 1.43 indicating that each additional hour of average transport time increased the odds of probable PTSD by 43%. This finding indicates that paramedics who need to spend more time transport a patient are at greater risk of probable PTSD, a situation that could apply to paramedics working outside the major cities. This coheres with the finding of this study that paramedics working in regional and rural areas were more likely to be identified as a case of probable PTSD.

7.4.6. Past Year Suicidal Planning

Having thoughts about suicide and making a plan in the past year was associated with 'disturbed sleep' and 'average hours to transport a patient'. These two variables explained between 3.4% and 10.9% of the variation in being classified as having made a suicidal plan

in the past year. The OR for 'disturbed sleep' was 2.06, indicating that each unit increase of scores on this scale increased the odds of making a suicide plan in the past year by 106%. The OR for 'average hours to transport a patient' was 1.62 showing that each additional hour in the average time to transport a patient increased the odds having thought about a suicide plan in the past year by 62%. The finding that disturbed sleep is a predictor of ideation about a suicide plan is coherent with other studies. Pigeon et al., (2012) conducted a meta-analysis of studies that published data on sleep disturbance and suicidal thoughts and behaviours. The resulting analysis was based on a large sample pool of 146,753. and found that sleep disturbance was associated with suicidal thoughts, suicidal behaviours and suicide.

7.4.7. Summary: Predictors of Paramedic Mental Health

Results of the regression analyses from the current study point to the importance of sleep in contributing risk of mental health concerns in paramedics. Disturbed sleep was associated with all of the mental health outcomes investigated in the logistic regression analyses. Not well rested on awakening was a predictor variable for each of the DASS21 subscales and the GHQ28. Difficulty awakening was associated with the anxiety and stress subscales of the DASS21, and GHQ28. These findings reiterate the importance of issues related to problems with sleep for this paramedic population. Poor quality sleep has been found to be associated with fatigue and high levels of fatigue have been found in Victorian paramedics (Courtney et al., 2010, 2013; Sofianopoulos et al., 2011). That fatigue is a matter of concern is recognized by its inclusion in AV's mental health strategy, and support is demonstrated through an online support programme (AV, 2016). However, the details of this programme are not clear from available publications and it cannot be determined if an evaluation of the effectiveness of this programme has been conducted. If no evaluation has been conducted, then this is an area for further research as it is important to know if an intervention has been effective.

Workplace fatigue is multifactorial and its management requires a wide ranging approach (Sadeghniaat-Haghighi & Yazdi, 2015). Very generally, fatigue interventions focus on what the individual can do to promote sleep and what the organisation can do to help workers to prevent or manage fatigue. At the organisational level, 12-hour shifts should be avoided and there should be 24-hour rest periods between shifts: provision of naps can also assist in preventing the development of fatigue (Sadeghniaat-Haghighi & Yazdi, 2015). These authors also write that the individual needs to develop good sleep hygiene to help them fall asleep and to get sufficient sleep. Although fatigue is recognized as an issue for paramedics, there is a paucity of research on interventions for its management in the paramedic context but paramedicine crosses the boundaries of other industries (medicine, transport) where work in this area has been done (Ramey et al., 2019). These authors summarized findings on fatigue management interventions that could be applicable to paramedics: these recognized that a multifactorial approach was needed and that were broadly consistent with those advocated by (Sadeghniaat-Haghighi et al.). The concept of promoting opportunities for adequate sleep through suitable shift patterns was also supported by Ramey et al., along with monitoring fatigue so remedial action could be taken if necessary. Ramey et al., also supported the idea of good sleep hygiene, including keeping a sleep log to help workers to manage their sleep habits.

7.5. Comorbidities of Past Year Suicidal Ideation and Probable PTSD

The fourth research question aimed to identify comorbidities, first with suicidal ideation in the form of having thoughts about ending one's life in the past year and, second, with PTSD.

The intention was to go beyond examining the association of scores on measures of mental health with sociodemographic variables arising from undertaking paramedic work with the ambulance service. This was achieved by focussing on probable PTSD and past year suicidal ideation because these were identified as two key mental health issues for

paramedics. The findings supported the hypothesis that sociodemographic and mental health variables would predict PTSD and suicidal ideation in this paramedic population.

7.5.1. Predictors of Past Year Suicidal Ideation

There were four predictors of past year suicidal ideation resulting from the backwards logistic regression analysis and which explained between 19% and 29% of the variation the classification of cases of suicidal ideation. The first variable was 'not partnered or partnered' and its inclusion was somewhat contrary to expectations. This variable was not a significant predictor (OR = 1.72, $p = .07$) yet it was included in the set of predictor variables. As described previously, this predictor may be contributing to the equation in the context of the total set of predictors (Heinze & Dunkler, 2017; Tabachnick & Fidell, 2014). 'Not partnered or partnered' was also counterintuitive in that having a partner increased the odds of being classified as a case of past year suicidal ideation by 72%. The second sociodemographic variable in the equation was 'average patient transport time' (OR = 1.31), indicating that each additional hour of average patient transport time increased the odds of past year suicidal ideation by 31%. 'Average patient transport time' was not significant ($p = .08$), nevertheless it formed part of the best set of predictor variables. Two mental health comorbidities were identified as significant predictors. The GHQ28 somatic scale obtained an odds ratio of 1.23, indicating that each unit increase in these scores increased the odds of suicidal ideation by 23%. Each unit increase on the DASS21 depression scale (OR = 1.10) increased the odds of classification by 10%.

The finding that having a partner increases the odds of suicidal ideation is inconsistent with previous research reporting that this variable has a protective effect (Nock et al 2008; Pirkis et al., 2000). It can only be conjecture, but it is possible that this variable acted as a proxy for some other unknown variable. The result that having a partner increases the odds of suicidal ideation becomes more perplexing if the data is examined further to consider the

proportions for people who were unpartnered: 35% of the participants who reported suicidal ideation were unpartnered while 19% of those reporting no suicidal ideation were unpartnered. This finding is more in keeping with *a priori* expectations, but difficult to reconcile with the logistic regression result.

The finding that depression is comorbid with past year suicidal ideation is in line with findings of previous studies (Johnston et al., 2009; Nock et al 2008; Pirkis et al., 2000). There is some evidence that GHQ28 somatic subscale cases (scores greater than three) are associated with suicidal ideation (Kawabe et al., 2016) and this is coherent with the result from the present study. The present study did not find that anxiety significantly contributed to identifying cases of suicidal ideation although this has been reported in other studies with large numbers of participants (N = 8,800 – 84,000; (Johnston et al., 2009; Nock et al 2008; Pirkis et al., 2000). The observation that the mental health conditions assessed by DASS21 depression and the GHQ28 somatic scale are comorbid with suicidal ideation indicates that when a person presents with any one of these issues, then an assessment should be made to ascertain the presence of the others. It may be informative to identify if there are specific items on the GHQ28 somatic subscale that are contributing to the classification of suicidal ideation cases. If particular items were found to be applicable to the present paramedic population, then this could provide information as to the nature of somatic problems experienced in this context. Examination of the individual GHQ28 somatic subscale items does not indicate that any of them are obviously related to suicidal ideation. Examples of items are ‘been feeling in need of a good tonic, and ‘been having hot or cold spells’. However, a subsequent correlation analysis reveals that all of the somatic subscale items are significantly correlated with past year suicidal ideation although the correlations were small in size (Pallant, 2013). Analysis of the other GHQ28 items reveals that all but one is correlated with past year suicidal ideation. Two of the items are directly related to suicidality (‘felt that life isn’t worth living’ and ‘thought of the possibility that you might make

away with yourself') and have respectively moderate ($r = .45$) and strong ($r = .52$) correlations with past year suicidal ideation. That all but one of the GHQ28 items are correlated with past year suicidality lends support to the potential usefulness of the GHQ28 as a screening tool for this paramedic population. Although the GHQ28 may not identify specific mental health issues in all instances, it could be useful in identifying the possible presence of a mental health condition.

7.5.2. Predictors of Past Year Probable PTSD

The five predictors of past year probable PTSD explained between 18% and 33% of the classification of cases of past year probable PTSD. The two sociodemographic variables were 'working rotating shifts' (OR = .37) and 'average patient transport time' (OR = 1.50). The result for 'working rotating shifts' was contrary to expectation because it suggested that this variable reduced the likelihood of being classified as a case of PTSD. Other research has indicated that shift work is likely to be associated with PTSD (Clohessy & Ehlers, 1999) so this result is difficult to reconcile with other findings. As mentioned previously, a large majority (88%) of participants in this sample who worked rotating shifts worked with a fellow paramedic. Although it can only be speculation, it may be that working with a companion, with the opportunity to talk about shared experiences, offers a protective effect against PTSD and the 'working rotating shifts' variable is acting as a proxy for this situation. If this were so then this could explain why working this shift pattern appears to have a protective effect. The odds ratio for 'average patient transport time' shows that each additional hour spent transporting patients increases the risk of being classified with PTSD by 50%. This may be a concern for paramedics working outside of the major cities because they are more likely to experience longer times transporting patients to the nearest hospital.

The remaining three predictors were the 'DASS21 Depression score' (OR = 1.05), 'DASS21 Stress Score' (OR = 1.06) and the 'GHQ28 Somatic Scale Score' (OR = 1.18). These

findings indicate that each unit increase in DASS21 depression and DASS21 stress scores respectively increase the odds of PTSD by 5% and 6%. These figures may be regarded as small but nevertheless contribute to PTSD. Similarly, each unit increase in GHQ28 somatic scores increases the odds of PTSD by 18%. Other studies have shown that PTSD is comorbid with depression (Brown et al., 2001; Greene et al., 2016) and this is consistent with the result found in the present investigation. Because these conditions are comorbid with PTSD a person with one of these mental health conditions should be assessed for the others (Australian Centre for Posttraumatic Mental Health, 2013).

7.5.3. PTSD and the Risk of Suicidal Ideation

The risk ratio (Kirkwood & Sterne, 2003) of experiencing past year suicidal ideation for participants identified as past year probable PTSD cases was 3.52. This finding indicates that a paramedic in this study identified as experiencing past year probable PTSD is also 3.52 times more likely to have experienced suicidal ideation in the past year. In other words, the risk in of suicidal ideation for probable PTSD cases is 252% higher in comparison with non-PTSD cases. Previous research examining the relationship between PTSD and suicidal ideation is not universally consistent. Some studies have found an association consistent with the present result in military veterans, police and peacekeepers (Guerra & Calhoun, 2011; Steyn et al., 2013; Thoresen & Mehlum, 2008) and consistent with a large (N = 9282) general population based study (Cogle et al., 2009). However, a police study did not find an association with PTSD symptoms experienced in the two weeks prior to assessment and suicidal ideation (Chopko et al., 2014). The variation in time scale of past year for the current study and previous two weeks for the latter study may have influenced this difference in outcomes. Nonetheless, that the relationship between PTSD and suicidal ideation is not always seen illustrates the necessity for assessing individual populations because what might be the case in one workforce may not apply in another. This variation in findings between different paramedic populations is in line with those reported in the literature.

Although PTSD is generally higher in paramedics, the small literature on paramedic suicidality shows variation in the levels of suicidality (e. g. the study on Norwegian paramedics reported levels of suicidality that were comparable to the general population [Sterud et al., 2008c]).

The sample size of the present study was reasonably large (N = 504 for the risk ratio reported here) and, if it was representative of the AV workforce, this would ordinarily mean that the findings could be generalized to other paramedic populations (Evans, 1985). However, such generalization is only valid if the compared population is the same as the study sample (Evans, 1985) and the variation in findings on paramedic mental health indicate that there is a grave possibility that there is diversity between different groups of ambulance workers. A further caveat is that a risk ratio is a non-parametric measure which is less powerful than parametric statistical tools (Field, 2013). However, the present findings suggest that paramedics from this study population presenting with PTSD should also be assessed for suicidal ideation, as is consistent with Australian guidelines (Australian Centre for Posttraumatic Mental Health, 2013).

7.6. Sources of Stress Associated with Paramedic Mental Health

The fifth research question also asked if the categories of the sources of stressors for paramedics were associated with mental health outcomes. The results indicate support for the hypothesis that scores on measures of stressors would predict variables measuring mental health outcomes in the present sample. That this hypothesis was supported has implications for the management of paramedic stress and its sequelae, as discussed in section 7.7.

One consistent finding is notable for its absence: 'emergency work' is not a significant predictor for all but one of the regression analyses. The 'emergency work' scale is

comprised of items that measure situations typically regarded as traumatic, such as, 'dealing with the death of children', and 'having my own life threatened'. The one analysis where 'emergency work' was a significant predictor was for DASS21 anxiety. This is the result which is often anticipated because of the common expectation that emergency work will result in mental ill-health (Boudreaux & Mandry, 1996b; Feldman et al., 2020).

The other scales which were associated with mental health outcomes measure the effects of shift work and employment conditions within ambulance service, interactions within the organisation, with the health system and with patients, their families and bystanders (Robinson, 2002). As summarized by Hamilton (2009) there is a body of work supporting the importance of these daily stressors on paramedic mental health. The findings of the present project are consistent with this body of work.

7.6.1. GHQ28 Total Scores

The multiple regression analysis indicated that four stressor categories were significantly associated with GHQ28 total scores. The strongest predictor was 'Communication within the ambulance service' followed (in order) by 'Organisational and welfare conditions', Shift work and 'Communication with other professionals and the public'. That 'Communication within the ambulance service' and 'Organisational and welfare conditions', were the strongest predictors is of interest because these scales measure events that arise entirely from within the ambulance organisation. They include items like, 'conflict with co-workers, and 'conflict with immediate supervisor' (the first predictor), and 'fear of lack of organisational support should I be injured', and 'lack of career path'. There is a body of evidence indicating that daily hassles like these from the organisation are a significant source of stress and may be associated with increased levels of poor mental health (Bennett et al., 2005; Burke & Paton, 2006; Hamilton, 2009; Lazarus & Folkman, 1984; van der Ploeg & Kleber, 2003). The other two predictors can also be said to be aspects of the paramedics' social or working

environment. However, the stressor 'Communication with other professionals and the public' appeared to have a paradoxical effect in that higher scores (indicating more stress) reduced the GHQ28 scores by .12 for each unit increase in the scores on this predictor. This predictor is paradoxical because items on this scale assess the impact of specific interactions experienced by paramedics, such as not having their skills and expertise recognized by hospital staff, being provided with inadequate information by doctors, and unrealistic community expectations. Higher scores on this scale signify higher levels of stress and it is not clear as to why each unit increase on the scale results in a small decrease in scores on the GHQ28 total scores.

7.6.2. DASS21 Depression Scores

Four variables were found to make a statistically significant contribution to the DASS21 depression scores, most of the input came from 'Communication within the ambulance service' followed (in order) by 'Organisational and welfare conditions', 'Communication with other professionals and the public' and 'Shift work'. These are the same predictors as for the GHQ28 scores (except the positions of the last two are reversed) and similar comments can be made about this result for depression. However, once again, 'Communication within the ambulance service' was the strongest predictor and provides result that illustrates the importance of stressors that arise from within the ambulance service. In addition to items mentioned previously, other experiences measured by this scale include 'Lack of camaraderie amongst co-workers and 'Lack of concern for me as a person'. These items can be regarded as aspects of social support, lack of which has been shown to be linked paramedic mental ill-health, including depression (Fjeldheim et al., 2014; Sterud et al., 2008b). Some of the items from the 'Organisational and welfare conditions' scale can also be regarded as measures of social support. The role of social support and mental health was not directly included in this study but the findings and observations mentioned here suggest that this could be a fruitful avenue for future research.

7.6.3. DASS 21 Anxiety Scores

Compared to depression, a similar set of four variables emerged as predictors for DASS21 anxiety scores except that 'Communication with other professionals and the public' was replaced by 'Emergency work'. That emergency work formed part of the best set of predictor variables was more consistent with *a priori* notions but its role was not, as mentioned below. The sources of stress that consistently entered the regression analyses in this section (7.6) arose from the total paramedic work environment and it is possible that 'Emergency work' is acting as a proxy for part of these aspects of ambulance work. The strongest predictor was 'Communication within the ambulance service' followed, in order, by 'Organisational and welfare conditions', 'Emergency work' and 'Shift work'. Once again, the highest contribution to predicting DASS21 anxiety scores arose from the organisation and the paramedic work environment. In this analysis 'Emergency work' formed part of the significant predictors in a counterintuitive way in that higher scores on this variable resulted in a decrease in the anxiety scores ($\beta = -.13, p = .035$). Variables in multiple regression analyses act in consort with each other with in predicting the outcome variable (Tabachnick & Fidell, 2014) and 'Emergency work' entering the equation (with a negative sign) has the effect of improving the multiple regression outcome. One possible explanation is that paramedics enjoy this aspect of their work as it leads to high job satisfaction and is a source of great pride and self-esteem (Robinson, 2002). It is possible that 'Emergency work' is a proxy for the positive elements of the paramedics work environment. It may also be that being engaged in emergency work has a protective effect because exposure to organisational stressors is avoided at that time. Also, as previously mentioned, much emergency work is conducted in company of colleagues and working rotating shifts. Perusal of the data shows that working rotating typically involves working with a paramedic colleague, and it is possible that working this way provides an opportunity to offer mutual support and encouragement. Social support of this kind is important because it can attenuate the effects some aspects of emergency

work and has been shown to have positive effects on mental health (Fjeldheim et al., 2014; Revicki & Gershon, 1996). Once again, these observations indicate the value of investigating the possible relationships between emergency work and social support and may contribute to understanding the results of the present study.

7.6.4. Disturbed Sleep Scores

This regression analysis resulted in three variables making a significant contribution to the prediction of disturbed sleep scores. 'Organisational and welfare conditions' made the largest contribution, followed by 'Shift work' and 'Communication with other professionals and the public' This result is consistent with the body of evidence showing that shift work is related to problems with sleep (e.g. Akerstedt et al., 2002; Courtney et al., 2010, 2013; Pirrallo et al., 2012). Daily hassles have been shown to be associated with sleep problems (Williams & Moroz, 2009) and this is consistent with the findings of this study that 'Organisational and welfare conditions' and 'Communication with other professionals and the public' contributed to disturbed sleep scores. (Although, it should be noted that the daily hassles assessed by Williams and Moroz were different to those comprising the items of the scales used in the present study).

The subscale 'Organisational and welfare conditions' is comprised of items that measure personal challenges, for instance, dealing with reaccreditation exams and faulty equipment, and personal concerns related to financial security, such as, worry about support from the service in the case of being injured, fear of being disabled or injured resulting in the inability to continue with paramedic work, and lack of retirement security. Concerns like these were labelled as 'worry about work' in a large study (N = 4000) of Swedish paramedics (Aasa et al., 2005) which found that 'worry about work' was strongly associated with sleep problems. The finding of the present study is consistent with those of Aase et al and are coherent with others demonstrating the role of stressors arising from the work environment on paramedic

mental health (Hamilton, 2009). The 'Communication with other professionals and the public' subscale contains items that indicate that the support necessary to perform the paramedic role is sometimes lacking (e.g. items indicating that other professionals do not acknowledge the skills that paramedics have, and that doctors don't always provide sufficient information for paramedic to care for their patients). These items can be regarded as negative aspects of social support that arise from the broader environment in which paramedics work. This aspect has the potential to impact on sleep as low social support at work increases the risk of disturbed sleep (Akerstedt et al., 2002). While low social support is not the only contributor to disturbed sleep, there can be flow on effects because disturbed sleep is an important predictor of fatigue (Akerstedt et al. 2004), high levels of which have been found in this population by other researchers. The consequences of poor sleep and fatigue were mentioned in section 7.3.3 when discussing these issues in relation to the general population.

7.6.5. Past Year Probable PTSD

The variables 'Communication within the ambulance service' and 'Organisational and welfare conditions' both contributed to predicting past year PTSD. These two variables broadly represent the low level and on-going stressors from the ambulance environment and there is some work that shows that events like these increase the risk of developing PTSD regardless of whether they are experienced before or after a traumatic event (Bennett et al., 2005; Maes et al., 2001; Phoenix Australia, 2020; van der Ploeg & Kleber, 2003). The result from the present study is consistent with these previous studies showing that daily hassles increase the risk of developing PTSD when a person is exposed to a traumatic event. The daily hassles that are measured by the items in these two variables have been described as being a proxy for cohesion and morale (Maguen et al., 2009). As mentioned in the previous section, the 'Organisational and welfare conditions' subscale is comprised of items that measure working conditions and financial security. While studies linking the specific items of

this subscale to PTSD could not be found, it can be argued that they are conceptually consistent with the intended sense of 'daily hassles'. The subscale of 'Communication within the ambulance service' includes a substantial number of items that describe negative aspects of social support, mostly various forms of interpersonal conflict and inadequate communication within the ambulance service. Items measuring these aspects of social support have been studied and shown to be a risk factors for PTSD (Australian Centre for Posttraumatic Mental Health [ACPMH], 2013; Lowery & Stokes, 2005; Maguen et al., 2009; van der Ploeg & Kleber, 2003). The findings of the present study are consistent with the findings of other researchers who investigated these aspects of stress. That these organisational stressors have been found to be associated with PTSD in studies of other paramedic populations suggests that this may be a widespread issue that needs to be addressed. These stressors do not arise from the traumatic nature part of paramedic work and a comprehensive programme aimed at preventing and managing PTSD would be advised to include ways of identifying and addressing these risk factors (Bennett et al., 2005; van der Ploeg & Kleber, 2003).

7.6.6. Probable Past Year Suicidal Ideation

The variables 'Shift work' and 'Communication within the ambulance service' were the two variables that made a small but statistically significant contribution to prediction past year suicidal ideation. Both variables had odds ratios of .97, which counterintuitively indicates that these two variables have a small protective effect (because the odds ratio values are less than 1). Each unit increase on the scores of the predictor scales decreases the odds of being classified as a case of past year suicidal ideation by 1%. As mentioned in the section on 'Predictors of Past Year Probable PTSD', paramedics working shift work generally do so as part of a crew of two and it is possible that this arrangement engenders a form of personal support that has a protective effect. If this were to be the case then that is a

possible explanation for the finding that shift work has the appearance of providing a protective effect against past year suicidal ideation.

'Communication in the ambulance service' measures stress arising from within the organisation as previously described. The result indicating that this variable has a protective effect on suicidal ideation is at odds with expectations and contrary to previous results in the present study related to this variable. It is also difficult to explain because this result is also inconsistent with other studies that have found that workplace stress is associated with suicidal ideation. Loerbroks et al, (2016) pooled data from six cross-sectional studies (N = 12,422) and assessed work stress based on three different theoretical models (which were the 'job demand-control model', the 'effort-reward imbalance model' and the 'organisational injustice model'). The odds ratios for workers reporting high work stress levels versus those reporting low levels ranged from 1.91 to 2.77: exposure to high levels of work stress approximately doubled the odds of suicidal ideation. An investigation of US police officers (N = 193) assessed the association of suicidal ideation with a number of variables that included age, PTSD, exposure to traumatic and non-traumatic work stress, stress from one's personal relationship, depression, alcohol use, and posttraumatic growth (Chopko et al, 2014). All these variables, except age and posttraumatic growth, were significantly correlated with suicidal ideation. 'Communication with the ambulance service' measures an aspect of job dissatisfaction which has been found to be associated with suicidal ideation in Norwegian police (Berg et al. 2003) and Norwegian paramedics (Sterud. et al., 2008c). The odds ratio for suicidal ideation in Norwegian paramedics was 2.8 for those exposed to conflict with colleagues in the form of bullying as opposed to those who had not been so exposed (Sterud et al., 2008c). Participants in both of these Norwegian studies were asked to indicate what they believed to be the reason for their suicidal ideation and neither group strongly related it to their general working conditions. Rather, both Norwegian police and paramedics mostly attributed the cause of suicidal ideation to personal and family problems. It would be of interest to ascertain what those paramedics in the present study who reported

experiencing past year suicidal ideation identified as its source. In summary, it can only be concluded that the findings of the present study are difficult to reconcile with other studies on workplace stress and suicidal ideation.

7.6.7. Summary of Regression Analyses with Sources of Stress as Predictors

The findings of the regression analyses indicate that the traumatic events measured by the 'Emergency work' scale are generally not associated with mental health outcomes. Contrary to the expectations of some, it is the daily stressors arising from shift work, the organisational context and the paramedic work environment that tend to contribute to mental health outcomes. Many, but not all, daily stressors are events that can be managed. The incidents on the scales measuring the sources of stress for paramedics included situations like, missing meals, interruption to meals, having no say in decisions that affect my work, poor communication between senior and junior staff, lack of career path and fear of organisational support should I be injured. (See Appendix A, section D1 'Ambulance Related Stressors', of the survey used in the study for a complete list of stress events). Managing these situations of concern might not be straightforward but nor is it impossible. For example, as previously mentioned, the ambulance service provides a twenty four hour emergency patient transport amenity and some form of shift work is necessary to perform this function. However, perhaps other forms of shift work that might have a less negative impact could be investigated. A case can be made that addressing manageable events is an obligation the organisations that employ paramedics (WorkSafe Victoria, 2007).

7.7. Integrated Discussion and Consolidated Commentary

As we know, paramedics may see 'terrible things' as part of their work (Kennedy, 1999), but that same work is a source of considerable job satisfaction. Paramedics report that they feel great pride in being able to afford skilled treatment and care to their patients and are deeply

offended when their capacity to do this is questioned (Tangherlini, 2000). They also report that the emergency aspect of ambulance work, “gets in your blood,” and is a basis of personal affirmation (Palmer, 1983, p. 171). Robinson (2002) found that five of the elements contributing to positive job satisfaction in this workforce were ‘helping people’ (99%), ‘a sense of doing a job well’ (98%), ‘contributing to the community, (97%), ‘seeing the benefits of my work’ (96%) and ‘saving lives’ (95%). Other researchers remarked that while anecdotal evidence suggests that emergency and trauma work provides considerable job satisfaction, such work can also have negative mental health consequences (Bennett et al., 2005). The main negative mental health consequences for the present study participants were PTSD, suicidality and problems with sleep. These have been recognized by Ambulance Victoria (2016b, 2019) and strategies have been put in place to deal with these and other mental health issues (e.g. fatigue management, regular monitoring of psychological health).

The high level of PTSD reported in this sample compared to the general population was consistent with previous findings in paramedic populations. In a sense, this normalises the higher level of PTSD in paramedic workforces as something that may be expected, and therefore acceptable. Instead, it infers that engaging in paramedic work is a risk factor for developing PTSD (including with delayed onset; McFarlane, 2010), that this is a foreseeable risk, and that provision should be made by ambulance services for its management (WorkSafe Victoria, 2007). Since PTSD is a foreseeable risk for paramedics, consequently so are its comorbidities (McFarlane, 2010). PTSD is often accompanied by other disorders that were explored in the current project, including anxiety, depression, sleep and suicidal ideation. While anxiety and depression were not found to be significant in the present study, levels of poor sleep and suicidal ideation were found to be high. Potential issues that may arise for paramedics with PTSD include anger, and alcohol abuse which often represents an attempt at self-medication (Phoenix Australia, 2020).

This study was the first to gather data (in 2010 – 2011) on aspects of paramedic suicidality in Australia, and found that suicidal ideation and planning was alarmingly higher than in the general population. A subsequent Australia-wide study of first responders by Beyond Blue found similar results (Lawrence et al., 2018). Together with the findings from the Victorian Coroner (Dwyer & Bugeja, 2015), this reinforces the importance of suicidality as a mental health concern for paramedics in Australia. All the aspects of suicidality mentioned here are mental health burdens in their own right (Johnston et al., 2009), and this has been recognized by Ambulance Victoria in their workforce mental health strategy which now includes a suicide prevention component (Ambulance Victoria, 2016).

Issues associated with poor sleep were a prominent feature of the findings of this study and congruent with other studies on paramedics who do shift work (Pirrallo, 2012). Most shift workers report problems with sleep health (Rosa & Colligan, 1997) so the findings here integrate the present paramedic participants into the experience of other shift workers. The higher level of sleep problems is 'normal' in the sense that it is consistent with other occupations where shift work is common. The higher level of sleep problems in shift workers may be commonplace, but it is a concern that has been recognized in the Ambulance Victoria mental health strategy through the provision of online training for fatigue management (Ambulance Victoria, 2016). Furthermore, while it is a concern in its own right, problems with sleep are also associated with a range of other mental ill-health conditions (Breslau et al., 1996; Cox & Otalunji, 2016; Roth et al., 2006) and this is consistent with the findings of this study. The present study found that symptoms of poor sleep health were predictors for DASS21 Anxiety, DASS21 Stress and GHG28 total scores. Taken together, these findings indicate there is a high level of poor sleep health in these paramedic participants and that it is associated with the range of mental health conditions that were investigated.

The final part of this study examined if the sources of stress arising from the totality of the paramedics working environment predicted mental health outcomes. There is a body of literature showing that exposure to traumatic experiences and exposure to ongoing daily stressors can both affect the mental health of paramedics (Bennett et al., 2005; Berger et al., 2012; Epstein et al., 1998; Maes et al., 2001; Phoenix Australia, 2020; van der Ploeg & Kleber, 2003). Indeed, some authors have noted that organisational stressors made a greater impact on paramedic mental health than did dealing with traumatic incidents (e.g. Bennett et al., 2005). The observation that stressors arising from the organisation and the total working environment contribute to paramedic mental ill-health has been made by other authors (Brough et al., 2005; Burke & Paton, 2006; Hamilton, 2009; van der Ploeg & Kleber, 2003) and is consistent with the findings of the present study. The observation that stressors arising from the organisational and environmental context can impact on paramedic mental health, along with trauma experienced as part of the operational context, has implications for how mental health might be managed. The implication is that all these sources of stress should be addressed as part of a comprehensive management programme (Maguen et al., 2009; Quick & Quick, 1984; WorkSafe Victoria, 2007).

A model for understanding and managing paramedic mental health necessitates a theoretical approach that can accommodate pertinent factors relating to individual paramedics and the environment in which they work. It is proposed that the biopsychosocial (BPS) model of health offers a suitable paradigm for this purpose because it can accommodate the environmental and personal factors that influence paramedic mental health, as well as mental and physical health consequences and their management. The social component of the BPS model accommodates consideration of both the stressors and protective factors that may be sourced from the social aspects of the environment. Environmental stress events can be found in paramedic work and in organisational daily hassles, but the environment can also provide protective factors, such as social support from colleagues and peer support, and the organisation can provide support services in the form

of counselling and psychological services (Ambulance Victoria, 2016; Feldman et al., 2021; Shakespeare-Finch & Scully, 2005; van der Ploeg & Kleber, 2003). The *social* aspect of the BPS model enables consideration of these environmental and organisational factors that impact on paramedic mental health. Personal characteristics such as resilience and coping can influence the development of mental ill-health after exposure to stressful events (Larsson et al., 2016; Lazarus & Folkman, 1984; LeBlanc et al., 2011; Shakespeare-Finch & Daley, 2017) and various forms of support, such as, psychotherapy, are directed towards the individual (Australian Centre for Posttraumatic Mental Health, 2013; Kar, 2011). The role of personal characteristics and interventions at the individual level can be accommodated by the *psychological* component of the BPS model. The *biological* component of the BPS model allows the changes to body's anatomical and physiological responses to stress to be considered, along with biomedical interventions (Melchert, 2014; Smith et al., 2013).

The biopsychosocial model is proposed because it is a general paradigm that can encompass the wide range of factors related to understanding and dealing with the stress experienced by paramedics and its mental and physical health sequelae (Smith et al. 2013). While the other models of mental health discussed in the theory chapter all make a contribution to the stress process and its management, no other theory offers such a comprehensive picture, or enables the total person to be considered in their environmental context as does the biopsychosocial model as first articulated by Engel (1977).

A comprehensive intervention based on the biopsychosocial model would provide the advantage of fostering the development of effective programmes for managing stress and addressing mental health issues faced by paramedics. This model has the capacity to encompass the sources of stress arising from the totality of paramedics work environment, and the support that needs to be offered at the individual and organisational levels. Such an all-inclusive model would provide an effective framework for managing the physical and mental health issues faced by paramedics.

7.8. Strengths and Limitations

One strength of this study was the relatively large sample size which increases the power of the statistical analyses employed to detect real effects that are present in the data. However, a large sample size also means the effects detected as significant may be very small, as is the case with most of the analyses examining differences within this paramedic sample. A second strength of this study is the relatively uncontaminated sample. A criticism of some previous studies on paramedic mental health has been that the study samples included paramedics who performed a number of roles besides transporting emergency patients. A criterion for selecting participants for the analyses in the present study was that their role must include transporting emergency patients more than 50% of the time. A further strength of this study was that it represented the first effort in Australia to investigate paramedic suicidality.

The limitations of this study include the age of the data, which was gathered in 2010-2011, because there have been significant changes in the Victorian ambulance service since the time when data was gathered. For example, the proportions of males and females was respectively 61.7% and 38.2% in 2010 but the current Ambulance Victoria Strategic Plan places the proportions at closer to 50% for each sex (Ambulance Victoria, 2017). Another significant change has been the increased attention given to paramedic mental health. In 2016, a mental health strategy was introduced which had strong support from senior levels of the ambulance service. This strategy was replaced by the Mental Health and Wellbeing Action Plan in 2019 (Ambulance Victoria, 2016, 2019). Nevertheless, despite these changes, a more recent study indicated that some of the issues identified by the present study still remain, both in terms of mental health issues and the organizational environment (Holland et al., 2020; Lawrence et al., 2018). The present study employed a cross-sectional design with the limitation that causality cannot be determined. However, such designs are often used

because of the poor feasibility of more robust approaches due to cost and convenience factors (Wang & Cheng, 2020). Further, the selection of participants for this study was non-random, and it possible that the sample does not accurately represent the paramedic population that was studied. Although, the sample size in this study was relatively large and may alleviate concerns about non-randomness. One potential consequence of a non-random sample is that findings may not be generalizable to other paramedic populations (Field, 2013). A further limitation was that although comparisons were made with other studies with the intention of contextualising the mental health findings, some comparisons may have been tainted because of the different methods used to assess mental health between studies.

7.9. Further Research

The high levels of suicidality found in this study is an important finding with ensuing questions. While the levels of suicidal thinking and planning are higher in this sample, the cognitive content is not known. Further research could be conducted to identify this cognitive content with the objective of discovering its nature and using this information to inform interventions, particularly those based on Cognitive Behavioural Therapy. A separate research project could be directed toward discovering the sources to which paramedics attribute suicidal ideations and plans. The small amount of research on attribution in first responders has found that suicidal thinking is not always attributed to their profession, and is instead attributed to personal and family problems. It would be informative to identify the attributions made by paramedics in this sample. This study found that suicidality was higher in some administrative regions and further investigation could be conducted to ascertain if this is still the case and, if so, the reasons why.

The higher levels of PTSD found in this study is of special concern because other studies have found associated physical health comorbidities often reported with this disorder

(Boscarino, 2008; David et al., 2004; Kagan et al., 1999; Karlovic et al., 2004; Kibler et al., 2009; Kubzansky et al., 2007; Maia et al., 2008; Perkonigg et al., 2004; Solter et al., 2002; Vieweg et al., 2007). It is logical to suspect that the frequency of these conditions is higher in the paramedic population of the present study given that they are comorbid with PTSD. Future research could assess the prevalence of these comorbidities to ascertain if they are more pervasive than might otherwise be expected. Should higher prevalences be found then this could form the basis of advice regarding risk, prevention and treatment. The prevalence of PTSD was found to be higher in areas outside the major cities, although the reasons for this are unclear. Potential further study could aim to identify potential risk factors specific to regional and rural areas and the prospects of managing them. One prospective risk factor arising from working in rural areas is the paramedic having to deal with patients known to them, sometimes in very distressing circumstances (Porter, 2013).

The sources of stress included in the present study were first identified in 1984.

Organisations and the work environment change over time and it is reasonable to expect that the stressors experienced by paramedics would also change. For example, reports of violence against paramedics have increased in recent years (Maguire, 2018): it is plausible to expect such assaults to be a stressor, and there may be others that have not been formally identified. An investigation could be conducted to identify the current sources of stress for paramedics and their impact on mental health. Such a study could also point the way to stressors that could be managed in order to reduce hazards for psychological injury (Safe Work Australia, 2014; WorkSafe Victoria, 2007).

Finally, data for the present study was gathered in 2010 – 2011. Organisations change over time and one such change is that new mental health strategies have been put in place and it would be of value to evaluate their impact on the current prevalence of mental ill-health.

7.10. Recommendations Arising from the Current Project

Some important implications arise from the results of this study, particularly in relation to possible interventions. This chapter outlines recommendations in relation to the main mental health issues for paramedics of suicidality, PTSD, and problems with sleep. The issues of health across the workforce and sources of stress for paramedics are then subsequently addressed and recommendations are presented at the end of each section. An expanded version of this section is provided in Appendix E where the background research supporting these recommendations is outlined.

7.10.1. Paramedic Suicidality

The findings of this study, together with the Victorian Coroner's report (Dwyer & Bugeja, 2015), indicate that this paramedic population is at a higher risk for suicidal ideation, planning and suicide. Consequently, there is an obligation to provide a programme or programmes to link individuals experiencing the various aspects of suicidality with support in order to alleviate symptoms and to prevent avoidable loss of life. There are two examples of properly evaluated suicide prevention programmes that have been shown to be effective in the first responder context, as outline in Appendix E. These examples are drawn from programmes designed and introduced by the Montreal Police Service (Mishara & Martin, 2012) and the Houston Fire Department (Finney et al., 2015). The recommendations below are based in these programmes, and on other supporting evidence.

It is recommended that:

1. A suicide prevention programme be developed for AV employees based on extensive and structured consultation with all stakeholders. The programme should provide education about suicide, the effects of stigma, how to identify colleagues who might be at risk of suicide and how to approach and speak with these colleagues.

2. Any suicide prevention programme ensures that relevant and readily available support services are available to employees. These support services should be provided in such a way that confidentiality is maintained and that ambulance service employees have trust and confidence in using them.
3. That the prevention programme must establish clear objectives that can be used to assess the success of the programme. This evaluation should be conducted at regular intervals and inform the ongoing development and implementation of the programme.
4. Therapeutic interventions at the individual level be based on evidence as to their effectiveness. Psychoeducational and Cognitive Behavioural Therapy approaches have some evidence for their effectiveness.
5. Research be conducted to identify if there are specific paramedic thoughts around suicide and suicidal planning. The information gained from this research could be used as part of the prevention programme. If such thinking is identified then it can be directly addressed.

7.10.2. PTSD

There is a lack of robust evidence for the effectiveness of programmes that aim at preventing PTSD (and other mental health issues), as outlined in Appendix E (Australian Centre for Posttraumatic Mental Health, 2013). These prevention programmes may yet prove to be effective, but they should not be relied upon given the current lack of unequivocal evidence. Therefore, it is recommended that:

6. The guidelines developed by the Australian Centre for Posttraumatic Mental Health (2013) be followed. These guidelines are comprehensive and those relevant to the present context of prevention in paramedics include screening at risk individuals and provision of appropriate therapy and support services. The guidelines indicate that

emergency service personnel should be screened after exposure to traumatic event if other risk factors are present. The development of PTSD symptoms can occur some time after exposure to the traumatic incident and the guidelines say that individuals should be assessed for PTSD at multiple points in time after exposure to the trauma.

7. Furthermore, it is recommended that interventions aimed at addressing PTSD in particular, and stress in general, should be considered in the context of the biopsychosocial model. The biopsychosocial model enables the totality of the paramedic environment to be considered, as well as an individual's psychological characteristics, and the physical consequences of exposure to stress and trauma (Melchert, 2014). Failure to consider the totality of an individual's interactions between their biological, psychological and sociocultural contexts risks failing to comprehensively address the impacts and consequences of daily hassles as well as traumatic stressors. One potential consequence of this failure is to narrow the focus to the individual. While this is necessary, it is also insufficient and may lead to placing more responsibility on an individual than is warranted, justified or fair. There are some situations that are not responsibility of the individual and are beyond their capacity to cope (Lazarus, 1999; Lazarus & Folkman, 1984).

7.10.3. Sleep Heath

The majority of paramedics who participated in this study reported working shifts, with most reporting that they worked rotating shifts. There is a body of evidence that shift work is deleterious to health (Rosa & Colligan, 1997, p 14) consequently, one way to address this situation is to avoid shift work or to establish an environment in which paramedics can have substantial naps or otherwise get more sleep. Regrettably, the logistics of such an arrangement render it virtually impossible to implement in the emergency pre-hospital environment (Sofianopoulos et al., 2011). Therefore, it is recommended that:

8. Paramedics be provided with education about the health risks associated with shift work. Sufficient information should be provided to enable paramedics to recognize when they might be experiencing these effects.
9. Paramedics be provided with practical advice on how the health effects of shift work might be managed.
10. Paramedic training includes how to maintain good sleep hygiene in the context of ambulance service shift work. One such sleep hygiene practice would be to establish a regular routine before going to bed.
11. Fatigue monitoring and management procedures be put in place.

7.10.4. Mental Health Across the Workforce

The mental health status of paramedics across different roles and locations within the workforce was investigated and no meaningful differences were found, with the possible exceptions of PTSD and suicidality. It is therefore recommended that:

12. Programmes addressing paramedic mental health should be made available to all roles and locations of the paramedic workforce.
13. Tools be made available for ambulance service employees to assess their own mental health. Access to mental health professionals could be provided, but there are also a number of evidence based online options that paramedics could be encouraged to use. Possible online options include MyCompass which is available from the Black Dog Institute, and Beyond Blue.

7.10.5. Sources of Stress

A key finding of the present study was that the predictor 'Emergency work' was only significantly associated with DASS21 anxiety scores. 'Emergency work' was not significantly

associated with the other mental health outcomes investigated in this thesis. However, while it is the case that traumatic stressors affect mental health, it is the long-term effects of stressors from the social aspects of the total workplace environment in which paramedics work that is associated with mental health outcomes (van der Ploeg & Kleber, 2003). This is because the ongoing experience daily stressors renders paramedics more vulnerable to negative mental health outcomes and increases the risk of developing PTSD when exposed to traumatic stressors (Epstein et al, 1998; Maes et al., 2001).

Examination of individual sources of paramedic stress indicate that some of them may be amenable to being managed to decrease the frequency with which they occur, and their subsequent mental health effects.

It is recommended that:

14. Events that are sources of stress for paramedics be regularly verified, as they may change over time and in relation to organisational changes.
15. Individual sources of stress should be examined for their ability to be managed and for the frequency of their occurrence be reduced.
16. The impact of individual stressors and the frequency with which they occur should be regularly monitored so that that the effectiveness of efforts to manage them can be established.

Chapter Eight

8. Concluding Remarks

This study addressed criticisms regarding the flaws of some previous studies on paramedic mental health. Specifically, criticisms of contaminated and inadequate samples were addressed, and the possible influences of work location and roles were addressed.

Regarding the purity of the sample, analyses were conducted only on data from paramedics whose work involved treating and transporting patients at least 50% of the time, and data from paramedics whose work involved other roles was excluded. This study found that there were few meaningful differences across the different roles and locations within this paramedic workforce, with the implication that mental health interventions need to be made available across the workforce, and that the main mental health conditions facing this paramedic population were PTSD, high levels of suicidality and high levels of problems with sleep. This study also found that emergency work was not, in the main, associated with mental health outcomes. Instead, it was found that daily hassles arising from the paramedics' social context comprising the organisational environment, the operational environment and interactions with patients and the health system were of importance. Experiencing these ongoing daily stresses increased the risk of developing most of the mental health conditions considered in the present study, including PTSD.

Much of the focus on managing stress has been on the individual, and while this is necessary, it is not sufficient (Quick & Quick, 1984). It is not just consequences of the terrible things that paramedics see that can affect their mental health. Daily stresses arising from the ambulance service environment and from the paramedics' interactions with the

hospital system, their patients, and bystanders can have an impact. Other aspects of the work environment, such as shiftwork, were also found to be contributing factors. WorkSafe Victoria (2007) advises that work place stress events can lead to harmful mental health outcomes. Furthermore, WorkSafe Victoria recommends that workplace stress hazards should be identified and managed so as to reduce or eliminate these mental ill-health outcomes. The principles underlying this advice are not new. In the late 19th century and early 20th century sources of infection for disease (e. g., cholera and plague) were recognised and authorities were impelled to take action to provide the populace with sanitation (e. g., sewerage and rubbish removal) and clean water. These actions removed the microbial sources of infection from polluted water and rats infested with fleas carrying infection. If sources of stress were the equivalent of fleas on rats and microbes in polluted water, then responsible authorities would feel compelled to manage the situation.

This project has highlighted ancillary causes of stress arising from daily hassles associated with emergency work that can be targeted for intervention to improve paramedic mental health. A complete programme to manage paramedic mental health would enable sources of stress to be identified and managed, in order to reduce the corollaries of raised levels of suicidality, PTSD and poor sleep health, which the current project has identified as central concerns for operational paramedics.

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Appendices

Appendix A: The Paramedic Psychosocial Health Survey

This is a complete copy of the survey instrument that was used to gather data on the mental health of paramedics in Victoria. The survey was entered into the Qualtrics survey system and distributed to all paramedics. A small number of paper copies were distributed on request and data entered manually into Qualtrics.

The data used in this thesis is derived from a wider ranging study conducted internally within Ambulance Victoria. Consequently, not all the data gathered by this complete copy of the survey is reported in this thesis.

PARAMEDIC PSYCHOSOCIAL HEALTH SURVEY

2010 STUDY

AMBULANCE PARAMEDICS

Three previous surveys related to paramedic health and wellbeing have been conducted in 1984, 1993 and 2002. These studies were known as the ambulance health and stress studies. This survey builds on that tradition.

We intend that the valuable information provided by you will be used to develop prevention and intervention strategies for paramedics and to inform paramedic education programmes as well as health, safety and welfare programmes and Victorian Ambulance Counselling Unit (VACU) services.

Everyone who works for Ambulance Victoria (AV) and whose work involves working with patients will be asked to take part in the survey. Your replies are vital in helping to identify issues concerning paramedic health and wellbeing. Your replies will help in understanding and improving the health and wellbeing of ambulance paramedics.

One aim is to identify if there are issues that are of importance to various groups of paramedics. For example are there issues that are specific to paramedics working in rural compared to urban environments; are there issues that are of concern to paramedics who work in low socioeconomic areas. It might be that there are things that relate specifically to recently employed paramedics and that there are different issues for paramedics who have been employed for some years.

With your help we will be able to begin to address these questions and concerns with the relevant departments of AV.

This project aims to identify if there any are issues that are unique to ambulance paramedics. To do this, it is necessary to make comparisons with the general population and with other occupational groups. This is done most effectively when questions are used that have been tested for accuracy in other studies with other occupational groups. This means that sometimes, the words used might sound a little odd for the ambulance situation. For example the word 'firm' might be used when it is obvious that 'service' or 'ambulance service' would be better. To make good and believable comparisons, the words used in the other studies need to be used. Please respond to the various questions as best you can even if the language sometimes appears to be a little unusual.

The questionnaire can be completed online and on paper; please do not complete more than one questionnaire.

All questionnaires will be treated in the strictest of confidence. All questionnaires will be anonymous unless you choose otherwise by providing your name.

Because the questionnaires are anonymous, it will not be possible to provide feedback to any individuals whose responses suggest that some sort of follow-up is indicated. An attempt has been made to provide feedback within the questionnaire.

If you provide a name then contact from VACU can be made with you should your responses suggest that a follow-up is advisable.

A summary of the results of the survey will be made available to you and other interested parties. These results will report group responses and there will be no references to individuals and individuals will not be able to be identified.

The questionnaire is quite long so don't feel you need to complete it all at one time. Your co-operation and time in filling out this questionnaire is very much appreciated. You will be contributing to information that will add to the knowledge of ambulance paramedic health and wellbeing in general and will be of great importance to Ambulance Victoria in particular.

If you have any questions please feel free to contact Heather Bancroft (Clinical Director, Victorian Ambulance Counselling Unit (VACU)) or David Dawson (Victoria University). Contact details are provided on the next page.

PLEASE COMPLETE THIS QUESTIONNAIRE AS SOON AS POSSIBLE. THE QUESTIONNAIRE COULD BE COMPLETED ONLINE OR ON PAPER. YOUR REPLIES WILL BE RECORDED AUTOMATICALLY (AND CONFIDENTIALLY) IF YOU COMPLETE THE ONLINE VERSION. IF YOU COMPLETE THE PAPER BASED VERSION THEN PLEASE RETURN IT BY DX (METRO) OR POST (RURAL) USING THESE DETAILS:

**Metro: To, "Victorian Ambulance Counselling Unit."
DX 21-1623**

**Rural: To, "Victorian Ambulance Counselling Unit,"
375 Manningham Rd,
DONCASTER VIC 3108.**

Heather Bancroft
Clinical Director,
Victorian Ambulance Counselling Unit.

PLEASE NOTE

Sometimes people who complete surveys like this find that they develop concerns or identify issues that can be distressing. Should this happen to you then please contact the Victorian Ambulance Counselling Unit through the staff support number.

The staff support number is 1800 626 377. Press option '2' to speak to a psychologist or to leave a message. Your call will be returned with an hour.

Who is conducting this study?

Heather Bancroft

Clinical Director,
Victorian Ambulance Counselling Unit.

Telephone: 1300 295 028
E-mail: clinical.director@vacu.com.au

David Dawson

Researcher, Victorian Ambulance Counselling Unit,
(On secondment from Victoria University).

Telephone: 9919 2793
E-mail: David.Dawson@vu.edu.au

David Cooper,

Peer Support Coordinator,
Ambulance Victoria (Metro)

Telephone: 0419 002 956
E-mail: David.Cooper@ambulance.vic.gov.au

Colin Horwell,

Peer support Coordinator,
Ambulance Victoria (Rural).

Telephone: 0407 855 647
E-mail: colin.horwell@ambulance.vic.gov.au

Please contact any of the people who are involved with this study if you have any questions or concerns about this project. You might find it useful to read the, "Information To Participants," document that was previously sent to you by e-mail (at your Ambulance Victoria e-mail address).

ETHICAL CONSIDERATIONS REQUIRE THAT POTENTIAL SURVEY PARTICIPANTS ARE PROVIDED WITH THE FOLLOWING INFORMATION BEFORE ATTEMPTING THE SURVEY. THE SAME INFORMATION IS PROVIDED AT THE BEGINNING OF THE SURVEY ITSELF.

INFORMATION TO PARTICIPANTS

Who Is Conducting This Study?

This study is being conducted by Heather Bancroft of the Victorian Ambulance Counselling Unit in association with David Dawson under the supervision of Associate Professor Adrian Fisher from the School of Social Sciences and Psychology at Victoria University.

What The Study Is About.

We would like to invite you to be a part of a study into the psychological and sociological health of ambulance paramedics in Victoria. The study aims to measure the state of mental health and social wellbeing of ambulance paramedics. This means that the study will measure things like stress, depression, anxiety and symptoms of post-traumatic stress as well as the kind of social support that paramedics get from their partners, family, friends and community.

Studies like this have been done before but most of them have been flawed. Most studies have measured psychological and sociological health of paramedics but have not made comparisons with the general population or other groups of workers. This means that there is little clear indication about what psychological or sociological health issues are specific to ambulance paramedics.

Previous work has identified the kinds of things that cause stress in paramedics. This study will also look at this. However, this study will try to measure how severe various events are as well as how often they happen.

Measuring all these things will make it possible to find out what psychological and sociological health issues are specific to paramedics and enable better training programmes to be developed to help new paramedics to deal with the demands of the job. It will also make it possible to target in-service training and support programmes to those paramedics who could benefit most from them.

What You Are Being Asked To Do

You are being asked to complete a questionnaire or survey. You can do this online or you can complete a paper copy, if you would prefer.

You will be sent an e-mail with a copy of the survey that you can print out, complete and return to the Victorian Ambulance Counselling Unit. (You might be reading this information as a result of an e-mail sent to you). The e-mail will also contain a link to the online version of the survey and you can respond to the survey from any computer. (You will need the link to take you to the survey, though).

The survey is quite long because it has to be. It has to be long to be more certain the things being measured are done so as accurately as possible. A shorter survey would give less certain results.

The things that are being measured are mentioned in the second paragraph of this 'information to participants' statement. The survey will also ask you to answer questions about yourself (like age, gender, how long you have worked for the ambulance service and how many children you have) and personal work situation (like if you work in a rural or urban area, whether you do emergency or non-emergency work and if you do shift work). These questions will enable specific groups of paramedics to be identified which will make it possible to assess if there are health issues that matter to those groups.

Personal Risks Of Participating

Some of the questions ask you if you have had experiences that you might have found upsetting. It is possible that thinking about such experiences will be distressing.

If you believe that thinking about these kinds of experiences will cause you distress then you should not participate in the survey.

If you participate in the survey and find that you feel upset in any way then you can contact the Victorian Ambulance Counselling Unit (VACU) for support and advice. Please note that all such contacts with VACU are confidential. If you want to support or counselling then this will be provided by psychologists who are outside the ambulance service. There will be no cost to you for any support provided of this kind; VACU will bear these costs.

Feedback About Your Responses And Confidentiality

Some sections of the survey measure forms of psychological distress (like anxiety, depression, stress and symptoms of post-traumatic distress). Information is given to you in the survey to enable you to judge if your responses suggest that there are issues that might be of concern. In such cases, you will be advised to seek further support.

Your responses to the survey questions are confidential so it will not be possible to provide feedback in any other way unless you choose to identify yourself. You will be given the opportunity to record your identity if you choose to do that.

No results from individuals will be released. Only summaries of findings and statistics will be reported.

Consenting To Participate In This Study

You may withdraw from this study at any time should you decide to participate. There are no penalties for declining to participate in this study or for withdrawing from the study.

Completing the survey indicates that you have given implied consent to participate in this study. This means that you

Have read this 'information to participants' statement.

Are participating in this study voluntarily.

Are over the age of 18 years.

Have had any questions or concerns about this study satisfactorily explained to you. Contact details for any questions you might have are provided below.

Understand that your responses to the survey questions are confidential and will not be able to be identified.

Any queries about your participation in this project may be directed to the researchers. Please contact Adrian Fisher (9919-2335; adrian.fisher@vu.edu.au) David Dawson by telephone on 03 9919 2793 or e-mail at this address: David.Dawson@vu.edu.au. Heather Bancroft can be contacted by e-mail at this address: clinical.director@vacu.com.au.

If you have any queries or complaints about the way you have been treated, you may contact the Ethics & Biosafety Coordinator, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001, phone (03) 9919 4148.

David Dawson,
Lecturer,
School of Biomedical and Health Sciences,
Victoria University.

Heather Bancroft,
Clinical Director,
Victorian Ambulance counselling Unit,
Ambulance Victoria.

Adrian Fisher
Associate Professor
School of Social Sciences and Psychology
Victoria University

IDENTIFYING YOURSELF

Please write your name here (and any contact details) if you would like to be contacted if your responses suggest that a follow-up is indicated or if you would like to discuss any aspect of your responses to the survey:

Name: _____

Contact: _____

INSTRUCTIONS

Most of these questions ask you to either circle an answer or a number that best describes your answer or write a number in a box. Sometimes you will be asked to write an answer to a question. If you are not sure how to answer any question please make a best guess, or leave it blank. If you do not want to answer a particular question, that is okay. Leave it blank and go on to the next one. If you want to elaborate on an answer then please write on the questionnaire.

Please don't spend too much time on any one question. Just put your answers down as quickly as you can.

SECTION A GENERAL INFORMATION

- A1 Age at last birthday (in years). []
- A2 Sex. (Please circle). Male
Female
- A3 Current marital status (circle the answer which best describes your current situation). Never married
Partnered – not living together
Married or living together
Separated/Divorced
Widowed
- A4 Have you divorced or separated in the past 12 months? (Circle). Yes No
Have you divorced or separated since joining the ambulance service? (Circle). Yes No
- A5 Do you agree that your divorce or separation was due to your ambulance work? (Circle the best answer). Strongly Agree Agree Neutral Disagree Strongly Disagree
- A6 Which best describes the highest educational qualification you have obtained (i.e. completed)? (Circle) Certificate/Diploma more than one year full time (or equivalent).
University Bachelor degree.
University postgraduate degree.
Other:

- A7 Are you committed to a religious belief? (Circle) Strongly
Moderately
Mildly
No
- A8 What is your country of birth? (Circle) Australia
An English speaking country.
A Non-English speaking country
- A9 Including yourself, how many people aged 18 and **over** live in your household? []
- A10 How many children **under** the age of 18 live in your household? []
- A11 What is the name of the locality OR postcode in which you work? Locality: _____
If you work on reserve, please indicate you admin. Branch. Postcode: _____

A12 Please circle the region in which you work?

Please circle the region in which you work (contd.).

or
Reserve admin.
branch: _____
Barwon South West:
Barwon.
Barwon South West:
South West.
Barwon South West:
Southern Grampians.
Grampians: Central.
Grampians: Wimmera.
Lodden-Mallee:
Lodden.
Lodden-Mallee:
Campaspe.
Lodden Mallee:
Northern Mallee.
Hume: Upper Hume.
Hume: Central Hume.
Hume: Western Hume.
Hume: Southern Hume
(Alexandra).
Gippsland: South
Coast.
Gippsland: Wellington.
Continued over page.

Gippsland: East
Gippsland.
Ballarat or other rural
office (e.g. Highton).
Air Ambulance.
Adult Retrieval.
Metro – Group 1
Metro – Group 2
Metro – Group 3
Metro – Group 4
Metro – Group 5
Metro – Group 6
Doncaster or other
metropolitan office (e.g.
South Melbourne).
MICA West
MICA East
Other: _____

SECTION B EMPLOYMENT INFORMATION

- B1 How many years of operational (road) work have you done? []
- B2 If you are not currently an operational paramedic, approximately how many years ago did you last work in this role? (Please write N/A if this question does not apply to you). []
- B2i Have you ever resigned from the ambulance service? Yes No
 If you have resigned for the ambulance service, what was the period of time before returning? (Please write N/A if this question does not apply to you). _____
- B3 What is your current role title? (Circle)
 Allowed multiple answers
- Graduate paramedic (i.e. working with a clinical instructor).
 Clinic transport officer.
 Casual paramedic.
 Paramedic.
 MICA paramedic.
 Senior reserve paramedic.
 Clinical instructor
 Other (please specify):
- B4 Does your current ambulance role involve: (Circle the answer or answers that apply).
- Rotating shiftwork (shifts that regularly change from day to night).
 Regular shiftwork (e.g. 9 am to 9 pm).
 Overtime shift
 On-call
 Single responder
 Relieving
 Communication centre/control room work
- You current role (cont.)
- Continued over page.**
 Team Manager
 Clinical instructor
 Clinical support
 Helicopter
 Fixed-wing
 Other, please specify:
- B5 How much of your current role involves transporting patients? (Please circle the best answer). _____
- 0 %
 1 – 24 %
 25 – 49 %
 50 – 74 %
 75 – 99 %
 100 %
- B6 Are you currently engaged in a course of study? (Circle) No

Yes. Completing a one-year paramedic degree conversion course.
 Yes. Student completing final year of three-year paramedic Bachelor degree, part time.
 Yes. Postgraduate ambulance qualification.
 Yes. Non-ambulance Bachelor degree.
 Yes. Non-ambulance postgraduate degree.
 Other: _____

B7 Do you currently have a paid job in addition to your ambulance job? (Circle)
 If you do have a job in addition to your ambulance job, did you spend more than *one hour* in this second job *in the last week*. (N/A = not applicable to you) (Circle)
 If you did work more than one hour in a second job, *how many hours did you work in the past week?* (Please write N/A if this question does not apply to you).

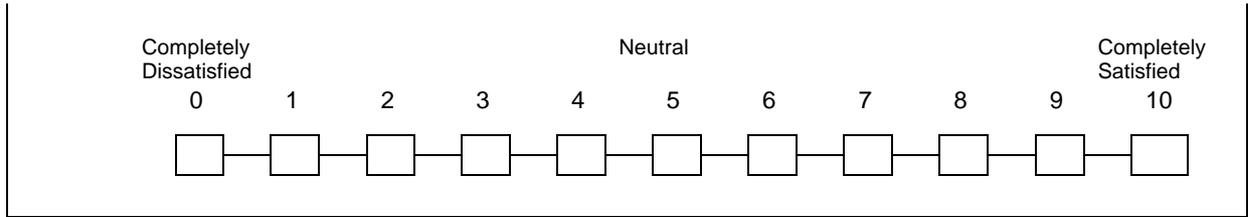
Yes No
 Yes No N/A
 _____hours

B8 Please make an estimate of the time you spend transporting a patient. You could also think of this as the 'average time to your nearest receiving hospital.'

____hr/s ____mins.

SINGLE RESPONDERS

B9	Are you a single responder?	Yes	No
If you are a single responder then please answer the remaining questions on this page.			
B9i	Did you opt to take on the first responder role?	Yes	No
B9ii	For approximately how long have been rostered to the single responder role? Please write in your answer.	_____	years _____ months _____ weeks
B9iii	What was the main reason that you chose to take on the first responder role? Please circle your choice.	Did not choose the single responder role. Not having to work night shift. Opportunity to work on MICA. Opportunity to work close to home. Previous experience with non-supportive colleagues. Prefer to work independently. I enjoy it. Overtime pay. Other: _____	
B9iv	Do you feel you can get support from colleagues when you need it?	Yes, definitely. Sometimes. Not at all.	
B9v	Thinking about your single responder experience, how satisfied are you with this role as a whole? Please tick the appropriate box to indicate your answer.		



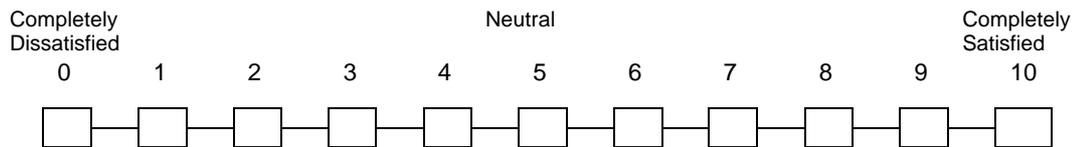
SECTION C HEALTH

C1 In general, would you say your health is? (Circle one)

- Excellent
- Very good
- Good
- Fair
- Poor

The previous question was taken from Community Indicators Victoria. Used with permission.

C2 “Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole?”
Please tick the appropriate box to indicate you answer.



The previous question was taken from Community Indicators Victoria. Used with permission.

C3 Please read this carefully
 We should like to know if you have had any medical complaints and how your health has been in general, *over the past few weeks*. Please answer ALL the questions on the following pages simply by underlining the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those you have had in the past.

It is important that you try to answer ALL the questions.

Thank you for you co-operation.

Have you recently

W1	been feeling perfectly well and in good health?	Better than usual	Same as usual	Worse than usual	Much worse than usual
W2	been feeling in need of a good tonic?	Not at all	No more than usual	Rather more than usual	Much more than usual
W3	been feeling run down and out of sorts?	Not at all	No more than usual	Rather more than usual	Much more than usual
W4	felt that you are ill?	Not at all	No more than usual	Rather more than usual	Much more than usual
W5	been getting any pains in your head?	Not at all	No more than usual	Rather more than usual	Much more than usual
W6	been getting a feeling of tightness in your head?	Not at all	No more than usual	Rather more than usual	Much more than usual
W7	been having hot or cold spells?	Not at all	No more than usual	Rather more than usual	Much more than usual
X1	Lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
X2	Had difficulty in staying asleep once you are off?	Not at all	No more than usual	Rather more than usual	Much more than usual
X3	Felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
X4	Been getting edgy and bad tempered?	Not at all	No more than usual	Rather more than usual	Much more than usual
X5	Been getting scared or panicky for no good reason?	Not at all	No more than usual	Rather more than usual	Much more than usual
X6	Found everything getting on top of you?	Not at all	No more than usual	Rather more than usual	Much more than usual
X7	Been feeling nervous and strung-up all the time?	Not at all	No more than usual	Rather more than usual	Much more than usual

Have you recently:

Y1	Been managing to keep yourself busy and occupied?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Y2	Been taking longer over the things you do?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Y3	Felt on the whole you were doing things well?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Y4	Been satisfied with the way you've carried out your task?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Y5	Felt that you are playing a useful part in things?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Y6	Felt capable of making decisions about things?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Y7	Been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Rather less than usual	Much less than usual
Z1	Been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
Z2	Felt that life is entirely hopeless?	Not at all	No more than usual	Rather more than usual	Much more than usual
Z3	Felt that life isn't worth living?	Not at all	No more than usual	Rather more than usual	Much more than usual
Z4	Thought of the possibility that you might make away with yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
Z5	Found at times you couldn't do anything because your nerves were too bad?	Not at all	No more than usual	Rather more than usual	Much more than usual
Z6	Found yourself wishing you were dead and away from it all?	Not at all	No more than usual	Rather more than usual	Much more than usual
Z7	Found that the idea of taking your own life kept coming into your mind?	Not at all	No more than usual	Rather more than usual	Much more than usual

The above questions assess a person's general wellbeing. If you selected five or more answers from the two right-hand columns then please consider seeking further advice from the Victorian Ambulance Counselling Unit or other health professional. (The choices in the two right hand columns are in the form of "worse/much worse than usual," or "rather/much less than usual," or "rather/much more than usual)." These items were taken from, "The General Health Questionnaire 28."

The above questions are divided into four sections. Each section is identified by W, X Y and Z. If you selected two or more answers from the two right-hand columns in any section then please consider seeking further advice from the Victorian Ambulance Counselling Unit or other health professional.

**The items in the previous section were taken from the General Health Questionnaire 28. Used with permission.
 © David Goldberg, 1978. All rights reserved.
 Published by GL Assessment Limited
 The Chiswick Centre 414 Chiswick High Road, London W4
 This edition published 1992.
 GL Assessment is part of the Granada Learning Group**

C4 SUBJECTIVE HEALTH COMPLAINTS

Here is a list of common health complaints. Please indicate how severely you have experienced these health problems in the last 30 days by circling the appropriate number under 'Not at all,' 'A little,' 'Some,' or 'Serious.'

Also, please estimate on how many days in the last 30 days the health problem has been experienced.

	Not at all	A little	Some	Serious	Number of days experienced in the past 30 days
1. Cold.	0	1	2	3	_____
2. Coughing.	0	1	2	3	_____
3. Shoulder pain.	0	1	2	3	_____
4. Neck pain.	0	1	2	3	_____
5. Upper back pain.	0	1	2	3	_____
6. Arm pain.	0	1	2	3	_____
7. Headache.	0	1	2	3	_____
8. Low back pain.	0	1	2	3	_____
9. Leg pain during physical activity.	0	1	2	3	_____
10. Migraine.	0	1	2	3	_____
11. Anxiety.	0	1	2	3	_____
12. Sadness/depression.	0	1	2	3	_____
13. Sleep problems	0	1	2	3	_____
14. Tiredness.	0	1	2	3	_____
15. Extra heartbeats.	0	1	2	3	_____
16. Heat Flashes.	0	1	2	3	_____
17. Dizziness.	0	1	2	3	_____
18. Stomach discomfort.	0	1	2	3	_____
19. Heartburn.	0	1	2	3	_____
20. Ulcer/non-ulcer dyspepsia.	0	1	2	3	_____
21. Stomach pain.	0	1	2	3	_____
22. Gas discomfort.	0	1	2	3	_____
23. Diarrhoea.	0	1	2	3	_____
24. Constipation.	0	1	2	3	_____
25. Asthma.	0	1	2	3	_____
26. Breathing difficulties	0	1	2	3	_____
27. Allergies.	0	1	2	3	_____
28. Eczema.	0	1	2	3	_____
29. Chest pain.	0	1	2	3	_____

The items in the previous section taken from the 'Subjective Health Complaints Questionnaire.' Used with permission.

C5 MEDICATION USE

Have you taken the medications listed below in the last two weeks.?

Please circle your answer.

Medication for heart.	Yes	No
Cough or cold medicine.	Yes	No
Vitamin or mineral supplements.	Yes	No
Anti-depressants.	Yes	No

Tablets or capsules for anxiety or nerves.	Yes	No
Tranquilisers.	Yes	No
Mood stabilisers	Yes	No
Sleeping tablets or capsules.	Yes	No
Pain relievers.	Yes	No
Stomach medications	Yes	No
Laxatives	Yes	No
Antiinflammatory medication for inflammation of the joints.	Yes	No
Antiinflammatory medication for other reasons (than joint inflammation).	Yes	No
Other prescription items.	Yes	No

C6 HELP-SEEKING

Seeking help from health professionals.

Have you, during the *past two weeks* or during *the past year*, consulted any of the following health professionals for personal or work related reasons? (Choose all that apply).

	Consulted in the past two weeks?		Consulted in the past year?		Was the contact work-related?		Were you required to make contact by AV?	
	Yes	No	Yes	No	Yes	No	Yes	No
General practitioner.	Yes	No	Yes	No	Yes	No	Yes	No
Occupational therapist.	Yes	No	Yes	No	Yes	No	Yes	No
Physiotherapist.	Yes	No	Yes	No	Yes	No	Yes	No
Chiropractor.	Yes	No	Yes	No	Yes	No	Yes	No
Medical specialist.	Yes	No	Yes	No	Yes	No	Yes	No
Emergency room physician (with or without being admitted).	Yes	No	Yes	No	Yes	No	Yes	No
Other physician.	Yes	No	Yes	No	Yes	No	Yes	No
Psychologist.	Yes	No	Yes	No	Yes	No	Yes	No
Psychiatrist.	Yes	No	Yes	No	Yes	No	Yes	No
Pharmacist.	Yes	No	Yes	No	Yes	No	Yes	No
Nurse.	Yes	No	Yes	No	Yes	No	Yes	No
Optician/optometrist.	Yes	No	Yes	No	Yes	No	Yes	No
Dietician/Nutritionist.	Yes	No	Yes	No	Yes	No	Yes	No
Audiologist.	Yes	No	Yes	No	Yes	No	Yes	No
Chiropodist/Podiatrist.	Yes	No	Yes	No	Yes	No	Yes	No
Radiologist.	Yes	No	Yes	No	Yes	No	Yes	No
Social worker.	Yes	No	Yes	No	Yes	No	Yes	No
Naturopath.	Yes	No	Yes	No	Yes	No	Yes	No
Other alternative health practitioner.	Yes	No	Yes	No	Yes	No	Yes	No

Please specify: _____

QUESTIONS ABOUT SLEEP

C7 How often do you experience the following in relation to sleep?

	Never	Seldom/ a few times per year	Sometimes/ several times per month	Mostly/ several days per week	Always/ everyday
Difficulties falling asleep.	1	2	3	4	5
Repeated awakenings.	1	2	3	4	5
Premature awakening.	1	2	3	4	5
Disturbed/restless sleep.	1	2	3	4	5
Difficulties awakening.	1	2	3	4	5
Not well rested on awakening.	1	2	3	4	5
Nightmares.	1	2	3	4	5
Heavy snoring.	1	2	3	4	5
Do you have young children that disturb your sleep?	1	2	3	4	5

If you are having sleeping difficulties then please contact VACU or a health professional for advice.

The items in the previous section were taken from the Karolinska Sleep Questionnaire developed by the Karolinska Institute, Stockholm, Sweden. Used with permission.

SICKNESS

C8 How many days have you had off on Work Cover in the past two weeks? [] Write '0' for none.

- C9 How many days, other than Work Cover, have you had off work because of physical sickness over **the past two weeks?** [] Write '0' for none.
- C10 How many days have you had off work due to stress or other mental health concerns over **the past two weeks?** [] Write '0' for none.
- C11 How many days have you spent in hospital as a patient over the past 12 months? [] Write '0' for none.
- C12 Have you consulted any of the following about a personal emotional problem over the past 12 months? (Circle)
- | | | |
|--|-----|----|
| VACU psychologist | Yes | No |
| VACU peer | Yes | No |
| General practitioner | Yes | No |
| Psychiatrist | Yes | No |
| Psychologist/Social worker (not from VACU) | Yes | No |
| Clergy | Yes | No |
| Other (please specify:_____) | Yes | No |
- C13 Have there been times in the past 12 months when you wanted to seek professional advice about a personal problem, but did not know where to go? (Circle) Yes No

ACCIDENTS

- C14 How many vehicle accidents have you been have you been involved in while **on duty** over **the past 12 months?** [] Write '0' for none.
- C15 How many vehicle accidents have you been involved in while **off-duty** in **the past 12 months?** [] Write '0' for none.
- C16 Have you been involved in any kind of accident (other than a vehicle accident) over **the last 12 months**, while you were **on duty**, which has resulted in loss of time at work? Yes No
- C17 Have you been involved in any kind of accident (other than a vehicle accident) over **the last 12 months**, while you were **off-duty**, which has resulted in loss of time at work? Yes No

SECTION D STRESS AND COPING

D1 Ambulance Related Stressors

If answering questions in this section causes you any form of distress please contact the Victorian Ambulance Counselling Unit (VACU) and arrange to see a VACU psychologist. The cost of a consultation with a psychologist will be covered by VACU. There will be no charge to you

The list of stressors in this section were identified by Robyn Robinson in her Ambulance Health and Stress Studies conducted in 1984, 1993 and 2002. Used with permission.

You are asked to indicate the severity of the stress that each stressor causes and how often it happened in the last six months.

If you have experienced the stressor in the last six months then indicate how stressful you found that situation to be on the 1 – 9 scale beside the item and then indicate on how many days it has happened (also on a 1 – 9 scale).

If you have not experienced the stressor in the last six months then please use all your experience in the ambulance service to estimate how severe you think the stress caused would be and then circle '0' to indicate that you haven't actually experienced this stressor in the last six months.

Here is the severity scale:

	Low degree of stress				Average amount of stress					High degree of stress
No stress	1	2	3	4	5	6	7	8	9	High stress

You are asked to indicate on how many days the stressor has happened in **the last six months** on a 1 – 9 scale. If the event has happened on nine or more days then you would circle '9.' Here is the scale:

No of days 1 2 3 4 5 6 7 8 9+

Shiftwork

Being a shift worker	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Sleep disturbance, e.g. loss of, disruption, not enough.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Waiting for calls.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Overtime shifts – too many.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Overtime shifts – too little.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Down time.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Interruption to meals (lack of meals, rushed eating, spoilt meals)	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+

Driving

My driving at high speeds.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Poor drivers on the road.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Being with a bad driver at high speeds (fellow ambulance officer).	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
'Near misses' with other cars. Being involved in an accident while on duty.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Inability to communicate by radio when on a call.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Getting lost.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+

Emergency work

Overload, multiple calls.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
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Making critical decisions about patient care.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Knowing the person whom I have to treat.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Dealing with the death of children.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Dealing with families and relatives of patients.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Being helpless in an emergency.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Patient dying while in my care.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Having my own life threatened.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Attending dangerous incidents eg Hazchem.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Witnessing the death or serious injury of an on-duty colleague.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Patient's verbal abuse.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Patient's physical abuse.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Fear of personal assault at the scene.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Actual personal assault at the scene.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Dealing with by-standers.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Dealing with the media.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Patients who abuse the ambulance system.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Hospital by-pass.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
My making clinical errors.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Lack of ambulance clinical support for crews at an incident.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Having to use skills, which are rarely used, at short notice.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Conveying news of tragedy to survivors.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Carry-over stress from family/personal problems.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Working as a first responder.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Communication within ambulance service		
Interference in my decisions by other people.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Having no say in decisions that affect my work.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Being told what to do by others not in authority.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Poor communications between senior and junior staff.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+

Lack of forward planning in the system from poor administration.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Promotion of incompetent people.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Low work morale	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Lack of camaraderie amongst co-workers.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Lack of consistency in application of rules and policies.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Lack of clarity in operational guidelines.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Inability to get satisfactory answers to my questions from management.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Responsibility without authority to make decisions.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Working with people who are physically unfit for ambulance work.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Working with people who are personally unfit for ambulance work.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Personality clashes at work.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Working with people who are inconsiderate.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Working with people who lack integrity.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Working with people who are manipulative.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Lack of concern for me as a person.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
'Bottling up' my feelings.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Conflict with co-workers.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Conflict with immediate supervisor.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Conflict with chief administrative officers	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Communication with other professionals and the public	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Lack of recognition by hospital staff of the training skills of ambulance personnel.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
Doctors not giving adequate information.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Unrealistic community expectations, eg. response time to calls.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Negative media coverage of Ambulance Services.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Complaints by members of the public.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9

Organisational and welfare conditions

Re-accreditation exams	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Inadequate funding of ambulance services.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Lack of equipment.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Equipment that is substandard, malfunctioning or improperly maintained.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Unsatisfactory superannuation scheme.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Lack of retirement security.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Fear of disability that would leave me unable to continue in the job.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Fear of lack of organisational support should I be injured.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Industrial relations.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Lack of career path.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Lack of job security, eg. fear of retrenchment.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9

Family and personal life

General marital or relationship discord.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Having an argument just before leaving home.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Being absent from the family when children are sick.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Not being home if an emergency happens.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Inability to be with the family on special occasions.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Not being able to meet financial commitments.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
Difficulties in attending social functions.	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9

Are there any other stressful situations you would like to add to this list? If yes, please list and rate.

_____	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9
_____	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9+
_____	Severity: 1 2 3 4 5 6 7 8 9	No of days: 0 1 2 3 4 5 6 7 8 9

D2 Stress and Associated States.

(DASS)

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

Did not apply to me at all.

Applied to me to some degree, or some of the time.
 Applied to me to a considerable degree, or a good part of the time.
 Applied to me very much, or most of the time.

1. I found it hard to wind down.	0	1	2	3
2. I was aware of dryness in my mouth.	0	1	2	3
3. I couldn't experience any positive feeling at all.	0	1	2	3
4. I experience breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion).	0	1	2	3
5. I found it difficult to work up the initiative to do things.	0	1	2	3
6. I tended to over-react to situations.	0	1	2	3
7. I experienced trembling (e.g. in the hands).	0	1	2	3
8. I felt that I was using a lot of nervous energy.	0	1	2	3
9 I was worried about situations in which I might panic and make a fool of myself.	0	1	2	3
10 I felt that I had nothing to look forward to.	0	1	2	3
11. I found myself getting agitated.	0	1	2	3
12 I found it difficult to relax.	0	1	2	3
13. I felt down-hearted and blue.	0	1	2	3
14 I was intolerant of anything that kept me from getting on with 15. what I was doing.	0	1	2	3
15. I felt I was close to panic.	0	1	2	3
16 I was unable to become enthusiastic about anything.	0	1	2	3
17 I felt I wasn't worth much as a person.	0	1	2	3
18. I felt that I was rather touchy.	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat).	0	1	2	3
20. I felt scared without any good reason.	0	1	2	3
21. I felt that life was meaningless.	0	1	2	3

These items measure anxiety: 2, 4, 7, 9, 15, 19 & 20. Add the circled numbers & double the result. Please consider seeking further advice if you obtained a score of 10 or more.

These items measure depression: 3, 5, 10, 13, 16, 17 & 21. Add the circled numbers & double. Please consider seeking further advice if you obtained a score of 13 or more.

These items measure stress: 1, 6, 8, 11, 12, 14 & 18. Add the circled numbers & double. Please consider seeking further advice if you obtained a score of 18 or more

These items were taken from the Depression, Anxiety and Stress Scales.

D3 Work Related Stress

The following questions cover the areas that have been found to be the main sources of stress for people **at work**.

Please tick the box that most accurately reflects how you feel about **your job** at the moment.

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Ro1	1. I am clear about what is expected of me at work.	[]	[]	[]	[]	[]
Co1	2. I can decide when to take a break.	[]	[]	[]	[]	[]
De1	3. Different groups at work demand things from me that are hard to combine	[]	[]	[]	[]	[]
Ro2	4. I know how to go about getting my job done.	[]	[]	[]	[]	[]
Re1	5. I am subject to personal harassment in the form of unkind words or behaviour.	[]	[]	[]	[]	[]
De2	6. I have unachievable deadlines	[]	[]	[]	[]	[]
PS1	7. If work gets difficult, my colleagues will help me.	[]	[]	[]	[]	[]
MS1		[]	[]	[]	[]	[]

De3	8. I am given supportive feedback on the work that I do.	[]	[]	[]	[]	[]
Co2	9. I have to work very intensively	[]	[]	[]	[]	[]
Ro3	10. I have a say in my own work speed.	[]	[]	[]	[]	[]
De4	11. I am clear about what my duties and responsibilities are.	[]	[]	[]	[]	[]
Ro4	12. I have to neglect some tasks because I have too much to do.	[]	[]	[]	[]	[]
Re2	13. I am clear about the goals and objectives for my department.	[]	[]	[]	[]	[]
Co3	14. There is friction or anger between colleagues.	[]	[]	[]	[]	[]
De5	15. I have a choice in deciding how I do my work.	[]	[]	[]	[]	[]
Ro5	16. I am able to take sufficient breaks	[]	[]	[]	[]	[]
De6	17. I understand how my work fits into the overall aim of the organization	[]	[]	[]	[]	[]
Co4	18. I am pressured to work long hours.	[]	[]	[]	[]	[]
	19. I have a choice in deciding what I do at work.					
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
De7		[]	[]	[]	[]	[]
Re3	20. I have to work very fast.	[]	[]	[]	[]	[]
De8	21. I am subject to bullying at work.	[]	[]	[]	[]	[]
MS2	22. I have unrealistic time pressures	[]	[]	[]	[]	[]
PS2	23. I can rely on my line manager to help me out with a work problem.	[]	[]	[]	[]	[]
Co5	24. I get help and support I need from colleagues.	[]	[]	[]	[]	[]
Ch1	25. I have some say over the way I work.	[]	[]	[]	[]	[]
PS3	26. I have sufficient opportunities to question managers about change at work.	[]	[]	[]	[]	[]
Ch2	27. I receive the respect at work I deserve from my colleagues.	[]	[]	[]	[]	[]
MS3	28. Staff are always consulted about change at work.	[]	[]	[]	[]	[]
Co6	29. I can talk to my line manager about something that has upset or annoyed me about work.	[]	[]	[]	[]	[]
PS4	30. My working time can be flexible.	[]	[]	[]	[]	[]
Ch3	31. My colleagues are willing to listen to my work-related problems	[]	[]	[]	[]	[]
MS4	32. When changes are made at work, I am clear how they will work out in practice.	[]	[]	[]	[]	[]
Re4	33. I am supported through emotionally demanding work.	[]	[]	[]	[]	[]
MS5	34. Relationships at work are strained.	[]	[]	[]	[]	[]
	35. My line manager encourages me at work.					

D4 Coping

Below is a list of ways in which people cope with a wide variety of concerns or problems. Please indicate the things you do to deal with your concerns or worries by circling the appropriate number. Work down the page and circle 1, 2, 3, 4, or 5 as you come to each statement. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which best describes how you feel.

For example if you **sometimes** cope with your concern by 'Talk to others to see what they would do if they had the problem' you would circle 3 as shown below.

1. Talk to others to see what they would do if they had the problem	Doesn't apply or don't do it	Used very little	Used some-times	Used often	Used a great deal
	1	2	3	4	5

Please note that within this scale is one item, designed primarily for clinical purposes, that indicates difficulty with coping. If you don't wish to complete this item you may omit it. The relevant item (highlighted with an asterisk) is item 5.

	Doesn't apply or don't do it	Used very little	Used some-times	Used often	Used a great deal
1	1	2	3	4	5
2	1	2	3	4	5
3	1	2	3	4	5
4	1	2	3	4	5
5*	1	2	3	4	5
6	1	2	3	4	5
7	1	2	3	4	5
8	1	2	3	4	5
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	1	2	3	4	5
13	1	2	3	4	5
14	1	2	3	4	5
	Doesn't apply or don't do it	Used very little	Used some-times	Used often	Used a great deal
15	1	2	3	4	5
16	1	2	3	4	5
17	1	2	3	4	5
18	1	2	3	4	5
19	1	2	3	4	5
20	1	2	3	4	5

D5 POSTTRAUMATIC STRESS

This section is intended to ask you about exposure to situations that have had such an impact on you that they resulted in experiences that are unusual for you. We want to know if you have had these experiences in the *past month*, in the *past year* and if you have *ever* had such experiences. And we want to know if the experience lasted for more than one month.

Do not respond to this section if you do not want to; that is OK.

In your life have you ever had any experience that was so frightening, horrible or upsetting, that you:

		In the past month		In the past year		Ever, in the past	
		Yes	No	Yes	No	Yes	No
1	Avoided being reminded of the experience by staying away from certain places, people or activities? <i>Did this experience last continuously for more than one month?</i>			Yes	No	Yes	No
2	Lost interest in activities that were once important or enjoyable? <i>Did this experience last continuously for more than one month?</i>	Yes	No	Yes	No	Yes	No
3	Began to feel more distant or isolated from other people? <i>Did this experience last continuously for more than one month?</i>	Yes	No	Yes	No	Yes	No
4	Found it hard to feel love or affection for other people? <i>Did this experience last continuously for more than one month?</i>	Yes	No	Yes	No	Yes	No
5	Begun to feel that there is no point in planning for the future? <i>Did this experience last continuously for more than one month?</i>	Yes	No	Yes	No	Yes	No
6	Had more trouble than usual falling or staying asleep? <i>Did this experience last continuously for more than one month?</i>	Yes	No	Yes	No	Yes	No
7	Became jumpy or easily startled by ordinary noise or movements? <i>Did this experience last continuously for more than one month?</i>	Yes	No	Yes	No	Yes	No

The previous section (D5) looks at the experience of traumatic stress symptoms. If you answered yes to four or more symptoms you should consider seeking further advice. You could contact the Victorian Ambulance Counselling Unit on 03 9349 1600 or a health professional for further information.

You may like to seek advice even if you experienced just one (or more) of the above symptoms.

The items on posttraumatic stress were taken from a screening scale developed by Naomi Breslau. Used with permission.

D6 Do you believe that any experience of the symptoms listed in the previous section were the result of: (Circle your answer).

One major ambulance work related incident.

Yes No

If yes, please describe:

.....

One major non-work related incident

Yes No

If yes, please describe:

.....

Several major ambulance work related incidents

If yes, please describe:

.....
.....
.....
.....
.....

Yes No

Several major non-work related incidents.

If yes, please describe:

.....
.....
.....
.....

Yes No

An accumulation of several work incidents (including minor ones)

Yes No

An accumulation of work and non-work related incidents (including minor ones)

Yes No

An accumulation of trauma with general work stress or personal stress.

D7 QUESTIONS ABOUT SUICIDE

		Ever, in the past		In the past year	
1	Have you ever felt that life was not worth living?	Yes	No	Yes	No
2	Have you ever wished you were dead for instance, that you could get to sleep and not wake up)?	Yes	No	Yes	No
3	Have you ever thought of taking your life, even if you would not really do it?	Yes	No	Yes	No
4	Have you reached the point where you seriously considered taking your life and even made plans for how you would go about it?	Yes	No	Yes	No

Please answer this question if you answered 'yes' to the previous question.

To what extent do you think the following factors influenced you to consider taking your life?

Personal problems.

Not at all A little Somewhat Quite a lot Very much

Family problems

Not at all A little Somewhat Quite a lot Very much

Social problems

Not at all A little Somewhat Quite a lot Very much

Problems connected to the ambulance profession.

Not at all A little Somewhat Quite a lot Very much

Other problems

Not at all A little Somewhat Quite a lot Very much

5	Have you ever made an attempt to take your life?	Yes	No	Yes	No
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Please answer this question if you answered 'yes' to the previous question.

To what extent do you think the following factors influenced you to consider taking your life?

Personal problems.

Not at all A little Somewhat Quite a lot Very much

Family problems

Not at all A little Somewhat Quite a lot Very much

Social problems

Not at all A little Somewhat Quite a lot Very much

Problems connected to the ambulance profession.

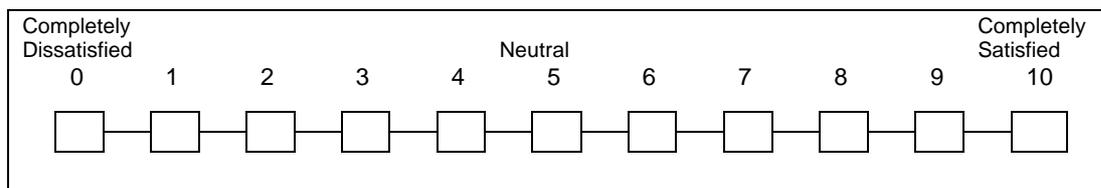
Not at all A little Somewhat Quite a lot Very much

Other problems

Not at all A little Somewhat Quite a lot Very much

E SOCIAL SUPPORT

- E1 Can you get help from friends, family and neighbours when needed? (Circle). Yes, definitely; Sometimes; No, not at all.
- E2 Could you raise \$2000 within two days in an emergency? (Circle). Yes, definitely; Sometimes; No, not at all.
- E3 Thinking about your own life and your personal circumstances, how satisfied are you with feeling part of your community? Please use a scale from 0-10, where 0 is completely dissatisfied and 10 is completely satisfied.



The previous question was taken from community Indicators Victoria. Used with permission.

E4 Perceived Social Support

Please indicate the strength of your agreement or disagreement with the following statements by circling the appropriate number.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
There is a special person who is around when I am in need.	1	2	3	4	5
There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5
My family really tries to help me	1	2	3	4	5
I get the emotional help and support I need from my family	1	2	3	4	5
I have a special person who is a real source of comfort to me.	1	2	3	4	5
My friends really try to help me.	1	2	3	4	5
I can count on my friends when things go wrong.	1	2	3	4	5
I can talk about my problems with my family.	1	2	3	4	5
I have friends with whom I can share my joys and sorrows.	1	2	3	4	5

There is a special person in my life who cares about my feelings.	1	2	3	4	5
My family is willing to help me make decisions.	1	2	3	4	5
I can talk about my problems with my friends.	1	2	3	4	5

SECTION F WORK LIFE

F1 Do you agree or disagree with the following statement? (Tick as appropriate).

<i>My work and family life often interfere with each other.</i>	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
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The previous question was taken from Community Indicators Victoria. Used with permission.

Job Satisfaction

F2 Please indicate how satisfied or dissatisfied you feel with each of these features of your present job by placing a tick in the appropriate box.

How satisfied or dissatisfied are you with:	I'm extremely dissatisfied	I'm very dissatisfied	I'm moderately dissatisfied	I'm not sure	I'm moderately satisfied	I'm very satisfied	I'm extremely satisfied
The physical working conditions?	[]	[]	[]	[]	[]	[]	[]
The freedom to choose your own method of working?	[]	[]	[]	[]	[]	[]	[]
Your fellow workers?	[]	[]	[]	[]	[]	[]	[]
The recognition you get for good work?	[]	[]	[]	[]	[]	[]	[]
Your immediate boss?	[]	[]	[]	[]	[]	[]	[]
The amount of responsibility you are given?	[]	[]	[]	[]	[]	[]	[]
Your rate of pay?	[]	[]	[]	[]	[]	[]	[]
Your opportunity to use your abilities?	[]	[]	[]	[]	[]	[]	[]
Industrial relations between management and workers in your firm?	[]	[]	[]	[]	[]	[]	[]
Your chance of	[]	[]	[]	[]	[]	[]	[]

Promotion?

The way the organisation is managed? [] [] [] [] [] [] [] []

The attention paid to suggestions you make? [] [] [] [] [] [] [] []

Your hours of Work? [] [] [] [] [] [] [] []

I'm extremely dissatisfied I'm very dissatisfied I'm moderately dissatisfied I'm not sure I'm moderately satisfied I'm very satisfied I'm extremely satisfied

The amount of variety in your job? [] [] [] [] [] [] [] []

Your job security? [] [] [] [] [] [] [] []

F3 Organisational Commitment

Please indicate on this scale how much you agree or disagree with each statement by placing a tick in the appropriate box.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am quite proud to be able to tell people who it is I work for.	[]	[]	[]	[]	[]
I sometimes feel like leaving this employment for good.	[]	[]	[]	[]	[]
I'm not willing to put myself out just to help the organisation.	[]	[]	[]	[]	[]
Even if the firm were not doing too well financially, I would be reluctant to change to another employer.	[]	[]	[]	[]	[]
I feel myself to be part of the organisation.	[]	[]	[]	[]	[]
In my work I like to feel I am making some effort, not just for myself but for the organisation as well.	[]	[]	[]	[]	[]
The offer of a bit more money with another employer would not seriously make me think of changing my job.	[]	[]	[]	[]	[]
I would not recommend a close friend to join our staff.	[]	[]	[]	[]	[]
To know that my own work had made a contribution to the good	[]	[]	[]	[]	[]

of the organisation would please me.

F4	How satisfied are you with your job in general?	Very Dissatisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
		[]	[]	[]	[]	[]

The previous question was taken from Community Indicators Victoria. Used with permission.

F5	For how long do you think you will remain with Ambulance Victoria?	Less than 5 years.
		5 - 9 years.
		10 - 14 years
		15 – 19 years
		20 or more years

Thank you for taking the time to complete this survey. We appreciate that it would have taken some time and could have been quite tiring. And we are grateful for your participation.

If there are any other comments or additional information or thoughts that you would like to describe then please write them here.

Appendix B: Ethics Documents

**Memo showing approval
Information to Participants**

MEMO

TO A/Prof Adrian Fisher
School of Social Sciences and Psychology
Footscray Park Campus

DATE 01/09/2010

FROM Dr Tony Watt
Acting Chair
Arts, Education & Human Development
Human Research Ethics Subcommittee

SUBJE Ethics Application – HRETH 10/133
CT

Dear A/Prof Fisher,

Thank you for submitting your application for ethical approval of the project entitled:

HRETH 10/133 Ambulance Paramedic Psychosocial Health Study

The proposed research project has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)', by the Acting Chair, Faculty of Arts, Education & Human Development Human Research Ethics Committee. Approval has been granted from 01/09/2010 to 30/06/2012.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date (by **01/09/2011**) or upon the completion of the project (if earlier). A report proforma may be downloaded from the VUHREC web site at:
<http://research.vu.edu.au/hrec.php>

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment.

If you have any queries, please do not hesitate to contact me on 9919 4119.

On behalf of the Committee, I wish you all the best for the conduct of the project.

Kind Regards,

Dr Tony Watt
Acting Chair

ARTS, EDUCATION & HUMAN DEVELOPMENT HUMAN RESEARCH ETHICS
SUBCOMMITTEE

INFORMATION TO PARTICIPANTS DOCUMENT

PARAMEDIC PSYCHOSOCIAL HEALTH SURVEY

ETHICAL CONSIDERATIONS REQUIRE THAT POTENTIAL SURVEY PARTICIPANTS ARE PROVIDED WITH THE FOLLOWING INFORMATION BEFORE ATTEMPTING THE SURVEY. THE SAME INFORMATION IS PROVIDED AT THE BEGINNING OF THE SURVEY ITSELF.

INFORMATION TO PARTICIPANTS

Who Is Conducting This Study?

This study is being conducted by Heather Bancroft of the Victorian Ambulance Counselling Unit in association with David Dawson under the supervision of Associate Professor Adrian Fisher from the School of Social Sciences and Psychology at Victoria University.

What The Study Is About.

We would like to invite you to be a part of a study into the psychological and sociological health of ambulance paramedics in Victoria. The study aims to measure the state of mental health and social wellbeing of ambulance paramedics. This means that the study will measure things like stress, depression, anxiety and symptoms of post-traumatic stress as well as the kind of social support that paramedics get from their partners, family, friends and community.

Studies like this have been done before but most of them have been flawed. Most studies have measured psychological and sociological health of paramedics but have not made comparisons with the general population or other groups of workers. This means that there is little clear indication about what psychological or sociological health issues are specific to ambulance paramedics.

Previous work has identified the kinds of things that cause stress in paramedics. This study will also look at this. However, this study will try to measure how severe various events are as well as how often they happen.

Measuring all these things will make it possible to find out what psychological and sociological health issues are specific to paramedics and enable better training programmes to be developed to help new paramedics to deal with the demands of the job. It will also make it possible to target in-service training and support programmes to those paramedics who could benefit most from them.

What You Are Being Asked To Do

You are being asked to complete a questionnaire or survey. You can do this online or you can complete a paper copy, if you would prefer.

You will be sent an e-mail with a copy of the survey that you can print out, complete and return to the Victorian Ambulance Counselling Unit. (You might be reading this information as a result of an e-mail sent to you). The e-mail will also contain a link to the online version of the survey and you can respond to the survey from any computer. (You will need the link to take you to the survey, though).

The survey is quite long because it has to be. It has to be long to be more certain the things being measured are done so as accurately as possible. A shorter survey would give less certain results.

The things that are being measured are mentioned in the second paragraph of this 'information to participants' statement. The survey will also ask you to answer questions about yourself (like age, gender, how long you have worked for the ambulance service and how many children you have) and personal work situation (like if you work in a rural or urban area, whether you do emergency or non-emergency work and if you do shift work). These questions will enable specific groups of paramedics to be identified which will make it possible to assess if there are health issues that matter to those groups.

Personal Risks Of Participating

Some of the questions ask you if you have had experiences that you might have found upsetting. It is possible that thinking about such experiences will be distressing.

If you believe that thinking about these kinds of experiences will cause you distress then you should not participate in the survey.

If you participate in the survey and find that you feel upset in any way then you can contact the Victorian Ambulance Counselling Unit (VACU) for support and advice. Please note that all such contacts with VACU are confidential. If you want to support or counselling then this will be provided by psychologists who are outside the ambulance service. There will be no cost to you for any support provided of this kind; VACU will bear these costs.

Feedback About Your Responses And Confidentiality

Some sections of the survey measure forms of psychological distress (like anxiety, depression, stress and symptoms of post-traumatic distress). Information is given to you in the survey to enable you to judge if your responses suggest that there are issues that might be of concern. In such cases, you will be advised to seek further support.

Your responses to the survey questions are confidential so it will not be possible to provide feedback in any other way unless you choose to identify yourself. You will be given the opportunity to record your identity if you choose to do that.

No results from individuals will be released. Only summaries of findings and statistics will be reported.

Consenting To Participate In This Study

You may withdraw from this study at any time should you decide to participate. There are no penalties for declining to participate in this study or for withdrawing from the study.

Completing the survey indicates that you have given implied consent to participate in this study. This means that you

1. Have read this 'information to participants' statement.
2. Are participating in this study voluntarily.
3. Are over the age of 18 years.
4. Have had any questions or concerns about this study satisfactorily explained to you. Contact details for any questions you might have are provided below.
5. Understand that your responses to the survey questions are confidential and will not be able to be identified.

Any queries about your participation in this project may be directed to the researchers. Please contact Adrian Fisher (9919-2335; adrian.fisher@vu.edu.au) David Dawson by telephone on 03 9919 2793 or e-mail at this address: David.Dawson@vu.edu.au. Heather Bancroft can be contacted by e-mail at this address: clinical.director@vacu.com.au.

If you have any queries or complaints about the way you have been treated, you may contact the Ethics & Biosafety Coordinator, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001, phone (03) 9919 4148.

David Dawson,

Lecturer,
School of Biomedical and Health Sciences,
Victoria University.

Heather Bancroft,

Clinical Director,
Victorian Ambulance counselling Unit,
Ambulance Victoria.

Adrian Fisher

Associate Professor
School of Social Sciences and Psychology
Victoria University

Appendix C: Preparation And Cleaning Of The Data Set

C1 Preparation And Cleaning Of The Dataset

All identifying variables were deleted from the data set. Qualtrics automatically records the respondents' IP address and these were deleted. Subjects were invited to identify themselves if they wanted to receive feedback about their responses. This was done to meet an obligation to provide advice and offer assistances to those whose scores on the various scales indicated the possibility of psychological distress and to provide feedback to those who were interested. All identifying names and contact addresses and phone numbers were deleted.

Qualtrics created five variables for internal management purposes. These variables were irrelevant and so deleted. Four variables consisted of beginning statements from the survey (information to participants about the survey and consent and other introductory material). These variables were deleted. The variable 'Response ID' was created by Qualtrics to identify individual cases. This variable was not in a user-friendly format so an automatic recode was performed to create a single numeric identifier that was more practicable. There were 113 cases where no data was recorded other than for 'Response ID.' These cases were deleted.

All variables were renamed so that it was more evident what measurement was represented by each variable.

Missing data was coded as '-1.' Missing data for postcodes representing the locality or branch in which paramedics respondents worked was coded as -1 except for Air Ambulance Victoria (AAV) paramedics whose postcodes were classified as missing and coded as -2. AAV postcodes were classified as missing so as to exclude this data from analyses dependent on locality. This was because AAV paramedics work from a base airport but do their work across the State. It was not appropriate to include this data in locality dependent

analyses. Missing AAV data was coded as -2 so these cases could be readily identified if necessary.

Average time to transport a patient. One survey item asked participants to estimate the average time they spent transporting a patient, in hours and minutes. A number of responses were logically inconsistent or not feasible (because the time entered by the respondent was not possible). There were 50 cases with unusable data for the variable measuring the estimated average time to transport a patient and the data for these cases was recoded as missing. The data for this variable was recalculated so that the average patient transport time was recorded in minutes and entered into a new variable. Some respondents recorded their average patient transport time as 'zero' minutes. Examination of the data showed that these cases had roles that did not involve transporting patients; average patient transport time for these 111 cases was recoded as missing.

Work or branch locality was determined by examining responses to questions asking where paramedics worked. Some branches are named for a place but were located in close-by but different suburbs with different postcodes. Branches were assigned the postcode for their actual location and not assigned the postcode for the branch name. An example is Broadmeadows branch (postcode 3047) which is actually located in Oak Park (postcode 3046). The postcode 3046 for Oak Park was used and this procedure was used to identify the postcode for other ambulance stations where necessary.

Frequencies were calculated for variables (using the SPSS frequency procedure) and the variable 'age' was found to have the values of 2 and 84. These were considered to be illogical and the data was set to 'missing.' Participants recorded their age by entering a numeral. A categorical variable for 'age' was created with the following categories:

1 = 20 - 24 years

2 = 25 – 29 years

3 = 30 – 34 years

4 = 35 – 39 years

5 = 40 – 44 years

6 = 45 – 49 years

7 = 50 – 54 years

8 = 55 – 59 years

9 = 60+ years.

The variable 'educational qualifications' contained data in the 'other' category where respondents had written their qualifications. Twenty-two cases were recoded from 'other' to the appropriate category. (E.g. Masters recoded to 'postgraduate degree' from 'other'). The categories recording educational qualifications were a/ certificate or diploma more than one year full time (which were the qualifications paramedics obtained under the post-employment model, before paramedic education was transferred to universities), b/ Bachelor degree, 3/ Postgraduate degree and 4/ Other.

Qualtrics coded binary variables as 1 = yes and 2 = no. All binary variable were recoded to the conventional 0 = no and 1 = yes.

C1.1 Recoded variables that were a mix of numerical and string (text) data to

numerical variables. Variables recoded in this way were:

Adults in household.

Children in household.

Years of operational experience.

Years since operational experience.

Years of operational experience was recoded to a separate, categorical variable:

1 = 0 – 1 years of experience

2 = 2 – 5 years of experience

3 = 6 -10 years of experience

4 = 11 – 15 years of experience

5 = 16 – 20 years of experience

6 = 21 – 25 years of experience

7 = 26 – 30 years of experience

8 = 31 – 35 years of experience

9 = 36+ years of experience

The variable 'region' recorded in which region of Ambulance Victoria the respondent worked.

There were 28 possible regions. Separate categorical variables were created to condense this information and make it more useful. Two general regions were created where 0 = rural and 1 = metropolitan. In addition, the following categories were created (representing regions of Ambulance Victoria):

1 = Barwon South West

2 = Grampians

3 = Loddon-Mallee

4 = Hume

5 = Gippsland

6 = Ballarat or other rural office

7 = Metropolitan (including Air Ambulance Victoria).

The variable 'SES Decile' (Socioeconomic Status Decile) was created by categorizing postcodes in which respondents worked using the SES decile in which each postcode was classified according to the Australian Bureau of Statistics (ABS) 'Index of Relative Socio-economic Advantage and Disadvantage,' (ABS, 2013). Decile 1 is the most disadvantaged compared to the other deciles.

The variable 'Locality Remoteness' was created by categorizing postcodes according to their distance from urban centres and access to health services. This was done using the Australian Bureau of Statistics 'Australian Standard Geographic Classification – Remoteness Area (ASGC-RA) classifications. The ASGC-RA approach is recommended by the Australian Institute of Health and Welfare (AIHW) (2015), and is described in AIHW (2012, pp xiii & 49). The ASGC-RA categories are:

Major Cities of Australia (classified as 'Major City' in the dataset),

Inner Regional Australia (classified as 'Inner Regional' in the dataset),

Outer Regional Australia, (classified as 'Outer Regional' in the dataset),

Remote Australia (classified as 'Remote' in the dataset) or

Very Remote Australia (classified as Very Remote in the dataset).

C2 VETTING AND CLEANING THE DATA SET

Methods for checking the data set for accuracy were taken from Pallant (2011, pp 44-46) and Tabachnick & Fidell (2013, p 61).

Categorical variables were checked in the following way-

Minimum and maximum values were checked to assess that the data values were within the feasible range of scores for that variable.

The number of valid and missing cases in each categorical variable was examined to assess if there were more missing cases than would be expected.

Codes for missing values were checked.

Continuous variables were checked by doing the following-

The minimum and maximum values were checked that they made sense for the variable concerned in the context of this sample.

The mean scores were scrutinized to assess that they were viable in the context of this paramedic sample.

Codes for missing values were checked.

Appendix D: Descriptive Information

D1 Internal Reliability

As shown in Table D1, all the values for Cronbach's alpha are larger than 0.7 indicating that all the scales used here have good internal consistency (Pallant, 2013, pp.101 & 105).

Table D1. Internal reliability: Cronbach's alpha for the scales of instruments used in this study.

Scale (No. of Items)	Male	Female	Total
GHQ28 Total Score (28)	0.936	0.906	0.927
GHQ28 Somatic (7)	0.841	0.803	0.828
GHQ28 Anxiety & Insomnia (7)	0.899	0.863	0.888
GHQ28 Social Dysfunction (7)	0.707	0.668	0.694
GHQ28 Depression (7)	0.916	0.870	0.903
DASS21 Depression (7)	0.909	0.880	0.900
DASS21 Anxiety (7)	0.780	0.791	0.784
DASS21 Stress (7)	0.882	0.873	0.878
KSQ Disturbed Sleep (4)	0.885	0.867	0.877

D2 Correlations

Pearson's correlation of the key pairs of continuous variables and combinations of a dichotomous variable with a continuous variable was conducted and the findings are displayed in Table D2. The first four variables (Sex, Age, Years of Service and Time to Transport a Patient) are independent variables and the remainder are outcome variables.

The correlations between the independent and outcome variables rarely reach statistical significance: whether or not significance is achieved, all these correlations can be regarded as weak (Greasley, 2008, p 80) or described as small or very small (Pallant, 2013, p 139).

The correlations between the GHQ28 scales and the scales of the DASS21 are all significant and moderate to strong in strength. The correlations between the GHQ28 scales range from 0.457 to 0.889 and range from 0.513 to 0.709 for the DASS21 scales. Similarly,

the correlations between the scales of the KSQ range from 0.337 to 0.606 indicating moderate correlations between them.

Table D2. Inter-correlations Between The Key Continuous And Dichotomous Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Sex																
2 Age	-.425**															
3 Years of Service	-.376**	.781**														
4 Time to Transport a Patient	-.091**	.142**	.161*													
5 GHQ28 Total	-.062	.055	.053	.040												
6 GHQ28 Somatic	.005	.005	.001	.000	.815**											
7 GHQ28 Anxiety & Insomnia	-.057	.034	.038	.026	.889**	.654**										
8 GHQ28 Social Dysfunction	-.078*	.054	.057	.003	.749**	.499**	.574**									
9 GHQ28 Depression	-.095**	.065	.059	.106**	.779**	.457**	.571**	.579**								
10 DASS21 Depression	-.098*	.082*	.048	.055	.731**	.536**	.584**	.611**	.709**							
11 DASS21 Anxiety	-.002	-.040	-.016	.049	.603**	.481**	.554**	.460**	.542**	.606**						
12 DASS21 Stress	-.019	.015	.014	-.021	.686**	.580**	.664**	.506**	.513**	.706**	.677**					
13 KSQ Disturbed Sleep	-.037	.129**	.062	.053	.467**	.406**	.485**	.269**	.296**	.357**	.294**	.417**				
14 KSQ Difficulty Awakening	.074*	-.172**	-.126**	.008	.294**	.319**	.300*	.197**	.204**	.233**	.286**	.299**	.337**			
15 KSQ Not Well Rested On Awakening	.042	-.025	-.033	.050	.441**	.422**	.425**	.311**	.279**	.385**	.336**	.447**	.606**	.507**		
16 PTSD Past Year Probable Case	-.030	.095*	.074	.171**	.457**	.344**	.362**	.318**	.430**	.392**	.364*	.382**	.264**	.156**	.210**	
17 Seriously Considered Taking Own Life – Past Year	.005	-.049	-.066	-.138**	-.390	-.243**	-.266**	-.199**	-.514**	-.368**	-.241	-.205**	-.172**	-.084*	-.083	-.370**

* p < 0.05, ** p < 0.01

D3 Descriptive Information For Continuous Dependent Variables

This section presents descriptive information for the dependent variables. Table D3 displays the descriptive data for the continuous dependent variables in this study. The descriptive statistics reported here are the number of participants on which each analysis was based (N), the mean (M) and the standard deviation (SD) (American Psychological Association (APA), 2001). The APA also recommends reporting confidence intervals because they combine location (in this case the mean) with precision and can be used to judge significance levels (APA, 2001, p 22; Cumming & Fidler, 2005). 95% confidence intervals are accordingly reported.

Scale	N	M	SD	95% CI ² of the Mean
GHQ28¹				
Total Score	852	5.88	5.66	[5.50, 6.26]
Somatic	1001	2.05	2.00	[1.93, 2.17]
Anxiety & Insomnia	984	1.94	2.06	[1.81, 2.07]
Social Dysfunction	965	1.42	1.76	[1.31, 1.53]
Depression	982	0.45	1.21	[0.37, 0.52]
DASS				
Depression	761	7.49	8.45	[6.89, 8.09]
Anxiety	761	4.75	5.96	[4.33, 5.18]
Stress	761	11.65	8.76	[11.02, 12.27]
Sleep Quality				
Disturbed Sleep	1029	2.06	0.94	[2.00, 2.11]
Difficulty	1024	2.51	1.32	[2.44, 2.59]
Awakening Not Well	1029	3.44	1.05	[3.38, 3.51]
Rested On Awakening				
Nightmares	1025	1.87	0.90	[1.81, 1.92]
Heavy Snoring	1025	2.17	1.18	[2.10, 2.24]

1 The 0-0-1-1 scoring system was used for the GHQ28 data presented in this table.

2 Confidence interval.

The mean for the overall scores on the GHQ28 was 5.88 for this sample (SD = 5.66) which is significantly higher than the mean of 2.45 for the general Australian population

(Taylor et al., 2000) ($t_{851} = 17.68$, $p < 0.001$, two-tailed). Mean scores on the subscales of the GHQ28 for the general Australian population could not be located.

The mean scores of this sample on the DASS depression and stress scales were higher than the general population. The mean DASS depression score was 7.49 (SD = 8.45) compared to the general population score of 6.34 (Lovibond & Lovibond, 1995) ($t_{761} = 3.75$, $p < 0.001$, two-tailed) and the sample mean for stress was 11.65 (SD = 8.76) ($t_{761} = 4.84$, $p < 0.001$, two-tailed) compared to the population score of 10.11. The sample mean for anxiety was 4.75. (SD = 5.96).

The mean score for items from the Karolinska Sleep Questionnaire measuring 'disturbed sleep' was 2.06 (SD = 0.94) which was significantly lower than the mean score of 2.19 obtained from the general Swedish population (Akerstedt, Knutsson, Westerholm, Theorell, Alfredsson & Kecklund, 2004) ($t_{1029} = -4.5$, $p < 0.001$, two-tailed). The mean scores for 'difficulty awakening,' 'not well rested on awakening,' nightmares' and 'heavy snoring' were respectively 2.51 (SD = 1.23), 3.44 (SD = 1.05), 1.87 (SD = 0.90) and 2.17 (SD = 1.18); normative means for these four measures could not be located.

D4 Descriptive Information For Categorical Dependent Variables

This section presents descriptive information for the categorical dependent variables used in the study. Table D3 presents the numbers of respondents experiencing PTSD symptoms and prevalence within the sample. The lifetime (ever in the past) prevalences of the PTSD symptoms for the sample shown in Table D3 are at least twice those reported by Breslau, Peterson, Kessler & Schultz (1999) in their normative sample drawn from the US population except for 'avoided being reminded of the experience' which is 38.2% higher (in this sample).

D4.1 PTSD Symptoms

The frequencies of PTSD symptoms are shown in Table D4.

Table D4. Frequencies of PTSD Symptoms Experienced

PTSD Symptom Experienced	In the Past month		In the Past Year		Ever, in the Past	
	Number	Percent	Number	Percent	Number	Percent
Avoided being reminded of the experience	92	14.4	172	26.7	320	48.7
Lost interest in activities that were once important or enjoyable	149	23.3	246	38.1	349	54.3
Began to feel more distant or isolated from other people	192	30.0	305	47.4	372	58.3
Found it hard to feel love or affection for other people	116	17.9	177	27.5	225	35.5
Begun to feel there was no point in planning for the future	57	8.8	98	15.4	153	23.9
Had more trouble than usual in falling or staying asleep	369	55.2	440	68.1	450	70.9
Became jumpy or easily startled by noise or movements	91	14.0	146	22.8	212	32.5

D4.2 Suicidality

The numbers and prevalences of suicidal ideation within the sample are shown in Table D4. Prevalences for suicidality were compared with the general Australian population published by Pirkis, Burgess & Dunt (2000) and Johnston, Pirkis & Burgess (2009). Thinking about suicide (suicidal ideation, the first three items) 'in the past year' or 'ever, in the past,' is at least twice that of the general Australian population, as is 'seriously considered taking your own life.' The prevalence of reported suicide attempts is comparable with that of the general Australian population

Table D5. Frequencies Of Suicidal Ideation Items Experienced In The Sample

Suicidal Ideation Item	Experienced in the Past Year		Experienced Ever in the Past	
	Number	Percent	Number	Percent
Felt that life was not worth living	109	15.9	280	37.8
Wished that you were dead (e.g. that you could get to sleep and not wake up)	90	13.1	226	30.6
Thought of taking your own life, even if you wouldn't really do it	131	19.1	287	38.9
Reached the point where you seriously considered taking your own life and even made plans for how you would go about it	34	5.0	97	13.1
Made an attempt to take your life	2	0.2	33	4.6

D4.3 Medication Use

Descriptive statistics for medications related to psychological health are presented in Table D6. A full list of medications investigated in this study is presented in the Appendix. A

notable feature is the use of sleeping tablets by paramedic participants in the previous two weeks; 17.6% of the sample reported using sleeping tablets. This level of use is four times the rate reported by the general Australian population (Australian Institute of Health and Welfare, 2006, p 98)

Table D6 Frequencies of medications used in the past two weeks

Medication	Number	Percent
Anti-depressant	68	6.6
For anxiety or nerves	54	5.3
Tranquillizer	33	3.2
Mood stabilizer	16	1.6
Sleeping tablet	180	17.6

**Appendix E: Recommendations Arising from the Current
Project.**

Some important implications arise from the results of this study, particularly in relation to pointing towards interventions that may address identified mental health issues with the aim to improve outcomes for the paramedic workforce. This section first reviews ways of dealing with the main mental health issues for paramedics of suicidality, PTSD and problems with sleep discussed in chapter 7. The issues of health across the workforce and sources of stress for paramedic are then subsequently addressed and recommendations are presented at the end of each section.

E1 Interventions for Preventing and Managing Suicidal Suicidality

The findings of this study, together with the Victorian Coroner's report (Dwyer & Bugeja, 2015) indicate that this paramedic population is at a higher risk for suicidal ideation, planning and suicide. Consequently, there is an obligation to provide a programme or programmes to link individuals experiencing the various aspects of suicidality with support in order to alleviate symptoms and to prevent avoidable loss of life.

Suicide prevention programmes need to be based on the best evidence available, although the evidence base of some strategies is not always strong (Mann et al., 2005). Nevertheless, appropriate guidelines should be followed when these are available. The Australian government has developed a National Suicide Prevention Strategy (NSPS) (Dept. of Health, 2016) the centrepiece of which is the, "Living Is for Everyone (LIFE) Framework (Dept. of Health & Aging, 2008). This framework provides a foundation from which to develop suicide prevention activities. Traditional approaches to health care have focussed on the ideas of primary, secondary and tertiary prevention. Rather than focus on this traditional approach, the LIFE framework centres on different groups of people who may be affected by suicide. This approach affords a continuum of activities aimed at suicide prevention. This continuum allows suicide prevention activities to focus on the whole population, to at risk groups and to

at risk individuals and continues on to include the identification of individuals at risk of suicide followed by treatment and follow-up. In the present study, the at-risk group is ambulance paramedics and suicide prevention activities should be designed to accommodate the circumstances of this group.

There is evidence that suicide prevention programmes can be effective, at least in some areas. An evaluation of suicide prevention activities associated with the Australian NSPS found generally positive outcomes but that some problematic issues were also identified [Australian Healthcare Associates (AHA), 2014]. For programmes delivered at specific communities or groups, high levels of participant satisfaction were demonstrated. Of interest, in the present context of the ambulance service, is that success was reported with training workers to recognize colleagues who were at risk of suicide accompanied by an improved capacity to respond in an apt manner. The AHA evaluation also related that people in targeted communities were more readily able to talk about suicide and that there was an increased awareness and better knowledge of how help could be accessed. That these positive outcomes were achieved by suicide prevention activities in various Australian communities and groups suggest that activities like these could also be successful in the ambulance service context: there is reason to be hopeful but there is also the necessity for meticulous evaluation of suicide prevention activities (Beautrais et al., 2007).

While some suicide prevention strategies have demonstrated positive outcomes, AHA (2014, pp. 129-130) reported two negative outcomes. One negative outcome was an increase in the experience of stigma among the participants involved. It was further reported that programmes associated with a probation and parole office or a mental health organisation lead to a perception among the public that all users of suicide prevention activities had been involved with the criminal justice system or were mentally ill. The corresponding outcome was that people were reluctant to access services because of this perceived association and the accompanying stigma. A second negative outcome was the

inability to access suicide prevention support services. This applied to prevention activities that were successful in raising awareness and encouraging people in the targeted audience to access help but the available support services were inadequate. This is a salient finding in the current context. If the ambulance service were to introduce a suicide prevention programme, then it would also be necessary to ensure that support services were available and consistent with the aims of the associated suicide prevention activities.

The AHA report also indicated characteristics of successful suicide prevention programmes (AHA, 2014, p 120). Essentially, successful suicide prevention projects set achievable and realistic goals (to which could be added the need to evaluate their achievement) and developed the necessary connections to support the project. Connections meant developing relationships with relevant stakeholders and developing the necessary supporting referral networks. Although not all examples of suicide prevention programmes in the first responder or military arena necessarily had these characteristics, there are example where success was achieved. Two programmes that were rigorously implemented and evaluated were identified in the review of first responder suicidality conducted by Stanley et al., (2016).

One example of an apparently successful suicide prevention programme is known as the, Houston Fire Department (HFD) model (Finney et al., 2015). The HFD had a staff of 4000 and experienced eight active duty fire fighter suicides in the 1984 – 2007 period. This is a rate that is about one-third that reported for fire fighters in the Victorian coroner's report (Dwyer & Bugeja, 2015). Three of these HFD suicides occurred in the 2005 -2007 period and propelled the development a suicide prevention programme. The HFD programme comprised three phases delivered over a one-year time frame, beginning in 2007. The first two phases focused on the fire fighters and the third phase focussed on departmental officers (supervisors to whom staff reported). Pertinent elements of the programme are mentioned here. The first two phases consisted of presentations (respectively of two hours and one hour in duration), with associated discussions, to fire fighters at each of the HFD

stations. The first phase was labelled 'awareness' and had the central aim of obtaining input from HDF fire fighters on addressing suicide and other mental health matters. This phase included an overview of the proposed programme, information about currently available support resources and concluded with a discussion where input was obtained from participants. The phase one session concluded by asking attendees to complete a questionnaire designed to assess mental health status and included questions on suicidal thoughts and behaviours and on the use of mental health services. Phase 2 was labelled 'prevention' and had the primary aim of educating fire fighters about suicide. Information about the risk factors and signs of suicide in fire fighters was provided; feedback from the phase one questionnaire was also given. Phase three, delivered online, was designed for staff with supervisory roles with the main purpose of providing information about identifying staff who might be at risk of suicide or experiencing a mental health difficulty. This phase included content on how to deal with colleagues when there was concern that they were experiencing aspects of suicidality. Material on how supervisors and their staff could access and utilize mental health resources was also delivered.

There were no suicides in the HDF for a period of five years after this programme was delivered, compared to three suicides in the preceding three-year period, and three "virtually certain" suicides were averted (Finney et al., 2015, p. 3). These authors also note that it is not possible to directly attribute these observations to the suicide prevention programme. The HDF subsequently suffered two suicides of active duty members in the years 2012 and 2013. This is an uncomfortable reminder that a realistic goal for suicide prevention programmes is to reduce suicide (World Health Organization, 2014): elimination is unlikely to be achieved. It can also be noted that the HFD suicide prevention programme is consistent with the Australian LIFE suicide prevention guidelines of providing an intervention that is devised for a particular group, identifying individuals at risk and providing access to follow up support service (Dept. of Health and Ageing, 2008, p 19).

A second suicide prevention programme in the first responder context was introduced for police in Montreal, Canada. In the ten-year period before this programme was implemented, the mean suicide rate of Montreal police was 30.5 per 100,000 population, a rate that was comparable for equivalent age and sex sections of the general population (Mishara & Martin, 2012). These authors noted that the death of a co-worker is a critical incident that has a significant effect in the emergency service professions and an earlier study found that the death of a colleague was a major source of distress (or critical incident) for Victorian paramedics (Robinson, 2002, p 15). Hackett & Violante (2003, p. 11) wrote, "The suicide of a department member can send the agency or a specific work unit into an emotional tailspin that can take months, if not years, in [sic] which to recover." A German study found that there was a higher incidence of mental illness among the co-workers of police officers who attempted or died by suicide (Bär et al 2004). It was with this background that the Montreal Police Force implemented a suicide prevention programme with the intention of decreasing suicides by police officers. The programme was delivered in 1998 and repeated in 2006.

A key part of the Montreal Police Force suicide prevention programme was to provide a half-day training programme for all employees (Mishara & Martin, 2012). This aspect of the programme covered the nature of suicide, identification of suicide risk, and how to help a colleague who might be in difficulty. In addition, a full day programme was provided to supervisors and union representatives that focused on developing supervisors' capacity to identify officers who were at risk of suicide and how to proffer assistance. Other aspects of this programme included the development of an employee specific telephone helpline, and an internal publicity campaign to inform officers about suicide prevention and how to access resources.

The impact of this programme was the reduction of the suicide rate in the Montreal Police Force by 78.9%. This outcome was obtained by comparing the number of suicides (14) in the 11 years before the programme with the number of suicides (4) in the subsequent 12

years. Comparisons with other police forces in Quebec are also salutary. Before introducing the suicide prevention programme, the suicide rate (per 100,000) for the Montreal Police Force was not significantly different from other forces in Quebec. In the 12 years following the programmes introduction, there was a small but non-significant reduction in police suicides in the rest of the province; in Montreal the suicide rate per 100,000 declined to 6.42 per 100,000 (from 30.5 per 100,000, a statistically significant change). The differences in suicide rates between Montreal and the rest of Quebec were also statistically significant. A further outcome of the Montreal Police Force programme was to enable staff to speak more freely about suicide. Mishara & Martin (2012) reported that officers felt more able, and were more prepared, to speak with fellow officers about whom they might have concerns regarding suicidal thoughts or intentions. These results provide persuasive evidence for the effects of the Montreal Police force suicide prevention programme and offer encouragement for other first responder organisations.

On an individual level, cognitive behavioural therapy (CBT) has shown to be effective for defence force personnel in reducing follow-up suicide attempts in those who had attempted suicide and in those with suicidal ideation (Rudd et al., 2015). Defence force personnel are not exactly the same as a first responder population but can be regarded as having characteristics in common (Stanley et al., 2016). Rudd et al. (2015) conducted a randomized clinical trial with military personnel who had either attempted suicide or experienced suicidal ideation with intent. The CBT programme included (but was not limited to) the development of a crisis response plan, emotional regulation skills training and cognitive restructuring of beliefs that operate as vulnerabilities for suicidal behaviour. One group was assigned to treatment as usual; the other group was assigned to a CBT programme (of 12 sessions). The two groups were followed up over a two-year period, at three-month intervals over the first six months, and two six-month intervals in the ensuing 18 months. The results showed that there was no statistically significant difference in suicidal ideation between the two treatment groups over the two-year period except at the six-month follow-up point where the

CBT group showed a significantly lower rate of ideation. However, suicidal ideation decreased in both groups over the two years with the reduction in magnitude being greater in the CBT group. The key finding of this study was that the CBT group had a 60% reduction in suicide attempts compared to the treatment as usual group. Rudd et al., (2015) note that, to their knowledge, that this result was the largest decrease on suicide risk reduction so far recorded.

Rudd et al., also concluded that their findings supported the notion that suicidal ideation and related behaviours (other than attempts) should be the target of a separate treatment goal. They also noted that the reduction in suicide attempts was achieved, even though there were non-significant differences in ideation between the two groups. This provides evidence in support of the contention that a reduction in suicide attempts can be achieved without the complete remission of other symptoms. While the previous study was conducted on military personnel, it provides an avenue of encouragement that CBT based interventions can be successful in reducing suicide attempts. Given there are similarities between military and first responder organisations (Australian Centre for Posttraumatic Mental Health, 2007, p. 141), this encouragement can arguably be extended from the military context to the first responder context. Taken together, the three studies described above indicate that suicide prevention activities can be successful at the organisational and individual level and in the first responder context. The suicide prevention activities described in these studies are also consistent with the Australian Government NSPS and the associated guidelines provided by the LIFE Framework (Dept. of Ageing, 2008, pp. 19-21).

This study identified disturbed sleep and longer patient transport times as risk factors for suicidal ideation. Problems with sleep and fatigue have been noted elsewhere in the literature on paramedic mental health (Courtney, 2010, 2012; Patterson et al., 2012; Sofianopoulos et al., 2011; Robinson, 2002). Developing suicide prevention activities that take into account the risk factors specific to an at-risk group is consistent with the LIFE

suicide prevention framework (Dept. of Health and Ageing, 2008). A suicide prevention programme for the paramedic population on which this study was based could incorporate dealing with these two risk factors within the exigencies and constraints of the ambulance service context.

Mishara & Martin (2012) noted that there were several other reports on suicide prevention programmes, but that empirical data regarding their effectiveness had not been provided. This reinforces the need for setting clear goals for suicide prevention programmes and rigorous measurement of their effectiveness. The need to set clear and achievable goals and to measure their attainment (or not) is consistent with the LIFE Framework (Dept. of Ageing, 2008, p 24) and with the Australian Healthcare Associates report on the evaluation of suicide prevention activities associated with the Australian Government NSPS. Suicide prevention is a proper goal in its own right that can be separated from efforts to target suicidal thoughts and behaviours, and the studies described above indicate that the rates of attempted suicide and completed suicides can be reduced. The Rudd et al. (2015) study shows that this reduction can be achieved in the presence of risk factors like suicidal ideation, at least at the individual level. These authors also noted that suicidal ideation and related behaviours should be included as independently targeted goals of a suicide prevention programme. This is also consistent with the statement by Johnston et al. (2009) that suicidal thoughts and behaviours are each public health issues in their own right. It would therefore be appropriate for a suicide prevention programme to set separate goals for addressing attempted suicide, suicidal ideation and planning as well as associated behaviours.

E1.2 Recommendations Related to Suicidality

Despite the studies reported above, there remains limited rigorous evidence for the effectiveness of suicide prevention programmes (Beautrais et al., 2007). Beautrais reported that there is only good evidence for suicide intervention strategies based on educating medical practitioners to recognize patients at risk of suicide, restricting access to methods enabling suicide, and education of gatekeepers to recognize people at risk of suicide. Nonetheless, the recommendations here are based on the research published regarding first responders and military personnel.

It is recommended that:

1. A suicide prevention programme be developed or AV employees based on extensive and structured consultation with all stakeholders. The programme should provide education about suicide, the effects of stigma, how to identify colleagues who might be at risk of suicide and how to approach and speak with these colleagues.
2. Any suicide prevention programme ensures that relevant and readily available support services are available to employees. These support services are provided in such a way that confidentiality is maintained and that ambulance service employees have trust and confidence in using them.
3. That the prevention programme must establish clear objectives that can be used to assess the success of the programme. This evaluation should be conducted at regular intervals and inform the ongoing development and implementation of the programme.
4. Therapeutic interventions at the individual level be based on evidence as to their effectiveness. Psychoeducational and Cognitive Behaviour Therapy approaches have some emerging evidence for their effectiveness.
5. Research be conducted to identify if there are specific paramedic thoughts around suicide and suicidal planning. The information gained from this research could be

used as part of the prevention programme. If such thinking is identified then it can be directly addressed.

E2 PTSD Prevention and Intervention

There have been genuine efforts to build resilience in populations at risk with the intention of preventing psychological ill-health, including PTSD. Two resilience programmes pertinent to the first responder context have been developed by the United States and Australian defence forces. The US Army developed and implemented a Comprehensive Soldier Fitness (CSF) programme. The aim of the CSF programme was to promote resilience in soldiers in order to prevent psychological ill-health, and included prevention of PTSD as a specific goal (Reivich et al., 2011; Steenkamp et al., 2013). This programme was based on the Penn Resilience Programme as well as drawing on concepts from positive psychology and cognitive behavioural therapy (with an emphasis on Albert Ellis's adversity-belief-consequence model). There were also components that facilitated soldiers' abilities to identify character strengths in themselves, in others and in people in their units and which developed the ability to use these strengths to deal with and overcome challenges and to achieve chosen objectives (Reivich et al., 2011).

The Australian Defence Force (ADF) also introduced a mental health strategy that included resilience training in 2002 (Cohn, Crane & Hodson, 2011, p 306; Department of Defence, 2011; Dunt, 2009). The resilience training component eventually became known as 'BattleSMART,' (Cohn et al., 2011). The intention of the BattleSMART programme was to, "promote resilient psychological functioning" (Cohn, Crane & Hodson, 2011, p 306), with the implied outcomes of better health and reduced risk of psychological ill-health and conditions like PTSD and depression. The BattleSMART training programme was founded on the stress and coping model of Lazarus and Folkman (1984) with cognitive appraisal as a central part of the process of helping personnel to manage situational demands. A core

component of this programme is to teach a wide range of coping skills and to help people to assess and manage their reactions to situations likely to be experienced in the military context. In brief, the programme encourages people to think about their response to situations as occurring in four domains, which are 1/ thoughts, 2/ emotions, 3/ behaviours and 4/ physical reactions. Having identified their reactions and identified them as being adaptive or maladaptive, people are encouraged to modify their reaction if and as appropriate (Cohn et al., 2011).

Evaluation of resilience training has produced mixed findings. In short, there is some support for resilience training *in vitro* but less support for its effects *in vivo*. A trial was conducted by Varker & Devilly (2012) with the aim of developing participants' ability to cope with scenes of a car accident presented on video. The study objective was described as an analogue study to examine the concept of inoculation/resilience training with emergency services personnel. There were two groups, one group received resilience training and the other (control group) was given practical training, which involved being taught what to do at the scene of a car accident. Negative affect was measured both before, and four weeks after the resilience training using the stress and depression subscales of the DASS21. Varker & Devilly (2012) reported the inoculation group showed reduced depression scores, whereas the control group showed increased depression scores. They also reported a greater decrease in stress scores compared to the control group. However, although the changes occurred in the expected direction, none reached statistical significance and therefore can only be considered as trends in the data.

Gardner et al. (2005) conducted a stress intervention study on a sample of employees drawn from the British NHS. The participants were divided into three groups. One group participated in a behavioural-based intervention, the second group received a cognitive based intervention and the third group served as a waitlist control group; general distress was measured with the GHQ12. Measures of general health were taken at the beginning

and at the end of the intervention, and at 3-month follow-up. Both the cognitive therapy (large effect size) and behavioural intervention (moderate effect size) groups showed a clinically significant improvement in their levels of distress compared to the control group, but only the cognitive intervention group achieved statistical significance. The authors reported that significance for the behavioural intervention was likely not achieved because of the small sample size. These findings suggest that an intervention programme can reduce psychological distress over time (a three-month period, in this case).

A study conducted by the Australian Defence Force in appraised the effectiveness of a brief cognitive-behavioural intervention for soldiers undergoing a 45-day recruit training programme (Cohn & Pakenham, 2008). Participants were assigned to a control group and a brief coping skills intervention group. Cohn & Pakenham measured attributional style (causal attributions and expectancy of future control), coping strategies and psychological adjustment. "The results indicated that compared to the control group, those who received the brief coping skills intervention reported more helpful and realistic attributions for their problems during training, showed less use of self-blame and reported better psychological adjustment at the end of training," (Cohn, Crane & Hodson, 2011, p. 304). These results indicated that a military based programme could produce statistically significant improvements in the psychological functioning of soldiers during their recruit training phase.

The studies mentioned above provide hopeful evidence that interventions to prevent stress and other forms of psychological dysfunction can be effective in the short term and in during a training period (for the military). In other words, there is some evidence to show interventions can be effective *in vitro*. There appears to be a lack of *in vivo* evidence demonstrating the effective of these interventions in the context of military operations or first responder organisations.

The US Institute of Medicine (IOM) (2014, pp133-134) conducted a review of the effectiveness of PTSD prevention and treatment programmes in the US military. Prevention in this context refers to programmes designed and delivered to individuals prior to exposure to precipitating events, or events that place individuals at risk. The IOM review concluded that, overall, the long term effects of resilience training in preventing PTSD was unknown. Specific mention was made of the Comprehensive Soldier Fitness (CSF) programmes and reported that the global assessment tool used to assess outcomes did not include assessment of PTSD symptoms. It could not consequently be determined that there was any association between resilience training and a reduction of PTSD symptoms, and no other information could be found on effectiveness in the short-term or long-term (IOM. 2014, p. 134). However, the IOM also reported that some aspects of the CSF programme might be beneficial for soldiers and their families, but that the programme had no unequivocal effect on the occurrence of PTSD, depression or anxiety, with only a slight reduction in the odds of developing these conditions. There was evidence of some statistically significant improvement in the measures of some psychological health outcomes, but the effect sizes were very small, and there were no clinically significant differences between pre-test and post-test scores (IOM, 2014). The evidence for the effectiveness of PTSD prevention programmes in the US military context is therefore lacking. It might be that such evidence might be found in future studies or in future programmes but there is a dearth of extant evidence. Furthermore, prevention programmes as described above run the risk of assuming that individuals will be better able to cope with the situations they face. The limits to coping were recognized by Lazarus (1999) when he write that some situations were beyond an individual's capacity to cope. Lazarus and Folkman (1984, p. 140) subsequently wrote that, "...coping should not be equated with mastery over the environment". To assume that training will enable individuals to cope with all the circumstances they might face is to run the risk of 'blaming the victim' when they face events with which they cannot cope.

The Australian guidelines on treating PTSD recognize this dearth of evidence in pre-incident training (ACPMH, 2013, p 68). These guidelines are cautious and state that pre-incident training may facilitate psychological adaptation following a traumatic event; they also state that there is a crucial requirement for rigorous study of the content and efficacy of pre-incident training (ACPMH, 2013, p 85). In the context of the lack of evidence for the effectiveness of prevention programmes, it is necessary to be cautious and conservative in designing intervention programmes in general, but also in first responder populations. The Australian guidelines on treating PTSD in emergency services workers recognizes that this is a population at increased risk; they specifically mention that first responders are more likely to be required to deal with multiple trauma exposures over the course of their career and recognize that the context of emergency service work means that these workers are exposed to significant workplace stressors like long hours and physically demanding work (ACPMH, 2013, p 149).

In recognition of this increased risk for emergency workers, the Australian guidelines specifically indicate that, “systematic screening potentially has an important role in identifying PTSD in emergency services personnel” (ACPMH, 2013, p. 150). Screening in this way is essentially ‘case finding’ which is appropriate for a first responder population who may be less likely seek assistance for problems like PTSD (ACPMH, 2023, p 150). The guidelines also indicate that at risk emergency workers should be screened soon after exposure to a traumatic event if there are other risk factors present. However, the onset of clinically significant symptoms may be delayed and consequently, routine annual screening for PTSD is recommended. These recommendations are consistent with the findings of a systematic review conducted by McFarlane & Bryant (2007). Both publications make the additional point that pre-incident screening lacks evidence as to its effectiveness.

The findings of the present study indicate that this paramedic population is at an elevated risk for PTSD, as are other paramedic populations in general. In the context of increased

risk, and that fact that the onset of PTSD symptoms can be delayed, then it would seem reasonable that those with a responsibility to care for the wellbeing of paramedics would have a concomitant obligation to provide regular screening for PTSD, as well as ensuring that adequate treatment and support services are available (McFarlane & Bryant, 2007). When dealing with PTSD in the context of comorbidity, it is recommended that the symptoms of PTSD be treated first (ACPMH, 2013, p 40). The findings of the present study, along with previous research, has identified that there are often comorbid conditions associated with PTSD. The Australian guidelines specifically recognize this and advise that a comprehensive assessment for PTSD should include appraisal of general mental health status and gauging the extent of comorbidity (ACPMH, 2013, pp.7 & 30). Part of managing PTSD necessarily entails being prepared to manage the associated comorbidities. This raises the question about the sequencing of treatment in people presenting with PTSD and other mental health conditions. While the literature on this matter is limited, the following guidelines are recommended by the Australian Centre for Posttraumatic Mental Health (2013). For patients presenting with PTSD and mild to moderate depression then treat the PTSD first as this will often alleviate the symptoms of depression. In the case of PTSD and severe depression which would compromise treatment of PTSD, and/or a high suicidality risk, then manage the suicide risk and care for the depression before dealing with the PTSD.

E2.1 Recommendations Relating to PTSD

1. There is a lack of robust evidence for the effectiveness of programmes that aim at preventing PTSD (and other mental health issues). These prevention programmes may yet prove to be effective, but they should not be relied upon given the current lack of unequivocal evidence. Therefore, it is recommended that the guidelines developed by the Australian Centre for Posttraumatic Mental Health (2013) be followed. These guidelines are comprehensive and those relevant to the present context of prevention in paramedics include screening at risk individuals and

provision of appropriate therapy and support services. The guidelines indicate that emergency service personnel should be screened after exposure to traumatic event if other risk factors are present. The development of PTSD symptoms can occur some time after exposure to the traumatic incident and the guidelines say that individuals should be assessed for PTSD at multiple points in time after exposure to the trauma.

2. Furthermore, it is recommended that interventions aimed to addressing PTSD in particular, and stress in general, should be considered in the context of the biopsychosocial model. The biopsychosocial model enables the totality of the paramedic environment to be considered, as well as an individual's psychological characteristics, and the physical consequences of exposure to stress and trauma (Melchert, 2014). Failure to consider the totality of an individual's interactions between their biological, psychological and sociocultural contexts risks failing to comprehensively address the impacts and consequences of daily hassles as well as traumatic stressors. One potential consequence of this failure is to narrow the focus to the individual. While this is necessary, it is also insufficient and may lead to placing more responsibility on an individual than is warranted, justified or fair. There are some situations that are not responsibility of the individual and are beyond their capacity to cope (Lazarus, 1999; Lazarus & Folkman, 1984).

E3 Prevention of Sleep Problems

The majority of paramedics who participated in this study reported working shifts, with most reporting that they worked rotating shifts.

There is a body of evidence that shift work is deleterious to health (Rosa & Colligan, 1997, p 14) consequently, one way to address this situation is to avoid shift work or to establish an environment in which paramedics can have substantial naps or otherwise get more sleep.

Regrettably, the logistics of such an arrangement render it virtually impossible to implement in the emergency pre-hospital environment (Sofianopoulos et al., 2011). Nevertheless, a small Japanese study involving 10 paramedics demonstrated that such an arrangement could have positive effects (Takeyama et al., 2009). In the traditional system, these paramedics had to work a 24-hour shift and respond to all emergency calls. In the modified system, each paramedic was allocated a five- or six-hour period in which they could sleep; these individuals were replaced by an additional paramedic during the allocated time for sleep. The results showed that providing the opportunity for substantial naps during the work shift alleviated the negative subjective effects of fatigue and improved physiological function.

Making time available for substantial naps during a night shift is generally not practical in the paramedic first responder context. The ambulance service is an organisation where emergency patient treatment and transport services need to be continuously available. Shift work is an unavoidable reality in organisations like this despite the fact that the best solution would be to eliminate it (Canadian Centre for Occupational Health & Safety (CCOHS), 2016). An alternative approach to shift work is to take a 'harm reduction' approach. Most of the paramedics in this study were working rotational shifts with a 'four days on, four days off' pattern and this kind of shift work has the most deleterious effects on health (Rosa & Colligan, 1997, p 8) although, one positive aspect of this arrangement is that there are four days off which can allow people some recovery time (CCOHS, 2016). One alternative that could be examined is a shift pattern that impacts less negatively on health. Such a pattern is a non-rotating shift that runs for a period of more than seven days. The period of seven days is specified because this is the period of time people need to adjust to a particular work and sleep pattern (CCOHS, 2016). However, it is likely that shift work will remain as part of the work arrangements for an emergency first responder system like the ambulance service.

Paramedics who work shifts can take a certain amount of individual action to increase the likelihood of getting enough quality sleep. These are largely centred around establishing suitable routines and patterns of behaviour as listed below (Rosa & Colligan, 1997, Chap 5)-

1. Maintain regular eating patterns with the main meal in the middle of the day when working afternoon or night shifts.
2. Follow good nutrition guidelines by eating fresh fruit and vegetables, avoid snack foods and reduce salt, alcohol, caffeine and greasy foods.
3. Keep the use of sleep medications to a minimum.
4. Establish a routine before going to bed so that the body 'learns' to recognize a pattern that means it is time to sleep.
5. Sleep in a cool environment.
6. Use relaxation techniques or engage in relaxing activities before going to bed.

While people who work shifts can experiment with various sleep hygiene methods in an effort to get an adequate amount and quality of sleep, the fact remains that all forms of shift work is likely to have adverse health effects. This is an observation that indicates that shift workers may need to monitor health more diligently than other workers.

E3.1 Recommendations Relating to Sleep Health

Avoiding shift work would be the most effective option for improving sleep health but it is frankly unrealistic in the ambulance service context. Therefore, the recommendations listed below are made that:

1. Paramedics be provided with education about the health risks associated with shift work. Sufficient information should be provided to enable paramedics to recognize when they might be experiencing these effects.

2. Paramedics be provided with practical advice on how the health effects of shift work might be managed.
3. Paramedic training includes how to maintain good sleep hygiene in the context of ambulance service shift work. One such sleep hygiene practice would be to establish a regular routine before going to bed.
4. Fatigue monitoring and management procedures be put in place.

E4 Addressing Mental Health Across the Paramedic Workforce

The mental health status of paramedics across different roles and locations within the workforce was investigated and no meaningful differences were found, with the possible exceptions of PTSD and suicidality. Some statistically significant differences were found but the effect sizes were mostly in the very small to small range. Comparing differences in PTSD by locality remoteness found an effect size that was at the lower end of the small to moderate range. PTSD was more prevalent in outer and inner regional areas compared to major cities (respectively 30.0%, 20.5% and 12%). There were higher levels of suicidality in some regions and the reasons for this should be investigated. Generally speaking, the findings of this study imply that it is not practically meaningful to target mental health interventions to specific sections of the paramedic workforce, although access to support services could be considered for those working outside the major cities

E4.1 Recommendations On Targeting Mental Health Interventions

It is recommended that:

1. Programmes addressing paramedic mental health should be made available to all roles and locations of the paramedic workforce.
2. Tools be made available for ambulance service employees to assess their own mental health. Access to mental health professionals could be provided, but there

are also a number of evidence based online options that paramedics could be encouraged to use. Possible online options include MyCompass which is available from the Black Dog Institute, and Beyond Blue.

E5 Sources of Stress for Paramedics Across the Workforce

A key finding of the present study was that the predictor 'Emergency work' was only significantly associated with DASS21 anxiety scores. 'Emergency work' was not significantly associated with the other mental health outcomes investigated in this thesis. However, while it is the case that traumatic stressors affect mental health, it is the long-term effects of stressors from the social aspects of the total workplace environment in which paramedics work that is associated with mental health outcomes (van der Ploeg & Kleber, 2003). This is because the ongoing experience daily stressors renders paramedics more vulnerable to negative mental health outcomes and increases the risk of developing PTSD when exposed to traumatic stressors (Epstein et al, 1998; Maes et al., 2001).

Examination of individual sources of paramedic stress indicate that some of them may be amenable to being managed to decrease the frequency with which they occur, and their subsequent mental health effects. Examples of stressors that could be amendable to management are things such as missing meals, having no say in decisions that affect my work, and ramping at hospitals. While it might be possible to manage stressors from the social environment of the workplace, it is not necessarily easy to achieve. Some stressors would be very difficult to manage, such as abuse from patients, patients who abuse the ambulance system (e.g. by insisting on being transported when it is not medically necessary), and hospital by-pass. Nevertheless, the case can be made that some of the stressors paramedics experience would be amenable to being managed and their effects ameliorated.

E5.1 Recommendations on Dealing with Paramedic Sources of Stress

It is recommended that:

1. Events that are sources of stress for paramedics be regularly verified, as they may change over time and in relation to organisational changes.
2. Individual sources of stress should be examined for their ability to be managed and for the frequency of their occurrence be reduced.
3. The impact of individual stressors and the frequency with which they occur should be regularly monitored so that that the effectiveness of efforts to manage them can be established.