



**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

THESIS

**SUICIDE IN THE FIRE SERVICE: SAVING THE LIVES
OF FIREFIGHTERS**

by

Steven C. Heitman

March 2016

Thesis Advisor:
Co-Advisor

Fathali Moghaddam
Robert Simeral

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) WashingtonDC20503.				
1. AGENCY USE ONLY <i>(Leave blank)</i>		2. REPORT DATE March 2016	3. REPORT TYPE AND DATES COVERED Master's thesis	
4. TITLE AND SUBTITLE SUICIDE IN THE FIRE SERVICE: SAVING THE LIVES OF FIREFIGHTERS			5. FUNDING NUMBERS	
6. AUTHOR(S) Steven C. Heitman				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			10. SPONSORING/ MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number ____N/A____.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200words) The goal of this thesis was to determine whether post-traumatic stress disorder (PTSD) and firefighter suicide are on the rise in the U.S. fire service and how fire chiefs can implement programs to curb PTSD-related firefighter suicide. The research was limited, however, by imprecise statistics on PTSD and suicide in the fire service, caused in part by the firefighter culture. To work toward a proactive solution, this research examined current, effective mental health programs that can be utilized in-house by fire departments, including Critical Incident Stress Debriefing, Psychological First Aid, and Stress First Aid. Research on professional mental health focused on therapies used by the Department of Veterans Affairs, including psychotherapy, medication, and eye movement desensitization and reprocessing. Through a critical review of available programs, this thesis identifies best practices for collecting accurate firefighter suicide data, and suggests development of a tiered approach to decrease PTSD and firefighter suicide. A limitation of the research was the inability to verify results of a firefighter being "cured" of PTSD.				
14. SUBJECT TERMS suicide, post-traumatic stress disorder, PTSD, firefighter, fire service, mental illness, mental health, Stress First Aid (SFA), Psychological First Aid (PFA), Critical Incident Stress Debriefing (CISD), cognitive behavioral therapy (CBT), trauma, stress, Interpersonal Theory of Suicide (ITS), Firefighter Behavioral Health Association (FBHA), National Fallen Firefighters Foundation (NFFF)			15. NUMBER OF PAGES 97	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU	

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

SUICIDE IN THE FIRE SERVICE: SAVING THE LIVES OF FIREFIGHTERS

Steven C. Heitman
Fire Chief, Mercer Island Fire Department, Washington
B.S., Grand Canyon University, 2011

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES
(HOMELAND SECURITY AND DEFENSE)**

from the

**NAVAL POSTGRADUATE SCHOOL
March 2016**

Approved by: Fathali Moghaddam
Thesis Advisor

Robert Simeral
Thesis Co-Advisor

Erik Dahl
Associate Chair of Instruction,
Department of National Security Affairs

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

The goal of this thesis was to determine whether post-traumatic stress disorder (PTSD) and firefighter suicide are on the rise in the U.S. fire service and how fire chiefs can implement programs to curb PTSD-related firefighter suicide. The research was limited, however, by imprecise statistics on PTSD and suicide in the fire service, caused in part by the firefighter culture. To work toward a proactive solution, this research examined current, effective mental health programs that can be utilized in-house by fire departments, including Critical Incident Stress Debriefing, Psychological First Aid, and Stress First Aid. Research on professional mental health focused on therapies used by the Department of Veterans Affairs, including psychotherapy, medication, and eye movement desensitization and reprocessing. Through a critical review of available programs, this thesis identifies best practices for collecting accurate firefighter suicide data, and suggests development of a tiered approach to decrease PTSD and firefighter suicide. A limitation of the research was the inability to verify results of a firefighter being “cured” of PTSD.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	THE PROBLEM SPACE: PTSD AND FIREFIGHTER SUICIDE	1
B.	RESEARCH QUESTION	3
C.	RESEARCH DESIGN	3
1.	Limits	3
2.	Data Sources	4
3.	Type and Mode of Analysis.....	4
4.	Output	5
II.	LITERATURE REVIEW	7
A.	FIREFIGHTER CULTURE	8
B.	POST-TRAUMATIC STRESS DISORDER (PTSD).....	9
1.	Signs of PTSD and Comorbidity	9
2.	Prevalence of PTSD and Suicide	10
3.	Suicide in the Fire Service.....	12
C.	TREATMENT, INTERVENTION, AND PREVENTION	13
1.	Critical Incident Stress Debriefing.....	13
2.	Psychological First Aid.....	14
D.	CONCLUSION	15
III.	POST-TRAUMATIC STRESS DISORDER AND THE FIRE SERVICE.....	17
A.	DEFINING PTSD	17
1.	Signs and Symptoms	17
2.	Behavioral Health Issues	19
3.	Potential Causes	22
4.	The Costs.....	25
5.	Why Some Develop PTSD and Others Do Not.....	27
B.	NATIONAL FIREFIGHTER SUICIDE	29
C.	IS THERE A CAUSAL CONNECTION?.....	31
D.	IDENTIFYING FIREFIGHTER RISK.....	33
IV.	CURRENT PTSD TREATMENT OPTIONS.....	41
A.	PSYCHOLOGICAL FIRST AID	41
B.	STRESS FIRST AID FOR FIREFIGHTERS AND EMS PERSONNEL	43

C.	CRITICAL INCIDENT STRESS MANAGEMENT AND CRITICAL INCIDENT STRESS DEBRIEFING	48
D.	JOINT MILITARY SERVICES AND THE DEPARTMENT OF VETERANS AFFAIRS PROGRAMS	51
1.	Cognitive Processing Therapy	52
2.	Prolonged Exposure.....	52
3.	Eye Movement Desensitization and Reprocessing	53
4.	Medication	54
E.	GATEKEEPER TRAINING FOR SUICIDE PREVENTION.....	55
V.	FINDINGS AND RECOMMENDATIONS	57
A.	FINDINGS.....	57
B.	RECOMMENDATIONS.....	59
C.	CONCLUSION	61
	APPENDIX A. DSM-IV-TR CRITERIA FOR PTSD.....	63
	APPENDIX B. EMPIRICALLY DEMONSTRATED RISK FACTORS FOR SUICIDE.....	65
	LIST OF REFERENCES	69
	INITIAL DISTRIBUTION LIST	77

LIST OF FIGURES

Figure 1.	PTSD Rates by Group.....	11
Figure 2.	Transition from Ideation to Suicide	23
Figure 3.	Firefighter Suicides by Year	30
Figure 4.	Constructs of Suicide	35
Figure 5.	Suicide Warning Signs Mnemonic	38
Figure 6.	Stress Continuum Model.....	45
Figure 7.	Stress First Aid Model	47

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	Direct and Indirect Costs of Employees with PTSD	26
Table 2.	Physical Costs of Employees with PTSD	27

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

APA	American Psychological Association
ARC	American Red Cross
CBT	cognitive behavioral therapy
CISD	Critical Incident Stress Debriefing
CISM	Critical Incident Stress Management
DOD	Department of Defense
DSM	<i>Diagnostic and Statistical Manual of Mental Disorders</i>
DVA	Department of Veteran Affairs
EMDR	eye movement desensitization and reprocessing
EMS	emergency medical services
FBHA	Firefighter Behavioral Health Alliance
FLSI	Firefighter Life Safety Initiative
FPC	firefighter peer counselor
ITS	interpersonal theory of suicide
LODD	line of duty death
NFFF	National Fallen Firefighters Foundation
NFPA	National Fire Protection Association
NICE	National Institute for Health and Care Excellence
NIMH	National Institute of Mental Health
NVFC	National Volunteer Fire Council
PCL	PTSD checklist
PE	prolonged exposure
PFA	Psychological First Aid
PTSD	Post-Traumatic Stress Disorder
SCM	Stress Continuum Model
SFA	Stress First Aid
USFA	United States Fire Administration

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

Firefighters play an essential role in the Department of Homeland Security’s mission to respond to and recover from emergencies and disasters. In order to bear the responsibilities of this role, firefighters must meet high standards of preparedness both physically and mentally. As time in this mission wears on, the diagnosis of post-traumatic stress disorder (PTSD) has become more prominent in the fire service and seems to be associated with a rising trend in firefighter suicide over the last 10 years; 2014 and 2015 were record years for the number of firefighter deaths by suicide in the United States.¹

PTSD in firefighters occurs about three to five times more than in the general population—one factor that explains the higher rates of suicide.² Firefighters are routinely exposed to physical and mental trauma while completing their duties, but the fire service culture is to “suck it up” and not acknowledge these traumatic events’ psychological and physical toll. Any discussion of mental health is taboo to the firefighter, so the subject of suicide remains neglected. Lack of accurate data makes determining the problem’s severity even more difficult; since suicide tends to be a private issue, commonly associated with shame, it remains underreported.

This thesis was written in order to determine how fire chiefs can address PTSD and firefighter suicide to break the cycle of increasing suicidal events. The main research is published studies by mental health experts and information from agencies such as the U.S. Department of Veterans Affairs, National Institute of Mental Health, International Association of Fire Chiefs, National Volunteer Fire Council, and the Firefighter Behavioral Health Alliance.

The causes of PTSD vary and are often associated with exposure to acute trauma events such as 9/11, military combat, and Hurricane Katrina, as well as recurrent trauma such as that routinely experienced by firefighters. PTSD diagnosis of firefighters is on the

¹ Jeff Dill, “Firefighter Behavioral Health Alliance,” accessed January 31, 2016, <http://www.ffbha.org/>.

² Kevin S. Del Ben et al., “Prevalence of Posttraumatic Stress Disorder Symptoms in Firefighters,” *Work & Stress* 20, no. 1 (March 2006): 37–48.

rise, but PTSD by itself does not cause a person to commit suicide. The process leading to suicide often includes PTSD, but is also commonly combined with other comorbid issues such as depression, substance abuse, anxiety, and mental illness. In order to understand this process better, the Interpersonal Theory of Suicide is used to identify the elements that cause a firefighter to commit suicide. Using this theory, firefighters who are suffering from PTSD and are susceptible to suicide can be more easily identified.

It is incumbent upon fire chiefs to institute policy and programs designed to decrease the number of firefighters who suffer from PTSD, and in turn the number who commit suicide. Programs such as Psychological First Aid, Stress First Aid, and Critical Incident Stress Debriefing have been developed to help individuals develop better coping skills when faced with traumatic situations. The DVA has been very successful through treatments based upon psychotherapy, medication, and eye movement desensitization and reprocessing.³

The research strongly suggests that the number of firefighter suicides related to PTSD, as well as the number of PTSD diagnoses, can be decreased through a program based upon policy and process. Peer support needs to be provided through the establishment of a Stress First Aid program, and supported by access to mental health professionals. In order to achieve this goal, reporting firefighter suicides to a central collection point must become mandatory throughout the United States. Mental health training in the fire service must receive as much emphasis and commitment as physical training in every fire department. As demonstrated by several academic research studies, as well as by the Joint Military Services and DVA, successful treatment of PTSD, and therefore potential suicide, is possible and should be applied to suffering firefighters.

Firefighters have dedicated their lives to saving others and ensuring public safety. There are enormous benefits to establishing a mental-health training program designed to prevent PTSD and suicide in the fire service. Inaction in this area is too costly. This will require a cultural change within the fire service and must be endorsed by fire chiefs at the federal, state, and local levels to be successful.

³ National Center for PTSD, "Understanding PTSD Treatment," August 2013, http://www.ptsd.va.gov/public/understanding_TX/booklet.pdf.

ACKNOWLEDGMENTS

I would like to thank my wife, Darla, who inspires me more than she knows, and my amazing children for their consistent support throughout the 18 months of the CHDS master's program. I appreciate your constant words of encouragement and your understanding of my crazy schedule that was split between family, school, and work. I could not have successfully completed this program without all of you.

I would also like to thank Noel Treat, former city manager for the City of Mercer Island, who fully supported my participation in this program and had the confidence to promote me to fire chief during my first in-residence period. I would like to acknowledge the support and encouragement of Assistant Fire Chief of the Seattle Fire Department Jay Hagen, who introduced me to the program and was a positive inspiration. Thanks to Brent Swearingen, deputy chief of operations at the Valley Regional Fire Authority, who participated in cohort 1403/1404, and was always willing to share his knowledge and insight. Thank you to the members of the Mercer Island Fire Department for their understanding of the CHDS program's demands and their support of my participation. And thank you to Fire Chief Chris Tubbs of South Marin Fire, my mentor and friend, who pushed me to continually seek education and prepared me to be a fire chief.

Finally, I would like to thank Fathali Moghaddam and Capt. Robert Simeral (Ret), who were my thesis advisors. Their wisdom and insight on the topic of PTSD and suicide inspired me to push forward and write this thesis while guiding me through the process.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. THE PROBLEM SPACE: PTSD AND FIREFIGHTER SUICIDE

In order for firefighters to effectively perform their duties, especially those duties related to homeland security, a better understanding of their increasing suicide rates and the relationship to Post Traumatic Stress Disorder (PTSD) is required. The study of what is now referred to as PTSD first took shape during World War I, and was commonly referred to as “shell shock.” During World War II, the designation was changed to a condition known as “combat fatigue,” and was finally recognized as PTSD in 1980 by the American Psychological Association (APA).

The diagnosis of PTSD has become more visible for firefighters, and is the subject of much discussion and research. Firefighters, paramedics, and emergency medical technicians (EMTs) are exposed to both physical and psychological trauma daily while answering emergency calls. This trauma may be from any kind or degree of exposure: treating a burn victim whose hands de-glove (skin sloughs off), witnessing a fractured femur that is protruding through the skin, or responding to an unsuccessful suicide attempt via a shotgun in the mouth. Knowing a patient’s backstory can also take an emotional toll; take, for example, a mother who is washing windows on the third floor when she loses her balance and falls to the ground below. When firefighters arrive on scene, she is conscious and conversing, asking them to tell her family that she loves them. Though she has sustained no obvious injuries, she expires at the hospital due to internal injuries and bleeding. It is up to the firefighters to inform her family. All of this can take a toll on a firefighter’s well-being over time.

Firefighters repeatedly take risks the majority of the population would never venture even once.¹ The fire service’s culture is for its members to “suck it up” and not acknowledge when these traumatic events affect them on an emotional level. As noted by Dill and Loew, one of the key elements of the firefighter’s job is acting in a professional

¹ Jeff Dill and Cheryl Loew, *Suicide in the Fire and Emergency Services* (Geenbelt, MD: National Volunteer Fire Council, 2012).

manner despite seeing people during their most traumatic times.² This historical culture is developed out of a “brotherhood”³ of firefighters who depend on each other for much of their emotional stability after being exposed to severe trauma. For many, admitting the need for help with a mental or behavioral issue carries a social stigma that many feel may hurt their reputation or pride.⁴ Despite, or possibly because of, this cultural barrier, several studies indicate that firefighters and other emergency workers have a higher prevalence of PTSD than the general population.⁵ PTSD among emergency workers ranges from 7 percent to 22 percent in several studies from around the world.⁶ According to Del Ben and his co-authors, this wide variance was most likely due to the use of varied measures (mainly self-reporting), different cut-off scores, and samples or events that had little in common.⁷ In order to find a more consistent and accurate measure of the percentage of firefighters with PTSD, Del Ben and his co-authors used a PTSD checklist (PCL) that was consistent with criteria in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) (see Appendix A for DSM-IV criteria).⁸ By using the PCL, they found a more accurate PTSD prevalence rate of 5 percent, which is lower than rates found in other studies yet still far higher than in the general population.⁹

² Ibid.

³ This brotherhood includes both men and women—women now make up 4.8 percent of the firefighter population. David R. Hollenbach III, “Women in the Fire Service: A Diverse Culture Leads to a Successful Culture,” *Fire Engineering*, April 25, 2014, <http://www.fireengineering.com/articles/print/volume-167/issue-4/features/women-in-the-fire-service-a-diverse-culture-leads-to-a-successful-culture.html>.

⁴ “Bringing PTSD out of the Shadows,” *Fire Fighter Quarterly*, Winter 2015, <http://www.iaff.org/mag/2015/01/html5/>.

⁵ Shannon L. Wagner, Juanita A. McFee, and Crystal A. Martin, “Mental Health Implications of Fire Service Membership,” *Traumatology* 16, no. 2 (2010), 26–32.

⁶ Ibid.

⁷ Del Ben et al., “Prevalence of Posttraumatic Stress Disorder Symptoms in Firefighters,” 37.

⁸ Ibid. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM) was first published by the American Psychiatric Association in 1952, with the diagnosis of PTSD introduced in the third edition in 1980. The DSM is now in its fifth edition.

⁹ Ibid.

B. RESEARCH QUESTION

This thesis seeks to answer the following question: When it comes to PTSD in firefighters, what can fire service leaders do to break the cycle that leads to suicide? The subquestions include:

- Are PTSD and firefighter suicide on the rise?
- Is there a causal connection between PTSD and suicide for firefighters signified by rate changes?
- What is PTSD and how is it impacting the fire service?
- Can the interpersonal theory of suicide (ITS) be used in training peer supporters to identify firefighters who may be at risk?
- What are some of the current programs available for the treatment of PTSD, and what programs have the Joint Military Services and Department of Veterans Affairs instituted to treat PTSD?

C. RESEARCH DESIGN

The object of this research is to further study and examine the growing diagnosis of PTSD in the fire service and the potential path leading to suicide. In addition, this thesis touches on elements of PTSD that can have significant impacts on firefighters, including mental health, substance abuse, behavioral problems, and anger management.

1. Limits

This study will not address “why” firefighters are committing suicide. This would require outside in-depth studies, set up and evaluated by trained psychological professionals, and is beyond the scope of this research. Although many outcomes of PTSD, such as substance abuse, behavioral issues, and anger management, may be involved in firefighter suicide (and treatment of these outcomes may aid prevention), they are not part of the main inquiry. Another limitation is the data available on firefighter suicides. There is not a strong link between suicide and occupation, which is because occupation is not commonly noted on a death certificate. Most of the information that is known is because the affected fire department reports it to organizations such as

the Firefighter Behavioral Health Alliance (FBHA). Another limitation of this research is the inability to verify results of a firefighter being “cured” of PTSD.

2. Data Sources

The vast majority of the data for this research paper came from literature. The National Fallen Firefighters Foundation (NFFF) has brought focus and emphasis to this issue as part of their 16 Firefighter Life Safety Initiatives (FLSI).¹⁰ Firefighter suicide is part of FLSI 13, *Psychological Support*, which is designed to provide firefighters, emergency medical services (EMS) personnel, and their families with the resources necessary to deal with the various complications brought on by their jobs, especially regarding emotional and psychological stress.¹¹ There are also reports that show the statistics of firefighter suicide, possible treatment options, and the effectiveness of various treatments. Much of this information is in relation to the efforts of the NFFF in meeting FLSI 13.

3. Type and Mode of Analysis

Much of the research for answering the thesis question was derived from meta-analysis of known data and studies of PTSD and suicide. In order to determine the impacts of PTSD on the fire service, analysis of existing reports and studies that have been conducted by agencies such as the National Institute of Mental Health (NIMH), the Department of Veterans Affairs (DVA), the International Association of Fire Chiefs, and the National Volunteer Fire Council (NVFC) were conducted. This information helps to answer questions about the behavioral health issues of PTSD, potential causes, and associated costs.

The interpersonal theory of suicide (ITS) was utilized in this thesis to understand what leads a person to commit suicide. According to this theory, repeated exposure to trauma that may be physically painful or fear-inducing can lead to suicide, or suicidal

¹⁰ National Fallen Firefighters Foundation, “16 Firefighter Life Safety Initiatives,” Everyone Goes Home, accessed January 31, 2016, <http://www.everyonegoeshome.com/16-initiatives/>.

¹¹ National Fallen Firefighters Foundation, “Psychological Support,” Everyone Goes Home, accessed January 20, 2016, <http://www.everyonegoeshome.com/16-initiatives/13-psychological-support/>.

behaviors.¹² The ITS was also used to help determine if there are distinct patterns to identify the potential warning signs of suicide among firefighters. The application of this theory may provide keen insight into breaking the chain leading from PTSD to suicide.

Some of the potential patterns for identifying suicide trends may come from statistical data or studies. Another potential cause to examine is if hiring veterans aligns with the prevalence of PTSD. If this is the case, the firefighter may have developed the root causes of PTSD in another environment, but they finally manifested from the constant exposure to trauma in the fire service.

This thesis also analyzes programs that have been developed by the military to deal with PTSD, such as the U.S. Marine Corps Combat Operational Stress First Aid Program. This program has been adapted by the NFFF and is known as “Stress First Aid for Firefighters and EMS Personnel.”¹³ In this thesis, Psychological First Aid and Critical Incident Stress Debriefings are evaluated for their effectiveness at a non-clinical level. In addition, military treatments such as cognitive behavioral therapy, medication therapy, eye movement desensitization and reprocessing, and gatekeeper training are analyzed through published studies on effectiveness.

4. Output

The goal of this research is to strengthen the ability to identify early symptoms of firefighters suffering from PTSD at the department level, and disrupt the process that leads to suicide. This can be accomplished creating policy that institutes mental health training and a graduated process for obtaining mental health care, and by requiring mandatory reporting of firefighter suicides. Another goal of this thesis is to validate if firefighter suicide is increasing and, if so, discerning its identifiable patterns or signs. Because we know that PTSD is a problem in the fire service, this research can be used to decrease the negative impacts on PTSD sufferers in our firefighting ranks.

¹² Kimberly A. Van Orden et al., “The Interpersonal Theory of Suicide,” *Psychological Review* 117, no. 2 (April 2010): 575–600, doi: 10.1037/a0018697.

¹³ The National Fallen Firefighters Foundation, *Confronting Suicide in the Fire Service: Strategies for Intervention and Prevention* (Emmitsburg, MD: National Fallen Firefighters Foundation, 2014), <http://www.everyonegoeshome.com/2014/12/02/suicides-preventable-reaching-vulnerable/>.

THIS PAGE INTENTIONALLY LEFT BLANK

II. LITERATURE REVIEW

Firefighting is a dangerous, stressful, and rewarding career that requires its members to be at their very best both physically and mentally. Because of the physicality of the work, physical fitness has been ingrained as part of the firefighter culture. The story is not the same for mental fitness. Due to the nature of this industry, firefighters are exposed to situations that include devastating single events, or multiple traumatic events over time. These types of exposures can have a significant detrimental impact on their mental health. The reaction to these stressors is different for everyone and can manifest both psychologically and physiologically.¹⁴ For a firefighter who commonly faces the prolonged or repeated exposure to such events, there can be a higher risk of behavioral health issues that can be incapacitating and/or lead to suicide.¹⁵ The International Association of Fire Chiefs, the International Association of Fire Fighters, Firefighter Behavioral Health Alliance (FBHA), and the National Volunteer Fire Council (NVFC) have brought a new and intense focus to this issue due to the perceived increase in firefighter suicides in recent years. In the *American Journal of Psychiatry*, Fullerton, Ursano, and Wang noted that anxiety and PTSD are predominant behavioral issues among firefighters and should comprise a large area of investigation.¹⁶

This literature review explores published research that examines the rate of suicide among firefighters related to the effects of PTSD. These sources help determine how firefighter culture plays a role in PTSD, how PTSD is defined, the associated signs and comorbidity, the prevalence of PTSD and suicide in the fire service, and some of the available treatment, intervention, and prevention solutions.

¹⁴ Dill and Loew, *Suicide in the Fire and Emergency Services*.

¹⁵ *Ibid.*, 4.

¹⁶ C. S. Fullerton, R. J. Ursano, and L. Wang, "Acute Stress Disorder, Posttraumatic Stress Disorder, and Depression in Disaster Rescue Workers," *American Journal of Psychiatry* 161, no. 8 (2004): 1370–76.

A. FIREFIGHTER CULTURE

The United States' fire service is known within its own ranks for its unofficial motto of "200 hundred years of tradition unimpeded by progress." The concept of brotherhood is pervasive throughout the fire service and is a foundational part of the culture.¹⁷ This bond emphasizes the criticality of belonging and how it is amplified among firefighters.¹⁸ A distinct element of this culture is refusing to show weakness and instead trying to live up to the image of being a hero. Because of this perception, firefighters generally do not talk about suicide.¹⁹

Being a firefighter involves risk. Firefighters routinely respond to incidents involving severe trauma or death, including suicide. The risks they face are more varied than ever before; they can be exposed to cancer-causing chemicals and mass casualty incidents, and can even be targets of active shooters.²⁰ With all of these risks have come increased emotional stressors. Fire service leaders need to understand, train, and help firefighters deal with not only stressors associated with their work, but also those associated with their environment outside of work.²¹ Examples of outside stressors can include family, finances, or issues from secondary careers worked on their off-time. Although stress from these issues is not directly related to their work as a firefighter, there may be bleed over, which can add to their stress at work. In addition, fire service leaders are hiring a new breed of firefighters that are more technologically advanced, do not have a long family history of firefighting, and are more willing to talk about their

¹⁷ Fred Crosby, "The Real Meaning of Brotherhood," *Fire Engineering*, July 1, 2007, <http://www.fireengineering.com/articles/print/volume-160/issue-7/features/the-real-meaning-of-brotherhood.html>.

¹⁸ Richard Gist, Vicki H. Taylor, and Scott Raak, "Suicide Surveillance, Prevention, and Intervention Measures for the U.S. Fire Service: Findings and Recommendations for the Suicide and Depression Summit," presented at the Suicide and Depression Summit, Baltimore, MD, July 2011, 14, http://www.naemt.org/docs/default-source/ems-health-and-safety-documents/mental-health-grid/suicide_white_paper_feb_1.pdf?sfvrsn=2. Richard Gist is the principal assistant to the director of the Kansas City (Missouri) Fire Department and a faculty member in the Department of Preventive Medicine at Kansas City University of Medicine and Biosciences.

¹⁹ Paul J. Antonellis Jr. and Denise Thompson, "A Firefighter's Silent Killer: Suicide," *Fire Engineering*, December 1, 2012, <http://www.fireengineering.com/articles/print/volume-165/issue-12/features/firefighters-silent-killer-suicide.html>.

²⁰ Janet A. Wilmoth, "Trouble in Mind," *NFPA Journal*, May–June 2014: 1–9.

²¹ Dill and Loew, *Suicide in the Fire and Emergency Services*, 6.

feelings.²² All of these cultural factors play a role in the potential development of PTSD and—ultimately—possible suicide.

B. POST-TRAUMATIC STRESS DISORDER (PTSD)

Dill and Loew describe PTSD as a fight between the body and mind; the body tries to keep the memories inside, while the mind tries to release those memories it perceives as painful. Eventually, the results of this self-battle can cause the individual to lose his or her ability to function on a daily basis, struggling with issues such as sleeping, eating, or performing simple tasks.²³ Unlike in most psychiatric illnesses, in a PTSD diagnosis the greatest importance is placed upon the cause, known as the “traumatic stressor.”²⁴ Everyone has a different capacity to cope with trauma-induced stress; though most people who experience trauma do not develop PTSD, those who are diagnosed can face crippling symptoms.²⁵ As noted by master’s student Cherie Penn, discussing a *Journal of Public Health Policy* article, “Regarding occupations in the military, police, fire, and emergency service workers, PTSD is probably the single most important psychiatric condition arising in these occupational settings.”²⁶

1. Signs of PTSD and Comorbidity

PTSD is not a stand-alone condition. Rather, it is an amalgamation of signs and symptoms, often accompanied by other mental health issues such as depression, substance abuse, or anger issues.²⁷

²² Ibid.

²³ Ibid., 8.

²⁴ Matthew J. Friedman, “PTSD History and Overview,” Department of Veterans Affairs, last modified August 17, 2015, 1, <http://www.ptsd.va.gov/professional/PTSD-overview/ptsd-overview.asp>.

²⁵ Ibid.

²⁶ Cherie A. Penn, “Substance Testing in the Fire Service: Making Public Safety a Matter of National Policy” (master’s thesis, Naval Postgraduate School, 2014), 9; see Alexander McFarlane, Penny Williamson, and Christopher A. Barton, “The Impact of Traumatic Stressors in Civilian Occupational Settings,” *Journal of Public Health Policy* 30, no. 3 (2009): 311–27. (311).

²⁷ NICE, “Post-Traumatic Stress Disorder: Management,” March 2005, <http://www.nice.org.uk/guidance/cg26>.

According to the National Institute for Health and Care Excellence (NICE), “the most characteristic symptoms of PTSD are re-experiencing symptoms,” such as flashbacks (painful memories) or nightmares.²⁸ Another core symptom of PTSD is evading anything that may act as reminder of the trauma, such as people, situations, or conditions.²⁹ Other symptoms that are commonly comorbid with PTSD are depression, substance abuse (both drugs and alcohol), emotional numbing, or anger issues.³⁰ According to Dr. Laura Ferguson, medical director at Hazelden in Springbrook, Oregon, “52% of people diagnosed with lifetime PTSD were also diagnosed with alcohol abuse or dependence, which is two times more often than adults with no history of PTSD.”³¹

2. Prevalence of PTSD and Suicide

Although the symptoms of PTSD have been recorded for hundreds of years, especially during times of war, the diagnosis itself was not officially recognized until 1980, when the American Psychological Association (APA) included PTSD in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III) nosologic classification system.³² Only recently has PTSD been addressed as a result of combat exposure in military members, and this knowledge has now been transferred to study firefighters.³³ There is increasing concern throughout the fire service about the growing number of firefighter suicides that may be a result of PTSD. The number of New York firefighters suffering from PTSD as a result of 9/11 has also highlighted this issue, especially in relation to a seminal event. A 2012 Canadian study of paramedics showed PTSD prevalence at 16–24 percent among medics, a 2014 BMC Emergency Medicine study found 16 percent prevalence in South African paramedics, and a U.K. study found

²⁸ NICE, “Post-Traumatic Stress Disorder: Management.”

²⁹ Ibid.

³⁰ Ibid., 28. Comorbidity refers to medical conditions that are present simultaneously.

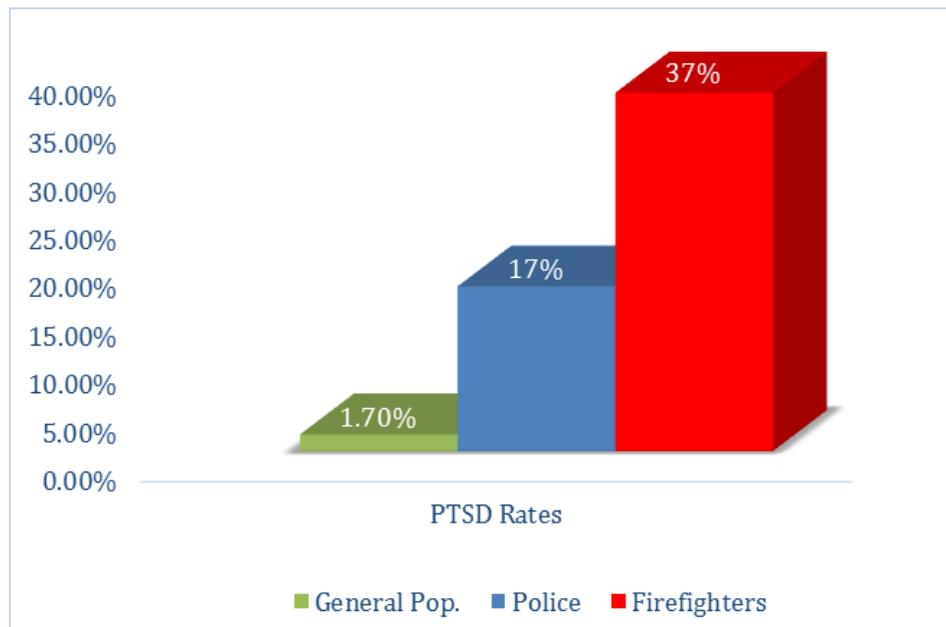
³¹ Laura Ferguson, “Treatment of Trauma in Healthcare,” Federation of State Physical Health Programs, 2014, 6, <http://www.fsphp.org/Ferguson%20Presentation.pdf>.

³² Yuval Neria, Laura DiGrande, and Ben G. Adams, “Posttraumatic Stress Disorder Following the September 11, 2001, Terrorist Attacks: A Review of the Literature among Highly Exposed Populations,” *American Psychology* 66, no. 6 (June 29, 2012): 2.

³³ Brian Meroney, “Dealing with PTSD in the Fire Service,” *Firefighter Nation*, accessed May 29, 2015, <http://www.firefighternation.com/article/management-and-leadership/dealing-ptsd-fire-service>.

the prevalence for PTSD among emergency responders at 22 percent, while the APA shows the general populace with symptoms of PTSD at about 3.6 percent.³⁴ These high numbers are supported by the National Institute of Health, which shows the general population at 1.9 percent, and firefighters—along with other rescue workers exposed to human disaster—at 17 percent.³⁵ In a journal article for the National Fire Protection Association (NFPA), Wilmoth found the number of emergency responders suffering from PTSD symptoms at 37 percent (see Figure 1).³⁶ Compare this to the United States military, which found that the number of veterans suffering from PTSD ranges from 11–30 percent, depending on area of combat.³⁷

Figure 1. PTSD Rates by Group



Adapted from Janet A. Wilmoth, “Trouble in Mind,” *NFPA Journal*, May–June 2014.

³⁴ John Erich, “Earlier Than Too Late: Stopping Stress and Suicide Among Emergency Personnel,” *EMS World*, November 1, 2014, 3, www.emsworld.com/article/12009260/suicide-stress-and-ptsd-among-emergency-personnel.

³⁵ Mary G. Carey et al., “Sleep Problems, Depression, Substance Use, Social Bonding, and Quality of Life in Professional Firefighters,” *Journal of Occupational Environmental Medicine* 53, no. 8 (November 1, 2012): 929.

³⁶ Wilmoth, “Trouble in Mind.”

³⁷ Department of Veterans Affairs, “How Common Is PTSD?” Last modified August 13, 2015, <http://www.ptsd.va.gov/public/PTSD-overview/basics/how-common-is-ptsd.asp>.

According to the FBHA, 358 confirmed firefighter suicides occurred between 1880 and 2011, with a sudden and dramatic increase starting in more recent years; of the 1.1 million career and volunteer firefighters in the United States, 79 occurred in 2012 and 69 in 2013.³⁸ The trend appears to be steadily rising, with 109 reported deaths by suicide in 2014 and 112 in 2015.³⁹

Other researchers, including Kimberly Van Orden, are not convinced that the numbers are actually increasing, but are more the result of an existing problem being brought to light.⁴⁰ Although there is an increased level of concern throughout the fire service, surprisingly little documentation occurs to record suicide frequency among firefighters.⁴¹ This is because death certificates do not often contain information related to occupation, which makes it difficult to find accurate numbers for firefighters that commit suicide. Compounding this issue is the fact the majority of American fire service personnel are volunteers, so occupation is often not reflected accurately, if at all. Lastly, some of those firefighters who commit suicide are retired, so even if occupation is listed, it may not reflect a previous career.⁴² Resultantly, it may be impossible to collect truly accurate information about the real prevalence of firefighter suicide.

3. Suicide in the Fire Service

The fire service has been shocked over the last ten years with reports of suddenly higher-than-normal suicide rates, especially in large metropolitan fire departments such as Chicago, Phoenix, New York, and Philadelphia.⁴³ Statistically, white males—the leading demographic among firefighters—commit 70 percent of all suicides.⁴⁴ Of male suicides, 70 percent are committed with firearms, whereas 80 percent of females use

³⁸ Jeff Dill, “Firefighter Behavioral Health Alliance,” accessed January 31, 2016, <http://www.ffbha.org/>.

³⁹ Ibid.

⁴⁰ Wilmoth, “Trouble in Mind.” Kimberly Van Orden is an assistant professor of psychiatry at the University of Rochester Medical Center.

⁴¹ Gist, Taylor, and Raak, “Suicide Surveillance, Prevention, and Intervention.”

⁴² Ibid.

⁴³ Ibid., 2.

⁴⁴ Dill and Loew, *Suicide in the Fire and Emergency Services*, 16.

poisoning or firearms.⁴⁵ As noted by Wilmoth and the FBHA, the highest prevalence of suicide is in the age range of 41–50, followed by 31–40, 18–30, and 51–60.⁴⁶

Gist, Taylor, and Raak, make a specific distinction that “suicide is not a *cause* of death, but is rather a *mode* of death.”⁴⁷ According to the website www.suicide.org, about 75 percent of people who commit suicide show some type of warning sign. The NVFC behavioral health survey identified strong associations between the potential for suicide and any combination of other mental health issues such as PTSD, substance abuse, stress, and depression.⁴⁸ Gist and his co-authors also found that firefighters are highly likely to develop a familiarity to pain and the predictability that death will occur, and therefore are more susceptible to the “capability for suicide” factor.⁴⁹

C. TREATMENT, INTERVENTION, AND PREVENTION

1. Critical Incident Stress Debriefing

In 1983, Dr. J. T. Mitchel, an expert in traumatic stress and professor of emergency health services at the University of Maryland, designed a technique used 48–72 hours after a traumatic event to help individuals talk about their experience, and designated this technique Critical Incident Stress Debriefing (CISD).⁵⁰ A critical incident is one that involves an unusually large amount of stress and can lead to an individual being overwhelmed emotionally.⁵¹ These incidents can include witnessing deaths in the

⁴⁵ Joshua De Leon, “Young Vets Are Three Times More Likely to Commit Suicide,” Ring of Fire, January 12, 2015, <http://ringoffireradio.com/2015/01/young-vets-are-three-times-more-likely-to-commit-suicide/>.

⁴⁶ Wilmoth, “Trouble in Mind.”

⁴⁷ “Cause of death is a judgment by the certifying authority (attending physician, medical examiner, or coroner) regarding the underlying disease process that led to the mechanism of death—the physiological conditions incompatible with life—that brought about the decedent’s final demise. Suicide is in fact a mode of death—one of four options the certifying authority declares to classify the death for legal purposes.” The options are: 1. Homicide; 2. Suicide; 3. Accident; and 4. Natural. Gist, Taylor, and Raak, “Suicide Surveillance, Prevention, and Intervention,” 2.

⁴⁸ Dill and Loew, *Suicide in the Fire and Emergency Services*.

⁴⁹ Gist, Taylor, and Raak, “Suicide Surveillance, Prevention, and Intervention,” 13.

⁵⁰ Jeffrey Hammond and Jill Brooks, “The World Trade Center Attack; Helping the Helpers: The Role of Critical Incident Stress Management,” *Critical Care* 5, no. 6 (November 6, 2001): 315–17.

⁵¹ *Ibid.*

line of duty (deaths of fellow firefighters), the death of a child, some type of mass casualty event, or a natural or man-made disaster.⁵²

In NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, two chapters were re-titled in the 2013 edition to, “Behavioral Health and Wellness Programs” and “Occupational Exposure to Atypical Stressful Events.”⁵³ During the NFPA revision of chapter 12, “Occupational Exposure to Atypical Events,” the topic of CISD and new research showing its potential ineffectiveness in use with first responders created some controversy.⁵⁴ There are also discussions about including mental health information for firefighters in NFPA 1582, *Comprehensive Occupational Medical Program for Fire Departments*, which would include a behavioral health component along with the annual fire service physical.⁵⁵

2. Psychological First Aid

Psychological First Aid (PFA) is a program designed for anyone involved in a traumatic event, with the intent of helping survivors cope with and recover from the emotional impact.⁵⁶ Designed as comprehensive treatment, PFA is run by the National Child Traumatic Stress Network and the National Center for PTSD through the DVA.⁵⁷ The program is designed to be run and managed by mental health professionals and other qualified or trained disaster response workers who may also be members of response units. Some of these units may include first responders, crisis response teams, health care

⁵² Ibid., 316.

⁵³ Wilmoth, “Trouble in Mind,” 6.

⁵⁴ Ibid., 8. “Based upon a public proposal submitted by Gist, CISD was removed from chapter 12 and made only minor mention of it in the chapter annex. Committee members believed, based upon the research and data they had before them, as well from their own experiences, that a different approach was needed to address fire department members and how the occupation could impact them. The CISD could be too intense for some responders, they said, arguing that a lower-key, more open-ended approach such as the “after-action-review” would work better for more people.”

⁵⁵ Ibid., 7.

⁵⁶ M. Brymer et al., *Psychological First Aid: Field Operations Guide*, 2nd edition (National Child Traumatic Stress Network and National Center for PTSD, 2006), 5, http://www.ptsd.va.gov/professional/manuals/manual-pdf/pfa/PFA_2ndEditionwithappendices.pdf.

⁵⁷ Brymer et al., *Psychological First Aid*, 5.

units, community organizations, other disaster relief organizations, and faith-based organizations.⁵⁸

D. CONCLUSION

PTSD in the fire service appears to be growing despite efforts to bring attention and treatment options to this cause. There is no definitive way to tell who will and who will not progress to PTSD through repeated exposure to trauma, through a single event or over time, nor through other circumstances in a firefighter's career. These circumstances may involve personal issues at home, a lost sense of belonging after retirement, or other underlying behavioral issues. PTSD is often comorbid with other behavioral issues such as alcoholism, drug addiction, or depression, and can lead to suicide. The good news is that there are treatment options available to help firefighters overcome PTSD before they become suicidal, and these treatments may also positively impact their other comorbidity issues. Unfortunately, one of the largest obstacles to treatment of PTSD is the firefighter culture, which encourages brotherhood and strength while inadvertently shunning weakness.

⁵⁸ Ibid., 5.

THIS PAGE INTENTIONALLY LEFT BLANK

III. POST-TRAUMATIC STRESS DISORDER AND THE FIRE SERVICE

A. DEFINING PTSD

The *Diagnostic and Statistical Manual of Mental Disorders* (DSM) was introduced by the APA in 1952 and was the first official manual to focus on clinical treatment of mental disorders.⁵⁹ Although the signs and symptoms of what is now known as PTSD have been recognized for roughly the last 150 years, especially during World War I from 1914 to 1918, it was not until more recently that official recognition was designated.⁶⁰ The APA first adopted PTSD as an official diagnosis in 1980, as part of DSM-III (DSM is currently in its fifth edition—DSM-V).⁶¹ The concept of PTSD was a unifying principle for investigators who were describing symptoms across a range of traumatic events, including syndromes stemming from child abuse, rape, battery, and combat.⁶² All of these syndromes, they noticed, though the event type differed, shared a number of similarities. As more information has been accumulated through scientific study since then, the criteria for diagnosis have been updated. In DSM-V, PTSD is no longer categorized as an “anxiety disorder” but is now in a new category, “trauma and stressor-related disorders,” alongside acute stress disorder, adjustment disorders, and other related diagnoses.⁶³

1. Signs and Symptoms

Signs of PTSD tend to be objective, while symptoms tend to be subjective. In other words, signs are what a doctor can see, while symptoms are what the patient

⁵⁹ American Psychological Association, “History of the DSM,” September 15, 2015, <http://psychiatry.org/psychiatrists/practice/dsm/history>.

⁶⁰ Matthew J. Friedman, Terence M. Keane, and Patricia A. Resick, eds., *Handbook of PTSD: Science and Practice*, Second (New York: Guilford Press, 2014).

⁶¹ Del Ben et al., “Prevalence of Posttraumatic Stress Disorder Symptoms in Firefighter..”

⁶² Friedman, Keane, and Resick, *Handbook of PTSD: Science and Practice*, 4.

⁶³ *Ibid.*, 7.

experiences.⁶⁴ Lower back pain, fatigue, or an upset stomach would only be known if the patient describes them, so they are often noted as symptoms. To add more confusion, some issues, such as a rash, can be both a sign and a symptom because both the patient and the doctor can notice it. For the purpose of this paper, signs and symptoms may be used interchangeably according to the type of information being presented.

The signs for PTSD vary greatly, and can be seen along with other mental or emotional issues. Some of the signs to watch for in firefighters include feelings of helplessness, negativity about the future, a change in the performance of daily activities, no feelings of joy or pleasure, a decrease in appetite or weight gain/loss, and inability to sleep.⁶⁵ For firefighters, sleep patterns are always an issue. This is due to a work schedule that requires working one to two 24-hour days in a row, while answering calls at all hours throughout each day. This is then followed by multiple days off with a normal sleep pattern, and leads to the body never really having the chance to adjust to either schedule. Compounding these problems is the fact that any or all of these signs could lead to more reckless behavior on the fire ground, which could endanger other firefighters as well.

With the publication of DSM-V, the behavioral symptoms of PTSD are now divided into four main categories, “re-experiencing, avoidance, negative cognitions and mood, and hyperarousal.”⁶⁶ According to the APA,

Re-experiencing covers spontaneous memories of the traumatic event, recurrent dreams related to it, flashbacks or other intense or prolonged psychological distress. Avoidance refers to distressing memories, thoughts, feelings or external reminders of the event. Negative cognitions and mood represent myriad feelings, from a persistent and distorted sense of blame of self or others, to estrangement from others or markedly diminished interest in activities, to an inability to remember key aspects of the event. Finally, arousal is marked by aggressive, reckless or self-

⁶⁴ Christian Nordqvist, “What Are Symptoms? What Are Signs?,” *Medical News Today*, September 8, 2014, <http://www.medicalnewstoday.com/articles/161858.php>.

⁶⁵ Beth Murphy, “Firefighter Suicide and Mental Illness,” FDIC International, September 2014, <http://www.fdic.com/articles/2014/09/beth-murphy-firefighter-suicide-and-mental-illness.html>.

⁶⁶ American Psychiatric Association, *Posttraumatic Stress Disorder* (Arlington, VA: American Psychiatric Publishing, 2013), 1, <http://www.dsm5.org/Documents/PTSD%20Fact%20Sheet.pdf>.

destructive behavior, sleep disturbances, and hyper vigilance or related problems.⁶⁷

Because they are usually constant, rather than being triggered by a memory of the trauma, hyperarousal symptoms can often lead a person to feel stressed or angry.⁶⁸ Sub-categories of hyperarousal were created to encompass the different onset times, which can be acute (within the first six months), chronic (longer than six months), or delayed (onset occurring beyond the initial six months).⁶⁹

With each version of the DSM, the APA has tried to provide better diagnostic guidance for clinicians dealing with patients that may be suffering from PTSD. As the APA describes,

The diagnostic criteria for DSM-V identify the trigger for PTSD as exposure to actual or threatened death, serious injury or sexual violation.

The exposure must result from one or more of the following scenarios, in which the individual: directly experiences the traumatic event; witnesses the traumatic event in person; learns that the traumatic event occurred to a close family member or close friend (with the actual or threatened death being either violent or accidental); or experiences first-hand repeated or extreme exposure to aversive details of the traumatic event (not through media, pictures, television, or movies, unless work-related).⁷⁰

One thing that is interesting to note in the DSM-V criteria is that PTSD is not the “physiological result of another medical condition, medication, drugs, or alcohol,” but these issues are listed prominently as comorbid with PTSD.⁷¹

2. Behavioral Health Issues

Substance Abuse. The World Health Organization defines substance abuse as “the harmful or hazardous use of psychoactive substances, including alcohol and illicit

⁶⁷ American Psychiatric Association, *Posttraumatic Stress Disorder*, 1.

⁶⁸ National Institute of Mental Health, “Post-Traumatic Stress Disorder (PTSD): What Is Post-Traumatic Stress Disorder (PTSD)?,” accessed January 31, 2016, <http://nimh.nih.gov/health/topics/post-traumatic-stress-disorder-ptsd/index.shtml>.

⁶⁹ Friedman, Keane, and Resick, *Handbook of PTSD: Science and Practice*, 5.

⁷⁰ American Psychiatric Association, *Posttraumatic Stress Disorder*, 1.

⁷¹ Ibid.

drugs.”⁷² Alcohol use is fairly common in the fire service, as demonstrated by a NVFC survey that found 42.5 percent of responding males and 60 percent of responding females had been involved with some type of binge drinking in the past 30 days.⁷³ One challenge for the fire service is, although pre-employment, post-incident, and reasonable suspicion substance testing exists, it is not a standardized practice throughout the fire service and therefore it is often not emphasized until late in the process.⁷⁴ Studies show that 30–50 percent of men and 25 percent of women diagnosed with PTSD have also at some point in their lives had a history of comorbid substance abuse or dependence.⁷⁵ Research has indicated a combination of PTSD and alcohol use creates a tenfold increase in the risk of suicide.⁷⁶ Alcohol can be a double-edged sword by both increasing the risk of suicide and acting as the method for committing suicide.⁷⁷

Depression. As stated previously, depression is often a comorbid symptom associated with PTSD. Major depressive disorder is still one of the most prevalent mental disorders, despite decades of research and treatment experience.⁷⁸ Recently renewed research is examining if depression may be linked to chronic infection—a prolonged or persistent invasion of the body by pathogens (viral or bacterial), that can be caused by any number of issues ranging from traumatic injury to periodontal disease, which involves a constant inflammatory response of the body.⁷⁹ This theory was first proposed

⁷² World Health Organization, “Substance Abuse,” accessed January 31, 2016, http://www.who.int/topics/substance_abuse/en/.

⁷³ Dill and Loew, *Suicide in the Fire and Emergency Services*, 10.

⁷⁴ Penn, “Substance Testing in the Fire Service.”

⁷⁵ Ernest J. Bordini, “Firefighter and First Responder Alcohol and Drug Issues Part I,” Mental Health, Clinical Psychology Associates, 2013, http://cpancf.com/articles_files/Firstresponderfirefighteralcoholdrugs1.asp. “Ernest J. Bordini, Ph.D., is a licensed psychologist more than 30 years of training and service in the evaluation and treatment of veterans, law enforcement officers and first responders. He is a member of the American Psychological Association Society of Military Psychology and a member of the City of Gainesville Violence Avoidance Task Force.”

⁷⁶ J. M. Violanti, “Predictors of Police Suicide Ideation,” *Suicide and Life-Threatening Behavior* 34, no. 3 (2004): 277–83.

⁷⁷ C. Ross, “Real Healing: Suicide: One of Addiction’s Hidden Risks,” *Psychology Today*, February 20, 2014, <http://www.psychologytoday.com/blog/real-healing/201402/suicide-one-addiction-s-hidden-risks>.

⁷⁸ Paul E. Holtzheimer and Charles B. Nemeroff, “Future Prospects in Depression Research,” *Dialogues in Clinical Neuroscience* 8, no 2 (June 2006): 175–89.

⁷⁹ *The Free Dictionary by Farlex*, s.v., “Chronic Infection,” accessed January 31, 2016, <http://medical-dictionary.thefreedictionary.com/chronic+infection>.

in 1907 by psychiatrist Henry Cotton when he began removing decaying teeth from his patients in the hope that they would be cured of their mental disorder.⁸⁰ Stressors from issues such as physical or sexual abuse, sleep deprivation, or grief, and not generally associated with an immune response, can in fact activate our immune system for weeks, months, or years.⁸¹ This could explain why firefighters, who are exposed to all of those stressors, have a higher propensity for developing PTSD that is comorbid with depression.

Suicide. More people die by their own hands than by those of another.⁸² This may come as a shock to some, since news stories highlight homicide. We likely do not hear about suicides as frequently because of suicide's negative social stigma. About 12 percent of the American populace admits to having thoughts of committing suicide in their lifetime, with about 5 percent actually attempting it, and 1.4 percent doing so successfully.⁸³ For white males, who make up the majority of personnel in the American fire service, suicide rates tend to suddenly increase in the early twenties.⁸⁴ As previously mentioned, white males are responsible for more than 70 percent of suicides in the U.S., with a firearm the preferred method of choice.⁸⁵ Moving from ideation of committing suicide to attempting it is more than twice as likely in individuals suffering from PTSD or conduct disorders.⁸⁶

⁸⁰ Bret Stetka, "Could Depression Be Caused by Infection?," *NPR*, October 25, 2015, http://www.npr.org/sections/health-shots/2015/10/25/451169292/could-depression-be-caused-by-an-infection?utm_source=npr_newsletter&utm_medium=email&utm_content=20151025&utm_campaign=news&utm_term=nprnews.

⁸¹ Stetka, "Could Depression Be Caused by Infection?"

⁸² Elizabeth Gudrais, "A Tragedy and a Mystery: Understanding Suicide and Self-Injury," *Harvard Magazine*, January–February (2011), <http://harvardmagazine.com/2011/01/tragedy-and-mystery>. This article was written based upon an interview with Dr. Matthew K. Nock, who is one of the foremost leading researchers on suicide and self-injury out of Harvard University.

⁸³ Gudrais, "A Tragedy and a Mystery."

⁸⁴ Thomas Joiner, Matthew Nock, and Lanny Berman, "Issues of Depression and Suicide in the Fire Service: Meeting Report," National Fallen Firefighters Foundation, July 11, 2011, http://1rxflr7bsmg1aa7h24arae91.wpengine.netdna-cdn.com/wp-content/uploads/sites/2/2014/01/depressionsuicide_summary.pdf.

⁸⁵ Joiner, Nock, and Berman, "Issues of Depression and Suicide."

⁸⁶ *Ibid.*

3. Potential Causes

According to the DVA, some of the more common causes of PTSD are combat exposure, child sexual or physical abuse, terrorist attack, physical/sexual assault, serious accident, or natural disaster.⁸⁷ Researchers at the National Institute of Mental Health (NIMH) are studying various areas of the brain to look for causes of PTSD in relation to memory formation. One area of study that has garnered attention is the amygdala, which plays a key role in forming memories, especially those involved in learning to fear an event.⁸⁸ Additionally, the prefrontal cortex plays a role in making decisions or solving problems, including suppressing the amygdala during a response to stress, which helps to decrease the original fear response.⁸⁹ If these areas of the brain were to be physically or chemically altered, this could potentially have a significant impact on whether or not a person develops PTSD.

Mental Illness. People are more likely to develop PTSD if they have experienced trauma that threatened their life, a history of abuse (physical or sexual), or mental health issues, including a family history of mental health problems.⁹⁰ PTSD was formerly classified as an anxiety disorder, but with the changes made in DSM-V is now in a new category, trauma and stressor-related disorders. To fall into this category, a person must have experienced some type of recognized trauma prior to the onset of the disorder.⁹¹ This category of mental illness covers a broad array of conditions that can appear alongside PTSD, such as depression, anxiety disorders, and substance abuse. Many people suffer from mental health concerns at one time or another, which is considered normal. A mental health concern crosses the threshold into mental illness, however, when the person's ability to function normally is compromised due to the ongoing signs and symptoms.⁹² Mental illness sets the stage for ideation of suicide. Among the U.S.

⁸⁷ Department of Veterans Affairs, "How Common Is PTSD?"

⁸⁸ National Institute of Mental Health, "Post-Traumatic Stress Disorder (PTSD)."

⁸⁹ Ibid.

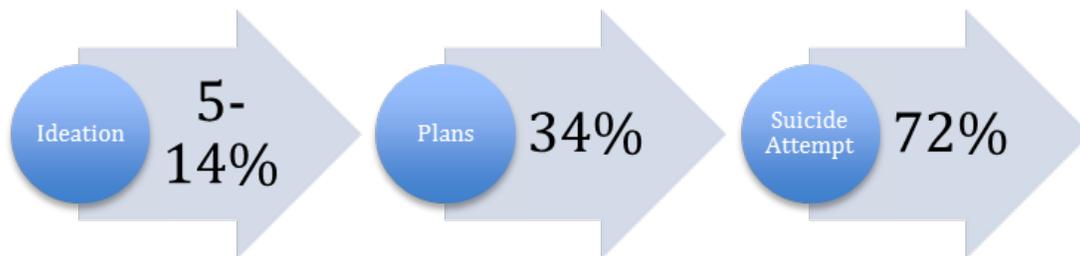
⁹⁰ Department of Veterans Affairs, "How Common Is PTSD?"

⁹¹ Friedman, "PTSD History and Overview," 2.

⁹² Mayo Clinic, "Diseases and Conditions: Mental Illness," October 13, 2015, <http://www.mayoclinic.org/diseases-conditions/mental-illness/basics/definition/con-20033813>.

population, “lifetime prevalence for ideation has generally been found to range from 5–14%; 34% of those with ideation form plans and 72% of those with plans proceed to an attempt” (see Figure 2).⁹³ As the data shows, it is not the PTSD alone that causes a person to progress from ideation to suicide, but the comorbid mental illness along with the PTSD increases the chance.

Figure 2. Transition from Ideation to Suicide



Adapted from Thomas Joiner, Matthew Nock, and Lanny Berman, “Issues of Depression and Suicide in the Fire Service: Meeting Report,” National Fallen Firefighters Foundation, July 11, 2011, http://1rxflr7bsmg1aa7h24arae91.wpengine.netdna-cdn.com/wp-content/uploads/sites/2/2014/01/depressionsuicide_summary.pdf.

Acute Trauma. Acute trauma, in the context of this research, describes significant or seminal events where the development of PTSD occurs from a single exposure rather than multiple exposures over time. This type of event can impact anywhere from one individual to large groups of individuals. Examples of acute trauma include events such as rape or physical abuse. Some of the best-known examples of seminal events causing the development of PTSD would be the terrorist attack on the World Trade Center on September 11, 2001, the Oklahoma City bombing in 1995, and Hurricane Katrina in August of 2005. Generally, after a large catastrophic event, the majority of people get better with basic support and time, but some do not. After Hurricane Katrina, a study of survivors found that there was an ongoing increase in symptoms of PTSD, depression, and other mental disorders.⁹⁴ Because of the amount of devastation and the large area of destruction from this event, this abnormal increase in mental health issues was attributed

⁹³ Joiner, Nock, and Berman, “Issues of Depression and Suicide ,” 5.

⁹⁴ National Institute of Mental Health, “Post-Traumatic Stress Disorder (PTSD).”

to the ongoing stress of the loss of jobs and schools, the inability to pay bills, find jobs, and access health care.⁹⁵

Recurrent Trauma. Recurrent trauma is used to describe trauma that is experienced at varying levels over time, and may not immediately impact the individual, though he or she may play a key role in responding to the traumatic event(s), such as a firefighter. Dr. Judith Herman of Harvard University has suggested that recurrent trauma may cause a different type of PTSD, known as Complex PTSD.⁹⁶ Sufferers of Complex PTSD may have symptoms not included in the PTSD diagnosis, and therefore might not get the full treatment they need for recovery. Some of the differences in symptoms of Complex PTSD and PTSD involve complete avoidance of thinking or talking about trauma-related topics, and self-mutilation or self-harm.⁹⁷

Combat Exposure. With the increased number of military actions over the last couple of decades, more and more veterans are being diagnosed with PTSD. According to the DVA, soldiers in Vietnam had a PTSD diagnosis rate of about 30 percent, soldiers in the Gulf War (Desert Storm) are reported at 12 percent, and Operation Iraqi Freedom and Enduring Freedom garner 11–20%.⁹⁸ Diagnosis can also include sexual assault experienced in the military; about 23 percent of female veterans who used DVA healthcare reported sexual assault while in the military.⁹⁹ Even more prevalent is the report of sexual harassment by both men and women, which were 55 percent and 38 percent respectively.¹⁰⁰ This is important because individuals often apply to become firefighters once their military service is complete, which gives them a higher propensity for developing PTSD.

⁹⁵ Ibid.

⁹⁶ Judith Herman, *Trauma and Recovery: The Aftermath of Violence from Domestic Abuse and Political Terror* (New York: Basic Books, 1997).

⁹⁷ Department of Veterans Affairs, “Complex PTSD,” last modified August 17, 2015, <http://www.ptsd.va.gov/professional/PTSD-overview/complex-ptsd.asp>.

⁹⁸ Department of Veterans Affairs, “How Common Is PTSD?”

⁹⁹ Ibid.

¹⁰⁰ Ibid.

The diagnoses of PTSD may not be enough to capture the severity of the psychological trauma that occurs in combat veterans and firefighters. Many cases of PTSD are caused by seminal or short-duration events, but recurring trauma over a long period of time may need a different treatment or diagnosis in order to be successful. In the fire service's efforts to help veterans assimilate back into society at the completion of their service, they may be handing them a double-edged sword. On one edge, the fire service provides veterans preference points to increase their chances of being hired; on the other edge, it may be setting them up to be exposed to more recurrent trauma, and causing or fueling the emergence of their PTSD.

4. The Costs

The costs associated with an employee suffering from PTSD are somewhat difficult to calculate, and vary depending on geographic location and local economy. The key factor is that there are both direct and indirect costs associated with the loss of an employee from PTSD or suicide. Table 1 provides information on the areas where those costs could potentially be measured, and Table 2 provides dollar estimates of physical costs.

Table 1. Direct and Indirect Costs of Employees with PTSD

Type of Cost	Discussion
Direct Costs	
Workplace	
Employee Wages	Employee still earns a full wage while using accrued sick leave
Backfill Wages	The Employee covering for the FF while they are off receives overtime compensation at a rate of 1.5 X normal pay rate.
Administration	
Legal Fees	Any and all legal fees that may be associated with a disability claim
Paperwork and Data Collection	Cost of personnel time and systems used in filing reports of injury, claims for compensation, insurance forms, collecting information, etc.
Investigations	
Insurance	
Non-Medical Payouts	Wage differential payments made by insurance companies on disability coverage
Premium Increases	Increase in insurance premiums
Medical Expenses	
In-patient	Cost directly related to hospitalization for required medical services, medications, rehabilitation, care providers, etc.
Out-patient	Cost directly related to hospitalization for required medical services, medications, rehabilitation, care providers, etc.
Public Safety Officers Benefit Program	Cost of federal payments on the Public safety Officers Benefits law. These are made for fatalities and completely disabling injuries that prevent the injured person from resuming gainful employment.
Other Direct Costs	
Reduced Tax revenues	Effect of reduced taxable wages on the federal, state, and local governmental revenue system.
Reduced Spending	Multiplier effect of removing disposable income from the economy.
Indirect Costs	
Administrative Costs	Costs related to the administration of insurance, does not include indemnity or medical payouts.
Pain and Suffering	Multiplier effect of removing disposable income from the economy.

Source: Tri Data Corporation, *The Economic Consequences of Firefighter Injuries and Their Prevention. Final Report* (NIST GCR 05-874), (Gaithersburg, MD: NIST, March 2005), 16-18, <http://fire.nist.gov/bfrlpubs/fire05/art025.html>.

Table 2. Physical Costs of Employees with PTSD

<u>Item</u>	<u>Avg. Cost</u>	<u>Total</u>
Employee Wage + Benefits	\$50.18/hr. X 24 Hrs.	\$1204
Overtime Backfill for the affected employee	\$56.95/hr. X 24 Hrs.	\$1367
	Total =	\$2571

Adapted from City of Mercer Island Washington, *2015–2016 Collective Bargaining Agreement* (AB 5059) (City of Mercer Island Washington, 2015), <http://sirepub.mercergov.org/meetings/cache/108/lurc4545temiyznoq5u0m555/41805501292016104034548.PDF>.

Based on the information in Table 2, the cost for a firefighter who is lost to time off from PTSD and or suicide can reach \$2,571 per day. Note that there is not a large difference in wages for the regular-duty firefighter and the overtime firefighter, because the firefighter working overtime does not receive additional benefits, only a higher hourly rate. This does not include peripheral costs, such as Fire Academy (\$7,055), turnout gear (\$1,500 per set), training costs, uniforms, and professional mental healthcare, in addition to the costs listed in Table 1. A non-measurable high cost is the loss of a life, a co-worker, father, and husband, along with the knowledge and experience of a tenured firefighter that cannot be replaced.

5. Why Some Develop PTSD and Others Do Not

According to the NIMH, the reason that everyone exposed to trauma does not develop PTSD may be due to our genes. Researchers have identified genes that make the protein stathmin, “which is necessary to form fear memories.”¹⁰¹ In studies on mice, a reduction in this protein was found to react more strongly to fear-inducing stimuli, causing the mice to show decreased fear while exploring unknown areas.¹⁰² “Gastrin-releasing peptide (GRP) is a signaling chemical in the brain that is released during emotional events.”¹⁰³ It has been shown in mice that GRP tends to help monitor any type of fear response, and a decrease of GRP may lead to longer-lasting and stronger

¹⁰¹ National Institute of Mental Health, “Post-Traumatic Stress Disorder (PTSD),” 1.

¹⁰² Ibid.

¹⁰³ Ibid.

memories associated with fear.¹⁰⁴ “Researchers have also found a version of the 5-HTTLPR gene, which controls the serotonin level, a brain chemical related to mood, and appears to fuel the fear response.”¹⁰⁵ Like GRP, low serotonin or cortisol levels may cause the formation of stronger emotional reactions (fear) when exposed to trauma.¹⁰⁶ Changes to any or all of these genes, or the areas of the brain that control them, through various types of trauma, whether physical or mental, could have a significant impact on whether or not a person develops PTSD. In addition, it has been suggested that PTSD may be a result of a pathologic condition an individual is born with rather than just a reflection of a normative stress response.¹⁰⁷ Research has also shown that catecholamine levels increase for certain individuals after a traumatic experience.¹⁰⁸ The strong imprinting of the memory along with exposure to significant stress can enable the development of altered memories and mentation after the event, including their perception of the level of danger and their ability to cope.¹⁰⁹ In other words, due to a pathological defect or because of low biological chemicals in our bodies, we may either store memories more intensely, or distort what really happened to the point of suffering from PTSD after being exposed to trauma. Although no single biological factor has been found that in itself leads to the development of PTSD, there has been enough evidence documented to continue to study this area of causation.

Just as there are risk factors that increase the potential for developing PTSD, there are resilience factors that may reduce this potential as well. These can include various things such as, “seeking out support from other people, including friends and family, finding a support group after a traumatic event, feeling good about one’s own actions in

¹⁰⁴ National Institute of Mental Health, “Post-Traumatic Stress Disorder (PTSD).”

¹⁰⁵ *Ibid.*, 1.

¹⁰⁶ *Ibid.*

¹⁰⁷ Rachel M. Yehuda and Alexander McFarlane, “Conflict between Current Knowledge about Posttraumatic Stress Disorder and its Original Conceptual Basis,” *American Journal of Psychiatry* 152 (1995): 1705–13.

¹⁰⁸ Rachel M. Yehuda et al. (eds.), “Neurobiological and Behavioral Consequences of Terrorism: Distinguishing Normal from Pathological Responses, Risk Profiling, and Optimizing Resilience,” in *Psychology of Terrorism* (New York: Oxford University Press, 2007).

¹⁰⁹ Yehuda et al., “Neurobiological and Behavioral Consequences of Terrorism,” 492.

the face of danger, having a coping strategy, or a way of getting through the event and learning from it, or being able to act and respond effectively despite feeling fear.”¹¹⁰ The simplest explanation is that some people have their own way of dealing with the stress, such as distraction during the traumatic event. As a simple example: An engine company with three personnel pulls up to a fully involved house fire, in which the occupants had sustained burns. One crewmember will attend to the victims while another focuses on putting out the fire, helping with the victims once it is extinguished. The crewmember who put out the fire may not be as traumatized as the initial caregiver, because he was distracted by the fire, and may still have been thinking about it once he began helping the burn victim. He may not form as strong of a memory of the event due this distraction.

B. NATIONAL FIREFIGHTER SUICIDE

Nationally, the number of deaths by suicide involving firefighters has been on the increase, but was not thoroughly tracked until 2010.¹¹¹ As noted previously, most death certificates do not list occupation, which makes tracking this number difficult. Since 2010, Captain (Ret.) Jeff Dill has undertaken what could be considered the most comprehensive effort to date in tracking the number of firefighter suicides in the United States. Much of this is accomplished by electronic form, which is available on the FBHA website.¹¹² For those agencies that prohibit the release of information, the FBHA provides a “blind form” that does not provide sender information and only requires a minimal amount of information be completed.¹¹³

According to the FBHA website, the number of firefighter deaths by suicide in the United States was 79 in 2012, 69 in 2013, 109 in 2014, and 112 in 2015.¹¹⁴ From 1880—1999, a 119-year period, records show only 98 total recorded firefighter suicides. Janet S. Savia, in her dissertation titled “Suicide among North Carolina Professional Firefighters: 1984–1999” found that, “compared with the professional firefighter line of duty deaths

¹¹⁰ National Institute of Mental Health, “Post-Traumatic Stress Disorder (PTSD),” 4.

¹¹¹ Dill, “Firefighter Behavioral Health Alliance.”

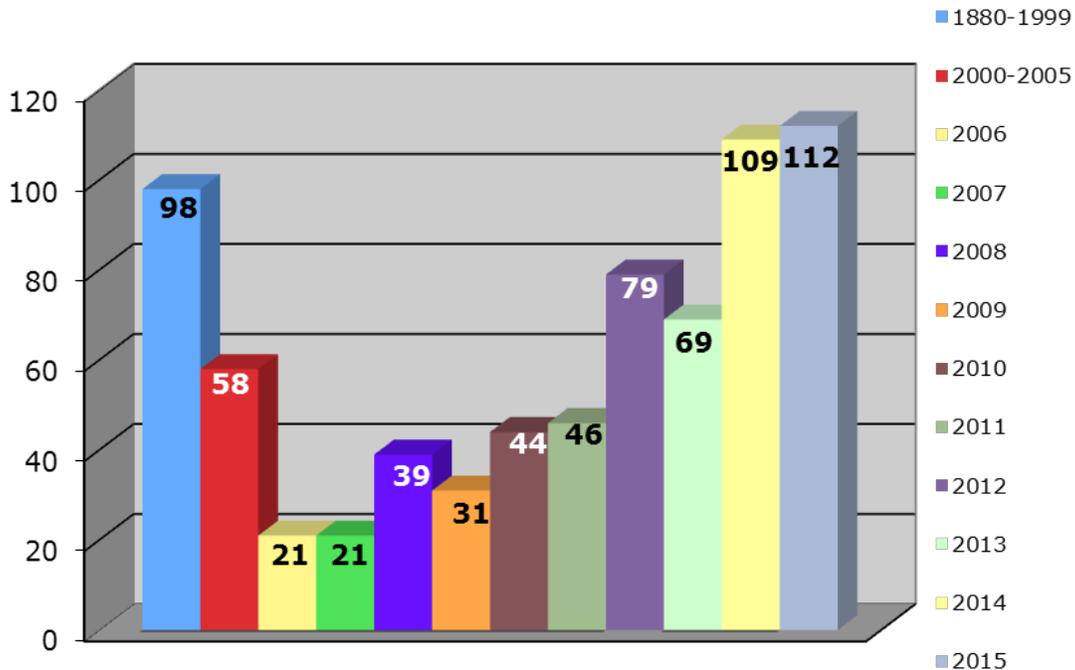
¹¹² *Ibid.*

¹¹³ *Ibid.*

¹¹⁴ *Ibid.*

(LODDs), suicides occurred more than three times as often.”¹¹⁵ Between the years 2000 and 2005, the number of suicides began to increase, with 58 committed during this five-year period (see Figure 3).¹¹⁶ Since then, the number of annual firefighter suicides has slowly—if not steadily—increased, and the trend continues.

Figure 3. Firefighter Suicides by Year



Adapted from Jeff Dill, “Firefighter Behavioral Health Alliance,” accessed January 31, 2016, <http://www.ffbha.org/>.

¹¹⁵ “Firefighter suicide has received little research attention, yet firefighters experience a number of factors that place them at risk for suicide. These include illness, injury, substance abuse, depression, and trauma exposure. This project represented a preliminary exploration of North Carolina death records for paid firefighters ($n = 982$) over 16 years (1984–1999). There were 25 reported firefighter suicides during this time. Proportionate mortality ratios (PMRs) indicated the number of firefighter suicides exceeded expectations. Compared with professional firefighter line of duty deaths (LODDs), suicides occurred more than three times as often. Joiner’s (2005) theory of heightened suicide risk provides the theoretical basis for this research. Recommendations include continued research and implementation of suicide prevention programs in fire departments across the country.” Janet S. Savia, “Suicide among North Carolina Professional Firefighters: 1984–1999,” (Ph.D. dissertation, Regent University, 2008), abstract, <http://gradworks.umi.com/33/05/3305393.html>.

¹¹⁶ Dill, “Firefighter Behavioral Health Alliance.”

Starting in 2013, Dill also began collecting information internationally in order to see if this was a further-reaching issue. Through his efforts and academic studies, it has been shown that firefighter suicide is both a national and international problem.

Furthermore, suicide and PTSD are not limited to any one department, geographical area, or seminal event (such as 9/11 or Hurricane Katrina), although there is some evidence that shows these types of events can lead to an increase in PTSD and suicide. The information that is available tends to come from larger fire departments, which makes sense statistically, but firefighter suicide can happen in any department. From 1984 through 2007, the Houston Fire Department had a total of eight active-duty firefighter suicides.¹¹⁷ What brought increased attention to this issue was the fact that three of these events took place in a short time span between 2005 and 2007. In addition, between the years of 2001 and 2007, four retired firefighters from the Houston Fire Department reportedly took their lives.¹¹⁸ The Chicago Fire Department had only one recorded suicide in the 15 years prior to 2008, but then had seven in a period of 18 months during 2008–2009, and in 2010 had four more in five months.¹¹⁹ According to the FBHA, the United States has experienced a total of 669 known firefighter suicides, but concedes that these in no way cover every suicide, but only those that have been reported.¹²⁰

C. IS THERE A CAUSAL CONNECTION?

Currently, there is no specific evidence of a direct causal connection between PTSD and suicide in firefighters. There is, however, information showing this connection among the general population and military veterans. In 2012, the link between PTSD and suicide was demonstrated in over 60 published studies.¹²¹ In a study by Panagioti,

¹¹⁷ Emmanuel J. Finney et al., “Suicide Prevention in the Fire Service: The Houston Fire Department (HFD) Model,” *Aggression and Violent Behavior*, December 2015, doi: 10.1016/j.avb.2014.12.012.

¹¹⁸ Finney et al., “Suicide Prevention in the Fire Service.”

¹¹⁹ Rogers, “Firefighters Address Alarming Suicide Rates.”

¹²⁰ Dill, “Firefighter Behavioral Health Alliance.”

¹²¹ Maria Panagioti, Patricia A. Gooding, and Nicholas Tarrier, “A Meta-Analysis of the Association between Posttraumatic Stress Disorder and Suicidality: The Role of Comorbid Depression,” *Comprehensive Psychology*, no. 53 (2012): 915–30, doi:10.1016/j.comppsy.2012.02.009.

Gooding, and Tarrier, “a highly significant positive association between a PTSD diagnosis and suicidality was found, which persisted across studies using different measures of suicidality, current and lifetime PTSD, psychiatric and non-psychiatric samples, and PTSD populations exposed to various types of traumas.”¹²² One important piece of information found in this study was that comorbid depression significantly increased the risk for suicide in individuals suffering from PTSD.¹²³

PTSD and depression are often comorbid, but not always, with the presence of one increasing the risk of the other, and both associated with attempted suicide.¹²⁴ This information is not surprising; as previously noted, studies have shown that a number of comorbid issues often accompany a diagnosis of PTSD, thus adding to the complexity of this issue. It must also be noted that not all comorbid issues associated with PTSD lead to suicide, but others have been shown to be components in suicide. The individual may develop a comorbid psychiatric disorder first, which then increases his or her potential to develop PTSD if exposed to trauma in the future.¹²⁵ “Two theories of suicide, the Cry of Pain and the Schematic Appraisal Model of Suicide, propose that feelings of hopelessness, defeat, and entrapment are core components of suicidality.”¹²⁶ Other comorbid issues that potentially compound the risk of suicide are psychosis, bipolar disorder, substance abuse disorders, and borderline personality disorder.¹²⁷

¹²² Panagiotti, Gooding, and Tarrier, “A Meta-Analysis,” 915.

¹²³ Ibid.

¹²⁴ Maria Oquendo et al., “Posttraumatic Stress Disorder Comorbid with Major Depression: Factors Mediating the Association with Suicidal Behavior,” *American Journal of Psychiatry* 163, no. 3 (March 2005): 560–66.

¹²⁵ Edna Foa, Seth J. Gillihan, and Richard A. Bryant, “Challenges and Successes in Dissemination of Evidence-based Treatments for Posttraumatic Stress: Lessons Learned from Prolonged Exposure Therapy for PTSD,” *Psychological Science in the Public Interest* 14, no. 2 (2013): 65–111, doi: 10.1177/1529100612468841.

¹²⁶ Maria Panagiotti, Patricia A. Gooding, and Nicholas Tarrier, “Hopelessness, Defeat, and Entrapment in Posttraumatic Stress Disorder: Their Association with Suicidal Behavior and Severity of Depression,” *Journal of Nervous and Mental Disease* 200, no. 8 (August 2012): 676. “The Cry of Pain Model conceptualizes suicidal behavior as the response to a situation that three components: defeat, no escape, and no rescue. The Schematic Appraisal Model of Suicide suggest that positive self-appraisals may be important for buffering suicidal thoughts and behaviors, potentially providing a key source of resilience.”

¹²⁷ Panagiotti, Gooding, and Tarrier, “A Meta-Analysis,” 927.

Many people do not want to talk about suicide due to beliefs that stem from their religious, cultural, moral, social, or ethical background.¹²⁸ Talking about suicide in any setting is generally considered a taboo subject. Antonellis and Thompson capture this, stating, “Suicide occurs because of the silence of society and the silence a person perceives is necessary when contemplating suicide caused by the absence of open and honest communication regarding the reality of suicidal thoughts in response to pain, stress, trauma, and even depression or other mental illnesses.”¹²⁹

What this all means is that being diagnosed with PTSD does not directly correlate to an individual committing suicide, but should lead to further evaluation or diagnosis of potential comorbid issues that may contribute to suicide. As more and more cases of PTSD are diagnosed, there will also be a corresponding increase in the number of suicides, thus demonstrating a causal connection. The problem with this conclusion is that the true cause of increased suicide rates is not due to increased PTSD, but is in fact due to other comorbid issues associated with PTSD.

D. IDENTIFYING FIREFIGHTER RISK

Suicide is not something that is done out of weakness, or because of a decision that a person comes to suddenly. Suicide only occurs when a person has gone through a process and determines this to be the only option. The key to successful intervention in the process leading to suicide comes from finding commonalities; identifying these commonalities can lead to the “development of a framework that explains the progression from [traumatic] experience to ideation, from ideation to intent, and from intent to action (suicide).”¹³⁰

Risk factors are characteristics, behaviors, or variables associated with the likelihood that a certain end result will occur.¹³¹ Therefore, risk factors for suicide are variables associated with or that have occurred in a person’s life that increase the

¹²⁸ Antonellis and Thompson, “A Firefighter’s Silent Killer: Suicide.”

¹²⁹ *Ibid.*, 1.

¹³⁰ Joiner, Nock, and Berman, “Issues of Depression and Suicide,” 6.

¹³¹ Van Orden et al., “The Interpersonal Theory of Suicide.”

probability of suicidal behaviors. “The literature indicates the most consistent and robust support for the following as risk factors for suicide: mental disorder, past suicide attempts, social isolation, family conflict, unemployment, and physical illness” (see Appendix B).¹³² All of these factors can be experienced by firefighters despite the battery of tests prior to hiring. As discussed previously, mental disorders play a key role in comorbidity, along with PTSD, in suicidal behavior. Research has shown that approximately 95 percent of people who commit suicide suffer from mental disorders.¹³³ Those mental health issues that share the features of burdensomeness, a low feeling of belonging, and acquired ability (fearlessness of death and higher pain tolerance) are more likely to involve suicidality.¹³⁴

The interpersonal theory of suicide (ITS) is a comprehensive model that takes into account the dynamic relationship between systems within the individual and the individual’s relationship with his or her environment that leads to suicide.¹³⁵ The ITS is based upon three essential conditions that generate the impetus for suicide and progressing to act upon that inspiration.¹³⁶ According to the theory, the ability to commit suicide arises through conditioning and acceptance in response to traumatic events.¹³⁷ In other words, the more you attempt or practice suicide, the more those fears become less scary and painful things become less painful. According to Van Orden, the deadliness of method and earnestness of the intent increase with repeated attempts. The theory further proposes that, in order for the progression to suicide to occur, “two interpersonal constructs—thwarted belongingness and perceived burdensomeness—must be present, and the capability to engage in suicidal behavior is separate from the desire to engage in suicidal behavior” (see Figure 4).¹³⁸ During a presentation to the National Fallen

¹³² Ibid., Table 1.

¹³³ J. T. Cavanagh et al., “Psychological Autopsy Studies of Suicide: A Systematic Review,” *Psychological Medicine* 33 (2003): 395–405.

¹³⁴ Van Orden et al., “The Interpersonal Theory of Suicide.”

¹³⁵ Ibid.

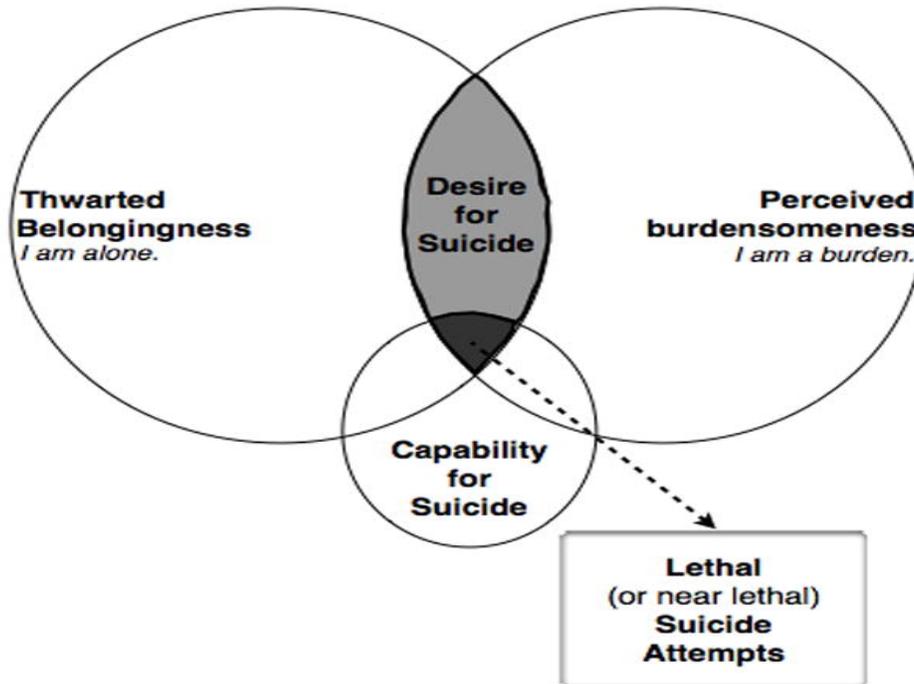
¹³⁶ Ibid.

¹³⁷ Ibid.

¹³⁸ Ibid., 2.

Firefighters Foundation, Dr. Thomas Joiner, who first developed the ITS, summarized his theory in the simplest of terms; people die by suicide, he explained, “because they want to and because they can.”¹³⁹

Figure 4. Constructs of Suicide



Source: Kimberly A. Van Orden et al., “The Interpersonal Theory of Suicide,” *Psychological Review* 117, no. 2 (April 2010): 575–600, doi: 10.1037/a0018697.

In their article titled “The Interpersonal Theory of Suicide,” published in the *Journal Psychological Review* in 2010, Van Orden and her co-authors outlined the different elements of the ITS. The first construct of the ITS is thwarted belongingness, which is the self-belief that a person is alone, even when surrounded by others.¹⁴⁰ A person experiencing thwarted belongingness feels he or she is without connection, or has lost the connection(s) essential to a meaning or purpose in life, and no longer feels a sense of self. Once this occurs, a person may feel that he or she is no longer an integral part of family, friends, co-workers, or any other groups to which they belong. This can

¹³⁹ Joiner, Nock, and Berman, “Issues of Depression and Suicide,” 6.

¹⁴⁰ Van Orden et al., “The Interpersonal Theory of Suicide.”

become a real problem with firefighters who retire, or who are injured or disabled for a long period. The fire service is ingrained with camaraderie that is derived from working together as a team in situations with the potential for death. Naturally, this builds strong bonds between individuals and groups that become a part of each person's social life. Any time a firefighter is removed from this environment for an extended period of time, or permanently, the connection to the group can be perceived to be lost.

The second necessary construct of the ITS is perceived burdensomeness, which is the perception that a person becomes a drain on the energy and resources of family, friends, co-workers, and society in general.¹⁴¹ It is through this construct that the misperception of, "the world would be better off without me" is formed. Some of the issues that can lead a firefighter to this perception are physical illness, functional impairment, or unemployment. A firefighter who suddenly experiences loss of purpose—being needed by family, the fire department, or the community—can quickly build this construct. It does not take long for a person to feel he or she has gone from a hero to a zero in self-perception.

The conjoining of these two constructs is what leads to the desire for suicide and suicidal ideation. Despite this, the desire to die is often not enough for a person to attempt suicide. Transitioning from suicidal desire to suicidal action is difficult, because it requires a person to overcome one of our most basic instincts, the drive for self-preservation.¹⁴² The third construct of the ITS is the capability for suicide, which is created when a combination of experience and disposition reaches a level that allows a person to overcome his or her natural aversion to taking his or her own life. This may result from learning to ignore pain through repeated attempts, which acts to familiarize the individual with the experience, thus decreasing the fear.¹⁴³ Either direct or indirect pathways can achieve the capability for suicide. The direct pathway would be through previous suicide attempts, and the indirect pathway would be through painful and

¹⁴¹ Ibid.

¹⁴² Joiner, Nock, and Berman, "Issues of Depression and Suicide."

¹⁴³ Ibid., 6.

provocative events such as childhood abuse, prostitution, or self-injecting drug use.¹⁴⁴ Evidence has shown that people with a history of suicide attempts have a higher pain tolerance than the general population.¹⁴⁵ It is only at the intersection of these constructs that suicide attempts, both successful and unsuccessful, can be made. If any of these constructs is interrupted in the process leading to suicide, in theory, the attempt will, at least temporarily, not occur. It is upon this premise that a successful support program may make the difference between life and death for the individual seeking to end his or her life through suicide.

The ability to commit suicide is commonly the barrier in the progression from ideation and forming a plan to lethal action for the general public, but firefighters may not have this same issue.¹⁴⁶ Firefighters are regularly exposed, and may become habituated, to trauma, suffering, and pain, along with the certainty of death, in the everyday aspects of their job. The possibility for the loss of one's own life in the fulfillment of a firefighter's duty is omnipresent and culturally recognized as an acceptable risk of the occupation. It is considerations such as this that can force firefighters to grapple with their own mortality in ways the general population does not, and may increase the capability for suicidal action amongst firefighters, whether or not thoughts of suicide are present.¹⁴⁷ For all people, it is only at the small intersection of these three ITS constructs that a person has the capacity for a lethal suicide attempt.

Although developed with the intent to help clinicians in the treatment of patients at risk for suicidality, the ITS may be helpful non-clinicians, such as firefighter peer counselors (FPCs), in identifying those who may be at risk. The first step in this process would be identifying risk factors versus warning signs. Risk factors are those symptoms that indicate individuals may be more susceptible to suicidal behavior (see Appendix A), whereas warning signs are those symptoms that indicate the presence of an immediate

¹⁴⁴ Kimberly Van Orden, "Using the Interpersonal Theory of Suicide to Guide Risk Assessment, Crisis Management, and Intervention with Suicidal Clients" (Ph.D. dissertation, University of Delaware, 2013), 30, http://dhss.delaware.gov/dsamh/files/si2013_usinginterpersonaltheoryofsuicide.pdf.

¹⁴⁵ Van Orden, "Using the Interpersonal Theory of Suicide."

¹⁴⁶ Joiner, Nock, and Berman, "Issues of Depression and Suicide."

¹⁴⁷ Ibid.

elevated risk of suicide.¹⁴⁸ Examples of warning signs are contained in the mnemonic in Figure 5, created by the American Association of Suicidology.

Figure 5. Suicide Warning Signs Mnemonic

IS	PATH	WARM?
Ideation	Purposelessness	Withdrawal
Substance Abuse	Agitation	Anger
	Trapped	Restlessness
	Hopelessness	Mood Changes

Adapted from American Association of Suicidology, “Know the Warning Signs of Suicide,” accessed January 31, 2016, <http://www.suicidology.org/resources/warning-signs>.

Warning signs would be easier to identify in the immediate context of time, through typical social interaction, and would not require in-depth intimate knowledge of a person’s past. Although given the close bonds associated with the firefighter culture, there could possibly be a higher percentage of firefighters that know the personal history of the people they are counseling than in the general population. Areas that FPCs could easily assess could be around the construct of thwarted belongingness, and deal with conversations involving such topics as whether or not the person has meaningful connections to others. Is there an absence of caring relationships that can be utilized when they are upset or stressed? Have they had any recent traumatic life events such as divorce or death? To assess the construct of perceived burdensomeness, an FPC could note statements such as, “others would be better off if I were gone,” or “the world would be better off without me.” Early intervention through simple counseling may disrupt the development of these constructs and therefore stop the progression toward suicide. If the

¹⁴⁸ Philip Rodgers, *Understanding Risk Factors and Protective Factors for Suicide: A Primer for Preventing Suicide* (Newton, MA: Education Development Center, 2011), <http://www.sprc.org/sites/sprc.org/files/library/RiskProtectiveFactorsPrimer.pdf>.

person being counseled starts to share information such as suicidal ideation, past attempts, substance abuse, self-harm, or exposure to or participation in physical violence, the next step would be for the FPC to help the individual get professional counseling or treatment. Using the ITS, FPCs can help to identify those firefighters who may be at risk for suicide.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. CURRENT PTSD TREATMENT OPTIONS

Any program that is established to work with the fire service will require buy-in from the members in order to have any chance of success at all. After 9/11, mental health professionals and counselors were brought in to help the members of FDNY deal with the emotions as a result of the horrific trauma they witnessed and experienced. These emotions were derived from various roles such as responding to this traumatic event, working on the site, and the terrible loss of their brothers and sisters. One aspect that was overlooked in the good intention of this program was the fact that these mental health professionals were viewed as outsiders, with no understanding of the firefighter culture. The firefighters did not see the health professionals as someone they could open up to in order expose their raw emotions from this event. It is rumored that some went so far as to purposefully give inaccurate information in an attempt to discredit the process through humor. The perception seems to have been one of how could you possibly grasp the gravity of what has happened when you are not one of us?

A. PSYCHOLOGICAL FIRST AID

“Psychological First Aid (PFA) is an evidence-informed modular approach to help children, adolescents, adults, families, first responders, and other disaster relief workers who may be acutely stressed in the immediate aftermath of a disaster or terrorism.”¹⁴⁹ In other words, PFA is early assistance to those individuals directly impacted by the traumatic event and helps to provide an initial assessment of the psychological impacts. It can also provide stabilization of psychological injuries and prevent an individual from progressing further. PFA is only designed as a temporary measure until the victim can transition to a mental health professional if necessary. PFA is intended to promote faster and better psychological healing in any type of setting

¹⁴⁹Brymer et al., *Psychological First Aid*, 5. “Psychological First Aid is supported by disaster mental health experts as the ‘acute intervention of choice’ when responding to the psychosocial needs of children, adults and families affected by disaster and terrorism. At the time of this writing, this model requires systematic empirical support; however, because many of the components have been guided by research, there is consensus among experts that these components provide effective ways to help survivors manage post-disaster distress and adversities, and to identify those who may require additional services.”

where those impacted by the disaster may be present. These non-professional volunteer mental health workers can be worked into existing units such as first responder constructs, incident command systems, health care worker networks, or any other incident disaster relief team. The objective of PFA is to establish a connection between survivors and responders, in a non-threatening way, by meeting immediate basic needs in an emotionally comfortable and safe environment.¹⁵⁰ Additionally, those delivering PFA can help determine the immediate physical needs and concerns of those involved, and provide assistance in addressing those needs and concerns.

PFA is designed to first observe the intended recipient(s), then make contact by providing assistance, such as getting food or water, and listening to what the recipient has to say.¹⁵¹ In addition, the PFA provider will want to stabilize those individuals who are emotionally overwhelmed or disoriented, and help them to obtain whatever services they require. The first task of PFA is to determine and then meet the immediate needs of the individual(s) affected by a large-scale disaster, including terrorism. Depending on the audience (child, adult, first responder, etc.), the messaging and listening may need to be altered to increase the effectiveness. Many people involved in a disaster or crisis may not want to talk to anyone so soon after the event. The core actions of PFA are, “contact and engagement, safety and comfort, stabilization, information gathering on current needs and concerns, practical assistance, connection with social supports, information on coping, and linkage with collaborative service.”¹⁵²

To review the effectiveness of PFA, the American Red Cross (ARC) requested an independent study that covered the years 1990–2010, to determine if non-professional volunteer mental health care workers can provide “safe, effective and feasible intervention.”¹⁵³ An expert panel searched standard databases to research events that were classified as either a disaster or mass casualty event where PFA had been provided.

¹⁵⁰ Ibid.

¹⁵¹ Ibid.

¹⁵² Ibid., 19.

¹⁵³ Jeffrey H. Fox et al., “The Effectiveness of Psychological First Aid as a Disaster Intervention Tool: Research Analysis of Peer-Reviewed Literature from 1990–2010,” *Disaster Medicine and Public Health Preparedness* 6, no. 3 (2012): 247–52.

Although there is little scientific proof for the effectiveness of PFA, this process determined that rational (if unproved) theorem and expert opinion can categorize it as “evidence informed.”¹⁵⁴ Also, Fox and his co-authors recommend that PFA should not be utilized in the same manner as CISD, since it is designed to help victims with their initial needs after a traumatic event, but is not designed to help with their mental health issues.¹⁵⁵

The ARC currently requires the completion of a PFA course by all disaster team assessment members. In addition, PFA has been included as a part of the curriculum for all courses sponsored by the ARC, including but not limited to first aid, cardiopulmonary resuscitation, lifeguard training, and nursing assistant training.¹⁵⁶

B. STRESS FIRST AID FOR FIREFIGHTERS AND EMS PERSONNEL

Stress First Aid (SFA) for firefighters and EMS personnel was developed by the NFFF, based upon the military’s Combat and Operational Stress First Aid.¹⁵⁷ It is designed to offer firefighters and first responders the tools necessary to deal with reactions to stress, while acting as a bridge to more formal treatment, if necessary. This program was developed to specifically deal with firefighters and EMS personnel, with the intent to reduce the likelihood that stress reactions they face in their profession do not develop into more severe or long-term problems. The developers of the program determined that the people best positioned to be SFA providers are those who work closely or have a relationship with the individual in need of support.¹⁵⁸

SFA helps identify early warning signs of severe reactions to stress, and provide for the needs of firefighters and first responders by getting them support and assistance

¹⁵⁴ Fox et al., “The Effectiveness of Psychological First Aid.”

¹⁵⁵ Ibid.

¹⁵⁶ Ibid.

¹⁵⁷ Bill Carey, “Understanding Stress First Aid in the Fire Service,” *Fire Rescue*, November 3, 2013, <http://www.firefighternation.com/article/firefighter-fitness-and-health/understanding-stress-first-aid-fire-service>.

¹⁵⁸ Patricia J. Watson et al., *Stress First Aid for Firefighters and Emergency Services Personnel* (Emmitsburg, MD: National Fallen Firefighters Foundation, 2013), doi: 10.13140/RG.2.1.1768.9123.

during and after traumatic events.¹⁵⁹ The design of this program allows it to continuously monitor the stress levels of firefighters and will quickly recognize individuals who may be reacting to different life stressors, both work and personal, and may need intervention. In addition, SFA is designed to monitor progress as an ongoing process during recovery to help in the restoration of a person's well-being.

Using the Stress Continuum Model (SCM), SFA demonstrates that different states of stress “lie along a spectrum of severity and type” (see Figure 6).¹⁶⁰ The SCM has four stages, “Ready (Green), Reacting (Yellow), Injured (Orange), and Ill (Red).”¹⁶¹ The green zone in the SCM is where most people are during normal circumstances, and is the objective of most training and prevention activities. As individuals move from left to right within the SCM (green to orange), they require more focused leader and peer support to reduce the chances of clinical intervention being needed. It is important to understand that 100 percent of people will react to a stressor within this spectrum, and can move from one zone to another very quickly. Unfortunately, the fire service culture has been shown to suppress the reaction to stressors by “toughing it out” rather than dealing with an issue early on. Once in the red zone, the individual has developed issues such as PTSD, depression, anxiety, or substance abuse. As noted previously, these types of disorders are often comorbid with PTSD and, left untreated, may lead to suicide.

¹⁵⁹ Watson et al., *Stress First Aid for Firefighters and Emergency Services Personnel*, 9.

¹⁶⁰ *Ibid.*

¹⁶¹ *Ibid.*, 7.

Figure 6. Stress Continuum Model

Ready (Green)	Reacting (Yellow)	Injured (Orange)	Ill (Red)
Definition	Definition	Definition	Definition
<ul style="list-style-type: none"> ▪ Optimal Functioning ▪ Adaptive Growth ▪ Wellness 	<ul style="list-style-type: none"> ▪ Mild and transient distress or impairment ▪ Always goes away ▪ Low risk optimal 	<ul style="list-style-type: none"> ▪ More severe and persistent stress or impairment ▪ Leaves a scar ▪ Higher risk 	<ul style="list-style-type: none"> ▪ Clinical mental disorder ▪ Unhealed stress injury causing life impairment
Features	Features	Features	Features
<ul style="list-style-type: none"> ▪ At one's best ▪ Well trained and prepared ▪ In control ▪ Physically, mentally, spiritually fit ▪ Mission focused ▪ Motivated ▪ Calm and steady ▪ Having fun ▪ Behaving ethically 	<ul style="list-style-type: none"> ▪ Feeling irritable, anxious or down ▪ Loss of motivation ▪ Loss of focus ▪ Difficulty sleeping ▪ Muscle tension or other physical changes ▪ Not having fun 	<ul style="list-style-type: none"> ▪ Loss of control ▪ Panic, rage or depression ▪ No longer feeling like normal self ▪ Excessive guilt, shame, or blame 	<ul style="list-style-type: none"> ▪ Symptoms persist and worsen over time ▪ Severe distress or social or occupational impairment
	Causes	Causes	Types
	<ul style="list-style-type: none"> ▪ Any stressor 	<ul style="list-style-type: none"> ▪ Life threat ▪ Loss ▪ Inner conflict ▪ Wear and tear 	<ul style="list-style-type: none"> ▪ PTSD ▪ Depression ▪ Anxiety ▪ Substance abuse

Source: Patricia J. Watson et al., *Stress First Aid for Firefighters and Emergency Services Personnel* (Emmitsburg, MD: National Fallen Firefighters Foundation, 2013), doi: 10.13140/RG.2.1.1768.9123.

In the yellow and orange zones of the SCM is where immediate and mid-term intervention is applied in order to be effective in the recovery with SFA. The five essential elements of these interventions are to “promote a sense of safety, calming, connectedness, a sense of self and collective efficacy, and a sense of hope.”¹⁶² Restoring or maintaining a feeling of safety can reduce the risk of injuries related to stress, which will help put the individual in a more relaxed state. Although some anxiety is to be expected, an extended period of hyperarousal can lead to negative long-term health

¹⁶² Ibid., 9.

effects due to issues such as increased heart rate, elevated blood pressure, and lack of sleep.¹⁶³

There are four classes of stressors identified in SFA that can occur and place individuals at risk for experiencing stress reactions, “Inner Conflict, Life Threat, Loss, and Wear & Tear.”¹⁶⁴ Inner conflict can arise from involvement in events that may change a person’s values, and cause the person to question what he or she is doing. Life threats for firefighters can occur daily as a matter of answering normal calls for service that involve trauma or some other horrific event. Loss can be a result of the grief when experiencing the loss of a loved one, a co-worker, or a person involved in a call, but it can also be a feeling of loss of oneself through the common exposure to trauma as a firefighter. Wear and Tear is a result of accumulated stress from a multitude of sources over time, which can cause an individual to break down and weaken, creating susceptibility to greater stress. In looking at these sources of stress, it is not difficult to make the connection back to the ITS and see the path to “thwarted belongingness and perceived burdensomeness” as a result of these stressors.¹⁶⁵ By applying the concepts presented as part of SFA, the process leading to suicide as identified in the ITS has the potential for early disruption.

Seven core actions are used to conduct SFA (see Figure 7).¹⁶⁶ As described by Watson and her co-authors, the first action is to **check** by assessing an individual’s current emotional level, assess for immediate risks, determine if more needs to be done, and reassess progress. The second action is to **coordinate**, which involves determining if and who else needs to be involved, coordinating for further evaluation or higher-level care, and other care needs that may be appropriate. Action three is to **cover**, and involves ensuring the immediate safety of the individual, both physically and emotionally, and protecting him or her from additional stress. The next action is to **calm**, which entails getting the individuals to relax and decrease their heart rate, slow their breathing, and

¹⁶³ Ibid.

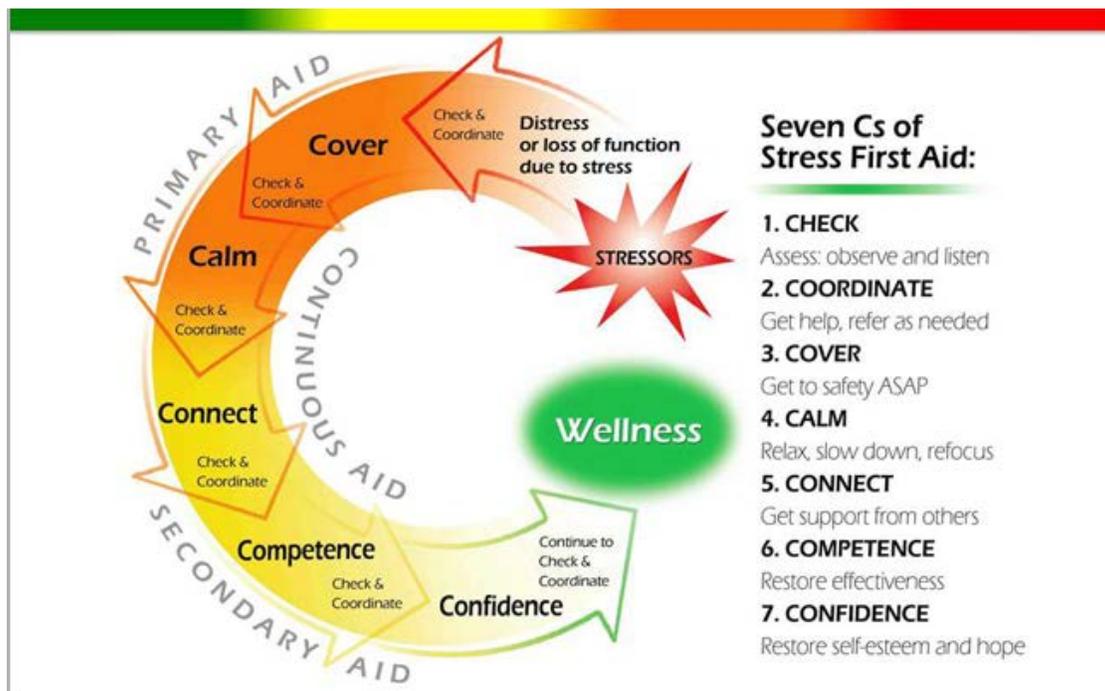
¹⁶⁴ Ibid., 8.

¹⁶⁵ Van Orden et al., “The Interpersonal Theory of Suicide.”

¹⁶⁶ Watson et al., *Stress First Aid for Firefighters and Emergency Services Personnel*.

reduce their fears or anger. The intent is to decrease their state of hyperarousal and nullify any potential long-term health effects. This can often be accomplished by being empathetic and listening to what they have to say (PFA) while also giving information that may help them to calm down. The fifth action is to **connect**, and is used to strengthen the bond with the individual in order to provide support and help remove obstacles to social support. A good way to do this is to involve the individual in social activities or gatherings that will foster positive crew or department interactions. Action six is **competence**, which is accomplished through mentoring or coaching the individual back to full function, and giving him or her the tools necessary to deescalate stressful situations. And finally, the seventh action is **confidence**, which involves getting the individual back to full capacity with confidence in self, leadership, family, crewmembers, and the mission of the department.

Figure 7. Stress First Aid Model



Source: Patricia J. Watson et al., *Stress First Aid for Firefighters and Emergency Services Personnel* (Emmitsburg, MD: National Fallen Firefighters Foundation, 2013), doi: 10.13140/RG.2.1.1768.9123.

The Seven Cs of SFA are designed to work in a smooth transitional delivery in order to break down cultural obstacles in the fire service and act as a bridge, not a solution, to complete wellness. Each “C” works in conjunction with the others based upon the intent of promoting the return of total wellness caused by different stressors. Left unchecked, stress itself can become as debilitating as a physical injury, and potentially lead to other conditions such as PTSD and, ultimately, suicide. We owe it to our firefighters to understand this complex system, and employ these techniques in order to keep our people healthy both physically and mentally.

C. CRITICAL INCIDENT STRESS MANAGEMENT AND CRITICAL INCIDENT STRESS DEBRIEFING

Critical Incident Stress Management (CISM) is a multilayered mental health system combining education, prevention and mitigation of the effects experienced from responding to traumatic incidents.¹⁶⁷ Firefighters and first responders experience these events on a much more regular basis than the general public. CISM is handled most effectively by personnel who have specific relevant training, such as crisis intervention specialists.¹⁶⁸ Within the process of CISM is what is referred to as the Critical Incident Stress Debriefing (CISD). CISD is founded on the belief that if an individual is exposed to trauma, the potential for psychological issues is increased for most people, but that if those people are treated through psychological intervention, they will either not develop PTSD, or if they do, their recovery will be sped up.¹⁶⁹ This is a facilitator-led group interaction conducted after an event that includes significant exposure to trauma that may have lasting effects on those personnel involved. According the *Critical Incident Stress Guide*, published by Occupational Safety and Health Administration, the process is designed to contain seven steps that include, “Introduction; Fact Phase; Thought Phase; Reaction Phase; Symptom Phase; Teaching Phase; and Re-entry Phase.”¹⁷⁰ Participants

¹⁶⁷ OSHA, “Critical Incident Stress Guide,” accessed November 23, 2015, <https://www.osha.gov/SLTC/emergencypreparedness/guides/critical.html>.

¹⁶⁸ OSHA, “Critical Incident Stress Guide.”

¹⁶⁹ James M. Jeannette and Alan Scoboria, “Firefighter Preferences Regarding Post-Incident Intervention,” *Work & Stress* 22, no. 4 (October 2008): 314–26.

¹⁷⁰ OSHA, “Critical Incident Stress Guide.”

are encouraged to talk to the group about the event and what they experienced. The facilitator then generally educates the participants on signs and symptoms that are common and provides tools or techniques for managing them. The intent behind this treatment is to establish support within the group by building bonds, and present the chance for further counseling when needed.

As noted previously, there are mental health experts who disagree with this process due to their belief that reliving the trauma so soon afterward can create permanent mental scars. In a study conducted by Halpern and her colleagues, data showed that EMTs found debriefing with their peers and supervisors within 24 hours after the incident was more helpful than CISD, which takes place generally 24–72 hours afterward.¹⁷¹ The authors also noted that the formality of CISD, coupled with the unfamiliarity of mental health professionals, might cause a person to bypass natural internal processing and natural social support. In short, people feel much more comfortable exposing themselves emotionally to their peers than to a stranger. This study also found that a brief “time-out” period of 30 minutes to an hour, often used to converse with peers, played a significant role in decreasing emotional hyperarousal by allowing for a release of emotion in a familiar environment. In the fire service, this often takes place in what is commonly called “the beanery,” which is the area of the firehouse where most firefighters eat and socialize. Unknowingly, this may be the area where some of the best mental health activities in a firefighter’s career take place.

The debate over CISD’s effectiveness has been raging for over 20 years. Some arguments point out that CISD was initially designed for use with emergency service response providers, but has since been applied to other groups. With the applied use outside of this arena, studies showing positive and negative effects lack the scientific evidence to sway the conclusion on effectiveness either way. This was strongly supported by Dr. Sharon Wagner in 2005, who reviewed studies both for and against CISD, concluding that evidence for the use of this intervention is at least as strong as the

¹⁷¹ Janice Halpern et al., “Interventions for Critical Incident Stress in Emergency Medical Services: A Qualitative Study,” TEMA Memorial Trust, accessed September 10, 2015, www.tema.ca/#!research/c1ekr.

evidence against it.¹⁷² The Los Angeles County Fire Department has one of the oldest CISM programs in the United States. From 1986 to 2000, their program conducted more than 500 CISD's with its personnel.¹⁷³ Through a survey of participants from their department, it was found that the majority of their members found the CISD process useful, and felt that it sped up the mental recovery from traumatic events.¹⁷⁴ Once again, however, this data is subjective; it is based upon the experience of the users with no real scientific data to back it up. What was interesting to note from this study was how it determined if these sessions should be mandatory. When voluntary compliance was attempted, no more than three people showed up at a session. Los Angeles County Fire Department management decided that making these sessions mandatory had a negative implication by sounding heavy-handed, so the term was changed from "mandatory" to "automatic" for the attendance policy.

Another criticism of CISD was that providers might unintentionally guide participants into a pre-conceived notion of an expected emotional response.¹⁷⁵ In other words, CISD sessions may lead to firefighters to think they must react a certain way emotionally, and if they vary from that, their emotional response may be inadequate or incorrect. This could cause further psychological trauma, especially for those whose transition to PTSD comes through multiple exposures to trauma over time, and therefore has slow developmental changes. In addition, CISD is limited because it is designed specifically to prevent PTSD; because the majority of the population will face trauma at some point in their lives but will not develop a true PTSD diagnosis, it is reasonable to postulate that although PTSD is a potential consequence of trauma exposure, it is not a certain response. Since the intent of CISD is focused on PTSD, it is reasonable to assume it has very little impact on the small proportion of people who develop PTSD.¹⁷⁶ In the

¹⁷² Shannon Wagner, "Emergency Response Service Personnel and the Critical Incident Stress Debriefing Debate," *International Journal of Emergency Mental Health* 7, no. 1 (2005): 33–41.

¹⁷³ Melvin Hokanson and Bonnita Wirth, "The Critical Incident Stress Debriefing Process for the Los Angeles County Fire Department: Automatic and Effective," *International Journal of Emergency Mental Health* 2, no. 4 (Fall 2000): 249–258.

¹⁷⁴ Hokanson and Wirth, "The Critical Incident Stress Debriefing Process."

¹⁷⁵ Jeannette and Scoboria, "Firefighter Preferences Regarding Post-Incident Intervention."

¹⁷⁶ *Ibid.*

end, it may be that those firefighters who have a higher propensity for mental health issues are more likely to recognize a stressful situation, and are more likely to seek and thus benefit from a discussion.

D. JOINT MILITARY SERVICES AND THE DEPARTMENT OF VETERANS AFFAIRS PROGRAMS

No entity has examined PTSD more than the Department of Veterans Affairs (DVA) and the National Center for PTSD. The adjustment from a military life involving combat back into civilian life can be challenging in various ways, and may contribute to what seems like the sudden emergence of mental health issues. The two main types of therapy currently used to treat veterans suffering from PTSD are psychotherapy, sometimes called counseling, and medication.¹⁷⁷ Psychotherapy involves treatment known as cognitive behavioral therapy (CBT), and has shown results indicating it is the most effective treatment for PTSD.¹⁷⁸ CBT is divided into cognitive processing therapy (CPT)—during which the individuals learn skills that enable them to comprehend how the way they think and feel has been altered by the trauma—and prolonged exposure (PE) therapy—which involves repeatedly talking about the trauma experience until the memories no longer cause the arousal reaction.¹⁷⁹ Another psychotherapy treatment is eye movement desensitization and reprocessing (EMDR), which uses hand movements or sounds to create a distraction while talking about the trauma, and can help change how the individual reacts to the traumatic memory.¹⁸⁰ Medications that treat PTSD are generally selective serotonin reuptake inhibitors (SSRIs), which can make a person feel better by increasing the brain’s serotonin levels.¹⁸¹

¹⁷⁷ National Center for PTSD, “Understanding PTSD Treatment,” August 2013, www.ptsd.va.gov/public/understanding_TX/booklet.pdf.

¹⁷⁸ National Center for PTSD, “Understanding PTSD Treatment.”

¹⁷⁹ *Ibid.*

¹⁸⁰ *Ibid.*

¹⁸¹ *Ibid.*

1. Cognitive Processing Therapy

The intent of CPT is to help the individuals learn how experiencing trauma, as either a significant event or over time, changes the way they look at the world, others, and themselves.¹⁸² This is accomplished through four main parts. As explained by the National Center for PTSD, the first part is to learn about the specific PTSD symptoms from which an individual is suffering and how the therapy will apply to those symptoms.¹⁸³ A therapy plan is devised and the reason behind each part of the therapy is explained. Next, the treatment is focused on helping the individuals become more aware of their thoughts and feelings. Making sense of what has happened and why they feel the way they do will provide a better understanding of what is occurring. The goal is for the individual to eventually think of his or her trauma in a different light, which leads to healing. The fourth part of CPT helps the PTSD sufferers gain an understanding of how their beliefs have changed after experiencing trauma.¹⁸⁴ Trauma can often impact a person's beliefs, which can then affect how they participate in relationships, self-esteem, ability trusting others, feelings of safety, and ability to control situations. CPT allows them to talk about their new beliefs, find balance in these new beliefs, and be better prepared to deal with them in the future. The success of CPT has encouraged the Veteran's Administration Office of Mental Health to roll out a national therapist-training program.

2. Prolonged Exposure

PE is based upon the belief that recurrent exposure to stress-inducing memories, feelings, or situations can help to decrease the emotional impact, and thus the power they have to cause stress.¹⁸⁵ By talking with a therapist, the individuals can learn to identify what triggers their stressful memories or other symptoms, and then find ways to deal with them. Over time, the intent is to become more aware of one's own thoughts and feelings,

¹⁸² Ibid.

¹⁸³ Ibid.

¹⁸⁴ Ibid.

¹⁸⁵ National Center for PTSD, "Prolonged Exposure Therapy," last modified August 14, 2015, <http://www.ptsd.va.gov/public/treatment/therapy-med/prolonged-exposure-therapy.asp>.

be able to take charge of those thoughts and feelings and change reaction, which, in turn, will raise self-esteem. Like CPT, PE's therapy process comprises four main parts. As explained, again, by the National Center for PTSD, the first phase is educating the patient about the treatment, common reactions to trauma, and PTSD itself. This allows the individuals to learn more about the symptoms they are experiencing due to their condition and understand the objectives of their treatment. The second phase is focused on breathing. When people are anxious or scared, their breathing often changes. With retraining in this skill, however, they can learn to make themselves relax temporarily. Phase three involves real-world practice, also known as in-vivo-exposure.¹⁸⁶ The idea is to practice exposing the individual to known safe situations that have been avoided because of a link to the trauma. An example would be a firefighter who avoids infants because he or she was involved in a SIDS incident.¹⁸⁷ Over time, this type of exposure helps to lessen the trauma-related distress and provides greater control to the individual. The final phase involves voicing the trauma again and again with a therapist, and is referred to as imaginal exposure.¹⁸⁸ By repeatedly talking through the trauma events, the individual will learn to be less and less afraid of his or her memories.

3. Eye Movement Desensitization and Reprocessing

In EMDR, the individuals talk through their trauma memories while focusing on distractions such as hand movements or sounds.¹⁸⁹ The rapid eye movement associated with these activities distracts the brain while it works through the traumatizing memories. It is thought that PTSD symptoms arise from incomplete processing of memories.¹⁹⁰ The brain is designed to take normal experiences and sort them out, then store what is useful

¹⁸⁶ National Center for PTSD, "Prolonged Exposure Therapy."

¹⁸⁷ Centers for Disease Control and Prevention, "Sudden Unexpected Infant Death and Sudden Infant Death Syndrome," September 28, 2015, <http://www.cdc.gov/sids/aboutsuidandsids.htm>. "SIDS is defined as the sudden death of an infant less than 1 year of age that cannot be explained after a thorough investigation is conducted, including a complete autopsy, examination of the death scene, and a review of the clinical history. About 1,500 infants died of SIDS in 2013. SIDS is the leading cause of death in infants 1 to 12 months old."

¹⁸⁸ National Center for PTSD, "Prolonged Exposure Therapy."

¹⁸⁹ National Center for PTSD, "Understanding PTSD Treatment."

¹⁹⁰ *Ibid.*, 5.

and discard what is not. When a trauma is experienced, this process gets stuck or is incomplete, and memories cannot be properly processed. Focusing on these external stimuli created by hand movements and sound may help to reprogram how an individual reacts to the traumatic memories over time.¹⁹¹ Like the other treatments recommended by the DVA, EMDR has four main parts:

1. The identification of a target memory, image, or belief about the trauma.
2. Desensitization and reprocessing by focusing on a mental image while conducting hand movements that require rapid eye movement.
3. Replacing negative images and thoughts with positive ones, once the distress caused by these images is lessened.
4. Conducting a body scan by focusing on tension and unusual sensations in the body.¹⁹²

4. Medication

SSRIs are used to increase the level of serotonin in the brain and therefore make an individual feel better. Currently, there are two FDA-approved SSRIs available to treat PTSD, sertraline (Zoloft), and paroxetine (Paxil).¹⁹³ The upside to this type of treatment is that patients do not have to go through the normal 10–12 psychotherapy sessions. The downside to this treatment is that some people may feel nauseated when taking the medication, experience decreased interest in sex, or feel tired or sleep too much.¹⁹⁴ In addition, the majority of people who find these medications effective may need to continue to take them indefinitely, or symptoms will reappear. Another potential downside to medications is that some doctors also prescribe “benzodiazepines” for people with PTSD. According to the National Center for PTSD, this type of medication is not a good choice since it is often prescribed to individuals suffering from anxiety, and while they may help in the near-term, they do not treat the symptoms of PTSD and therefore are not effective long-term.¹⁹⁵ Because of the rapid growth of prescribing psychotropic drugs for treating mental illness in the last decade, the APA is in strong

¹⁹¹ Ibid.

¹⁹² Ibid., 5.

¹⁹³ Ibid.

¹⁹⁴ Ibid., 6.

¹⁹⁵ Ibid.

support of involving both primary care and mental health providers in the treatment design for patients.¹⁹⁶

E. GATEKEEPER TRAINING FOR SUICIDE PREVENTION

The Department of Defense (DOD) has been working to prevent suicide in military service members for a long time. In a 2011 report on suicide prevention titled *The War Within*, the National Defense Research Institute (RAND) made 14 recommendations for the DOD to consider implementing in order to enhance the effectiveness of its suicide prevention program.¹⁹⁷ One of these, Recommendation 5, was to evaluate gatekeeper training.¹⁹⁸ In its simplest form, a “gatekeeper” is someone who is responsible for identifying and referring an individual who may be at risk for suicide. The gatekeepers in the military service tend to be non-commissioned officers and chaplains.

The intent of gatekeeper training is to increase the gatekeepers’ knowledge about suicide, discuss beliefs and attitudes about suicide prevention, and to overcome the disinclination to get involved by increasing the ability to intercede.¹⁹⁹ What has not been consistently proven is if this program has a significant impact on suicide rates. One criticism from the 2011 report is that, with so many people trained to be gatekeepers, there may be a tendency to see suicide as someone else’s problem. Data from the RAND report does show that knowledge of suicide can be increased and lead to more effective recognition of warning signs and intervention strategies, but that actual intervention behavior has not been studied.²⁰⁰ Currently, there is limited data showing that developing more dynamic beliefs and attitudes about the ability to prevent suicide is related to fewer suicides and suicide attempts.²⁰¹ The stigma associated with mental illness, and

¹⁹⁶ Smith, “Inappropriate Prescribing.”

¹⁹⁷ Rajeev Ramchand et al., *The War Within: Preventing Suicide in the U.S. Military* (Santa Monica, CA: RAND, 2011), <http://www.rand.org/pubs/monographs/MG953.html>.

¹⁹⁸ Crystal Burnette, Rajeev Ramchand, and Kynsay Ayer, *Gatekeeper Training for Suicide Prevention: A Theoretical Model and Review of the Empirical Literature* (Santa Monica, CA: RAND, 2015), iii, xxv, http://www.rand.org/content/dam/rand/pubs/research_reports/RR1000/RR1002/RAND_RR1002.pdf.

¹⁹⁹ Ramchand et al., *The War Within*.

²⁰⁰ Ibid.

²⁰¹ Burnette, Ramchand, and Ayer, *Gatekeeper Training for Suicide Prevention*.

especially suicide, is one reason people are reluctant, even as gatekeepers, to get involved or intervene. Studies show that, after receiving the gatekeeper training, reluctance to intervene is reduced.²⁰² However, to date, there is not a single study that shows improvements in decreasing levels of reluctance to intervene resulting in decreased rates of suicide or suicide attempts.²⁰³ Finally, when it comes to willingness to intervene—meaning an individual’s belief that he or she can impact getting treatment for a person at risk for suicide—there is, at best, mixed evidence showing positive improvement.²⁰⁴ The truth of the matter is that there is no definitive evidence showing a favorable outcome to either side. Therefore, based upon the evidence in the RAND report, there is very little, if any, benefit in the gatekeeper program.

²⁰² Ibid.

²⁰³ Ibid., 9

²⁰⁴ Ibid.

V. FINDINGS AND RECOMMENDATIONS

A. FINDINGS

The primary goal of this research was to determine whether fire service leaders could implement processes and policies that will decrease the number of firefighters suffering from PTSD that results in suicide. In order to study this issue, it was necessary to first determine if, in fact, firefighter suicide is on the rise, and if there is a causal connection between PTSD and suicide signified by rate changes. The research showed that firefighter suicide is increasing at an alarming rate, but still does not accurately reflect the enormity of this problem. In 2014, 109 firefighter suicides were recorded by the FBHA, which was a record year.²⁰⁵ In 2015 the record was broken again, with 112 reported firefighter suicides.²⁰⁶ It is important to keep in mind, however, that suicide statistics for firefighters have inaccuracies because they rely on self-reporting from fire agencies, and have only been tracked by the FBHA since 2010. In addition, the firefighter who commits suicide may have been a volunteer, so although occupation may be listed, it may not reflect their role as a firefighter. The FBHA is helping to track firefighter suicide from around the world, and has helped in highlighting that firefighter suicide is not just a national problem, but is an international problem as well.

The research did not identify a causal connection between PTSD and suicide for firefighters signified by rate changes. However, there is scientific information showing this connection among the general population and military veterans. Many veterans have been hired into the fire service in the last decade, which may establish this causal link in the future. What was shown is that the number of individuals being diagnosed with PTSD is increasing, with the help of better assessment tools, but this does not directly correlate to higher suicide rates.

With the publication of DSM-V, PTSD is no longer categorized as an anxiety disorder, but instead is part of a new category of “trauma and stressor-related disorders,”

²⁰⁵ Dill, “Firefighter Behavioral Health Alliance.”

²⁰⁶ Ibid.

along with acute stress disorder, adjustment disorders, and other related diagnoses. Although the majority of people will be exposed to traumatic events in their lifetime, only a small percentage will develop long-term PTSD. Causes of PTSD that are being studied include areas of the brain such as the prefrontal cortex and the amygdala. These areas play a role in the formation of memories, emotional responses, and the dampening of traumatic memories. Damage or chemical changes in these areas of the brain may be responsible for the development of PTSD. Also, chemical issues within the brain such as decreased serotonin, excess release of catecholamine, pathological development, or the lack of certain amino acids or proteins may cause the formation of stronger memories in certain individuals, and cause them to be more greatly affected by events than the general population. In general, PTSD itself is not the sole cause of suicide ideation. Often, the genesis for suicide is a result of PTSD and a comorbid issue such as depression, substance abuse, or mental illness.

Research shows that PTSD and suicide have impacted the fire service in many ways. On the surface are the financial impacts. Fire departments make a large investment in training, equipping, and maintaining the skills of their personnel, so the loss of any one firefighter has a significant cost in experience and knowledge. This does not account for the emotional loss, which cannot be measured and takes a toll on the entire organization.

The interpersonal theory of suicide shows the dynamic relationship between what is occurring inside the individual and its relationship with the individual's environment, which can be used as an accurate predictor for suicide. Using the ITS, it will be possible for fire department peer support personnel to identify firefighters who may be at risk for PTSD and potential suicide.

Of the mental health programs researched for use at the non-professional level, Stress First Aid seems to be the most comprehensive and logical choice to implement. The training and support is available at a national level, does not require in-depth knowledge and experience, and is available for a reasonable cost. Peer supporters will be able to easily utilize elements of SFA in conjunction with the ITS in order to identify at-risk firefighters. Although PFA and SFA share common elements, SFA was specifically designed for firefighters and first responders, not just survivors of disasters, and therefore

has more applicability to firefighter PTSD and suicide. SFA also allows for continuous monitoring of firefighters for different stressors in both their professional and personal lives. Using CISD, which is common in the fire service, has been under scrutiny for the last 20 years with no conclusive evidence as to its effectiveness.

The Department of Veterans Affairs has been one of the leading research authorities on PTSD and suicidality, due to the high number of combat veterans suffering from these conditions. The DVA has had success utilizing psychotherapy, in the forms of CBT (CPT and PE), medication therapy (SSRIs), and EMDR. For those firefighters who are beyond the level of peer counseling, professional mental health counseling and treatment is necessary. The success of the DVA's program has led them to establish a national therapist-training program for these therapies. At the time of this writing, it is clear that the military programs have provided the greatest scientific evidence in the positive treatment of PTSD and suicide. Further research needs to be conducted on suicide theories and their effectiveness at early prediction of PTSD and suicide risk factors. In addition, as technology and information become more available, research on biomarkers for PTSD, and how they can be used in the hiring process, should be conducted.

B. RECOMMENDATIONS

- (1) Reporting firefighter suicides should be mandatory for every fire department and enforced at a national level by the United States Fire Administration (USFA).

This research has shown that accurate data on the number of firefighters who commit suicide each year is very limited. Because there is no data collection program, the numbers that are gathered are almost certainly well below the true count, and do not accurately reflect the scope of this problem. Through a partnership involving the International Association of Fire Chiefs and the International Association of Firefighters, mandatory reporting of firefighter suicide should become a standard. As demonstrated by the research, without this reporting, the scope of the firefighter suicide problem cannot be accurately measured. Data collection means have already been put in place by the FBHA; the collection can be done anonymously to avoid violating the Health Insurance

Portability and Accountability Act. If necessary, the hiring process can include an acknowledgment that this data is provided per policy requirements.

- (2) Mental health training should be mandatory for every fire department training curriculum, as per USFA criteria, and should include a Stress First Aid program.

Because of the physicality of a firefighter's job, physical exercise is emphasized and even required by some certified bargaining agreements. This ensures the firefighters stay healthy and have the ability to perform their job properly and effectively. In light of the information provided in this research, mental health should be emphasized and considered just as important as physical health. Just as a physical injury can be debilitating, so, too, can a mental injury. Without a process to gauge the amount of mental trauma that has been sustained, the fire service will not have a way to ensure its firefighters' complete return to well-being.

Mental health training needs to occur at every level of a fire department and involve all employees in order to identify early PTSD and suicide warning signs. Programs such as Stress First Aid should be implemented in order to provide a platform to help those who are showing signs of stress and the potential for PTSD. This program should be designed as a tiered process, allowing a smooth transition from peer support to professional mental health treatment. Management and labor need to draft a process for treating those who may be suffering mental health issues that also protects the employees' rights. Policies outlining the process need to be designed and put in place so that each person has the same opportunity for a long career from a mental health perspective.

- (3) The USFA should require each fire department to implement a mental health policy, which should include a partnership with a professional mental health care provider.

Fire departments should be required to establish a retainer-type partnership with local mental health professionals in order to provide firefighters with easy access to professional resources if needed. This should be included in the design of a mental health program. Part of this program needs to focus on educating mental health professionals

about the firefighter culture, mission, and responsibilities. In order for their treatment to be effective, they must understand the people they will be treating.

C. CONCLUSION

Large emphasis is placed upon the number of line of duty deaths (LODDs) in the fire service each year, and varies from year to year. The fire service and many of its peripheral organizations, such as the NFFF, take great pride in their programs, such as the everybody goes home program, which are geared toward decreasing LODDs. This same pride and emphasis is not directed toward the issue of firefighter suicide. This thesis has demonstrated that the number of firefighter suicides has increased significantly in the past 10 years, and is continuing to rise. The data used to capture this trend has inaccuracies; there is a high probability that the number of firefighter suicides is under reported and does not accurately reflect the enormity of this issue. Discussing suicide is taboo, or seen as weakness, so most firefighters do not discuss it, and therefore it is a subject that stays in the shadows. Under USFA authority, the fire service culture must change, the enormity of the problem of suicide must be identified, and mental health must be a part of every training program. Through these efforts, the number of firefighter suicides can be decreased.

Further research should be conducted on fire departments with established programs that identify and treat PTSD; this research can help determine which treatments are most effective for firefighters. Also, from a social identity perspective, further research can identify the cultural barriers that hamper the issue of mental health, and how these can be overcome. As research continues into the biological factors for PTSD and suicide, researchers should identify those practices that have been proven to empirically identify at-risk candidates.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A. DSM-IV-TR CRITERIA FOR PTSD

Post Traumatic Stress Disorder (PTSD)

DSM-IV-TR Criteria for PTSD

- A.** The person has been exposed to a traumatic event in which both of the following were present:
1. Experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
 2. The person's response involved intense fear, helplessness, or horror
- B.** The traumatic event is persistently **RE-EXPERIENCED** in **one (or more)** of the following ways:
1. Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions
 2. Recurrent distressing dreams of the event
 3. Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated)
 4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
 5. Physiologic reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
- C.** Persistent **AVOIDANCE** of stimuli associated with the trauma and **NUMBING** of general responsiveness (not present before the trauma), as indicated by **three (or more)** of the following:
1. Efforts to avoid thoughts, feelings, or conversations associated with the trauma
 2. Efforts to avoid activities, places, or people that arouse recollections of the trauma
 3. Inability to recall an important aspect of the trauma
 4. Markedly diminished interest or participation in significant activities
 5. Feeling of detachment or estrangement from others
 6. Restricted range of affect (e.g., unable to have loving feelings)
 7. Sense of foreshortened future (e.g., does not expect to have a normal life)
- D.** Persistent symptoms of increased **AROUSAL** (not present before the trauma), indicated by **at least two** of the following:
1. Difficulty falling or staying asleep
 2. Irritability or outbursts of anger
 3. Difficulty concentrating
 4. Hyper-vigilance
 5. Exaggerated startle response
- E.** Duration of the disturbance (symptoms in B, C, and D) is > 1 month
- F.** The disturbance causes clinically significant distress or impairment in functioning

Source: DAV, "Post Traumatic Stress Disorder (PTSD) DSM-IV-TR Criteria for PTSD," 3, <http://www.pdhealth.mil/guidelines/downloads/ptsd.pdf>.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B. EMPIRICALLY DEMONSTRATED RISK FACTORS FOR SUICIDE

The following table is from Kimberly A. Van Orden et al., “The Interpersonal Theory of Suicide,” <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3130348/>.

Risk Factor	Studies demonstrating associations
Mental Disorders	(Brent, Perper, Moritz, Allman, Friend, Roth, et al., 1993; Goodwin & Jamison, 2007; Harris & Barraclough, 1997; Hawton, Sutton, Haw, Sinclair, & Harriss, 2005; Moskos, Olson, Halbern, Keller, & Gray, 2005; Nock, et al., 2009; Nock, Hwang, Sampson, & Kessler, 2009; Shaffer, Gould, Fisher, Trautman, Moreau, Kleinman, et al., 1996; Wilcox, Conner, & Caine, 2004). Includes meta-analysis
Previous suicide attempts	(Beautrais, 2002; Brent, Baugher, Bridge, Chen, & Chiappetta, 1999; Christiansen & Jensen, 2007; Conwell, Lyness, Duberstein, Cox, Seidlitz, DiGiorgio, et al., 2000; Coryell & Young, 2005; Fawcett, Scheftner, Fogg, Clark, Young, Hedeker, et al., 1990; Gibb, Beautrais, & Fergusson, 2005; Haste, Charlton, & Jenkins, 1998; Haw, Bergen, Casey, & Hawton, 2007; Hoffmann & Modestin, 1987; Jokinen, Carlborg, Martensson, Forslund, Nordstrom, & Nordstrom, 2007; Kotila & Lonnqvist, 1987; Kullgren, 1988; Li, Phillips, Zhang, Xu, & Yang, 2008; Limosin, Loze, Philippe, Casadebaig, & Rouillon, 2007; Maser, Akiskal, Schettler, Scheftner, Mueller, Endicott, et al., 2002; Nordstrom, Asberg, Aberg-Wistedt, & Nordin, 1995; Owens, Booth, Briscoe, Lawrence, & Lloyd, 2003; Phillips, Yang, Zhang, Wang, Ji, & Zhou, 2002; Pompili, Lester, Grispini, Innamorati, Calandro, Iliceto, et al., 2009; Renaud, Brent, Birmaher, Chiappetta, & Bridge, 1999; Shaffer, et al., 1996; Shafii, Carrigan, Whittinghill, & Derrick, 1985; Suominen, et al., 2004; Tidemalm, Elofsson, Stefansson, Waern, & Runeson, 2005; Tsai, Kuo, Chen, & Lee, 2002; Yim, Yip, Li, Dunn, Yeung, & Miao, 2004; Zonda, 2006)

Risk Factor	Studies demonstrating associations
Social Isolation	(Appleby, Cooper, Amos, & Faragher, 1999; Beautrais, 2002; Brent, Johnson, Perper, Connolly, Bridge, Bartle, et al., 1994a; Cantor & Slater, 1995; Conner, Duberstein, & Conwell, 1999; Conwell, Rotenberg, & Caine, 1990; Dervic, Brent, & Oquendo, 2008; Duberstein, Conwell, Conner, Eberly, Evinger, & Caine, 2004; Durkheim, 1897; Fazel, Cartwright, Norman-Nott, & Hawton, 2008; Fleischmann, et al., 2008; Gove & Hughes, 1980; Groholt, Ekeberg, Wichstrom, & Haldorsen, 1998; Heikkinen, Aro, & Lönnqvist, 1994; Hoyer & Lund, 1993; Koivumaa-Honkanen, Honkanen, Viinamäki, Heikkilä, Kaprio, & Koskenvuo, 2001; Kposowa, 2000; Maris, 1969; Miller, 1978; Motto & Bostrom, 2001; Murphy, Wetzel, Robins, & McEvoy, 1992; Nickel, Simek, Moleda, Muehlbacher, Buschmann, Fartacek, et al., 2006; Obafunwa & Busuttil, 1994; Pokorny, 1983; Qin & Nordentoft, 2005; Rubenowitz, Waern, Wilhelmson, & Allebeck, 2001; Sainsbury, 1955; Shafii, Carrigan, Whittinghill, & Derrick, 1985; Sourander, Klomek, Niemela, Haavisto, Gyllenberg, Helenius, et al., 2009; Stack, 1990; Thoresen, Mehlum, Roysamb, & Tonnessen, 2006; Turvey, Conwell, Jones, Phillips, Simonsick, Pearson, et al., 2002; Waern, Rubenowitz, & Wilhelmson, 2003; Wyder, Ward, & De Leo, 2009)
Physical Illness	(Bagley, Jacobson, & Rehin, 1976; Bastia & Kar, 2009; Blackmore, Munce, Weller, Zagorski, Stansfeld, Stewart, et al., 2008; Chynoweth, Tonge, & Armstrong, 1980; Conner, Duberstein, & Conwell, 1999; Conwell, Rotenberg, & Caine, 1990; Fang, et al., 2008; Harris & Barraclough, 1997; Harwood, Hawton, Hope, Harriss, & Jacoby, 2006; Heikkinen & Lonqvist, 1995; Hem, Loge, Haldorsen, & Ekeberg, 2004; Hunt, Kapur, Webb, Robinson, Burns, Shaw, et al., 2009; Kaplan, McFarland, Hugueta, & Newsom, 2007; Llorente, Burke, Gregory, Bosworth, Grambow, Horner, et al., 2005; Marshall, Burnett, & Brasure, 1983; Miller, Mogun, Azrael, Hempstead, & Solomon, 2008; Obafunwa & Busuttil, 1994; Quan & Arboleda-Florez, 1999; Rubenowitz, Waern, Wilhelmson, & Allebeck, 2001; Timonen, Viilo, Vaisanen, Rasanen, Hakko, & Sarkioja, 2002; Walker, Waters, Murray, Swanson, Hibberd, Rush, et al., 2008)
Unemployment	(Abe, Shioiri, Nishimura, Nushida, Ueno, Kojima, et al., 2004; Bastia & Kar, 2009; Breault, 1986; Brown, Beck, Steer, & Grisham, 2000; Conner, Duberstein, & Conwell, 1999; Faupel, Kowalski, & Starr, 1987; Gruenewald, Ponicki, & Mitchell, 1995; Gururaj, Isaac, Subbakrishna, & Ranjani, 2004; Heikkinen & Lonqvist, 1995; Hutchinson & Simeon, 1997; Inoue, Tanii, Kaiya, Abe, Nishimura, Masaki, et al., 2007; Kreitman & Platt, 1984; Platt, 1992; Preti & Miotto, 1999; Schony & Grausgruber, 1987; Sholders, 1981; Waern, Rubenowitz, & Wilhelmson, 2003; Yim, et al., 2004)

Risk Factor	Studies demonstrating associations
Family Conflict	(Bastia & Kar, 2009; Brent, Baugher, Bridge, Chen, & Chiappetta, 1999; Brent, et al., 1994a; Brent, Perper, Moritz, Liotus, Schweers, Balach, et al., 1994b; Duberstein, Conwell, Conner, Eberly, & Caine, 2004; Filiberti, et al., 2001; Foster, 2003; Gould, Fisher, Parides, Flory, & Shaffer, 1996; Gururaj, Isaac, Subbakrishna, & Ranjani, 2004; Hawton, Fagg, & Simkin, 1996; Heikkinen, Aro, & Lönnqvist, 1994; Heikkinen & Lonngqvist, 1995; Joiner, et al., 2002; Leighton & Hughes, 1955; Motto & Bostrom, 1990; Rubenowitz, Waern, Wilhelmson, & Allebeck, 2001; Samaraweera, Sumathipala, Siribaddana, Sivayogan, & Bhugra, 2008; Waern, Rubenowitz, & Wilhelmson, 2003)
Family History of Suicide	(Agerbo, Nordentoft, & Mortensen, 2002; Kim, Seguin, Therrien, Riopel, Chawky, Lesage, et al., 2005; McGirr, Tousignant, Routhier, Pouliot, Chawky, Margolese, et al., 2006; Qin, Agerbo, & Mortensen, 2002; Roy & Segal, 2001; Roy, Segal, Centerwall, & Robinette, 1991; Rubenowitz, Waern, Wilhelmson, & Allebeck, 2001; Runeson & Asberg, 2003; Shafii, Carrigan, Whittinghill, & Derrick, 1985; Tsai, Kuo, Chen, & Lee, 2002)
Impulsivity	(Brent, et al., 1994a; Dumais, Lesage, Alda, Rouleau, Dumont, Chawky, et al., 2005; Maser, et al., 2002; McGirr, Paris, Lesage, Renaud, & Turecki, 2007; McGirr, Renaud, Bureau, Seguin, Lesage, & Turecki, 2008; Renaud, Berlim, McGirr, Tousignant, & Turecki, 2008; Zouk, Tousignant, Seguin, Lesage, & Turecki, 2006)
Incarceration	(Binswanger, Stern, Deyo, Heagerty, Cheadle, Elmore, et al., 2007; Dooley, 1990; DuRand, Burtka, Federman, Haycox, & Smith, 1995; Fazel, Cartwright, Norman-Nott, & Hawton, 2008; Fruehwald, Frottier, Eher, Ritter, & Aigner, 2000; Hayes, 1989; Kariminia, Butler, Corben, Levy, Grant, Kaldor, et al., 2007)
Hopelessness	(Abramson, Metalsky, & Alloy, 1989; Beck, Brown, & Steer, 1989; Beck, Steer, & Trexler, 1989; Brown, Beck, Steer, & Grisham, 2000; Huth-Bocks, Kerr, Ivey, Kramer, & King, 2007; McMillan, Gilbody, Beresford, & Neilly, 2007; Nock & Kazdin, 2002; Smith, Alloy, & Abramson, 2006; Suominen, Isometsa, Ostamo, & Lonngqvist, 2004; Wagner, Rouleau, & Joiner, 2000; Wen-Hung, Gallo, & Eaton, 2004)
Seasonal Variation	(Ajdacic-Gross, Wang, Bopp, Eich, Rossler, & Gutzwiller, 2003; Chew & McCleary, 1995; Christodoulou, Papadopoulos, Douzenis, Kanakaris, Leukidis, Gournellis, et al., 2009; Fossey & Shapiro, 1992; Preti & Miotto, 2001; Rocchi & Perlini, 2002; Yip, Chao, & Chiu, 2000)

Risk Factor	Studies demonstrating associations
Serotonergic Dysfunction	(Anisman, Du, Palkovits, Faludi, Kovacs, Szontagh-Kishazi, et al., 2008; Arango, Underwood, Gubbi, & Mann, 1995; Arranz, Eriksson, Mellerup, Plenge, & Marcusson, 1994; Bach-Mizrachi, Underwood, Tin, Ellis, Mann, & Arango, 2008; Cheetham, Crompton, Czudek, Horton, Katona, & Reynolds, 1989; Cui, Nishiguchi, Ivleva, Yanagi, Fukutake, Nushida, et al., 2008; Fudalej, Fudalej, Kostrzewa, Kuzniar, Franaszczyk, Wojnar, et al., 2009; Gibb, McGeary, Beevers, & Miller, 2006; Hrdina, Demeter, Vu, Sotonyi, & Palkovits, 1993; Lopez de Lara, Dumais, Rouleau, Lesage, Dumont, Chawky, et al., 2006; Mann, Huang, Underwood, Kassir, Oppenheim, Kelly, et al., 2000; Mann, Stanley, McBride, & McEwen, 1986; Pandey, Dwivedi, Rizavi, Ren, Pandey, Pesold, et al., 2002; Rosel, Arranz, San, Vallejo, Crespo, Urretavizcaya, et al., 2000; Zill, Buttner, Eisenmenger, Moller, Bondy, & Ackenheil, 2004)
Agitation/sleep	(Barraclough & Pallis, 1975; Farberow & MacKinnon, 1974; Fawcett, et al., 1990; Goldstein, Bridge, & Brent, 2008; Pompili, et al., 2009)
Childhood abuse	(Beautrais, 2001; Brent, Baugher, Bridge, Chen, & Chiappetta, 1999; Brent, et al., 1994b; Plunkett, O'Toole, Swanston, Oates, Shrimpton, & Parkinson, 2001; Renaud, Brent, Birmaher, Chiappetta, & Bridge, 1999)
Exposure to suicide	(Exeter & Boyle, 2007; Insel & Gould, 2008; McKenzie, Landau, Kapur, Meehan, Robinson, Bickley, et al., 2005)
Homelessness	(Babidge, Buhrich, & Butler, 2001; Barak, Cohen, & Aizenberg, 2004; Bickley, Kapur, Hunt, Robinson, Meehan, Parsons, et al., 2006; Haw, Hawton, & Casey, 2006)
Combat exposure	(Adams, Barton, Mitchell, Moore, & Einagel, 1998; Bullman & Kang, 1996; Kang & Bullman, 2008)
(low) Openness to experience	(Duberstein, 2001; Duberstein, Conwell, & Caine, 1994)
Pulling Together	(Biller, 1977; Joiner, Hollar, & Van Orden, 2006; Salib, 2003). Protective effect.
Self-esteem, shame	(Brevard, Lester, & Yang, 1990; Chatard, Selimbegovi, & Konan, 2009; Foster, 2003; Pompili, et al., 2009)

LIST OF REFERENCES

- American Association of Suicidology. "Know the Warning Signs of Suicide." Accessed January 31, 2016. <http://www.suicidology.org/resources/warning-signs>.
- American Psychiatric Association. *Posttraumatic Stress Disorder*. Arlington, VA: American Psychiatric Publishing, 2013. <http://www.dsm5.org/Documents/PTSD%20Fact%20Sheet.pdf>.
- American Psychological Association. "History of the DSM." September 15, 2015. <http://psychiatry.org/psychiatrists/practice/dsm/history>.
- Antonellis, Paul J. Jr. and Denise Thompson. "A Firefighter's Silent Killer: Suicide." *Fire Engineering*. December 1, 2012. <http://www.fireengineering.com/articles/print/volume-165/issue-12/features/firefighters-silent-killer-suicide.html>.
- Bordini, Ernest J. "Firefighter and First Responder Alcohol and Drug Issues Part I." Clinical Psychology Associates. 2013. http://cpancf.com/articles_files/Firstresponderfirefighteralcoholdrugs1.asp.
- "Bringing PTSD out of the Shadows," *Fire Fighter Quarterly*, Winter 2015, <http://www.iaff.org/mag/2015/01/html5/>.
- Brymer, M., A. Jacobs, C. Layne, R. Pynoos, J. Ruzek, A. Steinberg, E. Vernberg, and P. Watson. *Psychological First Aid: Field Operations Guide*, 2nd edition. National Child Traumatic Stress Network and National Center for PTSD, 2006. http://www.ptsd.va.gov/professional/manuals/manual-pdf/pfa/PFA_2ndEditionwithappendices.pdf.
- Burnette, Crystal, Rajeev Ramchand, and Kynsay Ayer. *Gatekeeper Training for Suicide Prevention: A Theoretical Model and Review of the Empirical Literature*. Santa Monica, CA: RAND, 2015. http://www.rand.org/content/dam/rand/pubs/research_reports/RR1000/RR1002/RAND_RR1002.pdf.
- Carey, Bill. "Understanding Stress First Aid in the Fire Service." *Fire Rescue*. November 3, 2013. <http://www.firefighternation.com/article/firefighter-fitness-and-health/understanding-stress-first-aid-fire-service>.
- Carey, Mary G., Salah S. Al-Zaiti, Grace E. Dean, Lorelee Sesanna, and Deborah S. Finnelli. "Sleep Problems, Depression, Substance Use, Social Bonding, and Quality of Life in Professional Firefighters." *Journal of Occupational Environmental Medicine* 53, no. 8 (November 1, 2012): 928–33.

- Cavanagh, J. T., A. J. Carson, M. Sharpe, and S. M. Lawrie. "Psychological Autopsy Studies of Suicide: A Systematic Review." *Psychological Medicine* 33 (2003): 395–405.
- Centers for Disease Control and Prevention. "Sudden Unexpected Infant Death and Sudden Infant Death Syndrome." Last modified September 28, 2015. <http://www.cdc.gov/sids/aboutsuidandsids.htm>.
- Cherie A. Penn. "Substance Testing in the Fire Service: Making Public Safety a Matter of National Policy." Master's thesis, Naval Postgraduate School, 2014.
- City of Mercer Island Washington. *2015—2016 Collective Bargaining Agreement (AB 5059)*. City of Mercer Island Washington, 2015. <http://sirepub.mercergov.org/meetings/cache/108/lurc4545temiyznoq5u0m555/41805501292016104034548.PDF>.
- Crosby, Fred. "The Real Meaning of Brotherhood." *Fire Engineering*. July 1, 2007. <http://www.fireengineering.com/articles/print/volume-160/issue-7/features/the-real-meaning-of-brotherhood.html>.
- Del Ben, Kevin S., Joseph R. Sotti, Yi-Chuen Chen, and Beverly Fortson. "Prevalence of Posttraumatic Stress Disorder Symptoms in Firefighters." *Work & Stress* 20, no. 1 (March 2006): 37–48.
- De Leon, Joshua. "Young Vets Are Three Times More Likely to Commit Suicide." Ring of Fire. January 12, 2015. <http://ringoffireradio.com/2015/01/young-vets-are-three-times-more-likely-to-commit-suicide/>.
- Department of Veterans Affairs. "Complex PTSD." Last modified August 17, 2015. <http://www.ptsd.va.gov/professional/PTSD-overview/complex-ptsd.asp>.
- . "How Common Is PTSD?" Last modified August 13, 2015. <http://www.ptsd.va.gov/public/PTSD-overview/basics/how-common-is-ptsd.asp>.
- Dill, Jeff. "Firefighter Behavioral Health Alliance." Accessed January 31, 2016. <http://www.ffbha.org/>.
- Dill, Jeff, and Cheryl Loew. *Suicide in the Fire and Emergency Services*. Greenbelt, MD: National Volunteer Fire Council, 2012.
- Erich, John. "Earlier Than Too Late: Stopping Stress and Suicide among Emergency Personnel." *EMS World*. November 1, 2014. www.emsworld.com/article/12009260/suicide-stress-and-ptsd-among-emergency-personnel.
- Ferguson, Laura. "Treatment of Trauma in Healthcare." Federation of State Physical Health Programs. 2014. <http://www.fsphp.org/Ferguson%20Presentation.pdf>.

- Finney, Emmanuel J., Samuel J. Buser, Schwartz, Jonathan, Laura Archibald, and Rick Swanson. "Suicide Prevention in the Fire Service: The Houston Fire Department (HFD) Model," *Aggression and Violent Behavior*, December 2015, doi: 10.1016/j.avb.2014.12.012.
- Foa, Edna, Seth J. Gillihan, and Richard A. Bryant. "Challenges and Successes in Dissemination of Evidence-Based Treatments for Posttraumatic Stress: Lessons Learned from Prolonged Exposure Therapy for PTSD." *Psychological Science in the Public Interest* 14, no. 2 (2013): 65–111. doi: 10.1177/1529100612468841.
- Fox, Jeffrey H., Frederick M. Burkle Jr., Judith Bass, Francesco A. Pia, Jonathan L. Epstein, and David Markenson. "The Effectiveness of Psychological First Aid as a Disaster Intervention Tool: Research Analysis of Peer-Reviewed Literature from 1990–2010." *Disaster Medicine and Public Health Preparedness* 6, no. 3 (2012): 247–52.
- Friedman, Matthew J. "PTSD History and Overview." Department of Veterans Affairs. last modified August 17, 2015. <http://www.ptsd.va.gov/professional/PTSD-overview/ptsd-overview.asp>.
- Friedman, Matthew J., Terence M. Keane, and Patricia A. Resick, eds. *Handbook of PTSD: Science and Practice*. Second. New York: Guilford Press, 2014.
- Fullerton, C. S., R. J. Ursano, and L. Wang. "Acute Stress Disorder, Posttraumatic Stress Disorder, and Depression in Disaster Rescue Workers." *American Journal of Psychiatry* 161, no. 8 (2004): 1370–76.
- Gist, Richard, Vicki H. Taylor, and Scott Raak. "Suicide Surveillance, Prevention, and Intervention Measures for the U.S. Fire Service: Findings and Recommendations for the Suicide and Depression Summit." Presented at the Suicide and Depression Summit, Baltimore, MD, July 2011, http://www.naemt.org/docs/default-source/ems-health-and-safety-documents/mental-health-grid/suicide_white_paper_feb_1.pdf?sfvrsn=2.
- Gudrais, Elizabeth. "A Tragedy and a Mystery: Understanding Suicide and Self-Injury." *Harvard Magazine*, January–February 2011. <http://harvardmagazine.com/2011/01/tragedy-and-mystery>.
- Halpern, Janice, Maria Gurevich, Brian Schwartz, and Paulette Brazeau. "Interventions for Critical Incident Stress in Emergency Medical Services: A Qualitative Study." TEMA Memorial Trust. Accessed September 10, 2015. www.tema.ca/#!research/clekr.
- Hammond, Jeffrey, and Jill Brooks. "The World Trade Center Attack; Helping the Helpers: The Role of Critical Incident Stress Management." *Critical Care* 5, no. 6 (November 6, 2001): 315–17.

- Herman, Judith. *Trauma and Recovery: The Aftermath of Violence from Domestic Abuse and Political Terror*. New York: Basic Books, 1997.
- Hokanson, Melvin and Bonnita Wirth. "The Critical Incident Stress Debriefing Process for the Los Angeles County Fire Department: Automatic and Effective." *International Journal of Emergency Mental Health* 2, no. 4 (Fall 2000): 249–258.
- Hollenbach, David R. III. "Women in the Fire Service: A Diverse Culture Leads to a Successful Culture." *Fire Engineering*. April 25, 2014.
<http://www.fireengineering.com/articles/print/volume-167/issue-4/features/women-in-the-fire-service-a-diverse-culture-leads-to-a-successful-culture.html>.
- Holtzheimer, Paul E. and Charles B. Nemeroff. "Future Prospects in Depression Research," *Dialogues in Clinical Neuroscience* 8, no 2 (June 2006): 175–89.
- Jeannette, James M., and Alan Scoboria. "Firefighter Preferences Regarding Post-Incident Intervention." *Work & Stress* 22, no. 4 (October 2008): 314–26.
- Joiner, Thomas Matthew Nock, and Lanny Berman. "Issues of Depression and Suicide in the Fire Service," National Fallen Firefighters Foundation. July 11, 2011.
http://1rxflr7bsmg1aa7h24arae91.wpengine.netdna-cdn.com/wp-content/uploads/sites/2/2014/01/depressionsuicide_summary.pdf.
- Mayo Clinic. "Diseases and Conditions: Mental Illness." October 13, 2015.
<http://www.mayoclinic.org/diseases-conditions/mental-illness/basics/definition/con-20033813.033813>.
- McFarlane, Alexander, Penny Williamson, and Christopher A. Barton. "The Impact of Traumatic Stressors in Civilian Occupational Settings." *Journal of Public Health Policy* 30, no. 3 (2009): 311–27.
- Meroney, Brian. "Dealing with PTSD in the Fire Service." Firefighter Nation. Accessed May 29, 2015. <http://www.firefighternation.com/article/management-and-leadership/dealing-ptsd-fire-service>.
- Murphy, Beth. "Firefighter Suicide and Mental Illness." FDIC International. September 2014. <http://www.fdic.com/articles/2014/09/beth-murphy-firefighter-suicide-and-mental-illness.html>.
- National Center for PTSD. "Prolonged Exposure Therapy." Last modified August 14, 2015. <http://www.ptsd.va.gov/public/treatment/therapy-med/prolonged-exposure-therapy.asp>.
- . "Understanding PTSD Treatment." August 2013. http://www.ptsd.va.gov/public/understanding_TX/booklet.pdf.

- National Fallen Firefighters Foundation. "16 Firefighter Life Safety Initiatives." Accessed January 31, 2016. <http://www.everyonegoeshome.com/16-initiatives/>.
- . *Confronting Suicide in the Fire Service: Strategies for Intervention and Prevention*. Emmitsburg, MD: National Fallen Firefighters Foundation, 2014. <http://www.everyonegoeshome.com/2014/12/02/suicides-preventable-reaching-vulnerable/>.
- . "Psychological Support." Everyone Goes Home. Accessed January 20, 2016. <http://www.everyonegoeshome.com/16-initiatives/13-psychological-support/>.
- National Institute of Mental Health. "Post-Traumatic Stress Disorder (PTSD): What Is Post-Traumatic Stress Disorder (PTSD)?" Accessed January 31, 2016. <http://nimh.nih.gov/health/topics/post-traumatic-stress-disorder-ptsd/index.shtml>.
- Neria, Yuval, Laura DiGrande, and Ben G. Adams. "Posttraumatic Stress Disorder Following the September 11, 2001, Terrorist Attacks: A Review of the Literature among Highly Exposed Populations." *American Psychology* 66, no. 6 (June 29, 2012): 429–66.
- NICE. "Post-Traumatic Stress Disorder: Management." March 2005. guidance.nice.org.uk/cg26.
- Nordqvist, Christian. "What Are Symptoms? What Are Signs?" *Medical News Today*. September 8, 2014. <http://www.medicalnewstoday.com/articles/161858.php>.
- Oquendo, Maria, David A. Brent, Boris Birmaher, Laurence Greenhill, David Kolko, Barbara Stanley, and Jamie Zelazny. "Posttraumatic Stress Disorder Comorbid with Major Depression: Factors Mediating the Association with Suicidal Behavior." *American Journal of Psychiatry* 163, no. 3 (March 2005): 560–66.
- OSHA, "Critical Incident Stress Guide." Accessed November 23, 2015. <https://www.osha.gov/SLTC/emergencypreparedness/guides/critical.html>.
- Panagioti, Maria, Patricia A. Gooding, and Nicholas Tarrier. "A Meta-Analysis of the Association between Posttraumatic Stress Disorder and Suicidality: The Role of Comorbid Depression." *Comprehensive Psychology*, no. 53 (2012): 915–30. doi:10.1016/j.comppsy.2012.02.009.
- . "Hopelessness, Defeat, and Entrapment in Posttraumatic Stress Disorder: Their Association with Suicidal Behavior and Severity of Depression." *The Journal of Nervous and Mental Disease* 200, no. 8 (August 2012): 676–83.
- Ramchand, Rajeev, Joie Acosta, Rachel M. Burns, Lisa H. Jaycox, and Christopher G. Pernin. *The War Within: Preventing Suicide in the U.S. Military*. Santa Monica, CA: RAND, 2011. <http://www.rand.org/pubs/monographs/MG953.html>.

- Rodgers, Philip. *Understanding Risk Factors and Protective Factors for Suicide: A Primer for Preventing Suicide*. Newton, MA: Education Development Center, 2011), <http://www.sprc.org/sites/sprc.org/files/library/RiskProtectiveFactorsPrimer.pdf>.
- Ross, C. “Real Healing: Suicide: One of Addiction’s Hidden Risks.” *Psychology Today*. February 20, 2014. <http://www.psychologytoday.com/blog/real-healing/201402/suicide-one-addicton-s-hidden-risks>.
- Savia, Janet S. “Suicide among North Carolina Professional Firefighters: 1984–1999.” Ph.D. dissertation, Regent University, 2008. <http://gradworks.umi.com/33/05/3305393.html>.
- Stetka, Bret. “Could Depression Be Caused by Infection?” *NPR*. October 25, 2015. http://www.npr.org/sections/health-shots/2015/10/25/451169292/could-depression-be-caused-by-an-infection?utm_source=npr_newsletter&utm_medium=email&utm_content=20151025&utm_campaign=news&utm_term=nprnews.
- Tri Data Corporation. *The Economic Consequences of Firefighter Injuries and Their Prevention. Final Report* (NIST GCR 05–874). Gaithersburg, MD: NIST, March 2005. <http://fire.nist.gov/bfrlpubs/fire05/art025.html>.
- Van Orden, Kimberly. “Using the Interpersonal Theory of Suicide to Guide Risk Assessment, Crisis Management, and Intervention with Suicidal Clients.” Ph.D. dissertation, University of Delaware, 2013. http://dhss.delaware.gov/dsamh/files/si2013_usinginterpersonaltheoryofsuicide.pdf.
- Van Orden, Kimberly A., Tracy K. Witte, Kelly C. Cukrowicz, Scott Braithwaite, Edward A. Selby, and Thomas E. Joiner, Jr. “The Interpersonal Theory of Suicide.” *Psychological Review* 117, no. 2 (April 2010): 575–600. doi:10.1037/a0018697.
- Violanti, J. M. “Predictors of Police Suicide Ideation.” *Suicide and Life-Threatening Behavior* 34, no. 3 (2004): 277–83.
- Wagner, Shannon. “Emergency Response Service Personnel and the Critical Incident Stress Debriefing Debate.” *International Journal of Emergency Mental Health* 7, no. 1 (2005): 33–41.
- Wagner, Shannon L., Juanita A. McFee, and Crystal A. Martin. “Mental Health Implications of Fire Service Membership.” *Traumatology* 16, no. 2 (2010), 26–32.

Watson, Patricia J., Richard Gist, Vickie Taylor, William P. Nash, Britt Litz, and Richard Westpahl. *Stress First Aid for Firefighters and Emergency Services Personnel*. Emmitsburg, MD: National Fallen Firefighters Foundation, 2013. doi: 10.13140/RG.2.1.1768.9123.

Wilmoth, Janet A. "Trouble in Mind." *NFPA Journal*, May–June 2014: 1–9.

World Health Organization. "Substance Abuse." Accessed January 31, 2016.
http://www.who.int/topics/substance_abuse/en/.

Yehuda, Rachel M., Richard A. Bryant, Joseph Zohar, and Charles R. Marmar (eds.). "Neurobiological and Behavioral Consequences of Terrorism: Distinguishing Normal from Pathological Responses, Risk Profiling, and Optimizing Resilience." In *Psychology of Terrorism*, 492. New York: Oxford University Press, 2007.

Yehuda, Rachel M., and Alexander McFarlane. "Conflict between Current Knowledge about Posttraumatic Stress Disorder and its Original Conceptual Basis." *American Journal of Psychiatry* 152 (1995): 1705–13.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California