

## ABSTRACT

Title: PREDICTORS OF RESILIENCE AMONG  
COMMISSIONED OFFICERS IN THE  
UNITED STATES PUBLIC HEALTH  
SERVICE

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The purpose of this cross-sectional study was to examine the predictors of resilience and mental health among United States Public Health Service (USPHS) commissioned officers who have deployed. The study employed the Transactional Model of Stress and Coping (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977) to aid in evaluation of the above factors. Relatively few research studies have examined the concept of resilience, and to date, no study has systematically examined risk, social support, mental health and resilience in USPHS commissioned officers.

A pilot study (N = 11) was conducted to determine acceptability of the survey items and assess time needed to complete the questionnaire. The final 94-item on-line survey was completed over a two month time period by a convenience sample of 534 USPHS commissioned officers. Univariate analyses demonstrated that when entered individually, team support, post-deployment social support and mental health (protective factors) and the covariates, gender and relationship status were significantly ( $p < 0.05$ ) associated with resilience, while predeployment

affectivity (risk factor) was not. When all risk and protective factors were entered into the multivariate logistic regression model, team support, post-deployment social support, mental health, gender and being divorced as compared to being separated, widowed or living with a partner were found to be significantly associated with resilience ( $p<0.05$ ). Also, both team support and resilience were negatively associated with mental illness measured using depression, anxiety and post-traumatic stress disorder subscales ( $p<0.05$ ). Those USPHS commissioned officers who reported mental illness were less likely to be resilient.

This study provides new data that may help improve our understanding of the resilience and mental health of USPHS commissioned officers, before and after deployment. Findings can be used to inform education and training programs for USPHS commissioned officers (e.g. coping skills training techniques) to help increase their ability to thrive despite adversity before and after deployment.

PREDICTORS OF RESILIENCE AMONG COMMISSIONED OFFICERS IN THE UNITED  
STATES PUBLIC HEALTH SERVICE

by

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Dissertation submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park, in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
2012

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## Dedication

This dissertation is dedicated to my mentor and friend, the late, Dr. Daniel Leviton and my late grandparents, who imparted in me the belief that I can do anything. Last, to our twins, Carmen and Santina- may your spirits *live* on!

## Acknowledgements

I wish to express my deepest gratitude to my Lord and Savior Jesus Christ, who has given me the strength to overcome all difficulties. With Him, guidance from my committee members, help from friends, and support from my family and husband, Destry, there is a light at the end of the tunnel. Destry, without you I would never have been able to finish my dissertation. You really are my sun and stars.

I would like to also express my deepest gratitude to my advisor and chair, Dr. Sharon Desmond, for her guidance, and providing me an open atmosphere for discussion, thinking outside of the scope and leading me through this stimulating and demanding process. I would like to thank Dr. Kleinman (Rear Admiral, Retired, United States Public Health Service (USPHS)), Dr. Wang, Dr. Feldman, Dr. Sharp and Dr. Koblinsky for providing great insight into the concept of this dissertation. Your feedback has been invaluable in providing a productive dissertation study that aids in determining the role of resilience, team support and post-deployment social support in USPHS commissioned officers to deployment.

There other individuals too numerous to count that have had a hand at pushing me towards success, but I would like especially extend my thanks to all my girlfriends, but notable to- Dr. Essiet-Gibson, Dr. Cotterell, Dr. Ramos, Dr. Loatman-Omer (soon-to-be) for your friendship and wisdom. Also, to Mr. Paredes and Dr. Rochester for your willingness to provide assistance and giving the best of suggestions.

I would like to thank my Mom (Carmen Lydner- Peat) for traveling to and residing in a country that she did not know so that Tarik and I could succeed. To my Aunt Lyn (Lenneth

Lydner-Barnett) for leaving her loved ones and coming to the U.S. during the winter months to care for me and my family during my dissertation process. To my sons, Tristan and Tanner, for their love and patience when Mama had to do school “work.” You both are the best part of me.

Last but certainly not least, to the men and women of the USPHS- your willingness to respond to my request to participate in this dissertation study was overwhelming. Bravo zulu to you for exemplifying a motto of “onward and upward.”

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## **Chapter 1: Introduction and Significance**

### **Introduction**

Few research studies have examined the concept of resilience. In order for the United States to maintain national security, it relies on its uniformed services. There are seven United States uniformed services: the Army, Air Force, Navy, Marine Corps, Coast Guard, United States Public Health Service (USPHS), and the National Oceanic and Atmospheric Administration (NOAA). It is critical to understand service members' ability to thrive despite adversity before, during and after a stressful event such as deployment. This study investigated resilience and mental health issues as key components of force readiness among officers in the USPHS.

In the post September 11, 2001 terrorist attacks in New York and the ensuing Global War on Terrorism declared by the United States, the need for resilient and adaptable uniformed service members and leaders has become increasingly apparent. In Merriam-Webster's dictionary (11<sup>th</sup> ed.), resilience is defined as "an ability to recover from or adjust easily to misfortune or change" (p. 996). Lyons et al. (2010) further described resilience as "the ability to withstand operational demands and stressors without breaking down" (p. 7). There are numerous definitions for resilience; however for this study; resilience is best described as the ability to cope effectively to loss, hardship or adversity.

In military settings, resilience is seen as an important component of duty fitness (Lyons et al., 2010) because of the operational tempo associated with conflicts. Early research on duty fitness focused on identifying deficits within individuals and how to best identify and treat those

deficits (MacDermid et al., 2008). Researchers in behavioral health are beginning to explore the concept of resilience as a personal strength that may promote health and healing. Expanding on the previous definitions, resilience may be viewed as a coping strategy and could be an important target when treating anxiety and depression, and attempting to reduce stress reactions (Conner and Davidson, 2003). Studies have shown that resilience and social support may protect against the development of traumatic stress and depressive symptoms (Charuvastra et al., 2008; Southwick et al., 2005). In a study by King and colleagues (1998), resilience was shown to protect against the development of post-traumatic stress disorder (PTSD) following combat in Vietnam veterans and Army Reserve soldiers. Pietrzak, Johnson and Goldstein (2009) showed that higher perceived social support, which they operationalized as an individual's perception or experience of helpful and unhelpful social interactions, is also negatively associated with PTSD and depression. These findings suggest that increased resilience and perceived social support may help protect against the deleterious effects of traumatic stress and depression.

However, there is limited research with respect to examining risk factors such as predeployment affectivity and mental health problems and protective factors such as team support and post-deployment social support that affect resilience in commissioned officers in USPHS before, during and after deployment. The effect of stressors, potentially traumatic events and positive deployment experiences also need to be explored.

In 2007, approximately 11% of adults (23.7 million) in the United States experienced serious psychological distress, such as anxiety and mood disorders, that resulted in functional impairment that impeded one or more major life activities (Sundararaman, 2009). The Healthy People Initiative was launched by the Department of Health and Human Services in 1979 and

provides science-based, 10-year national goals and objectives for improving the health of all Americans. In the Healthy People 2020 document, mental health was identified as a nationwide health improvement priority. Healthy People 2020, Objective 18, “Mental Health and Mental Disorders” includes 12 specific national mental health and mental disorder sub-objectives that focus on mental health status improvement and treatment expansion (see Appendix A). One of the specific national goals is the improvement of mental health in general and to ensure access to appropriate, quality mental health services. For example, objective 18-4 sets a goal of ten percent reduction from the 2008 rate of 6.8 percent of adults as the proportion of adults who have been diagnosed with depression (Healthy People 2020). Further, objective 18-9 sets a goal of ten percent increase from the 2008 rate of 68.3 percent of adults with major depressive episodes who have received treatment (Healthy People 2020). Although mental health and absence of mental disorders are listed as overall objectives for our nation, the true prevalence of poor mental health is not well defined for these treatable medical conditions (NIMH, 2010).

In recent years, there has been an emergence of mental health issues among several special populations such as veterans who have experienced physical and mental trauma and people living in communities where large-scale psychological trauma occurred, caused by natural or manmade disasters. During the long wars in Iraq and Afghanistan, repeated military deployments have been linked to stress, anxiety and post-traumatic stress disorder (PTSD) among troops, as well as rising rates of suicide (Pietrzak et al., 2009). The federal government has implemented a number of programs and strategies to address this problem; however, there is still a lack of understanding regarding the scope of treatment options necessary to alleviate or mitigate adverse outcomes occurring as a result of mental disorders.

Five of seven military units, the Army, Air Force, Navy, Marine Corps and Coast Guard have observed increasing diagnoses of mental illness among their members (Pietrzak et al., 2010). Of 103,788 veterans assessed in a study by Seal et al. (2007), more than 32,000 veterans of Operation Iraqi Freedom and Operation Enduring Freedom who were discharged from the military between 2001 and 2005 were found by Veterans Affairs examiners to have mental health problems, including substance abuse. Specifically, the majority of soldiers determined to have mental health problems were diagnosed with PTSD, depression, anxiety and other related psychological problems that increase the risk of suicide (Seal et al., 2007). Post-traumatic stress disorder, depression and anxiety are often called the ‘expanding group of casualties from the conflict whose scars are more than skin deep’ or the ‘silent wound’ among members of the military (Tanielian and Jaycox, 2008).

This rise in diagnosis of mental illnesses among members of the uniformed services is well documented. However, uniformed services’ medical personnel are arguably less studied and to date, a large number of military medical personnel affected by mental illness have not been diagnosed and are therefore considered an unreported or under-reported population (Maguen et al., 2008). Military personnel have reported a host of deployment stressors that might place them at risk for mental health complications (Maguen et al., 2008), although the specific mental health risks among military medical personnel serving in Iraq are largely unknown. The authors further state that “if military medical personnel are worried about a variety of stressors at home, then it becomes increasingly more complicated to remain focused on their duties during their deployment” (p. 6).



The remaining two of the seven uniformed services, the USPHS and the NOAA, are also populations that could potentially face an increased risk of mental illnesses, similar to that observed among military personnel. Like the other five uniformed services, they repeatedly face stressors and traumatic events during deployments when responding to natural or technological disasters and providing humanitarian aid. Specifically, USPHS commissioned officers are medical and healthcare providers who may face similar stressors when deployed. In partnership with the Department of Defense, USPHS commissioned officers have served aboard Navy ships, providing clinical and public health services to Latin American, Caribbean, Pacific Rim, and Pacific Island residents. Further, USPHS commissioned officers have served in Afghanistan, delivering and coordinating clinical and public health interventions designed to improve maternal and child health outcomes in a sustainable system approach and are in harm's way similar to their armed forces counterparts (Galson, 2009). However, they remain an understudied population at risk for developing PTSD, depression, anxiety and related psychological problems that increase risk of suicide and subsequent loss in productivity. There are no known studies to date that identify risk factors associated with developing PTSD, depression and anxiety among commissioned officers in the USPHS after returning from a deployment. Nor is there research that focuses on the resilience and coping strategies used by members of the USPHS and NOAA.

The underlying premise for this dissertation was developed from the bolus of articles authored by Pietrzak et al. (2009 and 2010). The focus of this cross-sectional study was to examine possible predictors of resilience prior to and post deployment among medical and healthcare providers who are commissioned officers in the USPHS, using the Transactional

Model of Stress and Coping framework (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977). Specifically, the constructs of team support, predeployment affectivity, mental health and post-deployment social support were examined to determine their association with resilience in USPHS commissioned officers. Additionally, resilience and social support were studied to see whether they were protective against traumatic stress and depressive symptoms after controlling for demographic characteristics in these officers.

### **Statement of the Problem**

The USPHS commissioned corps is a unique branch of the uniformed services made up of highly skilled and educated health professionals. The individual mental and physical toughness of uniformed service has been a value to the military and has often been attributed to resilience. Researchers have long understood that traumatic events can lead to poor mental health and social functioning (Waugh et al., 2008). Less well understood is the resilience used to cope with a traumatic event or major life stressor such as deployment. Resilience, although not studied in this population, may be a necessary although not sufficient precondition for adaptable performance (Burns and Freeman, 2008). Additionally, the research methods related to resilience have not been standardized, and therefore resilience research findings are not easily applied by the military to identify which resilience factors are supported by scientific evidence (Meredith, 2011). This study sought to determine whether possible risk factors such as pre-deployment stressors and potential traumatic events and protective factors such as team support and post-deployment social support are predictors of resilience among commissioned officers in USPHS.

The mission of the United States Public Health Service commissioned corps officers is to protect, promote and advance the health and safety of the nation (Office of Force Readiness and Deployment, 2006). Commissioned officers achieve this mission through (1) rapid and effective response to public health needs, (2) leadership and excellence in public health practices, and (3) the advancement of public health science. This is accomplished by providing public health and medical resources to state, tribal and local health authorities throughout the United States and its territories. If a state, tribal or local health infrastructure suffers damage from a natural disaster or other event, deployment teams can assist officials in response and recovery efforts (Office of Force Readiness and Deployment, 2006).

United States Public Health Service commissioned officers who have met basic readiness standards deploy (voluntarily or directed) whenever public health is threatened to provide a service to an affected area. The primary areas of service provided by USPHS commissioned corps deployment teams include (Office of Force Readiness and Deployment, 2006):

1. Mass care (primary care, mental health, and public health services for sheltered populations);
2. Point of distribution operation (mass prophylaxis);
3. Medical/surgical;
4. Isolation and quarantine;
5. Pre-hospital triage and treatment;
6. Community outreach and assessment;
7. Humanitarian assistance;
8. On-site incident management;

9. Medical supplies management and distribution;
10. Clinical care coordination, psycho-social management and re-integration;
11. Public health needs assessment and epidemiological/surveillance investigations;
12. Preventative medical services delivery (e.g., disease prevention, vaccination, laboratory information, health information);
13. Worker health and safety; and
14. Animal health emergency support.

United States Public Health Service commissioned officers are increasingly serving at global crises points, providing disaster response leadership and humanitarian health services (Galson, 2009). As evidenced by the September 11<sup>th</sup> World Trade Center attacks, the Indian Ocean tsunami of 2004, Hurricane Katrina in 2005, Hurricanes Ike and Gustav in 2008, and the Haitian Earthquake and the Louisiana Oil Spill in 2010, natural and technological disasters can leave previously functioning public health infrastructures fragmented or ruined. United States Public Health Service commissioned officers charged with responding to these large-scale events have often faced chaotic and rapidly changing environments characterized by high levels of need, limited resources, and uncoordinated disaster response efforts (Galson, 2009). Often, USPHS commissioned officers deploy in small teams, usually numbering fewer than 10, to support health systems that are severely impacted by crises, such as those mentioned previously (Galson, 2009). Many of these services are provided in austere conditions, which could potentially affect the health and well-being of the USPHS commissioned officers.

There are limited studies that address the mental health effects seen among military health providers. Frequently, their duties include providing direct, sometimes intensive, medical care to trauma patients in a traumatic environment. Despite the evidence for elevated mental symptoms among military populations, few studies have examined the predictors of these symptoms pre and post deployment in military health care providers. A review of the literature finds an emphasis on the great importance of the need to assess predictors of negative affectivity, defined as “a mood-dispositional dimension that reflects pervasive individual differences in negative emotionality and self-concept” (Watson and Clark, 1984, p. 465) and positive affectivity, defined as “reflecting pervasive individual differences in positive emotionality and self-concept” (Watson and Clark, 1984, p. 465). This study also sought to begin to fill the gap in the literature of studies that examine mental health in USPHS commissioned officers post-deployment.

### **Justification for the Study**

Resilience research on military personnel has focused only on outcomes, particularly in response to high-intensity stressors. However, relatively little is known about the process of resilience, which deals with how individuals cope and adapt differently and what factors are associated with resilience (Maguen et al., 2008), particularly among commissioned officers in the USPHS. Recent studies of resilience (Hoge et al., 2004; Pietrzak et al., 2009 and 2010; Vogt et al., 2008) have been conducted on Armed Forces personnel: the Army, Navy, Marine Corps, Coast Guard and Air Force. The sample sizes were relatively small and again, they focused on outcomes, not predictors of the outcome.

As recent as the 2008 hurricane season, USPHS commissioned officers served alongside medical professionals from the Medical Reserve Corps and the National Disaster Medical System. They augmented local and state government responses to the public health emergencies and supported health systems that were severely impacted by the crisis posed by Hurricanes Gustav and Ike (Galson, 2009). However, no known research has been conducted that evaluates the resilience of commissioned officers in the United States Public Health Service and National Oceanic and Atmospheric Administration when its members are exposed to stressful deployment related events.

Although there has been an abundance of research on soldiers who often face negative sequelae after experiencing traumatic events such as combat deployment (Marx, 2009), extensive research has not been conducted on how resilient individuals think, how they behave, how they interact with their environment and how they regulate their emotions. Pietrzak et al. (2009) found in their study sample (n= 272), that a larger number of service members in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) returned from their deployments with PTSD, depression, and related psychological problems that impaired their functioning and quality of life than those who served in previous wars and conflicts. He and his colleagues further stated that:

“Little research has examined factors that may be protective against traumatic stress and depressive symptoms” (p. 102).

To date, there is no published literature that describes research on positive and negative affectivity among officers in the USPHS. Maguen et al. (2008) noted that “risk factors would account for a significant proportion of the variance in PTSD symptoms and that protective

factors would account for a small but significant proportion of the variance, above and beyond risk factors” (p. 7) in military medical personnel.

This cross-sectional study examined the predictors of resilience and mental health among United States Public Health Service (USPHS) commissioned officers who have deployed in a population that has not been previously studied.

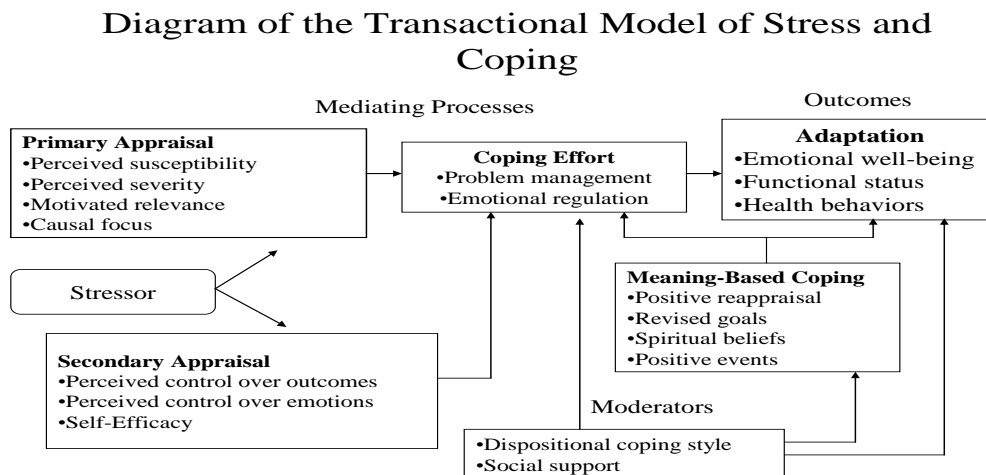
### **Theoretical Model**

The Transactional Model of Stress and Coping (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977) is a cognitive-behavioral theoretical framework for evaluating the processes of coping with stressful events. Stressful experiences are construed as person-environment transactions. These transactions depend on the impact of the external stressor. This is mediated first by the person’s appraisal of the stressor and second by the social and cultural resources at his or her disposal (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977). Mental health intervention programs that deal with stress management have been developed and premised on the idea that stress is not a direct response to a stressor but rather one's resources and ability to cope with or mediate the stress response, and is thus amenable to change, allowing stress to be controllable (Lazarus and Folkman, 1984).

To develop an effective stress management program, it is first necessary to identify factors that are central to a person controlling his/her stress as well as the intervention methods which effectively target these factors. The model contends that stress may not be a stressor if the person does not perceive the stressor as a threat but rather as positive or even challenging based on an individual’s appraisal. Also, if the person possesses or can use adequate coping skills, then stress may not actually be a result or develop because of the stressor (Glanz et al., 2002).

Therefore, coping strategies may result in short and long term positive or negative adaptation. Adaptation in this model is defined as the emotional well-being, functional status and health behavior of an individual to a stressor, followed by her/his appraisal of the situation (primary stressor), available resources (secondary appraisal), and coping efforts (problem management, emotional regulation and meaning-based coping), Figure 1.

**Figure 1: Transactional Model of Stress and Coping**



Source: Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977

## Research Questions

The intent of this study was to add to the body of knowledge regarding personal coping mechanisms of those faced with adversity. The research questions addressed by this dissertation research were (1) What factors (predeployment affectivity, mental health, team support, and post-deployment social support) differentiate USPHS commissioned officers who have high resilience to deployment (i.e., exposure to traumatic stressors) when compared to those with lower resilience?; (2) Does gender influence USPHS commissioned officers resilience after



deployment?; and (3) What impact does resilience, team support, predeployment affectivity and post-deployment social support have on the mental health of USPHS commissioned officers?

## **Hypotheses**

### *Hypothesis 1*

United States Public Health Service commissioned officers who receive team support from fellow officers will show significantly higher resilience.

### *Hypothesis 2*

United States Public Health Service commissioned officers who receive post-deployment social support will show significantly higher resilience.

### *Hypothesis 3*

United States Public Health Service commissioned officers who demonstrate better mental health will show significantly higher resilience.

### *Hypothesis 4*

United States Public Health Service commissioned officers who show positive affectivity prior to deployment will show significantly higher resilience.

### *Hypothesis 5*

Predeployment affectivity, team support, post-deployment social support and mental health status will predict resilience among United States Public Health Service commissioned officers.

### *Hypothesis 6*

Predeployment affectivity, resilience, team support, and post-deployment social support will predict better mental health in United States Public Health Service commissioned officers.

### **Definition of Key Terms**

The following is a list of terms used throughout this study and their associated definitions:

*Adaptability* is the ability to adjust to changing environments and circumstances (Lyons et al., 2010).

*Anxiety disorders* have multiple physical and psychological symptoms, but all have feelings of apprehension, tension, or uneasiness in common. Among the anxiety disorders are panic disorder, agoraphobia, obsessive-compulsive disorder, post-traumatic stress disorder and generalized anxiety disorder (Healthy People 2020).

*Coping efforts* are actual strategies used to mediate primary and secondary appraisals (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Depression* is a state of low mood that is described differently by people who experience it. Commonly described are feelings of sadness, despair, emptiness, or loss of interest or pleasure in nearly all things. Depression also can be experienced in other disorders such as bipolar disorder or manic-depressive disorder (Healthy People 2020).

*Diagnostic and Statistical Manual of Mental Disorders (DSM)*, published by the American Psychiatric Association, provides common language and standard criteria for the classification of

mental disorders (DSM-IV-TR; American Psychiatric Association, 2000). The fourth edition (DSM-IV) changes the criterion for diagnosis as well as includes a manual developed by the US Army (American Psychiatric Association, 2000).

*Dispositional coping styles* are generalized ways of behaving that can affect a person's emotional or functional reaction to a stressor and can be relatively stable across time and situations (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Emotional regulation* is a strategy aimed at changing the way one thinks or feels about a stressful situation (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Information Seeking* is an attentional style that is vigilant (monitoring) versus one that involves avoidance (blunting) (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Meaning-based coping* is a coping process that induces positive emotion, which in turn sustains the coping process by allowing reenactment of problem- or emotion-focused coping (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Mental disorders* are health conditions that are characterized by alterations in thinking, mood or behavior (or some combination thereof), which are associated with distress and/or impaired functioning and spawn a host of human problems that may include disability, pain or death (Healthy People 2020).

*Mental health* is a state of successful performance of mental function resulting in productive activities, fulfilling relationships with other people and the ability to adapt to change and to cope with adversity. Mental health is indispensable to personal well-being, family and interpersonal relationships and contribution to community or society (Healthy People 2020).

*Mental health services* are diagnostic, treatment and preventive care that helps improve how persons with mental illness feel both physically and emotionally as well as how they interact with other persons. These services also help persons who have a strong risk of developing a mental illness (Healthy People 2020).

*Mental illness* is the term that refers collectively to all diagnosable mental disorders (Healthy People 2020).

*Negative affectivity* is a mood-dispositional dimension that reflects pervasive individual differences in negative emotionality and self-concept. Research shows that negative affectivity relates to different classes of variables: self-reported stress and (poor) coping, health complaints, and frequency of unpleasant events (Watson and Clark, 1984).

*Optimism* is a tendency to have generalized positive expectancies for outcomes (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Outcomes of coping* are emotional well-being, functional status and health behaviors (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Positive affectivity* is a mood-dispositional dimension that reflects pervasive individual differences in positive emotionality and self-concept (Watson and Clark, 1984).

*Post-traumatic stress disorder (PTSD)* is a type of anxiety disorder. It can occur after experiencing a traumatic event that involved the threat of injury or death (Healthy People 2020).

*Primary appraisal* is an evaluation of the significance of a stressor or threatening event (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Problem management* is a strategy directed at changing a stressful situation (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Resilience* is the process of coping with or overcoming exposure to adversity or stress (Jensen and Fraser, 2005). Psychological resilience and resilience are used interchangeably in the literature.

*Secondary appraisal* is an evaluation of the controllability of the stressor and a person's coping resources (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Serious mental illness* is a diagnosable mental disorder found in persons aged 18 years and older that is so long lasting and severe that it seriously interferes with a person's ability to take part in major life activities (Healthy People 2020).

*Stress* is an elevation in physical and psychological arousal that results from exposure to a stimulus or demand (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

*Stressors* are demands made by the internal and external environment that upset balance or homeostasis, thus affecting physical and psychological well-being and requiring action to restore balance or equilibrium (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977).

## **Summary**

In this chapter, an overview of resilience, social support and mental health problems that affect members of the uniformed services was provided. Although our knowledge of mental health has broadened, there is an increase in vulnerable populations, such as members of the USPHS and NOAA who are under-recognized, undiagnosed and untreated for depression, anxiety, and PTSD. This dissertation was designed to examine risk and protective factors associated with resilience in commissioned officers in the USPHS, and examine whether predeployment affectivity, resilience and social support (team support and post-deployment

social support) protect against traumatic stress (i.e. deployment) and mental health symptoms.

This study is unique in its focus on a population not previously studied regarding such problems.

## **Chapter 2: Literature Review**

### **Introduction**

This chapter presents a review of the literature to illustrate: (1) the Transactional Model of Stress and Coping, which provides a theoretical framework for evaluating the processes of coping with stressful events; (2) existing research on resilience and adaptability; (3) an overview of social support and resilience; (4) current research on risk and protective factors for mental health outcomes; (5) the impact of mental health; and (6) the extent of psychopathological outcomes for military personnel and emergency responders. Due to the near complete absence of published literature conducted on United States Public Health Service commissioned officers regarding resilience or behavioral health studies, there is no literature that directly references studies of this cohort. The literature review was based on studies of members of the armed forces and civilian emergency responders.

### **Adapted Theoretical Model**

Based on a review of the literature, the Transactional Model of Stress and Coping (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977) framework served as the conceptual foundation guiding this study. This theoretical framework builds on an understanding of stress and coping as stress does not affect all people equally; some people live through terribly threatening experiences yet manage to cope well (Glanz et al., 2002). The concept for evaluating the processes of coping with stressful events such as trauma are construed

as person-environment transactions based on an external stressor or stressful life events. The key constructs, primary appraisal (individual evaluates the potential threat), secondary appraisal (ability to alter the situation and manage negative emotional reactions), coping efforts (problem management, emotional regulation and meaning based coping) leads to adaptation outcomes (psychological well-being, functional status and adherence).

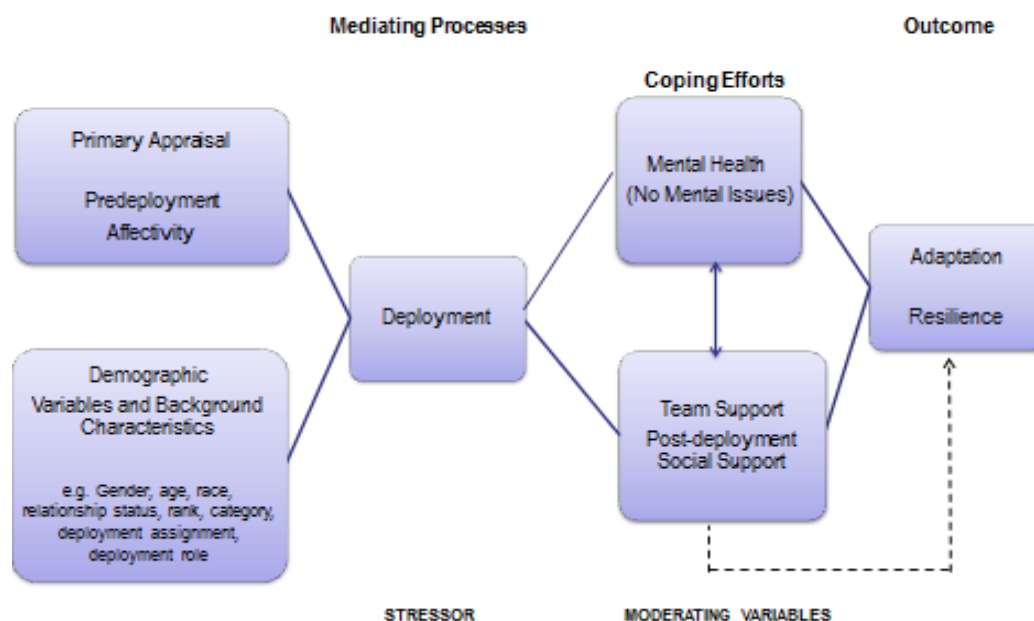
The Transactional Model of Stress and Coping has gained widespread use as a tool for evaluating adaptive coping strategies. The authors propose that individuals can be taught to manage stress and cope with stressors (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977). For the purposes of this study, the Transactional Model of Stress and Coping was adapted; the construct examined as the measure of primary appraisal was predeployment affectivity, coping efforts included team support and social support and the outcome measure was resilience. Secondary appraisal and meaning-based coping were not examined in this dissertation study.

This dissertation was designed to examine risk and protective factors associated with resilience in commissioned officers in the USPHS. Predeployment affectivity was defined as a primary appraisal variable that can decrease the adaptive process if evaluated initially as threatening or as negative stressors prior to deployment. The ability to adjust to deployment might be jeopardized if faced with a host of predeployment stressors that may affect commissioned officers resilience. The predeployment affectivity subscale included in the questionnaire for this study measured exposure to traumatic events before deployment specifically respondents were told, “the statements below refer to events you may have experienced before you were deployed.”



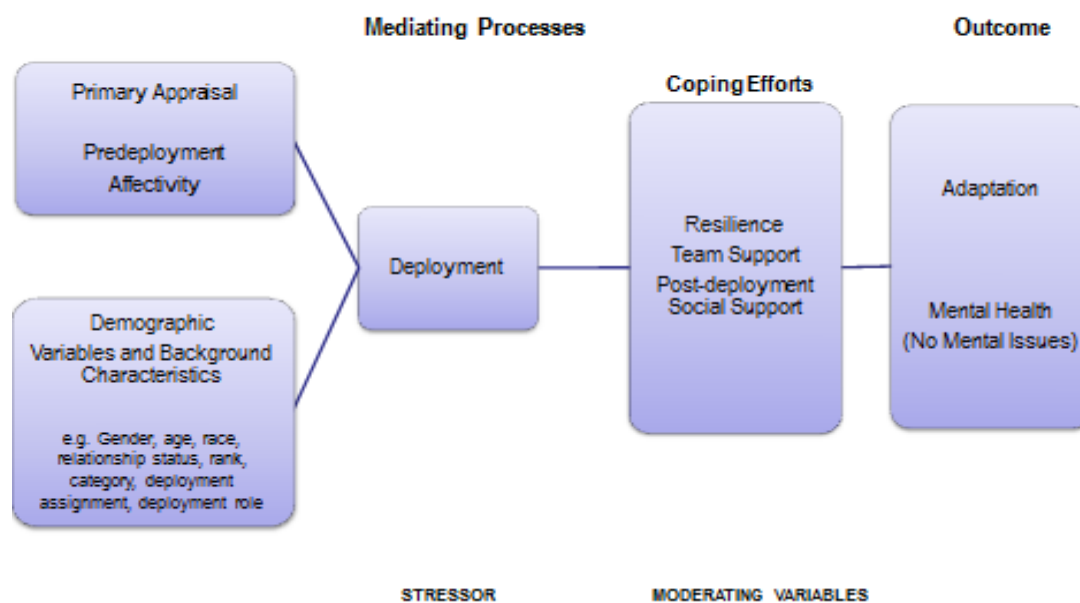
Team support and post-deployment social support were hypothesized to be actual coping strategies used to moderate the negative effects of primary appraisal (i.e. predeployment affectivity and background characteristics). The team support and post-deployment social support subscales used measured the nature of relationships (both personal and professional) before and after deployment. According to the adapted model, team support and post-deployment social support (moderating variables) will mitigate the impact of a stressor (deployment), thereby improving resilience. Mental health (i.e. no mental disorders) was also examined as a moderating variable (a type of coping effort) associated with resilience (Figure 2).

**Figure 2: Adaptation of the Transactional Model of Stress and Coping: Potential Predictors of Resilience in UPSPS Commissioned Officers after Deployment**



A second research question was whether or not resilience and social support would protect against traumatic stress and depressive symptoms after controlling for demographic characteristics in USPHS commissioned officers. In this adapted model, mental health was the outcome variable, and the coping efforts examined included resilience, team support and post-deployment social support. The primary appraisal, demographic variables, background characteristics and stressor measures remained the same (Figure 3).

**Figure 3: Adaptation of the Transactional Model of Stress and Coping: Potential Predictors of Mental Health in USPHS Commissioned Officers after Deployment**



## Resilience

Resilience as a construct lacks a consistent definition and has been defined many ways. Resilience is sometimes defined as a psychological process developed in response to intense life stressors that facilitate healthy functioning (Johnson et al., 2011). A simple definition of

resilience is the ability to cope effectively and adapt in the face of loss, hardship or adversity (Block and Kremen, 1996). There are other variations of this definition that include absence of adverse symptoms following trauma (Bonanno et al., 2006), sustained performance during an intense physical or psychological challenge, or maintenance of a positive outlook despite having experienced adversity (Luthar et al., 2000). Resilience embodies the personal qualities that enable one to thrive in the face of adversity, and is a multidimensional characteristic that varies with context, time, age, gender, and cultural origin, as well as within an individual subjected to different life circumstances (Ballenger-Browning and Johnson, 2010). According to these researchers, resilient qualities measure the psychosocial qualities of individuals and can be characterized into four prerequisites (Ballenger-Browning and Johnson, 2010):

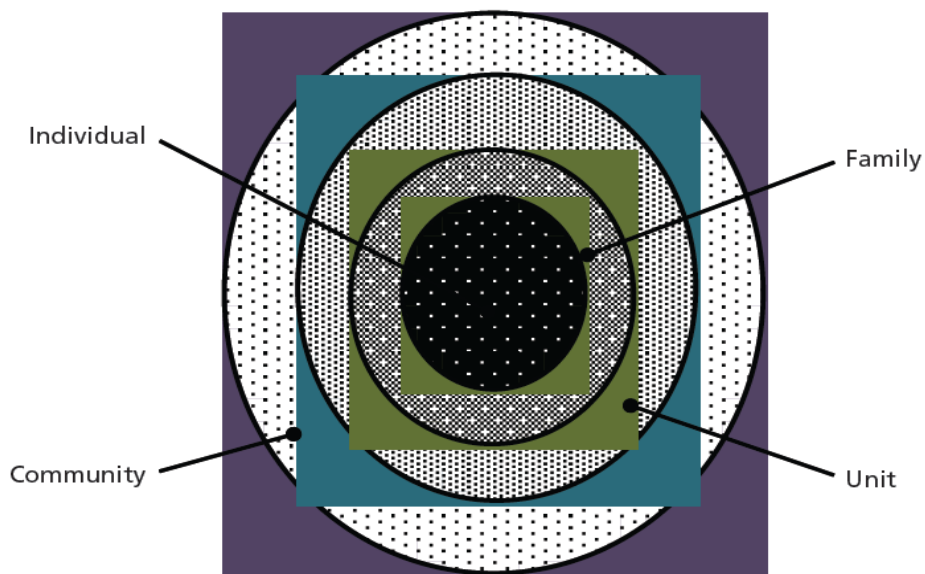
- 1) Risk or predisposition to biopsychosocial or environmental conditions;
- 2) Exposure to a high-magnitude stressor;
- 3) Stress response; and,
- 4) Return to baseline functioning and symptom levels.

These four resilient prerequisites distinguish intrinsic factors for primary appraisal that promote resilience within an individual and may involve other individuals who are part of that group (e.g. family, organization, community). A study of relevant literature identified individual resilience factors as positive coping, positive affect, realism, positive thinking, behavioral control, physical fitness, and altruism (Meredith, et. al., 2011). Family level factors include emotional ties, communication, support closeness, nurturing, and adaptability. Unit level factors include positive command climate, teamwork, and unit cohesion. Community level factors

include belongingness, community cohesion, connectedness, and collective efficacy. Meredith and colleagues (2011) concluded there was generally very little rigorous research available across the different resilience factors.

While resilience factors may broadly operate as being nested within layers moving outward from the individual toward group levels, the specific levels that are most salient will vary across individuals. For example, single service members may view the unit as being more important than factors at the family level, compared with married service members. Accordingly, spouses of reservists may place more primacy on factors that operate at the community level, as compared with the unit level. This is further illustrated in Figure 4, which outlines the framework for factors that promote resilience in military populations.

**Figure 4: Framework for Factors that Promote Resilience**



Source: A Joint Endeavor of RAND Health and the RAND National Defense Research Institute; Meredith et al., 2011

In another study, the researcher discussed the emotional aspects of resilience, focusing on the flexible use of emotional resources (e.g. high optimism, openness to experience) in adapting to adversity. When faced with threatening situations, this emotional flexibility enables resilient people to use emotional resources appropriately to meet the demands of the situation and to conserve emotional resources during innocuous events (Waugh, et al., 2008).

Positive emotions appear to serve an important function in promoting health. Multiple methodologies (e.g., self-report, observation, longitudinal studies) have been used to demonstrate that individuals who report resilience are characterized by positive emotionality; they have zestful and energetic approaches to life, and they are curious and open to new experiences (Tugade and Frederickson, 2004). These traits are further emphasized by the Connor and Davidson Resilience Scale, a self-reported measure that assesses resilience in individuals. Conner and Davidson (2003) identified factors related to resilience that they used in validating the Connor and Davidson Resilience Scale, including personal competence, trust in one's instincts or tolerance of negative effects, positive acceptance of change, control, and spiritual influences.

### *Adaptability*

Adaptability is an important function used to minimize the effects of stressors. Resilience is the process of coping with or overcoming exposure to adversity or stress (Jensen and Fraser, 2005). Adaptability has been described as the capacity of actors in a system to influence resilience (Walker et al., 2004). For some, adaptability is the antithesis of resilience, for others it is not, with the former equated with change and the latter with entrenchment (Schoon, 2005). This conceptualization of resilience as entrenchment is likely to have arisen from the view of

resilience as simply returning to a pre-existing state (Maguire and Cartwright, 2008). Military research on resilience and adaptability indicates both characteristics are needed and represent critical capabilities for the future force (Lyons et al., 2010). Morgan et al. (2011) posit that active duty service members' seemingly poor adaptability to traumatic stressors is a risk to force health.

The existing literature has broadly defined adaptability in numerous ways; however, at the most basic level, adaptability may be defined as an effective change in response to an altered situation (Mueller-Hanson et al., 2005) and, specifically, to an unpredicted change (Burns & Freeman, 2008). This definition emphasizes that an individual must recognize the need to change based on some current or future perceived alteration in the environment and change his or her behavior as appropriate.

Deployments are high stress environments where resilience, adaptability and the ability to think quickly are essential. These deployments may not always be accurately predicted and responders must always be ready to adapt plans to suit a situation unfolding in an unforeseen way. Therefore, resilience and adaptability include handling emergency or crisis situations, dealing effectively with unpredictable or changing work situations, handling work stress, learning new work tasks, technologies, procedures, and solving problems creatively (Mueller-Hanson et al., 2005). Therefore, the concepts of resilience and adaptability may be related but distinct. However, in this study, adaptability was considered a component of resilience.

### **Protective Factors Associated with Team Support and Post-Deployment Social Support**

Based on a review of the literature, Benzie and Mychasiuk (2009) identified and described nine specific protective factors that contribute to resiliency: (1) locus of control, (2)

emotional regulation, (3) belief systems, (4) self-efficacy, (5) effective coping skills, (6) education, skills and training, (7) health, (8) temperament, and (9) gender. Protective factors can be characteristics specific to the individual, such as good problem-solving skills and temperament, but they can include broader resources such as helpful family patterns and access to external support. Protective factors also shield those at risk from the negative impact of adversity.

Social support is considered to be an important protective predictor in the promotion of coping and overall well-being. There is increasing awareness and concern among public health professionals regarding the impact of stress, its prevention and treatment, and the need for enhanced coping skills. Social support is also characterized as a coping skill, acquired throughout a lifespan, and is a positive adaptation that affects one's ability to manage stressful events (Monson et al., 2009).

Team support is the amount of perceived assistance and encouragement received. For example, factors such as military personnel feeling that they were valued versus feeling that they were expendable by the military, having unit leaders who are trustworthy and dependable, and having other unit members who exhibit a sense of camaraderie with their peers in the unit (King et al., 2003) all contributed to higher perceived support from their team. Team support is also associated with the ability to engage in healthy social networks that promote well-being and optimal unit performance (Jones et al., 2010). Pietrzak et al. (2009) hypothesized that unit cohesion and social support would protect against depression. Higher perceived social support, which was operationalized in a study by Brewin et al. (2000) as an individual's perception or experience of helpful and unhelpful social interactions, is negatively associated with PTSD.

Moreover, team support is linked with team cohesion. In the military setting, team cohesion is founded on the principle that integrates the following factors: psychological sense of camaraderie, group connectedness, esprit de corps, and a sense of mutual support (Jones et al., 2010).

Post-deployment social support contributes to resilience after deployment. The stress of deployments often uncovers problems in relationships that have existed before, but have gone unnoticed. The degree to which family, friends, coworkers, employers, and the community provide emotional sustenance is considered post-deployment social support. Emotional sustenance refers to the extent to which others provide the individual with understanding, companionship, a sense of belonging, and positive self-regard (King et al., 2003). After OEF and OIF deployments, it is estimated that up to 17 percent of service members may experience symptoms associated with mental illness (McNulty, 2010). The negative effects of maladjustment may be compounded by significant differences in the work environment and work requirements after deployment compared to those experienced while deployed (Pietrzak et al., 2010). The authors noted that to address the associated negative effects of adjusting after deployment, post-deployment social support partially mediated the relationship between psychosocial difficulties. Social support may enhance functioning by fostering effective coping strategies, reducing involvement in high-risk behaviors or avoidance coping, promoting self-efficacy, and reducing loneliness (Pietrzak et al., 2010).



## **Risk Factors for Resilience**

Resilience factors (i.e., trait resilience and positive military experiences) were most strongly associated with positive affect before deployment. Maguen et al. (2009) noted that negative affect was associated with a combination of risk and protective factors, with trait resilience being inversely related to negative affect. The mechanism through which individuals experience negative affect seems to share a common pathway with PTSD symptoms and positive affect. Military health providers often, in comparison to their non-health provider colleagues, face a number of stressors that may cause nonspecific distress such as saying good-bye to loved ones, preparing to be away, assessing and making sure that finances are in order, or preparing for emotional challenges. Those who have previously deployed may be reminded of prior traumatic events. Another significant risk factor that may impact the resilience to deployment, and subsequently the deployed soldier's mental health has been documented by Slusarcick et al. (2001). This includes occupational experiences with the sick, the dying and the dead. However, there were several limitations of their study, including a small sample size and a large proportion of women, resulting in the authors' inability to generalize to members of the military community at large. These possible pre-deployment stressors may have residual effects that elevate mental health symptoms in subsequent deployments.

Kolkow et al. (2007) examined risk factors for PTSD, depression, and mental health care use among health care workers deployed to combat settings. Anonymous surveys were administered to previously deployed workers at a military hospital. PTSD and depression were assessed by using the PTSD Checklist and the Patient Health Questionnaire depression scale,

respectively. He determined that nine percent met the criteria for PTSD and five percent met the criteria for depression; a rate lower than that observed among returning combat soldiers. Direct and perceived threats of personal harm were risk factors for PTSD; exposure to wounded or dead patients did not increase risk. Those who met the criteria for PTSD were more likely to seek mental health care after but not before their deployment. The study concluded that for health care workers returning from a warfare environment, threat of personal harm may be the most predictive factor in determining those with subsequent PTSD. Predeployment PTSD symptoms were found to be most strongly associated with risk factors (i.e., predeployment stressors and lifetime trauma), over and above protective factors. It is possible that, in the context of preparations for deployment, nagging stressors and a history of trauma simply outweigh the benefits derived from a resilient personality. The inclusion of predeployment stressors stems from the recognition that exposure to prior stressors may influence reactions to subsequent stressors directly. Vogt and Tanner (2008) conducted a study in Gulf War I veterans that showed variables for prior stressors (e.g., family disruption, experience of divorce) interrelate to predict post-trauma psychopathology.

Gender is an inconsistent and unreliable predictor of resilience (Ballenger-Browning and Johnson, 2010). Researchers working with military families have identified factors that have the potential to either ease or exacerbate the stress and difficulty that accompanies deployment (Novack, 2011). Novack hypothesized that the relationship quality may defer by gender. For example, the relationship between fathers and their children is a powerful predictor of family adjustment to the deployment and post-deployment reintegration. Maintaining a loving

relationship, before and while deployed, may ensure that the family successfully copes to change during and after deployment.

A review of the literature indicated that there is discordance regarding the overall prevalence of mental and behavioral disorders between men and women. In a study conducted with crime victims, women reported lower resilience scores (Campbell-Sills et al., 2009); however, an earlier study by the same authors found no significant difference between genders (Campbell-Sills et al., 2006). The latter result could be attributed to women often having stronger social support system in place in their lives compared to men that may mitigate the levels of stress experienced.

Cortina and Kubiak (2006) labeled the possible discordance for women being more vulnerable to developing PTSD than men regardless of potentially traumatic life events exposure as the “feminine-vulnerability hypothesis.” Their findings suggested that women’s two-fold greater risk of PTSD is not accounted for by greater exposure to assaultive violence events, such as rape, and persists even after controlling for previous trauma history. The feminine-vulnerability hypothesis is also supported by the results of a meta-analysis which reported an overall PTSD sex difference that was consistent across many types of traumatic events excluding sexual abuse and assault (Tolin and Foa, 2006). Despite this strong association found in feminine-vulnerability hypothesis, the ability to draw conclusions about the gender differences in lifetime risk for PTSD is constrained by variations in number of methods and scale limitations (Tolin and Foa, 2006). A secondary goal of this study was to assess whether gender is associated with resilience to deployment in USPHS commissioned officer.

## **Resilience and Social Support**

### *Resilience*

Research on resilience and social support provide a potential to inform treatment of stress-related pathology, such as mental illness. However, little is known about the mechanisms that promote resilience and social support to inform training programs (e.g. stress inoculation training) aimed at preventing maladaptive responses to trauma (Ballenger-Browning and Johnson, 2010). The concept of resilience has received significant attention in recent years from the medical research community; however, current research indicates that resilience is a complex, dynamic, and multi-dimensional factor that is difficult to conclusively define and challenging to measure. As resilience research evolves, further investigation will involve identifying factors that may protect against traumatic stress and the progression to diagnosis with a mental illness for those in the uniformed services (Myatt and Johnson, 2009).

### *Social Support*

The effects of social support as a protective factor against negative adaptations to trauma are widely accepted. Meta-analysis associated with PTSD reveals that social support is one of the factors most robustly and negatively associated with PTSD symptoms (Monson et al., 2009). King et al. (2006) proposed that social support in the acute aftermath of trauma has been found to be related to less PTSD; however it has also been documented that social support will diminish over time in the presence of chronic PTSD (Monson et al., 2009).

According to Monson et al. (2009) and Price et al. (2006) research on combat veterans and their families from different countries and prior eras has long documented the strong

association between PTSD and family relationship problems. These studies revealed that veterans diagnosed with chronic PTSD, compared to those exposed to military related trauma but not diagnosed with the disorder, and their romantic partners report more numerous and severe relationship problems and generally poorer family adjustment. Conversely, OEF/OIF veterans who reported that they have family and friends with whom they could discuss their deployment and who perceived a greater sense of purpose and control were protected against suicidal ideation (Pietrzak et al., 2010). These findings are consistent with other findings (Charuvastra et al., 2008; King et al., 1998; Southwick et al., 2005; Vogt and Tanner, 2008) that also illustrated the importance of assessing levels of social support in returning veterans before and after deployment. Little is known about the longitudinal effects of social support in understanding the interactions between PTSD and intimate relationship problems. This study did not take into account this level of intimate relationship problems but focused only on the individual and unit (team) level factors, as described above.

The literature suggests that dissolution of existing social networks following a disaster may present an obstacle to successful trauma recovery (Pietrzak et al., 2009 and 2010). In a randomized study on Manhattan residents two- months following the September 11<sup>th</sup> World Trade Center attacks, researchers found significantly higher rates of PTSD and depression amongst those with a low level of social support (Galea et al., 2002). This may be due in part to the stigmatization associated with seeking mental health services. To counteract this phenomenon, Hardiman and Jaffee (2008) discussed the use of peer services which connect individuals with new avenues of social support. However, one would have to be willing to seek these services during and beyond the crisis.

### *Empirical Findings: Resilience, Unit (Team) Support and Post-deployment Social Support*

Relatively little research has been performed to evaluate the role of protective factors such as psychosocial resilience, unit support, and post-deployment social support in buffering against PTSD, depressive symptoms, and psychosocial difficulties (Pietrzak et al., 2010). It is also noteworthy that a large proportion of resilience research has been developed with children and adolescents however the salience of these protective factors may vary across the life span (Windle, 2011). Protective factors, such as resilience, may lower the risk of military personnel exposed to combat situations of experiencing suicidal ideation. Respondents to a variety of surveys reported increased stigma and barriers to care compared to respondents without suicidal ideation (Pietrzak et al., 2010). Resilience has been shown to be protective against the development of combat-related PTSD in Vietnam veterans (King, et al., 1998, Waysman et al., 2001).

Pietrzak et al. (2010) evaluated the associations between resilience, unit (team) support, post-deployment social support, traumatic stress and depressive symptoms, and psychosocial functioning. This study was performed two years following return from deployment in a sample of veterans returning from both Operation Enduring Freedom and Operation Iraqi Freedom. Results indicated that resilience fully mediated the relationship between unit support and PTSD and depressive symptoms. Previous research on resilience similarly found that social support is associated with increased resilience (Bonanno et al., 2006; Pietrzak et al., 2009) and lower risk of PTSD in military samples (King et al., 1998; Marx, 2009; Pietrzak et al., 2010). This finding suggested that high levels of perceived unit support were associated with increased resilience,

which in turn is associated with decreased PTSD and depressive symptoms. Unit support may enhance resilience by promoting feelings of personal control and self-efficacy, which may foster the development of active coping styles and increased ability to reappraise stressful situations. Results also indicated that that increased resilience was associated with increased post-deployment social support. This also corroborated previous research, which found that resilient individuals tend to be skilled at constructing social networks and seeking out social support in times of need (Sharkansky et al., 2000).

The referenced studies indicate the role of protective factors such as resilience and social support in protecting against trauma, although the ability to generalize to the military community at large is limited. More research is needed to examine the interrelationships among these variables for members of the uniformed services with respect to deployment.

### **Mental Health and its Associated Cost**

The National Co-Morbidity Survey (2004) reports that approximately one in four adults in the United States, ages 18 and older, experience a diagnosable mental disorder in a given year (Kessler et al., 2005). This means that 57.7 million people in 2004 experience a mental health disorder. Moreover, the Global Burden of Disease study, conducted in 2004 by the World Health Organization in collaboration with the World Bank and Harvard University, reveal that mental illness, to include suicide, accounts for over 15 percent of the mental health disease burden in established market economies such as the United States. Furthermore, this is considered more than the disease burden caused by all cancer (WHO, 2004).

The National Health Interview Survey (NHIS) conducted annually by the Center for Disease Control & Prevention (CDC) National Center for Health Statistics (NCHS) collects information on the mental health status of the U.S. adult population. Through this program, regular updates are provided for thirteen prevailing mental health indicators, including the prevalence of serious psychological distress among the adults in the U.S. Further, the NIMH 2010 report identifies mental disorders as the leading cause of disability in the U.S. and Canada for people aged 15-44.

The costs of mental illness to the individual and to society are high. The direct and indirect costs for an individual with mental illness correspond to nationwide spending on treatment and rehabilitation and loss of productivity at the workplace, school, and home due to premature death or disability (NIMH, 2010). Direct costs, such as hospitalization, only reflect a small portion of the economic burden. Indirect costs, which are very difficult to define, likely account for a large portion of the national expenditure on mental illness. In 2008, Harvard University published data from a nationally representative study of Americans age 18 to 64 in the 2002 National Comorbidity Survey Replication. In this study of 4,982 respondents, data was collected on individuals with reported serious mental illness and their inability to function for at least 30 days in the year prior to the survey. From the findings, the researchers extrapolated results to the general population and determined that serious mental illness costs society about \$193.2 billion annually in lost earnings. The results of this study confirmed the view that mental disorders contribute to losses of productivity.



## **Psychopathological Outcomes among Military Personnel**

Richardson et al. (2010) stated that PTSD is associated with severe functional impairment (both occupational and social), high comorbidity with other psychiatric disorders, high medical co-morbidity and/or reduced quality of life for the veterans who suffer from it. They contend that it represented a significant and costly illness to veterans, their families, and society as a whole. They performed a review that found that point prevalence of combat-related PTSD in studies of US military veterans of modern wars ranges from approximately 2% to 17%.

In another study by Marx (2009), the number of military service Veterans receiving compensation for PTSD increased significantly between 1999 and 2004, growing by almost 80%, whereas compensation for all other service related disabilities increased by only 42%. According to one study of individuals who were exposed to the September 11<sup>th</sup> World Trade Center attacks (Bonanno et al., 2006), the relationship between resilience and PTSD is dependent on the specific details of the trauma, including the amount and nature of exposure. For example, more than half (51.2%) of those involved in the rescue efforts were resilient, but resilience was less prevalent for those who were involved in the rescue effort and had seen the attack in person (40.3%). Approximately 65.1% of the total study participants were considered resilient (0 or 1 PTSD symptom), providing dramatic evidence of overall adjustment of the sample.

Pietrzak et al. (2010) examined the role of protective factors such as resilience and social support in protecting against traumatic stress and depressive symptoms, and psychosocial difficulties in OEF/OIF veterans. Results suggested that resilience, unit support, and post-deployment social support serve as psychosocial buffers of PTSD and depressive symptoms, and psychosocial difficulties at two years after deployment. They further observed that resilience

fully mediated the relationship between unit support and PTSD and depressive symptoms. Their research suggested that high levels of perceived unit support were associated with increased resilience, which in turn is associated with decreased PTSD and depressive symptoms. Pietrzak et al. (2010) did note that the self-reported screening instruments used to assess PTSD and depression symptoms may not be generalizable to larger, predominantly active duty, and/or more diverse samples of OEF/OIF veterans when formal clinical interviews and diagnostic instruments are utilized, and that this has not as yet been examined. They were also unable to examine temporal relationships among the variables assessed due to the cross-sectional design of this study.

Pietrzak et al. (2009) examined whether social support and beliefs about mental health care are associated with stigma, barriers to care, and mental health care utilization in a sample of veterans of OEF/OIF. They observed that negative beliefs about mental health care, particularly psychotherapy, and decreased perceived unit support predicted increased perceptions of stigma and barriers to care. Negative beliefs about mental health care were also associated with decreased likelihood of mental health counseling (Pietrzak et al., 2009). In a later study by the same authors, risk and protective variables associated with suicidal ideation in a sample of OEF/OIF veterans were examined. Respondents who endorsed suicidal ideation were more likely to screen positive for PTSD, depression, and alcohol problems, scored higher on measures of combat exposure, psychosocial difficulties, stigma, and barriers to care, and scored lower on measures of resilience, unit support, and post-deployment social support. Post-deployment social support in the form of accessibility of family and friends and greater sense of purpose and control protected against suicidal ideation, even after adjusting for risk factors. These findings

underscore the importance of assessing levels of social support in returning veterans and in providing psychoeducation for their families and friends to emphasize the importance of post-deployment support (Pietrzak et al., 2010). Hoge et al. (2004) also reported similar findings that mental health problems reported on post-deployment assessment were significantly associated with combat experiences for those returning from Iraq and Afghanistan.

In a review of the current literature regarding military-related PTSD and intimate relationships, Monson et al. (2009) noted that veterans diagnosed with chronic PTSD, compared with those exposed to military-related trauma but not diagnosed with the disorder, and their romantic partners report more numerous and severe relationship problems and generally poorer family adjustment. Veterans with PTSD also have been shown to divorce at higher rates than do their trauma-exposed counterparts without PTSD. Findings across settings and study methodology indicated that male veterans diagnosed with PTSD are more likely to perpetrate psychological and physical aggression against their partners and children than are veterans without PTSD (Marx, 2009).

A study of 272 predominantly older reserve/National Guard OEF/OIF veterans (mean age was 34.9) who completed a mail survey assessing traumatic stress and depressive symptoms, resilience, and social support indicated that interventions to bolster resilience and post-deployment social support may help reduce the severity of traumatic stress, anxiety and depressive symptoms in OEF/OIF veterans (Pietrzak et al., 2009). Vogt and Tanner (2008) applied structural equation modeling procedures to simultaneously examine relationships between pre-deployment, war-zone, and post-deployment risk and resilience factors and post-traumatic stress symptomatology (PTSS) in a cohort of U.S. veterans of the 1990-1991 conflict

in the Persian Gulf region. They observed that all three sets of risk and resilience factors contributed meaningful variance to the prediction of PTSD. They concluded that this highlights the importance of attending to events and circumstances that both precede and follow a focal trauma.

### **Psychopathological Outcomes among Emergency Responders**

Throughout this chapter, discussion centered on the psychopathological outcomes pertaining to members of the armed forces while briefly alluding to the general population of emergency responders. As emergency responders, police, fire and rescue workers also face stress from an incident and require support in reducing symptoms of post-traumatic stress disorder and other trauma related symptoms following disaster and humanitarian relief. A range of mental health and chemical abuse (behavioral health) problems may surface in the early stages of an emergency situation. Myers et al. (2005) observed that professionals who provide services to trauma survivors, including crisis workers, trauma counselors, nurses, and physicians, become victims themselves of secondary traumatic stress disorder. Emergency responders face occupational stress because they have much to do with the work itself including time and responsibility pressures and dealing with the emotional demands of survivors. As such, the different phases of disaster recovery have different impacts on emergency responders. In the 1995 Oklahoma City Federal Building bombing, emergency responders affected by their search, rescue and recovery efforts required the supportive services of mental health providers (Myers et al., 2005). The authors further noted that psychological reactions can continue long after the disaster. For example, police and fire fighters who responded to the September 11, 2001 attack

continued to identify symptoms of stress six months after the attack (Hardiman and Jaffee, 2008). These psychological reactions may continue to emerge among professionals who respond to an event.

## **Summary**

This chapter provided a detailed review of existing literature on the variables assessed in this study. The review supported the use of an adaptation of the Transactional Model of Stress and Coping as the theoretical framework. The review also illustrated the importance of resilience and mental health treatment to the nation, and addressed findings from current research on protective factors that differentiate individuals' resilience or lack thereof to stressful events. Additionally, possible risk factors that have been associated with mental health outcomes such as anxiety, depression and post-traumatic stress disorder symptoms, as well as pre-and-post deployment mental health indicators were examined. Lastly, to further understand the relationship between risk and protective factors such as team support and social support and gender difference that may affect the resilience of USPHS commissioned officers were explored.

## **Chapter 3: Methods**

### **Introduction**

This study used quantitative research methods to assess active duty USPHS commissioned corps officers. A cross-sectional study design was used to measure possible pre and post deployment predictors of resilience among health care providers who are commissioned officers in the USPHS, using an adaptation of the Transactional Model of Stress and Coping framework (Figures 2 and 3). The goal of this study was to examine: (1) risk and protective factors such as team support, predeployment affectivity, mental health and post-deployment social support that may affect USPHS commissioned officers' resilience prior to and post-deployment; (2) whether gender affects the resilience of USPHS commissioned officers when deployed; and (3) whether predeployment affectivity, resilience and social support protect against traumatic stress and mental health symptoms post deployment, after controlling for demographic characteristics.

This research study consisted of a pilot test followed by administration of the 94-item online (internet based) survey to a convenience sample of active duty commissioned corps officers in the USPHS. The purpose of the pilot test was to identify potential logistical problems and, if necessary, correct any problems prior to implementation with the target population (Mckenzie and Smeltzer, 2000).

### **Study Design**

United States Public Health Service commissioned corps officers were asked to participate in this cross-sectional study via an anonymous, self-administered, internet based 94-

item questionnaire consisting of the Connor-Davidson Resilience Scale (Connor and Davidson, 2003), the abbreviated Patient Health and Generalized Anxiety Disorders Questionnaires (Kroenke et al., 2009, 2010), and three subscales from the Deployment Risk and Resilience Inventory Scales (King et al., 2003). Study participants were provided with an informed consent form outlining the voluntary nature of their participation and the risks and benefits of participation. Additionally, potential participants were provided a contact point for any questions or concerns. To preserve confidentiality and anonymity, respondents indicated their consent by clicking on an “Agree” or “Disagree” radio button; they could not continue to the survey until they had read their rights, and potential risks and clicked the “Agree” radio button. All participants were ensured confidentiality of their responses similar to other studies conducted with military personnel (Grieger, 2006; Maguen, 2008; Pietrzak et al., 2009). Surveys were anonymous and no identifying information was available to the researcher except for those who self-identified as willing to participate in future studies. The contact information for these USPHS commissioned officers was kept in a separate file and not reviewed by the researcher during data analyses. Questionnaire responses were collected over a two month period (January and February 2012). A reminder email was sent to potential participants, reminding them to complete the internet based survey.

Each participant completing the survey was asked to provide demographic and background information (e.g. age, gender, race/ethnicity, relationship status, rank, years of service in the USPHS, number of times deployed, frequency of deployment, etc.). The study instrument was distributed to and completed by participants via the Internet. Based on the

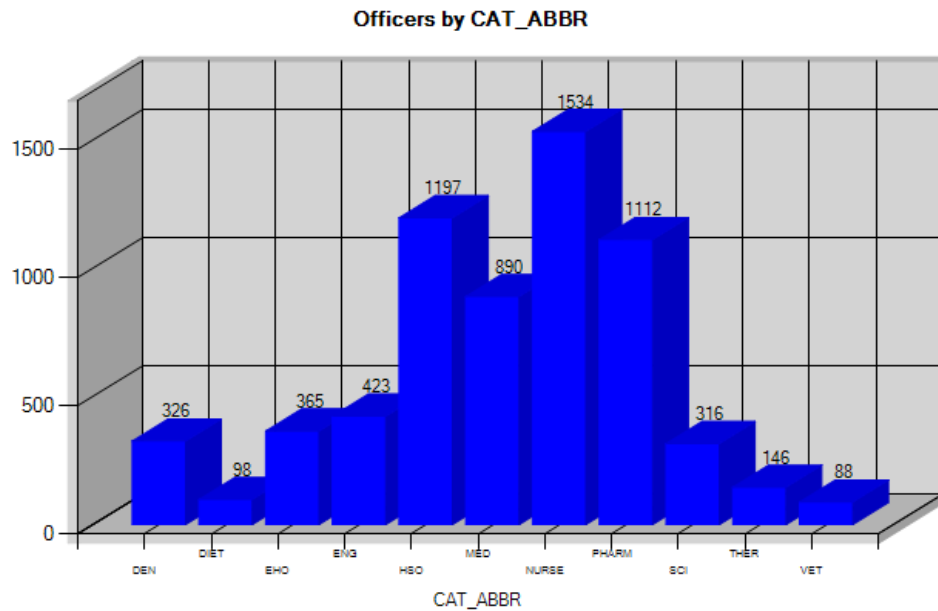
literature review (Maguen, 2008; Pietrzak et al., 2009), it should have taken approximately 15-20 minutes to complete the survey.

## **Study Population**

The U.S. Public Health Service Commissioned Corps is an elite team of full-time, well-trained, highly educated and qualified public health professionals, all of whom are commissioned officers; there are no enlisted or warrant officer ranks. The U.S. Public Health Service Commissioned Corps is a critical asset of the United States Department of Health and Human Services and is led by the Surgeon General of the United States. As one of America's seven uniformed services, the USPHS Commissioned Corps fills essential public health leadership and service roles within Federal Government agencies and programs, and can be directed to or volunteer to leave their normal jobs to deploy under the direction of the Secretary of Department of Health and Human Services. The Commissioned Corps has officers in many professions, divided into the following professional categories: physicians, dentists, nurses, pharmacists, engineers, environmental health officers, health services officers which include mental health specialists (e.g. clinical psychologists and clinical social workers), dietitians, scientists/researchers, therapists (including occupational therapy, physical therapy, speech-language pathology, and audiology), and veterinarians. As of September 5, 2011, there were 6,495 active duty officers in the USPHS, stationed at various geographical locations nationally and internationally (see Figure 5).



**Figure 5: USPHS Commissioned Officers by Professional Category**



Source: USPHS Public Statistical Database September 2011: Professional category abbreviation codes: dentist (DEN), dietitian (DIET), environmental health officer (EHO), engineer (ENG), health service officer (HSO), physician (MED), nurse (NURSE), pharmacy (PHARM), scientist (SCI), Therapist (THER), and veterinarian (VET)

## Study Participants

The data was collected under a dissertation project proposal approved by the University of Maryland Institutional Review Board (IRB) (Appendix B). The participants eligible for this cross-sectional study were active duty USPHS commissioned officers. Participants were recruited over a two-month time period using nonprobability sample design based on convenience and volunteer sampling approaches. It was determined that the use of nonprobability samples would be the best approach as it would be difficult to contact all officers in the survey population; therefore various existing officer listservs were used to contact potential participants. Nonprobability sample designs are often used by researchers conducting

studies in similar populations based on the nature of the sensitive questions, and to maximize participation without interfering with daily work duties (Hoge et al., 2006; Schell and Marshall, 2008). Of particular note, the earliest OEF/OIF studies were cross-sectional in design and conducted using anonymous assessments for resilience, PTSD, depression and anxiety of multiple convenience samples (Hoge et al., 2004).

### **Assessment Instrument**

All measures used in this study were valid and reliable instruments previously used by researchers studying resilience and mental health. The following assessment tools were employed:

Deployment Risk and Resilience Inventory (DRRI), the Conner-Davidson Resilience Scale (CD-RISC), the abbreviated Patient Health (PHQ) and Generalized Anxiety Disorders (GAD) questionnaires were used to assess the risk and protective factors associated with possible deployment stress-related reactions that may have implications for long-term health. There has been extensive use of the DRRI, PHQ, GAD and the CD-RISC scales in a variety of populations, including survivors of trauma, patients in treatment for depression, anxiety, PTSD, members of different ethnic groups and cultures and selected professional groups (e.g. nurses, social workers, the military, medical personnel and missionaries).

The DRRI is a suite of scales that can be used to assess deployment-related factors implicated in the health and well-being of military veterans (King et al., 2003). The DRRI is a 169-item self-reported instruments that assesses 14 risk and resilience factors:

- Predeployment/Prewar Factors: *prior stressors* (15 items) and *childhood family environment* (15 items)

- Deployment/War-zone Factors: *sense of preparedness* (14 items), *difficult living and working environment* (20 items), *concerns about life and family disruptions* (14 items), *deployment social support* (12 items), *sexual harassment* (7 items), *general harassment* (7 items), *perceived threat* (15 items), *combat experiences* (15 items), *exposure to the aftermath of battle* (15 items), and *self-reports of nuclear, biological, or chemical (NBC) exposures* (20 items)
- Post-deployment/Postwar Factors: *post-deployment social support* (15 items), and *post-deployment stressors* (17 items)

An advantage of the DRRI is its systematic development and rigorous psychometric evaluation that revealed high internal consistency, reliability, and sufficient levels of test-retest stability reliability (King et al., 2003; Vogt et al., 2004 and 2008). Furthermore, moderate associations were found for deployment risk and resilience factors that provided assurance for convergent validity, whereas weaker associations between risk and resilience factors and a measure of social desirability provided evidence of discriminant validity (Vogt et al., 2004). Validity of the DRRI subscales, used with a sample of 495 veterans from across the country, is presented in Table 1. Estimates of internal consistency for 11 of the 14 measures were 0.85 or higher; 7 of these 11 coefficients were 0.89 or higher. The three measures with lower internal consistency estimates (alphas in the 0.72 - 0.82 range) referenced constructs (*prior stressors*, *NBC exposures*, *post-deployment stressors*) that were based on discrete stressor events that are not necessarily expected to covary (King et al., 2003).

**Table 1: DRRI Scale Characteristics Resulting from Mail Survey**

| <b>Risk and Resilience Variables</b>       | <b># of Items</b> | <b>Mean</b> | <b>Standard Deviation</b> | <b>Range</b> | <b>Reliability Estimate</b> |
|--|-------------------|-------------|---------------------------|--------------|-----------------------------|
| Prior Stressors                            | 15                | 3.11        | 2.80                      | 0-12         | .75                         |
| Childhood Family Environment               | 15                | 54.04       | 11.62                     | 15-75        | .92                         |
| Preparedness                               | 14                | 47.17       | 10.78                     | 18-70        | .87                         |
| Difficult Living and Working Environment   | 20                | 58.46       | 14.09                     | 22-98        | .89                         |
| Concerns about Life and Family Disruptions | 14                | 24.67       | 11.00                     | 0-56         | .89                         |
| Deployment Social Support                  | 12                | 41.53       | 11.59                     | 12-60        | .94                         |
| General Harassment                         | 7                 | 11.92       | 5.24                      | 7-28         | .92                         |
| Sexual Harassment                          | 7                 | 7.89        | 2.68                      | 7-25         | .86                         |
| Perceived Threat                           | 15                | 47.64       | 12.18                     | 15-75        | .89                         |
| Combat Experiences                         | 15                | 3.12        | 3.31                      | 0-15         | .85                         |
| Aftermath of Battle                        | 15                | 5.58        | 4.32                      | 0-15         | .89                         |
| NBC Exposures                              | 20                | 24.72       | 7.05                      | 0-40         | .82                         |
| Post-deployment Social Support             | 15                | 56.69       | 10.52                     | 18-75        | .87                         |
| Post-deployment Stressors                  | 17                | 4.10        | 2.89                      | 0-14         | .72                         |

Source: King D, King L, Vogt D. (2003). Manual for the Deployment Risk and Resilience Inventory (DRRI): A Collection of Measures for Studying Deployment-Related Experiences of Military Veterans. Boston, MA: National Center on PTSD.

Any one or more of these measures may be used separately, or the entire DRRI instrument can be administered to examine key predeployment, deployment, and post-deployment variables.

For this study, three subscales were used; *prior stressors* (15 items), *deployment social support* (12 items), and *post-deployment social support* (15 items).

*Predeployment Affectivity Variable (prior stressor).* Predeployment affectivity is measured using the Prior Stressor scale, a 15-item instrument measuring exposure to traumatic events before deployment, such as community or domestic violence, physical assault, sexual abuse, previous combat duty, or other highly stressful life events. Participants are asked to

respond “no to event” (0) or “yes to event” (1) for each statement in the scale. Respondents receive a score of 0 to 17 due to special variations in the last two items if respondents answered “yes” to items 14 and 15 described in detail later in this chapter. A higher score indicates more exposure to predeployment stressors. A Cronbach  $\alpha$  of 0.74 was reported in the Vogt et al. (2008) study on Gulf war I veterans (n= 495).

*Team Support Variable.* The Deployment Social Support scale is a 12-item instrument assessing the nature of professional relationships and cohesion between the soldier and his or her unit, to include cohesion between unit leaders (e.g. military personnel beliefs that superiors are trustworthy and dependable) and other unit members (e.g. military personnel feeling a sense of camaraderie with their peers in the unit) during deployment. Participants rate their level of agreement with each statement on a 5-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5). Scores range from 12 to 60, with higher scores indicating greater perceived team support. A Cronbach  $\alpha$  of 0.93 was reported by Pietrzak and colleagues (2009) in a study with veterans of Operations Enduring Freedom and Iraqi Freedom (n= 272).

*Post-deployment Social Support Variable.* The 15-item Post-deployment Social Support scale provides an assessment of the extent to which family, friends, coworkers, employers, and the community provide emotional sustenance and instrumental assistance post deployment. Emotional sustenance refers to the extent to which others provide the individual with understanding, companionship, a sense of belonging, and positive self-regard. Instrumental assistance refers to the extent to which the individual receives tangible aid such as help to accomplish tasks and material assistance or resources. Participants are asked to rate their level of agreement with the statement on a 5-point Likert scale ranging from “strongly disagree” (1) to

“strongly agree” (5). Scores range from 15 to 75, with higher scores indicating greater perceived post-deployment social support. A Cronbach  $\alpha$  of 0.82 was reported in the Pietrzak et al. (2009) study on veterans of Operations Enduring Freedom and Iraqi Freedom (n= 272).

The CD-RISC is a 25-item self-report instrument that assesses resilience. The CD-RISC can also be used to assess other constructs using subscales developed by Connor and Davidson (2003) and colleagues. Five subscales were generated using exploratory factor analysis: (1) personal competence- 8-items, (2) tolerance of negative affect and stress-related growth- 7-items, (3) adaptability or acceptance of change- 5-items, (4) personal control- 3-items, and (5) spiritual orientation to the future- 2-items. Cronbach  $\alpha$ s of 0.93 and 0.94, respectively were reported in the Connor and Davidson study (2003) on a general population (n= 577) and the Pietrzak et al. (2009) study on veterans of Operations Enduring Freedom and Iraqi Freedom (n= 272). Individual items that comprise the scale are listed in Table 2.

*Resilience Variable.* The CD-RISC was developed by Connor and Davidson in 2003; they incorporated a fusion of constructs: hardiness, commitment, change viewed with a challenge, goals of aim, action orientation, strong self-esteem, adaptability when coping with change, strengthening effect of stress, previous experience of success and achievement, faith and belief in the benevolent intervention (Connor and Davidson, 2003). Participants were asked to rate on a 5-point Likert scale whether the statement is “rarely true” (0) to “true nearly all of the time” (4) for them. The summed score (0-100) provides a measure of the extent of resilience; higher scores reflecting greater resilience. Connor and Davidson (2003) reported Cronbach’s  $\alpha$  of 0.89 for a validation sample of general population subjects (n= 577). The normative mean scores reported in their study is 80.4 (SD= 12.8). A Cronbach  $\alpha$  of 0.94 was reported in the Pietrzak et

al. (2009) study on veterans of Operations Enduring Freedom and Iraqi Freedom (n= 272). For the purposes of this study, resilience was determined by using the CD-RISC scale.

**Table 2: Connor-Davidson Resilience Scale Items**

| Item no. | Description                                     |
|----------|---|
| 1        | Able to adapt to change                         |
| 2        | Close and secure relationships                  |
| 3        | Sometimes fate or God can help                  |
| 4        | Can deal with whatever comes                    |
| 5        | Past success gives confidence for new challenge |
| 6        | See the humorous side of things                 |
| 7        | Coping with stress strengthens                  |
| 8        | Tend to bounce back after illness or hardship   |
| 9        | Things happen for a reason                      |
| 10       | Best effort no matter what                      |
| 11       | You can achieve your goals                      |
| 12       | When things look hopeless, I don't give up      |
| 13       | Know where to turn for help                     |
| 14       | Under pressure, focus and think clearly         |
| 15       | Prefer to take the lead in problem solving      |
| 16       | Not easily discouraged by failure               |
| 17       | Think of self as strong person                  |
| 18       | Make unpopular or difficult decisions           |
| 19       | Can handle unpleasant feelings                  |
| 20       | Have to act on a hunch                          |
| 21       | Strong sense of purpose                         |
| 22       | In control of your life                         |
| 23       | I like challenges                               |
| 24       | You work to attain your goals                   |
| 25       | Pride in your achievements                      |

Source: Connor, K and Davidson, J. (2003). Development of a New Resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18:76-82.

*Depression (mental health) Variable.* The Patient Health Questionnaire (PHQ) is a 9-item screening instrument for depression derived from the clinician-administered Primary Care Evaluation of Mental Disorders based on DSM-IV (*Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition) criteria developed by Spitzer, Williams, Kroenke in 1999 (Kroenke et al., 2007). Participants rate on a 4-point Likert scale whether the experience or feeling described

occurs “not at all” (0) to “nearly every day” (3) for them. Scores of 15 or higher indicate a positive screen for depression. A Cronbach’s  $\alpha$  of 0.92 was reported for these items by Pietrzak and colleagues (2009) (n= 272). In the current study the PHQ-2, a brief depression questionnaire, was used. The PHQ-2 has been validated in a previous study (n =9,740) (Kroenke et al., 2009, 2010) and found to have good sensitivity for detecting depressive disorders with higher scores indicating depression.

*Anxiety and Post-Traumatic Stress Disorder (mental health) Variable.* The Generalized Anxiety Disorder (GAD) 7-item scale developed by Spitzer, Williams and Kroenke (1999) to diagnose generalized anxiety and post-traumatic stress disorder and its abbreviated two-item (GAD-2) subscale validated by Kroenke et al. (2007 and 2010) are based on the DSM-IV criteria. These scales have been found to be valid and reliable measures of detecting generalized anxiety, panic, social anxiety and post-traumatic stress disorder (Kroenke et al., 2007). Participants rate on a 4-point Likert scale whether the experience or feeling described occurs “not at all” (0) to “nearly every day” (3) for them. The optimal cut point is  $\geq 10$  on the parent scales (PHQ-9 and GAD-7) and  $\geq 3$  on the ultra-brief versions (PHQ-2 and GAD-2). The Cronbach’s  $\alpha$  of 0.83 was reported for the GAD-7 and 0.80 for the GAD-2 (Kroenke et al., 2010). Scores on the GAD-2 range from 0 to 6, with higher scores  $\geq 3$  indicating anxiety and PTSD. To study the combined effects of anxiety, depression and PTSD, the PHQ-4 scale (comprised of the PHQ-2 and GAD-2 subscales) was used to assess mental health (Kroenke et al., 2009, 2010). Lower scores on this scale indicated better mental health (i.e. not determined to have depression, anxiety and PTSD). The variables included in this study are illustrated in Table 3.



**Table 3: Study Variables**

| <b>Variable</b>                | <b>Measure</b>                   | <b>Description/Measurement Level</b>                                  | <b>Response Format/Scoring</b>   |
|--------------------------------|----------------------------------|---|--|
| Predeployment Affectivity      | Prior Stressor Scale             | 15-item scale. Interval level data                                    | Dichotomous items (0 = Events No; 1 = Yes), with special variations as described below.<br>For Items 14 and 15: If the respondent answers No, each of these items is scored 0. If the respondent answers Yes, each of these items is scored by examining the responses to the 14a or 15a options. If the respondent circles ONE OF THE TWO options, “in childhood” OR “in adulthood,” he/she should receive a 1. If the respondent endorses BOTH “in childhood” AND “in adulthood,” he/she should receive a 2. Item scores are summed and ranges from 0 to 17; higher scores are indicative of more exposure to predeployment stressors. |
| Team Support                   | Deployment Social Support        | 12-item scale. Interval level data                                    | 5-point Likert scale (1 = Strongly disagree; 5 = Strongly agree). Sum item scores and ranges from 12 to 60; higher scores are indicative of greater perceived support and cohesion with regard to the USPHS in general, leaders, and fellow team members.  |
| Post-deployment Social Support | Post-deployment Social Support   | 15-item scale. Interval level data                                    | 5-point Likert scale (1 = Strongly disagree; 5 = Strongly agree). Sum item scores and ranges from 15 to 75; higher scores are indicative of greater perceived social support upon return from the deployment.  |
| Resilience                     | Connor-Davidson Resilience Scale | 25-item scale. Interval level data and categorical cut-point is used. | 5-point Likert scale- 0 (“not true at all”) to 4 (“true nearly all the time). A total score of 0-100 with higher scores indicative of resilience. A cut-point of 79 was determined to transform data into a categorical variable (higher and lower resilience).  |

| Variable                         | Measure     |       | Description/Measurement Level  | Response Format/Scoring  |
|----------------------------------|-------------|-------|--|--|
| Depression (mental health)       | PHQ-4*      | PHQ-2 | First 2 items of PHQ-9. Ultra-brief depression screener. Interval level data       | 4- point Likert scale- Two items scored 0 (“not at all”) to 3 (“nearly every day”). A total score of 0-6 with higher scores indicative of depression. Assess using cut-off point for each when used as screeners is a score of 3 or greater.   |
| Anxiety and PTSD (mental health) |             | GAD-2 | First 2 items of GAD-7. Ultra-brief anxiety and PTSD screener. Interval level data | 4- point Likert scale- Two items scored 0 (“not at all”) to 3 (“nearly every day”). A total score of 0-6 with higher scores indicative of anxiety and PTSD. Assess using cut-point for each when used as screeners is a score of 3 or greater. |
| Gender                           | Demographic |       | Categorical  | 1= Male<br>2= Female   |
| Age                              | Demographic |       | Categorical  | 20 to 24<br>25 to 34<br>35 to 44<br>45 to 54<br>55 to 64<br>65 or greater  |

\*PHQ-4 assesses the combined effects of depression, anxiety and PTSD using cut-point score of 6 or greater.

| <b>Variable</b>                  | <b>Measure</b> | <b>Description/Measurement Level</b> | <b>Response Format/Scoring</b>  |
|----------------------------------|----------------|--------------------------------------|---|
| Race/Ethnicity                   | Demographic    | Categorical                          | White/Caucasian<br>African American/Black<br>Hispanic<br>Asian<br>Native Hawaiian/ Other Pacific Islander<br>American Indian or Alaskan Native<br>Other   |
| Relationship Status              | Demographic    | Categorical                          | Single, never married<br>Married without children<br>Married with children<br>Divorced<br>Separated<br>Widowed<br>Living with partner   |
| Military Rank                    | Demographic    | Categorical                          | 0-1/ENS (Ensign)<br>0-2/LTJG (Lieutenant Junior Grade)<br>0-3/LT (Lieutenant)<br>0-4/LCDR (Lieutenant Commander)<br>0-5/CDR (Commander)<br>0-6/CAPT (Captain)<br>0-7/RADM (Rear Admiral)<br>0-8/RADM (Rear Admiral) |
| Professional Discipline Category | Background     | Categorical, 1-11                    | Physician, dentist, nurse, pharmacist, engineer, environmental health officer, health services officer, dietitian, scientist/researcher, therapist, veterinarian  |
| Length of Time in USPHS          | Background     | Continuous                           | Numerical   |

| <b>Variable</b>                             | <b>Measure</b> | <b>Description/Measurement Level</b> | <b>Response Format/Scoring</b>  |
|---|----------------|--------------------------------------|---|
| Mental Health/Behavioral Health Discipline  | Background     | Categorical                          | If ‘yes’ to mental health provider is selected, participants asked to select one of the following: Clinical Psychologist, Psychiatrist, Clinical Social Worker, Psychiatric Nurse Practitioner, Psychiatric Nurse, Psychiatric Physician Assistant                        |
| Deployment Assignment                       | Background     | Categorical                          | Tier 1- response teams ready and able to respond to an event within 12 hours<br>Tier 2- teams ready and able to respond to an event within 36 hours<br>Tier 3- officers not on Tier 1 or 2 teams are Tier 3 responders, ready and able to respond to an event in 72 hours |
| Deployment Role                             | Background     | Categorical                          | Command Staff<br>Safety<br>Operations (Medical Services/Provider, Pharmacy, Preventive Medicine)<br>Planning<br>Administration<br>Logistics<br>Public Information Officer/Liaison<br>Other  |
| Number of Times Deployed                    | Background     | Categorical                          | “1” to “10” and greater   |
| Characteristics (intensity) of Deployment   | Background     | Categorical                          | Frequency   |
| Prior service in another uniformed services | Background     | Categorical                          | Prior Branch of Armed Forces (yes or no)<br>Active or Reserve status (select one)<br>Deployed with other services (yes or no)   |

## **Study Variables**

The outcomes variable in this study was resilience, measured using the 25 item CD-RISC scale. The independent variables included predeployment affectivity, team support, post-deployment social support and mental health. Potential covariates include age, gender, race/ethnicity, relationship status, rank, years of service in the USPHS, professional category, deployment assignment, deployment role, mental health provider, mental health discipline, number of times deployed, frequency of deployment, duration of the most recent deployment, deployment preparedness, perceived intensity of deployment, deployment stress (deployment stress factors), prior service in another uniformed service branch (active or reserve) and deployment with prior service.

## **Sample Selection and Data Collection Procedures**

### *Pilot Study*

A pilot study was conducted for this study. One of the advantages of conducting a pilot study is that it may give advance warning about where the main research project could fail, where research protocols may not be followed, or whether proposed methods or instruments are inappropriate or too complicated (van Teijlingen and Hundley, 2001). Ten USPHS commissioned officers, representative of the target population, were invited to participate in the pilot study. The researcher contacted potential participants via email to participate in the online pilot study (Appendix C), provide consent (Appendix D), complete the internet based questionnaire (Appendix I) and complete a pilot study online feedback form (Appendix E). This form included an option for the researcher to contact respondents to identify any ambiguities. Pilot study findings were used to assess the acceptability and readability of the instrument.

Upon completion (<http://tinyurl.com/peatpilotsurvey>), a few participants were selected for a telephone interview to provide clarity to ambiguities, unnecessary or difficult questions, appropriateness of the format and sensitive questions, estimate the time needed to complete the questionnaire, and to provide suggestions for improvement based on their responses to the pilot study feedback form. A total of three USPHS commissioned officers were selected to clarify their responses. All materials (Appendices C, D, E, F, G, H and I) were approved by the University of Maryland Institutional Review Board (IRB) on December 16, 2011, prior to use for pilot testing purposes.

The researcher reviewed the pilot survey for missing data and assessed the feedback form to determine whether any changes were necessary. An addendum request to the University of Maryland IRB was required for any significant modifications to the approved project. However, given recommended changes were largely grammatical, or reorganization of the order of items (e.g., demographic and background items at the end of the survey) and the addition of skip patterns for demographic and background items, an IRB addendum was not required. Participants in the pilot study were not eligible to participate in the final study.

### *Pilot Study Findings*

The pilot study required the participation of 10 USPHS commissioned officers and was sent to 13 potential respondents; 11 participants completed the online survey and feedback form within 24 hours of receiving it (Appendix E). Pilot study findings were used to determine acceptability and readability of the survey instrument. Participants were asked if there were any survey items they had difficulty understanding. They indicated that the item on how often they deployed was vague and the response format was not clear (i.e. were they to write in the number

of days, months, or years they were deployed?). To address this concern, the question was changed to a two part response: (1) how often did you deploy in the last seven years? and, (2) how often have you deployed in the past year?

Pilot study participants' demographic and background characteristics, including gender, age, race/ethnicity, rank, relationship status, professional category and deployment assignment can be found in Table 4. The majority of these respondents were men between the ages of 35 and 44 years old (55%) and married with children (64%). There was approximately equal representation of African American/Blacks (35%) and Asians (27%) in the pilot population. Larger proportions of the officers were of the rank of O-5/Commander (73%) and affiliated with the Health Services Officer professional category (45%). The average length of time in service was 6.6 active duty years ( $SD = 4.87$ ). There was an approximately equal distribution of officers who were part of a deployment team (Tier 1) and those who were not part of a deployment team (Tier 3). There was no representation from officers who were part of a Tier 2 deployment team - response teams ready and able to respond within 36 hours. Eight of the 11 respondents indicated it took between 10-15 minutes to complete the survey. The remaining three respondents stated they were disrupted while taking the survey; therefore, it took these individuals 20-25 minutes to complete the survey. The average time burden of 10-15 minutes was included in the final study recruitment material (Appendices F, G, H).

**Table 4: Descriptive Statistics of Pilot Study Participants (N =11)**

| <b>Demographic/Background Variables</b>                           | <b>Response Category</b> | <b>N (%)</b> |
|---|--------------------------|--------------|
| <b>Gender</b>   | Male                     | 6 (55%)      |
|   | Female                   | 5 (45%)      |
| <b>Age</b>  | 25 to 34 years           | 1 (9%)       |
|   | 35 to 44 years           | 6 (55%)      |
|   | 45 to 54 years           | 4 (36%)      |
| <b>Race/Ethnicity (5 of 7 race/ethnicity groups represented)</b>  | Caucasian/White          | 2 (18%)      |
|   | African American/Black   | 4 (35%)      |
|   | Hispanic                 | 1 (9%)       |
|   | Asian                    | 3 (27%)      |
|   | Other                    | 1 (9%)       |
| <b>Relationship Status</b>  | Single/Never Married     | 1 (9%)       |
|   | Married with Children    | 7 (64%)      |
|   | Divorced                 | 1 (9%)       |
|   | Separated                | 1 (9%)       |
|   | Living with Partner      | 1 (9%)       |
| <b>Rank</b>   | O-3/Lieutenant           | 1 (9%)       |
|   | O-4/Lieutenant Commander | 2 (18%)      |
|   | O-5/Commander            | 8 (73%)      |
| <b>Professional Category (5 out of 11 categories represented)</b> | Nurse                    | 2 (18%)      |
|   | Pharmacist               | 2 (18%)      |
|   | Engineer                 | 1 (9%)       |
|   | Health Services Officer  | 5 (45%)      |
|   | Scientist/Researcher     | 1 (9%)       |
| <b>Deployment Assignment</b>                                      | Tier 1                   | 6 (55%)      |
|   | Tier 3                   | 5 (45%)      |

### *Instrument Refinement and Testing*

Instrument development involved a multi-staged approach. The original 84-item questionnaire consisted of the Connor-Davidson Resilience Scale (Connor and Davidson, 2003), the abbreviated Patient Health and Generalized Anxiety Disorders Questionnaires (Kroenke et al., 2007), and three subscales from the Deployment Risk and Resilience Inventory Scales (King et al., 2003) (73-items) with 11 demographic variables (age, gender, race/ethnicity, relationship status, geographical location, length of service in the USPHS, rank, category, deployment tier assignment, deployment role, and number of times deployed). During study development,



additional demographic items regarding the duration of deployment, prior service, and frequency of deployments were included, whereas the geographical location variable was removed. After review of pilot study results, additional recommendations were made to add more demographic items in order to possibly explain environmental and other potential stress factors USPHS commissioned officers may have faced during deployment.

Additional variables and questions included were: (1) a probing question for the Health Services, Scientist/Researcher and Nurse Category officers who identified their specialty as “mental health provider,” (2) if the respondent indicated he/she was a mental health provider, it was recommended that information on his/her mental health discipline be acquired, (3) the number of times deployed in the past 7 years and in the past year, (4) the duration of the most recent deployment, (5) perception of preparedness for deployment, (6) characteristics/intensity of deployment, (7) determining whether the officer perceived stress during his/her most recent deployment, and (8) description of the possible cause of perceived stress. These additions were made to clarify ambiguous questions and resulted in a 21-item demographic section on the questionnaire. No significant relationship was found between resilience and these additional background characteristics. Table 5 outlines a detailed list of the internet based 94-item questionnaire consisting of the subscales and demographic and background variables used in the study. A more detailed summary of changes to the instrument is included in Appendix J.

**Table 5: Demographic Variables and Background Characteristics**

| <b>Variable</b>            | <b>Description/Measurement Level</b> | <b>Response Format/Scoring</b>  |
|----------------------------|--------------------------------------|---|
| <b>Gender</b>              | Categorical                          | 1= Male<br>0= Female  |
| <b>Age</b>                 | Categorical                          | 20 to 24 (1)<br>25 to 34 (2)<br>35 to 44 (3)<br>45 to 54 (4)<br>55 to 64 (5)<br>65 or greater (6)   |
| <b>Race/Ethnicity</b>      | Categorical                          | White/Caucasian (1)<br>African American/Black (2)<br>Hispanic (3)<br>Asian (4)<br>Native Hawaiian/ Other Pacific Islander (5)<br>American Indian or Alaskan Native (6)<br>Other (7) |
| <b>Relationship Status</b> | Categorical                          | Single, never married (1)<br>Married without children (2)<br>Married with children (3)<br>Divorced (4)<br>Separated (5)<br>Widowed (6)<br>Living with partner (7)                   |

| <b>Variable</b>                                   | <b>Description/Measurement Level</b> | <b>Response Format/Scoring</b>   |
|---|--------------------------------------|--|
| <b>Rank</b>                                       | Categorical                          | 0-1/ENS (Ensign) (1)<br>0-2/LTJG (Lieutenant Junior Grade) (2)<br>0-3/LT (Lieutenant) (3)<br>0-4/LCDR (Lieutenant Commander) (4)<br>0-5/CDR (Commander) (5)<br>0-6/CAPT (Captain) (6)<br>0-7/RADM (Rear Admiral) (7)<br>0-8/RADM (Rear Admiral) (8)                        |
| <b>Professional Category</b>                      | Categorical, 1-11                    | Physician (1), Dentist (2), Nurse (3), Pharmacist (4), Engineer (5), Environmental Health Officer (6), Health Services Officer (7), Dietitian (8), Scientist/Researcher (9), Therapist (10), Veterinarian (11)   |
| <b>Mental Health Provider</b>                     | Categorical                          | Dichotomous (1=Yes or 2=No)  |
| <b>Mental Health/Behavioral Health Discipline</b> | Categorical                          | If 'yes' to mental health provider is selected, participants asked to select one of the following: Clinical Psychologist (1), Psychiatrist (2), Clinical Social Worker (3), Psychiatric Nurse Practitioner (4), Psychiatric Nurse (5), Psychiatric Physician Assistant (6) |
| <b>Length of Time in USPHS</b>                    | Continuous                           | Numerical  |
| <b>Prior Service (Armed Forces)</b>               | Categorical                          | Dichotomous (1=Yes or 2=No)  |
| <b>Prior Service</b>                              | Categorical                          | Active (1)<br>Reserve (2)  |
| <b>Deployed as Armed Forces Member</b>            | Categorical                          | Dichotomous (1=Yes or 2=No)  |

| <b>Variable</b>  | <b>Description/Measurement Level</b> | <b>Response Format/Scoring</b>  |
|--|--------------------------------------|---|
| <b>Deployment Assignment</b>   | Categorical                          | Tier 1- response teams ready and able to respond to an event within 12 hours (1)<br>Tier 2- teams ready and able to respond to an event within 36 hours (2)<br>Tier 3- officers not on Tier 1 or 2 teams are Tier 3 responders, ready and able to respond to an event in 72 hours (3) |
| <b>Deployment Role</b>   | Categorical                          | Command Staff (1)<br>Safety (2)<br>Operations (Medical Services/Provider, Pharmacy, Preventive Medicine) (3)<br>Planning (4)<br>Administration (5)<br>Logistics (6)<br>Public Information Officer/Liaison (7)<br>Other (8)  |
| <b>Number of Times Deployed (in the past 7 years)</b>                                | Categorical                          | “1” to “10” and greater   |
| <b>Frequency of Deployment (in the past year)</b>                                    | Categorical                          | “0” to “10”   |
| <b>Length of Last Deployment</b>   | Continuous                           | Numerical   |
| <b>Preparedness for Deployment (via self-assessment)</b>                             | Categorical                          | Dichotomous (1= Yes or 2=No)  |
| <b>Deployment (intensity) Environment</b>  | Categorical                          | Very Difficult (1)<br>Difficult (2)<br>Somewhat Difficult (3)<br>Somewhat Easy (4)<br>Easy (5)<br>Very Easy (6)   |
| <b>Determining Stress (e.g. did they feel stress during their recent deployment)</b> | Categorical                          | Dichotomous (1=Yes or 2=No)   |
| <b>Determining Deployment Stress Factors</b>   | Script                               | Text Entry  |

### *Final Survey Instrument*

To perform a power analysis for multivariate logistic regression, the software G\*Power version 3.0 was used. For this cross-sectional study, an *a priori* calculated sample size of 143 (power of 0.8,  $p$  of 0.05, and 16 predictors) was determined. To obtain an *a priori* sample size of 143, a total of 200 active duty USPHS commissioned officers were recruited to address attrition or incomplete responses. USPHS commissioned officers were invited to participate across the country during a two-month time period, January to February 2012; study inclusion criteria included: (1) active duty United States Public Health Service Officers, and (2) officers who had been on at least one USPHS deployment. Deployment was defined as any response providing humanitarian aid, disaster relief, or emergency response and deployment trainings (e.g. Remote Area Medical training). United States Public Health Service deployments are temporary assignment of officers from their assigned duties within Health and Human Services and non-HHS organizations, authorized by the President or Secretary during a time of war or response to a national or public health emergency or urgent public health need (Office of Force Readiness and Deployment, 2006). The survey link (<http://tinyurl.com/rpeatsurvey>) remained open and active for the duration of the study. Participants completed the anonymous, internet based 94-item questionnaire consisting of the subscales and demographic and background characteristics items described in Table 3. Potential participants were self-identified and recruited at deployment team meetings, commissioned corps meetings, from various listservs, during trainings events, and via the use of email addresses. All were provided an email letter explaining the purpose of the study (Appendix F).

Due to the specific nature of the specific population of interest, nonprobability convenience sampling was used. Participants were recruited through the following existing listservs: (1) Office of Force Readiness and Deployment (OFRD) listserv which consists of approximately 1,200 active duty officers that are part of a Tier 1 and 2 deployment teams, (2) Junior Officer Advisory Group listserv (~3,000 officers included in this listserv), (3) United States Public Health Service professional category listservs, and (4) other existing USPHS committees or groups listservs. Participants were also recruited by word of mouth using snowball sampling, as interested persons were encouraged to invite other officers to participate in the research study.

Participants were assured confidentiality; emphasis was placed on the voluntary nature of participation and conformance to standards for the protection of human subjects. A reminder email (Appendix G) was sent to potential respondents via the various listservs requesting they complete the survey instrument. Reminder emails using the initial recruitment email (Appendix F) were sent a variable number of times, depending on the listservs' owner. Contacting non-responders is a technique commonly used in field survey research as it has been shown to significantly increase participation (Dillon, 2000). Due to ethical considerations and the command structure of USPHS, no incentives were provided to participants as the researcher is also an active duty USPHS commissioned officer.

### **Statistical Analysis of Data**

To answer the research questions and test the hypotheses, analyses were conducted to assess the relationship between the outcome variable and the independent variables. All analyses were performed using the Statistical Program for the Social Sciences (SPSS) software (version

20; SPSS Chicago, Illinois, 2011). Cronbach alphas were determined for the various subscales.

A Cronbach  $\alpha$  of 0.70 was considered sufficient for this study.

Demographic variables were analyzed to provide descriptive information about the sample. Additional analyses were conducted to determine the difference between higher and lower resilience for each independent variable in the study. Key demographic variables (covariates) determined to be statistically significant by chi-square analyses were included in the logistic regression model.

Logistic regression predicts the probability of an outcome occurring given known variables and does not assume a linear relationship between the independent and dependent variables, normally distributed variables, or homoscedasticity. The continuous dependent variable (resilience) was transformed to a binary variable and univariate and multivariate logistic regressions were used to analyze the data. Odd ratios,  $p$  values, and 95% confidence interval were reported.

## **Summary**

The study design, study variables, study instruments and materials, data collection and statistical methods were reported in this chapter. This cross-sectional study was conducted using an anonymous, self-administered, internet based questionnaire that contained the Connor-Davidson Resilience Scale, the abbreviated Patient Health and Generalized Anxiety Disorders Questionnaires and three subscales from the Deployment Risk and Resilience Inventory instrument. Univariate and multivariate logistic regression analyses were conducted to assess the relationship between the independent variables and the outcome variable.

## **Chapter 4: Results**

### **Introduction**

The intent of this study was to examine: (1) risk and protective factors such as team support, predeployment affectivity, mental health and post-deployment social support that may affect resilience in USPHS Officers prior to and post deployment, using an adaptation of the Transactional Model of Stress and Coping; (2) whether gender affects resilience in these officers; and (3) whether resilience and social support protect against traumatic stress and mental health problems post deployment after controlling for demographic characteristics. Data was collected using a 94-item online survey completed by 534 USPHS commissioned officers and analyzed to examine the relationship between the independent variables (predeployment affectivity, team support, post-deployment social support, and mental health) and the dependent variable (resilience). Findings are described and summarized, beginning with an explanation of how missing values were handled and a description of the demographic characteristics of the study sample. This is followed by a description of the univariate and bivariate analyses examining the relationships between resilience and the independent variables. Subsequently, logistic regression analyses were performed to assess the impact of the independent variables on both resilience and mental health problems.

### **Study Sample**

A sample size of 143 was calculated and 200 active duty USPHS commissioned officers were to be recruited to ensure data was adequately powered. United States Public Health Service



commissioned officers were invited to participate during a two-month time period, January 1 to February 29, 2012 after IRB approval was obtained (Appendix B).

Participants were recruited through an initial recruitment email request (Appendix F) via the following channels: (1) Office of Force Readiness and Deployment (OFRD) listserv which consists of active duty officers who are part of Tier 1 and 2 deployment teams (~1,400 officers); (2) Health Services Professional Advisory Committee listserv (~1,200 officers); (3) Junior Officer Advisory Group listserv (~3,000 officers); (4) United States Public Health Service professional category listservs; and (5) other existing USPHS committees or groups listservs. Officers who received an email request to participate likely received more than one copy of the same request, as they could belong to multiple listservs. Participants were also recruited by word of mouth using snowball sampling, as interested persons were encouraged to invite other officers to participate in the research study. No information is available on the percentage of respondents recruited by word of mouth.

A reminder email (Appendix G) was sent once to all potential respondents on the OFRD listserv (n= 1,405 minus one officer who had no email and 12 non-deliverable email) requesting recipients complete the survey instrument if they had not already done so. Reminder emails, using the initial recruitment email (Appendix F), were sent six times to the Health Services category listserv. Variability in the number of times reminder emails were sent to potential study participants was a function of internal listserv policy. The researcher had no control over the number of times (if any) reminder emails were sent.

Again, the online survey was available for completion from January 1, 2012 through February 29, 2012. At the conclusion of the study, 782 USPHS commissioned officers

(approximately twelve percent of active duty commissioned officers in the USPHS) responded to the request to participate in this voluntary study (i.e., responders). A total of 534 responders completed the survey instrument (i.e., completers), and these individuals made up the final sample.

### *Missing Values*

As mentioned above, 782 surveys were collected; however, missing values were a common problem. Approximately thirty-two percent of the surveys were excluded from the final analysis based on eligibility criteria (n=30) and missing values (n=218) (Appendix K). After removing surveys with many missing data points, the final study sample consisted of 534 participants (68% of the original responders). There were still missing data among the final sample, however no more than 5% of study variables had missing values.

Excluded participants were compared to final study participants on selected demographic variables, including gender, age, deployment assignment, and resilience (Table 6). Males made up 49.6% of the retained sample compared to four percent of the excluded sample. For both the retained and excluded samples, higher proportions were between the ages of 35 to 44, thirty-seven and eighteen percent, respectively. A larger number of excluded participants (n= 127) did not respond to the outcome question on resilience compared to those in the retained sample (n= 20).

**Table 6: Descriptive Statistics of Retained and Excluded Surveys**

| Variables                    | Response Category   | Retained (N =534) |         | Excluded (N = 248) |          |
|------------------------------|---------------------|-------------------|---------|--------------------|----------|
|                              |                     | N                 | (%)     | N                  | (%)      |
| <b>Gender</b>                | Males               | 265               | (49.6%) | 9                  | (3.6%)   |
|                              | Females             | 262               | (49.1%) | 27                 | (10.9%)  |
|                              | Missing             | 7                 | (1.3%)  | 212                | (85.5 %) |
| <b>Age</b>                   | 25 to 34 years      | 72                | (13.5%) | 7                  | (2.8%)   |
|                              | 35 to 44 years      | 196               | (36.7%) | 18                 | (7.3%)   |
|                              | 45 to 54 years      | 189               | (35.4%) | 5                  | (2.0%)   |
|                              | 55 to 64 years      | 67                | (12.5%) | 4                  | (1.6%)   |
|                              | 65 years or greater | 3                 | (0.6%)  | 1                  | (0.4%)   |
|                              | Missing             | 7                 | (1.3%)  | 213                | (85.9%)  |
| <b>Deployment Assignment</b> | Tier 1              | 188               | (35.2%) | 13                 | (5.2%)   |
|                              | Tier 2              | 121               | (22.7%) | 6                  | (2.4%)   |
|                              | Tier 3              | 215               | (40.3%) | 11                 | (4.5%)   |
|                              | Missing             | 10                | (1.8%)  | 218                | (87.9%)  |
| <b>Resilience</b>            | Higher              | 337               | (63.1%) | 70                 | (28.2%)  |
|                              | Lower               | 177               | (33.2%) | 51                 | (20.6%)  |
|                              | Missing             | 20                | (3.7%)  | 127                | (51.2%)  |

### *Sample Characteristics*

Demographic characteristics of the sample are illustrated in Table 7. Males and females were equally represented and the majority of respondents were between the ages of 35 to 54 years, Caucasian/White (64%), and married with children (58%). The sample was primarily comprised of Lieutenant Commanders, Commanders, and Captains (31, 30, and 26%, respectively), Health Services Officers (29%), and Nurses (21%). Each deployment tier was represented; 35% were Tier 1 responders, 23% were Tier 2 responders, and 40% were Tier 3 responders.

**Table 7: Sample Demographic Characteristics**

| <b>Variable</b>              | <b>Response Category</b>               | <b>N=534</b> | <b>%</b> |
|------------------------------|--|--------------|----------|
| <b>Gender</b>                | Males                                  | 265          | 49.6     |
|                              | Females                                | 262          | 49.1     |
|                              | Missing                                | 7            | 1.3      |
|                              |  |              |          |
| <b>Age</b>                   | 25 to 34 years                         | 72           | 13.5     |
|                              | 35 to 44 years                         | 196          | 36.7     |
|                              | 45 to 54 years                         | 189          | 35.4     |
|                              | 55 to 64 years                         | 67           | 12.5     |
|                              | 65 years or greater                    | 3            | 0.6      |
|                              | Missing                                | 7            | 1.3      |
|                              |  |              |          |
| <b>Race/Ethnicity</b>        | Caucasian/White                        | 341          | 63.9     |
|                              | African American/Black                 | 78           | 14.6     |
|                              | Hispanic                               | 36           | 6.7      |
|                              | Asian                                  | 34           | 6.4      |
|                              | Native American/Other Pacific Islander | 2            | 0.4      |
|                              | American Indian/Alaska Native          | 19           | 3.6      |
|                              | Other                                  | 16           | 3.0      |
|                              | Missing                                | 8            | 1.5      |
| <b>Relationship Status</b>   | Single/Never Married                   | 68           | 12.7     |
|                              | Married without Children               | 74           | 13.9     |
|                              | Married with Children                  | 311          | 58.2     |
|                              | Divorced                               | 42           | 7.9      |
|                              | Separated                              | 13           | 2.4      |
|                              | Widowed                                | 4            | 0.7      |
|                              | Living with Partner                    | 15           | 2.8      |
|                              | Missing                                | 7            | 1.3      |
| <b>Rank</b>                  | O-2/Lieutenant Junior Grade            | 14           | 2.6      |
|                              | O-3/Lieutenant                         | 45           | 8.4      |
|                              | O-4/Lieutenant Commander               | 167          | 31.3     |
|                              | O-5/Commander                          | 160          | 30.0     |
|                              | O-6/Captain                            | 139          | 26.0     |
|                              | O-7/Rear Admiral                       | 2            | 0.4      |
|                              | Missing                                | 7            | 1.3      |
|                              |  |              |          |
| <b>Professional Category</b> | Physician                              | 53           | 9.9      |
|                              | Dentist                                | 14           | 2.6      |
|                              | Nurse                                  | 112          | 21.0     |
|                              | Pharmacist                             | 49           | 9.2      |
|                              | Engineer                               | 32           | 6.0      |
|                              | Environmental Health Officer           | 40           | 7.5      |
|                              | Health Services Officer                | 154          | 28.8     |
|                              | Dietitian                              | 12           | 2.2      |
|                              | Scientist/Researcher                   | 40           | 7.5      |
|                              | Therapist                              | 12           | 2.2      |
|                              | Veterinarian                           | 7            | 1.3      |
|                              | Missing                                | 9            | 1.7      |
| <b>Deployment Assignment</b> | Tier 1                                 | 188          | 35.2     |
|                              | Tier 2                                 | 121          | 22.7     |
|                              | Tier 3                                 | 215          | 40.3     |
|                              | Missing                                | 10           | 1.8      |

Additional background characteristics of respondents are presented in Table 8. All participants reported being deployed at least once. Approximately ten percent of the sample (n=51) were mental health providers. Of those who were mental health providers, ten percent reported they were clinical psychologists (n=10) and over half (n=27) reported they were clinical social workers. Thirty-nine percent of the officers indicated their deployment role was part of the Operations Section (Medical Services/Provider, Pharmacy, and Preventive Medicine) while nineteen percent reported their role as 'Other.' Those who selected 'Other' specified their deployment role as Information Technology/Communications, Health Educator, Infection Control, Hazardous Material/Waste, Laboratory Technician, and Epidemiologist. The majority of participants had been deployed four or fewer times in the past seven years: 35% had one deployment, 18.7% had two deployments, 16.1% had three deployments and 12.2% had four deployments. Conversely, almost half of the respondents had not been deployed in the past year while thirty-five percent were deployed at least once.

The majority of respondents (71.5%) were prepared for deployments, and forty percent found deployment somewhat difficult, difficult, or very difficult. Forty-two percent (n=222) felt stress during deployment while 49% (n=262) did not. Those who felt stress, identified factors that accounted for the stress, including lack of sleep, austere conditions, poor leadership, poorly defined objectives, lack of training, treating a large number of wounded people, living conditions, being away from home, a high level of responsibility, long work hours, workload and understaffing.

**Table 8: Background Characteristics of Sample**

| <b>Variable</b>                                   | <b>Response Category</b>  | <b>N=534</b> | <b>%</b> |
|---|---|--------------|----------|
| <b>Mental Health Provider</b>                     | Yes   | 51           | 9.6      |
|   | No  | 476          | 89.1     |
|   | Missing   | 7            | 1.3      |
| <b>Mental Health Provider Specialty</b>           | Clinical Psychologist   | 10           | 1.9      |
|   | Psychiatrist  | 2            | 0.4      |
|   | Clinical Social Worker  | 27           | 5.1      |
|   | Psychiatric Nurse Practitioner  | 1            | 0.2      |
|   | Psychiatric Nurse   | 5            | 0.9      |
|   | Missing   | 6            | 1.1      |
|   | Not applicable  | 483          | 90.4     |
| <b>Deployment Role</b>                            | Command Staff   | 66           | 12.4     |
|   | Safety  | 23           | 4.3      |
|   | Operations (Medical Services/Provider, Pharmacy, Preventive Medicine) | 210          | 39.3     |
|   | Planning  | 20           | 3.7      |
|   | Administration  | 32           | 6.0      |
|   | Logistics   | 43           | 8.1      |
|   | Public Information Officer/Liaison                                    | 29           | 5.4      |
|   | Other   | 99           | 18.5     |
|   | Missing   | 12           | 2.2      |
| <b>Frequency of Deployment (past seven years)</b> | 1   | 187          | 35.0     |
|   | 2   | 100          | 18.7     |
|   | 3   | 86           | 16.1     |
|   | 4   | 65           | 12.2     |
|   | 5   | 41           | 7.7      |
|   | 6   | 22           | 4.1      |
|   | 7   | 11           | 2.1      |
|   | 8   | 7            | 1.3      |
|   | 9   | 3            | 0.6      |
|   | 10 or greater   | 12           | 2.2      |
| <b>Frequency of Deployment (past year)</b>        | 0   | 234          | 43.8     |
|   | 1   | 186          | 34.8     |
|   | 2   | 27           | 5.1      |
|   | 3   | 7            | 1.3      |
|   | 4   | 3            | 0.6      |
|   | 5   | 2            | 0.4      |
|   | 6   | -            | -        |
|   | 7   | 1            | 0.2      |
|   | 8   | -            | -        |
|   | 9   | 1            | 0.2      |
|   | Missing   | 73           | 13.7     |
| <b>Deployment Preparedness</b>                    | Yes   | 382          | 71.5     |
|   | No  | 102          | 19.1     |
|   | Missing   | 50           | 9.4      |

| Variable                                  | Response Category  | N=534 | %    |
|---|--------------------|-------|------|
| <b>Deployment (intensity) Environment</b> | Very Difficult     | 30    | 5.6  |
|   | Difficult          | 44    | 8.2  |
|   | Somewhat Difficult | 148   | 27.7 |
|   | Somewhat Easy      | 135   | 25.3 |
|   | Easy               | 91    | 17.0 |
|   | Very Easy          | 36    | 6.7  |
|   | Missing            | 50    | 9.4  |
| <b>Stress During Deployment</b>           | Yes                | 215   | 40.3 |
|   | No                 | 253   | 47.4 |
|   | Missing            | 66    | 12.4 |

### *Subscale Characteristics*

Internal consistency was determined for each of the independent and dependent variable subscales. Similar to findings in previous studies (Pietrzak et al., 2009; Connor and Davidson, 2003), all subscales demonstrated internal consistency. Cronbach alpha scores ranged from 0.74 for the 2-item mental health subscale to 0.92 for the 12-item team support scale (Table 9). The Cronbach alpha for the overall mental health scale was 0.81, the two item depression subscale, Patient Health Disorder (PHQ), had an alpha of 0.74 and the two item Generalized Anxiety Disorder (GAD) subscale measuring anxiety and PTSD had an alpha of 0.78.

**Table 9: Estimates of Internal Consistency Reliability for Study Scales**

| Scales                                | N (valid%) | N of Items | Cronbach $\alpha$ |
|---------------------------------------|------------|------------|-------------------|
| <b>Predeployment Affectivity</b>      | 513 (96%)  | 15         | .76               |
| <b>Team Support</b>                   | 501 (94%)  | 12         | .92               |
| <b>Post-deployment Social Support</b> | 494 (93%)  | 15         | .74               |
| <b>Resilience</b>                     | 514 (96%)  | 25         | .89               |
| <b>Mental Health</b>                  | 526 (99%)  | 4          | .81               |
| <i>PHQ (depression)</i>               | 527 (99%)  | 2          | .74               |
| <i>GAD (anxiety and PTSD)</i>         | 528 (99%)  | 2          | .78               |

Mean scores on the scales used to measure the theoretical constructs examined in this study are reported in Table 10. For the resilience scale, respondents had to select, for each item,

whether the statements were “rarely true” (0) to “true nearly all of the time” (4) on the five point Likert scale. Resilience scores ranged from 0 to 100 with higher scores indicating greater resilience. The mean resilience score for study participants was 82.81 (SD=10.48). The response format for the team support and post-deployment social support subscales consisted of a five point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5). On the team support subscale, scores ranged from 12 to 60 and higher scores indicated greater perceived team support among participants. The mean team support score for this sample was 47.5 (SD= 8.34). Total scores on the post-deployment social support subscale ranged from 15 to 75; the mean score was 57.8 (SD= 6.91). Higher scores indicated greater perceived post-deployment social support.

To capture predeployment affectivity, respondents were asked to identify the stressors they faced prior to deployment. Scores ranged from 0 to 17, with higher scores indicating greater exposure to predeployment stressors. The mean score on the predeployment affectivity subscale was 4.50 (SD= 3.04), indicating respondents experienced on average four stressful events prior to deploying. When responding to the mental health subscale items (measured using a four point Likert scale), respondents indicated whether they experienced the event described “not at all” (0) or “nearly every day” (3) over the past two weeks. Scores ranged from 0 – 12 on the mental health subscale; the mean was 1.53 (SD= 2.10) with higher scores indicating increased depression, anxiety, and PTSD. For both the PHQ-2 and GAD-2 subscales, scores ranged from 0 – 6. The mean for PHQ-2 was 0.98 (SD= 1.29) with higher scores indicating increased depression, while the mean for GAD-2 was 0.56 (SD= 1.05) with higher scores indicating increased anxiety and PTSD.



**Table 10: Means and Standard Deviations of Theoretical Subscales**

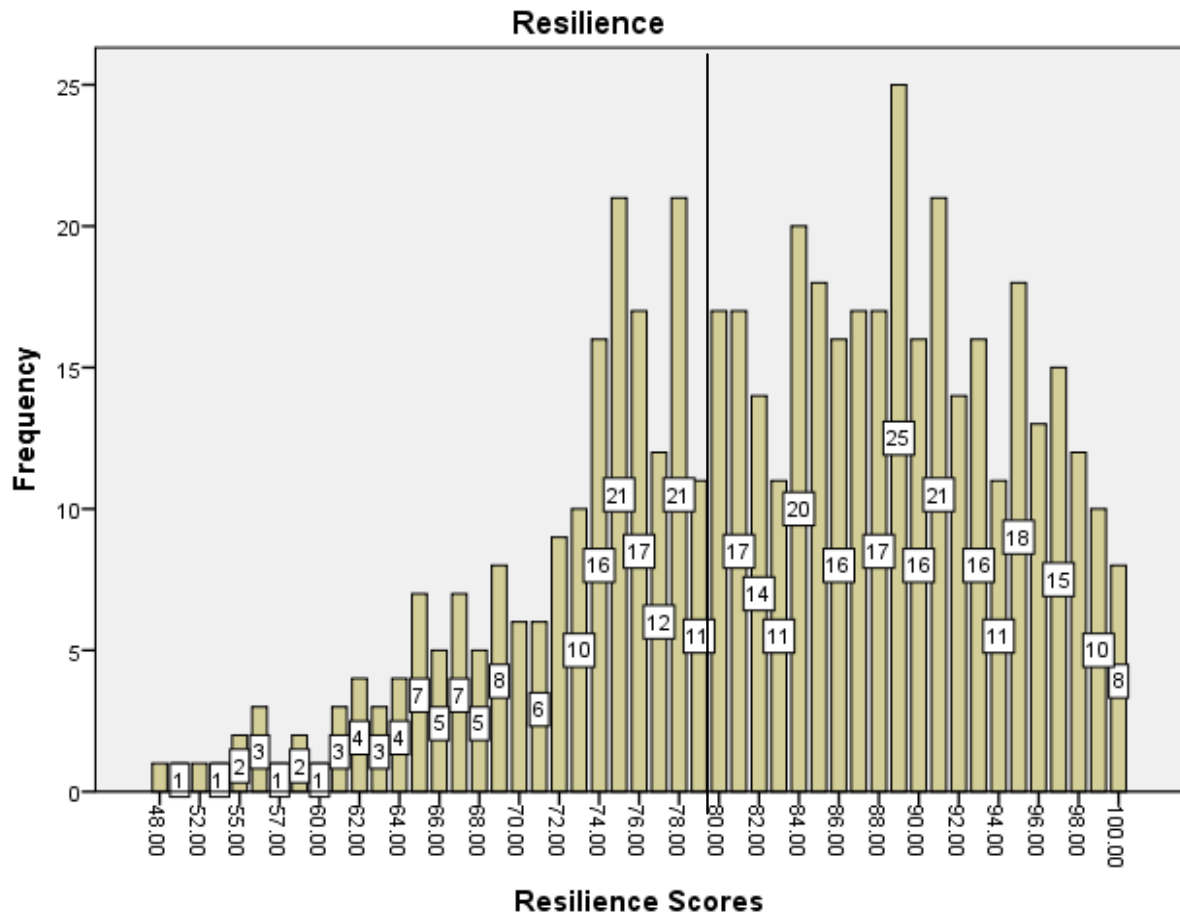
| Theoretical Constructs                |       |         |                 |             | Total N |
|---------------------------------------|-------|---------|-----------------|-------------|---------|
|                                       | Mean  | (SD)    | Number of Items | Score Range |         |
| <b>Predeployment Affectivity</b>      | 4.50  | (3.04)  | 15              | 0-17        | 510     |
| <b>Team Support</b>                   | 47.5  | (8.34)  | 12              | 12-60       | 499     |
| <b>Post-deployment Social Support</b> | 57.76 | (6.91)  | 15              | 15-75       | 491     |
| <b>Resilience</b>                     | 82.81 | (10.48) | 25              | 0-100       | 514     |
| <b>Mental Health</b>                  | 1.53  | (2.10)  | 4               | 0-12        | 522     |
| <i>PHQ (depression)</i>               | .975  | (1.29)  | 2               | 0-6         | 523     |
| <i>GAD (anxiety and PTSD)</i>         | .557  | (1.05)  | 2               | 0-6         | 524     |

**Dependent Variable: Resilience**

Again, as mentioned above, the score range for each item on the resilience scale was 0 - 4 with the summed scores ranging from 0 - 100. To conduct the logistic regression, scores on the resilience subscale were categorized into two groups- those with higher resilience to deployment (1) and those with lower resilience (0). Figure 6 illustrates a proportion of respondents (n=8, 1.6%) had a score of 100 on the subscale; the lowest score was 48 (n=1, 0.20%). Connor and Davidson (2003) reported mean item scores between 79-81. Determining the cut-point for this study was based on the frequency of scores, and previous studies. Costa de Robert et al. (2010) selected the lowest 25<sup>th</sup> percentile of their sample to determine their cut-point for the low resilience group in individuals exposed to stress. Jafari et al. (2012) indicated that the cut-point for individuals without any mental disorder was 80.4. Therefore, after analyzing the frequency of

resilience scores, a cut-point of 79 was established for this study for which 34.4% of respondents were classified as less resilient after deployment.

**Figure 6: Resilience Scores for USPHS Commissioned Officers**



### *Bivariate Analysis*

Chi-Square analyses ( $\chi^2$ ) and cross tabulations were used to determine whether there were significant differences between the demographic variables and resilience (i.e. those with higher and lower resilience scores) (Table 11). Significant variables (gender, age and relationship status) were included in the logistic regression model as covariates.

**Table 11: Chi-Square Analyses of Demographic and Background Characteristics by Respondents with Higher and Lower Resilience**

| Demographic Characteristic              | Higher Resilience<br>(N = 337) | Lower Resilience<br>(N =177) | Total | Chi-Square<br>( $\chi^2$ ) (p-value) |
|---|--------------------------------|------------------------------|-------|--------------------------------------|
|   |                                |                              | N     |                                      |
|   | N (valid%)                     | N (valid%)                   |       |                                      |
| <b>Gender</b>                           |                                |                              |       | <b>11.16 (.001)</b>                  |
| Male                                    | 150 (56.6%)                    | 115 (43.4%)                  | 265   |                                      |
| Female                                  | 185 (70.6%)                    | 77 (29.4%)                   | 262   |                                      |
| <b>Age</b>                              |                                |                              |       | <b>8.61 (.035)</b>                   |
| 25 to 34 years                          | 50 (69.4%)                     | 22 (30.6%)                   | 72    |                                      |
| 35 to 44 years                          | 109 (55.6%)                    | 87 (44.4%)                   | 196   |                                      |
| 45 to 54 years                          | 129 (68.3%)                    | 60 (31.7%)                   | 189   |                                      |
| 55 or greater                           | 47 (67.1%)                     | 23 (32.9%)                   | 70    |                                      |
| <b>Race/Ethnicity</b>                   |                                |                              |       | <b>5.184 (.269)</b>                  |
| White/Caucasian                         | 205 (60.1%)                    | 136 (39.9%)                  | 341   |                                      |
| African American/Black                  | 56 (71.8%)                     | 22 (28.2%)                   | 78    |                                      |
| Hispanic                                | 26 (72.2%)                     | 10 (27.8%)                   | 36    |                                      |
| Asian                                   | 21 (61.8%)                     | 13 (38.2%)                   | 34    |                                      |
| Native American/American Indian/Other*  | 29 (64.4%)                     | 16 (35.6%)                   | 45    |                                      |
| <b>Relationship Status</b>              |                                |                              |       | <b>16.11 (.003)</b>                  |
| Single/Never Married                    | 42 (61.8%)                     | 26 (38.2%)                   | 68    |                                      |
| Married without Children                | 48 (64.9%)                     | 26 (35.1%)                   | 74    |                                      |
| Married with Children                   | 198 (63.7%)                    | 113 (36.3%)                  | 311   |                                      |
| Divorced                                | 34 (81.0%)                     | 8 (19.0%)                    | 42    |                                      |
| Separated/ Widowed/Living with Partner* | 24 (61.5%)                     | 15 (36.9%)                   | 39    |                                      |

| Demographic Characteristic  |                                |                             |       |                                     |
|---|--------------------------------|-----------------------------|-------|-------------------------------------|
|   | Higher Resilience<br>(N = 337) | Lower Resilience<br>(N=177) | Total | Chi-Square<br>( $\chi^2$ )/ p-value |
|   | N (valid%)                     | N (valid%)                  | N     |                                     |
| <b>Rank</b>   |                                |                             |       | 4.09 (.394)                         |
| O-2/LTJG  | 9 (64.3%)                      | 5 (35.7%)                   | 14    |                                     |
| O-3/LT  | 34 (75.6%)                     | 11 (24.4%)                  | 45    |                                     |
| O-4/LCDR  | 101 (59.4%)                    | 69 (40.6%)                  | 170   |                                     |
| O-5/CDR   | 100 (62.5%)                    | 60 (37.5%)                  | 160   |                                     |
| O-6/CAPT/O-7/RADM*  | 93 (64.1%)                     | 52 (35.9%)                  | 145   |                                     |
| <b>Professional Category</b>  |                                |                             |       | 6.314 (.504)                        |
| Physician   | 29 (54.7%)                     | 24 (45.3%)                  | 53    |                                     |
| Nurse   | 80 (71.4%)                     | 32 (28.6%)                  | 112   |                                     |
| Pharmacist  | 31 (63.3%)                     | 18 (36.7%)                  | 49    |                                     |
| Engineer  | 20 (62.5%)                     | 12 (37.5%)                  | 32    |                                     |
| Environmental Health Officer  | 27 (67.5%)                     | 13 (32.5%)                  | 40    |                                     |
| Health Services Officer   | 94 (61.0%)                     | 60 (39.0%)                  | 154   |                                     |
| Scientist/Researcher  | 25 (62.5%)                     | 15 (37.5%)                  | 40    |                                     |
| Dentist/Dietitian/<br>Therapist/Veterinarian*                               | 31 (57.4%)                     | 23 (42.6%)                  | 54    |                                     |
| <b>Deployment Assignment</b>  |                                |                             |       | 1.09 (.579)                         |
| Tier 1  | 125 (66.5%)                    | 63 (33.5%)                  | 188   |                                     |
| Tier 2  | 75 (62.0%)                     | 46 (38.0%)                  | 121   |                                     |
| Tier 3  | 133 (61.9%)                    | 82 (38.1%)                  | 215   |                                     |
| <b>Deployment Role</b>  |                                |                             |       | 6.20 (.287)                         |
| Command Staff   | 45 (68.2%)                     | 21 (31.8%)                  | 66    |                                     |
| Operations (Medical<br>Services/Provider, Pharmacy,<br>Preventive Medicine) | 134 (63.8%)                    | 76 (36.2%)                  | 210   |                                     |
| Administration  | 25 (78.1%)                     | 7 (21.9%)                   | 32    |                                     |
| Logistics   | 25 (58.1%)                     | 18 (41.9%)                  | 43    |                                     |
| Public Information<br>Officer/Liaison/Planning/Safety*                      | 56 (56.6%)                     | 43 (43.4%)                  | 99    |                                     |
| Other   | 52 (61.9%)                     | 32 (38.1%)                  | 84    |                                     |

\*If there were fewer than 20 respondents per group, groups were combined.

Respondents were categorized as being more resilient if they scored between 79 and 100 (n = 337) on the resilience scale; those who scored 78 or less were categorized as less resilient (n = 177). There were differences on demographic variables between those with higher and lower resilience scores. Women were more resilient to deployment stress when compared to men (71 and 57% respectively).

With respect to age, there were differences among those who scored higher and lower on the resilience scale. Those in the older age category, 35 to 44 years old, scored lower for resilience (55.6%) when compared to the other age categories. Those who were divorced (81.0%) reported higher resilience while those who were separated, widowed or living with a partner, scored lower on the resilience scale (61.5%).

Additionally, *t*-tests were conducted to test for significant differences between those who scored higher and lower on the resilience scale for each independent variable. Those with higher resilience had statistically higher means on team support, post-deployment social support and mental health (Table 12).

**Table 12: Mean Scores, Standard Deviations and *t*-test Statistics for Key Independent Variables Subscale by Resilience Category**

|                                       | Resilience | N   | Mean  | Std. Deviation | <i>t</i> test | <i>p</i> -value |
|---------------------------------------|------------|-----|-------|----------------|---------------|-----------------|
| <b>Predeployment Affectivity</b>      | Higher     | 325 | 4.50  | 3.05           | -.006         | >.05            |
|                                       | Lower      | 188 | 4.50  | 3.01           |               |                 |
| <b>Team Support</b>                   | Higher     | 318 | 48.91 | 8.22           | 5.13          | <.001           |
|                                       | Lower      | 184 | 45.03 | 8.00           |               |                 |
| <b>Post-deployment Social Support</b> | Higher     | 313 | 58.88 | 6.65           | 5.46          | <.001           |
|                                       | Lower      | 181 | 55.60 | 6.81           |               |                 |
| <b>Mental Health</b>                  | Higher     | 335 | 1.15  | 1.86           | -5.66         | <.001           |
|                                       | Lower      | 191 | 2.19  | 2.31           |               |                 |
| <i>PHQ (depression)</i>               | Higher     | 335 | 0.76  | 1.16           | -4.80         | <.001           |
|                                       | Lower      | 192 | 1.34  | 1.42           |               |                 |
| <i>GAD (anxiety and PTSD)</i>         | Higher     | 336 | 0.39  | 0.929          | -4.69         | <.001           |
|                                       | Lower      | 192 | 0.85  | 1.19           |               |                 |

## Hypotheses Testing

Logistic regression using the entry method was used to analyze each study hypothesis to determine which variable best predicted the likelihood of resilience in USPHS commissioned officers. Gender, age and relationship status were found to be statistically significant ( $p < 0.05$ ) when examining those with higher and lower resilience scores, therefore, these variables were included in the multivariate logistic regression analyses as covariates. The reference group for each covariate included in the multivariate logistic regression analyses was selected based on the subgroup that scored the lowest in the higher resilience group (Table 11). The reference group provided meaningful insight into the data collected as it makes a distinctive contribution in understanding the process for those with higher and lower resilience to deployment and used as a basis for comparison to the demographic categories; age, gender and relationship status.

### *Hypothesis 1*

Hypothesis 1 stated that United States Public Health Service commissioned officers who receive team support from fellow officers will be more resilient. Specifically, the multivariate logistic regression model consisted of the independent variable (team support), the dependent variable (resilience), and the covariates; age, gender, and relationship status. In Table 13, the estimated odds ratio (OR) based on the final model for team support, relationship status, age and gender is presented. Estimates from the multivariate logistic regression model displays for each unit, increase in team support, the odds of being in the higher resilience group increased by 6%. USPHS commissioned officers who were married with children were two-and-half times more likely to be in the higher resilience group when compared to the reference group, those who were

separated, widowed, or living with partner. Those who were divorced were almost five times more likely to be in the higher resilience group when compared to those who were separated, widowed or living with a partner. The estimated adjusted OR for gender was: OR = 2.00 (95% CI 1.33 – 2.99), indicating women were twice more likely to be in the higher resilience group than men. Age was not statistically significant. This hypothesis was accepted.

**Table 13: Multivariate Logistic Regression Analysis on Resilience for Team Support**

| Independent Variables                     | Adjusted OR  | <i>p</i> -value | 95% C.I.     |               |
|---|--------------|-----------------|--------------|---------------|
|   |              |                 | Lower        | Upper         |
| <b>Team Support</b>                       | <b>1.058</b> | <b>&lt;.001</b> | <b>1.033</b> | <b>1.084</b>  |
| <b>Relationship Status</b>                |              |                 |              |               |
| Separated/Widowed/<br>Living with Partner | 1.00*        |                 |              |               |
| Single/Never Married                      | 2.429        | .065            | 0.948        | 6.223         |
| Married without Children                  | 2.292        | .075            | 0.920        | 5.709         |
| Married with Children                     | <b>2.549</b> | <b>.020</b>     | <b>1.161</b> | <b>5.596</b>  |
| Divorced                                  | <b>4.781</b> | <b>.005</b>     | <b>1.612</b> | <b>14.181</b> |
| <b>Gender</b>                             |              |                 |              |               |
| Male                                      | 1.00*        |                 |              |               |
| Female                                    | <b>1.995</b> | <b>&lt;.001</b> | <b>1.330</b> | <b>2.991</b>  |
| <b>Age</b>                                |              |                 |              |               |
| 35-44                                     | 1.00*        |                 |              |               |
| 25-34                                     | 0.980        | .895            | 0.509        | 1.930         |
| 45-54                                     | 0.948        | .895            | 0.430        | 2.089         |
| ≥ 55                                      | 0.568        | .089            | 0.296        | 1.091         |

C.I. = confidence interval. OR= odds ratio. \*Referent group.

## *Hypothesis 2*

United States Public Health Service commissioned officers who receive post-deployment social support will show significantly higher resilience (Hypothesis 2). In Table 14, the multivariate logistic regression model consisted of the dependent variable (resilience), the independent variable (post-deployment social support) and the covariates, age, gender, and relationship status. Estimates from the multivariate logistic regression model displays for each unit increase in post-deployment social support, the odds of being in the higher resilience group increased by 7%. USPHS commissioned officers who were married with children were two-and-half times more likely to be in the higher resilience group when compared to the reference group, those who were separated, widowed or living with a partner. Those who were divorced were five-and-a third times more likely to be in the higher resilience group when compared to those who were separated, widowed or living with a partner. The estimated adjusted OR for gender was OR = 1.72 (95% CI 1.14 – 2.58), indicating women were almost twice as likely to be in the higher resilience group compared to men. Age was not statistically significant. This hypothesis was accepted.

**Table 14: Multivariate Logistic Regression Analysis on Resilience for Post-Deployment Social Support**

| Independent Variables                     | Adjusted OR  | <i>p</i> -value | 95% C.I.     |              |
|---|--------------|-----------------|--------------|--------------|
|   |              |                 | Lower        | Upper        |
| <b>Post-deployment Social Support</b>     | <b>1.072</b> | <b>&lt;.001</b> | <b>1.041</b> | <b>1.104</b> |
| <b>Relationship Status</b>                |              |                 |              |              |
| Separated/Widowed/<br>Living with Partner | 1.00*        |                 |              |              |
| Single/Never Married                      | 2.394        | .069            | 0.935        | 6.129        |
| Married without Children                  | 2.138        | .098            | 0.868        | 5.263        |



| Independent Variables | Adjusted OR  | p-value     | 95% C.I.     |               |
|-----------------------|--------------|-------------|--------------|---------------|
|                       |              |             | Lower        | Upper         |
| Married with Children | <b>2.494</b> | <b>.022</b> | <b>1.139</b> | <b>5.460</b>  |
| Divorced              | <b>5.336</b> | <b>.003</b> | <b>1.781</b> | <b>15.984</b> |
| <b>Gender</b>         |              |             |              |               |
| Male                  | 1.00*        |             |              |               |
| Female                | <b>1.719</b> | <b>.009</b> | <b>1.143</b> | <b>2.584</b>  |
| <b>Age</b>            |              |             |              |               |
| 35-44*                | 1.00*        |             |              |               |
| 25-34                 | 0.853        | .652        | 0.428        | 1.701         |
| 45-54                 | 0.937        | .877        | 0.414        | 2.123         |
| ≥ 55                  | 0.517        | .054        | 0.265        | 1.012         |

C.I. = confidence interval. OR= odds ratio.\*Referent group.

### *Hypothesis 3*

United States Public Health Service commissioned officers who demonstrate better mental health will show significantly higher resilience. Again, multivariate logistic regression was used to analyze this hypothesis. The multivariate logistic regression model consisted of the dependent variable (resilience), the independent variable (mental health) and the covariates, age, gender, and relationship status (Table 15). Estimates from the multivariate logistic regression model displays for those with perceived mental illness (depression, anxiety and PTSD), the odds of being in the higher resilience group decreased by 24%. USPHS commissioned officers who were married with children were two-and-half times more likely to be in the higher resilience group when compared to the reference group, those who were separated, widowed or living with a partner. Those who were divorced were almost four-and-a half times more likely to be in the higher resilience group when compared to those who were separated, widowed or living with a partner. The estimated adjusted OR for gender was OR = 1.95 (95% CI 1.32 – 2.90), indicating

women were twice more likely to be in the higher resilience group than men. Age was not statistically significant. This hypothesis was supported as mental illness; specifically depression, anxiety and PTSD, predicted resilience.

**Table 15: Multivariate Logistic Regression Analysis on Resilience for Mental Health**

| Independent Variables                 | Adjusted OR  | <i>p</i> -value | 95% C.I.     |               |
|---------------------------------------|--------------|-----------------|--------------|---------------|
|                                       |              |                 | Lower        | Upper         |
| <b>Mental Health<sup>†</sup></b>      | <b>0.783</b> | <b>&lt;.001</b> | <b>0.711</b> | <b>0.862</b>  |
| <b>Relationship Status</b>            |              |                 |              |               |
| Separated/Widowed/Living with Partner | 1.00*        |                 |              |               |
| Single/Never Married                  | 1.863        | .177            | 0.754        | 4.600         |
| Married without Children              | 2.361        | .060            | 0.965        | 5.774         |
| Married with Children                 | <b>2.509</b> | <b>.020</b>     | <b>1.157</b> | <b>5.438</b>  |
| Divorced                              | <b>4.433</b> | <b>.007</b>     | <b>1.502</b> | <b>13.090</b> |
| <b>Gender</b>                         | <b>1.952</b> | <b>.001</b>     | <b>1.315</b> | <b>2.899</b>  |
| Male                                  | 1.00*        |                 |              |               |
| Female                                |              |                 |              |               |
| <b>Age</b>                            |              |                 |              |               |
| 35-44                                 | 1.00*        |                 |              |               |
| 25-34                                 | 1.114        | .747            | .578         | 2.147         |
| 45-54                                 | 1.007        | .985            | .461         | 2.203         |
| ≥ 55                                  | 0.547        | .059            | .292         | 1.024         |

C.I. = confidence interval. OR= odds ratio. <sup>†</sup>Higher scores on mental health (e.g. reported depression, anxiety and PTSD). \*Referent group.

The two subscales, the PHQ (depression) and GAD (anxiety and PTSD) that comprise the mental health scale were also entered into a logistic regression model to examine their individual association with resilience. Depression and anxiety and PTSD variables were statistically significant for lower resilience (Table 16).

**Table 16: Logistic Regression Analysis for Resilience for Depression, Anxiety and PTSD**

|                               | Unadjusted<br>OR | <i>p</i> -value | 95% C.I.     |              |
|-------------------------------|------------------|-----------------|--------------|--------------|
|                               |                  |                 | Lower        | Upper        |
| <b>PHQ (depression)</b>       | <b>.803</b>      | <b>.012</b>     | <b>0.676</b> | <b>0.954</b> |
| <b>GAD (anxiety and PTSD)</b> | <b>.763</b>      | <b>.013</b>     | <b>0.617</b> | <b>0.944</b> |

C.I. = confidence interval. OR= odds ratio.

#### *Hypothesis 4*

United States Public Health Service commissioned corps officers who show positive affectivity prior to deployment will show significantly higher resilience. Multivariate logistic regression was conducted to test the association between resilience and predeployment affectivity. USPHS commissioned officers who were married with children were almost three times more likely to be in the higher resilience group when compared to the reference group, those who were separated, widowed or living with a partner. Those who were divorced were five times more likely to be in the higher resilience group when compared to those who were separated, widowed or living with a partner. This hypothesis was rejected as there was no significant association between resilience and predeployment affectivity (Table 17).

**Table 17: Multivariate Logistic Regression Analysis on Resilience for Predeployment Affectivity**

| Independent Variables                     | Adjusted OR | <i>p</i> -value | 95% C.I. |       |
|---|-------------|-----------------|----------|-------|
|   |             |                 | Lower    | Upper |
| <b>Predeployment Affectivity</b>          | 1.013       | .703            | 0.949    | 1.080 |
| <b>Relationship Status</b>                |             |                 |          |       |
| Separated/Widowed/<br>Living with Partner | 1.00*       |                 |          |       |
| Single/Never Married                      | 1.930       | .149            | 0.791    | 4.712 |
| Married without Children                  | 2.569       | .035            | 1.071    | 6.167 |

| Independent Variables | Adjusted OR  | p-value     | 95% C.I.     |               |
|-----------------------|--------------|-------------|--------------|---------------|
|                       |              |             | Lower        | Upper         |
| Married with Children | <b>2.785</b> | <b>.008</b> | <b>1.309</b> | <b>5.924</b>  |
| Divorced              | <b>5.192</b> | <b>.002</b> | <b>1.800</b> | <b>14.979</b> |
| <b>Gender</b>         |              |             |              |               |
| Male                  | 1.00*        |             |              |               |
| Female                | <b>1.927</b> | <b>.001</b> | <b>1.302</b> | <b>2.853</b>  |
| <b>Age</b>            |              |             |              |               |
| 35-44                 | 1.00*        |             |              |               |
| 25-34                 | 0.879        | .703        | 0.454        | 1.703         |
| 45-54                 | 0.803        | .586        | 0.364        | 1.770         |
| ≥ 55                  | 0.576        | .075        | 0.314        | 1.057         |

C.I. = confidence interval. OR= odds ratio.\* Referent group.

### *Hypothesis 5*

Predeployment affectivity, team support, mental health and post-deployment social support will predict resilience in United States Public Health Service commissioned officers. Four independent variables, team support, post-deployment social support, mental health, predeployment affectivity and three covariates, relationship status, age and gender, were entered into the model. All variables were retained in the equation (Table 18) however only significant variables are highlighted. For each unit increase in team support, the odds of being in the higher resilience group increased by 4%. Similarly, for each unit increase in post-deployment social support, the odds of being in the higher resilience group increased by 5% after deployment. For individuals with perceived mental illness (e.g. higher on the mental health score), the odds of being in the high resilience group decreased by 21% after deployment. USPHS commissioned officers who were divorced were three times more likely to be in the higher resilience group when compared to the reference group, those who were separated, widowed or living with

partner. The estimated adjusted OR for gender was OR = 1.86 (95% CI 1.20 – 2.89), indicating women were almost twice as likely to be in the higher resilience group compared to men. Age was not statistically significant. This hypothesis was partially supported.

**Table 18: Multivariate Logistic Regression Analysis on Resilience for Key Independent Variables**

| Independent Variables                     | Adjusted OR  | <i>p</i> -value | 95% C.I.     |               |
|---|--------------|-----------------|--------------|---------------|
|   |              |                 | Lower        | Upper         |
| <b>Predeployment Affectivity</b>          | 1.064        | .099            | 0.988        | 1.144         |
| <b>Team Support</b>                       | <b>1.035</b> | <b>.014</b>     | <b>1.007</b> | <b>1.064</b>  |
| <b>Post-deployment Social Support</b>     | <b>1.049</b> | <b>.006</b>     | <b>1.014</b> | <b>1.086</b>  |
| <b>Mental Health†</b>                     | <b>0.814</b> | <b>&lt;.001</b> | <b>0.735</b> | <b>0.902</b>  |
| <b>Relationship Status</b>                |              |                 |              |               |
| Separated/Widowed/<br>Living with Partner | 1.00*        |                 |              |               |
| Single/Never Married                      | 2.100        | .147            | 0.771        | 5.571         |
| Married without Children                  | 2.069        | .145            | 0.778        | 5.504         |
| Married with Children                     | 1.845        | .154            | 0.795        | 4.282         |
| Divorced                                  | <b>3.312</b> | <b>.041</b>     | <b>1.053</b> | <b>10.417</b> |
| <b>Gender</b>                             |              |                 |              |               |
| Male                                      | 1.00*        |                 |              |               |
| Female                                    | <b>1.864</b> | <b>.005</b>     | <b>1.204</b> | <b>2.886</b>  |
| <b>Age</b>                                |              |                 |              |               |
| 35-44                                     | 1.00*        |                 |              |               |
| 25-34                                     | 1.063        | .872            | 0.506        | 2.235         |
| 45-54                                     | 0.874        | .763            | 0.365        | 2.094         |
| ≥ 55                                      | 0.549        | .098            | 0.270        | 1.116         |

C.I. = confidence interval. OR= odds ratio. †Higher scores on mental health (e.g. reported depression, anxiety and PTSD). \*Referent group.

### *Hypothesis 6*

Predeployment affectivity, resilience, team support, and post-deployment social support will predict better mental health in United States Public Health Service commissioned officers. Four independent variables- resilience, team support, post-deployment social support, and predeployment affectivity were entered into the model. All variables were retained in the equation in the multivariate logistic regression model (Table 19). As described in Chapter 3, this continuous variable has an optimal cut point of  $\geq 3$  on the mental health subscale when used as a screen for depression, anxiety and PTSD (Kroenke et al., 2010). Chi-Square analyses were used to determine whether there were significant differences between the demographic and background characteristics variables and mental health (i.e. those with and without mental illness). Demographic and background characteristics variables were not significant by chi-square analyses and were not included in the final multivariate logistic regression model. For each unit increase, those with higher resilience and team support scores (i.e. protective factors), were significantly less likely (7% and 8%, respectively) to have mental illness (i.e. those with depression, anxiety and PTSD) after deployment. This hypothesis was partially supported.

**Table 19: Multivariate Logistic Regression Analysis on Mental Health for Key Independent Variables**

| Independent Variables                 | Adjusted OR  | <i>p</i> -value | 95% C.I.     |              |
|---------------------------------------|--------------|-----------------|--------------|--------------|
|                                       |              |                 | Lower        | Upper        |
| <b>Predeployment Affectivity</b>      | 0.992        | .905            | 0.868        | 1.134        |
| <b>Team Support</b>                   | <b>0.925</b> | <b>.000</b>     | <b>0.886</b> | <b>0.965</b> |
| <b>Post-deployment Social Support</b> | 1.035        | .294            | 0.971        | 1.103        |
| <b>Resilience</b>                     | <b>.945</b>  | <b>.005</b>     | <b>0.909</b> | <b>0.983</b> |

C.I. = confidence interval. OR= odds ratio.

## Summary

The purpose of this study was to examine risk and protective factors in response to deployments to humanitarian aid (e.g. September 11, 2001 World Trade Center attacks), natural (e.g. hurricane) or technological (e.g. nuclear, biological, radiological or chemical) disasters among USPHS commissioned officers. This chapter presented findings from the data analyses of the final sample of 534 USPHS commissioned officers. An adaptation of the Transaction Model of Stress and Coping (Antonovsky and Kats, 1967; Cohen, 1984; Lazarus and Cohen, 1977) was used to assess whether protective factors; team support, post-deployment social support, mental health and a risk factor, predeployment affectivity were associated with resilience.

A little more than half the respondents (58%) were married with children, and the majority were between the ages of 35-54 years of age (72%) and of a rank of O-4/Lieutenant Commander or higher (87.4%). There were approximately equal numbers of males and females who participated in the study (265 and 262, respectively). Over half of respondents (65.6%) were resilient after deployment. Chi-square analyses demonstrated statistical significance ( $p<0.05$ ) between the demographic variables, gender, age and relationship status, and resilience.

Univariate and multivariate logistic regression analyses were conducted to address the research questions. Table 20 illustrates the summary of research findings in the study.

**Table 20: Summary of Research Findings**

| Research Question/Hypothesis   | Summary of Key Findings  |
|--|--|
| <b>Research Question 1: What factors (predeployment affectivity, mental health, team support, post-deployment social support) differentiate USPHS commissioned officers who have higher resilience to deployment (i.e., exposure to traumatic stressors) when compared to those with lower resilience?</b> |  |
| <i>Hypothesis 1:</i> United States Public Health Service commissioned officers who receive team support from fellow officers will show significantly higher resilience.  | This hypothesis was supported. Those that have perceived team support were more likely to be resilient to deployment.  |
| <i>Hypothesis 2:</i> United States Public Health Service commissioned officers who receive post-deployment social support will show significantly higher resilience.   | This hypothesis was supported. Those that have perceived post deployment social support were more likely to exhibit higher resilience to deployment.   |
| <i>Hypothesis 3:</i> United States Public Health Service commissioned officers who demonstrate better mental health will show significantly higher resilience.   | This hypothesis was supported. Those with perceived mental illness, depression, anxiety and PTSD were less likely to be resilient to deployment.   |
| <i>Hypothesis 4:</i> United States Public Health Service commissioned officers who show positive affectivity prior to deployment will show significantly higher resilience.  | This hypothesis was rejected. There was no significant association between resilience and predeployment affectivity.   |
| <i>Hypothesis 5:</i> Predeployment affectivity, team support, post-deployment social support and mental health will predict resilience in United States Public Health Service commissioned officers.   | This hypothesis was partially supported. Three of the four variables were statistically significant. Those with perceived team support and post-deployment social support were more likely to be resilient to deployment compared to those with lower resilience. Those with reported mental illness were significantly less likely to be in the higher resilient group. |
| <b>Research Question 2: Does gender influence USPHS commissioned officers resilience after deployment?</b>   |  |
| There is a significant association between resilience and gender.  |  |
| <b>Research Question 3: What impact does resilience, team support, predeployment affectivity, and post-deployment social support have on the mental health of USPHS commissioned officers?</b>   |  |
| <i>Hypothesis 6:</i> Predeployment affectivity, resilience, team support, and post-deployment social support will predict better mental health in United States Public Health Service commissioned officers.   | This hypothesis was partially supported. Two of the four variables were statistically significant. Those with perceived resilience and team support were significantly less likely to have mental illness (i.e. higher scores on the mental health scale) after deployment compared to those with mental illness.  |



When entered individually, protective factors, team support, post-deployment social support and mental health and the demographic variables, gender, and relationship status, were significantly associated with resilience. Being a woman, married with and without children, or divorced as compared to being separated, widowed, or living with a partner increased the likelihood of being in the higher resilience group ( $p < 0.05$ ). Age was not a significant predictor of resilience. Predeployment affectivity was not significantly associated with resilience.

When all protective factors were entered into the multivariate logistic regression model, team support, post-deployment social support, mental health, gender (e.g. being a woman) and being divorced as compared to being separated, widowed, or living with a partner were significantly associated with resilience ( $p < 0.05$ ). When examining mental health, both team support and resilience were negatively associated with mental illness; depression, anxiety and PTSD ( $p < 0.05$ ). Higher mental health symptomology (e.g. greater depression) was associated with less resilience after deployment.

## **Chapter 5: Discussion**

### **Introduction**

This chapter describes the primary findings of the analyses related to resilience and compares and contrasts these findings to those found in the literature. An overview of the study's limitations and recommendations for future research and conclusions are also discussed in detail. An adaptation of the Transactional Model of Stress and Coping (Figures 2 and 3) formed the underlying theoretical perspective of this research study. The theory, described in detail in the first two chapters, was selected because it provides an appropriate and widely accepted metric to evaluate the processes of coping both during and after stressful events. Based on the constructs of this theory, differences in prior (predeployment affectivity) and post-deployment predictors (team support, post-deployment social support, and mental health) of resilience were assessed. This chapter also addresses the observed relationship of team support and resilience in explaining symptoms of depression, anxiety and PTSD. The following is an overview of findings for the research questions and associated hypotheses.

### **Discussion of Findings**

To the researcher's knowledge, this is the first study that examines the relationship between a risk factor (predeployment affectivity), protective factors, and resilience in USPHS commissioned officers. Data were collected from 534 USPHS commissioned officers and this is the first known study to obtain data on deployment resilience; data were collected for over 8% (534/6,500) of these officers. There were equal proportions of males and females who

participated in this study. Previous studies that investigated resilience and social support among soldiers returning from Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) had many more male respondents. Eighty percent of respondents in the study by Pietrzak et al. (2009) were men, as were 58% in the Maguen et al. (2008) study.

Participants in this study varied in age but this variation in age was not found in other studies that investigated risk and resilience in soldiers with and without PTSD, where the majority of respondents were between the ages of 18-29 years old (King et al., 1998, 2008; Maguen et al., 2008; Marx, 2008; Pietrzak et al., 2009, 2010). Age related observations made in other studies included a finding that the younger age of participants was a significant factor contributing to group differences among combat experiences, psychosocial difficulties, post-deployment social support, and unit support (Pietrzak et al., 2010). Other studies also found that those who were unable to cope or had PTSD were younger than the group with no PTSD (Bonanno et al., 2012; King et al., 1998, 2008).

The slight majority of participants in the current study were of senior officers (O-5, Commander and above), while a little less than half were junior officers (below or equal to the officer rank of O-4, Lieutenant Commander). Similar to the observations for the age demographic, these findings are in contrast to those observed in the studies by King et al. (2008), Maguen et al. (2008), Marx (2008), Pietrzak et al. (2009, 2010), as most of their respondents in these studies were junior enlisted personnel (E1-E4) or non-commissioned [enlisted] officers (E-5-E-9). In the Maguen et al. (2008) study of members of the U.S. Air Force, forty percent of the 328 participants were medical officers. However, this is the first study of its kind to include such

a large percentage of officers (~99%) ranging from the rank of O-2 (Lieutenant Junior Grade) to O-7 (Rear Admiral).

This study was well populated by members of each of the eleven professional categories in the USPHS. The second largest individual category of the commissioned corps, the Health Services Officer category, represented the largest proportion of participants in the study. Clinical social workers were especially well represented and to the researcher's knowledge, there are no other studies of uniformed service members with such a large proportion of healthcare and mental health professionals.

### *Hypotheses Testing*

In this cross-sectional study, theoretical constructs adapted from the Transaction Model of Stress and Coping (team support, post-deployment social support, predeployment affectivity, and mental health), were analyzed for their association to resilience before and after deployment. Individuals who are directly exposed to a traumatic event (e.g., a disaster) will most likely be distressed and challenged by their experience, but only some will exhibit low resilience. In-fact, two-third of participants in this study were resilient. However, it is not enough to be individually resilient, individuals must also be able to cope and adapt as a team to a changing environment (such as deployment). If this is accomplished, then resilience prior to, during and post-deployment will likely be enhanced, fostering one's ability to address adversity with positive outcomes.

In this study, higher resiliency scores were positively associated with team support and post-deployment social support and less mental illness. A meta-analysis on research with combat veterans revealed that social support is one of the factors most robustly and negatively

associated with PTSD symptoms (Brewin et al., 2000). The author further suggested that social support in the aftermath of trauma is related to less PTSD symptomology. Monson et al. (2009) proposed that additional studies are needed in determining the specific aspects of social support that account for the association between social support and PTSD.

The study indicated that those with perceived social support from their team members (team-support), family and friends (post-deployment social support) were more resilient after deployment than their peers with less team support, and post-deployment social support from family and friends; however, the specific mechanism for this association is unclear. The perceived team support may be derived from a preformed, established team or one that is established after initial deployment. Monson et al. (2009) hypothesized that “social activity, practical and logistic support provided by others, can diminish post-traumatization, or modeling of tolerance of negative emotional states on the part of supportive others” (p. 711). This may be a possible explanation for the association of increased team support and resilience to deployment in this study. Overall, about one in three USPHS commissioned officers reported lower resilience, post-deployment.

This study found a statistically significant relationship between gender and resilience as well as gender, mental health and resilience similar to that of Monson et al. (2009), where gender differences were found in adjustment to the family after exposure to trauma. In this study, gender was a significant predictor of USPHS commissioned officers reporting resilience after deployment. Women reported higher resilience to deployment and this finding was modified by relationship status, women who were married with or without children or divorced were even more likely to be resilient than the reference group those who were separated, widowed or living

with a partner. Few studies have focused on gender differences in resilience; however in an adult population, resilient women were found to elicit and provide more social support than men (Werner, 2001). Women may be more likely to seek support from fellow team members during deployment and seeking additional support from family and friends after deployment. Additionally, Vogt et al. (2004) speculated that a possible explanation why women cope better to stressors was their stronger social support network which mitigated the stress of occupying multiple roles. These findings, if replicated, may prove important in understanding the buffering effects of supportive relationships and gender in USPHS commissioned officers.

This study also found a significant association to relationship status and resilience. Findings revealed that USPHS commissioned officers who were divorced were more resilient when compared to the reference group, separated, widowed, or living with a partner after deployment. A possible explanation for increased resilience may be due to the ability to address and cope with unique challenges that could potentially be seen as a stressful change, and therefore now feel more resilient. Resilience is one of several strengths that can assist people in positive life adaptation (Ryan and Caltabiano, 2009). Many of the study participants are in midlife period (from approximately 35 to 60 years old). Ryan and Caltabiano (2009) proposed that “midlife is a period that brings a unique set of challenges and issues to be negotiated, which can include separation, divorce, marriage/remarriage, raising children/stepchildren, changing work conditions, career transitions, re-entry into them workforce or further study, financial difficulties, caring for elderly parents, retirement, deteriorating health, potential illness, and the empty nest” (p. 40). The midlife period is characterized by a complex interplay of multiple roles and responsibilities, with an increasing amount of time spent juggling these roles and attempting

to achieve a balance between work, family, and personal needs (Lachman, 2004). An individual's progression through this stage, including stressful situations such as divorce, may make them more resilient to deployment, dependent on the personal resources of the individual.

In this study, no association was found between gender and mental health, similar to findings reported in King et al. (2008). Other studies have found that men and women differ in the types of trauma most frequently encountered; molestation and sexual abuse are more frequent in women, while fights, accidents, and threats involving a weapon (and combat) are more frequent in men. Despite this, when both men and women are subjected to the same type of trauma, women still have approximately twice the risk of developing PTSD symptoms, which are more likely to persist than symptoms among men (Cortina and Kubiak, 2006). However, not all studies find this increased susceptibility in women. In a nested study of 30,000 Gulf War era veterans (Nemeroff et al., 2006), exposure to severe trauma was more often associated with PTSD in men compared to women.

In this study, it appears that resilience and team support were associated with reduced mental illness. This study corroborates past findings by King et al. (2003) and Sharkansky et al. (2000) that together, team support and resilience are necessary in times of need. Previous research on resilience similarly found that social support is associated with increased resilience (Bonanno et al., 2006; Pietrzak et al., 2009) and lower risk of PTSD in military populations (King et al., 1998; Marx, 2009; Pietrzak et al., 2010). This finding suggests that high levels of perceived unit (team) support were associated with increased resilience, which in turn is associated with decreased PTSD, anxiety, and depressive symptoms. Resilience and team support may act in concert with one another to reduce the likelihood of developing trauma

related psychopathology and mental illness (Pietrzak et al., 2010), which may foster the development of active coping styles and increased ability to reappraise stressful situations (Jones et al., 2010).

Post-traumatic stress disorder is conceptualized as a unique clinical syndrome that can arise only after a defined traumatic event, outlined as criterion A in the DSM-IV (Rosen and Taylor, 2007). This research study did not distinguish between anxiety and PTSD, partial PTSD, and full PTSD. Furthermore, post-traumatic stress symptoms also overlap with other diagnostic constructs that may account for PTSD such as depression or panic disorder (Vogt and Tanner, 2008). However, it is unclear from this study if USPHS commissioned officers who scored higher on the mental health screens for depression, anxiety and PTSD, have conditions that are due to the specific psychopathology that occurred from a traumatic deployment or due to a non-specific psychopathology due to childhood or adult abuse which is associated with an increased risk for these disorders (Vogt et. al., 2004).

Increased team support and resilience may also be related to reduced mental illness because team members may benefit from the presence of a perceived safer environment due to overall team cohesiveness. Richardson et al. (2010) speculated that relevant factors of team support include characteristics of the deployed area as well as unit (team) characteristics, and both are predictors of post-traumatic stress. Based on the findings of this study, the USPHS should promote interventions that focus on enhanced support from team members which increases coping abilities in individuals.



## **Study Implications**

Findings from this study demonstrated that team support, post-deployment social support, relationship status and gender are protective factors against lower resilience to deployment as well as the association between mental health and resilience. Study results demonstrated a need for interventions that heighten team cohesion which will likely increase the resilience of USPHS commissioned officers. Such interventions should buffer personnel against deployment stress. This recommendation is similar to what Maguen and colleagues (2008) recommended when they studied military medical personnel before deployment to Iraq. They found that strong team (unit) cohesion can be a systemic protective factor for deployed healthcare providers. A trusted environment leads to effective communication. Team members, who have perceived team support will be able to communicate what they need and are more likely to know the resources that are available to achieve higher resilience, during and post deployment.

An additional finding of the study is the association between resilience and team support on the mental health of USPHS commissioned officers. An individual cannot be deemed resilient in the absence of a significant stressor (MacDermid, 2008). The combined effect of resilience and social support may improve emotional regulation, decrease fear-related appraisal and cognitions, promote cognition that the world is safe and non-threatening, enhance self-efficacy and control and reduce stress related physiological arousal (Campbell et al., 2006, Charuvastra and Cloitre, 2008). Ballenger-Browning and Johnson (2010), note that the effect of social support on resilience is widely accepted and resilient individuals are more likely to have more social support than non-resilient individuals. Moreover, individuals in the Ballenger-

Browning and Johnson (2010) study with higher social support were 40% to 60% more resilient than those with low social support. This information should be incorporated into education and training to increase officers' abilities to be resilient when deployed and be able to adapt to change and increase hardiness before and after deployment.

In the development of a program to increase the ability to cope (i.e. higher resilience), USPHS leadership can review the programs that have been adopted by other uniformed services. Studies reveal that for optimal function before, during and after deployment, four foundational pillars are required: (1) physical fitness, (2) proper nutrition, (3) psychological resilience, and (4) social integration (Jones et al., 2010). Based on these pillars, the Department of Defense adopted a new paradigm called Total Force Fitness (Jones et al., 2010). Fitness for an individual, family, or organization is a state of adaptation in balance with the conditions at hand (Jones et al., 2010) that enhances the resilience of that individual, family or organization (i.e., team). A state of fitness is not merely physical but holistic and embodies eight domains- social, behavioral, psychological, nutritional, spiritual, medical, environmental and physical (Figure 7). Based on this model, the USPHS can address team support and post-deployment social support on one's resiliency to deployment by including a component on psychological resilience in mediating the effects of poor mental health by incorporating education and training focused on specific domains such as coping, awareness, belief and appraisal, decision making, social support, task cohesion, social cohesion and engagement.

**Figure 7: Total Force Fitness**



Source: Jones et al. (2010). Total Fitness for the 21<sup>st</sup> Century: A new paradigm.

The Department of Defense has operationalized the Total Force Fitness model by implementing the Comprehensive Soldier Fitness Program (Jones et al., 2010). Aspects of the program are implemented based on the needs of the force. Particularly of use to USPHS commissioned officers as protective measures of higher resilience after deployment is the use of the unit (team) and family component of the Comprehensive Soldier Fitness Program. Within these components, the Comprehensive Soldier Fitness program attempts to quantify levels of social support, resilience, self-confidence and agility. The Comprehensive Soldier Fitness Program can be implemented in small group settings or via the privacy of the officer's cell phone or computer as there are downloadable iPhone, iPad and Andriod applications (App) for self-assessment. If adopted, monitoring and evaluating the domains included in the Total Force Fitness will require comparative evaluations across implemented approaches and domains.

Similarly, the implementation of a Total Force Fitness model would require changing the culture of training and deploying USPHS commissioned officers. Developing and preserving resilience as a key skill requires that organizations value and promote resilience and adaptability as operational significance. Thus, increasing or maintaining the desired skill of resilience requires a culture in which its systems of education, training and promotion encourage the development of adaptability (Burns and Freeman, 2008).

An additional benefit of adopting the Comprehensive Soldier Fitness Program is its focus on basic communication skills. One important aspect of good communication is being able to communicate in a variety of ways (e.g. casual vs. formal, democratic vs. autocratic, verbal vs. nonverbal, oral vs. written) to be effective with a number of different audiences (Mueller-Hanson et al., 2005). One can become progressively more resilient. An enhancing adaptation in communicating and navigating resources, and becoming more adaptable, requires broad experience, continuing education, and training at every level and in every relevant operational venue (Burns and Freeman, 2008). Utilizing this scenario, the USPHS commissioned corps should incorporate a program that addresses resilience and adaptation.

There are a variety of individual characteristics of resilience such as self-efficacy, and openness that are amendable to training. For example, Uhernik and Husson (2009) indicated that an aspect of psychological first aid occurs through specific components of natural resiliency that refers to one's beliefs in one's ability to problem solve. Uhernik and Husson (2009) theorized that psychological first aid supports "the concept of resiliency, in individuals and in communities, which encourages self-efficacy and decreases victimization and dependency (p.

275). Team members, who have perceived self-efficacy, will be able to utilize available resources to achieve higher resilience and performance outcomes.

In some instances, USPHS commissioned officers are deployed before a disaster occurs to implement Department of Health and Human Services' Federal Medical Stations. These stations augment medical special needs facilities, low-acuity bed space and quarantine support when a local, state or regional response to an event is overwhelmed. As such, USPHS commissioned officers themselves become disaster survivors and this could also impact their individual coping response. In these circumstances, it is recommended they are provided with an intensive training course on how to seek support from their team members to include team leadership, and their individual support system at home to better cope with emotional difficulties that can lead to maladaptation post-deployment. The active use of training on topics like coping skills, understanding somatic reactions, identifying and clarifying feelings, normalizing fears, coping with grief/loss, turning crisis into opportunity, dealing with anger and rage and seeking a better future was found to be particularly helpful for teaching disaster survivors (Meredith et al., 2011) to cope with adversity.

In a study by Henley et al., (2010), a group provided professional mental health support and training to a wide variety of professional and para-professional service providers who were working with severely traumatized displaced population (including displaced children and their families) in a hospital setting. The researchers described evidence that showed that offering the necessary coping skills-building trainings to medical providers was crucial for the ongoing services they were providing to the population. Commissioned officers in USPHS, other medical and health providers in other uniformed services as well as emergency medical responders can

benefit from mental health support and training when serving traumatized populations during deployment.

“Testimony Therapy,” which is typically used in resolving extreme trauma experience and involves the writing and public presentation of autobiographical accounts of experiences during ethnic cleansing, can be adapted for use with USPHS commissioned officers after deployment. Studies show that in before and after assessments of the effectiveness of ‘testimony therapy,’ a significant decrease in PTSD and depression symptoms and an improvement in overall functioning occurred (Jones et al., 2010). Similarly, another strategy widely used to promote perceptions of control and self-efficacy, encourage positive appraisals and acceptance of change, and increase coping strategies in individuals is cognitive-behavioral intervention (Pietrzak et al., 2010). This intervention is time limited, practical, solution focused, and based on building new skills and attributes (Pietrzak et al., 2009). The Navy and Marines have implemented a program called “Peer to Peer Support” which includes testimonials from other Marines who have deployed to enhance communication for suicide prevention. This program also has a component that includes a mutual aid support system otherwise known as a “buddy system” to foster communication among peer support group. Although no metrics have been obtained to date on the program’s effectiveness, it has open discussion on perceptions of control, self-efficacy and seeking social support from available resources. The buddy system in the USPHS as a form of social support is not a well-established practice similar to the other uniformed services, however if adopted it can enhance team support and post-deployment social support among its officers.

In addition to the Comprehensive Soldier Fitness program (described above), implementing resilience training that includes aspects of the Army's Battlemind pre and post deployment resilience program could be beneficial to assist USPHS commissioned officers with lower resilience after a deployment. Important aspects of the Army's Battlemind program include training of soldiers and leaders in the principles and skills that enhance soldier and organizational resilience, and reduction of the barriers to seeking behavioral health care (Jones et al., 2010). Also, the Army's BattleMind trainings are meant to normalize the consequences of combat and encourage a buddy system where peers watch out for each other (Jones et al., 2010). Moreover, this study revealed that relationship status had an impact on the resilience of USPHS commissioned officers to deployment. One dimension of the Army's program is the use of training that helps the deployed member and their family prepare for and transition from deployment called the Spouse Battlemind training (Sayers, 2011). The Spouse Battlemind training encourages the service member's partner to use available resources and to learn coping skills to potential changes to the family unit and the deployed member, both during and after deployment. Oftentimes, USPHS commissioned officers and their partner are not aware of the resources available to them before, during and after deployment. The USPHS commissioned corps can incorporate a program that addresses resilience by providing training to commissioned officers and their partner in navigating the resources available to them as Health and Human Services employees and members of the uniformed services.

One important element that must be addressed is distinguishing resilience programs that include mental health and social support from traditional mental health programs to facilitate engagement with uniformed service members and reduce the stigma associated with mental

health. Meredith et al. (2010) noted that many programs were designed for nonclinical groups or for the general military population and their families. Program representatives often spoke of their programs as preventive but noted that the programs were often perceived as treatment or clinical entities by service members. To implement a resilience program that includes components of mental health and social support for USPHS commissioned officers, any references to a mental health program have to be removed with the preventive aspect of the program highlighted to encourage participation. Additionally, to maintain the officers' privacy, after deployment a distress hotline could be implemented to provide anonymous counseling and discussion of available resources.

Community-oriented resilience enhancement based programs to buffer the effects of mental illness are increasingly being suggested as the new approach to treating populations experiencing traumatic conditions in post-emergency settings (Henley et al., 2010). Moreover, although the majority of persons affected by large-scale trauma do not develop long-term serious mental health problems, when the scale of the trauma is large enough (such as a response to hurricanes or tsunamis), the minority may still represent a substantial number of people. The presence of nearly a third of the study population with lower resilience post-deployment may complicate and obstruct future relief efforts which may be abated by access to and utilization of resources. Therefore, external resources are needed in the community to address resilience.

An aspect not before mentioned with social support programs is the need to incorporate resilience training. Similar to the Burns and Freeman (2008) study illustrating that adaptability training could be approached from two parallel paths, so too can resilience programs adapt these two recommendations for parallel paths. United States Public Health Service commissioned



officers have exhibited higher resilience in this study, however to continue to foster resilience including adapting to a changing environment due to deployment, exposure to training should occur at each stage of an individual's career designed to enhance individual and team experiences to challenges that take people out of their "comfort zones." This concept is particularly important for junior officers, Lieutenant Commander (O-4) who will one day assume the rank of a senior officer, Commander (O-5) and higher, with increased responsibility, greater demands of them, and potentially leading a deployment team. The second path for resilience training that can be modeled from the adaptability training described by Burns and Freeman (2008) requires using skills one has to respond effectively to a changed situation. Therefore, resilience training should include practicing learned skills in a variety of challenging and stressful situations.

### **Study Limitations and Recommendations for Future Studies**

There were a number of potential limitations to the study. Cross-sectional studies only allow the researcher to measure or assess a particular population at a fixed point in time (McKenzie and Smeltzer, 2000). A cross-sectional study was implemented for this exploratory study on the basis of the nature of the sensitive questions, time constraints and to maximize participation without interfering with daily work duties (Hoge et al., 2006; Schell and Marshall, 2008). As such, the researcher could only determine the association of the predictor variables, team support, post-deployment social support and mental health on resilience and not causation. Longitudinal studies are needed to determine whether social support provides a protective mechanism as it relates to resilience.

This current study depended on the use of retrospective self-reports. It should be noted that a third of the officers who participated in the study had deployed within the past year and research findings are indicative of past rather than initial resilience shortly after deployment. Given that the survey was administered almost a year after many deployed, the positive changes reported likely reflect long-term and stable aspects of resilience. The results obtained from the Pietrzak et al., (2009 and 2010) studies were derived from veterans 26.9 months after returning from deployment. A longitudinal study by Silver et al. (2002) suggested that the prevalence of post-traumatic stress symptoms related to the September 11, 2001 World Trade Center disaster among the US population outside New York City declined from 17 percent at two months to 5.8 percent at six months. Not surprisingly, coping strategies assessed shortly after the attacks were the strongest predictors of post-traumatic stress symptoms (Nemeroff et al., 2006).

This study suggests that interventions at the individual level and the team level may positively affect the resilience of team members through resilience intervention programs, discussed in the above section. Because intervention programs will need to understand the complexity of both individual and team based resilience, a study could be conducted that examines the interrelationships of whether resilient people attract more social support from their team members or family and friends. It is important to note that future studies should be based on data collected from a common set of variables and consistent, reliable, valid metrics (Morgan, 2011). Additionally, Monson et al. (2009) suggests that the developmental course of social support in trauma recovery and elucidation of the specific factors involved in social support and mental illness are important areas in need of further investigation. In this way, appropriate

programs to enhance resilience prior to and post-deployment could be implemented using evidence-based interventions.

This study provided an understanding of the risk and protective factors that could potentially impact the resilience of USPHS commissioned officers. There are other aspects of resilience that were not addressed in this study. Cognitive functioning, problem solving and decision making skills and metacognitive skills may assist with explaining team support and post-deployment social support scores associated with resilience. Deployment poses an inherent challenge to USPHS commissioned officers' resilience as limited resources in a constantly changing environment requires skilled problem solvers/decision makers who are likely to respond with effective decisions and solutions. Research on resilience indicates that decision making processes are particularly effective in high pressure and ambiguous situations, when time pressure prohibits a more structured, rational approach. Studies should be conducted that assess the other aspects of resilience related to resilience in this target population.

The observed results were derived from quantitative data. Additional studies should be conducted using focus groups or interviews to generate qualitative data that may enrich and extend our knowledge of the meaning of a specific construct in the current study. This is described as a "phenomenological approach," in which the goal is to obtain an understanding of the phenomenon as the respondents see it (Creswell, 2002). This type of study formulates and builds new theories of the event or situation based on participant's perceptions of their experiences (Creswell, 2002).

The foundation of generalizability is probability sampling, but most OEF/OIF studies have used convenience samples of troops who served in specific time periods and geographic

areas. A review of the literature found that OEF/OIF studies reported on the number of troops who participated in the study compared with those who were not eligible; the participants' representation of a more general population in the Armed Forces was not described. As a result, the generalizability of the findings is limited. For this study, convenience sampling was used and study findings may not be representative of the entire population. Higher participation rates were found in studies that selected volunteers compared with studies that invited participants from a list of individuals who represented a targeted population (Dillman, 2000). In contrast to similar resilience studies, this study invited individuals to voluntarily participate in the study.

This study had a higher representation of uniformed service members (80% of active duty USPHS commissioned officers) compared to other similar studies of veterans returning from Iraq and Afghanistan (<1% of veterans in the Pietrzak et al., 2009 and 2010 studies). However, the results of this study cannot be generalizable to other uniformed services (e.g., Army, Air Force, Navy, Marines and Coast Guard) that include a mixture of heterogeneous populations (e.g., commissioned and non-commissioned [enlisted] officers), numerous job specialties (e.g., human resources, combat positions, medical personnel, etc.), and different missions (e.g. exposure to combat, etc.). Future studies should examine the risk and protective factors using the same constructs--team support, post-deployment social support, predeployment affectivity, and mental health--on predicting resilience in other uniformed services.

Survey questions that investigate issues such as coping skills employed to solve problems, assesses mental illness and challenges and previous life experiences, are by nature very sensitive topics. An additional complication stems from assessing members of the uniformed services which may introduce bias due to the sensitive nature of the questions posed,

the fear of repercussion or promotion readiness, and recall or environmental factors such as lack of privacy while using the computer may introduce bias. This may induce a social desirability effect, namely the tendency for respondents to censor reports of their mental health or resilience status to fit their perceived audience.

The key to minimizing social desirability effects is to create an environment in which individuals fear no penalty (i.e. social judgment) for an honest response (Dillman, 2000). To this end, assurances of confidentiality were emphasized in the invitation to participate in this internet-based questionnaire, and in the reminder contacts. Additionally, as a self-administered survey was used, it eliminated the possible effect of an interviewer contributing to socially desirable responses. Given the steps taken in the design and execution of this study, general conclusions about the role of resilience, team support, and post-deployment social support among commissioned officers in the United States Public Health Service can be made.

With respect to mental health indicators, given the limitations of the existing method of the self-reporting questionnaire to determine mental health status for depression, anxiety, and PTSD, there may be additional benefit to gaining clinician diagnostic status. Future studies should incorporate clinical diagnosis of mental illness as opposed to only self-reporting. Before implementation of any training on resilience, there is a need for optimal assessment tools from well accepted diagnostic measures to detect or screen for mental health disorders. Currently, there are no well-established, accepted diagnostic tools to screen for anxiety and PTSD (Pietrzak et al., 2009 and 2010). Such tools would be critical for appropriate allocation of resources to early intervention and prevention efforts. As described in Chapter 2, this study does not address

family and community resilience and its association with mental health. Future studies are needed to account for external predictors of resilience in USPHS commissioned officers.

## **Conclusion**

The relationship between deployment to potentially traumatic events and resilience following deployment has not been studied to date in this group. This study is the first to examine the role of a set of constructs (pre-deployment affectivity, team support, post-deployment social support, and mental health) in predicting resilience in USPHS commissioned officers. This study is also the first to identify protective factors such as resilience and team support and their association with mental health in this group. Results of the study suggest that the majority of respondents relied on team support and post-deployment social support to enhance their ability to adjust to a changing environment and therefore these two constructs were associated with resilience. Resilience and team support were negatively associated with mental illnesses such as depression, anxiety and PTSD. Findings replicate and extend an increasing body of research on resilience, social support and mental health, to include information on post-traumatic growth in a variety of trauma-exposed populations.

Although this study had a homogeneous sample of medical and healthcare providers and a large sample size, the results are not generalizable to the entire USPHS commissioned corps because the sample is not representative of the entire population due to the use of convenience sampling, resulting in a low external validity. Another possible limitation of the study is the selected reference group. The reference group for each covariate included in the multivariate logistic regression analyses was selected based on the subgroup that scored the lowest in the

higher resilience group for each covariate. The consequence of using a reference group with a small sample size could introduce a bias in the results.

There are a very limited number of studies that focus on resilience, therefore this study highlights the importance of understanding the underlying factors associated with one's ability to cope well compared to those with a lesser degree of resilience to deployment. Findings suggest that more work is called for to explore the issues of team support, post-deployment social support, and mental health on resilience. Additionally, this study extends the current literature on understanding the relationship between resilience and social support on the mental health of unformed service members.

With this examination, the development or adaption of previously existing interventions can be designed to bolster resilience to traumatic stress in USPHS commissioned officers associated with deployment and eventually to other trauma exposed populations. No singular program may work; a multidisciplinary approach that is refined to the needs of USPHS commissioned officers is required. Increasing one's coping abilities would likely improve USPHS commissioned officers' resilience to deployments while minimizing the impact of lower resilience on overall force health. A coordinated effort that allows for implementation of interventions and outcome evaluation and a mechanism for disseminating results is needed. Therefore, for officers to behave in a resilient fashion, they should be selected specifically for their individual characteristics related to resilience. Training and development programs should address improving resilience-related skills and organizational policies and practices should support creativity and appropriate risk taking among the leadership. It is also recommended that brief pre and post assessment survey for resilience is adopted to assess additional behavioral

health issues before and after deployment. The assessment and development of a resilience survey is important as research suggests that resilience is one of those strengths that are modifiable (Ryan and Caltabiano, 2009).

During the March 2012 Warrior Resilience Conference IV, comments were raised highlighting the importance of being adaptive and incorporating training to build more adaptable and versatile leaders who can meet the challenges we are facing today and in the future. Adaptability and resilience are integral to the success of total force fitness. There is a growing body of evidence that the resilience and adaptability go hand-in-hand (Lyons et al., 2010). The absence of resilience and adaptability is expressed in a wide range of human dimension problems in the military, from degraded mental and physical performance to serious negative mental health outcomes including post-traumatic stress disorders and suicide (Lyons et al., 2010). Additional studies will be needed in this target population on adaptability; however USPHS leadership can readily adopt study recommendations on resilience to enhance force fitness.

The United States Public Health Service will need to integrate this new shift into addressing adaptability and resilience as it relates to psychological health and social support in its officers. Embracing these concepts associated with resilience will require a change and integration into the existing USPHS culture; a potential paradigm shift. Therefore, more research is needed to examine additional protective factors not explored in this study that underscore personality characteristics and resilience coping mechanisms in order to develop prevention and treatment interventions to enhance adaption and related positive outcomes.



## **Appendices**

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| Appendix B | University of Maryland IRB Approval Letter                             |
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## Healthy People 2020 Summary of Objectives

### Mental Health and Mental Disorders: Objectives and Title

#### **Mental Health Status Improvement**

MHMD–1 Suicide

MHMD–2 Adolescent suicide attempts

MNMD–3 Eating disorders

MHMD–4 Major depressive episodes

#### **Treatment Expansion**

MHMD–5 Mental health treatment provided in primary care facilities

MHMD–6 Treatment for children with mental health problems

MHMD–7 Juvenile justice facility screening

MHMD–8 Employment of persons with serious

MHMD–9 Treatment of adults with mental health disorders

MHMD–10 Treatment for co-occurring substance abuse and mental disorders

MHMD–11 Depression screening by primary care providers

MHMD–12 Receipt of mental health services among homeless adults

### *Topic Area: Mental Health and Mental Disorders*

#### **Mental Health Status Improvement**

**MHMD–1:** Reduce the suicide rate.

Target: 10.2 suicides per 100,000.

Baseline: 11.3 suicides per 100,000 occurred in 2007.

Target setting method: 10 percent improvement.

Data source: National Vital Statistics System (NVSS), CDC, NCHS.

**MHMD–2:** Reduce suicide attempts by adolescents.

Target: 1.7 suicide attempts per 100.

Baseline: 1.9 suicide attempts per 100 occurred in 2009.

Target setting method: 10 percent improvement.

Data source: Youth Risk Behavior Surveillance System (YRBSS), CDC.

**MHMD–3:** Reduce the proportion of adolescents who engage in disordered eating behaviors in an attempt to control their weight.

Target: 12.9 percent.

Baseline: 14.3 percent of adolescents engaged in disordered eating behaviors in an attempt to control their weight in 2009.

Target setting method: 10 percent improvement.

Data source: Youth Risk Behavior Surveillance System (YRBSS), CDC, NCCDPHP.

**MHMD–4:** Reduce the proportion of persons who experience major depressive episodes (MDE).

MHMD–4.1 Adolescents aged 12 to 17 years.

Target: 7.4 percent.

Baseline: 8.3 percent of adolescents aged 12 to 17 years experienced a major depressive episode in 2008.

Target setting method: 10 percent improvement.

Data source: National Survey on Drug Use and Health, SAMHSA.

MHMD–4.2 Adults aged 18 years and older.

Target: 6.1 percent.

Baseline: 6.8 percent of adults aged 18 years and older experienced a major depressive episode in 2008.

Target setting method: 10 percent improvement.

Data source: National Survey on Drug Use and Health, SAMHSA.

## **Treatment Expansion**

**MHMD–5:** Increase the proportion of primary care facilities that provide mental health treatment onsite or by paid referral.

Target: 87 percent.

Baseline: 79 percent of primary care facilities provided mental health treatment onsite or by paid referral in 2006.

Target setting method: 10 percent improvement.

Data source: Uniform Data System (UDS), HRSA.

**MHMD–6:** Increase the proportion of children with mental health problems who receive treatment.

Target: 75.8 percent.

Baseline: 68.9 percent of children with mental health problems received treatment in 2008.

Target setting method: 10 percent improvement.

Data source: National Health Interview Survey (NHIS), CDC, NCHS.

**MHMD–7:** Increase the proportion of juvenile residential facilities that screen admissions for mental health problems.

Target: 64 percent.

Baseline: 58 percent of juvenile residential facilities screened admissions for mental health problems in 2006.

Target setting method: 10 percent improvement.

Data source: National Juveniles in Residential Facilities Census (JFRC), National Center for Juvenile Justice.

**MHMD–8:** Increase the proportion of persons with serious mental illness (SMI) who are employed.

Target: 64.4 percent.

Baseline: 58.5 percent of persons with serious mental illness (SMI) were employed in 2008.

Target setting method: 10 percent improvement.

Data source: National Survey on Drug Use and Health (NSDUH), SAMHSA.

**MHMD–9:** Increase the proportion of adults with mental disorders who receive treatment.

MHMD–9.1 Adults aged 18 years and older with serious mental illness (SMI).

Target: 64.6 percent.

Baseline: 58.7 percent of adults aged 18 years and older with serious mental illness (SMI) received treatment in 2008.

Target setting method: 10 percent Improvement.

Data source: National Survey on Drug Use and Health (NSDUH), SAMHSA.

MHMD–9.2 Adults aged 18 years and older with major depressive episodes.

Target: 75.1 percent.

Baseline: 68.3 percent of adults aged 18 years and older with major depressive episodes received treatment in 2008.

Target setting method: 10 percent improvement.

Data source: National Survey on Drug Use and Health (NSDUH), SAMHSA.

**MHMD–10:** Increase the proportion of persons with co-occurring substance abuse and mental disorders who receive treatment for both disorders.

Target: 3.3 percent.

Baseline: 3.0 percent of persons with co-occurring substance abuse and mental disorders received treatment for both disorders in 2008.

Target setting method: 10 percent Improvement.

Data source: National Survey on Drug Use and Health (NSDUH), SAMHSA.

**MHMD–11:** Increase depression screening by primary care providers.

MHMD–11.1 Increase the proportion of primary care physician office visits that screen adults aged 19 years and older for depression.

Target: 2.4 percent.

Baseline: 2.2 percent of primary care physician office visits screened adults aged 19 years and older for depression in 2007.

Target setting method: 10 percent improvement.

Data source: National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS.

MHMD–11.2 Increase the proportion of primary care physician office visits that screen youth aged 12 to 18 years for depression.

Target: 2.3 percent.

Baseline: 2.1 percent of primary care physician office visits screened for depression in 2005–07.

Target setting method: 10 percent improvement.

Data source: National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS.

**MHMD–12:** Increase the proportion of homeless adults with mental health problems who receive mental health services.

Target: 41 percent.

Baseline: 37 percent of homeless adults with mental health problems received mental health services in 2006.

Target setting method: 10 percent improvement.

Data source: Projects for Assistance in Transition from Homelessness (PATH), SAMHSA.

## Appendix B: University of Maryland IRB Approval Letter



### UNIVERSITY OF MARYLAND INSTITUTIONAL REVIEW BOARD

#### Initial Application Approval

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To: Principal Investigator, Dr. Sharon M. Desmond, Behavioral and Community Health  
Student, Raquel Peat, Behavioral and Community Health

From: James M. Hagberg  
IRB Co-Chair  
University of Maryland College Park

Re: IRB Protocol: 11-0758 - The Role of Resilience, Team Support, and Post-deployment Social Support Among Commissioned Officers in the United States Public Health Service

Approval Date: December 16, 2011

Expiration Date: December 16, 2012

Application: Initial

Review Path: Expedited

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The University of Maryland, College Park Institutional Review Board (IRB) Office approved your Initial IRB Application. This transaction was approved in accordance with the University's IRB policies and procedures and 45 CFR 46, the Federal Policy for the Protection of Human Subjects. Please reference the above-cited IRB Protocol number in any future communications with our office regarding this research.

**Recruitment/Consent:** For research requiring written informed consent, the IRB-approved and stamped informed consent document will be sent via mail. The IRB approval expiration date has been stamped on the informed consent document. Please note that research participants must sign a stamped version of the informed consent form and receive a copy.

**Continuing Review:** If you intend to continue to collect data from human subjects or to analyze private, identifiable data collected from human subjects, beyond the expiration date of this protocol, you must [submit a Renewal Application](#) to the IRB Office 45 days prior to the expiration date. If IRB Approval of your protocol expires, all human subject research activities including enrollment of new subjects, data collection and analysis of identifiable, private information must cease until the Renewal Application is approved. If work on the human subject portion of your project is complete and you wish to close the protocol, please [submit a Closure Report](#) to [irb@umd.edu](mailto:irb@umd.edu).

**Modifications:** Any changes to the approved protocol must be approved by the IRB before the change is implemented, except when a change is necessary to eliminate an apparent immediate hazard to the subjects. If you would like to modify an approved protocol, please [submit an Addendum request](#) to the IRB Office.

**Unanticipated Problems Involving Risks:** You must promptly report any unanticipated problems involving risks to subjects or others to the IRB Manager at 301-405-0678 or [jsmith@umresearch.umd.edu](mailto:jsmith@umresearch.umd.edu)

**Additional Information:** Please contact the IRB Office at 301-405-4212 if you have any IRB-related questions or concerns. Email: [irb@umd.edu](mailto:irb@umd.edu)

The UMCP IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and operates under Federal Wide Assurance No. FWA00005856.

1204 Marie Mount Hall  
College Park, MD 20742-5125  
TEL 301.405.4212  
FAX 301.314.1475  
[irb@umd.edu](mailto:irb@umd.edu)  
<http://www.umresearch.umd.edu/IRB>

## Appendix C: Pilot Study Email Letter

Dear USPHS Officers,

### Looking for Pilot Test Survey Participants

An exciting opportunity awaits you!

We are contacting you to see if you would be interested in participating in a pilot study to examine risk and protective factors United States Public Health Service (USPHS) commissioned officers may experience when deployed to a natural or technological disaster. As participant in this online survey you will assist in improving our understanding of the survey instrument and in determining the length of time needed to complete the study. Participating involves you completing an anonymous on-line survey and an on-line feedback form about the survey instrument itself.

We are looking for active duty United States Public Health Service Officers who have served in at least one USPHS deployment. To be a part of the pilot study, please click on the following link: <http://tinyurl.com/peatpilotsurvey>. You will be asked to complete the informed consent form, the online survey and the pilot study online feedback form at the end of the survey. We believe this will take no more than 20 minutes of your time. If you are interested in participating in our pilot study please click on the above link (when you have 20 minutes free time) and complete the survey and feedback form.

Your participation is extremely important as a high response rate is essential to high quality data. If you have any questions or concerns about this survey, please contact Raquel Peat at 301-257-3540, 301-847-8512 (fax) or [rpeat@umd.edu](mailto:rpeat@umd.edu) or Sharon Desmond at 301-405-2526 or [desmond@umd.edu](mailto:desmond@umd.edu).

We greatly appreciate your participation and feedback!

Sincerely,



LCDR Raquel Peat  
FDA/CDRH/OIVD/DMD  
10903 New Hampshire Avenue  
Building 66, Room 5561 Silver Spring, MD 20993-0002



Sharon M. Desmond, Ph.D.  
Associate Professor  
2376 SPH Bldg, Dept. Beh. Comm. Hlth.  
School of Public Health  
University of Maryland  
College Park, MD 20742



#### Appendix D: Pilot Study Informed Consent Form

|  |  |
|--|--|
| <b>Project Title</b>                   | The Role of Resilience, Team Support, And Post-deployment Social Support Among Commissioned Officers In The United States Public Health Service  |
| <b>Purpose of the Study</b>            | This research is being conducted by Dr. Sharon M. Desmond [Principal Investigator] and LCDR Raquel Peat [Student Investigator] at the University of Maryland, College Park. The purpose of this research project is to examine risk and protective factors such as resilience, team support and social support in response to a deployment to natural or technological disasters among commissioned corps officers in the United States Public Health Service.   |
| <b>Procedures</b>                      | At the start of the survey, you will be provided the purpose of the research and a description of its voluntary and confidential nature. First, complete this online survey without interruption. Second, carefully review the online survey while taking notes about any items that you did not understand, were uncomfortable answering or that you feel should have been excluded. Also, if there were any items you think we should have included, but did not, please let us know that as well. Third, please fill out the Pilot Study Online Feedback Form (which you will find at the end of the online survey). Last, if you choose to provide your contact information, the researcher may contact you to provide clarity to your responses in the Pilot Study Online Feedback Form. We anticipate that the pilot study (online survey and pilot study online feedback form) should take no more than 20-25 minutes to complete, and our survey system will guide you step-by-step. |
| <b>Potential Risks and Discomforts</b> | There are no known risks associated with completing this survey. However, the topic matter may be sensitive because it deals with questions about perceptions of team and social support, and mental health status as it relates to resilience. Reading and responding to the survey questions could possibly cause feelings of discomfort. You may skip any question that makes you uncomfortable.  |
| <b>Potential Benefits</b>              | There is no personal benefit to you. Results obtained will hopefully provide a better understanding of the resiliency among United States Public Health Service officers after deployment which may lead to improved training and policies for commissioned officers in the future.  |
| <b>Confidentiality</b>                 | A number of steps will be taken to ensure confidentiality. Personally identifiable data (e.g., email addresses) will not be captured or stored. For the purposes of the pilot study, we are requesting a contact number (if you choose to provide it) as we may contact you if we need clarification on any of your responses on the feedback from. Your identity will be protected to the maximum extent possible by password-protected computers in a locked office limited to Dr. Sharon Desmond (P.I.) and student investigator Raquel Peat. This information will be stored in a separate file from other data, and no one will have access to this information except the research team (Dr. Sharon Desmond and LCDR Raquel Peat). Your comments to  |

|  |  |
|--|--|
|  | the pilot study will be written and described in an aggregate format (only reporting comments and never reporting individual comments) and your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.  |
| <b>Medical Treatment</b>               | The University of Maryland does not provide any medical, hospitalization or other insurance for participants in this research study, nor will the University of Maryland provide any medical treatment or compensation for any injury sustained as a result of participation in this research study, except as required by law.  |
| <b>Right to Withdraw and Questions</b> | <p>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</p> <p>If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, Dr. Sharon M. Desmond [Principal Investigator] at: 301-405-2526 or <a href="mailto:desmond@umd.edu">desmond@umd.edu</a> or LCDR Raquel Peat [Student Investigator] at 301-257-3540 or <a href="mailto:rpeat@umd.edu">rpeat@umd.edu</a>.</p> |
| <b>Participant Rights</b>              | <p>If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:</p> <p style="text-align: center;"> <b>University of Maryland College Park</b><br/> <b>Institutional Review Board Office</b><br/> <b>1204 Marie Mount</b><br/> <b>College Park, Maryland, 20742</b><br/> <b>E-mail: <a href="mailto:irb@umd.edu">irb@umd.edu</a></b><br/> <br/> <b>Telephone: 301-405-0678</b> </p> <p>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</p>   |
| <b>Statement of Consent</b>            | Selecting the “Agree” button below indicates you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You may print a copy of this signed consent form. If you agree to participate, please select “Agree” below. If you do not want to participate, please select “Disagree” below.  |
| <b>Consent</b>                         | <input type="radio"/> Agree<br><input type="radio"/> Disagree  |

### Appendix E: Pilot Study Online Feedback Form

Thanks so much for participating in this pilot study of the online survey. We would like to evaluate how well you understood the survey items/questions; if any items/questions made you uncomfortable and if there were any questions that should be excluded or included.

1. Were there any survey items/questions you had difficulty understanding?
2. Were there any words that you did not know the meaning of or did not understand?
3. Were you uncomfortable with any language used in the survey items/questions?
4. Were you uncomfortable with any of the survey items/questions?
5. Were there any survey items/questions you feel we should have asked, but did not? If “yes,” what are they?
6. Please provide a contact number in order for the researcher to contact you if there are any questions to the responses above?

## Appendix F: Recruitment Email to Study Participants

Dear USPHS Officers,

I am contacting you to see if you would be interested in participating in a study aimed at examining the risk and protective factors present when commissioned officers in the United States Public Health Service are deployed to a natural or technological disaster. This study is being conducted by the School of Public Health, Department of Behavioral and Community Health, University of Maryland. Results obtained will hopefully provide a better understanding of resiliency among United States Public Health Service officers after deployment, which may lead to improved training and policies for commissioned officers in the future. We are inviting you to complete this on-line survey because you represent the population we wish to better understand (active duty United States Public Health Service Officers and those that have been on at least 1 USPHS deployment). Deployment is defined as any response to a request for humanitarian assistance, disaster relief, emergency response and deployment trainings (e.g. Remote Area Medical training).

We are asking that you complete the survey on your personal time, by Wednesday, **February 29, 2012**. Based on the pilot study we conducted, the survey should take no more than 10-15 minutes of your time. Please click on the following link: <http://tinyurl.com/rpeatsurvey>.

We recognize that some of the questions are, by necessity, quite personal. Be assured that we maintain strict security procedures to ensure the anonymity of survey respondents. IP addresses will not be collected. Your participation in this project is voluntary. You may end the survey at any point and you may decline to answer any question or questions. If you choose, you will be able to stop the survey and resume it later using the same computer; however the survey may only be completed once. We recommend that you try to take it when you have 10-15 minutes of uninterrupted time so that you do not need to go back to it at a later time.

Your participation is extremely important as a high response rate is essential to high quality data. If you have any questions or concerns about this survey, please contact Raquel Peat at 301-257-3540, 301-847-8512 (fax) or [rpeat@umd.edu](mailto:rpeat@umd.edu) or Sharon Desmond at 301-405-2526 or [desmond@umd.edu](mailto:desmond@umd.edu).

Thank you in advance for your important and highly valued contribution to this research!

\*Sincerely,



LCDR Raquel Peat  
FDA/CDRH/OIVD/DMD  
10903 New Hampshire Avenue  
Building 66, Room 5561 Silver Spring, MD 20993-0002



Sharon M. Desmond, Ph.D.  
Associate Professor  
2376 SPH Bldg, Dept. Beh. Comm. Hlth.  
School of Public Health  
University of Maryland  
College Park, MD 20742

\*Signatory altered to include OFRD signatory and contact information only for the OFRD listerv.

## Appendix G: Reminder Email to Study Participants

Dear USPHS Officers,

This is an email reminder about your potential participation in the study examining risk and protective factors among commissioned officers in the United States Public Health Service when deployed to a natural or technological disaster. You were invited to participate in this survey and if you have already submitted your survey, thank you very much!

If you have not yet completed the survey, we are hopeful you will. We need your assistance because you represent the population we wish to better understand (active duty United States Public Health Service Officers and those that have been on at least 1 USPHS deployment). Deployment is defined as any response to a request for humanitarian assistance, disaster relief, emergency response and deployment trainings (e.g. Remote Area Medical training).

Again, we hope to use the findings to better understand resiliency among United States Public Health Service officers after deployment, which may lead to improved training and policies for commissioned officers in the future. The survey link will close on **February 29, 2012**. Please select the following link or copy and paste the link into your browser explorer bar to access the survey: <http://tinyurl.com/rpeatsurvey>.

Thank you in advance for your important and highly valued contribution to this research!

\*Sincerely,



LCDR Raquel Peat  
FDA/CDRH/OIVD/DMD  
10903 New Hampshire Avenue  
Building 66, Room 5561 Silver Spring, MD 20993-0002



Sharon M. Desmond, Ph.D.  
Associate Professor  
2376 SPH Bldg, Dept. Beh. Comm. Hlth.  
School of Public Health  
University of Maryland  
College Park, MD 20742

\*Signatory altered to include OFRD signatory and contact information only for the OFRD listerv.

## Appendix H: Informed Consent Form

|  |  |
|--|--|
| <b>Project Title</b>                   | The Role of Resilience, Team Support, And Post-deployment Social Support Among Commissioned Officers In The United States Public Health Service  |
| <b>Purpose of the Study</b>            | This research is being conducted by Dr. Sharon M. Desmond [Principal Investigator] and LCDR Raquel Peat [Student Investigator] at the University of Maryland, College Park. The purpose of this research project is to examine risk and protective factors such as resilience, team support and social support in response to a deployment to natural or technological disasters among commissioned corps officers in the United States Public Health Service.   |
| <b>Procedures</b>                      | At the start of the survey, you will be provided the purpose of the research and a description of its voluntary and confidential nature. Please complete this online survey by answering each question to the best of your ability. This survey should take no more than 10-15 minutes, and our survey system will guide you step-by-step. However, if you find that you are unable to complete the survey in one sitting, you may save your survey by simply closing your browser. To continue completing your survey, you will need to use the same computer and click the same link you first used—you will be taken to the page you were on when you had to log out. |
| <b>Potential Risks and Discomforts</b> | There are no known risks associated with completing this survey. However, the topic matter may be sensitive because it deals with questions about perceptions of team and social support, and mental health status as it relates to resilience. Reading and responding to the survey questions may possibly cause feelings of discomfort. You may skip any question that makes you uncomfortable.  |
| <b>Potential Benefits</b>              | There is no personal benefit to you. Results obtained will hopefully provide a better understanding of the resiliency among United States Public Health Service officers after deployment which may lead to improved training and policies for commissioned officers in the future.  |
| <b>Confidentiality</b>                 | A number of steps will be taken to ensure confidentiality. Personally identifiable data (e.g., email addresses) will not be captured or stored. If a report or article is written about this research, results will be written and described in an aggregate format (only reporting combined results and never reporting individual results) and your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.  |
| <b>Medical Treatment</b>               | The University of Maryland does not provide any medical, hospitalization or other insurance for participants in this research study, nor will the University of Maryland provide any medical treatment or compensation for   |

|  |  |
|--|--|
|  | any injury sustained as a result of participation in this research study, except as required by law.   |
| <b>Right to Withdraw and Questions</b> | <p>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</p> <p>If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, Dr. Sharon M. Desmond [Principal Investigator] at: 301-405-2526 or desmond@umd.edu or LCDR Raquel Peat [Student Investigator] at 301-257-3540 or rpeat@umd.edu.</p> |
| <b>Participant Rights</b>              | <p>If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:</p> <p style="text-align: center;"> <b>University of Maryland College Park</b><br/> <b>Institutional Review Board Office</b><br/> <b>1204 Marie Mount</b><br/> <b>College Park, Maryland, 20742</b><br/> <b>E-mail: <a href="mailto:irb@umd.edu">irb@umd.edu</a></b><br/> <br/> <b>Telephone: 301-405-0678</b> </p> <p>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</p>   |
| <b>Statement of Consent</b>            | <p>Selecting the “Agree” button below indicates you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You may print a copy of this signed consent form. If you agree to participate, please select “Agree” below. If you do not want to participate, please select “Disagree” below.</p>   |
| <b>Consent</b>                         | <p> <input type="radio"/> Agree<br/> <input type="radio"/> Disagree </p>   |

## Appendix I: Study Questionnaire

(Final Questionnaire)

### THE ROLE OF RESILIENCE, TEAM SUPPORT, AND POST-DEPLOYMENT SOCIAL SUPPORT AMONG COMMISSIONED OFFICERS IN THE UNITED STATES PUBLIC HEALTH SERVICE SURVEY

For this survey, deployment is defined as any response to a request for humanitarian assistance, disaster relief, emergency response and deployment trainings (e.g. Remote Area Medical training). Active duty USPHS officers who have been on at least 1 USPHS deployment are eligible to participate in this survey. The next series of questions relates to risk, resilience and social support.

1 For each item, please click on the circle below that best indicates how much you agree with the following statements as they apply to you.

|  | Not true at all<br>(0) (0) | Rarely true<br>(1) (1) | Sometime<br>true (2) (2) | Often true (3)<br>(3) | True Nearly<br>all the time<br>(4) (4) |
|--|----------------------------|------------------------|--------------------------|-----------------------|--|
| I am able to adapt when changes occur. (1)                           | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/>                  |
| I tend to bounce back after illness, injury, or other hardships. (2) | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>    | <input type="radio"/> | <input type="radio"/>                  |



2 Over the last 2 weeks, how often have you been bothered by the following problems?

|   | Not at all (0) (0)    | Several days (1)<br>(1) | More than half<br>the days (2) (2) | Nearly every day<br>(3) (3) |
|---|-----------------------|-------------------------|------------------------------------|-----------------------------|
| Feeling nervous,<br>anxious or on<br>edge (1)         | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/>              | <input type="radio"/>       |
| Not being able to<br>stop or control<br>worrying (2)  | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/>              | <input type="radio"/>       |
| Little interest or<br>pleasure in doing<br>things (3) | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/>              | <input type="radio"/>       |
| Feeling down,<br>depressed, or<br>hopeless (4)        | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/>              | <input type="radio"/>       |

3 You are about to answer questions on resilience. For each item, please click on the circle below that best indicates how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

|   | not true at all<br>(0) (0) | rarely true (1)<br>(1) | sometimes<br>true (2) (2) | often true (3)<br>(3) | true nearly all<br>the time (4)<br>(4) |
|---|----------------------------|------------------------|---------------------------|-----------------------|--|
| I am able to adapt when changes occur. (1)  | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/>                  |
| I have at least one close and secure relationship that helps me when I am stressed. (2) | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/>                  |
| When there are no clear solutions to my problems, sometimes fate or God can help. (3)   | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/>                  |
| I can deal with whatever comes my way. (4)  | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/>                  |
| Past successes give me confidence in dealing with new challenges and difficulties. (5)  | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/>                  |
| I try to see the humorous side of things  | <input type="radio"/>      | <input type="radio"/>  | <input type="radio"/>     | <input type="radio"/> | <input type="radio"/>                  |

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| when I am faced with problems. (6)                                   |                       |                       |                       |                       |                       |
| Having to cope with stress can make me stronger. (7)                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I tend to bounce back after illness, injury, or other hardships. (8) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Good or bad, I believe that most things happen for a reason. (9)     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I give my best effort no matter what the outcome may be. (10)        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe I can achieve my goals, even if there are obstacles. (11)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Even when things look hopeless, I don't give up. (12)                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| During times of stress/crisis, I know where to turn for help. (13)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Under pressure, I stay focused and think clearly. (14)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I prefer to take the lead in solving problems rather than letting others make all the decisions. (15) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am not easily discouraged by failure. (16)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I think of myself as a strong person when dealing with life's challenges and difficulties. (17)       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can make unpopular or difficult decisions that affect other people, if it is necessary. (18)        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am able to handle unpleasant or painful feelings like sadness, fear,                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| and anger.<br>(19)   |                       |                       |                       |                       |                       |
| In dealing<br>with life's<br>problems,<br>sometimes<br>you have to<br>act on a<br>hunch<br>without<br>knowing<br>why. (20) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have a<br>strong sense<br>of purpose in<br>life. (21)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I feel in<br>control of my<br>life. (22)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I like<br>challenges.<br>(23)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I work to<br>attain my<br>goals no<br>matter what<br>roadblocks I<br>encounter<br>along the<br>way. (24)                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I take pride in<br>my<br>achievements.<br>(25)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4 The statements below refer to events you may have experienced BEFORE YOU WERE DEPLOYED. Please click on the circle “yes” or “no” for each item below.

|   | Yes (1)               | No (0)                |
|---|-----------------------|-----------------------|
| ...a natural disaster (for example, a flood or hurricane), a fire, or an accident in which I was hurt or my property was damaged. (1)   | <input type="radio"/> | <input type="radio"/> |
| ...exposure to a toxic substance (such as dangerous chemicals, radiation) (2)   | <input type="radio"/> | <input type="radio"/> |
| ...combat or exposure to a war zone (in the military or as a civilian). (3)   | <input type="radio"/> | <input type="radio"/> |
| ...the mental illness (for example, clinical depression, anxiety disorder), or life-threatening physical illness (for example, cancer or heart disease) of someone close to me. (4) | <input type="radio"/> | <input type="radio"/> |
| ...a parent who had a problem with drugs or alcohol. (5)  | <input type="radio"/> | <input type="radio"/> |
| ...the death of someone close to me. (6)  | <input type="radio"/> | <input type="radio"/> |
| ...been through a divorce or been left by a partner or significant other. (7)   | <input type="radio"/> | <input type="radio"/> |
| ...witnessed someone being assaulted or violently killed (8)  | <input type="radio"/> | <input type="radio"/> |
| ...been robbed or had my home broken into. (9)  | <input type="radio"/> | <input type="radio"/> |
| ...lost my job. (10)  | <input type="radio"/> | <input type="radio"/> |
| ...been emotionally mistreated (for example,  | <input type="radio"/> | <input type="radio"/> |

|  |                       |                       |
|--|-----------------------|-----------------------|
| shamed, embarrassed, ignored, or repeatedly told I was no good). (11)                              |                       |                       |
| ...seen or heard physical fighting between my parents or caregiver. (12)                           | <input type="radio"/> | <input type="radio"/> |
| ...been physically punished by a parent or caregiver (13)  |                       |                       |
| ...been physically injured by another person (for example, hit, kicked, beaten up). (14)           | <input type="radio"/> | <input type="radio"/> |
| ...experienced unwanted sexual activity as a result of force, threat of harm, or manipulation (15) | <input type="radio"/> | <input type="radio"/> |

You mentioned you had been physically injured by another person (for example, hit, kicked, beaten up). Did this occur in childhood or as an adult?

- ☐ Childhood (1)  
☐ Adult (2)

Answer If The statements below refer to events you may have experienced unwanted sexual activity as a result of force, threat of harm, or manipulation. Yes Is Selected

You mentioned that you have experienced unwanted sexual activity as a result of force, threat of harm, or manipulation. Did this occur in childhood or as an adult?

- ☐ Childhood (1)  
☐ Adult (2)

5 The statements below are about your relationships with other USPHS personnel while you are deployed. Please read each statement and describe how much you agree or disagree by selecting what best fits your answer.

|  | Strongly<br>disagree (1)<br>(1) | Somewhat<br>disagree (2)<br>(2) | Neither Agree<br>nor Disagree<br>(3) (3) | Agree (4) (4)         | Strongly<br>Agree (5) (5) |
|--|---------------------------------|---------------------------------|--|-----------------------|---------------------------|
| My team was like a family to me. (1)   | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/> | <input type="radio"/>     |
| I felt a sense of camaraderie between myself and other officers in my team. (2)  | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/> | <input type="radio"/>     |
| Members of my team understood me. (3)  | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/> | <input type="radio"/>     |
| Most people in my team were trustworthy. (4)                                     | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/> | <input type="radio"/>     |
| I could go to most people in my team for help when I had a personal problem. (5) | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/> | <input type="radio"/>     |
| My commanding officer(s) [team commander and deputy(s)] were interested in       | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/> | <input type="radio"/>     |



|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <p>what I thought and how I felt about things. (6)</p> <p>I was impressed by the quality of leadership in my team. (7)</p> <p>My team supervisor made a real attempt to treat me as a person. (8)</p> <p>The commanding officer(s) [team commander and deputy(s)] in my team were supportive of my efforts. (9)</p> <p>I felt like my efforts really counted to the mission of the United States Public Health Service. (10)</p> <p>The United States Public Health Service appreciated my service. (11)</p> <p>I was</p> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| supported by<br>the United<br>States Public<br>Health<br>Service (12) |  |  |  |  |  |
|---|--|--|--|--|--|

6 You have completed the questions about team support during your deployment. The next set of statements refers to social support after deployment. Please read each statement and describe how much you agree or disagree by selecting what best fits your answer.

|  | Strongly<br>disagree (1)<br>(1) | Somewhat<br>disagree (2)<br>(2) | Neither agree<br>nor disagree<br>(3) (3) | Somewhat<br>agree (4) (4) | Strongly<br>agree (5) (5) |
|--|---------------------------------|---------------------------------|--|---------------------------|---------------------------|
| The reception I received when I returned from my deployment made me feel appreciated for my efforts. (1)             | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/>     | <input type="radio"/>     |
| The American (i.e., co-workers) people made me feel at home when I returned. (2)                                     | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/>     | <input type="radio"/>     |
| When I returned, people made me feel proud to have served my country in the United States Public Health Service. (3) | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/>     | <input type="radio"/>     |
| I am carefully listened to and understood by family members or friends. (4)  | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/>     | <input type="radio"/>     |
| Among my   | <input type="radio"/>           | <input type="radio"/>           | <input type="radio"/>                    | <input type="radio"/>     | <input type="radio"/>     |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
| <p>friends or relatives, there is someone who makes me feel better when I am feeling down. (5)</p> <p>I have problems that I can't discuss with family or friends. (6)</p> <p>Among my friends or relatives, there is someone I go to when I need good advice. (7)</p> <p>People at home just don't understand what I have been though while in the United States Public Health Service. (8)</p> <p>There are people to whom I can talk about my deployment experiences. (9)</p> <p>There are people I work with respect</p> | <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> | <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> |
|--|--|--|--|--|--|

|  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <p>the fact that I am an officer in the United States Public Health Service. (10)</p> <p>My supervisor understands when I need time off to take care of personal matters. (11)</p> <p>My friends or relatives would lend me money if I needed it. (12)</p> <p>My friends or relatives would help me move my belongings if I needed to. (13)</p> <p>When I am unable to attend to daily chores, there is someone who will help me with these tasks. (14)</p> <p>When I am ill, friends or family members will help out until I am well.</p> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|

|      |  |  |  |  |  |
|------|--|--|--|--|--|
| (15) |  |  |  |  |  |
|------|--|--|--|--|--|

Please answer the following demographic questions.

7 What is your gender?

- ☐ Male (1)
- ☐ Female (2)

8 What is your current age?

- ☐ 20 to 24 (1)
- ☐ 25 to 34 (2)
- ☐ 35 to 44 (3)
- ☐ 45 to 54 (4)
- ☐ 55 to 64 (5)
- ☐ 65 or greater (6)

9 What is your race?

- ☐ White/Caucasian (1)
- ☐ African American/Black (2)
- ☐ Hispanic (3)
- ☐ Asian (4)
- ☐ Native Hawaiian/Other Pacific Islander (5)
- ☐ American Indian or Alaska Native (6)
- ☐ Other (7) \_\_\_\_\_

10 What is your current relationship status?

- ☐ Single, never married (1)
- ☐ Married without children (2)
- ☐ Married with children (3)
- ☐ Divorced (4)
- ☐ Separated (5)
- ☐ Widowed (6)
- ☐ Living w/ partner (7)

11 What is your rank?

- ☐ 0-1/ENS (1)
- ☐ 0-2/LTJG (2)
- ☐ 0-3/LT (3)
- ☐ 0-4/LCDR (4)
- ☐ 0-5/CDR (5)
- ☐ 0-6/CAPT (6)
- ☐ 0-7/RADM (7)
- ☐ 0-8/RADM (8)

12 What is your USPHS Category?

- ☐ Physician (1)
- ☐ Dentist (2)
- ☐ Nurse (3)
- ☐ Pharmacist (4)
- ☐ Engineer (5)
- ☐ Environmental Health Officer (6)
- ☐ Health Services Officer (7)
- ☐ Dietitian (8)
- ☐ Scientist/Researcher (9)
- ☐ Therapist (10)
- ☐ Veterinarian (11)

13 Are you a Mental Health/Behavioral Health Provider?

- ☐ Yes (1)
- ☐ No (2)

Answer If Are you a Mental Health/Behavioral Health Provider? Yes Is Selected

14 If you are a Mental Health/Behavioral Health Provider, please indicate your discipline below.

- ☐ Clinical Psychologist (1)
- ☐ Psychiatrist (2)
- ☐ Clinical Social Worker (3)
- ☐ Psychiatric Nurse Practitioner (4)
- ☐ Psychiatric Nurse (5)
- ☐ Psychiatric Physician Assistant (6)

15 Length of time in USPHS (in years)?

16 What is your Deployment assignment (e.g. Tier)?

- ☐ Tier 1- response teams ready and able to respond to an event within 12 hours (1)
- ☐ Tier 2- teams ready and able to respond to an event within 36 hours (2)
- ☐ Tier 3- officers not on Tier 1 or 2 teams are Tier 3 responders, ready and able to respond to an event in 72 hours (3)

17 What is your deployment role?

- ☐ Command Staff (Team Leadership) (1)
- ☐ Safety (2)
- ☐ Operations (Medical Services/Provider, Pharmacy, Preventive Medicine) (3)
- ☐ Planning (4)
- ☐ Administration (5)
- ☐ Logistics (6)
- ☐ Public Information Officer/Liaison (7)
- ☐ Other (8) \_\_\_\_\_

18 Please list the number of times you have been deployed (in the past 7 years).

- ☐ 1 (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5 (5)
- ☐ 6 (6)
- ☐ 7 (7)
- ☐ 8 (8)
- ☐ 9 (9)
- ☐ 10 or greater (10)



If you have been on multiple USPHS deployments (>1), please answer the following questions related to your deployment.

19 How often have you deployed (in the past year)?

- ☐ {CHOICE 11} (0)
- ☐ 1 (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5 (5)
- ☐ 6 (6)
- ☐ 7 (7)
- ☐ 8 (8)
- ☐ 9 (9)
- ☐ 10 (10)

20 How long ago was your last deployment? Answer in months

21 Did you feel prepared for your deployment?

- ☐ Yes (1)
- ☐ No (2)

22 When considering the environment, was your last deployment difficult or easy?

- ☐ Very Difficult (1)
- ☐ Difficult (2)
- ☐ Somewhat Difficult (3)
- ☐ Somewhat Easy (4)
- ☐ Easy (5)
- ☐ Very Easy (6)

23 If your deployment lasted more than 5 days, did you feel stress?

- ☐ Yes (1)
- ☐ No (2)

Answer If your deployment lasted more than 5 days, did you feel stress. Yes Is Selected

24 Based on your previous response, if you felt stress on your last deployment, what factors contributed to your stress?

25 Did you previously serve in the Armed Forces (Army, Air Force, Navy, Marines, Coast Guard)?

☐ Yes (1)

☐ No (2)

Answer If Did you previously serve in the Armed Forces (Army, Air Force, Navy, Marines, Coast Guard). Yes Is Selected

26 If yes, did you serve in an active or reserve status?

☐ Active (1)

☐ Reserve (2)

Answer If Did you previously serve in the Armed Forces (Army, Air Force, Navy, Marines, Coast Guard). Yes Is Selected

27 Were you ever deployed as a member of the armed forces?

☐ Yes (1)

☐ No (2)

Would you be interested in participating in future studies (this information will be kept in a separate file and not included in the captured dataset)?

☐ Yes (1)

☐ No (2)

Answer If Would you be interested in participating in future studies (this information will be kept in a separate file and not included in the captured dataset)? Yes Is Selected

You have indicated interest in participating in future studies. Please provide an email address where you may be contacted.

Rank (1)

First Name (2)

Last Name (3)

Email Address (4)

Thank you for your time. Your responses are very important to us. Should you have any questions or concerns about this survey, please contact me at [rpeat@umd.edu](mailto:rpeat@umd.edu), or 301-257-3540.

## Appendix J: Pilot Study Findings Summary

For the pilot study, eleven respondents were recruited via an email letter to participate in order to meet the proposed sample size of 10 participants. All eleven completed the survey within 24 hours of the request. In the full sample, the mean age range was 35 to 44 years old ( $SE=0.6$ ), 55% were male, 36% were white, 73% were of the rank of Commander (CDR) and 45% belong to the professional category of the Health Services. Of those that took the pilot study, 8 out of 11 participants indicated that it took 10-15 minutes to complete the study if uninterrupted. The three respondents that took 20-25 minutes indicated that they were disturbed while conducting the study.

Participants were asked if there were any survey questions that they had difficulty understanding and they indicated that the question on how often they deployed was vague, did not specify what the number designated (days/months/years) and did not seem to correlate with the question. To address this concern, the question was changed to a two item response: (1) how often did you deploy in the last 7 years; and (2) how often have you deployed in the past year. The two items differed as the question “how often have you deployed in the last seven years” is to capture those that deployed in response to Hurricanes Katrina and Rita (occurred in 2005) to present day before the adoption of team based deployments. Whereas the question, “how often have you deployed in the past year” is related to those that have recently deployed and the recall period for the following questions on deployment stress. A respondent suggested that we incorporate questions on perceived preparation for deployment and whether the deployment was voluntary and the number of active or reserve status years served in another uniform service. The

question was incorporated based on perceived preparedness for deployment and did not include whether deployments are voluntary, as largely all deployments are voluntary unless declared a priority by the President or the Secretary of Health and Human Services. The neutral button on the question on the difficulty and ease of their recent deployment was removed to six categorical variables; very difficult, difficult, somewhat difficult, somewhat easy, easy and very easy.

When asked, “were there any words that they did not know the meaning of or did not understand” all respondents indicated that there were no words that they did not understand. One of ten respondents (one did not answer the question at all) indicated that they were uncomfortable with language used in the survey items/questions. When asked, “were there any items that they think that should have been left out and if they answered yes, which ones”, one respondent indicated that they were unsure and another respondent indicated that the questions on personal abuse should have been left out. When asked whether they would be interested in answering any questions that the researcher may have on the information provided, nine out of 11 (82%) indicated that they would like to be contacted. Three respondents were contacted and all indicated that they would have liked to be able to skip the questions on mental health providers since they were not of that discipline and did not like the question that just queried their status. The final changes to the instrument included movement of the survey questions to the end of the survey, insertion of a skip pattern for the question on mental health providers, change of “status” to “relationship status” and addition of a text box for the race/ethnicity question stating ‘Other’.

Appendix K: Missing Values for Key Variables in the Original Sample

**Table 21: Missing Values for Key Variables with the Original Samples (N=782)**

|                            | N   | Missing |         | No. of Extremes <sup>a</sup> |      |
|----------------------------|-----|---------|---------|------------------------------|------|
|                            |     | Count   | Percent | Low                          | High |
| Gender                     | 563 | 219     | 28.0    | 0                            | 0    |
| Age                        | 562 | 220     | 28.1    | 0                            | 4    |
| Race                       | 562 | 220     | 28.1    | 0                            | 40   |
| Relationship Status        | 563 | 219     | 28.0    | 0                            | 20   |
| Rank                       | 566 | 216     | 27.6    | 14                           | 2    |
| USPHS Category             | 560 | 222     | 28.4    | 0                            | 8    |
| Deployment Assignment      | 554 | 228     | 29.2    | 0                            | 0    |
| Deployment Role            | 552 | 230     | 29.4    | 0                            | 0    |
| Abbreviated Adapability_1  | 657 | 125     | 16.0    | 27                           | 0    |
| Abbreviated Adaptability_2 | 715 | 67      | 8.6     | 37                           | 0    |
| PHQ-4_1                    | 697 | 85      | 10.9    | 0                            | 23   |
| PHQ-4_2                    | 695 | 87      | 11.1    | 0                            | 39   |
| PHQ-4_3                    | 695 | 87      | 11.1    | 0                            | 33   |
| PHQ-4_4                    | 697 | 85      | 10.9    | 0                            | 23   |
| Resilience_1               | 657 | 125     | 16.0    | 27                           | 0    |
| Resilience_2               | 657 | 125     | 16.0    | 29                           | 0    |
| Resilience_3               | 655 | 127     | 16.2    | 0                            | 0    |
| Resilience_4               | 657 | 125     | 16.0    | 41                           | 0    |
| Resilience_5               | 656 | 126     | 16.1    | 35                           | 0    |
| Resilience_6               | 656 | 126     | 16.1    | 20                           | 0    |
| Resilience_7               | 655 | 127     | 16.2    | 16                           | 0    |
| Resilience_8               | 655 | 127     | 16.2    | 31                           | 0    |
| Resilience_9               | 655 | 127     | 16.2    | 54                           | 0    |
| Resilience_10              | 654 | 128     | 16.4    | 32                           | 0    |
| Resilience_11              | 654 | 128     | 16.4    | 35                           | 0    |
| Resilience_12              | 656 | 126     | 16.1    | 9                            | 0    |
| Resilience_13              | 655 | 127     | 16.2    | 22                           | 0    |
| Resilience_14              | 656 | 126     | 16.1    | 7                            | 0    |
| Resilience_15              | 654 | 128     | 16.4    | 14                           | 0    |
| Resilience_16              | 656 | 126     | 16.1    | 31                           | 0    |
| Resilience_17              | 654 | 128     | 16.4    | 46                           | 0    |
| Resilience_18              | 655 | 127     | 16.2    | 28                           | 0    |
| Resilience_19              | 655 | 127     | 16.2    | 8                            | 0    |
| Resilience_20              | 655 | 127     | 16.2    | 50                           | 0    |
| Resilience_21              | 656 | 126     | 16.1    | 10                           | 0    |
| Resilience_22              | 654 | 128     | 16.4    | 18                           | 0    |
| Resilience_23              | 654 | 128     | 16.4    | 12                           | 0    |
| Resilience_24              | 654 | 128     | 16.4    | 52                           | 0    |
| Resilience_25              | 655 | 127     | 16.2    | 31                           | 0    |
| Predeployment Affectiv_1   | 624 | 158     | 20.2    | 0                            | 0    |
| Predeployment Affectiv_2   | 624 | 158     | 20.2    | 0                            | 118  |
| Predeployment Affectiv_3   | 624 | 158     | 20.2    | 0                            | 77   |
| Predeployment Affectiv_4   | 624 | 158     | 20.2    | 0                            | 0    |
| Predeployment Affectiv_5   | 624 | 158     | 20.2    | 0                            | 0    |
| Predeployment Affectiv_6   | 622 | 160     | 20.5    | 0                            | 0    |
| Predeployment Affectiv_7   | 624 | 158     | 20.2    | 0                            | 0    |
| Predeployment Affectiv_8   | 624 | 158     | 20.2    | 0                            | 116  |
| Predeployment Affectiv_9   | 624 | 158     | 20.2    | 0                            | 0    |
| Predeployment Affecti_10   | 622 | 160     | 20.5    | 0                            | 0    |
| Predeployment Affecti_11   | 621 | 161     | 20.6    | 0                            | 0    |
| Predeployment Affecti_12   | 625 | 157     | 20.1    | 0                            | 0    |

|                          | N   | Missing |         | No. of                |      |
|--------------------------|-----|---------|---------|-----------------------|------|
|                          |     | Count   | Percent | Extremes <sup>a</sup> |      |
|                          |     |         |         | Low                   | High |
| Predeployment Affecti_13 | 625 | 157     | 20.1    | 0                     | 0    |
| Predeployment Affecti_14 | 623 | 159     | 20.3    | 0                     | 84   |
| Physical Inhury.1        | 179 | 603     | 77.1    | 0                     | 0    |
| Team Support_5           | 574 | 208     | 26.6    | 24                    | 0    |
| Team Support_6           | 573 | 209     | 26.7    | 19                    | 0    |
| Team Support_7           | 574 | 208     | 26.6    | 27                    | 0    |
| Team Support_8           | 573 | 209     | 26.7    | 42                    | 0    |
| Team Support_9           | 574 | 208     | 26.6    | 34                    | 0    |
| Team Support_10          | 574 | 208     | 26.6    | 40                    | 0    |
| Team Support_11          | 573 | 209     | 26.7    | 23                    | 0    |
| Team Support_12          | 573 | 209     | 26.7    | 27                    | 0    |
| Post-deployment SocSup_1 | 545 | 237     | 30.3    | 29                    | 0    |
| Post-deployment SocSup_2 | 543 | 239     | 30.6    | 11                    | 0    |
| Post-deployment SocSup_3 | 539 | 243     | 31.1    | 15                    | 0    |
| Post-deployment SocSup_4 | 543 | 239     | 30.6    | 21                    | 0    |
| Post-deployment SocSup_5 | 542 | 240     | 30.7    | 14                    | 0    |
| Post-deployment SocSup_6 | 543 | 239     | 30.6    | 0                     | 37   |
| Post-deployment SocSup_7 | 542 | 240     | 30.7    | 13                    | 0    |
| Post-deployment SocSup_8 | 541 | 241     | 30.8    | 0                     | 22   |
| Post-deployment SocSup_9 | 543 | 239     | 30.6    | 16                    | 0    |
| Post-deployment SocSu_10 | 542 | 240     | 30.7    | 15                    | 0    |
| Post-deployment SocSu_11 | 541 | 241     | 30.8    | 41                    | 0    |
| Post-deployment SocSu_12 | 539 | 243     | 31.1    | 18                    | 0    |
| Post-deployment SocSu_13 | 542 | 240     | 30.7    | 22                    | 0    |
| Post-deployment SocSu_14 | 542 | 240     | 30.7    | 39                    | 0    |
| Post-deployment SocSu_15 | 540 | 242     | 30.9    | 24                    | 0    |

<sup>a</sup> The number of cases that falls outside of the range.

## **Glossary**

1. Categories in USPHS: There are 11 professional categories: Dentist, Dietitian, Engineer, Environmental health officers, Health Service Officers, Nurse, Medical, Pharmacist, Scientist, Therapists (including physical, occupational, speech), Veterinarian. The Health Services Officer (HSO) category comprises over 50 specialties, including audiology, social workers, physician assistants, optometrists, statisticians, computer scientists, dental hygienists, medical records administrators, medical technologists and others.
2. Deployment: Any response to a request for humanitarian assistance, disaster relief, emergency response and deployment trainings (e.g. Remote Area Medical training).
3. Deployment Social Support: Amount of assistance and encouragement in the war zone from the military in general (i.e., military personnel felt they were valued versus expendable by the military), unit leaders (i.e., military personnel believed that superiors were trustworthy and dependable), and other unit members (i.e., military personnel felt a sense of camaraderie with their peers in the unit).
4. Disasters: Sudden, calamitous events that bring great damage, loss or destruction, whether through natural, human made (deliberate, through error or negligence) or technological causes. Typically, they cause loss of life and property and social and economic disruption. They can be classified as:
  - exogenous (floods, drought, storms, landslides and avalanches),
  - endogenous (volcanism and earthquakes); and
  - anthropogenic or man-induced (collapse of structures, desertification, fires).
5. Humanitarian aid: Aid and action designed to save lives, alleviate suffering and maintain and protect human dignity during and in the aftermath of emergencies.
6. Operations Enduring Freedom and Iraqi Freedom (OEF/OIF): Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom (primarily in Iraq) are military campaigns that are part of the Overseas Contingency Operation. Operation Enduring Freedom (OEF) began in October 2001. Operation Iraqi Freedom (OIF) began on March



20, 2003, and continued until 2010, when Operation New Dawn began, reflecting a reduced U.S. role in Iraq.

7. **Predeployment Affectivity:** Assesses prior stressors which are exposure to traumatic events before deployment, such as community or domestic violence, physical assault, sexual abuse, previous combat duty, or other highly stressful life events.
8. **Post-deployment Social Support:** The extent to which family, friends, coworkers, employers, and community provide emotional sustenance and instrumental assistance. Emotional sustenance refers to the extent to which others provide the individual with understanding, companionship, a sense of belonging, and positive self-regard. Instrumental assistance refers to the extent to which the individual receives tangible aid such as help to accomplish tasks and material assistance or resources.
9. **SAMHSA:** The Substance Abuse and Mental Health Services Administration (SAMHSA) is a branch of the U.S. Department of Health and Human Services. It is charged with improving the quality and availability of prevention, treatment, and rehabilitative services in order to reduce illness, death, disability, and cost to society resulting from substance abuse and mental illnesses.
10. **Technological disasters:** Usually associated with man-made infrastructure, and are typically accidental, though the rise in global terrorism has awakened populations to the risk of purposeful calamities, whether nuclear, biological, radiological or chemical. Examples of technological disasters include chemical or nuclear plant explosions, mining accidents, and major train derailments involving hazardous materials.
11. **Tier 1:** USPHS response teams ready and able to respond to an event within 12 hours. Tier 1 teams are primarily made up of Rapid Deployment Force (RDF) teams that are made up of over 100 officers with multiple specialties, and are focused on providing acute clinical care of disaster-exacerbated chronic conditions.
12. **Tier 2:** USPHS response teams ready and able to respond within 36 hours. Tier 2 teams include the Applied Public Health Team (APHT), the Mental Health Team (MHT), and the Services Access Team (SAT).

13. Tier 3: USPHS responders, officers not on Tier 1 or 2 teams are ready and able to respond to an event in 72 hours.
14. Title 10 of the United States Code (USC) Uniformed Services Statutory Definition: The term "uniformed services" means—(A) the armed forces; (B) the commissioned corps of the National Oceanic and Atmospheric Administration; and (C) the commissioned corps of the Public Health Service.
15. Title 10 of the United States Code (USC) United States Armed Forces Statutory Definition: The term "armed forces" means the Army, Navy, Air Force, Marine Corps, and Coast Guard.
16. Uniformed Services: The United States has seven federal uniformed services that commission officers as defined by Title 10, and subsequently structured and organized by Title 10, Title 14, Title 33 and Title 42 of the United States Code. The seven uniformed services are, in order of precedence by ceremonial formation:
- United States Army
  - United States Marine Corps
  - United States Navy
  - United States Air Force
  - United States Coast Guard
  - United States Public Health Service Commissioned Corps
  - National Oceanic and Atmospheric Administration Commissioned Corps
17. United States Public Health Service (USPHS) Commissioned Corps: A federal uniformed service of the United States Public Health Service (PHS) and is one of the seven uniformed services of the United States.
18. Veteran: Webster dictionary defines a veteran as (1) A person who has served in the armed forces, or (2) An old soldier who has seen long service, (3) Unknown author defines a veteran as someone who, at one point in his/her life, wrote a blank check made payable to "The United States of America," for an amount of "up to and including my life."

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