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SAN DIEGO STATE UNIVERSITY

PTSD: Prevalence, New Onset, Persistence, and Resiliency in a
Large Population-Based Military Cohort

A Dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy

in

Public Health (Epidemiology)

by

Tyler Clain Smith

Committee in charge:

University of California, San Diego

Professor Deborah L. Wingard, Chair
Professor Margaret A. K. Ryan
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San Diego State University

Professor James F. Sallis
Professor Donald J. Slymen

2007

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The Dissertation of Tyler Clain Smith is approved, and it is acceptable in quality and form for publication on microfilm:

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University of California, San Diego

San Diego State University

2007

DEDICATION

Many family and friends have inspired and tolerated me during the past five years in this doctoral program. I would like to thank them for the patience and commitment they have shown me.

My father (Thomas) who put in weeks at a time with little Thomas so that I could focus on this work, and my mother (Nikki)... their love and support through my entire life has been a driving force for who I am. I owe a debt of gratitude for which I only hope to repay to my son Thomas.

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LIST OF ABBREVIATIONS

PTSD, posttraumatic stress disorder

GWOT, Global War on Terrorism

MCS, mental component summary

PCS, physical component summary

PCL-C, PTSD Checklist–Civilian Version

SF-36V, Medical Outcomes Study Short Form 36-Item Health Survey for Veterans

SWA, Southwest Asia

CI, confidence interval

OR, odds ratio

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Smith TC, Wingard DL, Ryan MAK, Kritz-Silverstein D, Slymen DJ, Sallis JF, for the Millennium Cohort Study Team. Prior Assault Increases the Likelihood of New-onset PTSD After Combat Deployment. In review.

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ABSTRACT OF THE DISSERTATION

PTSD: Prevalence, New Onset, Persistence, and Resiliency in a
Large Population-Based Military Cohort

by

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Doctor of Philosophy in Public Health (Epidemiology)

University of California, San Diego, 2007

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Background: Posttraumatic stress disorder (PTSD) results from experiencing or witnessing traumatic, life-threatening events including military combat. There is concern about the health impact of military deployment to Iraq and Afghanistan after reports of higher prevalence of PTSD in combat-exposed veterans. Further, the vulnerability or resiliency for PTSD symptoms in individuals following overwhelming stress is not well understood.

Methods: Using data from a large population-based military cohort, the Millennium Cohort Study baseline (July 2001 – June 2003) and follow-up (June 2004 – February 2006), the objective of this dissertation was to 1) document the prevalence of PTSD symptoms and diagnosis, associated physical and mental health, and the association with self-reported exposure to chemical and biological warfare agents independent of other combat-related exposures, 2) prospectively investigate the effect of military deployment and self-reported combat exposures on new-onset and persistent PTSD symptoms, and 3) prospectively investigate the association of prior assault and new-onset PTSD symptoms among combat deployed.

Results: At baseline, the combined weighted prevalence PTSD symptoms in the Millennium Cohort was 3.6%, with the majority (2.0%) being those with PTSD symptoms without a diagnosis. Nearly 25% of the Cohort deployed between baseline and follow-up. New-onset PTSD symptoms or diagnoses were identified in 7.6%-8.7% of deployers reporting combat exposures, 1.4%-2.1% of deployers not reporting combat exposures, and 2.3%-3.0% of nondeployers. Persistence of PTSD symptoms was similar in nondeployed and those deployed with combat exposures. New-onset PTSD symptoms or diagnosis among deployers reporting combat exposures was 21.7% for women reporting prior assault and 10.1% for women not reporting prior assault. Among men, the rates were 12.4% and 5.9% respectively.

Conclusions: These data suggest a 2% prevalence of PTSD symptoms without diagnosis and a threefold increase in new-onset PTSD symptoms or diagnosis among deployed military personnel reporting combat exposures. Further, these prospective data

indicate a two-fold increase in new-onset PTSD symptoms or diagnosis among deployed military personnel reporting combat exposures who reported a prior assault at baseline. The findings of this dissertation define the vulnerability of some individuals to new-onset PTSD symptoms and emphasize that specific combat exposures, rather than deployment itself, significantly affect the onset of PTSD symptoms postdeployment.

INTRODUCTION

Posttraumatic stress disorder (PTSD) is a psychiatric condition resulting from experiencing or witnessing traumatic events such as military combat,¹⁻⁹ natural disasters,¹⁰ terrorist attacks,¹¹⁻¹³ serious accidents,¹⁴ death,¹⁵ violent assaults or other physical, sexual, or emotional abuse.¹⁶⁻²⁰ In 1980, the American Psychiatric Association added PTSD to the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* nosologic classification.²¹⁻²⁹ Criteria for PTSD were revised in 1994 in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). The new PTSD diagnosis requires persistent reexperiencing of the traumatic event, persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness, and persistent symptoms of increased arousal.³⁰ Further, symptoms must be present for more than one-month, and the disturbance must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.³⁰

Reported lifetime prevalence of PTSD in US adults is estimated to be 7.8 percent, with women (10.4%) twice as likely as men (5%) to have PTSD at some point in their life.³¹ This national report also suggested that PTSD symptoms are likely to persist in at least one third of those with PTSD even after many years.³¹ Several longitudinal studies have reported that as many as 30 percent of individuals meet the criteria for PTSD one-month after a traumatic exposure, while more than 70 percent of women meet this criteria following a sexual assault.^{18, 32, 33}

Participation in armed conflicts result in a multitude of adverse health outcomes including emotional and psychological conditions from real and perceived life-

threatening exposures.^{23, 24, 34, 35} Since the US Civil War, comparable syndromes, illnesses, and conditions have been documented following every conflict with minor variations and different naming conventions.³⁵ While acute combat stress reaction has been thought of as an immediate consequence of psychological trauma,³⁶ PTSD, initially called “Post-Vietnam syndrome”, has since been used to describe a condition resulting from both short and long-term consequences of extreme psychological stress.^{30, 35, 37} In 1992, the National Institute of Mental Health Diagnostic Interview was administered to 8,169 middle-aged males who served in the military during the Vietnam era and reported the prevalence of PTSD to be 10 percent lifetime.³⁸ The Centers for Disease Control (CDC) reported 2.2 percent having PTSD over a decade after the Vietnam War ended and 14.7 percent lifetime.³⁷ During the same time period, the National Vietnam Veterans Readjustment Study (NVVRS) estimated 30.9 percent of Vietnam veterans had developed PTSD in their lifetime and that 15.2 percent were still suffering from PTSD.¹ However, a recent investigation of NVVRS data using different methods reported 18.7 percent of Vietnam Veterans with PTSD in their lifetime as well as 9.1 percent with PTSD symptoms 11 to 12 years after the war.³⁹ Symptoms of PTSD have been reported in more than 10 percent of veterans returning from the 1991 Gulf War as well as in veterans returning from the current combat operations in Iraq and Afghanistan.^{2-4, 40, 41} While inconsistencies remain in reporting of PTSD prevalence after significant combat operations, research has been consistent in reporting significant proportions of those sent into combat will return with PTSD symptoms. In the context of the ongoing combat operations against the persistent threat of insurgencies in Iraq and Afghanistan, and the

continuation of the Global War on Terrorism (GWOT), PTSD and associated functional impairment⁴² is a significant public health concern today that will impact veterans' health for years to come.

Stressful experiences are a necessary precursor in the criteria implicating PTSD symptoms, however, it is not well understood whether the stress of perceived exposure to chemical and biological warfare agents is associated with PTSD symptoms independent of other combat exposures. Specifically, if exposures to biological and chemical agents, medical countermeasures against biological and chemical agents, or hearing chemical agent alarms necessitating the wearing of chemical warfare protective gear influence psychological morbidity and PTSD symptoms. Perceived threats may also play a role in developing PTSD symptoms independent of other combat experiences.^{34, 43} The first objective of this dissertation was to document the prevalence of PTSD symptoms and diagnosis in a large, population-based US military cohort. Investigation of the association of PTSD symptoms and diagnosis with self-reported exposure to chemical and biological warfare agents independent of other self-reported military, combat, and combat-related exposures was conducted. Additionally, the physical and mental health of those with current, past, and no PTSD symptoms was reported (Chapter 2).

Recent reports suggest that US Marine and Army infantry units returning from duty in Iraq and Afghanistan have greater than expected proportions of mental disorders including PTSD,⁴ that combat duty in Iraq is associated with high utilization of mental health services and attrition from military service,⁴⁰ and that there is increased risk of neuropsychological compromise after deployment in support of the GWOT.⁴⁴ The

second objective of this dissertation was to prospectively document new onset and persistent PTSD symptoms among deployed and nondeployed US military members supporting the GWOT. The unique nature of the Millennium Cohort allowed for the investigation of active duty and Reserve/Guard members who remained in military service or who separated from the military after deployment (Chapter 3).

Experiencing prior stressful life events, including prior assault, and experiencing previous mental illness have been shown to be associated with lower levels of mental health and higher risk for PTSD after a stressful experience.^{16, 41, 45-52} While most agree that combat experiences play the most influential role in post combat PTSD symptoms,⁵³ the level of vulnerability or predisposition for PTSD symptoms in individuals following overwhelming stress is not well understood. Previous research suggests that past trauma increases the risk for future traumatic experiences, which may result in increased risk for PTSD.^{54, 55} This may be reflected in increased risk-taking behavior such as not wearing seatbelts, excessive alcohol consumption, or entering into combat-related occupations and volunteering for deployment to combat areas. The third objective of this dissertation was to conduct a prospective investigation of the association of prior assault and new-onset PTSD symptoms among service members deployed in support of the wars in Iraq and Afghanistan who also self-reported combat exposures (Chapter 4).

In summary, using data from the Millennium Cohort Study (methods described in Chapter 1), this dissertation has three objectives; 1) to document the prevalence of PTSD in a large, contemporary, population-based US military cohort and investigate the association with self-reported exposure to chemical and biological warfare agents

independent of other self-reported military, combat, and combat-related exposures. Additionally, the physical and mental health of those with current, past, and no PTSD symptoms was investigated (Chapter 2), 2) to prospectively investigate the effect of military deployment to the GWOT and self-reported combat exposures on new onset and persistent PTSD symptoms in a large population-based US military cohort (Chapter 3), and 3) to conduct a prospective investigation of association of prior assault and new-onset PTSD symptoms among service members deployed in support of the GWOT who also self reported combat exposures (Chapter 4).

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CHAPTER 1

Millennium Cohort: Enrollment Begins a 21-year Contribution to Understanding the Impact of Military Service



Millennium Cohort: enrollment begins a 21-year contribution to understanding the impact of military service

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Abstract

Objective: In response to health concerns of military members about deployment and other service-related exposures, the Department of Defense (DoD) initiated the largest prospective study ever undertaken in the U.S. military.

Study Design and Setting: The Millennium Cohort uses a phased enrollment strategy to eventually include more than 100,000 U.S. service members who will be followed up through the year 2022, even after leaving military service. Subjects will be linked to DoD and Veterans Affairs databases and surveyed every 3 years to obtain objective and self-reported data on exposures and health outcomes.

Results: The first enrollment phase was completed in July 2003 and resulted in 77,047 consenting participants, well representative of both active-duty and Reserve/Guard forces. This report documents the baseline characteristics of these Cohort members, describes traditional, postal, and Web-based enrollment methods; and describes the unique challenges of enrolling, retaining, and following such a large Cohort.

Conclusion: The Millennium Cohort was successfully launched and is becoming especially relevant, given current deployment and exposure concerns. The Cohort is representative of the U.S. military and promises to provide new insight into the long-term effects of military occupations on health for years to come. © 2007 Elsevier Inc. All rights reserved.

Keywords: Military medicine; Military personnel; Veterans; Longitudinal studies; Combat disorders; Gulf War syndrome

1. Introduction

Since the 1991 Gulf War, numerous studies and much effort has been expended to evaluate the health concerns of veterans. Several large epidemiologic studies have found no unexplained increase in morbidity among these veterans [1–6], and etiologies for increased symptom reporting remain elusive after more than a decade [7–12]. Some hypothesize that symptoms and symptom complexes among Gulf War veterans result from a more physically and psychologically demanding lifestyle in the military compared with the typical experiences of the civilian working

population [13,14]. Others suggest that the psychological and physical effects of deployment may have a greater impact on health [15–25]. Separation from family during prolonged deployments, irregular working hours, strenuous training, mastering technologically advanced weaponry, threats of exposure to unknown chemical or biological agents, witnessing extreme violence and death, and dynamics inherent to deployment missions may all contribute to increased symptom reporting or psychological distress during and after deployment [17–25]. Observations that U.S. Reserves/National Guard military personnel may be at greater risk for postdeployment illnesses have been of particular concern [1,6,8,12,26–28].

In response to the Department of Defense (DoD) recommendation for a coordinated effort to study, the potential effects of deployment-related exposures [29], and bolstered by the Institute of Medicine's recommendation for

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a systematic, longitudinal, population-based assessment of service members' health [30], the Millennium Cohort Study was launched in October 2000 [31]. Just as other Cohort studies have yielded important findings for the development of public health policy [32–35], the Millennium Cohort Study is poised to do the same. This prospective study incorporates temporal sequence for the study of potential causal pathways of deployment-related exposures and subsequent health outcomes. Ultimately it may improve the health of future service members by identifying both risk factors and preventive factors for chronic disease. In this paper, the authors present the successes and challenges of enrolling more than 77,000 service members in the first panel of the Millennium Cohort.

2. Materials and methods

2.1. Study population

The invited first panel of the Millennium Cohort included 256,400 randomly selected U.S. military personnel. To ensure adequate power for statistical inferences, several subgroups were oversampled, including those previously deployed, Reserve/Guard personnel, and female service members. The probability-based sample, representing approximately 11.3% of the 2.2 million men and women in service as of October 1, 2000, was provided by the Defense Manpower Data Center (DMDC) in California. DMDC data included sex, birth date, highest education level, marital status, race/ethnicity, recent deployment to southwest Asia, Bosnia, or Kosovo, pay grade, service component (active duty and Reserve/Guard), service branch (Army, Navy, Coast Guard, Air Force, and Marines), primary and duty occupations, unit identification code, date and reason for separation from service, Social Security number (SSN), name, and home and duty addresses.

2.2. Focus groups and pilot study

To improve the survey instrument, enhance tracking and database processing techniques, establish practical timelines, evaluate potential cost-savings initiatives, and test quality control measures for combining paper and electronic questionnaire submissions, three focus groups were conducted and the survey was pilot tested on approximately 1% of the initial sample. The resulting group of nonresponders afforded the opportunity to investigate reasons for nonresponse among 100 randomly chosen individuals by phone interview. These findings were then used to further refine the instrument and enrollments methods.

2.3. Enrollment invitations

Initial enrollment of the Millennium Cohort began with postcard mailings in July 2001, followed shortly by the terrorist attacks of September 11 and the anthrax attacks

through the U.S. Postal Service (USPS). To address these challenges, the research team used a modified Dillman method with extended enrollment cycles [36]. Both the initial and extended enrollment cycles included an introductory postcard, survey, and reminder postcard mailings outlined by Dillman, with repeat survey and reminder postcard mailings for nonresponders. To ensure adequate time for locating new addresses and processing returned mail, enrollment cycles were staggered, with each cycle lasting approximately 7 months. The final invitation to join the Cohort was mailed in December 2002.

Recognizing the possible limitations of enrollment through mail surveys alone due to increased deployment of service members, the team added an e-mail invitation cycle. E-mail invitations encouraged participation via the World Wide Web (Web) by providing a direct link to the online survey, but also encouraged completion of the paper surveys for those preferring that option. To further compensate the increase in military deployments and the highly mobile nature of our target population, the team added an extended enrollment cycle that mirrored the procedures used in the initial enrollment cycle.

2.4. Web enrollment

The growing ubiquity of e-mail and the web provided an alternate contact and recruitment modality. Although U.S. mail service to bases and camps overseas may be slow and sporadic, many deployed U.S. military personnel have Web and email access. The demonstrated shortcomings of standard mail, the clear benefit to data integrity, and substantial cost savings made Web enrollment especially advantageous. Due to the sensitive nature of these data, secure data transmission of survey responses via the Web was of paramount importance. Web site security licenses were sought and each participant's user identification and password were verified prior to granting access to the survey Web site. All transmissions between the participant's Web browser and the Web server software were based on the most secure technology available at the time, using well established and widely accepted Secure Sockets Layer technology with 128-bit encryption.

2.5. Cost-savings initiatives

The Web-based survey option was encouraged by the research team because of its potential to increase data quality and reduce costs. The Web site address was highlighted on mailed correspondence, and e-mail communication provided direct links to the survey log-in page. In addition, a free T-shirt or phone card was offered to those choosing the Web option. These cost-saving initiatives, or incentives, proved effective in increasing Web-based response steadily throughout the enrollment period, resulting in more than half of all participants completing their questionnaires online.

Most project costs were considered to have a shared association between Web-based and paper-based respondents. The study team conservatively estimated, however, that the costs associated with paper-respondents alone included questionnaire printing, return postage, scanning hardware and software, paper storage facilities, and personnel time for scanning, verifying, and filing the paper questionnaires. Costs that were considered associated with web respondents alone included web questionnaire design and coding, web security, server costs, and e-mail invitation costs. A conservative estimate of the differential cost indicated that Web response saved the project at least \$50 over paper-based response.

2.6. E-mail and postal addresses

Algorithms were developed for efficient mail tracking and for identifying accurate postal addresses. Initial addresses were obtained from DMDC, followed by inexpensive postcard mailings with return receipt to validate addresses. Address locator services were used for invalid addresses, including commercial locators and the Internal Revenue Service (IRS) through an agreement with the National Institute for Occupational Safety and Health. Assessment of the address-finding services was conducted by randomizing more than 375 service members with invalid addresses into two groups, one forwarded to a commercial locator and the other to the IRS. The IRS addresses were found to be correct more often than those from the commercial locator (62% vs. 28%) and at a substantial cost savings.

E-mail addresses held the added advantage in providing opportunities for increased contact with potential Cohort members as well as the substantial cost savings associated with the Web-based survey submission. Although ascertainment of e-mail addresses was challenging because DoD-wide electronic databases maintained by DMDC were new and evolving, e-mail addresses linked by SSN were obtained for Cohort members from the Army, Air Force, Navy, and Marines. In the future, because all military identification cards are converted to the microchip-containing Common Access Cards, DMDC will maintain a listing of current e-mail addresses, linked by SSN, for all service members.

2.7. Participant tracking after enrollment

Semiannual e-mails and postcards are used to track participants, sustain interest in continued study participation, and verify accuracy of contact information for this highly mobile population. The research team selected Memorial Day and Veterans Day to send postcards because these holidays may hold special significance for service members and are spaced approximately 6 months apart. Each holiday contact consists of a unique postcard and e-mail message thanking subjects for their contribution to military service and to the study, and directing them to the study Web site to update their contact information. In addition to this

cost-effective means of verifying the accuracy of contact information, the USPS “Return Service Requested” is used to obtain forwarding address information on undeliverable postcards.

2.8. Survey instrument

The Millennium Cohort questionnaire for first enrollment included more than 450 questions on diagnosed medical conditions, symptoms, psychosocial assessment, physical status, functional status, use of alcohol, tobacco, complementary and alternative medicine, occupations, military exposures, sleep patterns, and basic demographic and contact information [31]. Standardized instruments were incorporated whenever possible because of their established reliability and validity and to enable future comparisons with other populations. Such instruments included the Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire (PHQ) [37–39], used to assess major depressive syndrome, panic syndrome, other anxiety syndrome, bulimia nervosa, alcohol abuse, and binge-eating disorders, (overall accuracy = 0.85, 85%; (sensitivity = 0.75, specificity = 0.90), as well as specific conditions such as major depressive disorder (sensitivity = 0.93, specificity = 0.89) [40], and panic disorder (sensitivity = 1.00, specificity = 0.63) [41]; the Medical Outcomes Study Short Form-36 for Veterans (SF-36V) [42,43] (eight components to assess physical functioning, role limitations caused by physical problems, bodily pain, general health, vitality, social functioning, role limitations caused by emotional problems, and mental health) found to have high internal consistency across all eight domains in a military population [44]; a Department of Veterans Affairs Gulf War survey of specific war-time exposures such as depleted uranium, and chemical or biological warfare agents [8,45]; the CAGE questionnaire for the detection of alcoholic problems [46]; and the Posttraumatic Stress Disorder (PTSD) Checklist—Civilian Version (PCL-C) [47–49] shown to be highly specific (specificity = 0.99) with slightly lower sensitivity (60%), a positive predictive value of 75%, and negative predictive value of 97% when using a cutoff of 50 [50]. Participants were identified as possibly having PTSD if they reported experiencing (at moderate or more extreme level) at least one intrusion symptom, three avoidance symptoms, and two hyperarousal symptoms [51], and had a total score of 50 or more on a scale of 17–85 [16,48,52,53]. Free text fields were included to allow participants to report conditions, problems, concerns, and exposures not listed elsewhere on the survey.

2.9. Data quality monitoring

To ensure the highest quality data, systematic validation and quality control processes were established for both paper and electronic submissions. The paper survey was created, scanned, and verified using mark-sense TELEform

Elite Software (Cardiff Software, Vista, CA, USA). For every 3,000-paper surveys that were scanned, 50 were randomly selected and compared with corresponding electronic records, with necessary adjustments made. In addition, all electronic records from scanned paper survey responses were searched for excessive missing values and then verified that the responses were truly missing. If, in fact, the responses were present (typically, very light pencil response was the cause), data were entered manually. The sensitivity of the scanning device was assessed throughout the process of scanning paper surveys, and thresholds were set for missing data that triggered further investigation.

The electronic version of the survey facilitated quality control by allowing direct data entry by responders. To ensure that all fields properly translated electronically, numerous mockup surveys were submitted both initially and throughout enrollment to check for correct data coding and transmission. Trends in missing data over the length of the survey that might indicate diminishing interest or survey fatigue were not detected (Fig. 1). Although no question was skipped by more than 15% of the responders, several questions tended to be associated with missing responses proportionally more often than other questions.

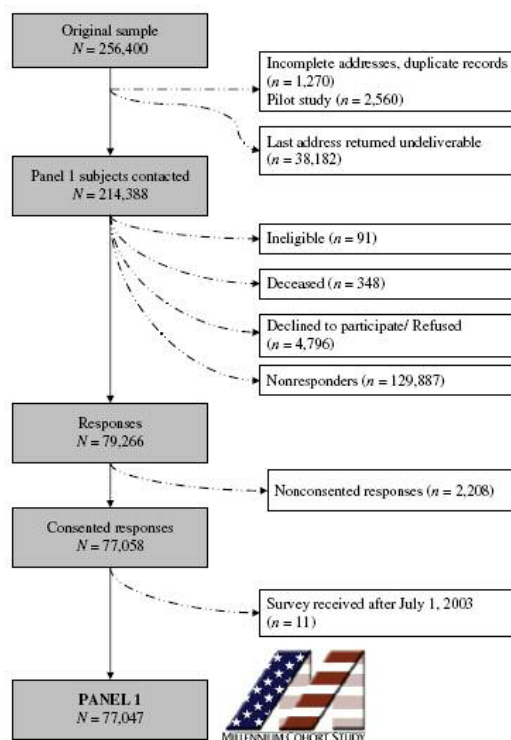


Fig. 1. Millennium Cohort Study flow of participants from sample to enrolled Cohort with Millennium Cohort Study logo.

This prompted review of these questions for follow-up surveys.

2.10. The Cohort

Although the initial target population included 256,400 potential participants, 1,270 were excluded due to invalid SSNs, name, or address information; 2,560 were included in the pilot study [31]; and 38,182 could not be contacted after multiple address searches found no valid address (Fig. 1).

Among the 214,388 contacted members of the invited sample, enrollment in the Cohort was not completed for the following reasons: determined to be ineligible ($n = 8$), deceased (348), explicitly declined to participate ($n = 4,796$), survey completed by someone other than the invited service member ($n = 83$), consent form not returned ($n = 2,208$), and survey submitted after close of enrollment ($n = 11$). All others were considered to be nonresponders ($n = 129,887$). The 77,047 consenting participants in the first enrollment panel represent 36% response rate of those contacted and invited to enroll.

2.11. Analyses

Descriptive analyses of the initial Cohort included means and proportions of important demographic characteristics as well as selected survey questions of interest. Initial results were stratified by active-duty or Reserve/Guard status. Univariate statistics including chi-square and t tests of association were used to establish differences among the enrolled Cohort members, the invited sample, and the U.S. military in 2000. Data were warehoused and analyzed using SAS software (Version 9.1, SAS Institute, Inc., Cary, NC, USA) [54,55].

3. Results

Demographic data for the Cohort were complete for 76,715 of the 77,047 (99.6%) participants (Table 1). Univariate analyses of population demographics suggested that there were statistically significant differences between the Cohort, invited sample, and the composition of the 2000 U.S. military (Table 1). When compared with the 2000 U.S. military at large, Cohort members were slightly more likely to be female, older, better educated, married, officers, in the Air Force, and from health care occupations. The higher enrollment of women and those recently deployed reflects the intended oversampling.

Self-reported health behaviors and military exposures are shown in Table 2. The most frequently reported military-specific exposures included receiving at least one anthrax vaccination (32%) and witnessing a person's death due to war, disaster, or tragic event (26%) (Table 2). Five percent of the Cohort reported being exposed to chemical or biological warfare agents and 4% reported being

Table 1
 Characteristics of Millennium Cohort Study responders (panel 1), compared to the invited sample and the U.S. military, as of October 2000

Variable	Cohort, <i>N</i> = 77,047; <i>N</i> (%)	Invited Cohort, ^a <i>N</i> = 256,400; (%)	U.S. military, ^b <i>N</i> = 2,273,793; (%)
Sex			
Male	56,415 (73.2)	76.0	84.7
Female	20,632 (26.8)	24.0	15.3
Unknown	0 (0.0)	<0.1	<0.1
Age, years			
17–24	14,559 (18.9)	30.8	32.5
25–34	27,083 (35.2)	35.4	33.9
35–44	25,400 (33.0)	25.1	25.0
>44	9,975 (13.0)	8.6	8.5
Unknown	30 (<0.1)	0.1	0.1
Education			
Less than high school diploma	4,722 (6.1)	7.6	8.0
High school diploma	32,957 (42.8)	50.4	53.0
Some college	19,655 (25.5)	23.6	20.3
Bachelor's degree	12,722 (16.5)	11.6	11.3
Master's/PhD degree	6,986 (9.1)	5.4	5.8
Unknown	5 (<0.1)	1.4	1.6
Marital status			
Single	23,183 (30.1)	40.5	41.7
Married	48,594 (63.1)	52.8	53.2
Divorced	5,270 (6.8)	5.7	5.0
Unknown	0 (0.0)	1.0	0.2
Race/ethnicity			
White non-Hispanic	53,459 (69.4)	64.7	67.3
Black non-Hispanic	10,576 (13.7)	19.0	18.7
Asian/Pacific Islander	6,068 (7.9)	6.1	3.3
Hispanic	4,921 (6.4)	7.5	7.9
Native American	677 (0.9)	0.9	1.0
Other	1,065 (1.4)	1.5	1.2
Unknown	281 (0.4)	0.4	0.8
Past deployment status			
Deployment experience	23,234 (30.2)	30.0	10.0
No deployment experience	53,813 (69.8)	70.0	90.0
Military pay grade			
Enlisted	59,318 (77.0)	84.6	84.3
Commissioned officer	16,346 (21.2)	14.3	14.5
Warrant officer	1,383 (1.8)	1.1	1.2
Service component			
Active duty	43,890 (57.0)	54.9	57.5
Reserve/Guard	33,157 (43.0)	45.1	42.5
Branch of service			
Army	36,481 (47.4)	44.0	45.5
Air Force	22,357 (29.0)	28.1	23.3
Navy	13,435 (17.4)	19.6	20.0
Marines	3,941 (5.1)	7.2	9.4
Coast Guard	833 (1.1)	1.2	1.9
Unknown	0 (0.0)	1.2	<0.1
Occupational category			
Combat specialists	15,425 (20.0)	20.9	21.9
Electrical repair	6,784 (8.8)	8.0	8.1
Communications/intelligence	5,428 (7.1)	6.7	7.0
Health care specialists	8,018 (10.4)	8.4	8.1
Other technical	1,972 (2.6)	2.4	2.7
Functional support specialists	15,413 (20.0)	17.9	17.6
Electrical/mechanic	11,387 (14.8)	16.2	15.1
Craft workers	2,390 (3.1)	3.5	3.7
Service support	6,686 (8.7)	8.9	9.4
Students, prisoners, other	3,523 (4.6)	5.8	3.7
Unknown	21 (<0.1)	1.3	2.8

^a Oversampled for women, recently deployed, and Reserve/Guard.

^b Based on 2000 U.S. military service rosters.

Table 2
Examples of unadjusted survey data—exposures and health behaviors among Millennium Cohort members upon enrollment

	Cohort, <i>N</i> = 77,047; <i>N</i> (%)	Active duty, <i>N</i> = 43,890; (%)	Reserve/Guard, <i>N</i> = 33,157; (%)
Self-reported military exposures			
Ever exposed to the following:			
Witnessed a person's death due to war, disaster, or tragic event	19,621 (25.5)	(25.1)	(26.0)
Chemical or biological warfare agents	4,175 (5.4)	(4.8)	(6.3)
Anthrax vaccine	24,701 (32.1)	(43.1)	(17.4)
Exposed within the past 3 years:			
Depleted uranium	2,826 (3.7)	(4.8)	(2.2)
Occupational hazards requiring protective equipment, such as respirators or hearing protection	41,430 (53.8)	(59.2)	(46.7)
Any exposure, physical or psychological, during a military deployment that had a significant impact on your health	5,181 (6.7)	(7.3)	(5.9)
Behavioral risk factors			
Alcohol			
Chronic drinkers ^a	5,801 (7.5)	(7.5)	(7.6)
Drank five or more drinks on ≥1 day(s) in past year	35,195 (45.7)	(48.2)	(42.3)
Smoking			
Never smoked > 100 cigarettes in lifetime	42,557 (55.2)	(55.5)	(54.9)
Smoked > 100 cigarettes in lifetime	31,460 (40.8)	(41.0)	(40.6)
Unknown	3,030 (3.9)	(3.5)	(4.5)
Pack-years (median, IQR) ^b	5.3 (12.3)	4.5 (10.0)	6.0 (13.5)
BMI (kg/m ²)			
Underweight (<18.5)	636 (0.8)	(0.8)	(0.9)
Normal (18.5–24.9)	27,758 (36.0)	(36.6)	(35.3)
Overweight (25.0–29.9)	39,194 (50.9)	(51.3)	(50.3)
Obese (≥30.0)	8,394 (10.9)	(10.0)	(12.0)
Unknown	1,065 (1.4)	(1.3)	(1.5)
Complementary and alternative medicine use			
Chiropractic care	8,424 (10.9)	(8.0)	(14.8)
Herbal therapy	7,312 (9.5)	(8.6)	(10.7)
Acupuncture	1,289 (1.7)	(1.7)	(1.7)

Abbreviation: IQR, interquartile range.

^a Chronic drinkers defined as > 14 drinks in a typical week for men, and > 7 drinks in a typical week for women.

^b Median pack-years and IQR calculated for participants smoking > 100 cigarettes in their lifetime.

exposed to depleted uranium. Nearly three times the proportion of active-duty personnel had reported receiving the anthrax vaccine (43%) compared with Reserve/Guard personnel (17%).

Regarding modifiable risk behaviors, 46% of participants might be categorized as binge drinkers, whereas only 8% were categorized as chronic drinkers (Table 2). Active-duty and Reserve/Guard subjects appeared similar with regard to chronic use of alcohol; however, more active-duty members were classified as binge drinkers in the past year (48% and 42%, respectively). Approximately 40% of participants smoked at least 100 cigarettes in their lifetime (median pack-years = 5.3), whereas the majority of the Cohort (55%) had not smoked. Although active-duty and Reserve/Guard responders were similar with respect to having ever smoked 100 cigarettes in their lifetime, median pack-years were higher in Reserve/Guard than active-duty

members (6.0% and 4.5%, respectively). Reserve/Guard members were more likely to be obese as indicated by body mass index (BMI) and also more likely to have used complementary and alternative medicine therapies.

More than 60% of the Cohort reported that their general health was very good or excellent. There were 38 specific medical conditions and one free text option included on the questionnaire of which we report on one prevalent condition (hypertension, 10.2%), a condition of current high public health concern (diabetes mellitus, 1.3%), and a condition of much interest to veterans of past deployments (chronic fatigue syndrome, 1.3%) (Table 3). Major depressive disorder, as defined by the PRIME-MD PHQ, was reported by 3.3% of the Cohort. The PCL-C responses suggested that 2% of the Cohort has signs or symptoms of PTSD. The SF-36V assessment of functional status indicated relatively high means (range: 62.1–91.0), with the

Table 3
Examples of unadjusted survey data—physical and mental health among Millennium Cohort members upon enrollment

	Cohort, N = 77,047; N (%)	Active duty, N = 43,890; %	Reserve/Guard, N = 33,157; %
General health			
In general, would you say your health is...			
Poor	562 (0.8)	1.0	0.5
Fair	5,331 (7.1)	8.1	5.9
Good	23,373 (31.3)	33.1	28.9
Very good	30,437 (40.7)	39.3	42.6
Excellent	15,045 (20.1)	18.6	22.1
Specific medical conditions			
Hypertension	7,799 (10.2)	9.9	10.6
Chronic fatigue syndrome	1,015 (1.3)	1.3	1.4
Diabetes	1,008 (1.3)	1.2	1.5
PRIME-MD PHQ			
Major depressive disorder	1,002 (3.3)	3.6	2.9
Panic syndrome	890 (1.2)	1.2	1.2
Other anxiety syndrome	1,617 (2.1)	2.4	1.8
Eating disorders	2,457 (3.2)	3.5	2.9
PCL-C			
PTSD ^a	1,821 (2.4)	2.5	2.3
SF-36V^b			
	Mean	Mean	Mean
Physical functioning	91.0	90.6	91.6
Role physical	82.2	81.6	83.1
Bodily pain	75.4	73.8	77.5
General health	76.9	75.5	78.7
Vitality	62.1	60.7	64.1
Social functioning	87.1	86.4	88.2
Role emotional	83.7	83.7	83.7
Mental health	78.6	78.1	79.4

Abbreviation: PCL-C, Posttraumatic Stress Disorder Checklist-Civilian Version.

^a PTSD, posttraumatic stress disorder defined as moderate or above level of at least one intrusion symptom, three avoidance symptoms, and two hyperarousal symptoms, with a total score ≥ 50 on a scale of 17–85.

^b SF-36V, Medical Outcomes Study Short Form-36 for Veterans. Increasing score indicates better health and functioning status, with a maximum score of 100.

highest mean for physical functioning. SF-36V scores were somewhat higher, indicating better functional status, for Reserve/Guard than for active-duty responders (Fig. 2).

4. Discussion

The Millennium Cohort represents a major milestone in military and occupational epidemiologic research. The prospective study design responds to an important charge to assess objective health information by linking to DoD maintained inpatient, ambulatory, and pharmacy database, as well as subjective symptoms and level of functioning, among a large military population over several decades, during and beyond actual military service [30]. Health status is assessed through triennial questionnaires as well as by linking to large health care databases. Likewise, exposure experiences are evaluated through triennial questionnaires as well as linking to electronically maintained occupation, vaccine, deployment, and environmental exposure history data. With those data that currently overlap while in military service, preliminary investigation of concordance between

self-report and electronic occupation and vaccine data suggest substantial reliability in these data. A vital component of the study is the ability to compare Reserve/Guard forces with regular active-duty forces on both exposures and health outcomes. The Reserve/Guard represent the “citizen soldiers” and, as such, are an important comparison population for those choosing the military as a full-time occupation.

Despite extensive planning and pilot testing, the Millennium Cohort enrollment year was marked by numerous challenges. The study was launched shortly before the historic terrorist attacks of September 11 and the crippling effects of the anthrax scare on the U.S. postal system. Investigators mitigated these challenges by extending the invitation cycle, locating new addresses using the IRS, using e-mail as a contact mode, and encouraging enrollment via a secure Web site. These strategies, as well as use of semiannual Veterans Day and Memorial Day contact, will be leveraged to maintain participation and complete follow-up of the original Cohort every 3 years through 2022. These strategies will also be important in enrolling subsequent panels of the Cohort, in 2004 and one planned for 2007, to achieve a total enrollment of at least 140,000.

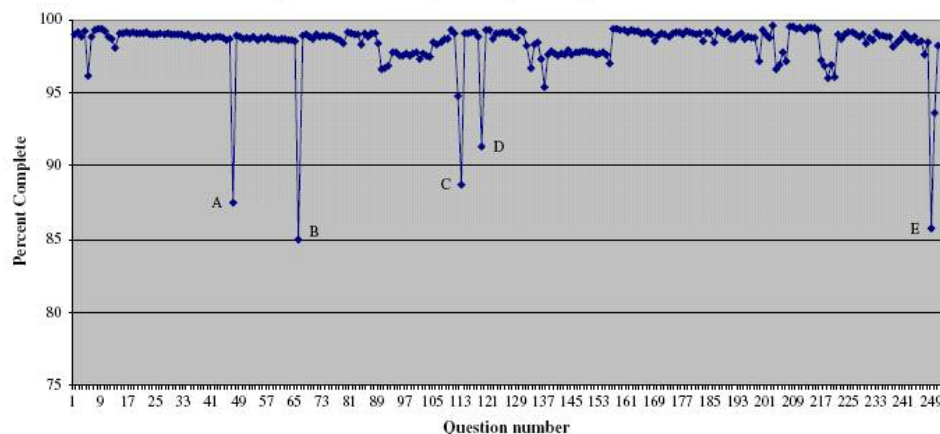


Fig. 2. Individual question completion percentages of Millennium Cohort questionnaire. Percentages incorporate skip patterns. A: 13% skipped “other” on the question “Has your doctor or other health professional ever told you that you have any of the following conditions?”; B: 15% skipped “other” on the question “During the last 12 months, have you had persistent or recurring problems with any of the following conditions?”; C: 11% of those indicating eating disorder skipped a frequency query on the problem; D: 9% of those who indicated problems skipped a query qualifying degree of challenge in “doing work, taking care of things at home, or getting along with other people?”; and E: 14% skipped a military occupational coding query.

Members of the Cohort were demographically older, more educated, married, and in the officer ranks, compared with individuals in the invited sample or the military population at large. The high operational tempo following the September 11 terrorist attacks in 2001 may be one explanation for underrepresentation of Marines and those aged 17–24 years, as large numbers of young service members participated in lengthy combat deployments; however, this trend of lower participation among younger invitees has been reported elsewhere [56]. Deployment aside, older and more educated individuals and those classified as health care specialists, may have more interest in health issues, perhaps increasing their propensity for enrollment. The sampling strategy to ensure adequate representation to assess rare outcomes in particular subgroups was largely successful, with women comprising nearly 27% of the Cohort, whereas those with prior deployment experience comprise 30% of the Cohort. The small proportional differences suggest that the Cohort is a reasonably representative sample of the military as a whole, and study findings should be generalizable to the target population. Subsequent panel enrollment will allow investigators to reflect the changing composition of the U.S. military.

Unlike the civilian workplace, there are inherent, unique, and sometimes unpredictable, hazards associated with military service [2,4,5,57]. More than half of the Cohort reported having used protective equipment because of potential occupational hazards (Table 2). Also, witnessing a tragic event, including death, can be an accompaniment of military service. About 25% of both the active-duty and Reserve/Guard components of the Cohort have personally experienced such events. Other potentially hazardous

exposures associated with military service include the target of lethal weapons, operating sophisticated weapons systems, and working under environmentally extreme conditions [58]. Finally, deployed military personnel are exposed to specific pharmaceuticals, multiple immunizations, and other products, which are rarely, if ever, administered to civilians [58–60]. The Millennium Cohort allows, for the first time, the opportunity to assess such exposures prospectively on a large sample.

The Millennium Cohort has the advantage of being systematically drawn from all branches and components of the armed forces, using repeated measures to monitor population trends over at least two decades. Individual self-reported behavioral data may be linked to specific and militarily relevant health outcomes, even among those who retire or otherwise leave military service. Robust comparisons between Reserve/Guard and active forces have heretofore not been possible because a standardized instrument has never been applied to study their similarities and differences in such a systematic and comprehensive fashion. Although explicit comparisons, adjusted for factors such as age and sex, are beyond the scope of this introductory paper, the preliminary data presented here suggest that military personnel will report health and behavioral habits even when these habits are relatively unhealthy. Early data suggest that there will be large subgroups of military personnel in different risk categories that may influence the occurrences of illnesses and injuries. For example, data from this baseline survey show that more than 50% of the Reserve/Guard and active component members of the Millennium Cohort are overweight but that only 10% are considered obese, with a slightly higher proportion of the

Reserve/Guard exceeding the BMI for obesity (Table 2). When compared with the Healthy People 2010 objectives, Millennium Cohort participants meet or surpass the objectives for alcohol moderation and weight control [61].

Given the relative youth of the Cohort and the physical fitness standards that must be met for military service, one might expect the general health among military service members to be considerably better than that of the U.S. average. In fact, over 90% of the Cohort rated their physical health as good or better, compared with 85% of U.S. residents included in the 2003 Behavioral Risk Factor Surveillance System (BRFSS) [61,62]. This was true for both Reserve/Guard and active-duty personnel. Of note, 51% of 2003 BRFSS participants were younger than 45 years of age compared to 87% of Cohort members. Similar high ratings of self-reported health have been reported for active-duty military personnel who participated in the 2000 BRFSS [63] as well as military personnel who returned from international deployments and were part of the Defense Medical Surveillance System, the central repository of U.S. military medical surveillance data [64]. However, active-duty military personnel were more likely to report greater number of days of activity limitation, pain, and not enough rest than their counterparts who were not in the military [63]. This appears to be consistent with relatively lower SF-36V scores for physical functioning, bodily pain, and general health in active duty when compared with Reserve/Guard responders (Table 3). Finally, the low rates of chronic conditions such as diabetes and hypertension were as expected, given the relative youth of the Cohort [65]. Self-reported prevalence of nonpregnancy-related diabetes and hypertension in the 2003 BRFSS (7% and 25%, respectively) was considerably higher than that seen in this Cohort [62]. A slightly higher prevalence of hypertension and diabetes was seen in Reserve/Guard vs. active-duty members, possibly explained by the somewhat higher prevalence of obesity (BMI \geq 30) in Reserve/Guard (Table 2).

In addition to describing baseline mental and physical health, this is the first population-based mental health survey of all components of the U.S. military (active duty, Guard and Reserve) that documents the substantial burden of symptomatic mental illness among all U.S. military members at rates similar to that of the general U.S. population. Worldwide, mental disorders accounted for nearly 11% of the disease burden in 1990 and are projected to affect 15% of the world population by 2020, causing a public health impact nearly as large as cardiovascular and respiratory diseases [66,67]. Thirteen percent of all military hospitalizations from 1990 to 1999 were reported as mental health disorders [68], and as many as 17% of serving members had symptoms of anxiety and 19% had symptoms of depression in 2001 [69]. Among Cohort members, meaningful levels of a number of common, potentially serious mental disorders were identified and found to be consistent with prevalence in other populations, such as major depressive disorder (3%), panic syndrome (1%), other anxiety

syndrome (2%), eating disorders (2%), and PTSD (2%). Future analyses will provide insight into risk factors that may be used to target groups at highest risk for intervention, as well as to discern the impact of deployment on mental health. Finally, the Cohort exhibited higher unadjusted means measured for SF-36V physical functioning, general health, vitality, social functioning, role emotional, and mental health, and lower unadjusted means for those components describing role limitations due to physical problems and bodily pain, suggesting a more functionally capable population when compared with the U.S. population [42].

The Millennium Cohort Study represents the first ever, comprehensive effort by any nation to prospectively evaluate health outcomes of military service. This project holds tremendous promise to help us better understand enigmatic problems, such as multisymptom illnesses experienced by Gulf War veterans. The Cohort will also identify and characterize the numerous, some as yet unidentified, benefits to health that may be common to our men and women in uniform, but not detected by previous study methodologies. The enrollment of more than 60,000 additional service members in subsequent panels will ensure that the Cohort remains relevant and representative of the military and their experiences with current and future deployments. Like other groundbreaking prospective studies, the value of the Millennium Cohort in defining causes of both health and disease is expected to have a resounding impact that grows over time.

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CHAPTER 2

PTSD Prevalence, Associated Exposures, and Functional Health Outcomes in a Large, Population-Based Military Cohort

Abstract

Background: Posttraumatic stress disorder (PTSD) results from experiencing or witnessing traumatic, life-threatening events including combat-related experiences. The purpose of this study was to investigate the prevalence of PTSD symptoms and diagnosis, self-reported exposures, and functional health in a large cross-section of the US military.

Methods: This study uses baseline Millennium Cohort data (July 2001 – June 2003) of 74 947 US military members to assess the population-based prevalence of PTSD symptoms, self-reported exposures, and functional health as measured by the Medical Outcomes Study Short Form 36-Item Health Survey for Veterans (SF-36V).

Results: PTSD diagnosis without current symptoms was reported by 951 (1.2%, weighted), 1487 (2.0%, weighted) reported no diagnosis but reported PTSD symptoms, and 284 (0.4%, weighted) reported diagnosis and current symptoms. Self-reported exposure to chemical or biological warfare agents, protective countermeasures, or hearing alarms were associated with PTSD symptoms independent of other combat-like exposures. Physical health was similar among those with PTSD diagnosis and current PTSD symptoms. However, compared to the overall Cohort, lower mental health summary means for those reporting current PTSD symptoms (mean=27.2), current symptoms and diagnosis (mean=26.0), and diagnosis without current symptoms (mean=48.5) was found.

Conclusions: Results suggest a 2% prevalence of PTSD symptoms without diagnosis and that self-reported threatening exposures such as chemical or biological warfare exposures were significantly associated with PTSD symptoms. Mental and

physical health scores of those with current PTSD symptoms appear diminished, but return to Cohort levels with resolution of PTSD symptoms.

Keywords: combat disorders; stress disorders, posttraumatic; cohort studies

Posttraumatic stress disorder (PTSD) is a psychiatric condition resulting from experiencing or witnessing traumatic events such as military combat,¹⁻⁹ natural disasters,¹⁰ terrorist attacks,¹¹⁻¹³ serious accidents,¹⁴ death,¹⁵ or violent assaults or other physical, sexual, or emotional abuse.¹⁶⁻²⁰ Reported lifetime prevalence of PTSD in an adult US sample of the National Comorbidity Survey was 7.8%, with women (10.4%) twice as likely as men (5%) to have PTSD at some point in their lives.²¹ Symptoms are likely to persist in at least one third of those with PTSD.²¹

Participation in armed conflicts results in a multitude of adverse health outcomes, including emotional and psychological conditions from real and perceived exposures.²² Since the US Civil War, comparable syndromes, illnesses, and conditions have been documented following every conflict, with some minor variations and different naming conventions.²³ While acute combat stress reaction has been thought of as an immediate consequence of psychological trauma,²⁴ PTSD, initially called “Post-Vietnam syndrome,” has since been used to describe a condition resulting from both short- and long-term consequences of extreme psychological stress.^{23, 25, 26} Although combat experience is an established cause of PTSD symptoms, little is known about other exposures associated with PTSD symptoms. Exposures, such as chemical or biological (chem/bio) agents, medical countermeasures against chem/bio agents, or hearing chemical agent alarms necessitating the wearing of chemical warfare protective gear, may have a profound influence on psychological morbidity and PTSD. Perceived threats may also play a role in developing PTSD symptoms independent of other combat experiences.^{22, 27} This study reports the prevalence of PTSD symptoms and diagnosis in a large, population-based US

military cohort and investigates the association with self-reported exposure to chem/bio agents independent of other self-reported military, combat, and combat-related exposures. This report also documents the physical and mental health of those with PTSD symptoms and diagnosis and associated problem drinking and cigarette smoking.

Methods

Population and Data Sources

This study included 74 947 baseline consenting participants from the first panel of the Millennium Cohort Study (enrolled July 2001 to June 2003), a 22-year longitudinal study of military personnel health.²⁸ Designed oversampling resulted in a population-based US military sample of more than 25% women and 30% deployed to Southwest Asia, Bosnia, or Kosovo between 1998 and 2000 as of October 1, 2000. This research has been conducted in compliance with all applicable federal regulations governing the protection of human subjects in research (Protocol NHRC.2000.007).

In addition to self-reported survey data, demographic and military personnel data were linked to each participant and reflected military status as of October 1, 2000. These data included gender, birth year (pre-1960, 1960–1969, 1970–1979, and 1980 forward), educational level (high school or less, some college or a bachelor's degree, more than a bachelor's) marital status (married, never married, divorced/other), pay grade (enlisted or officer), race/ethnicity (White non-Hispanic, Black non-Hispanic, and other), service component (active duty or Reserve/Guard), service branch (Army, Air Force, Navy/Coast

Guard, and Marines), and occupation (combat specialists, healthcare specialists, functional and support specialists, or other).

Measures

Examination and diagnosis of PTSD has been debated since first appearing as a formal diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, 3rd edition (DSM-III), in 1980.²⁹⁻³⁷ Because traumas associated with PTSD are heterogeneous, defining PTSD and symptom criteria as well as establishing etiologies has been challenging.³⁸⁻⁴⁰ Further, the pattern of PTSD symptoms over time, emerging or re-emerging long after the original trauma,^{25, 41-47} contributes to the complexity of diagnosing PTSD and the differences in reported prevalence estimates.⁴⁸

The PTSD Checklist–Civilian Version (PCL-C) is a 17-item self-report measure of PTSD symptoms that requires respondents to rate the severity of each symptom during the past 30 days on a 5-point Likert scale ranging from 1 (not at all) to 5 (extremely). Participants were identified as having PTSD symptoms if they reported a moderate or higher level of at least one intrusion symptom, three avoidance symptoms, and two hyperarousal symptoms (criteria established by the DSM-IV),²⁶ and had a score of 50 or more on a scale of 17 to 85.^{4, 49-51} This approach has been shown to have reasonable sensitivity (0.60) and high specificity (0.99).⁵² Internal consistency of the PCL-C in this Cohort, as measured using Cronbach's Alpha (alpha=0.94), indicated an appropriate measurement tool for this population.⁵³

In addition to the PCL-C assessment of PTSD, participants were asked “Has your doctor or other health professional EVER told you that you have any of the following conditions? ...PTSD... (no, yes)... If YES, what year did the problem begin?”

Functional health was measured by the Medical Outcomes Study Short Form 36-Item Health Survey for Veterans (SF-36V).⁵⁴⁻⁵⁶ The SF-36V assesses eight health concepts^{54, 57} that make up the physical component summary (PCS) and mental component summary (MCS).^{58, 59} MCS and PCS scores are calculated using 1998 general US population norm-based scoring algorithms, where a score of 50 and a standard deviation of 10 reflect the 1998 US population. The scales are constructed such that higher scores reflect better functional health.⁵⁴ If the respondent answered at least half of the questions in a scale, imputed values were used for the missing questions to reflect the mean of the score for the complete portion of that scale.^{54, 57}

Self-reported Exposures

The Millennium Cohort questionnaire includes an occupational exposure section that asks “Have you EVER been exposed to the following?”, with allowable answers of no, yes 1 time, yes more than 1 time; it also asks the year of exposure. Within this section are three items regarding exposures to chem/bio warfare or countermeasures for these weapons: (1) chemical or biological warfare agents, (2) other medical countermeasures for chemical or biological warfare agent exposure, and (3) alarms necessitating wearing of chemical or biological warfare protective gear. If a Cohort

member reported any of these exposures, they were reported in the aggregate within the “chem/bio” variable.

For the purposes of investigating the association between chem/bio exposure and PTSD independently of other combat-type exposures, questions asking about combat-type exposures, including “Witnessing a person’s death due to war, disaster, or tragic event”, “Knowledge of or witnessing instances of physical abuse (torture, beating, rape)”, “Dead and/or decomposing bodies”, “Maimed soldiers/civilians”, and “Prisoners of war/refugees”, were grouped into a single “combat-like exposure” variable.

Smoking Cigarettes and Drinking Alcohol

Current smoking was assessed based on responses to the following questions: “In your lifetime, have you smoked at least 100 cigarettes (5 packs)?”, “In the past year have you used cigarettes?”, and “Have you ever tried to quit smoking?” Problem drinking was assessed using the CAGE questionnaire.⁶⁰

Statistical Analyses

Descriptive and univariate comparisons were conducted of Cohort members’ exposures, functional health, demographics, and military characteristics, stratified by self-report of (1) no PTSD symptoms, (2) being told by a healthcare professional that they had PTSD without current PTSD symptoms based on the PCL-C (PTSD diagnosis without symptoms), (3) PTSD symptoms based on the PCL-C without diagnosis (PTSD symptoms without diagnosis), and (4) being told by a healthcare professional they had

PTSD with current PTSD symptoms based on the PCL-C (PTSD diagnosis and current PTSD symptoms).

Prevalence estimates and adjusted odds ratios were weighted based on the inverse of the sampling fraction for the three characteristics oversampled: female gender, past deployment to Southwest Asia (SWA), Bosnia, or Kosovo between 1998 and 2000, and Reserve/Guard status.

Variables examined included gender, age, education, marital status, race/ethnicity, deployment to the 1991 Gulf War, SWA, Bosnia, or Kosovo (none, 1991GW only, 1991GW and BOS/KOS/SWA, BOS/KOS/SWA only), other combat-like exposures (no/yes), rank, service branch, component, occupational category, smoking (no, past, current), and problem drinking (no/yes).

An initial analysis was completed to assess multicollinearity, significant associations, and possible confounding, while simultaneously adjusting for all other variables in the model. Confounding was investigated using a manual backward removal technique of variables that were not contributing significantly to the model, at an alpha level of ≤ 0.05 , while potentially distorting the measure of effect by more than 15%. Multivariate polychotomous logistic regression with sampling weights was used to investigate the adjusted association of self-reported exposures to chem/bio warfare agents, protective countermeasures for these agents, or hearing alarms due to these agents, with PTSD symptoms or self-reported healthcare provider-indicated PTSD. Data management and statistical analyses were performed using SAS software, version 9.1.3 (SAS Institute, Inc., Cary, North Carolina).

Results

Complete military, demographic, PTSD, and MCS and PCS scores were available for 74,947 (96.4%) of Millennium Cohort participants. The majority of the study population consisted of men who were born between 1960 and 1979 and enlisted members serving on active duty; other demographic features are shown in table 1. In this Cohort, 42% reported current or past smoking and 19% reporting problem drinking. Nearly 20% reported chem/bio exposures while over 40% reported other combat-like exposures. Both weighted and non-weighted Cohort percentages are reported in table 1. Table 2 compares the weighted demographic and behavioral characteristics after stratification by PTSD symptom and diagnosis status. As shown, 951 (1.2%, weighted) reported PTSD diagnosis without current symptoms, 1487 (2.0%, weighted) reported no PTSD symptoms without reporting a diagnosis, and 284 (0.4%, weighted) reported PTSD diagnosis along with reporting current symptoms. Those reporting PTSD diagnosis without symptoms, current PTSD symptoms, or PTSD diagnosis with current PTSD symptoms were significantly more likely to be women, less educated, never married or divorced, and report current smoking and current problem drinking behaviors. Those with no diagnosis of PTSD and current symptoms, or diagnosis of PTSD and current symptoms, had significantly less favorable PCS and MCS scores, while those with PTSD diagnosis and no current symptoms had lower scores that were much closer to the overall Cohort means.

Table 3 compares the weighted military characteristics after stratification by PTSD symptom and diagnosis status. Those reporting PTSD diagnosis only, current

PTSD symptoms only, or PTSD diagnosis with current PTSD symptoms were also more likely to report chem/bio exposures and other combat exposures, and to have been deployed to the 1991 Gulf War, enlisted, and Army personnel. Active-duty members were more likely to report current symptoms without a PTSD diagnosis. In contrast Reserve/Guard members were more likely to report a diagnosis of PTSD with and without symptoms. Healthcare specialists were also more likely to report a diagnosis of PTSD with and without symptoms.

Investigation of multicollinearity, using variance inflation factors of greater than four to establish multicollinearity showed there were no variables in table 1 exhibiting noteworthy multicollinearity.

Weighted multivariate polychotomous logistic regression results for demographic and military characteristics are presented in table 4. Those reporting chem/bio exposures were significantly more likely to also report PTSD diagnosis without current symptoms (odds ratio [OR] = 1.65; 95% confidence interval [CI]: 1.37, 2.00), PTSD symptoms without diagnosis (OR = 1.89; 95% CI: 1.62, 2.21), and PTSD diagnosis with current symptoms (OR = 3.35; 95% CI: 2.44, 4.60) when compared with those with no PTSD symptoms or diagnosis.

Weighted multivariate polychotomous logistic regression results for possible comorbidities including are presented in table 5. Those with more favorable MCS and PCS scores were significantly less likely to report PTSD diagnosis or current PTSD symptoms when compared to those with no PTSD symptoms or diagnosis. Those reporting signs of problem drinking were 1.40 times more likely to report PTSD

symptoms without diagnosis when compared to those without signs of problem drinking (95% CI= 1.18, 1.65).

Discussion

PTSD affects physical and mental health and is associated with numerous comorbidities. In this study the combined weighted prevalence of diagnosed and undiagnosed PTSD symptoms was 3.6%. The majority of these individuals (2.0%) were those with PTSD symptoms without a diagnosis of PTSD; just over 1% reported being told in their life-time by a healthcare professional that they had PTSD but did not exhibit current symptoms as defined by the PCL-C. Further, this report documents the stressful experiences of exposure to chem/bio warfare agents, protective countermeasures, or hearing alarms due to these agents as being significantly associated with PTSD diagnosis and current PTSD symptoms independent of other combat and combat-like exposures. This report documents a strong association between current PTSD symptoms and lower mental and physical health while also demonstrating a tendency toward levels in the general Cohort of mental and physical health with the apparent resolution of PTSD symptoms.

Finding a near twofold increase in association between reporting PTSD symptoms or diagnosis and reporting an experience related to chem/bio warfare, independent of reporting other combat-like exposures, is interesting. Whether the individual was or was not exposed to chem/bio weapons, the perception of a chem/bio experience doubled the risk for PTSD symptoms, both diagnosis and current symptoms. This type of self-

reported exposure, while difficult to validate, may be used as a surrogate for unmeasurable stressful or life-threatening exposures that may be experienced in combat situations. While the individual may not exhibit physical morbidities, the exposure to potentially life-threatening events may take an unseen toll for years to come.

Diminished physical and mental health in association with current PTSD symptoms confirms previous findings.^{61, 62} It is noteworthy, however, that those with past PTSD diagnosis demonstrating apparently resolved symptoms had physical and mental functioning similar to the general Cohort. The mental health of those with current symptoms was surprisingly low in the context of the magnitude of the PCS and may reflect a population who appear physically fit for duty but who may be vulnerable to stress induced from deployment to combat areas. The 2.0% with PTSD symptoms without a diagnosis may represent a population without knowledge, understanding, or acceptance of the disorder. These individuals appear physically fit and may not display noticeable signs of lower functioning to healthcare providers or superiors. Routine screening for PTSD symptoms in the US military may be justified to identify those who could benefit from early treatment of PTSD.

The use of alcohol and cigarettes was evident in those with current PTSD symptoms. However, the prevalence of both problem drinking and current smoking seemed to approach general Cohort levels in those reporting PTSD diagnosis without current symptoms based on the PCL-C. This should be reassuring to those suffering from PTSD and their families and should signal to healthcare professionals to be especially vigilant in the early detection of PTSD. Prompt treatment of individuals, returning them

to non-symptomatic levels of PTSD, could reduce the risk of adverse health behaviors such as problem drinking and smoking.

Limitations to these analyses should be considered. Although these analyses are weighted based on the designed oversampling of female, deployed, and Reserve/Guard members, there were additional, small, proportional differences between responders and nonresponders.²⁸ Further, it is possible that those who were ill may have believed that inclusion in a study of this type might be of benefit to them, resulting in a possible overestimation of the true prevalence of PTSD. Conversely, those who may have been physically or mentally ill, specifically those who may have PTSD, may have found the survey distressing and chose not to respond, potentially underestimating the true prevalence of PTSD. However, a recent report suggests that pre-enrollment health, as measured by hospital encounters and outpatient care, was consistent when comparing Cohort members with nonresponders (data not yet published). Self-report of exposures and outcome data used to represent the true exposure and disease prevalence may be limited. Studies have shown that increased exposure and symptom reporting occur among personnel seeking medical compensation.⁶³ However, compensation is not offered to Millennium Cohort participants, and this may mitigate this bias. Further, Millennium Cohort data analyses of occupation, exposure, and health outcomes have found the Cohort to have reliable data.^{53, 64, 65} Also, it was not possible to discern those exposures that are truly unique to military service from those that could be encountered through other occupational or nonoccupational activities. Although many investigations have been conducted to validate or establish reliability of the Millennium Cohort

questionnaire responses (data not yet published), the validity of self-reported exposure data could not be evaluated against objective exposure information. Lastly, although the PCL-C has undergone thorough testing and has been found to correlate well with a physician's assessment of PTSD, the use of a survey instrument as a surrogate for PTSD diagnosis is imperfect.

There are also many strengths to these analyses. Although self-reported data are inherently limited, they are also invaluable for the information they provide that is not accessible elsewhere. Not only is there a lack of objective exposure data available but PTSD is often underreported in healthcare databases. Self-reported instruments are essential tools for identifying this disorder in populations not readily submitting for care for mental disorders. Additionally, the large sample, including a large population of women, allows for robust estimation of prevalence and associations. The use of a standard instrument allows for comparison with other populations, such as the US population in general and other military populations.

In summary, in this report we document a 2-percent prevalence of current PTSD symptoms without diagnosis and an almost 0.5-percent prevalence of current PTSD symptoms with a healthcare provider diagnosis. Rising concern over deployment-related exposures as well as the decreased physical and mental health associated with PTSD in returning deployed personnel have prompted many investigations into the etiologies of PTSD and associated comorbidities. In addition to describing the prevalence of diagnosis and current PTSD symptoms in a large US military cohort, we investigated how PTSD was associated with self-reported chem/bio exposures. Findings suggested that real or

perceived exposures to chem/bio warfare agents, protective countermeasures for these agents, or hearing alarms due to these agents were associated with a twofold increased risk for diagnosis or current PTSD symptoms. Those with a PTSD diagnosis with no current PTSD symptoms had significantly better physical and mental health when compared with those with current PTSD symptoms. More research is necessary to prospectively evaluate the risk for development of PTSD after significant combat deployments and to identify the types of combat exposure most predictive of PTSD onset. Millennium Cohort, a prospective 21-year study, will soon meet this important research need.

Acknowledgments

Chapter 2 in full, and titled, “PTSD Prevalence, Associated Exposures, and Functional Health Outcomes in a Large, Population-Based Military Cohort”, has been submitted for publication. The dissertation author was the primary investigator and author of this paper.

Smith TC, Wingard DL, Ryan MAK, Kritz-Silverstein D, Slymen DJ, Sallis JF, for the Millennium Cohort Study Team. PTSD Prevalence, Associated Exposures and Functional Health Outcomes in a Large Population-Based Military Cohort. In review.

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TABLE 2.1. Weighted^a and non-weighted characteristics of Millennium Cohort participants with complete military, demographic, and PTSD information (2001–2003)

Characteristic	Millennium Cohort (N = 74 947)		
	n	%	w%
Functional health			
MCS, weighted mean (95% CI)		53.0 (52.9, 53.1)	
PCS, weighted mean (95% CI)		53.4 (53.2, 53.6)	
Gender			
Male	55 897	73.3	85.0
Female	20 050	26.7	15.0
Birth year			
Pre-1960	16 200	21.6	22.9
1960-1969	28 400	37.9	39.7
1970-1979	25 952	34.6	32.7
1980 and forward	4395	5.9	6.7
Education			
High school or less diploma/equivalent	36 563	48.8	50.3
Some college or bachelor's	31 561	42.1	39.5
Higher than bachelor's	6823	9.1	10.2
Marital status			
Married	47 365	63.2	65.3
Never married	22 450	30.0	28.9
Divorced	5132	6.8	5.8
Race/ethnicity			
White non-Hispanic	52 312	69.8	70.3
Black, non-Hispanic	10 202	13.6	12.4
Other	12 433	16.6	17.3
Smoking			
Nonsmoker	43 332	57.8	57.7
Past smoker	18 014	24.0	24.1
Current smoker	13 601	18.2	18.2
Problem drinking			
No	60 998	81.4	80.4
Yes	13 949	18.6	19.6
Past chem/bio exposures			
No	60 550	80.8	80.5
Yes	14 397	19.2	19.5
Deployment experience ^b			
None prior	46 806	62.4	79.1
1991 GW only	5482	7.3	10.8
1991 GW and Bos/Kos/SWA	3504	4.7	1.5
Only Bos/Kos/SWA	19 155	25.6	8.5
Other combat-like exposures			
No	43 294	57.8	57.5
Yes	31 653	42.2	42.5
Military rank			
Enlisted	57 672	77.0	75.6
Officer	17 275	23.0	24.3
Service component			
Active duty	42 743	57.0	58.3
Reserve/Guard	32 204	43.0	41.7
Branch of service			
Army	35 479	47.3	48.8
Air Force	21 921	29.3	25.6
Navy/Coast Guard	13 746	18.3	18.5
Marines	3801	5.1	7.1
Occupational category			
Other occupations	30 621	40.9	41.2
Combat specialists	15 071	20.1	21.9
Healthcare specialists	7774	10.4	9.8
Service supply and functional	21 481	28.7	27.2

PTSD, posttraumatic stress disorder; MCS, mental component summary; PCS, physical component summary; CI, confidence interval; GW, 1991 Gulf War; Bos, Bosnia; Kos, Kosovo; SWA, Southwest Asia; chem/bio, self-reported exposure to chemical or biological warfare agents, protective countermeasures for these agents, or hearing alarms due to these agents.

^aWeighted for designed sampling differences in gender, military component, and prior deployment.

^bDeployment to Southwest Asia, Bosnia, or Kosovo any time from January 1, 1998, to September 30, 2000.

TABLE 2.2. Weighted^a measures of demographic and behavioral characteristics by PTSD diagnosis and symptom status (2001-2003)

Characteristic	Millennium Cohort <i>N</i> = 74 947	PTSD diagnosis without current symptoms ^b <i>N</i> = 951	PTSD symptoms without diagnosis ^c <i>N</i> = 1487	PTSD diagnosis with current symptoms ^c <i>N</i> = 284
Functional health				
MCS, weighted mean (95% CI)	53.0 (52.9, 53.1)	48.5 (47.8, 49.3)	27.4 (26.8, 28.1)	26.0 (24.5, 27.4)
PCS, weighted mean (95% CI)	53.4 (53.2, 53.6)	50.0 (49.3, 50.7)	48.0 (47.3, 48.7)	43.2 (41.6, 44.9)
	<i>w</i> %	<i>w</i> %	<i>w</i> %	<i>w</i> %
Gender				
Male	85.0	76.8	81.1	73.8
Female	15.0	23.2	18.9	26.2
Birth year				
Pre-1960	22.9	28.0	16.6	33.8
1960-1969	37.7	36.0	30.0	29.3
1970-1979	32.7	30.3	39.3	31.0
1980 and forward	6.7	5.8	14.0	5.9
Education				
High school or less diploma/equivalent	50.3	59.0	73.4	64.1
Some college or bachelor's	39.5	32.9	24.6	31.0
Higher than bachelor's	10.2	8.1	2.0	4.9
Marital status				
Married	65.3	63.9	53.3	59.6
Never married	28.9	27.7	40.8	28.3
Divorced	5.8	8.4	5.9	12.1
Race/ethnicity				
White non-Hispanic	70.3	73.7	66.3	68.1
Black non-Hispanic	12.4	12.4	14.8	13.7
Other	17.3	14.0	18.9	18.2
Smoking				
Nonsmoker	57.7	48.4	40.8	42.1
Past smoker	24.1	26.8	26.8	24.4
Current smoker	18.2	24.8	34.8	33.2
Problem drinking				
No	80.4	76.6	59.0	66.8
Yes	19.6	23.4	41.0	33.2

PTSD, posttraumatic stress disorder; MCS, mental component summary; PCS, physical component summary; CI, confidence interval.

^aWeighted for designed sampling differences in gender, military component, and prior deployment. Only participants with complete data were included in this table.

^bIncludes participants told they had PTSD by a healthcare professional without current symptoms based on the PTSD Patient Checklist (PCL-C).

^cPTSD symptoms at baseline enrollment determined using the PCL-C.

TABLE 2.3. Weighted^a measures of military characteristics by PTSD diagnosis and symptom status (2001-2003)

Characteristic	Millennium Cohort <i>N</i> = 74 947	PTSD diagnosis without current symptoms ^b <i>N</i> = 951	PTSD symptoms without diagnosis ^c <i>N</i> = 1487	PTSD diagnosis with current symptoms ^c <i>N</i> = 284
	w/%	w/%	w/%	w/%
Past chem/bio exposures				
No	80.5	63.8	68.2	47.1
Yes	19.5	36.2	31.8	52.9
Deployment experience ^d				
None prior	79.1	67.8	78.7	64.8
1991 GW only	10.8	23.8	13.2	26.8
1991 GW and	1.5	1.5	0.9	1.4
Only Bos/Kos/SWA	8.5	7.0	7.2	6.9
Other combat-like exposures				
No	57.5	35.6	35.5	18.1
Yes	42.5	64.4	64.5	81.9
Military rank				
Enlisted	75.6	83.2	93.4	89.8
Officer	24.3	16.8	6.6	10.2
Service component				
Active duty	58.3	54.1	63.4	49.1
Reserve/Guard	41.7	45.9	36.6	50.9
Branch of service				
Army	48.8	57.5	61.0	59.7
Air Force	25.6	19.8	12.9	13.7
Navy/Coast Guard	18.5	17.3	17.4	18.8
Marines	7.1	5.4	8.7	7.8
Occupational category				
Other occupations	41.2	36.8	44.4	32.8
Combat specialists	21.9	18.7	19.1	19.3
Healthcare specialists	9.8	14.9	8.0	13.3
Service supply and	27.2	29.6	28.5	34.7

PTSD, posttraumatic stress disorder; GW, 1991 Gulf War; SWA, Southwest Asia; Bos, Bosnia; Kos, Kosovo; chem/bio, self-reported exposure to chemical or biological warfare agents, protective countermeasures for these agents, or hearing alarms due to these agents.

^aWeighted for designed sampling differences in gender, military component, and prior deployment. Only participants with complete data were included in this table.

^bIncludes participants told they had PTSD by a healthcare professional without current symptoms based on the PTSD Patient Checklist, PCL-C.

^cPTSD symptoms at baseline enrollment determined using the PTSD Patient Checklist, PCL-C.

^dDeployment to Southwest Asia, Bosnia, or Kosovo any time from January 1, 1998, to September 30, 2000.

TABLE 2.4. Weighted^a and adjusted odds of reporting PTSD symptoms when compared with reporting of no PTSD symptoms ($N = 72\,225$) using multivariate polychotomous logistic regression with various military and demographic characteristics (2001–2003)

Characteristic	PTSD diagnosis without current symptoms ^b $N = 951$ OR (95% CI)	PTSD symptoms without diagnosis ^c $N = 1487$ OR (95% CI)	PTSD diagnosis with current symptoms ^c $N = 284$ OR (95% CI)
Gender			
Male	1.00	1.00	1.00
Female	2.00 (1.70, 2.37)	1.41 (1.23, 1.62)	2.68 (1.99, 3.60)
Birth year			
Pre-1960	1.00	1.00	1.00
1960-1969	0.70 (0.57, 0.85)	0.83 (0.69, 1.00)	0.45 (0.31, 0.66)
1970-1979	0.77 (0.61, 0.97)	1.00 (0.82, 1.09)	0.66 (0.45, 0.96)
1980 and forward	0.68 (0.45, 1.03)	1.40 (1.06, 1.84)	0.60 (0.30, 1.19)
Education			
High school or less	1.00	1.00	1.00
Some college or bachelor's	0.83 (0.68, 1.02)	0.78 (0.65, 0.93)	0.92 (0.65, 1.32)
Higher than bachelor's	0.86 (0.56, 1.34)	0.43 (0.26, 0.71)	0.78 (0.36, 1.71)
Marital status			
Married	1.00	1.00	1.00
Never married	1.06 (0.87, 1.30)	1.27 (1.08, 1.49)	1.12 (0.76, 1.66)
Divorced	1.21 (0.93, 1.57)	1.18 (0.92, 1.51)	1.73 (1.17, 2.58)
Race/ethnicity			
White non-Hispanic	1.00	1.00	1.00
Black non-Hispanic	0.76 (0.59, 0.98)	1.05 (0.87, 1.26)	0.91 (0.61, 1.37)
Other	0.81 (0.64, 1.02)	1.34 (1.13, 1.60)	1.34 (0.90, 2.00)
Deployment experience ^d			
None prior	1.00	1.00	1.00
1991 GW only	1.80 (1.42, 2.28)	0.81 (0.65, 1.02)	1.35 (0.91, 1.99)
1991 GW and Bos/Kos/SWA	1.04 (0.71, 1.50)	0.55 (0.39, 0.78)	0.84 (0.40, 1.76)
Only Bos/Kos/SWA	0.95 (0.78, 1.16)	0.91 (0.78, 1.06)	0.99 (0.67, 1.47)
Other combat-like exposures			
No	1.00	1.00	1.00
Yes	2.03 (1.76, 2.44)	2.39 (2.09, 2.73)	4.63 (3.26, 6.59)
Military rank			
Enlisted	1.73 (1.28, 2.34)	3.30 (2.41, 4.52)	3.56 (2.01, 6.33)
Officer	1.00	1.00	1.00
Service component			
Active duty	1.00	1.00	1.00
Reserve/Guard	1.02 (0.87, 1.21)	0.75 (0.66, 0.86)	1.26 (0.95, 1.69)
Branch of service			
Army	1.00	1.00	1.00
Air Force	0.53 (0.43, 0.65)	0.56 (0.37, 0.85)	0.89 (0.71, 1.12)
Navy/Coast Guard	0.89 (0.71, 1.12)	0.77 (0.64, 0.92)	1.21 (0.81, 1.81)
Marines	0.69 (0.46, 1.01)	0.78 (0.61, 1.01)	1.08 (0.60, 1.95)
Occupational category			
Other occupations	1.00	1.00	1.00
Combat specialists	1.03 (0.81, 1.31)	0.92 (0.76, 1.10)	1.27 (0.83, 1.94)
Healthcare specialists	1.47 (1.14, 1.90)	0.89 (0.70, 1.13)	1.45 (0.92, 2.29)
Service supply and functional	1.13 (0.93, 1.38)	1.03 (0.88, 1.20)	1.41 (1.00, 1.99)
Past chem/bio exposures			
No	1.00	1.00	1.00
Yes	1.65 (1.37, 2.00)	1.89 (1.62, 2.21)	3.35 (2.44, 4.60)

PTSD, posttraumatic stress disorder. GW, 1991 Gulf War; SWA, Southwest Asia; Bos, Bosnia; Kos, Kosovo; chem/bio, self-reported exposure to chemical or biological warfare agents, protective countermeasures for these agents, or hearing alarms due to these agents; OR, odds ratio; CI, confidence interval.

^aWeighted for designed sampling differences in gender, military component, and prior deployment. Only participants with complete data were included in this table.

^bIncludes participants told they had PTSD by a healthcare professional without current symptoms based on the PTSD Patient Checklist, PCL-C.

^cPTSD symptoms at baseline enrollment determined using the PTSD Patient Checklist, PCL-C.

^dDeployment to Southwest Asia, Bosnia, or Kosovo any time from January 1, 1998, to September 30, 2000.

TABLE 2.5. Weighted^a and adjusted^b odds of reporting PTSD symptoms when compared with reporting of no PTSD symptoms ($N = 72\,225$) using multivariate polychotomous logistic regression for potential comorbidities (2001–2003)

Characteristic	PTSD diagnosis without current symptoms ^b $N = 951$ OR (95% CI)	PTSD symptoms without diagnosis ^c $N = 1487$ OR (95% CI)	PTSD diagnosis with current symptoms ^c $N = 284$ OR (95% CI)
Functional health, per 5 points	1.00	1.00	1.00
MCS (95% CI)	0.95 (0.95, 0.96)	0.83 (0.83, 0.84)	0.81 (0.80, 0.83)
PCS (95% CI)	0.96 (0.95, 0.97)	0.92 (0.91, 0.92)	0.89 (0.87, 0.90)
Smoking			
Nonsmoker	1.00	1.00	1.00
Past smoker	1.06 (0.87, 1.28)	1.00 (0.83, 1.22)	0.87 (0.59, 1.29)
Current smoker	1.20 (0.98, 1.46)	1.20 (0.97, 1.46)	1.15 (0.79, 1.68)
Problem drinking			
No	1.00	1.00	1.00
Yes	0.99 (0.82, 1.20)	1.40 (1.18, 1.65)	1.14 (0.81, 1.59)

PTSD, posttraumatic stress disorder; MCS, mental component summary; PCS, physical component summary; OR, odds ratio; CI, confidence interval.

^aWeighted for designed sampling differences in gender, military component, and prior deployment. Only participants with complete data were included in this table. Adjusted for past chem/bio exposures, sex, birth year, education, marital status, race/ethnicity, deployment experience, other combat-like exposures, military rank, service component, branch of service, and occupational category.

^bAdjusting for which includes sex, age, education, marital status, race/ethnicity, chem/bio exposure, previous deployment, other combat-like exposures, rank, component, service branch, and occupation

^cIncludes participants previously told they had PTSD by a healthcare professional without current symptoms based on the PTSD Patient Checklist, PCL-C.

^dPTSD symptoms at baseline enrollment determined using the PTSD Patient Checklist, PCL-C.

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CHAPTER 3

PTSD: New Onset and Persistent Symptoms After Deployment and Combat Exposures in a Large, Population-based Military Cohort

Abstract

Context: Concerns have been raised about the health impact of military deployment to Iraq and Afghanistan. Posttraumatic stress disorder (PTSD) is reported to be prevalent in combat-exposed veterans.

Objectives: To describe new onset and persistence of PTSD symptoms in a large population-based military cohort, many of whom deployed in support of the Global War on Terrorism (GWOT).

Design, Setting, and Participants: Survey data from enrollment of the Millennium Cohort (July 2001 to June 2003) were obtained before the current GWOT. Follow-up (June 2004 to February 2006) data on health outcomes were collected from over 50 000 participants.

Main Outcome Measures: PTSD as measured by the PTSD Checklist-Civilian version (PCL-C) using *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV) criteria.

Results: Over 40% of the Cohort was deployed between 2001 and 2006; 24% deployed for the first time in support of the GWOT between baseline and follow-up. New incidence rates of 10 to 13 cases per 1000 person years in the Millennium Cohort were found. New-onset PTSD symptoms or diagnosis were identified in 7.6% to 8.7% of deployers reporting combat exposures, 1.4% to 2.1% of deployers not reporting combat exposures, and 2.3% to 3.0% of nondeployers. Among those with baseline PTSD symptoms, deployment did not impact persistence of symptoms. Temporal assessment of

new-onset PTSD symptoms after deployment with combat exposures suggests a bimodal distribution of symptom prevalence.

Conclusions: After adjusting for baseline characteristics, these prospective data indicate a threefold increase in new-onset PTSD symptoms or diagnosis among deployed military personnel reporting combat exposures. Findings define the importance of PTSD in this population and emphasize that specific combat exposures, rather than deployment itself, significantly affect the onset of PTSD symptoms postdeployment.

For over 5 years the US military has been engaged in the combat-intensive Global War on Terrorism (GWOT) in Iraq, Afghanistan, and neighboring countries. There is growing public and veteran concern that postdeployment health consequences among US military personnel may be significant and lasting. A recent report suggested that US Marine and Army infantry units returning from duty in Iraq and Afghanistan have higher-than-expected proportions of mental disorders and that as many as 10% are returning home with symptoms of posttraumatic stress disorder (PTSD).¹ Combat duty in Iraq has been associated with high utilization of mental health services and attrition from military service,² and risk of neuropsychological compromise after deployment in support of the GWOT.³

PTSD symptoms have been reported among as many as 30% of veterans following service in Vietnam and in more than 10% of US military personnel returning from the 1991 Gulf War.^{1, 2, 4-9} Epidemiologic studies to date have largely focused on retrospective data or select groups. Prospective investigation of the etiology of the disorder in large, population-based military cohorts has been limited. The objective of this study was to prospectively investigate the effect of military deployment and self-reported combat exposures on new-onset and persistent PTSD symptoms in a large population-based US military cohort. The unique nature of the Millennium Cohort Study allows the investigation of both active duty and Reserve/National Guard members who have remained in military service or who have separated from the military after returning from deployment.

Methods

Study Population

Between July 2001 and June 2003 the first panel of participants in the Millennium Cohort Study, a population-based US military cohort of 77 047 regular active duty and Reserve/National Guard military personnel, was enrolled in a 22-year longitudinal study of health.¹⁰ Between June 2004 and February 2006, 55 021 (71%) participated in the first 3-year follow-up questionnaire. Participants who were deployed in support of the GWOT while submitting the baseline questionnaire (n=621) or prior to their submission of the baseline questionnaire (n=2230) were removed from these analyses. Additionally, those on their first deployment while submitting their follow-up questionnaire (n=1986) were removed, leaving 50 184 participants for these analyses.

Demographic and military personnel data were linked to each participant and reflected status at the time of baseline enrollment. These data included sex, birth year (categorized by groups: pre-1960, 1960-1969, 1970-1979, and 1980 forward), level of education (high school or less, some college or bachelor's degree, higher than a bachelor's degree), marital status (married, never married, divorced/other), pay grade (enlisted or officer), race/ethnicity (white non-Hispanic, black non-Hispanic, and other), service component (active duty or Reserve/National Guard), service branch (Army, Air Force, Navy/Coast Guard, and Marines), and occupation (combat specialists, health care specialists, service supply and functional support specialists, or other). Self-reported data were used to supplement missing data from personnel records as needed.

Deployment Data

Regular active duty and Reserve/National Guard personnel who had deployed for 1 or more days in support of the GWOT between their baseline and follow-up questionnaire submissions were considered deployers. Cohort members who never deployed or who were deployed for the first time after their baseline and follow-up questionnaire submissions were considered nondeployers in these analyses. Deployment data were provided by the Defense Manpower Data Center, Monterey Bay, Calif, and included entry and exit deployment dates. These data correlate strongly with Millennium Cohort self-reported deployment status (data not shown).

PTSD Assessment

Because of the complexity of diagnosing PTSD and the differences in reported prevalence estimates,⁵ the standardized PTSD Checklist-Civilian Version (PCL-C), with highly sensitive and specific criteria for PTSD symptoms, was used. The sensitive PTSD symptom definition used the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed (DSM-IV) criteria alone, whereas the specific PTSD symptom definition included the DSM-IV criteria and a requirement of a sum of 50 on a scale from 17 to 85 points for all of the questions in the PCL-C.^{1, 11-15} The PCL-C is a 17-item self-report measure of PTSD symptoms that requires participants to rate the severity of each symptom during the past 30 days on a Likert scale that ranged from 1 (not at all) to 5 (extremely). The DSM-IV criteria for PTSD were met when a participant reported a moderate or higher level of at least 1 intrusion symptom, 3 avoidance symptoms, and 2 hyperarousal symptoms.¹²

The DSM-IV criteria alone are reported to have a 100% sensitivity with a specificity of 92.0%, while the stricter criteria of at least 50 points on the PCL-C in addition to the DSM-IV criteria have shown reasonable sensitivity (0.60) and high specificity (0.99).¹¹ Internal consistency of the PCL-C in the Millennium Cohort, as measured by Cronbach α ($\alpha=0.94$), indicated that the PCL-C was a reliable measure for this population.¹⁶ In addition to the standard instrument assessment of PTSD symptoms at baseline, participants were asked, “Has your doctor or other health professional EVER told you that you have any of the following conditions?...Posttraumatic stress disorder”. In the follow-up questionnaire, participants were asked “in the last 3 years” and was used to indicate a more-recent diagnosis.

A participant was identified as having new-onset PTSD symptoms if they did not have PTSD symptoms or diagnosis at baseline and they met the criteria for the PCL-C or they reported a diagnosis at follow-up. A participant was identified with persistent PTSD symptoms if they were identified with PTSD symptoms at baseline and follow-up using criteria for the PCL-C.

Other Questionnaire Information

Cigarette smoking (never smoker, past smoker, current smoker) was assessed using responses to the following questions: “In your lifetime, have you smoked at least 100 cigarettes (5 packs)?” “In the past year have you used cigarettes?” and “Have you ever tried to quit smoking?” Problem alcohol drinking (yes/no) was assessed using the CAGE questionnaire.¹⁷

To assess combat exposures, the follow-up survey asked: “During the past 3 years, have you been PERSONALLY exposed to any of the following?” Answer options were “Witnessing a person’s death due to war, disaster, or tragic event,” “Witnessing instances of physical abuse (torture, beating, rape),” “Dead and/or decomposing bodies,” “Maimed soldiers or civilians,” and “Prisoners of war or refugees.” These were combined with deployment experience to indicate a deployment with self-reported stressful or combat exposures.

Statistical Analysis

Descriptive and univariate analyses of population characteristics by deployment status and new-onset and persistent PTSD symptoms or diagnosis were completed. Deployment status was grouped by no GWOT deployment between baseline and follow-up questionnaire, deployment in support of the GWOT without self-reported combat exposures between baseline and follow-up questionnaire submission and deployment in support of the GWOT with self-reported combat exposures between baseline and follow-up questionnaire submission.

A subpopulation analysis was performed to investigate time between end of deployment and follow-up questionnaire submission to determine possible temporal trends in reporting new-onset PTSD symptoms after deployment.

Multivariable logistic regression was used to compare the adjusted odds of association between deployment in support of GWOT and new-onset PTSD symptoms or diagnosis. Secondary analyses of persistence of PTSD was conducted on a subpopulation

of individuals with baseline PTSD symptoms. Data management and statistical analyses were performed using SAS software, version 9.1.3 (SAS Institute, Inc., Cary, NC).

Results

Data were complete and available for 50 128 of the 50 184 (99.9%) eligible Cohort members for these analyses. The average elapsed time between baseline and follow-up questionnaire submission was 2.7 years (SD=0.5 years; median=2.8 years). Deployed Cohort members were proportionately more likely to be male, born between 1970 and 1979, less educated, active duty, and combat specialists when compared with nondeployed Cohort members (Table 1).

Applying the specific criteria for PTSD, 1681 participants had PTSD symptoms or a previous diagnosis at baseline. Applying the sensitive criteria for PTSD, 2291 participants had PTSD symptoms or a previous diagnosis at baseline. This left 48 447 or 47 837 Cohort members respectively available for analyses of new-onset PTSD symptoms or diagnosis (Table 2).

Analyses of new-onset PTSD symptoms or diagnosis are presented in Table 2. New-onset PTSD symptoms, defined by the specific criteria of DSM-IV with a sum of 50 points on the PCL-C, were found in 7.6% of Cohort members deployed to GWOT and self-reporting combat exposures, 1.4% of Cohort members deployed to GWOT and not self-reporting combat exposures, and 2.3% of nondeployed Cohort members. Applying the more-sensitive DSM-IV criteria alone, new-onset PTSD symptoms were identified in 8.7%, 2.1%, and 3.0%, respectively. These data correspond to new-onset PTSD

symptoms or diagnosis of up to 21 per 1000 non-combat-deployers and up to 87 per 1000 combat-deployed military personnel. New-onset PTSD symptoms were proportionately higher among Cohort members who were female, younger, high school or less educated, never married or divorced, black non-Hispanic, enlisted, Reserve/National Guard, Army, health care specialists, service supply and functional specialists, and in those who self-reported being a current smoker or problem drinker at baseline.

Persistent PTSD symptoms among those with symptoms only at baseline (995 based on DSM-IV criteria with a sum of 50 points and 1659 based on DSM-IV criteria) are also presented in Table 2. Members with a diagnosis of PTSD at baseline with no current symptoms at baseline were removed from these analyses. Persistent PTSD symptoms defined by the specific criteria were found in 43.5% of Cohort members deployed to GWOT and reporting combat exposures, 26.2% of Cohort members deployed to GWOT and not reporting combat exposures, and 47.6% of nondeployed Cohort members. Applying the more-sensitive DSM-IV criteria alone, persistent PTSD symptoms were identified in 47.9%, 22.4%, and 45.9% respectively. Persistent PTSD symptoms were proportionately higher among older, higher educated, divorced, officers, Reserve/National Guard, Marines, health care specialists, and in those who self-reported being a smoker or problem drinker at baseline.

There were no variables in Table 1 exhibiting multicollinearity using a variance inflation level of 4. Logistic regression results for new-onset PTSD symptoms or diagnosis based on the more-specific criteria are presented in Table 3, stratified by branch of service. Analyses adjust for baseline characteristics including sex, age, education,

marital status, race/ethnicity, rank, service component, occupation, cigarette smoking, and problem alcohol drinking. Among all of the services, deployed personnel reporting combat exposures had significantly higher odds of postdeployment PTSD symptoms (Army odds ratio [OR], 3.59; 95% confidence interval [CI], 3.08-4.17; Air Force OR, 3.38; 95% CI, 2.29-4.98; Navy/Coast Guard OR, 2.48; 95% CI, 1.48-4.14; Marine Corps OR, 2.78; 95% CI, 1.52-5.07) than those not deployed. Being female, divorced, enlisted, and reporting problem alcohol drinking were also associated with increased odds of new-onset PTSD symptoms or diagnosis in at least 3 of the 4 service branches. Among the Air Force members, deployers not reporting combat exposures had significantly lower odds of postdeployment PTSD symptoms or diagnosis (OR, 0.56; 95% CI, 0.36-0.90) than nondeployers. No statistical difference was found between deployed Army, Navy/Coast Guard, and Marine Corps Cohort members who did not report combat exposures when compared with nondeployers.

The average elapsed time between returning from first GWOT deployment and follow-up questionnaire submission was 1.3 years (SD=0.8 years). The percentage of new-onset PTSD symptoms or diagnosis varied with time from end of deployment with reported combat exposures to follow-up questionnaire submission (Figure 1). There was a notably higher percentage with new-onset of PTSD symptoms among those who returned approximately 6 months prior to submission of the follow-up questionnaire. There was also a notably higher percentage with new-onset PTSD symptoms among those who returned approximately 9 and 10 months prior to follow-up questionnaire submission. Attempting to understand the bimodal appearance of the figure, the figure

was reproduced for single deployers, multiple deployers, males, females, officers, enlisted, those with a PTSD diagnosis, and those with PTSD symptoms. While the shape of the figure varied somewhat across these subpopulations, there were no clear differences from the population data of Figure 1. Further investigation of both deployers and nondeployers not reporting combat exposures found the percentage of new-onset PTSD symptoms or diagnosis to be consistent month to month with no pattern emerging (data not shown).

Comment

While combat deployments are complex and diverse, significant morbidity has been well documented following previous large-scale conflicts.¹⁸⁻²⁰ Currently, there is much veteran and public concern over military personnel returning from deployments to Iraq and Afghanistan with lasting health consequences. The unpredictability and intensity of urban combat, constant risk of roadside bombs, multiple and prolonged tours, and complex issues of differentiating enemies from allies can leave many troops with significant stress levels. In the current study we document increased risk of new-onset PTSD symptoms among Cohort members who were female, divorced, enlisted, and in those who self-reported being a current smoker or problem drinker at baseline. Further, overall new incidence rates of 10 to 13 cases per 1000 person years and a three-fold increase in new-onset PTSD symptoms in deployed personnel reporting combat exposures are reported.

Studies have estimated as many as 31% of Vietnam War veterans developed PTSD at some point following the war, with between 9% and 15% having the disorder by

the end of the 1980s.^{4,21,22} Among 1991 Gulf War veterans, as many as 10% were reported to have PTSD symptoms years after returning from deployment.^{7,9} Although not all PTSD is war-related, these trends of persistent PTSD symptoms in veterans suggest what may be expected after the current combat deployments in Iraq and Afghanistan. Identifying personnel with PTSD symptoms early may lead to a smaller burden of the disorder in the years to come, if appropriate and timely treatments are provided. In the present study, new-onset PTSD symptoms or diagnosis varied from about 1% to 10% after an average of 1-year from end of deployment to follow-up questionnaire submission.

Differences in the amount of PTSD in returning US military found in these analyses when compared with past reports are likely due to variations in the populations studied, time periods between assessment, and prospective methodology.^{1,2} We used the Millennium Cohort to prospectively investigate new-onset and persistent PTSD symptoms by differentiating those with PTSD symptoms at baseline. The average time between baseline and follow-up was nearly 3 years, whereas the average time between end of first deployment and follow-up was just over 1 year. Future longitudinal investigation of the Millennium Cohort will yield information that may be more comparable to studies of symptoms in Vietnam and 1991 Gulf War veterans, conducted many years after deployment. Differences may also be due to the ability to consider those with and without PTSD symptoms or diagnosis at baseline. Nearly half of those with symptoms at baseline reported symptoms at follow-up and would have increased the burden of postdeployment PTSD symptoms if reported in the aggregate. Further, this

Cohort allowed us to investigate a large, population-based sample of US military members, which may differ in composition from those in specific combat units who are involved with combat operations on a daily basis.

Perhaps a better comparison group than nondeployers would be deployers without combat exposures. Table 1 shows the demographic differences between deployers and nondeployers. The new-onset of as many as 87 cases of PTSD symptoms per 1000 combat deployers when compared with 21 cases of new-onset PTSD symptoms per 1000 non-combat-deployers suggests that up to 76% of new-onset PTSD symptoms or diagnosis may be attributed to combat exposures in deployers. This report documents a threefold adjusted increase in risk of new-onset PTSD symptoms among those deployed who also report combat exposures when compared with nondeployed Cohort members. The increase in risk would be much larger if compared to non-combat deployers. This suggests that deployment in itself may not lead to the onset of PTSD symptoms, but rather exposures during deployment significantly contribute to the onset of PTSD symptoms.

The baseline Millennium Cohort prevalence of PTSD symptoms using specific criteria was 2.4%.²³ Persistent PTSD symptoms at follow-up were found in 40% to 50% of the Millennium Cohort members who had PTSD symptoms at baseline. This implies resiliency or recovery among more than half of the population over an average of 2.7 years between questionnaires. Still, this underscores a significant burden of persistent PTSD symptoms among those with baseline PTSD symptoms and suggests that resolution of PTSD may not be expected for many over several years. Interestingly,

Cohort members who were older, higher educated, officers, and Marines were more likely to experience persisting PTSD symptoms at follow-up. This contrasts with the lower odds of new-onset PTSD symptoms in these personnel. This may reflect subgroups of the population who are concerned about the perceived stigma often associated with PTSD. These groups may be less likely to report new-onset symptoms; however, once they accept the diagnosis, these individuals may be more willing to report problems they are experiencing. As found with new-onset PTSD symptoms, individuals with persisting symptoms were more likely to be divorced, Reserve/National Guard, health care specialists, and to have reported problem alcohol drinking and cigarette smoking at baseline.

The appropriate time to screen for PTSD after traumatic or stressful experiences has been explored in past reports.²⁴⁻²⁶ Figure 1 displays a temporal assessment of new-onset PTSD symptoms or diagnosis among deployers reporting combat exposures and suggests a bimodal distribution of 6 and 10 months postdeployment when symptoms may be most prevalent. This may be an artifact of these data; however, trends were consistent when investigating subgroups. After additional investigation of nondeployers and deployers not reporting combat exposures, we found the percentage of new-onset PTSD symptoms or diagnosis was consistent month to month, suggesting the bimodal distribution was only apparent in those who deployed and reported combat exposures. These data allowed an exploratory look at the temporal association between stressful experiences and onset of PTSD symptoms and may suggest different forms of PTSD postdeployment. Future research may better define the timing of new-onset PTSD

symptoms by asking those with PTSD when symptoms began and lead health care professionals to more efficient and productive screening approaches.

Some limitations to these analyses should be noted. The Millennium Cohort, by design, oversampled female, previously deployed, and Reserve/National Guard personnel and may not be representative of the military population in general or all deployers. However, approximately 40% of the Cohort was deployed in support of the GWOT from 2001 through 2006, while approximately 30% of the US military on rosters when the Cohort was established were deployed during the same period (data not shown). This indicates a robust Cohort for investigating deployment-related concerns. The Millennium Cohort was able to track and obtain a follow-up questionnaire from over 70% of those submitting a baseline questionnaire; however, it is possible that response biases exist. Investigation of possible biases in follow-up participants continue, though reports of Millennium Cohort baseline data suggest a representative sample of military personnel measured by demographic and health characteristics and reliable health and exposure reporting.^{10, 16, 23, 27, 28} Self-report of exposures and PTSD symptoms represent an estimate of the true prevalence of exposures and disease. Studies have shown that increased exposure and symptom reporting occur among personnel seeking medical compensation,²⁹ and among individuals with PTSD symptoms.³⁰ There is no offer of compensation to Millennium Cohort participants, which should eliminate potential bias associated with compensation. Also, it was not possible to discern those exposures that are truly unique to combat from those that might be encountered through other occupational or nonoccupational activities. Lastly, the use of a standardized instrument

for self-reported data as a surrogate for PTSD diagnosis is imperfect. However, the PCL-C using the DSM-IV criteria along with a sum of 50 points has been found to correlate well with a physician's assessment of PTSD symptoms,¹¹ and the PCL-C is internally valid in Millennium Cohort members.¹⁶

Unique strengths of these analyses should also be considered. This study is the first large, population-based, prospective analysis of new-onset PTSD symptoms after combat deployment. Self-reported data offer information not accessible elsewhere. Further, PTSD is often underreported in electronic health care databases among populations not readily submitting for care for mental disorders. The use of a standardized instrument allows for comparison with other populations, such as the general US population and other military populations.

These prospective data suggest a three-fold statistically significant increase in new-onset PTSD symptoms or diagnosis among recently deployed military personnel reporting combat exposures. When compared with nondeployed personnel, there was no significant difference in new-onset PTSD symptoms or diagnosis among deployers who did not report combat exposures. While the overall prevalence of PTSD in the military is not high, a substantial number of PTSD cases can be expected based on the number of services members deployed and exposed to combat over time in the GWOT. The PTSD risk conferred by combat exposure suggests that routine PTSD screening, prevention, and follow-up services after deployments should be provided to combat-exposed members to reduce morbidity. Continued longitudinal investigation of PTSD in the Millennium

Cohort will yield even greater insight into the temporal onset of PTSD symptoms, the persistence and/or recurrence of symptoms, and eventual recovery from this disorder.

Acknowledgments

Chapter 3 in full, and titled, “PTSD: New Onset and Persistent Symptoms After Deployment and Combat Exposures in a Large, Population-based Military Cohort”, has been submitted for publication. The dissertation author was the primary investigator and author of this paper.

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TABLE 3.1. Baseline Characteristics by Deployment Status, of 50 128 Millennium Cohort Members*

Characteristic*	Deployed GWOT† (N = 11 930)		Nondeployed GWOT† (N = 38 031)	
	n	(%)	n	(%)
Sex				
Male	9727	(81.4)	26 552	(69.6)
Female	2225	(18.6)	11 624	(30.4)
Birth year				
Pre-1960	2078	(17.4)	10 714	(28.1)
1960-1969	4943	(41.4)	15 362	(40.2)
1970-1979	4286	(35.9)	10 728	(28.1)
1980 and forward	645	(5.4)	1372	(3.6)
Education				
High school or less diploma/equivalent	5241	(43.9)	16 452	(43.1)
Some college or bachelor's	5736	(48.0)	17 003	(44.5)
Higher than bachelor's	975	(8.1)	4721	(12.4)
Marital status				
Married	7784	(65.1)	25 667	(67.2)
Never married	3406	(28.5)	9615	(25.2)
Divorced	762	(6.4)	2894	(7.6)
Race/ethnicity				
White non-Hispanic	8443	(70.6)	27 123	(71.1)
Black non-Hispanic	1312	(11.0)	4834	(12.7)
Other	2197	(18.4)	6219	(16.3)
Smoking				
Never smoker	7126	(59.6)	22 816	(59.8)
Past smoker	2855	(23.9)	9768	(25.6)
Current smoker	1971	(16.5)	5592	(14.7)
Problem drinking				
No	9723	(81.4)	31 327	(82.1)
Yes	2229	(18.6)	6849	(17.9)
Military rank				
Enlisted	8802	(73.6)	27 556	(72.2)
Officer	3150	(26.4)	10 620	(27.8)
Service component				
Reserve/National Guard	4543	(38.0)	17 988	(47.1)
Active duty	7409	(62.0)	20 188	(52.9)
Branch of service				
Army	5548	(46.4)	18 438	(48.3)
Air Force	4333	(36.3)	10 608	(27.8)
Navy/ Coast Guard	1478	(12.4)	7582	(19.9)
Marines	593	(5.0)	1548	(4.1)
Occupational category				
Other occupations	5185	(43.4)	14 341	(37.6)
Combat specialists	2901	(24.3)	7114	(18.6)
Health care specialists	864	(7.2)	5005	(13.1)
Service supply and functional	3002	(25.1)	11 716	(30.7)

GWOT, Global War on Terrorism.

*Characteristic taken at time of baseline questionnaire submission among member who submitted questionnaires at baseline (July 2001-June 2003) and follow-up (July 2004-Jan 2006).

†GWOT deployment considered if full deployment occurred between submission dates of baseline and follow-up questionnaires. Cohort members deploying after follow-up survey are included with nondeployers in these analyses.

TABLE 3.2. New-onset and Persistent PTSD Symptoms of Millennium Cohort Members*

Characteristic*	No PTSD Symptoms or Diagnosis at Baseline				PTSD Symptoms at Baseline			
	N=48 447		N=47 837		N=995		N=1659	
	New-onset PTSD by Specific Criteria [†] , n=1347		New-onset PTSD by Sensitive Criteria [‡] , n=1695		Persisting PTSD by Specific Criteria [†] ,		Persisting PTSD by Sensitive Criteria [‡] ,	
	n	(%)	n	(%)	n	(%)	n	(%)
GWOT deployment [§]								
Not deployed	849	(2.3)	1106	(3.0)	391	(47.6)	614	(45.9)
Deployed without combat exposures	89	(1.4)	128	(2.1)	17	(26.2)	30	(22.4)
Deployed with combat exposures	409	(7.6)	461	(8.7)	47	(43.5)	89	(47.9)
Sex								
Male	851	(2.4)	1084	(3.1)	296	(45.8)	482	(43.5)
Female	496	(3.8)	611	(4.7)	159	(45.7)	251	(45.6)
Birth year								
Pre 1960	276	(2.2)	343	(2.8)	137	(57.8)	191	(50.7)
1960-1969	456	(2.3)	594	(3.1)	150	(45.7)	248	(44.1)
1970-1979	512	(3.5)	627	(4.4)	138	(39.2)	237	(40.2)
1980 and forward	103	(5.4)	131	(7.0)	30	(38.5)	57	(43.5)
Education								
High school or less diploma/equivalent	859	(4.2)	1041	(5.1)	264	(42.7)	458	(43.5)
Some college or bachelor's	416	(1.9)	568	(2.6)	166	(49.4)	241	(44.2)
Higher than bachelor's	72	(1.3)	86	(1.5)	25	(62.5)	34	(54.8)
Marital status								
Married	790	(2.4)	1000	(3.1)	261	(46.4)	421	(43.8)
Never married	420	(3.4)	532	(4.3)	141	(43.3)	233	(44.1)
Divorced	137	(3.9)	163	(4.8)	53	(50.0)	79	(46.8)
Race/ethnicity								
White non-Hispanic	889	(2.6)	1134	(3.3)	310	(46.6)	505	(44.1)
Black non-Hispanic	207	(3.5)	247	(4.2)	73	(47.4)	112	(46.5)
Other	251	(3.1)	314	(3.9)	72	(40.9)	116	(42.3)
Smoking at baseline								
Never smoker	654	(2.2)	831	(2.9)	185	(43.7)	294	(41.6)
Past smoker	356	(2.9)	463	(3.9)	136	(46.0)	220	(45.5)
Current smoker	337	(4.7)	401	(5.8)	134	(48.6)	219	(46.7)
Problem drinking at baseline								
No	1008	(2.5)	1278	(3.2)	289	(45.0)	459	(42.3)
Yes	339	(4.0)	417	(5.0)	166	(47.0)	274	(47.7)
Military rank								
Enlisted	1162	(3.3)	1451	(4.2)	403	(45.0)	656	(43.9)
Officer	185	(1.4)	244	(1.8)	52	(52.0)	77	(46.4)
Service component								
Reserve/National Guard	630	(2.9)	784	(3.7)	218	(49.1)	338	(45.6)
Active duty	717	(2.7)	911	(3.5)	237	(43.0)	395	(43.1)
Branch of service								
Army	906	(3.9)	1103	(4.9)	280	(45.0)	459	(45.8)
Air Force	184	(1.3)	267	(1.8)	82	(48.0)	114	(37.9)
Navy/ Coast Guard	195	(2.2)	250	(2.9)	67	(42.7)	118	(42.6)
Marines	62	(3.0)	75	(3.7)	26	(57.8)	42	(53.2)
Occupational category								
Other occupations	517	(2.7)	683	(3.7)	175	(42.8)	288	(42.4)
Combat specialists	237	(2.4)	290	(3.0)	70	(45.5)	118	(45.7)
Health care specialists	161	(2.9)	193	(3.5)	57	(56.4)	86	(50.0)
Service supply and functional	432	(3.1)	529	(3.8)	153	(46.2)	241	(43.8)

Abbreviations: PTSD, posttraumatic stress disorder; GWOT, Global War on Terrorism; OR, odds ratio; CI, confidence interval; PCL-C, PTSD Checklist-Civilian Version; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.

*Characteristic taken at time of baseline questionnaire submission among member who submitted questionnaires at baseline (July 2001-June 2003) and follow-up (July 2004-Jan 2006).

[†]PTSD symptoms based on PCL-C and DSM-IV criteria or a diagnosis of PTSD within the past 3 years.

[‡]PTSD symptoms based on PCL-C with DSM-IV criteria and a sum of 50 points out of 85 points possible or a diagnosis of PTSD within the past 3 years.

[§]GWOT deployment considered if full deployment occurred between submission dates of baseline and follow-up questionnaires. Cohort members deploying after follow-up survey are included with nondeployers in these analyses.

TABLE 3.3. Adjusted Odds of New-onset PTSD[†], Stratified by Service Branch, Among Millennium Cohort Members[‡] Without Baseline PTSD Symptoms

Characteristic [†]	Army Cohort Members (N=22 959)		Air Force Cohort Members (N=14 608)		Navy and Coast Guard Cohort Members (N=8655)		Marine Cohort Members (N=2077)	
	(%)	OR (95% CI)	(%)	OR (95% CI)	(%)	OR (95% CI)	(%)	OR (95% CI)
GWOT deployment [‡]								
Not deployed	(3.0)	1.00 --	(1.2)	1.00 --	(2.2)	1.00 --	(2.3)	1.00 --
Deployed without combat expos	(2.6)	0.87 (0.64, 1.18)	(0.7)	0.56 (0.35, 0.89)	(1.4)	0.60 (0.35, 1.02)	(2.8)	1.42 (0.57, 3.51)
Deployed with combat exposures	(9.3)	3.59 (3.08, 4.17)	(3.5)	3.38 (2.29, 4.98)	(5.2)	2.48 (1.48, 4.14)	(5.7)	2.78 (1.52, 5.07)
Sex								
Male	(3.6)	1.00 --	(1.0)	1.00 --	(1.8)	1.00 --	(2.8)	1.00 --
Female	(4.9)	1.70 (1.44, 2.00)	(2.0)	2.00 (1.41, 2.83)	(3.4)	1.73 (1.25, 2.38)	(4.4)	1.92 (0.94, 3.94)
Birth year								
Pre 1960	(3.1)	1.00 --	(1.2)	1.00 --	(2.0)	1.00 --	(1.2)	1.00 --
1960-1969	(3.5)	0.90 (0.74, 1.10)	(1.0)	0.84 (0.56, 1.24)	(2.1)	0.99 (0.66, 1.48)	(1.4)	0.71 (0.18, 2.79)
1970-1979	(4.9)	1.09 (0.88, 1.36)	(1.6)	1.40 (0.89, 2.21)	(2.4)	0.97 (0.60, 1.56)	(3.9)	1.51 (0.40, 5.70)
1980 and forward	(6.0)	1.17 (0.83, 1.65)	(2.5)	1.72 (0.70, 4.26)	(5.2)	1.73 (0.79, 3.78)	(6.8)	2.00 (0.42, 9.56)
Education								
High school or less diploma/equiv	(5.0)	1.00 --	(2.2)	1.00 --	(2.7)	1.00 --	(3.8)	1.00 --
Some college or bachelor's	(2.8)	0.83 (0.69, 1.00)	(1.2)	0.75 (0.50, 1.14)	(1.6)	0.89 (0.57, 1.39)	(1.4)	0.70 (0.22, 2.20)
Higher than bachelor's	(1.9)	0.80 (0.54, 1.19)	(0.6)	0.82 (0.35, 1.92)	(1.6)	1.31 (0.60, 2.88)	(0.7)	0.57 (0.05, 6.17)
Marital status								
Married	(3.7)	1.00 --	(1.1)	1.00 --	(1.9)	1.00 --	(2.0)	1.00 --
Never married	(4.4)	0.80 (0.67, 0.96)	(1.3)	0.79 (0.51, 1.23)	(2.7)	1.14 (0.81, 1.61)	(4.3)	1.09 (0.56, 2.10)
Divorced	(4.7)	1.09 (0.85, 1.40)	(2.7)	1.85 (1.25, 2.74)	(4.9)	2.53 (1.31, 4.91)	(5.7)	2.75 (1.06, 7.14)
Race/ethnicity								
White non-Hispanic	(4.0)	1.00 --	(1.3)	1.00 --	(2.0)	1.00 --	(2.9)	1.00 --
Black non-Hispanic	(4.5)	1.14 (0.93, 1.38)	(1.2)	0.86 (0.51, 1.47)	(3.5)	1.54 (1.02, 2.34)	(1.6)	0.70 (0.21, 2.36)
Other	(3.5)	1.37 (1.13, 1.65)	(1.4)	1.06 (0.63, 1.76)	(2.6)	1.22 (0.80, 1.88)	(4.3)	1.53 (0.78, 3.01)
Smoking								
Never smoker	(3.2)	1.00 --	(1.1)	1.00 --	(1.8)	1.00 --	(2.1)	1.00 --
Past smoker	(4.1)	1.21 (1.03, 1.44)	(1.3)	1.05 (0.73, 1.50)	(2.5)	1.33 (0.94, 1.88)	(3.6)	1.55 (0.83, 2.88)
Current smoker	(6.4)	1.69 (1.42, 2.01)	(2.1)	1.40 (0.94, 2.07)	(3.4)	1.59 (1.08, 2.34)	(5.7)	1.84 (0.94, 3.59)
Problem drinking								
No	(3.6)	1.00 --	(1.2)	1.00 --	(2.0)	1.00 --	(2.4)	1.00 --
Yes	(5.4)	1.47 (1.25, 1.73)	(1.9)	1.69 (1.17, 2.43)	(3.1)	1.59 (1.08, 2.34)	(4.7)	1.73 (1.00, 2.99)
Military rank								
Enlisted	(4.8)	2.20 (1.70, 2.86)	(1.5)	2.31 (1.24, 4.30)	(2.7)	2.14 (1.16, 3.94)	(3.7)	1.92 (0.52, 7.13)
Officer	(1.9)	1.00 --	(0.6)	1.00 --	(1.3)	1.00 --	(1.1)	1.00 --
Service component								
Reserve/National Guard	(3.8)	1.00 --	(1.5)	1.00 --	(2.1)	1.00 --	(2.5)	1.00 --
Active duty	(4.1)	0.88 (0.76, 1.03)	(1.1)	0.79 (0.56, 1.13)	(2.3)	1.24 (0.86, 1.77)	(3.1)	1.24 (0.62, 2.47)
Occupational category								
Other occupations	(4.4)	1.00 --	(1.3)	1.00 --	(2.0)	1.00 --	(2.8)	1.00 --
Combat specialists	(3.3)	0.91 (0.75, 1.11)	(0.7)	0.71 (0.41, 1.25)	(1.7)	1.14 (0.72, 1.79)	(3.7)	1.63 (0.86, 3.06)
Health care specialists	(3.7)	1.02 (0.81, 1.29)	(1.3)	0.78 (0.46, 1.33)	(3.1)	1.49 (0.96, 2.32)	--	--
Service supply and functional	(4.1)	0.95 (0.80, 1.12)	(1.4)	0.93 (0.65, 1.33)	(2.6)	1.23 (0.85, 1.79)	(2.7)	1.02 (0.52, 1.99)

Abbreviations: PTSD, posttraumatic stress disorder; GWOT, Global War on Terrorism; OR, odds ratio; CI, confidence interval; PCL-C, PTSD Patient Checklist-Civilian Version; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.

[†]PTSD symptoms based on PCL-C with DSM-IV criteria and a sum of 50 points out of 85 points possible or a diagnosis of PTSD within the past 3 years.

[‡]Characteristic taken at time of baseline questionnaire submission among member who submitted questionnaires at baseline (July 2001-June 2003) and follow-up (July 2004-Jan 2006).

[§]GWOT deployment considered if full deployment occurred between submission dates of baseline and follow-up questionnaires. Cohort members deploying after follow-up survey are included with nondeployers in these analyses

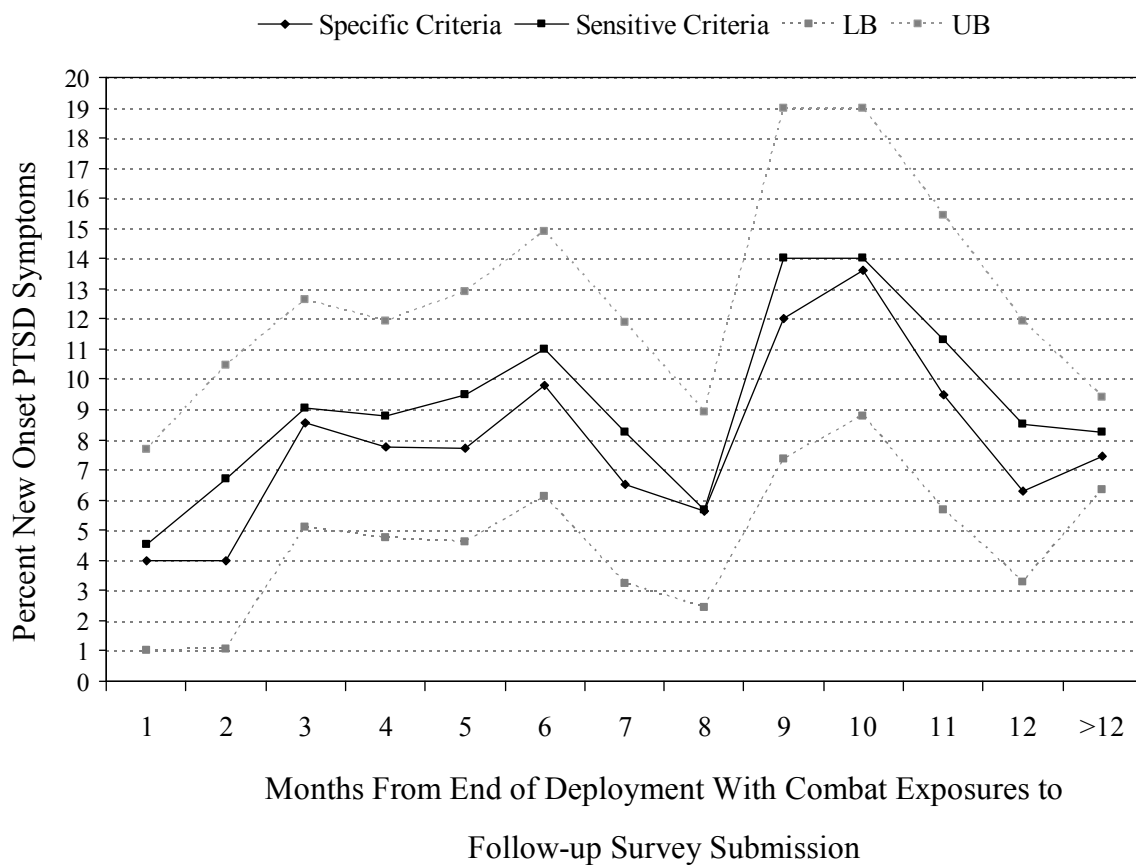


Figure 3.1. Percentage of participants reporting new-onset PTSD symptoms, among deployed personnel reporting combat exposures by month from end of first deployment to Millennium Cohort follow-up questionnaire submission. PTSD symptoms defined using the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed (DSM-IV) criteria along with the DSM-IV criteria and a sum of 50 points on a scale from 17 to 85.

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CHAPTER 4

Prior Assault Increases the Likelihood of New-onset PTSD After Combat Deployment

Abstract

Background: Studies have reported that posttraumatic stress disorder (PTSD) is prevalent in U.S. military personnel returning from combat deployment in support of the Global War on Terrorism (GWOT). Vulnerability for, and resilience against PTSD in individuals following overwhelming stress is not well understood. The objective of this study was to prospectively examine the relation between prior assault and new-onset PTSD symptoms in a large U.S. military cohort deployed in support of GWOT.

Methods: Millennium Cohort baseline enrollment data (July 2001 to June 2003) were obtained before GWOT. Follow-up data on health outcomes (June 2004 to February 2006) were collected from over 55,000 participants. Of these, 5324 were deployed in support of GWOT, reported combat exposures, and were free of PTSD at baseline (women=881, men=4443). Multivariable logistic regression was used to model the risk of new-onset PTSD in relation to prior assault.

Results: Analyses were conducted stratifying by sex and adjusting for baseline age, education, marital status, race/ethnicity, cigarette smoking, problem drinking, rank, service component, service branch, and occupation. New-onset PTSD symptoms or diagnosis among deployers reporting combat exposures occurred in 21.7% of women who reported prior assault and 10.1% of those not reporting prior assault. Among men, rates were 12.4% and 5.9% respectively. Adjusting for baseline factors, the risk of new-onset PTSD symptoms was more than twofold higher in both women and men who reported assault prior to deployment.

Conclusions: Survival from prior assault appears to confer increased risk for, rather than resilience against, PTSD symptoms among military professionals deployed to recent combat operations.

Keywords: combat disorders; stress disorders; posttraumatic; cohort studies; mental health; violence

Posttraumatic stress disorder (PTSD) symptoms have been reported among as many as 30% of veterans following service in Vietnam and in as many as 10% of U.S. military personnel returning from the 1991 Gulf War.¹⁻⁷ The current combat deployments to Iraq and Afghanistan are marked by intense urban combat, persistent risk of roadside bombs, multiple and prolonged tours, and ambiguous threats such as differentiating enemy and nonenemy combatants. There is evidence that as many as 10% of deployed military members have PTSD symptoms following stressful experiences during current combat deployments in Iraq and Afghanistan.⁸⁻¹⁰

The level of vulnerability for, or resilience against, PTSD symptoms in individuals following overwhelming stress is not well understood. While wartime stressors are known to cause PTSD symptoms, it is plausible that wartime threats in combination with individual risk factors, serve to heighten vulnerability of some individuals to postwar PTSD symptoms. Victims of prior assault and those with a history of mental illness have been shown to exhibit less optimal levels of mental health and higher risk for PTSD after a stressful experience.¹¹⁻²⁰ Epidemiologic studies of PTSD in military members to date have largely focused on retrospective data, rendering investigation of etiologic pathways of PTSD, including prior sexual or violent assault, inconclusive. The objective of the present study was to conduct a prospective investigation of the relationship between prior assault and PTSD in a large U.S. military cohort of service members deployed to combat in support of the wars in Iraq and Afghanistan.

Methods

Study Population

The baseline enrollment for the Millennium Cohort Study was conducted between July 2001 and June 2003 and succeeded in establishing a population-based military cohort of over 77,000 regular active-duty and Reserve/National Guard members from all services.²¹ The first follow-up survey of this 22-year longitudinal cohort was conducted between June 2004 and February 2006, when 55,021 (71%) submitted a follow-up survey. The current study included only participants who were free of PTSD symptoms and diagnosis at baseline, deployed in support of the Global War on Terrorism (GWOT) for the first time between baseline and follow-up survey submissions, and who reported combat exposures on their follow-up questionnaire. This resulted in a population of 5359 (890 women, 4469 men) for investigation.

Baseline demographic and military personnel data included sex, birth year (categorized by groups: pre-1960, 1960–1969, 1970–1979, and 1980 forward), level of education (high school or less, some college or bachelor's, higher than a bachelor's degree), marital status (married, never married, divorced/other), pay grade (enlisted or officer), race/ethnicity (white non-Hispanic, black non-Hispanic, and other), service component (active duty or Reserve/National Guard), service branch (Army, Air Force, Navy/Coast Guard, and Marines), and occupation (combat specialists, healthcare specialists, service supply and functional support specialists, or other). As needed, self-reported data were used to supplement missing data from personnel records (<1.0%).

Deployment Data

Participants were considered deployed if they were regular active duty and Reserve/National Guard personnel who deployed for one or more days in support of GWOT between their baseline and follow-up questionnaires. Cohort members who were deployed for the first time after their follow-up questionnaire were not considered in these analyses. Deployment data were provided by the Defense Manpower Data Center, Monterey Bay, California and included entry and exit deployment dates. These data have been shown to strongly correlate with Millennium Cohort self-reported deployment information (data not shown).

PTSD Assessment

Diagnosing PTSD is complex, resulting in differences in reported prevalence estimates based solely on criteria of diagnosis.² For the present study, the PTSD Checklist-Civilian Version (PCL-C), with specific criteria for PTSD symptoms, was used. These criteria employ the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) with an additional requirement of a sum of 50 points for all questions in the PCL-C.^{8,22,23} This approach for diagnosing PTSD has been shown to have reasonable sensitivity (0.60) and high specificity (0.99).²² The PCL-C is a 17-item self-report measure of PTSD symptoms that requires participants to rate the severity of each symptom during the past 30 days on a Likert scale ranging from 1 (not at all) to 5 (extremely). The DSM-IV criteria for PTSD were met when a participant reported a moderate or higher level of at least one intrusion symptom, three avoidance symptoms,

and two hyperarousal symptoms.²³ An investigation of the internal consistency of the PCL-C in the Millennium Cohort indicated that the PCL-C had sufficiently high reliability and was an appropriate measurement tool for this population (Cronbach's alpha = 0.94).²⁴

To assess previous PTSD diagnosis, posttraumatic stress disorder was one of the choices in answer to, "Has your doctor or other health professional **EVER** told you that you have any of the following conditions?" In the follow-up questionnaire, instead of "EVER", "last 3 years" was used to indicate recent diagnosis.

Assault Information

Prior assault was assessed using responses to the following questions and responses: "Have you **EVER** had any of the following life events happen to you?": (1) "Suffered forced sexual relations or sexual assault" (2) "Suffered a violent assault." These two questions were combined to characterize the assault variable.

Behavioral Risk-Factor Information

Cigarette smoking at baseline (never smoker, past smoker, and current smoker) was assessed using responses to the following questions: "In your lifetime, have you smoked at least 100 cigarettes (5 packs)?", "In the past year have you used cigarettes?", and "Have you ever tried to quit smoking?". Problem alcohol drinking (yes/no) at baseline was assessed using the CAGE questionnaire.²⁵

Combat-Exposure Information

To assess combat exposures, the follow-up questionnaire included: “During the past 3 years, have you been PERSONNALLY exposed to any of the following?” Answer options were “Witnessing a person’s death due to war, disaster, or tragic event,” “Witnessing instances of physical abuse (torture, beating, rape),” “Dead and/or decomposing bodies,” “Maimed soldiers or civilians,” and “Prisoners of war or refugees.” These were combined with deployment experience to restrict the population to those who deployed and also self-reported stressful or combat exposures.

Data Analysis

Analyses were limited to Cohort members with a deployment in support of GWOT between baseline and follow-up questionnaire who also self-reported combat exposures. Descriptive and univariate analyses of population characteristics by prior assault status and new-onset PTSD symptoms or diagnosis were stratified by sex.

Multivariable logistic regression was used to compare the adjusted odds of new-onset PTSD symptoms or diagnosis for those who reported prior assault at baseline with those who did not. Two models were developed: a reduced model after removing potential pathway variables (cigarette smoking, alcohol drinking, and marital status), and a full model including all variables. Model analyses began with assessment of multicollinearity using a variance inflation level of four to establish multicollinearity. Data management and statistical analyses were performed using SAS software (version 9.1.3, SAS Institute, Inc., Cary, NC).

Results

Data were complete for 5324 of 5359 (99.3%; 881 women, 4443 men) for this study. Prior assault was reported by 27.7% of women (5.2% violent assault only, 15.8% sexual assault only, 6.9% both) and 9.1% of men (7.5% violent assault only, 0.9% sexual assault only, 0.7% both) in this subpopulation of the Cohort (Table 1). Among women, those reporting assault were proportionately more likely to be high school or less educated, married or divorced, enlisted, and report current or past smoking and problem drinking. Among men, those reporting assault were proportionately more likely to be younger, high school or less educated, and never married.

Table 2 presents the percentage of new-onset PTSD symptoms or diagnosis among women and men who were deployed in support of GWOT and reported combat exposures. The percentage of new-onset PTSD symptoms or diagnosis among women was 13.3% overall, and 21.7% among women who also reported a baseline assault. Other factors associated with higher percentages of new-onset PTSD symptoms or diagnosis among women included, being younger, having a high school education or less, enlisted, Army or Marines, service supply and functional support specialists, and reporting current smoking or problem drinking at baseline. The percentage of new-onset PTSD symptoms or diagnosis among men was 6.5% overall and 12.4% among men reporting prior assault at baseline. Other factors associated with higher percentages of new-onset PTSD symptoms or diagnosis among men included being younger, having a high school education or less, enlisted, Reserve/National Guard, Army, and reporting current smoking or problem drinking at baseline.

The results of multivariable logistic regression for new-onset PTSD symptoms or diagnosis after stratification by sex is presented in Table 3. Investigation did not identify variables exhibiting noteworthy multicollinearity using a variance inflation level of 4.0. Among women who were deployed in support of GWOT and reported combat exposures, those reporting prior assault at baseline had significantly higher odds of postdeployment PTSD symptoms (odds ratio [OR] = 2.36; 95% confidence interval [CI], 1.56-3.57) than those not reporting prior assault (after adjusting for baseline characteristics, including age, education, marital status, race/ethnicity, prior deployment, rank, service component, service branch, and occupation). When also including potential pathway variables in the model (marital status, current cigarette smoking, and problem alcohol drinking) those reporting prior assault at baseline had significantly higher odds of postdeployment PTSD symptoms (OR=2.27; 95% CI, 1.49-3.47).

After excluding those reporting a violent assault, an analysis of prior sexual assault yielded results consistent with the above analyses of prior assault (sexual and/or violent). Among women who were deployed in support of GWOT and who reported combat exposures, those reporting prior sexual assault at baseline had significantly higher adjusted odds of postdeployment PTSD symptoms (OR=2.09; 95% CI, 1.30-3.35) than those not reporting prior sexual assault.

Among men who were deployed in support of GWOT and who reported combat exposures, those reporting assault at baseline had significantly higher odds of postdeployment PTSD symptoms (OR = 2.12; 95% CI, 1.52-2.96) than those not reporting assault after adjusting for baseline characteristics including age, education,

marital status, race/ethnicity, prior deployment rank, service component, service branch, and occupation. When also including potential pathway variables in the model (marital status, current cigarette smoking, and problem alcohol drinking), those reporting prior assault at baseline had significantly higher odds of postdeployment PTSD symptoms (OR=2.01; 95% CI, 1.44-2.82).

Discussion

There is increasing public concern for military members returning from current combat deployments where, recent reports have suggested, that as many as 10% of personnel may have symptoms of PTSD following deployment.^{8,10} The predisposition or vulnerability for new onset of PTSD symptoms in military personnel after stressful combat deployments is not well understood. Likewise, little is known about any resilience conferred by surviving prior trauma without PTSD. Identifying subgroups of military personnel with increased risk for postcombat PTSD symptoms and screening individuals who may be vulnerable to combat-induced PTSD may help to focus preventive efforts prior to deployment. In the present study, women and men who reported prior assault at baseline were found to have more than twice the risk of new-onset PTSD symptoms or diagnosis after combat deployment in support of GWOT.

A previous report using prospective data from the Millennium Cohort suggested a near-threefold increase in new-onset PTSD symptoms or diagnosis after deployment among those reporting combat exposures when compared with nondeployed Cohort members.¹⁰ Moreover, as compared to nondeployed Cohort members, deployed

personnel who did not report combat exposures did not have an increased risk for new-onset PTSD symptoms after deployment. From this and other studies,⁸⁻¹⁰ it is apparent that while deployment itself may be stressful, combat exposure can be identified as the operative risk factor for new-onset PTSD. In the current study, only deployers who reported combat exposures were considered in order to isolate the effect of prior assault on subsequent new-onset PTSD symptoms in a distinct at-risk population.

After noting the large differences in prevalence and type of prior assault reported by men and women, analyses were stratified by sex. Nearly 30% of women reported a prior sexual or violent assault, with over half of those reporting sexual assault alone. In contrast, 10% of men in this subpopulation reported a prior assault, almost all due to violent (not sexual) assault. Despite these sex differences in prevalence and type of prior assault, the risk of new onset of PTSD symptoms after deployment and reported combat exposures was consistent between men and women with both displaying over a two-fold increase. The two-fold increase persisted even after adjusting for demographic, military, and behavioral characteristics, suggesting that having a history of assault is more important than the type of assault.

It could be hypothesized that U.S. military members reporting prior assault with no evidence of PTSD, who are mentally and physically healthy enough to deploy, might demonstrate particularly high resilience to subsequent stressful experiences. Their ability to cope with past stress may help to identify and affectively manage negative experiences and mental health symptoms. However, this hypothesis contrasts with the findings of the current report for both male and female personnel. Previous studies show that those with

past traumatic events have a higher likelihood of encountering future traumatic events, which may result in increased risk for PTSD.^{26,27} A history of trauma could be related to increased risk-taking behavior such as not wearing seatbelts, excessive alcohol consumption, or entering into combat-related occupations and volunteering for deployment to combat areas.^{26,27} Consistent with previous research, in this study, those reporting prior assault reported more smoking and problem drinking.^{28,29} These behaviors could reflect attempts to manage psychological symptoms or a general tendency toward risk taking. Adjusting for these behaviors in the present study had little effect on odds ratios for prior assault, so it appears prior assault has specific effects that increase the risk of new-onset PTSD in combat-exposed military members deployed in support of GWOT.

Limitations to these analyses should be noted. Although approximately 40% of the Millennium Cohort was deployed in support of GWOT from 2001 through 2006, only 30% of the U.S. military personnel on rosters at the time had deployed during the same time period. Therefore the population of deployers in this Cohort may differ. Although investigation of possible biases in baseline Millennium Cohort data suggest a reliable and representative sample of military personnel,^{21,24,30-32} some biases may exist with regard to the baseline participants who did not submit a follow-up questionnaire. Changes in exposure reporting have been associated with changes in PTSD symptoms.³³ Since assault, exposures, and PTSD symptoms are determined by self-report, rates in the present study are estimates of the true prevalence of exposures and outcomes. It was not possible to discern those exposures that are truly unique to military service from those

that might also be encountered through other occupational or nonoccupational activities. Using the PCL-C along with the DSM-IV criteria and a sum of 50 points, has been found to correlate well with a physician's assessment of PTSD symptoms,²² and the PCL-C is internally valid in Millennium Cohort members,²⁴ however, the use of a standardized instrument for self-reported data as a surrogate for PTSD diagnosis is imperfect. Finally, studies have reported increased exposure and symptom reporting among personnel seeking medical compensation.³⁴ There is no offer of compensation to Millennium Cohort participants, however, which should reduce or eliminate such potential bias.

Despite limitations, these analyses offer the first large, prospective epidemiologic investigation of predisposition for new-onset PTSD symptoms in combat-deployed military men and women. The large sample of both men and women along with many variables to adjust for confounding allow for robust estimate of new-onset PTSD symptoms associated with prior assault. Population-based baseline self-reported prior assault and PTSD symptoms offer information not accessible elsewhere and allow for a broad investigation of the modification of new-onset PTSD symptoms after stressful experiences. PTSD is often underreported in electronic healthcare databases among populations not readily accessing care for mental disorders, making it a necessity for self-reported baseline and follow-up measures. Using the DSM-IV criteria with a PCL-C score of at least 50 increased the specificity of identifying true PTSD.

Deployed military members exhibit an overall remarkable resiliency to stressful combat and noncombat experiences, because the vast majority of those exposed to combat do not report development of PTSD. However, certain subpopulations,

particularly combat-exposed deployers, bear a disproportionate burden of PTSD symptoms. Among combat-exposed deployers already at risk, both women and men with a history of sexual or violent assault experienced an additional doubling of risk of new-onset PTSD. Substantial proportions of combat-exposed women (30%) and men (10%) reported prior assaults, highlighting a sizable population of military members at particularly high risk for PTSD. Because the subgroup with additional risk due to prior assault can be identified prior to deployment, options for screening and prevention need to be considered. Further longitudinal investigation of those with prior assault will yield insight into the resiliency and/or vulnerability that this population may have in the resolution or recurrence of PTSD symptoms.

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Chapter 4 in full, and titled, “Prior Assault Increases the Likelihood of New-onset PTSD After Combat Deployment”, has been submitted for publication. The dissertation author was the primary investigator and author of this paper.

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in compliance with all applicable federal regulations governing the protection of human subjects in research (Protocol NHRC.2000.007).

TABLE 4.1. Baseline Characteristics of 5324 Millennium Cohort Members Free of PTSD* Symptoms or Diagnosis Before Combat Deployment† in Support of GWOT by Prior Assault (July 2001 – June 2003).

Baseline Characteristic	Women N = 881		Men N = 4443	
	No Assault n = 637 n (%)	Assault n = 244 n (%)	No Assault n = 4401 n (%)	Assault n = 402 n (%)
Birth year				
Pre-1960	84 (13.2)	30 (12.3)	633 (15.7)	54 (13.4)
1960-1969	203 (31.9)	85 (34.8)	1670 (41.3)	149 (37.1)
1970-1979	281 (44.1)	105 (43.0)	1534 (38.0)	173 (43.0)
1980 and forward	69 (10.8)	24 (9.8)	204 (5.1)	26 (11.3)
Education				
High school or less diploma/equivalent	316 (49.6)	139 (57.0)	2074 (51.3)	251 (62.4)
Some college or bachelor's	260 (40.8)	86 (35.3)	1625 (40.2)	124 (30.9)
Higher than bachelor's	61 (9.6)	19 (7.8)	342 (8.5)	27 (6.7)
Marital status				
Married	243 (38.2)	103 (42.2)	2803 (69.4)	237 (59.0)
Never married	315 (49.5)	99 (40.6)	1057 (26.2)	149 (37.1)
Divorced	79 (12.4)	42 (17.2)	181 (4.5)	16 (4.0)
Race/ethnicity				
White non-Hispanic	380 (59.7)	141 (57.8)	2766 (68.5)	293 (72.9)
Black non-Hispanic	118 (18.5)	46 (18.9)	359 (8.9)	32 (8.0)
Other	139 (21.8)	57 (23.4)	916 (22.7)	77 (19.2)
Smoking				
Never smoker	428 (67.2)	128 (52.5)	2398 (59.3)	190 (47.3)
Past cigarette smoker	121 (19.0)	56 (23.0)	961 (23.8)	113 (28.1)
Current cigarette smoker	88 (13.8)	60 (24.6)	682 (16.9)	99 (24.6)
Problem alcohol drinking				
No	576 (90.4)	186 (76.2)	3265 (80.8)	293 (72.9)
Yes	61 (9.6)	58 (23.8)	776 (19.2)	109 (27.1)
Deployment experience‡				
None prior	494 (77.6)	184 (75.4)	2069 (51.2)	218 (54.2)
1991 GW or Bos/Kos/SWA	143 (22.4)	60 (24.6)	1972 (48.8)	184 (45.8)
Military rank				
Enlisted	444 (69.7)	190 (77.9)	2819 (69.8)	319 (79.4)
Officer	193 (30.3)	54 (22.1)	1222 (30.2)	83 (20.7)
Service component				
Active duty	341 (53.5)	136 (55.7)	2629 (65.1)	253 (62.9)
Reserve/National Guard	296 (46.5)	108 (44.3)	1412 (34.9)	149 (37.0)
Branch of service				
Army	450 (70.6)	170 (69.7)	2681 (66.3)	266 (66.2)
Air Force	127 (19.9)	50 (20.5)	802 (19.9)	62 (15.4)
Navy and Coast Guard	51 (8.0)	18 (7.4)	246 (6.1)	33 (8.2)
Marines	9 (1.4)	6 (2.5)	312 (7.7)	41 (10.2)
Occupational category				
Combat specialists	56 (8.8)	25 (10.3)	1327 (32.8)	132 (32.8)
Healthcare specialists	157 (24.7)	61 (25.0)	323 (8.0)	34 (8.5)
Service supply and functional	216 (33.9)	96 (39.3)	841 (20.8)	89 (22.1)
Other occupations	208 (32.7)	62 (25.4)	1550 (38.4)	147 (36.6)

PTSD denotes posttraumatic stress disorder; GWOT Global War on Terrorism; PCL-C, PTSD Patient Checklist-Civilian Version; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.

* PTSD symptoms based on PCL-C and DSM-IV criteria and a sum of 50 points out of 85 points possible or a diagnosis of PTSD at baseline

†GWOT deployment considered if full deployment occurred between submission dates of baseline and follow-up questionnaires, and combat exposures reported.

‡ Deployment to the 1991 Gulf War, or Southwest Asia, Bosnia, or Kosovo anytime from January 1, 1998 to September 30, 2000.

TABLE 4.2. Characteristics of Those with Postdeployment New-onset PTSD* Symptoms Among 5324 Combat Deployed† Millennium Cohort Members; Baseline (July 2001 – June 2003) and Follow-up (July 2004 - Jan 2006).

Baseline Characteristic	Women N	Men N	New-onset PTSD* Symptoms	
			Women n (%)	Men n (%)
Overall	881	4443	117 (13.3)	288 (6.5)
Prior assault				
No	637	4041	64 (10.1)	238 (5.9)
Yes	244	402	53 (21.7)	50 (12.4)
Birth year				
Pre 1960	114	687	12 (10.5)	35 (5.1)
1960-1969	288	1819	32 (11.1)	95 (5.2)
1970-1979	386	1707	59 (15.3)	126 (7.4)
1980 and forward	93	230	14 (15.1)	32 (13.9)
Education				
High school or less diploma/equivalent	455	2325	81 (17.8)	222 (9.6)
Some college or bachelor's	346	1749	29 (8.4)	55 (3.4)
Higher than bachelor's	80	369	7 (8.8)	11 (3.0)
Marital status				
Married	346	3040	43 (12.4)	181 (6.0)
Never married	414	1206	56 (13.5)	94 (7.8)
Divorced	121	197	18 (14.9)	13 (6.6)
Race/ethnicity				
White non-Hispanic	521	3059	65 (12.5)	205 (6.7)
Black non-Hispanic	164	391	28 (17.1)	25 (6.4)
Other	196	993	24 (12.2)	58 (5.8)
Smoking				
Never smoker	556	2588	68 (12.2)	126 (4.9)
Past cigarette smoker	177	1074	22 (12.4)	77 (7.2)
Current cigarette smoker	148	781	27 (18.2)	85 (10.9)
Problem alcohol drinking				
No	762	3558	96 (12.6)	209 (5.9)
Yes	119	885	21 (17.7)	79 (8.9)
Deployment experience‡				
None prior	678	2287	87 (12.8)	172 (7.5)
1991 GW or Bos/Kos/SWA	203	2156	30 (14.8)	116 (5.4)
Military rank				
Enlisted	634	3138	100 (15.8)	253 (8.1)
Officer	247	1305	17 (6.9)	35 (3.0)
Service component				
Active duty	477	2882	66 (13.8)	157 (5.5)
Reserve/National Guard	404	1561	51 (12.6)	131 (8.4)
Branch of service				
Army	620	2947	94 (15.2)	238 (8.1)
Air Force	177	864	12 (6.8)	23 (2.7)
Navy and Coast Guard	69	279	8 (11.6)	10 (3.6)
Marines	15	353	3 (20.0)	17 (4.8)
Occupational category				
Combat specialists	81	1459	9 (11.1)	85 (5.8)
Healthcare specialists	218	357	18 (8.3)	21 (5.9)
Service supply and functional	312	930	56 (18.0)	71 (7.6)
Other occupations	270	1697	34 (12.6)	111 (6.5)

PTSD denotes posttraumatic stress disorder; PCL-C PTSD Patient Checklist-Civilian Version; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.

*New onset in those without baseline PTSD; PTSD symptoms based on PCL-C and DSM-IV criteria and a sum of 50 points out of 85 points possible or a diagnosis of PTSD at follow-up.

† Global War on Terrorism deployment considered if full deployment occurred between submission dates of baseline and follow-up questionnaires, and combat exposures reported.

‡ Deployment to the 1991 Gulf War, or Southwest Asia, Bosnia, or Kosovo anytime from January 1, 1998 to September 30, 2000.

TABLE 4.3. Odds of New-onset PTSD* Symptoms for Prior Assault Among 5324 Deployed† Millennium Cohort Members Reporting Combat Exposures; Baseline (July 2001 – June 2003) and Follow-up (July 2004 - Jan 2006).

	New-onset PTSD* Symptoms	
	Women n = 881 OR (95% CI)	Men n = 4443 OR (95% CI)
Prior assault (yes/no)		
Unadjusted	2.48 (1.67, 3.70)	2.27 (1.64, 3.14)
Adjusted for baseline birth year, education, race/ethnicity, prior deployment, military rank, service component, branch of service, and occupation	2.36 (1.56, 3.57)	2.12 (1.52, 2.96)
Adjusted for above plus baseline marital status, cigarette smoking, and problem alcohol drinking	2.27 (1.49, 3.47)	2.01 (1.44, 2.82)

PTSD denotes posttraumatic stress disorder; PCL-C PTSD Patient Checklist-Civilian Version; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed; OR, odds ratio; CI, confidence interval.

*New onset in those without baseline PTSD; PTSD symptoms based on PCL-C and DSM-IV criteria and a sum of 50 points out of 85 points possible or a diagnosis of PTSD at follow-up.

† Global War on Terrorism deployment considered if full deployment occurred between submission dates of baseline and follow-up questionnaires, and combat exposures reported

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CONCLUSIONS

Posttraumatic stress disorder (PTSD) is physically and mentally debilitating and is associated with comorbidities such as smoking,¹⁻⁴ alcohol use,^{5,6} coronary heart disease,⁷ and other mental and physical illnesses.⁸⁻¹¹ PTSD has been estimated to affect 7.7 million American adults¹² and is often thought of in relation to military combat,¹³⁻²¹ although symptoms can result from a variety of stressful events such as natural disasters,²² terrorist attacks,²³⁻²⁵ serious accidents,²⁶ death,²⁷ violent assaults or other physical, sexual, or emotional abuse.²⁸⁻³² This dissertation utilizes data from a large population-based military cohort to document prevalence of PTSD symptoms and diagnosis with associated exposures, prospective persistence and new-onset PTSD symptoms or diagnosis in relation to combat deployment in support of the Global War on Terrorism, and prior assault as a predictor for post-combat PTSD symptoms.

At baseline, the combined weighted prevalence of diagnosed and undiagnosed PTSD symptoms in the Millennium Cohort was 3.6%, with the majority (2.0%) being those with PTSD symptoms without a diagnosis. This is consistent with previous literature on PTSD prevalence.¹² The finding of diminished physical and mental health in association with current PTSD symptoms confirms previous findings.^{11,33} The strong association between current PTSD symptoms and lower levels of physical and mental health was anticipated, however, the dramatically lower levels of mental health among those with current symptoms with or without diagnosis is concerning. These individuals comprise a subgroup of military that reflects a perception of being physically fit for duty but who may be vulnerable to stress such as deployment to combat areas. Further, the

2.0% who reported PTSD symptoms without a PTSD diagnosis may be more vulnerable as they may lack the knowledge, understanding, or acceptance of the disorder and may not be noticed by healthcare providers or superiors. Routine screening for PTSD symptoms in the US military may be justified to identify those who might benefit from early treatment of PTSD.

This dissertation documents consistent patterns of demographic, military, and behavioral characteristics associated with PTSD symptoms. PTSD symptoms and diagnosis were more prevalent in women, those less educated, never married or divorced, and those who report current smoking and current problem drinking behaviors. Similarly, new-onset PTSD symptoms were more common in women, divorced, enlisted, and those who self-report current smoking and current problem drinking behaviors. Some differences were found in characteristics of persistent PTSD symptoms where older, higher educated, divorced, officers, Reserve/National Guard, Marines, health care specialists, and those who self-reported being a smoker or problem drinker at baseline were more likely to have PTSD symptoms at baseline and follow-up.

Of the 71% who participated in the follow-up questionnaire, new-onset PTSD symptoms or diagnosis were found in 2.8% of Cohort members defined by a specific criteria of DSM-IV with a sum of 50 points on the PCL-C, and in 3.5% of Cohort members using a more-sensitive criteria of the DSM-IV diagnosis alone. These new onset-PTSD symptom levels correspond to new incidence rates of 10 to 13 cases per 1,000 person years in the Millennium Cohort.

Studies have estimated as many as 31% of Vietnam War veterans developed PTSD at some point following the war, with between 9% and 15% having PTSD by the end of the 1980s.³⁴⁻³⁶ Among 1991 Gulf War veterans, as many as 10% were reported to have PTSD symptoms years after returning from deployment.^{15, 37} In this dissertation, new-onset PTSD symptoms or diagnosis was identified in 1% to 10% after an average of 1-year from end of deployment to follow-up questionnaire submission. This dissertation documents a threefold adjusted increase in risk of new-onset PTSD symptoms among those deployed who also report combat exposures when compared with nondeployed Cohort members. This finding was consistent for each service; Army, Air Force, Navy and Coast Guard, and Marines. Those who were deployed without combat exposures may be thought of as a better comparison group. These data correspond to up to a 6-fold increase of new-onset PTSD and as many as many as 87 cases of PTSD symptoms per 1,000 combat deployers when compared with 21 cases of new-onset PTSD symptoms in non-combat deployers. This suggests that up to 76% of new-onset PTSD symptoms or diagnosis may be attributed to combat exposures in deployers. Importantly, there was no significant increase in risk of new-onset PTSD symptoms in deployers who did not report combat exposures. This suggests that deployment, in itself, may not lead to the onset of PTSD symptoms, but rather exposures during deployment significantly contribute to the onset of PTSD symptoms.

Although the intensity of combat are comparable, estimates of prevalence and new-onset PTSD symptoms are lower after deployment to the current Global War on Terrorism when compared to reported levels after the Vietnam and 1991 Gulf Wars.

However, the current studies have been conducted in close temporal proximity to deployment whereas PTSD symptoms after Vietnam and 1991 Gulf War were estimated many years out from the war. Future longitudinal investigation of the Millennium Cohort will yield information that will document the benefit of current PTSD screening efforts or perhaps will approach levels of PTSD symptoms found after the Vietnam or 1991 Gulf Wars.

This dissertation also investigated the temporality of PTSD symptoms after stressful experiences. While Millennium Cohort data were not designed to identify when new-onset PTSD symptoms begin, these data may give some insight into potential times to screen for PTSD symptoms. The appropriate time to screen for PTSD after traumatic or stressful experiences has been explored in past reports.³⁸⁻⁴⁰ The temporal assessment of new-onset PTSD symptoms or diagnosis among deployers reporting combat exposures suggests that 6 and 10 months postdeployment may be when symptoms are most prevalent. Attempting to understand the apparent bimodal distribution, investigations were conducted among deployers by single deployers, multiple deployers, males, females, officers, and enlisted and all were consistent in distribution. Investigation of nondeployers found the percentage of new-onset PTSD symptoms or diagnosis to be consistent month to month, suggesting the uniqueness of the bimodal distribution in those who deployed and reported combat exposures. These data allowed an exploratory look at the temporal association between stressful experiences and onset of PTSD symptoms and may suggest different forms of PTSD postdeployment. Future research may better define the timing of new-onset PTSD symptoms by asking those with PTSD when symptoms

began which, in turn, could lead health care professionals to more efficient and productive screening approaches.

The predisposition or vulnerability for new onset of PTSD symptoms in military personnel after stressful combat deployments is not well understood. Likewise, any resilience conferred by surviving prior trauma without PTSD is not well understood. Identifying subgroups of military personnel with increased risk for post-combat PTSD symptoms may help to focus preventive efforts prior to deployment, as well as consideration of screening for individuals that may be vulnerable to combat-induced PTSD. In this dissertation, women and men who reported prior assault at baseline were found to have more than twice the risk of new-onset PTSD symptoms or diagnosis after combat deployment in support of the Global War on Terrorism. Because additional risk of PTSD symptoms due to prior assault can be identified prior to deployment, options for focused screening and prevention may have significant impact on the overall and long-term burden of PTSD.

PTSD is likely a result of varying degrees of genetic, environmental, and psychological factors and may be biologically related to the production of fear and anxiety through the brain.⁴¹ Using brain imaging technology, limited research suggests that right hippocampal atrophy may be more evident in combat veterans with PTSD.⁴² Using the Millennium Cohort to conduct neuroimaging of select populations pre and post combat exposures could lead to further understanding of the temporal pathway of PTSD and result in better treatments for anxiety disorders.

Limitations to these analyses should be considered. Although these analyses are weighted based on the designed oversampling of female, deployed, and Reserve/Guard members, there were additional, albeit small, proportional differences between responders and nonresponders.⁴³ Further, it is possible that those who were ill may have believed that inclusion in a study of this type might be of benefit to them, resulting in a possible overestimation of the true prevalence of PTSD. Conversely, those who may have been physically or mentally ill, specifically those who may have PTSD, may have found the survey distressing and chose not to respond, potentially underestimating the true prevalence of PTSD. However, a recent report suggests that pre-enrollment health, as measured by hospital encounters and outpatient care, was consistent when comparing Cohort members with nonresponders (data not yet published). Self-report of exposures and outcome data used to represent the true exposure and disease prevalence may be limited. Studies have shown that increased exposure and symptom reporting occur among personnel seeking medical compensation.⁴⁴ However, compensation is not offered to Millennium Cohort participants, and this may mitigate this bias. Further, Millennium Cohort data analyses of occupation, exposure, and health outcomes have found the Cohort to have reliable data.⁴⁵⁻⁴⁷ Also, it was not possible to discern those exposures that are truly unique to military service from those that could be encountered through other occupational or nonoccupational activities. Although many investigations have been conducted to validate or establish reliability of the Millennium Cohort questionnaire responses (data not yet published), the validity of self-reported exposure data could not be evaluated against objective exposure information. Lastly, although the

PCL-C has undergone thorough testing and has been found to correlate well with a physician's assessment of PTSD, the use of a survey instrument as a surrogate for PTSD diagnosis is imperfect.

There are also many strengths to these analyses. Although self-reported data are inherently limited, they are also invaluable for the information they provide that is not accessible elsewhere. Not only is there a lack of objective exposure data available but PTSD is often underreported in healthcare databases. Self-reported instruments are essential tools for identifying this disorder in populations not readily submitting for care for mental disorders. Additionally, the large sample, including a large population of women, allows for robust estimation of prevalence and associations. The use of a standard instrument allows for comparison with other populations, such as the US population in general and other military populations.

In summary, leveraging a large population based military cohort, this dissertation confirms lower levels of mental and physical health in those with current PTSD symptoms and a relatively large burden of undiagnosed PTSD symptoms. Furthermore, new-onset PTSD symptoms and diagnosis in a select group of deployed military members who report combat exposures, and a vulnerability to combat stress by those experiencing previous assaults was documented. Vigilance of families and healthcare professionals in the early detection and acceptance of PTSD will have resounding influence on the future burden of PTSD in this population. Prompt treatment of individuals, returning them to non-symptomatic levels of PTSD, could reduce the risk of adverse health behaviors such as problem drinking and smoking. Systematic screening for PTSD symptoms and other

mental health morbidity in the US military should be considered as part of routine health maintenance with certain subpopulations screened at multiple and various times post deployment. Further prospective evaluation of new-onset, persistence, and resolution of PTSD symptoms using the Millennium Cohort will yield insight into the temporality of PTSD symptoms years after stressful military experiences.

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Appendix

Panel 1 Wave 1; Baseline

6590254483



www.MillenniumCohort.org

WE NEED YOUR HELP. This questionnaire is an important part of providing you with the best military and veterans' health care policy possible. Your answers will help the Department of Defense to better understand how to prevent disease among military personnel by monitoring health status over time.

YOUR NAME WAS RANDOMLY CHOSEN for participation in this study through a scientific process, matching your service characteristics with those of approximately 100 other service members you will represent through your individual responses.

WE UNDERSTAND THAT YOU ARE BUSY. However, the results of this study will not truly portray the current health status of our military if we only include participants who have extra time to complete the questionnaire. Your individual response is critical to capture important information regarding the health of the military.

EVEN IF YOU HAVE RETIRED OR LEFT MILITARY SERVICE, we need you to complete the questionnaire. You still provide information important to our understanding of military service and subsequent health status.

THE QUESTIONNAIRE CAN BE COMPLETED ONE OF TWO WAYS. You may complete this paper questionnaire with pencil or pen and return it through the mail in the enclosed business reply envelope. Or, you may go to www.MillenniumCohort.org and complete the same questionnaire over the secure web site. To do so, use the last four digits of your social security number and your Subject ID number, found below the barcode on this page. ***The choice is yours!***

THIS INFORMATION IS FOR RESEARCH PURPOSES ONLY. According to the DoD Policy, "Interim Regulations to Improve Privacy Protections for DoD Medical Records" dated October 31, 2000, the information you provide is for research purposes only and may not be disclosed except for specifically authorized purposes or with the consent of the individual about whom the information pertains. Uses and disclosures of this information shall comply with provisions of the Privacy Act and implementing regulations.

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Consent Form

(Please Read and Sign Before Starting the Questionnaire)

★ What is the study about?

You are being asked to be a volunteer in a research study called "The Millennium Cohort Study." This study will follow the long-term health of military personnel during and after their military service. The purpose is to assess the health risks of military deployment, military occupations, and general military service. You have been scientifically selected to represent your service branch, gender, service type, military occupation, and age group from among the over two million military personnel serving as of October 2000 in the regular active duty, Reserve, and National Guard forces. ***It is very important that you participate because no one else can provide the data your country and fellow service men and women need from you.***

★ What will participation involve?

You are being asked to do the following:

1. Complete the attached questionnaire today. The questionnaire asks about your physical and mental health. The questions are similar to those a doctor or mental health professional might ask you on your first visit, with specific questions related to possible traumatic life events or experiences of military service. You are also being asked to complete 6 similar surveys that will be sent to you once every 3 years, for a total of 21 years. Filling out the questionnaire will take about 30 minutes each time you complete it.
2. Grant permission for researchers to review electronic military records of your deployments, assignments, promotions, and health care use. These data are very important in determining if your military service, occupation, and operational exposures are likely to have caused any of your illnesses, injuries, or diseases.

You will be contacted annually by mail to verify your current address. In addition, there is a 3% chance that you will be contacted by telephone to confirm your original answers on the questionnaire. Participants will be selected at random for this verification. You are one of approximately 140,000 volunteers who are being asked to participate in this very important study.

★ What risks are involved in the study?

The data collection procedures are not expected to involve any risk or discomfort to you. The only risks to you are those associated with the inappropriate disclosure of the data you provide. However, this research group has collected similar information from hundreds of studies during the past several years without any cases of inappropriate disclosure.

★ How will your data be protected against those risks?

All questionnaires will be kept in locked files. When your data are entered into computer files for analysis, your answers will be identified only by a special study identification number known to you and research team members. This number is located on the barcode of your study envelope and survey. Your social security number and any other personal identification information will be removed from your questionnaire and data file upon return to the researchers. Even if someone outside the research team broke into the files, it would be impossible for them to identify your data. To minimize the risk of anyone breaking into the data files, those files will be maintained on Department of Defense (DoD) computers protected by all the measures required by DoD computer security regulations. All members of the research team with access to the data files will be trained in DoD computer security procedures specifically designed to protect sensitive data. Reports of the study findings will contain only group data (e.g., all males or all privates), so that no individual study participant can be identified. Similar procedures have been used to protect data in previous studies conducted within the Naval Health Research Center.

According to the DoD Policy "Interim Regulations to Improve Privacy Protections for DoD Medical Records" dated October 31, 2000, the information you provide is for research purposes only and may not be disclosed except for specifically authorized purposes or with the consent of the individual about whom the information pertains. Uses and disclosures of this information shall comply with provisions of the Privacy Act and implementing regulations.

continued on page 4....

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continued from page 3....

★ *How is your data protected if you complete the questionnaire using the Internet web site option?*

All information collected through the Internet questionnaire option is done by using Secure Sockets Layer (SSL) data transmission lines. SSL encrypts, or scrambles, all the questionnaire data sent over the Internet. The data will only be understandable when it reaches the investigator database. The same methods of protection listed above will then be followed to further protect your information.

★ *What are the benefits of participating in the study?*

While we cannot guarantee that your participation in this study will directly benefit you, it is possible that, should we learn that your military service has put you at risk for disease, we may be able to notify you that such a disease risk might be reduced. **More importantly, your participation will help define health care policy for future generations of military personnel and guide prevention and treatment programs for years to come.**

★ *Do you have to participate?*

No, you do not! Your participation must be completely voluntary. If you decide to participate, you can stop at any time you wish or skip any question you choose. If you choose not to participate or if you later drop out of the study, you will not lose any rights or benefits to which you are otherwise entitled.

★ *Who can provide additional information if you need it?*

Questions about the research (science) aspects of this study should be directed to the principal investigator of the Millennium Cohort Study, at telephone (619) 553-7027. You may also refer to the web site at www.MillenniumCohort.org for more information. Questions about the ethical aspects of this study, your rights as a volunteer, or any problem related to the protection of research volunteers should be directed to Dr. Ross Vickers, Chairperson, Committee for the Protection of Human Subjects, Naval Health Research Center, at telephone (619) 553-0633.

★ *Where can you find your records if you wish to review them?*

The principal investigator will be responsible for storing the consent form and other research records related to this study. The records will be stored at the DoD Center for Deployment Health Research, Naval Health Research Center, P.O. Box 85122, San Diego, CA, 92186-85122.

Voluntary Consent

I consent to participate in the study described above. My consent is completely voluntary and is based solely on the information provided in this consent form.

Volunteer's signature

Date (mm/dd/yy)

Volunteer's printed name (first, middle initial, last)

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Consent For office use only



Please turn the page to begin the questionnaire.

PRIVACY ACT STATEMENT: You have rights under the Privacy Act. The following statement describes how that Act applies to this study:

Authority: Authority to request this information is granted under Title 5, U.S. Code 136, the Department of Defense Regulations, Executive Order 9396, and DoD RCS#DD-HA(AR)2106 (expires 11-01-03). Personal identifiers will be used to link survey data with medical and other military records.

Purpose: Medical research information will be collected in a research project titled "Prospective Studies of U.S. Military Forces: The Millennium Cohort Study." The project objective is to enhance basic medical knowledge and to improve the treatment and prevention of illnesses that may be related to military service.

Routine Uses: The information provided in this questionnaire will be maintained in data files at the DoD Center for Deployment Health Research at the Naval Health Research Center and used only for medical research purposes. Use of these data may be granted to other federal and non-federal medical research agencies as approved by the Naval Health Research Center's Institutional Review Board. However, your personal identifiers will be protected. By signing the enclosed consent form, you are volunteering to disclose your information as identified above. If you do not agree to this disclosure, your failure will make the research less useful. The "Blanket Routine Uses" that appears at the beginning of the Department of Defense's compilation of medical data bases also applies to this system.

Anonymity: All responses will be held in confidence by the DoD Center for Deployment Health Research. Information you provide will be considered only when statistically summarized with the responses of others. Your personal identifiers (name, etc) will only be used to link data sets and then the identifiers will be stripped from study data such that medical researchers cannot identify you individually.

Voluntary Disclosure: Completion of the questionnaire is voluntary. Failure to respond to any of the questions will NOT result in any penalties except possible lack of representation of your views in the final results and outcomes.

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UoD RCS#DD-HA(AR)2106 exp 11-01-03

The Millennium Cohort Study Questionnaire



INSTRUCTIONS

- *Use a black/blue pen or no. 2 pencil.
- *Completely erase any marks you wish to change.
- *Do not make any stray marks on this form.
- *When printing, please use CAPITAL LETTERS and avoid contact with the edge of the box.
- *Please answer every question as honestly as possible and to the best of your ability, unless you are requested to skip over a question. The questionnaire will take between 20-30 minutes to complete.
- *Please feel free to reference any records you may have in your possession.
- *You may also complete this questionnaire on the web at www.MillenniumCohort.org

1. Is the original mailing address label on your envelope correct? ----- NO YES

If "NO," please indicate your correct address below:

NUMBER	STREET		
BUILDING/APARTMENT/UNIT NUMBER			
CITY (FPO/APO)	STATE	ZIP CODE	-
COUNTRY			

Should you move, please log on to www.MillenniumCohort.org and enter your new mailing address, phone number, and email address.

2. What is today's date?

		/			/				
mm			dd			yyyy			

3. What are the last four digits of your social security number?

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4. What is your **CURRENT** marital status? Choose the single best answer:

- Single, never married
- Now married
- Separated
- Divorced
- Widowed

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5. What is the highest level of education that you have **COMPLETED**? Choose the single best answer:

- Less than high school completion/diploma
- High school degree/GED/or equivalent
- Some college, no degree
- Associate's degree
- Bachelor's degree
- Master's, doctorate, or professional degree

6. Are you a twin? ----- NO YES

7. Approximately how much do you weigh (in pounds)?

pounds

8. How tall are you? For example, a person who is 5'8" tall would write 5 feet 08 inches.

feet inches

9. Has your doctor or other health professional **EVER** told you that you have any of the following conditions?

	NO	YES	If YES, what year did the problem begin?			
a. Hypertension (high blood pressure) -----	<input type="radio"/>	<input type="radio"/>				
b. Coronary heart disease -----	<input type="radio"/>	<input type="radio"/>				
c. Heart attack -----	<input type="radio"/>	<input type="radio"/>				
d. Angina (chest pain) -----	<input type="radio"/>	<input type="radio"/>				
e. Any other heart condition please specify <input type="text"/>	<input type="radio"/>	<input type="radio"/>				
f. Sinusitis -----	<input type="radio"/>	<input type="radio"/>				
g. Chronic bronchitis -----	<input type="radio"/>	<input type="radio"/>				
h. Emphysema -----	<input type="radio"/>	<input type="radio"/>				
i. Asthma -----	<input type="radio"/>	<input type="radio"/>				
j. Kidney failure requiring dialysis -----	<input type="radio"/>	<input type="radio"/>				
k. Bladder infection -----	<input type="radio"/>	<input type="radio"/>				
l. Pancreatitis -----	<input type="radio"/>	<input type="radio"/>				
m. Diabetes or sugar diabetes -----	<input type="radio"/>	<input type="radio"/>				
n. Gallstones -----	<input type="radio"/>	<input type="radio"/>				
o. Hepatitis B -----	<input type="radio"/>	<input type="radio"/>				
p. Hepatitis C -----	<input type="radio"/>	<input type="radio"/>				
q. Any other hepatitis -----	<input type="radio"/>	<input type="radio"/>				
r. Cirrhosis -----	<input type="radio"/>	<input type="radio"/>				
s. Rheumatoid arthritis -----	<input type="radio"/>	<input type="radio"/>				
t. Lupus -----	<input type="radio"/>	<input type="radio"/>				
u. Multiple sclerosis -----	<input type="radio"/>	<input type="radio"/>				
v. Crohn's disease -----	<input type="radio"/>	<input type="radio"/>				
w. Stomach, duodenal, or peptic ulcer -----	<input type="radio"/>	<input type="radio"/>				
x. Ulcerative colitis or proctitis -----	<input type="radio"/>	<input type="radio"/>				
y. Significant hearing loss -----	<input type="radio"/>	<input type="radio"/>				

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Question 9 continued....

	NO	YES	If YES, what year did the problem begin?			
z. Migraine headaches	<input type="radio"/>	<input type="radio"/>				
aa. Stroke	<input type="radio"/>	<input type="radio"/>				
bb. Neuropathy-caused reduced sensation in hands or feet	<input type="radio"/>	<input type="radio"/>				
cc. Seizures	<input type="radio"/>	<input type="radio"/>				
dd. Sleep apnea	<input type="radio"/>	<input type="radio"/>				
ee. Anemia	<input type="radio"/>	<input type="radio"/>				
ff. Thyroid condition other than cancer	<input type="radio"/>	<input type="radio"/>				
gg. Cancer please specify <input type="text"/>	<input type="radio"/>	<input type="radio"/>				
hh. Chronic fatigue syndrome	<input type="radio"/>	<input type="radio"/>				
ii. Depression	<input type="radio"/>	<input type="radio"/>				
jj. Schizophrenia or psychosis	<input type="radio"/>	<input type="radio"/>				
kk. Manic-depressive disorder	<input type="radio"/>	<input type="radio"/>				
ll. Posttraumatic stress disorder	<input type="radio"/>	<input type="radio"/>				
mm. Other please specify <input type="text"/>	<input type="radio"/>	<input type="radio"/>				

10. DURING THE LAST 12 MONTHS, have you had persistent or recurring problems with any of the following conditions?

	NO	YES	If YES, what year did the problem begin?			
a. Severe headache	<input type="radio"/>	<input type="radio"/>				
b. Diarrhea	<input type="radio"/>	<input type="radio"/>				
c. Rash or skin ulcer	<input type="radio"/>	<input type="radio"/>				
d. Sore throat	<input type="radio"/>	<input type="radio"/>				
e. Frequent bladder infections	<input type="radio"/>	<input type="radio"/>				
f. Cough	<input type="radio"/>	<input type="radio"/>				
g. Fever	<input type="radio"/>	<input type="radio"/>				
h. Sudden unexplained hair loss	<input type="radio"/>	<input type="radio"/>				
i. Earlobe pain	<input type="radio"/>	<input type="radio"/>				
j. Sleepy all the time	<input type="radio"/>	<input type="radio"/>				
k. Night sweats	<input type="radio"/>	<input type="radio"/>				
l. Chest pain	<input type="radio"/>	<input type="radio"/>				
m. Unusual muscle pains	<input type="radio"/>	<input type="radio"/>				
n. Shortness of breath	<input type="radio"/>	<input type="radio"/>				
o. Trouble sleeping	<input type="radio"/>	<input type="radio"/>				
p. Unusual fatigue	<input type="radio"/>	<input type="radio"/>				
q. Forgetfulness	<input type="radio"/>	<input type="radio"/>				
r. Confusion	<input type="radio"/>	<input type="radio"/>				
s. Other please specify <input type="text"/>	<input type="radio"/>	<input type="radio"/>				

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11. **DURING THE LAST 4 WEEKS**, how much have you been bothered by any of the following problems?

	NOT BOTHERED	BOTHERED A LITTLE	BOTHERED A LOT
a. Stomach pain -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Back pain -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Pain in your arms, legs, or joints (knees, hips, etc)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Pain or problems during sexual intercourse -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Headaches -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Chest pain -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Dizziness -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Fainting spells -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Feeling your heart pound or race -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Shortness of breath -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Constipation, loose bowels, or diarrhea -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Nausea, gas, or indigestion -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Women only: menstrual cramps or other problems with your periods -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. **OVER THE LAST 2 WEEKS**, how often have you been bothered by any of the following problems?

	NOT AT ALL	SEVERAL DAYS	MORE THAN HALF THE DAYS	NEARLY EVERY DAY
a. Little interest or pleasure in doing things -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Feeling down, depressed, or hopeless -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Trouble falling or staying asleep or sleeping too much -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Feeling tired or having little energy -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Poor appetite or overeating -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Feeling bad about yourself - or that you are a failure or have let yourself or your family down -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Trouble concentrating on things, such as reading the newspaper or watching television -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Moving or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Thoughts that you would be better off dead or of hurting yourself in some way -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you have been frequently bothered by several of the items listed above, you may want to seek help from a health professional in your area.

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13. Questions about anxiety.

	NO	YES
a. IN THE LAST 4 WEEKS , have you had an anxiety attack - suddenly feeling fear or panic?	<input type="radio"/>	<input type="radio"/>
If you checked "NO," please go to question 15.		
b. Has this ever happened to you before?	<input type="radio"/>	<input type="radio"/>
c. Do some of these attacks come suddenly out of the blue - that is, in situations where you don't expect to be nervous or uncomfortable?	<input type="radio"/>	<input type="radio"/>
d. Do these attacks bother you a lot, or are you worried about having another attack?	<input type="radio"/>	<input type="radio"/>

14. Think about your last bad anxiety attack.

	NO	YES
a. Were you short of breath?	<input type="radio"/>	<input type="radio"/>
b. Did your heart race, pound, or skip?	<input type="radio"/>	<input type="radio"/>
c. Did you have chest pain or pressure?	<input type="radio"/>	<input type="radio"/>
d. Did you sweat?	<input type="radio"/>	<input type="radio"/>
e. Did you feel as if you were choking?	<input type="radio"/>	<input type="radio"/>
f. Did you have hot flashes or chills?	<input type="radio"/>	<input type="radio"/>
g. Did you have nausea or an upset stomach, or the feeling that you were going to have diarrhea?	<input type="radio"/>	<input type="radio"/>
h. Did you feel dizzy, unsteady, or faint?	<input type="radio"/>	<input type="radio"/>
i. Did you have tingling or numbness in parts of your body?	<input type="radio"/>	<input type="radio"/>
j. Did you tremble or shake?	<input type="radio"/>	<input type="radio"/>
k. Were you afraid you were dying?	<input type="radio"/>	<input type="radio"/>

15. **OVER THE LAST 4 WEEKS**, how often have you been bothered by any of the following problems?

	NOT AT ALL	SEVERAL DAYS	MORE THAN HALF THE DAYS
a. Feeling nervous, anxious, on edge, or worrying a lot about different things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you checked "NOT AT ALL," go to question 16.			
b. Feeling restless so that it is hard to sit still.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Getting tired very easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Muscle tension, aches, or soreness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Trouble falling asleep or staying asleep.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Trouble concentrating on things, such as reading a book or watching TV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Becoming easily annoyed or irritable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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16. Questions about eating. NO YES

- a. Do you often feel that you can't control what or how much you eat? -----
- b. Do you often eat, within any 2 hour period, what most people would regard as an unusually large amount of food? -----

If you checked "NO," to either question 16a or 16b, go to question 19.

- c. Has this been as often, on average, as twice a week for the last 3 months? -----

17. **IN THE LAST 3 MONTHS**, have you done any of the following in order to avoid gaining weight? NO YES

- a. Made yourself vomit? -----
- b. Took more than twice the recommended dose of laxatives? -----
- c. Fasted - not eaten anything at all for at least 24 hours? -----
- d. Exercised for more than an hour specifically to avoid gaining weight after binge eating? -----

18. If you checked "YES" to any of these ways of avoiding gaining weight, were any as often, on average, as twice a week? ----- NO YES

19. If you checked any problems on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

- NOT DIFFICULT AT ALL SOMEWHAT DIFFICULT VERY DIFFICULT EXTREMELY DIFFICULT

20. **IN THE LAST 4 WEEKS**, how much have you been bothered by any of the following problems?

	NOT BOTHERED	BOTHERED A LITTLE	BOTHERED A LOT
--	--------------	-------------------	----------------

- | | | | |
|---|-----------------------|-----------------------|-----------------------|
| a. Worrying about your health ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b. Your weight or how you look ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c. Little or no sexual desire or pleasure during sex ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d. Difficulties with husband/wife, partner/lover, or boyfriend/girlfriend ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e. The stress of taking care of children, parents, or other family members ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f. Stress at work outside of the home or at school ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| g. Financial problems or worries ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| h. Having no one to turn to when you have a problem ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| i. Something bad that happened <u>recently</u> ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| j. Thinking or dreaming about something terrible that happened to you in <u>the past</u> - like your house being destroyed, a severe accident, being hit or assaulted, or being forced to commit a sexual act ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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21. **IN THE LAST YEAR**, have you been hit, slapped, kicked, or otherwise physically hurt by someone, or has anyone forced you to have an unwanted sexual act? ----- NO YES

22. Are you **CURRENTLY** taking any medicine for anxiety, depression, or stress? ----- NO YES

23. **OVER THE PAST MONTH**, how many hours of sleep did you get in an average 24-hour period? ----- hours

If you are **MALE**, please go to question 25.
If you are **FEMALE**, please go to question 24.

24. **FOR WOMEN ONLY: Questions about menstruation, pregnancy, and childbirth.**

a. Which best describes your menstrual periods?

- No periods because pregnant or recently gave birth
- No periods for over a year and unrelated to pregnancy or childbirth
- Periods regulated by hormone replacement (estrogen) therapy or oral contraceptives
- Periods unregulated and unchanged for over a year
- Periods have become irregular or changed in frequency, duration, and/or amount in last year

- | | NO | YES | DOES NOT APPLY |
|--|-----------------------|-----------------------|-----------------------|
| b. During the week before your period starts, do you have a <u>serious</u> problem with your mood - like depression, anxiety, irritability, anger, or mood swings? ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c. If YES: Do these problems go away by the end of your period? ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d. Have you given birth within the last 3 years? ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e. Have you had a miscarriage within the last 3 years? ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f. During the last 3 years have you tried and been unable to become pregnant? ----- | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
a. Repeated, disturbing memories of stressful experiences from the past. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Repeated, disturbing dreams of stressful experiences from the past. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Suddenly acting or feeling as if stressful experiences were happening again. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Feeling very upset when something happened that reminds you of stressful experiences from the past. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Trouble remembering important parts of stressful experiences from the past. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 25 continued on page 13

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Question 25 continued....

	NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
f. Loss of interest in activities that you used to enjoy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Feeling distant or cut off from other people. ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Feeling emotionally numb, or being unable to have loving feelings for those close to you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Feeling as if your future will somehow be cut short.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Trouble falling asleep or staying asleep.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Feeling irritable or having angry outbursts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Having difficulty concentrating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Being "super-alert" or watchful or on guard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Feeling jumpy or easily startled.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Having physical reactions when something reminds you of stressful experiences from the past.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Avoid thinking about your stressful experiences from the past or avoid having feelings about them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. Avoid activities or situations because they remind you of stressful experiences from the past.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. In general, would you say your health is: (Please check only one.)

- EXCELLENT
 VERY GOOD
 GOOD
 FAIR
 POOR

27. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	YES, LIMITED A LOT	YES, LIMITED A LITTLE	NO, NOT LIMITED AT ALL
a. Vigorous activities , such as running, lifting heavy objects, participating in strenuous sports?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Moderate activities , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Lifting or carrying groceries?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Climbing several flights of stairs?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Climbing one flight of stairs?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Bending, kneeling, or stooping?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Walking more than a mile ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Walking several blocks?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Walking one block?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Bathing or dressing yourself?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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28. **DURING THE PAST 4 WEEKS**, have you had any of the following problems with your work or other regular daily activities *as a result of your physical health*?

	NO, NONE OF THE TIME	YES, A LITTLE OF THE TIME	YES, SOME OF THE TIME	YES, MOST OF THE TIME	YES, ALL OF THE TIME
a. Cut down the amount of time you spent on work or other activities. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Accomplished less than you would like. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Were limited in the kind of work or other activities. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Had difficulty performing the work or other activities (for example, it took extra effort). -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. **DURING THE PAST 4 WEEKS**, have you had any of the following problems with your work or other regular daily activities *as a result of any emotional problems* (such as feeling depressed or anxious)?

	NO, NONE OF THE TIME	YES, A LITTLE OF THE TIME	YES, SOME OF THE TIME	YES, MOST OF THE TIME	YES, ALL OF THE TIME
a. Cut down the amount of time you spent on work or other activities. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Accomplished less than you would like.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Didn't do work or other activities as carefully as usual. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30. **DURING THE PAST 4 WEEKS**, *to what extent* has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

NOT AT ALL SLIGHTLY MODERATELY QUITE A BIT EXTREMELY

31. **DURING THE PAST 4 WEEKS**, how much bodily pain have you had?

NONE VERY MILD MILD MODERATE SEVERE VERY SEVERE

32. **DURING THE PAST 4 WEEKS**, how much did pain interfere with your normal work (including both work outside the home and housework)?

NOT AT ALL A LITTLE BIT MODERATELY QUITE A BIT EXTREMELY

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33. These questions are about how you feel and how things have been with you DURING THE PAST 4 WEEKS. For each question, please give the one answer that comes closest to the way you have been feeling. DURING THE PAST 4 WEEKS, how much of the time:

	ALL OF THE TIME	MOST OF THE TIME	A GOOD BIT OF THE TIME	SOME OF THE TIME	A LITTLE OF THE TIME	NONE OF THE TIME
a. Did you feel full of pep?-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Have you been a very nervous person? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Have you felt so down in the dumps that nothing could cheer you up? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Have you felt calm and peaceful? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Did you have a lot of energy? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Have you felt downhearted and blue? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Did you feel worn out? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Have you been a happy person? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Did you feel tired? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. DURING THE PAST 4 WEEKS, how much of the time has your *physical health or emotional problems* interfered with your social activities (like visiting with friends, relatives)?

ALL OF THE TIME MOST OF THE TIME SOME OF THE TIME A LITTLE OF THE TIME NONE OF THE TIME

35. Please choose the answer that best describes *how true or false* EACH of the following statements is for you.

	DEFINITELY TRUE	MOSTLY TRUE	NOT SURE	MOSTLY FALSE	DEFINITELY FALSE
a. I seem to get sick a little easier than other people. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I am as healthy as anybody I know. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I expect my health to get worse. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. My health is excellent. -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Now we'd like to ask you some questions about how your health may have changed.

36. COMPARED TO 3 YEARS AGO, how would you rate your *physical health* in general now?

MUCH BETTER SOMEWHAT BETTER ABOUT THE SAME SOMEWHAT WORSE MUCH WORSE

37. COMPARED TO 3 YEARS AGO, how would you rate your *emotional health or well-being* (such as feeling anxious, depressed, or irritable) *now*?

MUCH BETTER SOMEWHAT BETTER ABOUT THE SAME SOMEWHAT WORSE MUCH WORSE

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38. Besides your regular physician, we'd like to ask you about other ways you may treat your health problems. IN THE LAST 12 MONTHS, have you used:

NO YES

- a. Acupuncture ----- NO YES
- b. Chiropractic care ----- NO YES
- c. Herbal therapy ----- NO YES
- d. High dose/megavitamin therapy ----- NO YES
- e. Special diet programs for weight loss ----- NO YES

If YES, how many shots of the anthrax vaccine have you received?

39. Have you received the anthrax vaccine? ----- NO YES ----- shots

These next few questions are about drinking alcoholic beverages. Some studies have shown that alcohol consumption is related to certain medical conditions. Alcoholic beverages include liquor such as whiskey, gin, beer, wine, wine coolers, and any other type of alcoholic beverage. For the purpose of this questionnaire:

One drink = one 12-ounce beer, one 4-ounce glass of wine, or one 1.5 ounce shot of liquor

40. IN ANY ONE YEAR, have you had a total of 12 drinks of any type of alcoholic beverage (including beer and wine)? ----- NO YES

41. IN YOUR ENTIRE LIFE, have you had at least 12 drinks of any type of alcoholic beverage (including beer and wine)? ----- NO YES

If you checked "YES," go to question 42.
If you checked "NO," go to question 50.

42. IN THE PAST YEAR, have you had at least 12 drinks of any type of alcoholic beverage? --- NO YES

If you checked "YES," go to question 43.
If you checked "NO," go to question 50.

43. IN THE PAST YEAR, how OFTEN did you typically drink any type of alcoholic beverage?

- NEVER
- RARELY
- MONTHLY
- WEEKLY
- DAILY

44. IN THE PAST YEAR, on those days that you drank alcoholic beverages, on average, how many drinks did you have? ----- drinks

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45. IN A TYPICAL WEEK, how many drinks do you have? drinks

46. LAST WEEK, how many drinks of alcoholic beverages did you have?

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>

47. IN THE PAST YEAR, on how many DAYS did you have 5 or more drinks of any alcoholic beverage? days

48. IN THE LAST 12 MONTHS, have any of the following happened to you MORE THAN ONCE? NO YES

- | | | |
|--|-----------------------|-----------------------|
| a. You drank alcohol even though a doctor suggested that you stop drinking because of a problem with your health | <input type="radio"/> | <input type="radio"/> |
| b. You drank alcohol, were high from alcohol, or hung over while you were working, going to school, or taking care of children or other responsibilities | <input type="radio"/> | <input type="radio"/> |
| c. You missed or were late for work, school, or other activities because you were drinking or hung over | <input type="radio"/> | <input type="radio"/> |
| d. You had a problem getting along with people while you were drinking | <input type="radio"/> | <input type="radio"/> |
| e. You drove a car after having several drinks or after drinking too much | <input type="radio"/> | <input type="radio"/> |

49. Have you EVER felt any of the following? NO YES

- | | | |
|---|-----------------------|-----------------------|
| a. Felt you needed to cut back on your drinking | <input type="radio"/> | <input type="radio"/> |
| b. Felt annoyed at anyone who suggested you cut back on your drinking | <input type="radio"/> | <input type="radio"/> |
| c. Felt you needed an "eye-opener," or early morning drink | <input type="radio"/> | <input type="radio"/> |
| d. Felt guilty about your drinking | <input type="radio"/> | <input type="radio"/> |

50. IN THE PAST YEAR, have you used any of the following tobacco products? NO YES

- | | | |
|--|-----------------------|-----------------------|
| a. Cigarettes | <input type="radio"/> | <input type="radio"/> |
| b. Cigars | <input type="radio"/> | <input type="radio"/> |
| c. Pipes | <input type="radio"/> | <input type="radio"/> |
| d. Smokless tobacco (chew, dip, snuff) | <input type="radio"/> | <input type="radio"/> |

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51. **IN YOUR LIFETIME**, have you smoked at least 100 cigarettes (5 packs)? NO YES

If you checked "YES," go to question 52.
If you checked "NO," go to question 56.

52. At what age did you start smoking? years old

53. How many years have or did you smoke an average of at least 3 cigarettes per day (or one pack per week)? years

54. When smoking, how many packs per day did you or do you smoke?
 Less than a half pack per day
 1/2 to 1 pack per day
 1 to 2 packs per day
 More than 2 packs per day

55. Have you ever tried to quit smoking?
 Yes, and succeeded
 Yes, but not successfully
 No

56. Have you **EVER** had any of the following life events happen to you?

	NO	YES	If YES, list most recent year
a. You were divorced or separated	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
b. Suffered major financial problems (such as bankruptcy)	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
c. Suffered forced sexual relations or sexual assault	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
d. Experienced sexual harassment	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
e. Suffered a violent assault	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
f. Had a family member or loved one become severely ill or die	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
g. Suffered a disabling illness or injury	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

57. Have you **EVER** been exposed to any of the following?

	NO	YES, 1 TIME	YES, MORE THAN 1 TIME	If YES, list most recent year of exposure
a. Witnessing a person's death due to war, disaster, or tragic event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
b. Knowledge of or witnessing instances of physical abuse (torture, beating, rape)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
c. Dead and/or decomposing bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Question 57 continued on page 19...

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Question 57 continued...

	NO	YES, 1 TIME	YES, MORE THAN 1 TIME	If YES, list most recent year of exposure
d. Maimed soldiers/civilians -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
e. Prisoners of war/refugees -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
f. Chemical or biological warfare agents -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
g. Other medical countermeasures for chemical or biological warfare agent exposure -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
h. Alarms necessitating wearing of chemical/biological warfare protective gear -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

58. **DURING THE PAST 3 YEARS**, were you exposed to any of the following?

	NO	DON'T KNOW	YES	If YES, list most recent year of exposure
a. Occupational hazards requiring protective equipment, such as respirators or hearing protection -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
b. Routine skin contact with paint and/or solvent and/or substances -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
c. Depleted uranium (DU) -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
d. Microwaves (excluding small microwave ovens) -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
e. Pesticides, including creams, sprays, or uniform treatments -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
f. Pesticides applied in the environment or around living facilities -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
g. Any exposure, physical or psychological, during a military deployment that had a significant impact on your health? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
please specify <input type="text"/>				

59. What is your current military status? Please choose the single best answer.

- Enlisted (Active Duty, Reserve, or National Guard) ----- Go to question 60
- Officer (Active Duty, Reserve, or National Guard) ----- Go to question 61
- Retired ----- Go to question 62
- Disabled ----- Go to question 62
- Other ----- Go to question 62
- No Longer In The Military ----- Go to question 62

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60. Answer this question only if you are **ENLISTED (Active Duty, Reserve, or National Guard)**. (All others skip to question 61.) Please review the list of military occupational categories and select the **TWO** that **BEST MATCH** your military job. Please fill in the two-digit code listed for your **PRIMARY** job code and your **SECONDARY** job code.

--	--

PRIMARY JOB CODE

--	--

SECONDARY JOB CODE

<p>INFANTRY, GUN CREWS & SEAMANSHIP SPECIALISTS</p> <p>01 Infantry</p> <p>02 Armor & Amphibious</p> <p>03 Combat Engineering</p> <p>04 Artillery/Gunnery, Rockets & Missiles</p> <p>05 Air Crew</p> <p>06 Seamanship</p> <p>07 Installation Security</p>	<p>COMMUNICATIONS & INTELLIGENCE SPECIALISTS</p> <p>20 Radio & Radio Code</p> <p>21 Sonar</p> <p>22 Radar & Air Traffic Control</p> <p>23 Signal Intel/Electronic Warfare</p> <p>24 Intelligence</p> <p>25 Combat Operations Control</p> <p>26 Communications Center Operations</p>	<p>CRAFTWORKERS</p> <p>70 Metalworking</p> <p>71 Construction</p> <p>72 Utilities</p> <p>74 Lithography</p> <p>75 Industrial Gas & Fuel Production</p> <p>76 Fabric, Leather & Rubber</p> <p>79 Other Craftworker</p>	<p>SERVICE & SUPPLY HANDLERS</p> <p>80 Food Service</p> <p>81 Motor Transport</p> <p>82 Material Receipt, Storage & Issue</p> <p>83 Law Enforcement</p> <p>84 Personnel Service</p> <p>85 Auxiliary Labor</p> <p>86 Forward Area Equipment Support</p> <p>87 Other Services</p>
<p>ELECTRONIC EQUIPMENT REPAIRERS</p> <p>10 Radio/Radar</p> <p>11 Fire Control Electric Systems (Non-Missile)</p> <p>12 Missile Guidance, Control & Check-out</p> <p>13 Sonar Equipment</p> <p>14 Nuclear Weapons Equipment</p> <p>15 ADP Computers</p> <p>16 Teletype & Cryptographic Equipment</p> <p>19 Other Electronic Equipment</p>	<p>HEALTH CARE SPECIALISTS</p> <p>30 Medical Care</p> <p>31 Ancillary Medical Support</p> <p>32 Biomedical Sciences & Allied Health</p> <p>33 Dental Care</p> <p>34 Medical Admin & Logistics</p> <p>35 Other Technical & Allied Specialists</p>	<p>ELECTRICAL/ MECHANICAL EQUIPMENT REPAIRERS</p> <p>60 Aircraft & Aircraft-Related</p> <p>61 Automotive</p> <p>62 Wire Communications</p> <p>63 Missile Mechanical & Electrical</p> <p>64 Armament & Munitions</p> <p>65 Shipboard Propulsion</p> <p>66 Power Generating Equipment</p> <p>67 Precision Equipment</p> <p>69 Other Mechanical & Electrical Equipment</p>	<p>FUNCTIONAL SUPPORT & ADMINISTRATION</p> <p>50 Personnel</p> <p>51 Administration</p> <p>52 Clerical/Personnel</p> <p>53 Data Processing</p> <p>54 Accounting, Finance & Disbursing</p> <p>55 Other Functional Support</p> <p>56 Religious, Morale & Welfare</p> <p>57 Information & Education</p>
<p>PHOTOGRAPHY</p> <p>41 Mapping, Surveying, Drafting & Illustrating</p> <p>42 Weather</p> <p>43 Ordnance Disposal & Diving</p> <p>45 Musician</p> <p>49 Technical Specialist</p>		<p>NON-OCCUPATIONAL</p> <p>90 Patients & Prisoners</p> <p>91 Officer Candidate & Student</p> <p>92 Undesignated Occupations</p> <p>95 Not Occupationally Qualified</p>	

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61. Answer this question only if you are an **OFFICER (Active Duty, Reserve, or National Guard)**. (All others skip to question 62). Please review the list of military occupational categories and select the **TWO** that **BEST MATCH** your military job. Please fill in the two-digit code listed for your **PRIMARY** job code and your **SECONDARY** job code.

--	--

PRIMARY JOB CODE

--	--

SECONDARY JOB CODE

- ENGINEERING & MAINTENANCE OFFICERS**
- 4A Construction & Utilities
 - 4B Electrical/Electronic
 - 4C Communications & Radar
 - 4D Aviation Maintenance & Allied
 - 4E Ordnance
 - 4F Missile Maintenance
 - 4G Ship Construction & Maintenance
 - 4H Ship Machinery
 - 4J Safety
 - 4K Chemical
 - 4L Automotive & Allied
 - 4M Surveying & Mapping
 - 4N Other

- NON-OCCUPATIONAL**
- 9A Patient
 - 9B Student
 - 9E Other

- GENERAL OFFICERS & EXECUTIVES**
- 1A General & Flag
 - 1B Executive

- SCIENTISTS & PROFESSIONALS**
- 5A Physical Scientist
 - 5B Meteorologist
 - 5C Biological Scientist
 - 5D Social Scientist
 - 5E Psychologist
 - 5F Legal
 - 5G Chaplain
 - 5J Mathematician & Statistician
 - 5K Educator & Instructor
 - 5L Research & Development Coordinator
 - 5M Community Activities Officers
 - 5N Scientist & Professional

- INTELLIGENCE OFFICERS**
- 3A Intelligence, General
 - 3B Communications Intelligence
 - 3C Counter-intelligence

- ADMINISTRATORS**
- 7A Administrator, General
 - 7B Training Administrator
 - 7C Manpower & Personnel
 - 7D Comptroller & Fiscal
 - 7E Data Processing
 - 7F Pictorial
 - 7G Information
 - 7H Police
 - 7L Inspection
 - 7N Morale & Welfare

- TACTICAL OPERATIONS OFFICERS**
- 2A Fixed-Wing Fighter & Bomber Pilot
 - 2C Helicopter Pilot
 - 2D Aircraft Crew
 - 2E Ground & Naval Arms
 - 2F Missiles
 - 2G Operations Staff
 - 2H Civilian Pilot

- SUPPLY, PROCUREMENT & ALLIED OFFICERS**
- 8A Logistics, General
 - 8B Supply
 - 8C Transportation
 - 8D Procurement & Production
 - 8E Food Service
 - 8F Exchange & Commissary
 - 8G Other

- HEALTH CARE OFFICERS**
- 6A Physician
 - 6C Dentist
 - 6E Nurse
 - 6G Veterinarian
 - 6H Biomedical Sciences & Allied Health
 - 6I Health Service Administration

62. Do you have a civilian job at this time?

- YES ----- Go to question 63
- NO civilian employment at this time ----- Go to question 64
- Homemaker ----- Go to question 64

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63. If you checked "YES" to question 62, please review the list of **CIVILIAN** occupational categories on this page and the next page. (All others skip to question 64.) Then select the **TWO** that **BEST MATCH** your civilian job. Please fill in the three digit code listed for your **PRIMARY** job code and your **SECONDARY** job code.

 PRIMARY JOB CODE SECONDARY JOB CODE

<p>OFFICE & ADMINISTRATION SUPPORT</p> <p>431 Supervisors, Office & Administrative Support</p> <p>432 Communications Equipment Operator</p> <p>433 Financial Clerk</p> <p>434 Information & Record Clerk</p> <p>435 Material Recording, Scheduling, Dispatching & Distributing Worker</p> <p>436 Secretaries & Admin Assistants</p> <p>439 Other Office & Admin Support</p>	<p>PRODUCTION OCCUPATIONS</p> <p>511 Supervisor, Production Worker</p> <p>512 Assembler, Fabricator</p> <p>513 Food Processing Worker</p> <p>514 Metal & Plastic Worker</p> <p>515 Printing Worker</p> <p>516 Textile, Apparel & Furnishing Worker</p> <p>517 Woodworker</p> <p>518 Plant & Systems Operator</p> <p>519 Other Production Occupation</p>	<p>PERSONAL CARE SERVICE</p> <p>391 Supervisor, Personal Care & Service</p> <p>392 Animal Care & Service</p> <p>393 Entertainment Attendant & Related Worker</p> <p>394 Funeral Worker</p> <p>395 Personal Appearance</p> <p>396 Transportation, Tourism & Lodging Attendant</p> <p>399 Other Personal Care & Service Worker</p>
<p>INSTALLATION, REPAIR & MAINTENANCE OCCUPATIONS</p> <p>491 Supervisor of Installation, Maintenance & Repair Worker</p> <p>492 Electrical & Electric Equipment Mechanic, Installer & Repairer</p> <p>493 Vehicle & Mobile Equipment Mechanic, Installer, & Repairer</p> <p>499 Other Installation, Maintenance & Repair</p>	<p>FARMING, FISHING & FORESTRY WORKERS</p> <p>451 Supervisor, Farming, Fishing & Forestry Worker</p> <p>452 Agricultural Worker</p> <p>453 Fishing & Hunting Worker</p> <p>454 Forest, Conservation & Logging Worker</p> <p>459 Other Farming, Fishing & Forestry</p>	<p>EDUCATION, TRAINING & LIBRARY</p> <p>251 Postsecondary Teacher</p> <p>252 Primary, Secondary & Special Education School Teacher</p> <p>253 Other Teacher & Instructor</p> <p>254 Librarian, Curator & Archivist</p> <p>259 Other Education, Training & Library Occupations</p>
<p>COMPUTER & MATHEMATICAL</p> <p>151 Computer Specialist</p> <p>152 Mathematical Specialist</p> <p>153 Mathematical Tech</p>	<p>BUSINESS & FINANCIAL OPERATIONS</p> <p>131 Business Operations Specialist</p> <p>132 Financial Specialist</p>	<p>LEGAL</p> <p>231 Lawyer, Judge & Related Worker</p> <p>232 Legal Support Worker</p>
<p>ARTS, DESIGN, MEDIA, ENTERTAINMENT & SPORTS</p> <p>271 Art & Design</p> <p>272 Entertainer & Performer Sports & Related Worker</p> <p>273 Media Communication Worker</p> <p>274 Media Communication Equipment Worker</p>	<p>ARCHITECTURE & ENGINEERING</p> <p>171 Architect, Surveyor & Cartographer</p> <p>172 Engineer</p> <p>173 Drafters, Engineering & Mapping Technician</p>	<p>COMMUNITY & SOCIAL SERVICES</p> <p>211 Counselor, Social Worker & Other Community & Social Service Specialist</p> <p>212 Religious Worker</p>

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Question 63 continued, Civilian Occupational categories...

<p>CONSTRUCTION & EXTRACTION</p> <p>471 Supervisor, Construction & Extraction Worker</p> <p>472 Construction Trades Worker</p> <p>473 Helper, Construction Trades</p> <p>474 Other Construction & Related Worker</p> <p>475 Extraction Worker</p>	<p>FOOD PREPARATION & SERVING RELATED</p> <p>351 Supervisor, Food Preparation & Serving</p> <p>352 Cook & Food Preparation Worker</p> <p>353 Food and Beverage Worker</p> <p>359 Other Food Preparation & Serving Related Worker</p>	<p>BUILDING & GROUNDS CLEANING & MAINTENANCE</p> <p>371 Supervisor, Building & Grounds & Cleaning & Maintenance Worker</p> <p>372 Building Cleaning & Pest Control</p> <p>373 Ground Maintenance</p>
<p>TRANSPORTATION & MATERIAL MOVING</p> <p>531 Supervisor, Transportation & Material Moving</p> <p>533 Motor Vehicle Operator</p> <p>534 Rail Transportation Worker</p> <p>535 Water Transportation</p> <p>536 Other Transportation</p> <p>537 Material Moving Worker</p>	<p>HEALTH CARE</p> <p>295 Physician</p> <p>311 Nursing, Psychiatric & Home Health Aid</p> <p>312 Occupational & Physical Therapist Assistant and Aid</p> <p>319 Other Health Care Occupations</p>	<p>SALES-RELATED OCCUPATIONS</p> <p>411 Supervisor, Sales</p> <p>412 Retail Sales Worker</p> <p>413 Sales Rep, Services</p> <p>414 Sales Rep, Wholesale & Manufacturing</p> <p>415 Counter & Rental Clerks & Parts Salesperson</p> <p>419 Other Sales & Related Worker</p>
<p>LIFE, PHYSICAL & SOCIAL SCIENCES</p> <p>191 Life Scientist</p> <p>192 Physical Scientist</p> <p>193 Social Scientist & Related Worker</p> <p>194 Life, Physical & Social Sciences Technician</p>	<p>PROTECTIVE SERVICES</p> <p>331 First Line Supervisor/ Manager, Protective Services</p> <p>332 Firefighting & Prevention Worker</p> <p>333 Law Enforcement Worker</p> <p>339 Other Protective Service Worker</p>	<p>MANAGEMENT</p> <p>111 Top Executive</p> <p>112 Advertising, Marketing, Promotions, PR & Sales Manager</p> <p>113 Operations Specialties Manager</p> <p>119 Other Management Occupations</p>

64. Do you have any concerns about your health that are not covered in this survey that you would like to share? (Continue on a separate sheet if necessary.)

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65. May we contact you by phone if we have questions about your responses to any of the items on this survey?
Please list your daytime phone number.

66. May we contact you by email if we have questions about your responses to any of the items on this survey?
Please list your email address. (Note: you may also update your email address at www.MillenniumCohort.org)

68. If you should move, it is important that we know your most current address. Please provide names, addresses, phone numbers, and email addresses of individuals who will always know your location who we may contact to learn your latest address. We will **NOT** share your questionnaire responses with these individuals.

Contact #1

First	<input type="text"/>										Last	<input type="text"/>									
Number	Street Name															Apt/Unit #					
<input type="text"/>																<input type="text"/>					
City/APO/FPO										STATE	Zip Code										
<input type="text"/>										<input type="text"/>		<input type="text"/>				-		<input type="text"/>			
Phone Number																					
<input type="text"/>																					
Email address																					
<input type="text"/>																					

Contact #2

First	<input type="text"/>										Last	<input type="text"/>									
Number	Street Name															Apt/Unit #					
<input type="text"/>																<input type="text"/>					
City/APO/FPO										STATE	Zip Code										
<input type="text"/>										<input type="text"/>		<input type="text"/>				-		<input type="text"/>			
Phone Number																					
<input type="text"/>																					
Email address																					
<input type="text"/>																					

Panel 1 Wave 2; Follow-up

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[] For office use only

Panel 1, Wave 2



OMB #0720-0029 exp 09/30/06
DoD RCS#DD-HA(AR)2106 Part B exp 11/30/06

0843168628



You may also complete this questionnaire online at www.MillenniumCohort.org

MARKING INSTRUCTIONS

- Use BLACK or BLUE ink.
 - Shade circles like this: ● Not like this: ⊗ ⊙
 - Mistakes must be crossed out with an "X".
 - Print in CAPITAL LETTERS and avoid contact with the edge of the box. EXAMPLE:
- | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
- Answer every question to the best of your ability.
 - It will take approximately 30 minutes to complete the questionnaire.

1. What is your current mailing address?

Address Line 1:

Address Line 2 (optional):

City (or FPO/APO):

State/Province/Region (or AA/AE/AP):

ZIP/Postal Code:

Country:

2. Please provide your daytime phone number:

3. Please provide your email address:

If any of your contact information changes, please log on to www.MillenniumCohort.org or call our toll-free number at (888) 942-5222 to provide an update.

4. What is today's date?

M	M	/	D	D	/	Y	Y	Y	Y
<input type="text"/>	<input type="text"/>	/	<input type="text"/>	<input type="text"/>	/	2	0	0	<input type="text"/>

5. What are the last four digits of your Social Security number?

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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6. What is your **current** marital status?
Choose the single best answer:

- Single, never married
- Now married
- Separated
- Divorced
- Widowed

7. What is the **highest level** of education that you have **completed**?
Choose the single best answer:

- Less than high school completion/diploma
- High school degree/GED/or equivalent
- Some college, no degree
- Associate's degree
- Bachelor's degree
- Master's, doctorate, or professional degree

8. In the **last 3 years**, has your doctor or other health professional told you that you have any of the following conditions?

			If YES, in what year were you first diagnosed?	Mark here if you were hospitalized for the condition in the last 3 years
a. Hypertension (high blood pressure) _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
b. Coronary heart disease _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
c. Heart attack _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
d. Angina (chest pain) _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
e. Any other heart condition please specify <input type="text"/>	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
f. Sinusitis _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
g. Chronic bronchitis _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
h. Emphysema _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
i. Asthma _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
j. Kidney failure requiring dialysis _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
k. Bladder infection _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
l. Pancreatitis _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
m. Diabetes or sugar diabetes _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
n. Gallstones _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
o. Hepatitis B _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
p. Hepatitis C _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
q. Any other hepatitis _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
r. Cirrhosis _____	<input type="radio"/> No	<input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized

Question 8 continued on page 5...

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Question 8 continued...

			If YES, in what year were you first diagnosed?	Mark here if you were hospitalized for the condition in the last 3 years
s.	Rheumatoid arthritis	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
t.	Lupus	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
u.	Multiple sclerosis	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
v.	Crohn's disease	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
w.	Stomach, duodenal, or peptic ulcer	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
x.	Ulcerative colitis or proctitis	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
y.	Significant hearing loss	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
z.	Significant vision loss even with glasses or contact lenses	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
aa.	Migraine headaches	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
bb.	Stroke	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
cc.	Neuropathy-caused reduced sensation in hands or feet ..	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
dd.	Seizures	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
ee.	Sleep apnea	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
ff.	Anemia	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
gg.	Thyroid condition other than cancer	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
hh.	Cancer please specify <input type="text"/>	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
ii.	Chronic fatigue syndrome	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
jj.	Depression	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
kk.	Schizophrenia or psychosis	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
ll.	Manic-depressive disorder	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
mm.	Posttraumatic stress disorder	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized
nn.	Other please specify <input type="text"/>	<input type="radio"/> No <input type="radio"/> Yes	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> Hospitalized

7213168626

9. In the **last 3 years**, have you had persistent or recurring problems with any of the following?

a. Severe headache ----- <input type="radio"/> No <input type="radio"/> Yes	k. Night sweats ----- <input type="radio"/> No <input type="radio"/> Yes
b. Diarrhea ----- <input type="radio"/> No <input type="radio"/> Yes	l. Chest pain ----- <input type="radio"/> No <input type="radio"/> Yes
c. Rash or skin ulcer ----- <input type="radio"/> No <input type="radio"/> Yes	m. Unusual muscle pains ----- <input type="radio"/> No <input type="radio"/> Yes
d. Sore throat ----- <input type="radio"/> No <input type="radio"/> Yes	n. Shortness of breath ----- <input type="radio"/> No <input type="radio"/> Yes
e. Frequent bladder infections ----- <input type="radio"/> No <input type="radio"/> Yes	o. Trouble sleeping ----- <input type="radio"/> No <input type="radio"/> Yes
f. Cough ----- <input type="radio"/> No <input type="radio"/> Yes	p. Unusual fatigue ----- <input type="radio"/> No <input type="radio"/> Yes
g. Fever ----- <input type="radio"/> No <input type="radio"/> Yes	q. Forgetfulness ----- <input type="radio"/> No <input type="radio"/> Yes
h. Sudden unexplained hair loss ---- <input type="radio"/> No <input type="radio"/> Yes	r. Confusion ----- <input type="radio"/> No <input type="radio"/> Yes
i. Earlobe pain ----- <input type="radio"/> No <input type="radio"/> Yes	s. Other ----- <input type="radio"/> No <input type="radio"/> Yes
j. Sleepy all the time ----- <input type="radio"/> No <input type="radio"/> Yes	please specify <input type="text"/>

10. Over the **past 3 years**, approximately how many days were you hospitalized because of illness or injury?
(exclude hospitalization for pregnancy and childbirth)

- None 1 day 2-5 days 6-10 days 11-15 days 16-20 days 21 days or more

11. Over the **past 3 years**, approximately how many days were you unable to work or perform your usual activities because of illness or injury? (exclude lost time for pregnancy and childbirth)

- None 1 day 2-5 days 6-10 days 11-15 days 16-20 days 21 days or more

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12. During the last 4 weeks, how much have you been bothered by any of the following problems?

	Not bothered	Bothered a little	Bothered a lot
a. Stomach pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Back pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Pain in your arms, legs, or joints (knees, hips, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Pain or problems during sexual intercourse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Headaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Chest pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Dizziness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Fainting spells	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Feeling your heart pound or race	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Shortness of breath	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Constipation, loose bowels, or diarrhea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Nausea, gas, or indigestion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Women only: menstrual cramps or other problems with your periods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

	Not at all	Several days	More than half the days	Nearly every day
a. Little interest or pleasure in doing things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Feeling down, depressed, or hopeless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Trouble falling or staying asleep or sleeping too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Feeling tired or having little energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Poor appetite or overeating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Feeling bad about yourself, or that you are a failure or have let yourself or your family down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Trouble concentrating on things, such as reading the newspaper or watching television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Moving or speaking so slowly that other people could have noticed, or the opposite - being so fidgety or restless that you have been moving around a lot more than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Thoughts that you would be better off dead or of hurting yourself in some way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you have been bothered by any of the items listed above, you may want to seek help from a health professional in your area.

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14. a. In the **last 4 weeks**, have you had an anxiety attack - suddenly feeling fear or panic? No Yes

If you marked "NO," please skip to question 16

- b. Has this ever happened to you before? No Yes
- c. Do some of these attacks come **suddenly out of the blue** - that is, in situations where you don't expect to be nervous or uncomfortable? No Yes
- d. Do these attacks bother you a lot, or are you worried about having another attack? No Yes

15. Think about your last bad anxiety attack.

- a. Were you short of breath? No Yes
- b. Did your heart race, pound, or skip? No Yes
- c. Did you have chest pain or pressure? No Yes
- d. Did you sweat? No Yes
- e. Did you feel as if you were choking? No Yes
- f. Did you have hot flashes or chills? No Yes
- g. Did you have nausea or an upset stomach, or the feeling that you were going to have diarrhea? No Yes
- h. Did you feel dizzy, unsteady, or faint? No Yes
- i. Did you have tingling or numbness in parts of your body? No Yes
- j. Did you tremble or shake? No Yes
- k. Were you afraid you were dying? No Yes

16. Over the **last 4 weeks**, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days
a. Feeling nervous, anxious, on edge, or worrying a lot about different things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you marked "NOT AT ALL," skip to question 17

b. Feeling restless so that it is hard to sit still	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Getting tired very easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Muscle tension, aches, or soreness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Trouble falling asleep or staying asleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Trouble concentrating on things, such as reading a book or watching TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Becoming easily annoyed or irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2963168623

17. How tall are you? For example, a person who is 5'8" tall would write 5 feet 08 inches.

feet inches

18. What is your **current** weight? pounds

19. How much did you weigh a **year ago**? pounds

20. On an **average day**, how many 8-12 oz beverages containing caffeine do you drink (e.g. coffee, tea, soda)?
 None 1-2 per day 3-5 per day 6-10 per day 11 or more per day

21. About how many times **each week** do you eat from a fast food restaurant (like hamburgers, tacos, or pizza)?
 None Once a week 2-3 times/week 4-7 times/week 8-14 times/week 15 or more times/week

22. In the **past year**, have you been on any high protein, low carbohydrate diets (like Atkins) for more than a month? No Yes

23. a. Do you often feel that you can't control **what** or **how much** you eat? No Yes
b. Do you often eat, within any **2 hour period**, what most people would regard as an unusually **large** amount of food? No Yes
c. If you answered "**YES**" to either of the above, has this been as often, on average, as **twice a week** for the **LAST 3 MONTHS**? No Yes

24. In the **last 3 months**, have you done any of the following in order to avoid gaining weight?
a. Made yourself vomit? No Yes
b. Took more than twice the recommended dose of laxatives? No Yes
c. Fasted - not eaten anything at all for at least 24 hours? No Yes
d. Exercised for more than an hour specifically to avoid gaining weight after binge eating? No Yes
e. If you checked "**YES**" to any of these ways of avoiding gaining weight, were any as often, on average, as **twice a week**? No Yes

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25. In the **last 4 weeks**, how much have you been bothered by any of the following problems?

	Not bothered	Bothered a little	Bothered a lot
a. Worrying about your health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Your weight or how you look	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Little or no sexual desire or pleasure during sex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Difficulties with husband/wife, partner/lover, or boyfriend/girlfriend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. The stress of taking care of children, parents, or other family members...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Stress at work outside of the home or at school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Financial problems or worries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Having no one to turn to when you have a problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Something bad that happened recently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Thinking or dreaming about something terrible that happened to you in the past - like your house being destroyed, a severe accident, being hit or assaulted, or being forced into a sexual act	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. In the **last year**, have you been hit, slapped, kicked, or otherwise physically hurt by someone, or has anyone forced you to have an unwanted sexual act? No Yes

27. Are you **currently** taking any medicine for anxiety, depression, or stress? No Yes

28. Over the **past month**, how many hours of sleep did you get in an average 24-hour period? hours

If you are FEMALE, please go to question 29
If you are MALE, please skip to question 30

2185168629

29. **FOR WOMEN ONLY:**

- a. Which best describes your menstrual periods?
- No periods because pregnant or recently gave birth
 - No periods for over a year and unrelated to pregnancy or childbirth
 - Periods regulated by hormone replacement (estrogen) therapy or oral contraceptives
 - Periods unregulated and unchanged for over a year
 - Periods have become irregular or changed in frequency, duration, and/or amount in last year
- b. During the week before your period starts, do you have a **serious** problem with your mood - like depression, anxiety, irritability, anger, or mood swings? _____
- | | No | Yes | Does not apply |
|--|-----------------------|-----------------------|-----------------------|
| b. During the week before your period starts, do you have a serious problem with your mood - like depression, anxiety, irritability, anger, or mood swings? _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c. If YES : Do these problems go away by the end of your period? _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| d. Have you given birth within the last 3 years ? _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| e. Have you had a miscarriage within the last 3 years ? _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| f. During the last 3 years , have you tried and been unable to become pregnant? _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

30. In the **past month** have you experienced...?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
a. Repeated, disturbing memories of stressful experiences from the past _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Repeated, disturbing dreams of stressful experiences from the past _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Suddenly acting or feeling as if stressful experiences were happening again _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Feeling very upset when something happened that reminds you of stressful experiences from the past --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Trouble remembering important parts of stressful experiences from the past _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Loss of interest in activities that you used to enjoy ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Feeling distant or cut off from other people _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Feeling emotionally numb, or being unable to have loving feelings for those close to you _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Feeling as if your future will somehow be cut short --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Trouble falling asleep or staying asleep _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Feeling irritable or having angry outbursts _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 30 continued on page 12 ...

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Question 30 continued...

	Not at all	A little bit	Moderately	Quite a bit	Extremely
l. Difficulty concentrating -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Feeling "super-alert" or watchful or on guard -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Feeling jumpy or easily startled -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Physical reactions when something reminds you of stressful experiences from the past -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Efforts to avoid thinking about your stressful experiences from the past -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. Efforts to avoid activities or situations because they remind you of stressful experiences from the past -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31. In general, would you say your health is: (Please select only one.)

- Excellent
 Very good
 Good
 Fair
 Poor

32. In a **typical week**, how much time do you spend participating in...
(Please mark both your typical "days per week" and "minutes per day" doing these activities)

a. STRENGTH TRAINING or work that strengthens your muscles? (e.g. lifting/pushing/pulling weights)	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> None <input type="radio"/> Cannot physically do
	Days per week	Minutes per day	
b. VIGOROUS exercise or work that causes heavy sweating or large increases in breathing or heart rate? (e.g. running, active sports, marching, biking)	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> None <input type="radio"/> Cannot physically do
	Days per week	Minutes per day	
c. MODERATE or LIGHT exercise or work that causes light sweating or slight increases in breathing or heart rate? (e.g. walking, cleaning, slow jogging)	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="radio"/> None <input type="radio"/> Cannot physically do
	Days per week	Minutes per day	

33. Choose the single best description of your **USUAL** daily activities.

- You sit during the day and do not walk much.
- You stand or walk a lot during the day, but do not carry or lift things often.
- You lift or carry light loads, or climb stairs or hills often.
- You do heavy work or carry heavy loads often.

34. On a **typical day**, how much time do you spend sitting and watching TV or videos or using a computer?

Hours per day

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35. The following questions are about activities you might do during a **typical day**. Does your health **now** limit you in these activities? If so, how much?

	No, not limited at all	Yes, limited a little	Yes, limited a lot
a. Vigorous activities , such as running, lifting heavy objects, or participating in strenuous sports?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Moderate activities , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Lifting or carrying groceries?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Climbing several flights of stairs?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Climbing one flight of stairs?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Bending, kneeling, or stooping?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Walking more than a mile ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Walking several blocks?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Walking one block?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Bathing or dressing yourself?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities as a result of your **physical health**?

	No, none of the time	Yes, a little of the time	Yes, some of the time	Yes, most of the time	Yes, all of the time
a. Cut down the amount of time you spent on work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Accomplished less than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Were limited in the kind of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Had difficulty performing the work or other activities (for example, it took extra effort)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

37. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities as a result of any **emotional problems** (such as feeling depressed or anxious)?

	No, none of the time	Yes, a little of the time	Yes, some of the time	Yes, most of the time	Yes, all of the time
a. Cut down the amount of time you spent on work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Accomplished less than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Didn't do work or other activities as carefully as usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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38. During the **past 4 weeks**, to what extent has your **physical health** or **emotional problems** interfered with your normal social activities with family, friends, neighbors, or groups?

- Not at all Slightly Moderately Quite a bit Extremely

39. During the **past 4 weeks**, how much bodily pain have you had?

- None Very mild Mild Moderate Severe Very severe

40. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

- Not at all A little bit Moderately Quite a bit Extremely

41. During the **past 4 weeks**, how much of the time:
(Select the **single best** answer for each question.)

	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
a. Did you feel full of pep ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Have you been a very nervous person ? ..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Have you felt so down in the dumps that nothing could cheer you up ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Have you felt calm and peaceful ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Did you have a lot of energy ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Have you felt downhearted and blue ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Did you feel worn out ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Have you been a happy person ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Did you feel tired ?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. During the **past 4 weeks**, how much of the time has your **physical health** or **emotional problems** interfered with your social activities (like visiting with friends, relatives)?

- None of the time A little of the time Some of the time Most of the time All of the time

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43. Please choose the answer that best describes how **true** or **false** each of the following statements is for you.

	Definitely true	Mostly true	Not sure	Mostly false	Definitely false
a. I seem to get sick a little easier than other people -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I am as healthy as anybody I know -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I expect my health to get worse -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. My health is excellent -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. **Compared to 3 years ago**, how would you rate your **physical health** in general now?

- Much better
 Somewhat better
 About the same
 Somewhat worse
 Much worse

45. **Compared to 3 years ago**, how would you rate your **emotional health** or **well-being** (such as feeling anxious, depressed, or irritable) now?

- Much better
 Somewhat better
 About the same
 Somewhat worse
 Much worse

46. Other than conventional medicine, what other health treatments have you used **in the last 12 months**?

a. Acupuncture ----- <input type="radio"/> No <input type="radio"/> Yes	g. High dose/megavitamin therapy --- <input type="radio"/> No <input type="radio"/> Yes
b. Biofeedback ----- <input type="radio"/> No <input type="radio"/> Yes	h. Homeopathy ----- <input type="radio"/> No <input type="radio"/> Yes
c. Chiropractic care ----- <input type="radio"/> No <input type="radio"/> Yes	i. Hypnosis ----- <input type="radio"/> No <input type="radio"/> Yes
d. Energy healing ----- <input type="radio"/> No <input type="radio"/> Yes	j. Massage ----- <input type="radio"/> No <input type="radio"/> Yes
e. Folk remedies ----- <input type="radio"/> No <input type="radio"/> Yes	k. Relaxation ----- <input type="radio"/> No <input type="radio"/> Yes
f. Herbal therapy ----- <input type="radio"/> No <input type="radio"/> Yes	l. Spiritual healing ----- <input type="radio"/> No <input type="radio"/> Yes

47. Have you ever received the anthrax vaccine? ----- No Yes

If YES, how many shots of the anthrax vaccine have you received?

48. In the **past 3 years**, have you received the smallpox vaccine? ----- No Yes

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These next few questions are about drinking alcoholic beverages. Alcoholic beverages include liquor such as whiskey, gin, beer, wine, wine coolers, etc. For the purpose of this questionnaire:

One drink = one 12-ounce beer, one 4-ounce glass of wine, or one 1.5-ounce shot of liquor

49. In the past year, how often did you have a drink containing alcohol?

- Never
 Monthly or less
 2-4 times a month
 2-3 times a week
 4 or more times a week

If you marked "Never," skip to question 55.

50. In the past year, on those days that you drank alcoholic beverages, on average, how many drinks did you have?

		drinks
--	--	--------

51. In the past year, how often did you have 5 or more alcoholic beverages on one occasion?

- Never
 Monthly or less
 2-4 times a month
 5-10 times a month
 11 or more times a month

52. Last week, how many drinks of alcoholic beverages did you have?

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

53. Review the answers you provided to question 52.

Does this represent the number of alcoholic beverages you drink in a typical week?

- No, I usually drink LESS than this amount
 No, I usually drink MORE than this amount
 Yes, this represents how much I drink in a typical week

54. In the last 12 months, have any of the following happened to you more than once?

- a. You drank alcohol even though a doctor suggested that you stop drinking because of a problem with your health No Yes
 b. You drank alcohol, were high from alcohol, or hung over while you were working, going to school, or taking care of children or other responsibilities No Yes
 c. You missed or were late for work, school, or other activities because you were drinking or hung over No Yes
 d. You had a problem getting along with people while you were drinking No Yes
 e. You drove a car after having several drinks or after drinking too much No Yes

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55. Have you ever felt any of the following?

- a. Felt you needed to cut back on your drinking No Yes
- b. Felt annoyed at anyone who suggested you cut back on your drinking No Yes
- c. Felt you needed an "eye-opener," or early morning drink No Yes
- d. Felt guilty about your drinking No Yes

56. In the past year, have you used any of the following tobacco products?

- a. Cigarettes No Yes
- b. Cigars No Yes
- c. Pipes No Yes
- d. Smokeless tobacco (chew, dip, snuff) No Yes

57. In your lifetime, have you smoked at least 100 cigarettes (5 packs)? No Yes

If you checked "YES," go to question 58
 If you checked "NO," skip to question 62

58. At what age did you start smoking? years old

59. How many years have or did you smoke an average of at least 3 cigarettes per day
 (or one pack per week)? years

60. When smoking, how many packs per day did you or do you smoke?

- Less than half a pack per day
- Half to 1 pack per day
- 1 to 2 packs per day
- More than 2 packs per day

61. Have you ever tried to quit smoking?

- Yes, and succeeded
- Yes, but not successfully
- No

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62. In the past 3 years, have any of the following life events happened to you?

If YES, list most recent year

a. You were divorced or separated	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	
b. Suffered major financial problems (such as bankruptcy)	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	
c. Suffered forced sexual relations or sexual assault	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	
d. Experienced sexual harassment	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	
e. Suffered a violent assault	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	
f. Had a family member or loved one become severely ill or die	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	
g. Suffered a disabling illness or injury	<input type="radio"/> No	<input type="radio"/> Yes	2	0	0	

63. During the past 3 years, have you been **PERSONALLY** exposed to any of the following?
(do not include TV, video, movies, computers, or theater)

	No	Yes, 1 time	Yes, more than 1 time	If YES, list most recent year of exposure
a. Witnessing a person's death due to war, disaster, or tragic event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
b. Witnessing instances of physical abuse (torture, beating, rape)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
c. Dead and/or decomposing bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
d. Maimed soldiers or civilians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
e. Prisoners of war or refugees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
f. Chemical or biological warfare agents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
g. Medical countermeasures for chemical or biological warfare agent exposure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
h. Alarms necessitating wearing of chemical or biological warfare protective gear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0

64. During the past 3 years, were you exposed to any of the following?

	No	Don't know	Yes	If YES, list most recent year of exposure
a. Occupational hazards requiring protective equipment, such as respirators or hearing protection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
b. Routine skin contact with paint and/or solvent and/or substances	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
c. Depleted uranium (DU)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
d. Microwaves (excluding microwave ovens)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0

Question 64 continued on page 19...

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Question 64 continued...

	No	Don't know	Yes	If YES, list most recent year of exposure
e. Pesticides, including creams, sprays, or uniform treatments ----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
f. Pesticides applied in the environment or around living facilities --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
g. Any exposure, physical or psychological, during a military deployment that had a significant impact on your health? -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2 0 0
please specify				<input type="text"/>

65. Over the past 3 years, did you receive imminent danger pay, hardship duty pay, or combat zone tax exclusion benefits for deployment to any of the regions listed below?

No → Skip to question 68
 Yes → Continue to question 66

Country Codes			Sea Codes		
01	Afghanistan	10	Philippines	19	Arabian Sea
02	Bahrain	11	Qatar	20	Gulf of Aden
03	Croatia	12	Saudi Arabia	21	Gulf of Oman
04	Kuwait or Iraq	13	Serbia (includes Kosovo)	22	Persian Gulf
05	Kyrgyzstan	14	Tajikistan	23	Red Sea
06	Macedonia	15	Turkey	24	Other sea area
07	Montenegro	16	United Arab Emirates	<input type="text"/>	
08	Oman	17	Uzbekistan	please specify	
09	Pakistan	18	Other country	<input type="text"/>	
			please specify		

66. If "YES", use the country and sea codes assigned to the locations above to indicate the region(s) where you received imminent danger pay, hardship duty pay, or combat zone tax exclusion benefits.

	Location	Date Arrived		TO	Date Departed	
		Month	Year		Month	Year
a.	<input type="text"/>	<input type="text"/>	2 0 0		<input type="text"/>	2 0 0
b.	<input type="text"/>	<input type="text"/>	2 0 0		<input type="text"/>	2 0 0
c.	<input type="text"/>	<input type="text"/>	2 0 0		<input type="text"/>	2 0 0
d.	<input type="text"/>	<input type="text"/>	2 0 0		<input type="text"/>	2 0 0
e.	<input type="text"/>	<input type="text"/>	2 0 0		<input type="text"/>	2 0 0

67. In the past 3 years, have you been to more regions where you received imminent danger pay, hardship duty pay, or combat zone tax exclusion benefits than fit into the space allowed above? ---- No Yes

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Please answer question 68 ONLY if you are ENLISTED (Active Duty, Reserve, or National Guard)
All others please skip to question 69

68. Review the list of military occupational categories below. Select the **two** categories that **best match** your military job and fill in the two-digit codes for your **primary** job code and your **secondary** job code.

PRIMARY JOB CODE

SECONDARY JOB CODE

INFANTRY, GUN CREWS & SEAMANSHIP SPECIALISTS

- Infantry (01)
- Armor or Amphibious (02)
- Combat Engineering (03)
- Artillery/Gunnery, Rockets or Missiles (04)
- Air Crew (05)
- Seamanship (06)
- Installation Security (07)

COMMUNICATIONS & INTELLIGENCE SPECIALISTS

- Radio or Radio Code (20)
- Sonar (21)
- Radar or Air Traffic Control (22)
- Signal Intel/Electronic Warfare (23)
- Intelligence (24)
- Combat Operations Control (25)
- Communications Center Operations (26)

FUNCTIONAL SUPPORT & ADMINISTRATION

- Personnel (50)
- Administration (51)
- Clerical/Personnel (52)
- Data Processing (53)
- Accounting, Finance or Disbursing (54)
- Other Functional Support (55)
- Religious, Morale or Welfare (56)
- Information or Education (57)

HEALTH CARE SPECIALISTS

- Medical Care (30)
- Ancillary Medical Support (31)
- Biomedical Sciences or Allied Health (32)
- Dental Care (33)
- Medical Administration or Logistics (34)
- Other Technical or Allied Specialists (35)

SERVICE & SUPPLY HANDLERS

- Food Service (80)
- Motor Transport (81)
- Material Receipt, Storage or Issue (82)
- Law Enforcement (83)
- Personnel Service (84)
- Auxiliary Labor (85)
- Forward Area Equipment Support (86)
- Other Services (87)

PHOTOGRAPHY

- Mapping, Surveying, Drafting or Illustrating (41)
- Weather (42)
- Ordnance Disposal or Diving (43)
- Musician (45)
- Technical Specialist (49)

CRAFTWORKERS

- Metalworking (70)
- Construction (71)
- Utilities (72)
- Lithography (74)
- Industrial Gas or Fuel Production (75)
- Fabric, Leather or Rubber (76)
- Other Craftworker (79)

ELECTRONIC EQUIPMENT REPAIRERS

- Radio/Radar (10)
- Fire Control Electric Systems, Non-Missile (11)
- Missile Guidance, Control or Check-out (12)
- Sonar Equipment (13)
- Nuclear Weapons Equipment (14)
- ADP Computers (15)
- Teletype or Cryptographic Equipment (16)
- Other Electronic Equipment (19)

ELECTRICAL/MECHANICAL EQUIPMENT REPAIRERS

- Aircraft or Aircraft Related (60)
- Automotive (61)
- Wire Communications (62)
- Missile Mechanical or Electrical (63)
- Armament or Munitions (64)
- Shipboard Propulsion (65)
- Power Generating Equipment (66)
- Precision Equipment (67)
- Other Mechanical or Electrical Equipment (69)

OTHER

- Patients or Prisoners (90)
- Officer Candidate or Student (91)
- Undesignated Occupations (92)
- Not Occupationally Qualified (95)

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Please answer question 69 ONLY if you are an OFFICER or WARRANT OFFICER (Active Duty, Reserve, or National Guard)
All others please skip to question 70

69. Review the list of military occupational categories below. Select the two that **best match** your military job and fill in the two-digit codes for your **primary** job code and your **secondary** job code.

--	--

PRIMARY JOB CODE

--	--

SECONDARY JOB CODE

<p>ADMINISTRATORS</p> <ul style="list-style-type: none"> • Administrator, General (7A) • Training Administrator (7B) • Manpower or Personnel (7C) • Comptroller or Fiscal (7D) • Data Processing (7E) • Pictorial (7F) • Information (7G) • Police (7H) • Inspection (7L) • Morale & Welfare (7N) <hr/> <p>ENGINEERING & MAINTENANCE OFFICERS</p> <ul style="list-style-type: none"> • Construction or Utilities (4A) • Electrical or Electronic (4B) • Communications or Radar (4C) • Aviation Maintenance or Allied (4D) • Ordnance (4E) • Missile Maintenance (4F) • Ship Construction or Maintenance (4G) • Ship Machinery (4H) • Safety (4J) • Chemical (4K) • Automotive or Allied (4L) • Surveying or Mapping (4M) • Other (4N) <hr/> <p>GENERAL OFFICERS & EXECUTIVES</p> <ul style="list-style-type: none"> • General or Flag (1A) • Executive (1B) 	<p>HEALTH CARE OFFICERS</p> <ul style="list-style-type: none"> • Physician (6A) • Dentist (6C) • Nurse (6E) • Veterinarian (6G) • Biomedical Sciences or Allied Health (6H) • Health Service Administration (6I) <hr/> <p>INTELLIGENCE OFFICERS</p> <ul style="list-style-type: none"> • Intelligence, General (3A) • Communications Intelligence (3B) • Counter-intelligence (3C) <hr/> <p>OTHER</p> <ul style="list-style-type: none"> • Patient (9A) • Student (9B) • Other (9E) <hr/> <p>SUPPLY, PROCUREMENT & ALLIED OFFICERS</p> <ul style="list-style-type: none"> • Logistics, General (8A) • Supply (8B) • Transportation (8C) • Procurement or Production (8D) • Food Service (8E) • Exchange or Commissary (8F) • Other (8G) 	<p>SCIENTISTS & PROFESSIONALS</p> <ul style="list-style-type: none"> • Physical Scientist (5A) • Meteorologist (5B) • Biological Scientist (5C) • Social Scientist (5D) • Psychologist (5E) • Legal (5F) • Chaplain (5G) • Mathematician or Statistician (5J) • Educator or Instructor (5K) • Research & Development Coordinator (5L) • Community Activities Officer (5M) • Scientist or Professional (5N) <hr/> <p>TACTICAL OPERATIONS OFFICERS</p> <ul style="list-style-type: none"> • Fixed-Wing Fighter or Bomber Pilot (2A) • Helicopter Pilot (2C) • Aircraft Crew (2D) • Ground or Naval Arms (2E) • Missiles (2F) • Operations Staff (2G) • Civilian Pilot (2H)
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70. Do you have a civilian job at this time?

- YES Go to question 71
- NO civilian employment at this time Go to question 72
- Homemaker Go to question 72

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Please answer question 71 ONLY if you answered "YES" to question 70
All others please skip to question 72

71. Review the list of **civilian** occupational categories on this page and the next page. Select the **two** categories that **best match** your civilian job and fill in the three-digit codes for your **primary** and your **secondary** job codes.

--	--	--

PRIMARY JOB CODE

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SECONDARY JOB CODE

<p>ARCHITECTURE & ENGINEERING</p> <ul style="list-style-type: none"> • Architect, Surveyor or Cartographer (171) • Engineer (172) • Drafter, Engineering or Mapping Technician (173) <hr style="width: 20%; margin: 10px auto;"/> <p>ARTS, DESIGN, MEDIA, ENTERTAINMENT & SPORTS</p> <ul style="list-style-type: none"> • Art or Design (271) • Entertainer, Performer, Sports or Related Worker (272) • Media Communication Worker (273) • Media Communication Equipment Worker (274) <hr style="width: 20%; margin: 10px auto;"/> <p>BUILDING & GROUNDS CLEANING & MAINTENANCE</p> <ul style="list-style-type: none"> • Supervisor, Building & Grounds, Cleaning & Maintenance Worker (371) • Building Cleaning or Pest Control (372) • Ground Maintenance (373) <hr style="width: 20%; margin: 10px auto;"/> <p>BUSINESS & FINANCIAL OPERATIONS</p> <ul style="list-style-type: none"> • Business Operations Specialist (131) • Financial Specialist (132) <hr style="width: 20%; margin: 10px auto;"/> <p>COMMUNITY & SOCIAL SERVICES</p> <ul style="list-style-type: none"> • Counselor, Social Worker or Other Community or Social Service Specialist (211) • Religious Worker (212) <hr style="width: 20%; margin: 10px auto;"/> <p>COMPUTER & MATHEMATICAL</p> <ul style="list-style-type: none"> • Computer Specialist (151) • Mathematical Specialist (152) • Mathematical Technician (153) <hr style="width: 20%; margin: 10px auto;"/> <p>CONSTRUCTION & EXTRACTION</p> <ul style="list-style-type: none"> • Supervisor, Construction or Extraction Worker (471) • Construction Trades Worker (472) • Helper, Construction Trades (473) • Other Construction or Related Worker (474) • Extraction Worker (475) 	<p>EDUCATION, TRAINING & LIBRARY</p> <ul style="list-style-type: none"> • Postsecondary Teacher (251) • Primary, Secondary or Special Education School Teacher (252) • Other Teacher or Instructor (253) • Librarian, Curator or Archivist (254) • Other Education, Training or Library Occupation (259) <hr style="width: 20%; margin: 10px auto;"/> <p>FARMING, FISHING & FORESTRY WORKERS</p> <ul style="list-style-type: none"> • Supervisor, Farming, Fishing or Forestry Worker (451) • Agricultural Worker (452) • Fishing or Hunting Worker (453) • Forest, Conservation or Logging Worker (454) • Other Farming, Fishing or Forestry (459) <hr style="width: 20%; margin: 10px auto;"/> <p>FOOD PREPARATION & SERVING RELATED</p> <ul style="list-style-type: none"> • Supervisor, Food Preparation or Serving (351) • Cook or Food Preparation Worker (352) • Food and Beverage Worker (353) • Other Food Preparation or Serving Related Worker (359) <hr style="width: 20%; margin: 10px auto;"/> <p>HEALTH CARE</p> <ul style="list-style-type: none"> • Physician (295) • Nursing, Psychiatric or Home Health Aid (311) • Occupational or Physical Therapist Assistant or Aid (312) • Other Health Care Occupation (319) <hr style="width: 20%; margin: 10px auto;"/> <p>INSTALLATION, REPAIR & MAINTENANCE OCCUPATIONS</p> <ul style="list-style-type: none"> • Supervisor of Installation, Maintenance or Repair Worker (491) • Electrical or Electric Equipment Mechanic, Installer or Repairer (492) • Vehicle or Mobile Equipment Mechanic, Installer or Repairer (493) • Other Installation, Maintenance or Repair (499) <hr style="width: 20%; margin: 10px auto;"/> <p>LEGAL</p> <ul style="list-style-type: none"> • Lawyer, Judge or Related Worker (231) • Legal Support Worker (232)
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More categories listed on page 23.

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Question 71 continued, Civilian Occupational categories...

<p>LIFE, PHYSICAL & SOCIAL SCIENCES</p> <ul style="list-style-type: none"> • Life Scientist (191) • Physical Scientist (192) • Social Scientist or Related Worker (193) • Life, Physical or Social Sciences Technician (194) <hr/> <p>MANAGEMENT</p> <ul style="list-style-type: none"> • Top Executive (111) • Advertising, Marketing, Promotions, PR or Sales Manager (112) • Operations Specialties Manager (113) • Other Management Occupation (119) <hr/> <p>OFFICE & ADMINISTRATIVE SUPPORT</p> <ul style="list-style-type: none"> • Supervisor, Office or Administrative Support (431) • Communications Equipment Operator (432) • Financial Clerk (433) • Information or Record Clerk (434) • Material Recording, Scheduling, Dispatching or Distributing Worker (435) • Secretary or Administrative Assistant (436) • Other Office or Administrative Support (439) <hr/> <p>PERSONAL CARE SERVICE</p> <ul style="list-style-type: none"> • Supervisor, Personal Care or Service (391) • Animal Care or Service (392) • Entertainment Attendant or Related Worker (393) • Funeral Worker (394) • Personal Appearance (395) • Transportation, Tourism or Lodging Attendant (396) • Other Personal Care or Service Worker (399) 	<p>PRODUCTION OCCUPATIONS</p> <ul style="list-style-type: none"> • Supervisor, Production Worker (511) • Assembler, Fabricator (512) • Food Processing Worker (513) • Metal or Plastic Worker (514) • Printing Worker (515) • Textile, Apparel or Furnishing Worker (516) • Woodworker (517) • Plant or Systems Operator (518) • Other Production Occupation (519) <hr/> <p>PROTECTIVE SERVICES</p> <ul style="list-style-type: none"> • First Line Supervisor/Manager, Protective Services (331) • Firefighting or Prevention Worker (332) • Law Enforcement Worker (333) • Other Protective Service Worker (339) <hr/> <p>SALES-RELATED OCCUPATIONS</p> <ul style="list-style-type: none"> • Supervisor, Sales (411) • Retail Sales Worker (412) • Sales Representative, Services (413) • Sales Representative, Wholesale or Manufacturing (414) • Counter or Rental Clerk or Parts Salesperson (415) • Other Sales or Related Worker (419) <hr/> <p>TRANSPORTATION & MATERIAL MOVING</p> <ul style="list-style-type: none"> • Supervisor, Transportation or Material Moving (531) • Motor Vehicle Operator (533) • Rail Transportation Worker (534) • Water Transportation (535) • Other Transportation (536) • Material Moving Worker (537)
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72. Do you have any concerns about your health that are not covered in this survey that you would like to share?
(Continue on a separate sheet if necessary.)

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Thank you for completing this important survey!



More information regarding the Millennium Cohort Study can be found at

<http://www.Millennium Cohort.org>

Please also visit the website to update any changes to your mailing address,
phone number, email address, or last name