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MEDICAL SURVEILLANCE MONTHLY REPORT

MENTAL HEALTH ISSUE:

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Supplemental report

The Office of the Deputy Assistant Secretary of Defense for Force Health Protection and Readiness has released the following report on selected mental health disorders diagnosed among active component members of the U.S. Armed Forces. The report was produced in collaboration with the Armed Forces Health Surveillance Center and the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury. Quarterly updates of this report will be published at the health.mil website.

Selected Mental Health Disorders Among Active Component Members, U.S. Armed Forces, 2007-2010

Mental health disorders are leading causes of disability worldwide.¹ Among U.S. military members, mental disorders account for significant morbidity, disability, health care utilization, and attrition from military service.² Among the 1.4 million members of the active component of the Armed Forces, mental disorders are the leading cause of hospitalizations among men and the second leading cause among women (after pregnancy-related conditions).³ Each year approximately 6% of service members have at least one health care encounter associated with a diagnosis of a mental disorder.⁴

Mental health disorders are strongly associated with attrition from military service. Mental disorders that existed prior to service (EPTS) have accounted for a relatively high proportion of medical discharges of military trainees. For example, from 2003-2008, "psychiatric conditions" accounted for more EPTS discharges than any other single cause in the Army (22%), Navy (24%), and Marine Corps (42%).⁵ Mental disorders are also associated with attrition later in military service.^{4,6} In 2002, Hoge and colleagues reported that nearly 50% of service members hospitalized for a mental disorder were subsequently separated from military service within 6 months. In contrast, they reported that only 12% of service members hospitalized for other conditions were separated from service in the subsequent 6 months.⁶

Mental health disorders have an important impact on the military during both peacetime and periods of armed conflict. Since the onset of combat operations in Afghanistan and Iraq, many service members, like previous generations of veterans of U.S. conflicts, have experienced mental health problems associated with their service in the combat zones.

This report summarizes counts, incidence rates and estimated prevalences of five selected mental health disorders diagnosed among active component members of the U.S. Armed Forces. The five disorders are: post-traumatic stress disorder (PTSD), major depression, bipolar disorder, alcohol dependence, and substance dependence. These specific disorders were selected for several reasons. First, they are among the most common mental health disorders among active component service members. Secondly, the disorders tend to be chronic in nature or long-lasting in duration, thereby increasing the likelihood that the diagnoses may adversely affect military service. Third, these five conditions may, in part, be associated with participation in ongoing combat operations. Lastly, these disorders may be preventable. In contrast, disorders that occur less frequently, are relatively transient,

or have predominantly organic origins are not included in this report. The diagnoses of alcohol and substance abuse and tobacco-related conditions are also not included in the report. Service members with at least one of the five disorders of interest represent an estimated 52-57% of all service members diagnosed with any type of mental health disorder during the period 2007 to 2010. While this first quarterly report focuses on the five conditions described above, other mental disorders may be included in future updates.

Methods

The surveillance period was 1 January 2007 through 30 June 2010. Relevant medical encounter records were obtained from data routinely maintained in the Defense Medical Surveillance System (DMSS). Summaries were prepared for calendar years 2007, 2008, and 2009, and the first two quarters of 2010. The surveillance population included all individuals who served in

Table 1: Diagnostic codes (ICD-9-CM)

Mental health disorder	ICD-9-CM diagnostic code	Diagnosis description
Post-traumatic stress disorder	309.81	Post-traumatic stress disorder
Major depression	296.20-296.26	Major depressive disorder, single episode
	296.30-296.36	Major depressive disorder, recurrent episode
	296.90	Unspecified episodic mood disorder
	311	Depressive disorder, not elsewhere classified
Bipolar disorder	296.00-296.06	Bipolar I disorder, single manic episode
	296.10-296.16	Manic disorder recurrent episode
	296.40-296.46	Bipolar I disorder, most recent episode (or current) manic
	296.50-296.56	Bipolar I disorder, most recent episode (or current) depressed
	296.60-296.66	Bipolar I disorder, most recent episode (or current) mixed
	296.7	Bipolar I disorder, most recent episode (or current) unspecified
	296.80	Bipolar disorder, unspecified
	296.89	Other (Bipolar II disorder, Manic-depressive psychosis, mixed type)
Alcohol dependence	303.90-303.93	Other and unspecified alcohol dependence (Chronic alcoholism, Dipsomania)
Substance dependence	304.00-304.03	Opioid type dependence
	304.10-304.13	Sedative, hypnotic or anxiolytic dependence
	304.20-304.23	Cocaine dependence
	304.30-304.33	Cannabis dependence
	304.40-304.43	Amphetamine and other psychostimulant dependence
	304.50-304.53	Hallucinogen dependence
	304.60-304.63	Other specified drug dependence
	304.70-304.73	Combinations of opioid type drug with any other
	304.80-304.83	Combinations of drug dependence excluding opioid type drug
304.90-304.93	Unspecified drug dependence	

Mental Health Conditions	Calendar Year 2007			Calendar Year 2008			Calendar Year 2009			Calendar Year 2010 ^a		
	Number of New Cases	Rate of New Cases ^b	% Population Affected ^c	Number of New Cases	Rate of New Cases ^b	% Population Affected ^c	Number of New Cases	Rate of New Cases ^b	% Population Affected ^c	Number of New Cases	Rate of New Cases ^b	% Population Affected ^c
Armed Forces (includes Coast Guard)												
PTSD	11,145	8.1	1.2	13,567	9.7	1.7	13,010	9.2	1.9	5,959	8.4	2.0
Major Depression	23,146	17.3	4.4	25,519	18.9	4.8	26,295	19.2	5.1	10,751	15.7	5.1
Bipolar Disorder	2,203	1.6	0.2	2,512	1.8	0.2	2,548	1.8	0.3	1,017	1.4	0.3
Alcohol Dependence	7,955	5.8	1.6	9,130	6.5	1.7	9,836	6.9	1.8	4,431	6.2	1.8
Substance Dependence	2,033	1.5	0.2	2,658	1.9	0.2	2,904	2.0	0.2	1,373	1.9	0.2
Service members with any condition	35,226	26.8	6.4	38,644	29.2	7.1	38,438	28.7	7.6	16,411	24.6	7.6
Army												
PTSD	7,244	14.5	2.1	9,095	17.6	2.9	8,613	16.3	3.4	3,807	14.3	3.4
Major Depression	12,133	25.1	5.2	14,121	28.2	6.0	14,705	28.8	6.7	5,673	22.0	6.6
Bipolar Disorder	1,190	2.3	0.3	1,494	2.8	0.3	1,500	2.8	0.4	607	2.2	0.4
Alcohol Dependence	3,601	7.2	1.9	4,487	8.6	2.1	5,148	9.6	2.3	2,255	8.4	2.3
Substance Dependence	1,342	2.6	0.3	1,819	3.4	0.4	2,027	3.7	0.5	935	3.4	0.4
Service members with any condition	18,680	39.5	8.0	21,493	44.2	9.2	21,354	43.2	10.1	8,758	35.3	10.0
Navy												
PTSD	1,166	3.5	0.6	1,217	3.7	0.8	1,362	4.2	0.9	587	3.7	0.9
Major Depression	4,374	13.6	3.4	4,101	13.0	3.6	4,446	14.2	3.7	1,882	12.2	3.8
Bipolar Disorder	454	1.4	0.2	407	1.2	0.2	417	1.3	0.2	139	0.9	0.2
Alcohol Dependence	2,022	6.2	2.0	1,990	6.2	2.0	2,034	6.4	2.0	849	5.4	2.0
Substance Dependence	264	0.8	0.1	297	0.9	0.1	286	0.9	0.1	112	0.7	0.1
Service members with any condition	6,639	21.0	5.5	6,358	20.5	5.7	6,614	21.5	5.9	2,805	18.5	5.9
Air Force												
PTSD	900	2.7	0.6	1,058	3.3	0.7	1,082	3.3	0.8	557	3.4	0.9
Major Depression	3,796	12.0	5.1	3,773	12.3	5.2	3,638	11.7	5.2	1,626	10.4	5.2
Bipolar Disorder	304	0.9	0.2	283	0.9	0.2	297	0.9	0.2	135	0.8	0.2
Alcohol Dependence	673	2.0	0.9	751	2.3	0.9	793	2.4	0.9	399	2.4	0.9
Substance Dependence	180	0.5	0.1	182	0.6	0.1	215	0.7	0.1	118	0.7	0.1
Service members with any condition	4,762	15.2	6.1	4,831	15.9	6.3	4,702	15.3	6.4	2,156	14.0	6.4
Marines												
PTSD	1,758	9.7	1.2	2,101	11.0	1.7	1,869	9.4	1.8	959	9.7	1.9
Major Depression	2,244	12.6	2.2	2,975	15.7	2.7	3,001	15.3	3.0	1,362	14.0	3.2
Bipolar Disorder	209	1.1	0.1	272	1.4	0.1	284	1.4	0.2	123	1.2	0.2
Alcohol Dependence	1,481	8.2	1.7	1,720	9.0	1.8	1,710	8.6	1.9	856	8.7	1.9
Substance Dependence	215	1.2	0.1	329	1.7	0.2	338	1.7	0.2	190	1.9	0.2
Service members with any condition	4,396	25.1	4.3	5,260	28.4	5.1	5,127	26.7	5.5	2,398	25.3	5.7

Case definition: one inpatient or two outpatient encounters on separate days.
 ICD-9 codes used: PTSD (309.81), major depression (296.20 - 296.26, 296.30 - 296.36, 296.90, 311, 311.0), bipolar disorder (296.00 - 296.06, 296.10 - 296.16, 296.40 - 296.46, 296.50 - 296.56, 296.60 - 296.66, 296.7, 296.80, 296.89), alcohol dependence (303.90 - 303.93), and substance dependence (304, 304.00 - 304.93).

^aData through the second quarter
^bNew cases per 1,000 persons per year. Cases are attributed to the year during which the first medical encounter for a given mental health condition occurred. Individuals are counted only once per condition.
^cPercent of active component members with conditions ever diagnosed as of the end of the year. For 2010, this was calculated as of the end of the second quarter.

the active component of the Army, Navy, Air Force, Marine Corps or Coast Guard for any time during the surveillance period. For surveillance purposes, the following ICD-9-CM diagnostic codes were considered indicators of the respective mental health disorders (Table 1).

Further, for each mental health disorder, a case was defined as a single hospitalization or two ambulatory visits on separate days for which a health care provider had recorded the indicator diagnosis in any diagnostic position. The surveillance case definitions for the five mental health disorders were formulated in consultation with subject matter experts from mental health disciplines, representing medical, clinical, and public health organizations.

For each case, the earliest medical encounter was considered the incident encounter for each individual in each mental health condition. A single member of the surveillance population may have been counted as a unique case in more than one of the mental health disorders, but was counted in each disorder only once during the surveillance period.

"Number of new cases", "rate of new cases" and "percent population affected" are presented for each service (Coast Guard is not included in service breakdown due to small numbers) and for all of the Armed Forces, for the full calendar years of 2007, 2008, and 2009 and for the first two quarters of 2010 (Table 2). "Rate of new cases" is expressed in numbers of new cases per 1,000 persons per year during the indicated

year. "Percent population affected" is calculated based on the number of current cases - new and previously diagnosed - among all individuals serving in the active component at the end of the year of the interest. For this measure, diagnoses rendered at any time prior to 2007 at a medical facility in the Military Health System were also included. "Service members with any of the above conditions" represents unique individuals diagnosed with at least one of the five mental health disorders. Since individuals may have multiple disorders, the figures shown in this category will be less than the sum of the counts of individual disorders diagnosed.

Results

During the 42-month surveillance period (1 January 2007-30 June 2010), among active component members of the U.S. Armed Forces, the total number of incident diagnoses for each diagnosis of interest were: PTSD - 43,681; major depression - 85,711; bipolar disorder - 8,280; alcohol dependence - 31,352; and substance dependence - 8,968 (Table 2). Individuals with at least one incident diagnosis of a mental disorder of interest accounted for approximately one-half (% per year, range: 52%-57%) of all service members who were given any mental health-specific diagnosis during the period (any mental health condition defined by ICD-9 codes 290-319 except 305.1 [tobacco use disorder]).

Many service members were diagnosed with more than one of the subject mental disorders. For example, in 2007, there were 46,482 incident diagnoses among 35,226 unique individuals (Table 2). The average number of incident diagnoses per individual by year was 1.32 in 2007, 1.38 in 2008, 1.42 in 2009, and 1.43 in 2010 and indicated a slightly increasing trend.

Among the Services overall, annual incidence rates (of at least one mental disorder of interest) were highest in 2008 (29.2 cases per 1,000 service members per year (p-yrs)) and lowest in the first two quarters of 2010 (24.6 cases per 1,000 p-yrs). During each year, the highest disorder-specific incidence rates were for major depression (range, 15.7 to 19.2 cases per 1,000 p-yrs), PTSD (range, 8.1 to 9.7 cases per 1,000 p-yrs), and alcohol dependence (5.8 to 6.9 cases per 1,000 p-yrs). The annual rates of diagnoses of bipolar disorder (1.4 to 1.8 cases per 1,000 p-yrs) and substance dependence (1.5 to 2.0 cases per 1,000 p-yrs) were consistently lower. In each of the Services, except the Navy, the rank order of rates of the three most common incident diagnoses was similar; however, in the Navy, alcohol dependence (rather than PTSD) had the second highest incidence after major depression.

The proportion of active component members who had ever been diagnosed with a mental health disorder of interest increased from 6.4% in 2007 to 7.6% in 2010. This trend was also apparent among each of the individual services. Among all active component members who were still in uniform at the end of the second quarter of 2010, the percentages who had ever been diagnosed with the most frequent mental disorders were 5.1% for major depression, 2.0% for PTSD, and 1.8% for alcohol dependence.

In general, rates of new diagnoses of PTSD, major depression, bipolar disorder, alcohol dependence, and substance dependence were highest in the Army and lowest in the Air Force. The only exceptions to this observation were in 2007, 2008, and the first two quarters of 2010 when the incidence rates of new diagnoses of alcohol dependence in the Marine Corps were the highest of all the Services. The Army also had the highest proportion of its members who had ever been given a prior mental health disorder diagnosis. For example, among all soldiers on active duty on 30 June 2010, one of every ten (10.0%) had ever been diagnosed with at least one subject mental health disorder during active service. In contrast, approximately one of 18 (5.7%) Marines had been given at least one diagnosis of a subject mental disorder.

Editorial comment

There is an important methodological aspect of this report that should be kept in mind when interpreting the results. For each of the conditions examined, cases were determined based upon a single relevant inpatient encounter record; or two relevant outpatient encounter records on separate days. If, for a given condition, a service member is considered a case based on outpatient encounters, the case is attributed to the year of the first relevant encounter. Thus, if a service member was diagnosed with depression during a single outpatient encounter in 2008, and then again in 2010, the service member would meet the case definition for depression in 2010; however,

the case would be attributed to the year 2008. The effect of defining cases based upon encounters widely separated in time is that rates for past periods will likely increase as this report is periodically updated. Furthermore, results for the most recent year will reflect only cases that met case defining criterion during that year (i.e., without the "benefit" of future years of data). Accordingly, it would be inappropriate to interpret this report as suggesting that the incidence rates of the diagnoses of interest have truly declined in 2010.

The news media have extensively covered the subject of mental health among military service members. Journalists have cited published numerical estimates of the frequency of mental health disorders in service members, especially among those who have deployed in support of current operations. The sources of such estimates have used differing methods and assumptions in collecting and analyzing their data.

Accordingly, the rates of mental health disorders reported here are likely not directly comparable to other published rates. For example, the 2009 post-traumatic stress disorder (PTSD) incidence rate of 9.2 per 1,000 person-years and the prevalence rate of 1.9% among all service members of the active component contrast sharply with figures in media reports and the scientific literature.^{7,8} By way of illustration, news media have cited published medical articles that suggest PTSD prevalences of 12% or higher among service members following deployment.

Several important factors distinguish the results in this report from those in others. First, the results presented here reflect healthcare provider-assigned clinical diagnostic codes entered into the electronic medical records of service members, i.e., the providers rendered formal diagnoses of the conditions enumerated in this report. In contrast, other published studies have relied upon self-reported data from deployment health assessments, anonymous questionnaires, or retrospective interviews in which service members affirm or deny the presence of symptoms that are often associated with the mental health disorders of interest. Such techniques are useful in screening large numbers of persons (including service members) for symptoms whose presence may warrant further, in-depth evaluation by mental health professionals; however, the symptoms alone are not diagnostic of the disorders. The use of such screening techniques is intended to maximize the opportunity to identify persons with the diagnoses of interest; however, screening inevitably identifies many persons who do not suffer from the disorders of concern.

Secondly, this report documents the incidence and prevalence of mental health disorders among the entire population of service members in the active component. The report does not focus solely on those who have served on a deployment to a combat zone; it includes many who have never deployed (approximately 39% of the active component has never deployed). Service in a combat zone is a risk factor for most, if not all, of the mental disorders of interest. This analysis and report, however, did not examine the role of deployment. Future reports will attempt to quantify the associations between deployment and subsequent mental health disorders.

Thirdly, this report does not contain data about diagnoses of mental health disorders among members of the Reserves

and National Guard. Studies that have included those groups have shown higher rates of self-reported symptoms suggestive of mental health disorders than among members of the active component. If those higher rates of symptoms reflect higher rates of subsequently diagnosed mental health disorders, then this report would underestimate the prevalence of diagnosed mental health disorders among members of the total force (all components).

Lastly, the barriers to care described below may affect the recording of diagnoses of the mental health disorders covered in this report. The net effect is that this report very likely underestimates the true incidence and prevalence of the disorders of interest. Studies that employed anonymous questionnaires have measured the relatively high frequency with which symptomatic service members have expressed their reluctance to seek assessment and care for possible mental health disorders.

There are real and perceived barriers to seeking and accessing care for mental health disorders among military members. These barriers include shortages of mental health professionals in some areas and the social and military stigmas associated with seeking or receiving mental health care. The nature and effects of these barriers to care have likely changed during the surveillance period. As a result, ascertainment of all "true cases" of the disorders of interest for this report is undoubtedly incomplete and changing over time. In turn, the incidence rates and prevalences estimated in this report may underestimate the actual rates and prevalences of the subject conditions. Also, trends of annual incidence rates of diagnoses likely reflect, at least in part, changes in barriers and stigmas to seeking care and in diagnosing and reporting the subject mental health disorders.

Finally, estimates of the population affected by subject mental health conditions are based on "ever prior" diagnoses

of the conditions. This method implies that military members who were ever diagnosed with the subject conditions are clinically affected by the conditions for the remainder of their military service. The method probably overestimates the actual prevalences of clinically relevant mental health conditions among currently serving active component members, since many military members are successfully treated for mental health conditions.

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The authors of this report included:

Jean Lin Otto, DrPH, MPH

Francis L. O'Donnell, MD, MPH

Susan Allen Ford, PA-C, MPH

Hans V. Ritschard, Lt Col USAF, BSC

Mental Disorders and Mental Health Problems, Active Component, U.S. Armed Forces, January 2000 - December 2009

In recent years among U.S. military members, there have been continuous and steep increases in lost duty time and health care burden due to mental disorders. In 2009, mental disorders accounted for more hospitalizations of U.S. service members than any other diagnostic category and more ambulatory visits than any other category except musculoskeletal and connective tissue disorders.¹⁻³

In studies of mental disorders in military populations, “cases” are often identified by medical encounters documented with diagnosis codes 290.0 to 319.0 of the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM); these diagnoses generally correspond to psychiatric disorders documented in the Diagnostic and Statistical Manual, 4th edition (DSM-IV).⁴ However, some military mental health experts suggest that comprehensive assessments of the natures, burdens, and impacts of mental disorders in military populations should account for mental health problems that are not documented with mental disorder-specific diagnosis codes. Such conditions include psychosocial and behavioral problems related to difficult life circumstances (e.g., marital, family, other interpersonal relationships; occupational, other military-related stresses); they are often documented with V codes of the ICD-9-CM. In some studies, service members who received mental health care (documented with V-coded diagnoses) were at greater risk of attrition from military service than those treated for only physical health conditions but at less risk of attrition than those who received mental disorder-specific ICD-9-CM diagnoses.^{5,6}

This report summarizes numbers, natures, and rates of incident mental disorder-specific diagnoses (ICD-9-CM: 290.0-319.0) among active component U.S. service members over a ten-year surveillance period. It also summarizes numbers, natures, and rates of incident “mental health problems” (documented with mental health-related V codes) among active component members during the same period.

Methods:

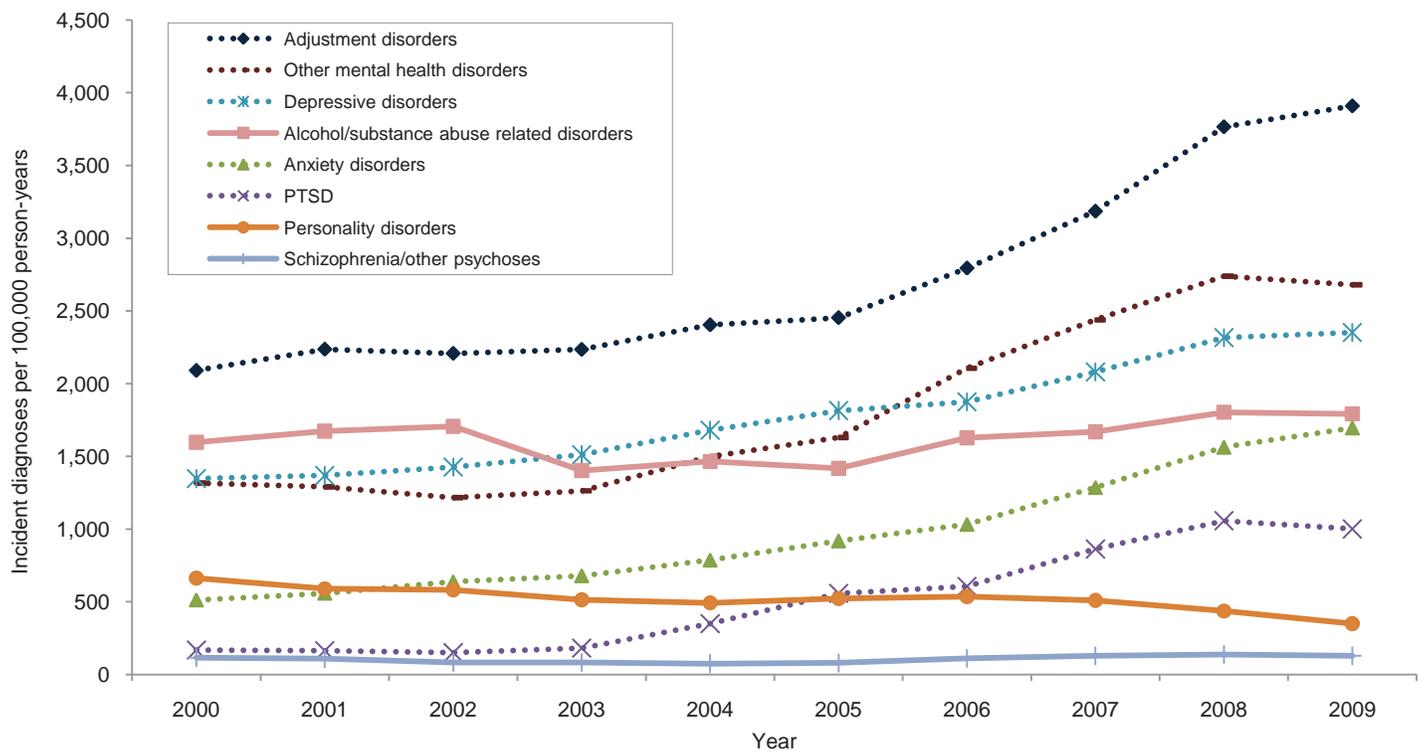
The surveillance period was 1 January 2000 to 31 December 2009. The surveillance population included all individuals who served in the active component of the U.S. Armed Forces at any time during the surveillance period. All data used to determine incident mental disorder-specific diagnoses and mental health problems were derived from records routinely maintained in the Defense Medical Surveillance System (DMSS). These records document both ambulatory encounters and hospitalizations of active component members of the U.S. Armed Forces in fixed military and civilian (if reimbursed through the Military Health System) treatment facilities. Medical encounters outside of fixed medical facilities (e.g., in deployed settings, shipboard, during field training exercises) are not routinely available for health surveillance purposes and thus were not included in the analysis.

For surveillance purposes, “mental disorders” were ascertained from records of medical encounters that included mental disorder-specific diagnoses (ICD-9-CM: 290-319,

Table 1. Mental health categories and diagnostic codes (ICD-9-CM)

Category	ICD-9-CM codes
Mental disorder diagnoses (ICD-9-CM: 290-319)	
Adjustment disorders	309.0X-309.9X (exclude 309.81)
Alcohol/substance abuse related disorder	303.XX, 304.XX, 305.XX (exclude 305.1: tobacco use disorder)
Anxiety disorders	300.00-300.09, 300.20-300.29, 300.30-300.39
Post-traumatic stress disorder (PTSD)	309.81
Depressive disorders	296.20-296.35, 296.50-296.55, 296.9, 300.4, 311
Personality disorders	301.0, 301.10, 301.11, 301.12, 301.13, 301.20, 301.21, 301.22, 301.3, 301.4, 301.50, 301.51, 301.59, 301.6, 301.7, 301.81, 301.82, 301.83, 301.84, 301.89, 301.9
Schizophrenia/Other psychoses	293.81, 293.82, 295.00, 295.01-295.05, 295.10-295.15, 295.20-295.25, 295.30-295.35, 295.40-295.45, 295.50-295.55, 295.60-295.65, 295.70-295.75, 295.80-295.85, 295.90-295.95, 297.0X-297.3X, 297.8, 297.9, 298.0, 298.1, 298.2, 298.3, 298.4, 298.8, 298.9
Other mental health disorder	Any other code between 290-319 (except 305.1: tobacco use disorder)
Mental health problems (selected V-codes)	
Partner relationship problems	V61.0X, V61.1, V61.10 (Exclude V61.11, V61.12)
Family circumstance problems	V61.2, V61.23, V61.24, V61.25, V61.29, V61.8, V61.9
Maltreatment related	V61.11, V61.12, V61.21, V61.22, V62.83, 995.80-995.85
Life circumstance problems	V62.XX (Exclude V62.6, V62.83)
Mental, behavioral problems and substance abuse counseling	V40.XX (Exclude V40.0, V40.1), V65.42

Figure 1. Incidence rates of mental disorder diagnoses per 100,000 person-years, by category, active component, U.S. Armed Forces, 2000-2009



the entire “mental disorders” section of the ICD-9-CM coding guide (Table 1) in the first or second diagnostic position. “Mental health problems” were ascertained from records of health care encounters that included V-coded diagnoses indicative of psychosocial or behavioral health issues in the first or second diagnostic position (Table 1).

For summary purposes, mental disorder-specific diagnoses indicative of adjustment reaction, substance abuse, anxiety disorder, post-traumatic stress disorder (PTSD), or depressive disorder were grouped into categories defined by Seal et al.⁷ and previously reported in the *MSMR*⁸ with a single modification: “depressive disorder, not elsewhere classified” (ICD-9-CM: 311) was included in the depression category instead of the “other mental diagnoses” category. Diagnoses indicative of “personality disorder” or “schizophrenia and other psychotic disorders” were grouped using the categories developed by the Agency for Healthcare Research and Quality (AHRQ). V-coded diagnoses indicative of mental health problems were grouped into five categories using previously published criteria (Table 1).⁵

Each incident diagnosis of a mental disorder (ICD-9-CM: 290-319) or a mental health problem (selected V codes) was defined by a hospitalization with an indicator diagnosis in the first or second diagnostic position; two outpatient visits within 180 days documented with indicator diagnoses (from the same mental disorder or mental health problem-specific category) in the first or second diagnostic positions; or a single outpatient visit in a psychiatric or mental health

care specialty setting (defined by Medical Expense and Performance Reporting System [MEPRS] code: BF) with an indicator diagnosis in the first or second diagnostic position.

Service members who were diagnosed with one or more mental disorders prior to the surveillance period (i.e., prevalent cases) were not considered at risk of incident diagnoses of the same conditions during the period. Service members who were diagnosed with more than one mental disorder during the surveillance period were considered incident cases in each category in which they fulfilled the case-defining criteria. Service members could be incident cases only once in each mental disorder-specific category. Only service members with no incident mental disorder-specific diagnoses (ICD-9-CM: 290-319) during the surveillance period were eligible for inclusion as cases of incident mental health problems (selected V codes).

Results:

During the 10-year surveillance period, 767,290 active component members were diagnosed with at least one mental disorder; of these individuals, 344,288 (44.9%) were diagnosed with mental disorders in more than one diagnostic category. Overall, there were 1,368,627 incident diagnoses of mental disorders in all diagnostic categories (Table 2a).

Among active component members, annual numbers and rates of incident diagnoses of at least one mental disorder increased by approximately 60 percent during the

Table 2a. Numbers and rates of incident diagnoses of mental disorders (ICD-9: 290-319), by diagnostic category, active component, U.S. Armed Services, 2000-2009

Category ^a	Total 2000-2009		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009	
	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b
Adjustment disorders	364,906	2717.9	28,393	2090.5	30,148	2236.5	30,206	2207.6	30,912	2234.9	33,201	2404.1	32,833	2453.3	36,774	2794.4	41,583	3185.5	49,311	3765.8	51,545	3909.5
Alcohol/substance related	220,422	1614.4	21,744	1597.2	22,655	1672.9	23,484	1705.7	19,568	1402.3	20,481	1464.7	19,275	1417.7	21,863	1627.7	22,346	1668.6	24,397	1803.6	24,609	1792.6
Anxiety disorders	134,298	964.7	7,112	512.9	7,728	558.8	8,983	637.8	9,696	679.2	11,244	787.1	12,750	918.9	14,140	1032.8	17,543	1286.5	21,493	1563.3	23,609	1696.3
Post-traumatic stress (PTSD)	71,665	508.4	2,357	169.1	2,295	164.7	2,141	150.6	2,622	181.6	5,061	349.7	7,847	557.9	8,416	605.8	11,957	863.4	14,776	1057.5	14,193	1001.1
Depression	242,353	1773.8	18,450	1347.7	18,651	1368.7	19,760	1426.0	21,210	1512.3	23,536	1679.5	24,663	1814.5	25,114	1874.1	27,758	2080.0	31,178	2317.0	32,033	2351.5
Personality disorders	73,183	519.1	9,195	662.3	8,181	589.8	8,241	582.3	7,393	514.2	7,117	493.4	7,343	522.8	7,459	536.6	7,084	509.8	6,150	436.6	5,020	350.0
Schizophrenia/other psychoses	14,984	105.6	1,613	115.5	1,534	109.9	1,193	83.8	1,213	83.8	1,096	75.5	1,131	80.0	1,558	111.3	1,812	129.6	1,965	138.6	1,869	129.6
Other mental disorders	246,816	1809.3	18,006	1316.5	17,567	1290.2	16,865	1216.9	17,741	1263.2	21,037	1498.2	22,202	1630.4	28,219	2105.7	32,427	2438.4	36,580	2738.3	36,172	2679.5
	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b
>1 category of mental disorder	344,288	2423.6	21,903	1567.5	21,883	1566.6	22,201	1557.0	22,311	1539.7	25,383	1746.2	27,371	1933.5	31,161	2223.9	36,445	2601.9	42,784	3013.5	43,313	2996.2
Any mental disorder diagnosis ^c	767,290	5401.3	75,784	5423.6	77,914	5577.7	79,527	5577.3	78,658	5428.1	86,305	5937.3	88,226	6232.4	97,668	6970.5	107,715	7689.9	119,905	8445.5	123,374	8534.6

^aEach individual may be a case within a category only once per lifetime

^bIncident diagnoses per 100,000 person-years

^cAt least one reported mental disorder diagnoses (ICD-9: 290-319)

Table 2b. Numbers and rates of incident diagnoses of mental health problems (V-coded mental health visits) among those WITHOUT a mental disorder diagnosis (ICD-9: 290-319), active component, U.S. Armed Services, 2000-2009

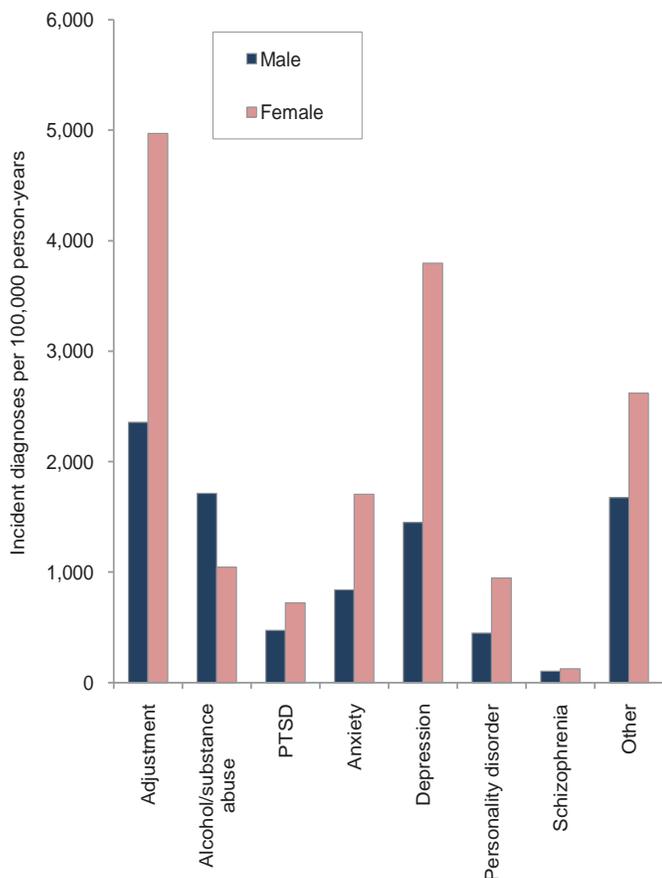
Category ^a	Total 2000-2009		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009	
	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b
Partner relationship	86,035	624.4	10,164	741.0	9,715	711.3	9,246	665.2	8,285	587.9	8,614	610.6	8,596	627.4	8,840	653.2	8,018	593.7	7,389	540.4	7,168	515.1
Family circumstance	31,579	224.4	3,726	267.9	3,873	279.1	3,740	264.4	3,674	255.9	2,788	193.7	2,395	170.9	2,030	146.4	2,619	189.0	3,558	253.6	3,176	222.5
Maltreatment related	20,503	145.6	3,713	267.5	3,111	224.5	2,883	203.9	2,243	156.2	2,126	147.6	1,872	133.5	1,759	126.7	1,281	92.3	834	59.3	681	47.5
Life circumstance	170,590	1247.3	18,045	1317.5	18,597	1365.5	16,991	1227.6	16,783	1196.9	20,198	1441.0	26,062	1925.5	15,260	1142.6	13,200	988.7	11,408	842.4	14,046	1018.9
Mental, behavioral, substance abuse	56,173	399.4	3,331	239.1	4,117	296.1	3,434	242.2	3,984	276.8	4,940	342.7	5,642	402.6	6,370	460.1	6,649	481.4	8,317	595.4	9,389	662.0
	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b	No.	Rate ^b
>1 category of mental hlt prob (V-code)	44,420	312.7	4,149	296.9	3,744	268.0	3,471	243.4	2,906	200.5	3,067	211.0	3,040	214.8	2,861	204.2	2,671	190.7	2,684	189.0	2,484	171.8
Any mental hlt prob (V-code) ^c	310,513	2185.8	34,015	2434.3	34,984	2504.4	32,278	2263.7	31,609	2181.3	35,168	2419.4	41,067	2901.0	31,103	2219.8	28,847	2059.4	28,457	2004.4	31,714	2193.9

^aEach individual may be a case within a category only once per lifetime

^bIncident diagnoses per 100,000 person-years

^cAt least one reported mental health problem (V-coded diagnosis)

Figure 2. Incidence rates of mental disorder diagnoses per 100,000 person-years, by category and gender, active component, U.S. Armed Forces, 2000-2009



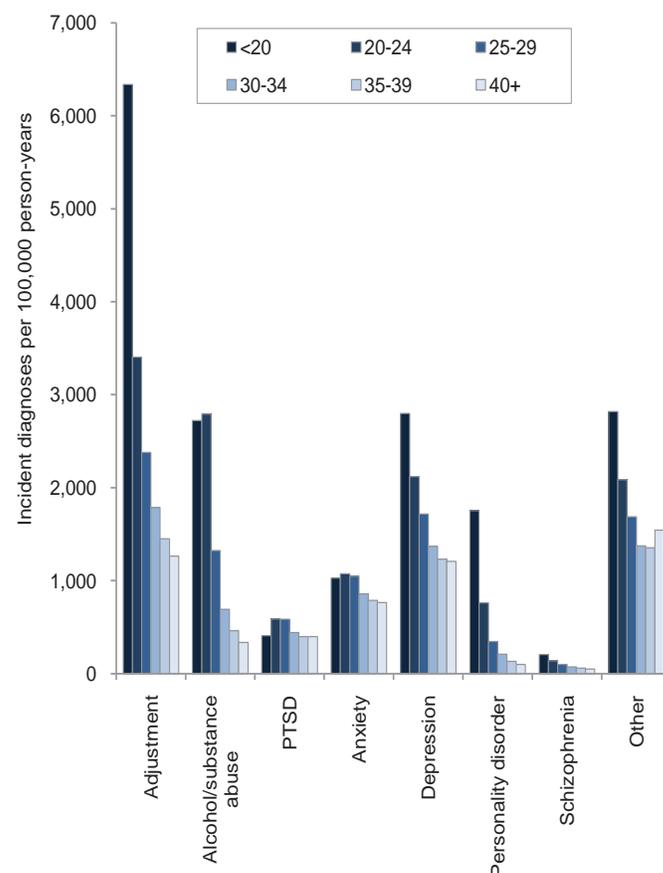
period (incident diagnoses of at least one mental disorder, by year: 2000: $n=75,784$, rate=5,423.6 cases per 100,000 person-years [p-yrs]; 2009: $n=123,374$, rate=8,534.6 per 100,000 p-yrs) (Table 2a).

Over the entire period, nearly 90 percent of all incident mental disorder diagnoses were attributable to adjustment disorders ($n=364,906$; 26.7%), “other” mental disorders ($n=246,816$; 18.0%), depressive disorders ($n=242,353$; 17.7%), alcohol or substance abuse related disorders ($n=220,422$; 16.1%), and anxiety disorders ($n=134,298$; 9.8%); in comparison, relatively few incident diagnoses were attributable to personality disorders ($n=73,183$; 5.3%), PTSD ($n=71,665$; 5.2%), and schizophrenia and other psychotic disorders ($n=14,984$; 1.1%) (Table 2a).

Crude rates of incident diagnoses of PTSD, anxiety disorders, depressive disorders, adjustment disorders, and other mental disorders generally increased during the period – particularly after 2003. In contrast, crude incidence rates of diagnoses of personality disorders, schizophrenia/other psychoses, and alcohol and substance related disorders were relatively stable or declined during the period (Figure 1).

In all categories of mental disorders, the proportions of incident diagnoses that affected military members in their first six months of service generally declined throughout the period; of particular note, the proportion of PTSD diagnoses

Figure 3. Incidence rates of mental disorder diagnoses per 100,000 person-years, by category and age group, active component, U.S. Armed Forces, 2000-2009



that affected individuals in their first six months of service declined from 12.4 percent ($n=292$) in 2000 to 0.9 percent ($n=124$) in 2009. The mental disorders that were relatively most frequently diagnosed in the first six months of service were personality disorders (9.6%), schizophrenia and other psychoses (8.3%), and adjustment disorders (7.4%) (data not shown).

In general, rates of incident mental disorder diagnoses were higher among females than males and declined with increasing age. For example, crude incidence rates of adjustment, anxiety, depressive, and personality disorders were more than twice as high among females than males; notably, the crude rate of alcohol and substance abuse disorders was higher among males than females (Figure 2). Also, crude incidence rates of adjustment, depressive, personality, “other” mental disorders and schizophrenia and other psychoses were higher among the youngest (<20 years old) compared to any older age group of service members; rates of alcohol/substance abuse, anxiety disorders, and PTSD were higher among 20-24 year olds than any other age group (Figure 3).

Overall incidence rates of mental disorders were higher in the Army than in any of the other Services (Figure 4). The Army also had the highest crude incidence rates for each category of mental disorders except personality disorder (data not shown). In each category of mental disorders except

Figure 4. Incidence rates of mental disorder diagnoses per 100,000 person-years, by service and year, active component, U.S. Armed Forces, 2000-2009

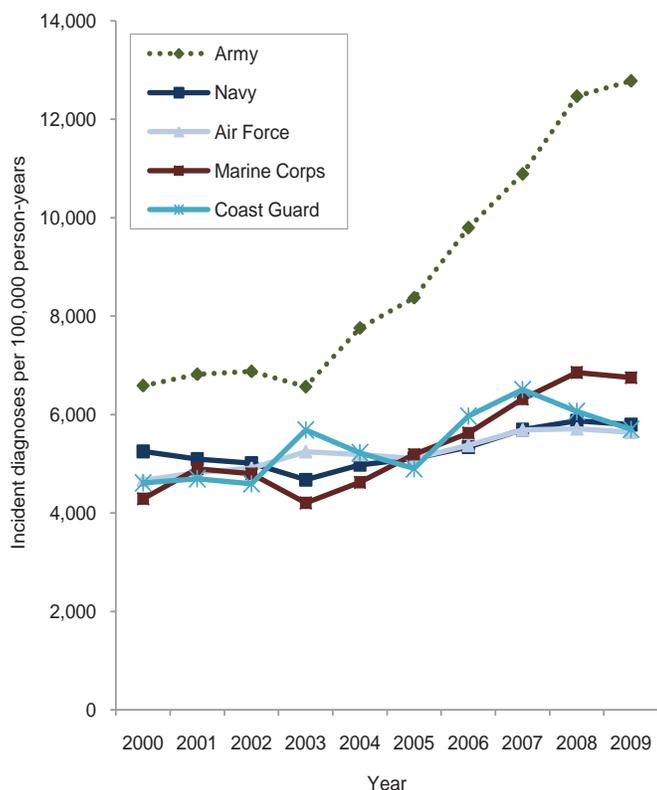
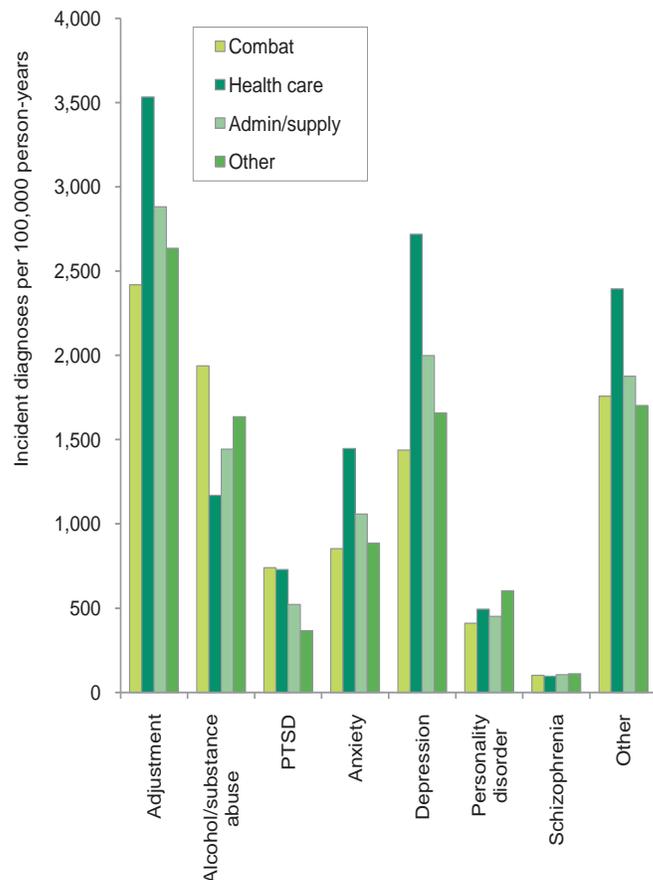


Figure 5. Incidence rates of mental disorder diagnoses per 100,000 person-years, by diagnostic category and military occupation, active component, U.S. Armed Forces, 2000-2009



PTSD and alcohol and substance abuse, crude incidence rates were higher among those in health care than any other military occupational group. Of note, rates of PTSD and alcohol and substance abuse disorders were higher among those in combat-specific than any other category of occupations (Figure 5).

During the surveillance period, there were 364,880 incident reports of mental health problems (documented with V codes) among active component members who were not diagnosed with a mental disorder (ICD-9-CM: 290-319). During the period, 70 percent of all incident reports of mental health problems were related to life circumstances (e.g., pending, current, or recent return from military deployment; bereavement; acculturation difficulties) ($n=170,590$; 46.8%) or partner relationships ($n=86,035$; 23.6%) (Table 2b).

Annual rates of incident mental health problems due to maltreatment, family circumstances, and partner relationships were fairly stable throughout the period. Rates of mental health problems related to life circumstances were fairly stable from 2000 to 2003, increased to a sharp peak in 2005 (1,924.7 per 100,000 p-yrs), and then sharply declined through 2008; of note, the crude incidence rate of life circumstance-related problems was more than 20 percent lower in the last (2009: 1,017.2 per 100,000 p-yrs) compared to the first year of the period (2000: 1,317.5 per 100,000

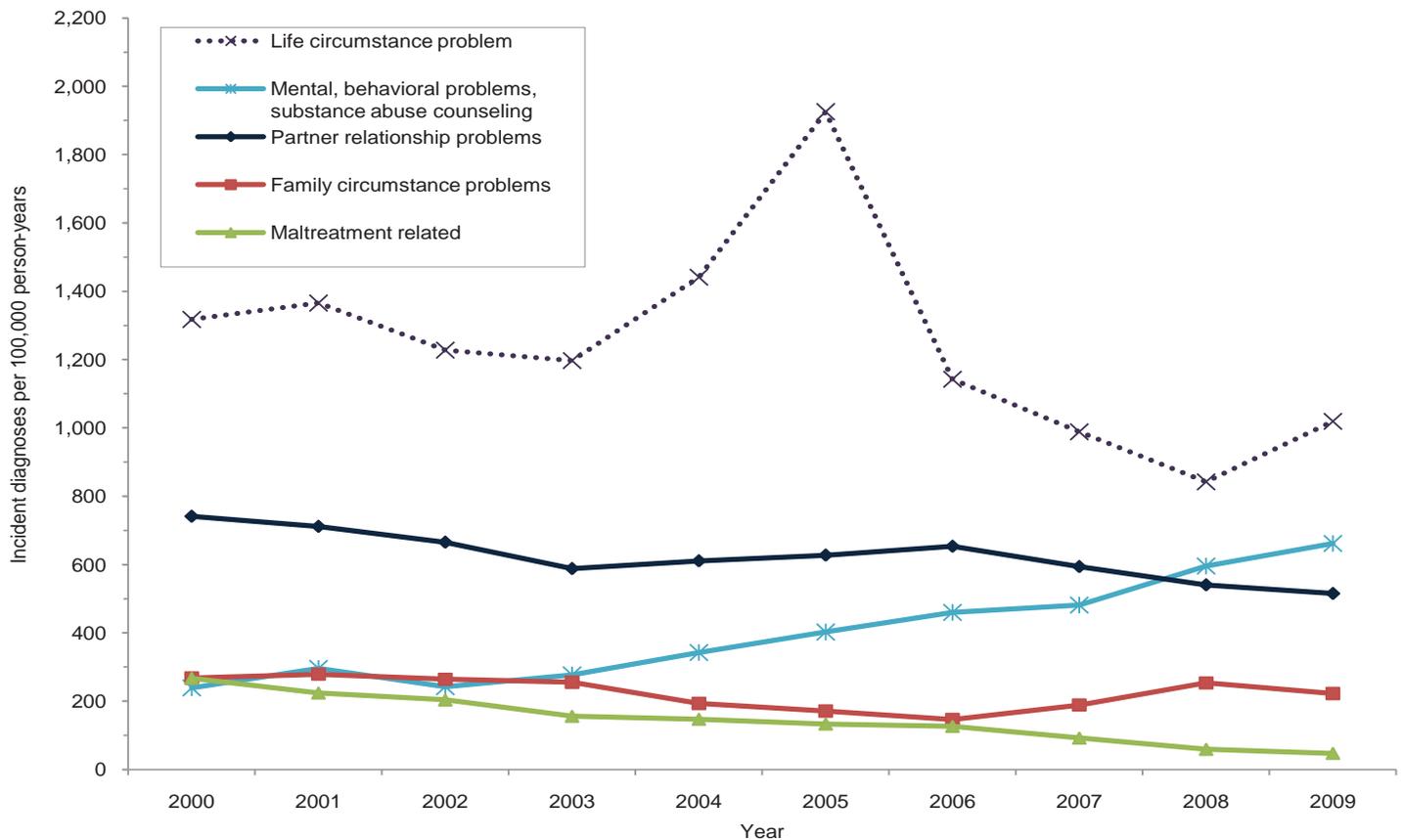
p-yrs). Rates of mental health problems related to mental, behavioral, and substance abuse difficulties steadily increased from 2002 through 2009 (Figure 6).

Rates of any mental health problem were relatively stable during the period compared to rates of any mental disorder diagnosis, which increased sharply after 2003 (Figure 7). In general, gender, age, service, and military occupation had similar relationships with rates of mental health problems (as reported with V codes) as with mental disorder diagnoses (data not shown).

Editorial comment:

This report provides a comprehensive overview of incident diagnoses of mental disorders and reports of mental health problems among active component members of the U.S. Armed Forces during the last 10 years. On average each year during the past decade, approximately one of every 19 service members received at least one incident (first time in military service) mental disorder diagnosis; and in the last year of the decade, approximately one of every 12 service members received at least one incident mental disorder diagnosis. Moreover, among service members who were not diagnosed with any mental disorders, approximately one of every 46 received care for at least one mental health problem each year.

Figure 6. Incidence rates of mental health problems (V-coded mental health visits) among those WITHOUT a mental disorder per 100,000 person-years, by category and year, active component, U.S. Armed Forces, 2000-2009



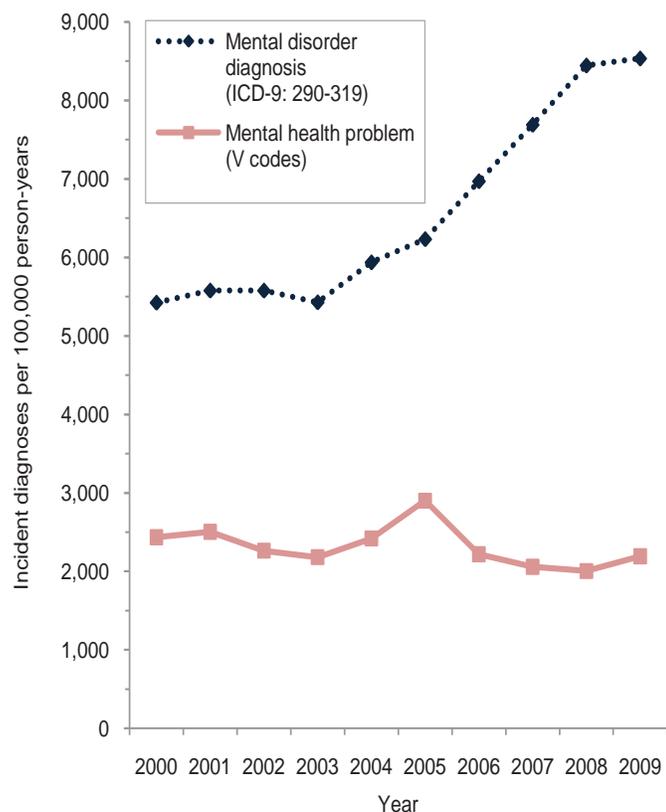
The report also documents striking increases – mostly since 2003 – in the numbers and rates of diagnoses of most categories of mental disorders. Interestingly, among military members who were not diagnosed with any mental disorders, rates of most types of mental health problems actually declined during the past decade. This decline may reflect an increase in the use of mental disorder diagnosis codes. Together, the findings of this and other reports in this issue of the *MSMR* document a large, widespread, and growing mental health problem among U.S. military members. However, the nature and magnitude of mental health-related problems in the military should be interpreted in a broader context. For example, a recently conducted, nationally representative survey of adults in the U.S. estimated that approximately one-half of all Americans will meet criteria for a mental disorder sometime in their lifetime; clearly, the large and growing problem of mental disorders among military members reflects to some extent the similar experience of the general U.S. population.⁹

Undoubtedly, the sharp increases in rates of most categories of mental disorders after 2003 reflect an increasing psychological toll among participants in Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF). Most notably in this regard, the rate of incident diagnoses of post-traumatic stress disorder (PTSD) increased nearly six-fold from 2003 to 2008. Also in the past decade, there have been significant

changes in mental health-related policies, enhancements of mental health education, outreach, and screening efforts, and increases in mental health care resources. For example, the Department of Defense has made significant efforts to reduce stigmas associated with care seeking for, and treatment of, mental illnesses and to remove barriers to receiving timely and appropriate diagnostic and treatment services. Undoubtedly, such changes have resulted in increases in the detection and treatment of previously undiagnosed mental disorders and more complete documentation of mental disorders in electronic medical records. Such records are routinely used for health surveillance activities such as the analyses reported here and elsewhere in this issue.

The findings of this report in regard to age-related risk are consistent with the findings of other studies in veteran and active military populations. Most notably, for most categories of mental disorders, rates of incident diagnoses were highest among the youngest (and thus likely most junior) service members. Several factors likely contribute to the finding. For example, recruit training and first time experiences in active combat are among the most psychologically stressful of all military activities. Recruits are the youngest and most junior of all military members; and among all deployed service members, the most junior are most likely to be experiencing their first lifetime exposures to combat. Also, the endpoints of analyses in this report were incident (i.e., first ever during

Figure 7. Incidence rates of any mental disorder diagnosis or any mental health problem per 100,000 person-years, by year, active component, U.S. Armed Forces, 2000-2009



military service) diagnoses of mental disorders; thus, even if the prevalences of a disorder were similar across age groups, rates of incident diagnoses of the disorder would likely decrease with age (because in younger versus older age groups, relatively more of the diagnoses would be considered incident diagnoses, i.e., documented for the first time in their military service careers). In addition, because of real or perceived stigmas and/or fears of negative impacts on their military careers, older (and higher ranking) service members may be more reluctant to seek mental health care than those who are younger. Finally, past studies have documented that mental disorders and mental health problems are associated with higher rates of attrition from military service; thus, compared to their counterparts, individuals with mental health problems likely leave military service sooner and at younger ages.^{6,10}

Of interest, service members in health care occupations had relatively high rates of incident diagnoses of most types of mental disorders. In particular, rates of incident diagnoses of PTSD were similar among those in health care and combat-specific occupations. The finding likely reflects, at least in part, increased access to and utilization of health care services by medical personnel in general. It likely also reflects the effects of the psychological stresses that are inherent to many health care roles, particularly in wartime. Studies of

deployed military medical personnel in the Armed Forces of the United Kingdom have demonstrated higher rates of psychological distress in medical personnel.¹¹

This analysis did not consider the effects of deployment on the incidence of mental disorders. Many researchers have examined the effects of deployment in general and combat exposure specifically on rates of diagnosed mental disorders. For example, in 2008, Larson and colleagues documented mental disorder diagnoses among U.S. Marines who had recently served in OIF/OEF; among those with no predeployment mental disorder diagnoses, rates of all types of mental disorders except PTSD were lower among combat-deployed than non-combat deployed Marines.¹² Recent *MSMR* analyses have documented that deployers who were diagnosed with mental disorders before deploying were more than twice as likely as their counterparts to receive mental disorder diagnoses after deploying.⁸ Among veterans of OEF/OIF service in general, combat exposure is a strong predictor of post-deployment anxiety diagnoses, including among those with no predeployment histories of mental disorders.¹³ Hoge and colleagues documented that mental health outcomes are correlated with combat experiences; in particular, combat veterans had more post-deployment psychiatric problems than their counterparts who served in non-combat locations.¹⁴ Future *MSMR* reports will continue to examine mental disorders in relation to the natures, locations, frequencies, durations, and experiences during overseas deployments.

There are significant limitations to this report that should be considered when interpreting the results. For example, incident cases of mental disorders and mental health problems were ascertained from ICD-9-CM coded diagnoses that were reported on standardized administrative records of outpatient clinic visits and hospitalizations. Such records are not completely reliable indicators of the numbers and types of mental disorders and mental health problems that actually affect military members. For example, the numbers reported here are underestimates to the extent that affected service members did not seek care or received care that is not routinely documented by records that were used for this analysis (e.g., private practitioner, deployed troop clinic); that mental disorders and mental health problems were not diagnosed or reported on standardized records of care; and/or that some indicator diagnoses were miscoded or incorrectly transcribed on the centrally transmitted records. On the other hand, some conditions may have been erroneously diagnosed or miscoded as mental disorders or mental health problems (e.g., screening visits). Finally, the analyses reported here summarize the experiences of individuals while they were serving in an active component of the U.S. military; as such, the results do not include mental disorders and mental health problems that affect members of reserve components or veterans of recent military service.

Finally, as with most health surveillance-related analyses among U.S. military members, this report relies on data in the Defense Medical Surveillance System (DMSS). The DMSS integrates records of nearly all medical encounters of active component members in fixed (i.e. not deployed or at sea) military medical facilities. Administrative medical record systems, like DMSS, enable comprehensive surveillance of medical conditions of interest through identification of likely cases; such cases are identified by using surveillance case definitions that are based entirely or in part on indicator ICD-9-CM codes. Other considerations in the construction of surveillance case definitions include the clinical setting in which diagnoses of interest are made (e.g., hospitalization, relevant specialty clinic), frequency and timing of indicator diagnoses, and the priority with which diagnoses of interest were reported (e.g., first listed versus others). The accuracy of estimates of the numbers, natures, and rates of illnesses and injuries of surveillance interest depend to a great extent on specifications of the surveillance case definitions that are used to identify cases. For this analysis, the medical literature and subject matter experts were consulted prior to creating the surveillance case definitions that were used to identify the mental health conditions of interest for this report. If case definitions with different specifications were used to identify cases of nominally the same conditions, estimates of numbers, rates, and trends would vary from those reported here.^{15, 16}

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Hospitalizations for Mental Disorders, Active Components, U.S. Armed Forces, January 2000-December 2009

Among U.S. military members, mental disorders are the leading cause of hospital bed days and the second leading cause of medical encounters.¹ The conflicts in Iraq and Afghanistan have heightened interest in defining the numbers, natures, and risk factors for mental disorders and assessing mental disorder-related burdens on the military health system.

Many mental disorders are appropriately treated in ambulatory settings; however, some require inpatient management – often for prolonged periods. Inpatient treatment of mental disorders is not only expensive but also disruptive to the affected individuals, their military units, and their families. This report documents diagnostic categories associated with, and numbers, lengths, and trends of, mental disorder-related hospitalizations of active component members of the U.S. Armed Forces during the past ten years.

Methods:

The surveillance period was 1 January 2000 to 31 December 2009. The surveillance population included all individuals who served in the active component of the U.S. Armed Services any time during the surveillance period. Endpoints of analyses were mental disorder-related hospitalizations; for analysis purposes, these were defined by hospitalization records with primary (first-listed) diagnoses of a “mental disorder” ICD-9-CM: 290-319 (excluding “tobacco use disorder” ICD-9-CM: 305.1). Hospitalizations longer than 60 days were excluded. For summary purposes, mental disorder-related hospitalizations were grouped into six categories: depression, anxiety disorders, post-traumatic stress disorder (PTSD), adjustment disorder, substance abuse, and “other” (Table 1). In each category, an individual was allowed one hospitalization per year.

Results:

During the 10-year surveillance period, 94,391 active component service members experienced 109,895 mental disorder hospitalizations. Annual numbers of mental disorder-related hospitalizations remained fairly stable from 2000 through 2006 and then monotonically increased through 2009; there were nearly 50 percent more mental disorder-related hospitalizations in 2009 (n=15,328) than in 2006 (n=10,262) (Figure 1). The increase overall since 2006 was largely due to sharp increases in hospitalizations for PTSD, depression, and substance abuse (% increases in hospitalizations, 2006-2009: PTSD: 95.0%; depression: 68.4%; substance abuse: 71.9%).

During each year from 2000 to 2005, there were more hospitalizations for adjustment disorders than any other category of mental disorders; however, during each year from 2006 to 2009, there were more hospitalizations for depression than any other category of mental disorders (Figure 1).

Over the 10-year period, the median length of mental disorder-related hospitalizations was 6 days (25%-75%iles: 3-9 days). From 2000 to 2006, annual mean lengths of mental disorder hospitalizations were approximately 8 days (range, annual mean lengths of hospitalization, 2000-6: 7.7-8.2 days); and during the last three years of the period, the mean lengths of such hospitalizations markedly increased: 2007: 8.6 days; 2008: 9.3 days; 2009: 10.6 days (Figure 2). In general, hospitalizations for substance abuse were longer (mean length: 11.0 days) and those for adjustment disorders were shorter (mean: 5.9 days) than those for other categories of mental disorders (data not shown).

During the 10-year period, active component members were hospitalized for 2,873 cumulative person-years (hosp-yrs) for treatment of mental disorders. The time hospitalized each year for treatment of mental disorders remained fairly stable from 2000 through 2006 and then markedly increased through 2009; the cumulative time hospitalized for mental disorders in 2009 (504.25 hosp-yrs) was more than two times higher than in any year from 2000 through 2005 (data not shown).

Over the entire period, the relative time lost due to mental disorder-related hospitalizations was more than two times higher in the Army (3.09 hosp-yrs per 10,000 p-yrs of active service [hosp-yrs/10,000 p-yrs]) than in any of the other Services (Marine Corps: 1.52 hosp-yrs/10,000 p-yrs; Air Force: 1.51 hosp-yrs/10,000 p-yrs; Coast Guard: 1.40 hosp-yrs/10,000 p-yrs; Navy: 1.35 hosp-yrs/10,000 p-yrs); and during the last year of the period, the relative time lost due to hospitalization in the Army (5.95 hosp-yrs/10,000 p-yrs) was more than three times higher than in any other

Table 1. Mental health categories and ICD-9-CM codes

Depression	296.20-296.35, 296.50-296.55, 296.90, 300.40-300.49, 311.xx
Anxiety disorders	300.00-300.09, 300.20-300.29, 300.30-300.39
PTSD	309.81
Adjustment disorder	309.0-309.9 (excluding PTSD)
Substance abuse	303.xx, 304.xx, 305.xx (excluding 305.1)
Other	All other 290.xx-319.xx (excluding 305.1)

Figure 1. Mental disorder-related hospitalizations, by diagnostic category, active component, U.S. Armed Forces, 2000-2009

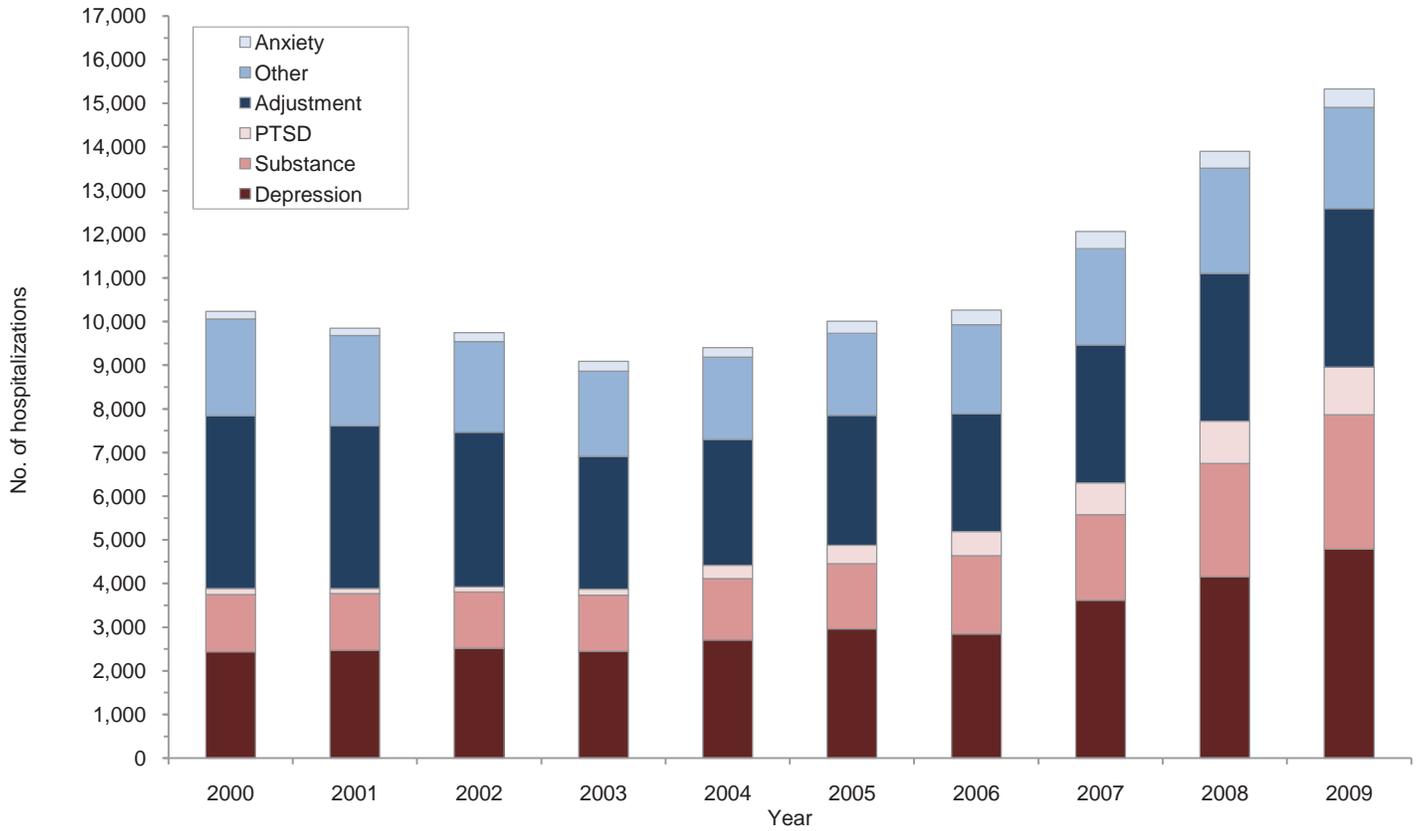


Figure 2. Variability of lengths of mental disorder-related hospital stays, by year, active component, U.S. Armed Forces, 2000-2009

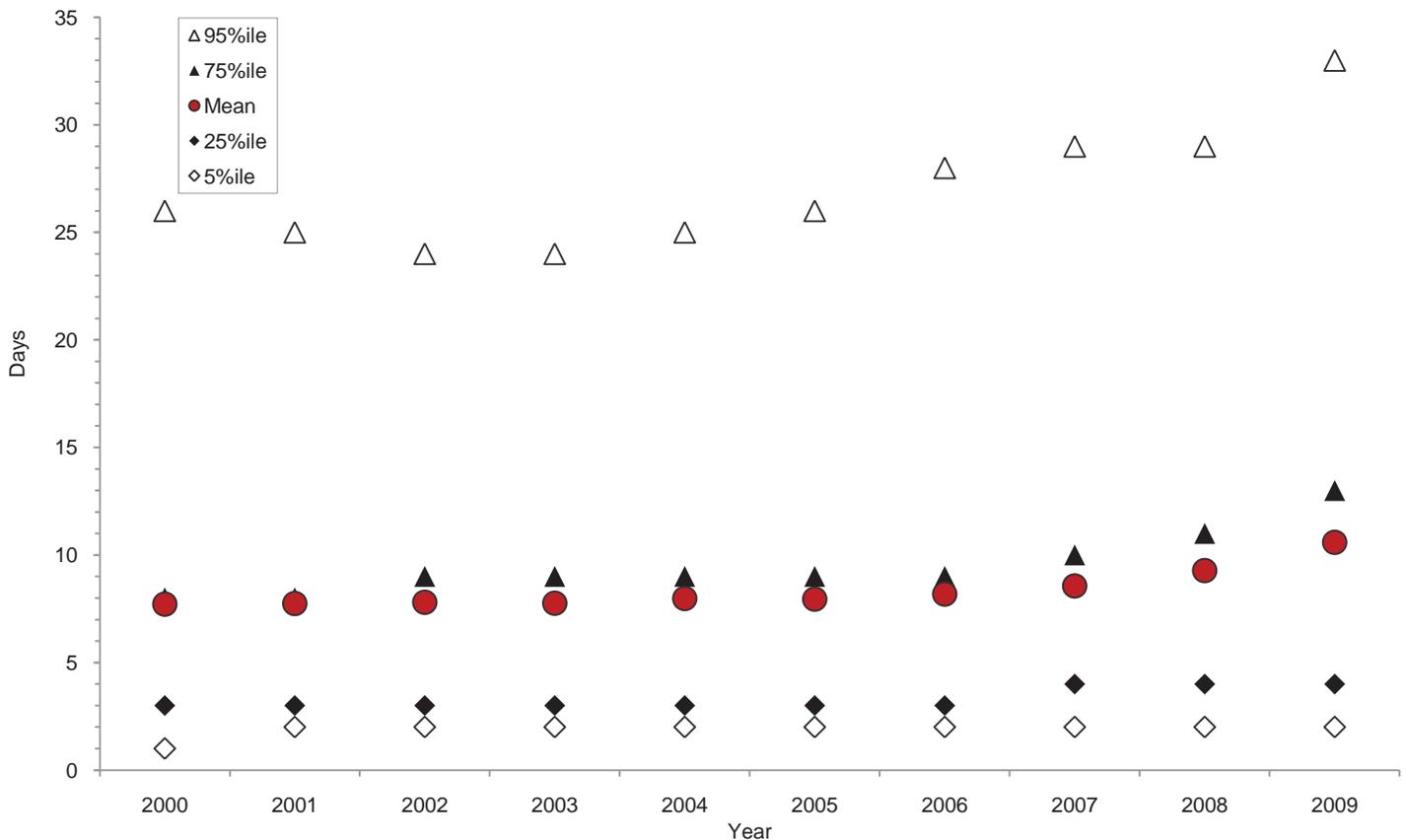
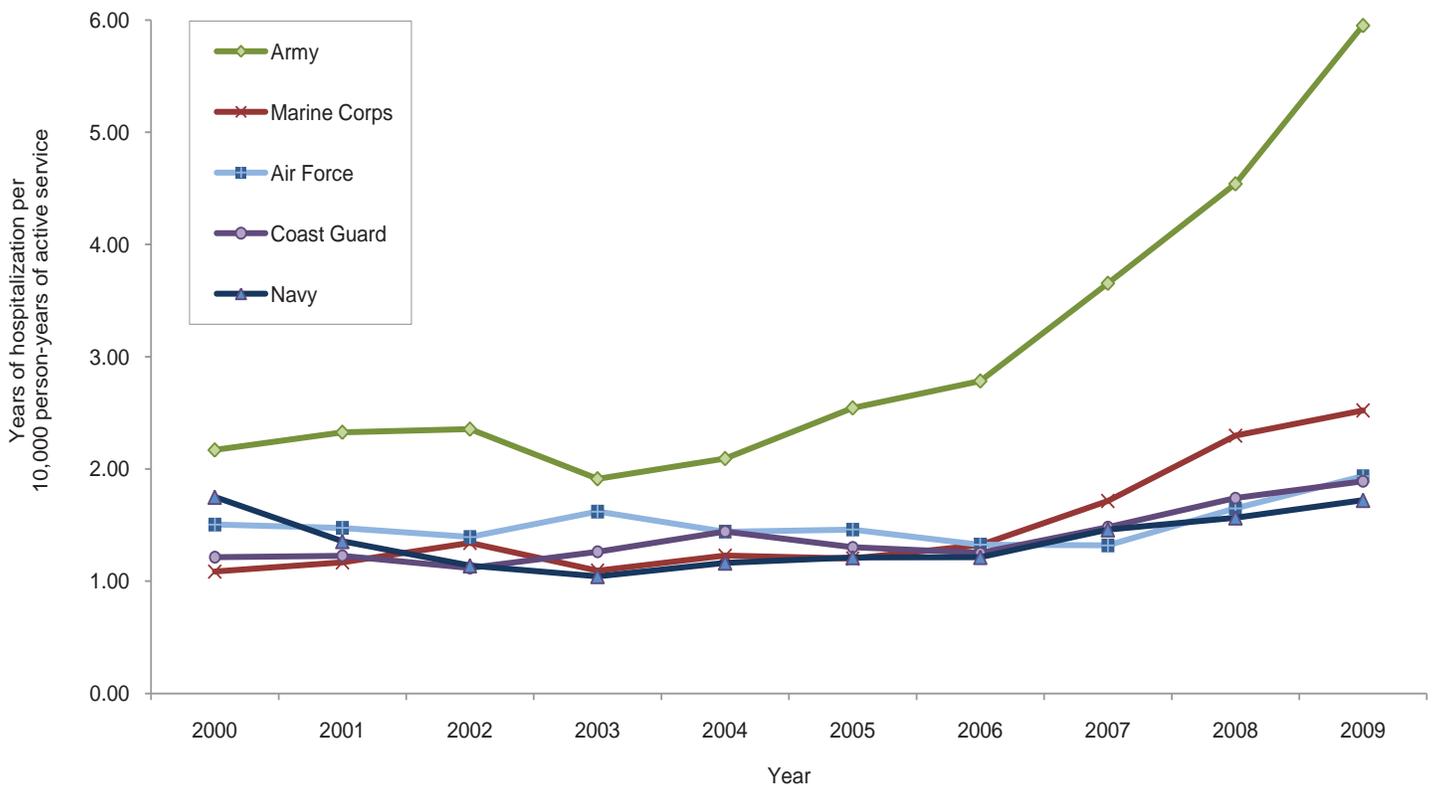


Figure 3. Relative duty time lost to mental disorder-related hospitalizations by service, active component, U.S. Armed Forces, 2000-2009



Service except the Marine Corps (Marine Corps: 2.52 hosp-yrs/10,000 p-yrs; Air Force: 1.94 hosp-yrs/10,000 p-yrs; Coast Guard: 1.89 hosp-yrs/10,000 p-yrs; Navy: 1.72 hosp-yrs/10,000 p-yrs) (Figure 3).

Editorial comment:

This report documents increases in the numbers and durations of mental disorder-related hospitalizations among U.S. military members since 2006; the increases overall are largely due to sharp rises in recent years in PTSD, depression, and substance abuse-related hospitalizations.

The findings of this report likely reflect not only increased incidence rates of clinically significant mental disorders, such as PTSD, among veterans of one or more combat deployments but also increased case ascertainment. Since the beginning of combat operations in Afghanistan and Iraq, there have been significant efforts to decrease stigmas associated with, and remove barriers, to evaluation and treatment of mental disorders among combat veterans. In 2005, for example, the U.S. military mandated post-deployment health reassessments three to six months after service members returned from overseas deployments; the reassessments were designed to “identify and address health concerns, with specific emphasis on mental health” that emerge within the first few months after returning from overseas.

In this report, the Army was relatively most affected (based on lost duty time) by mental disorder-related hospitalizations overall; and in 2009, the loss of manpower to the Army was more than twice that to the Marine Corps and more than three times that to the other Services. Compared to the other Services, the Army has had many more deployers to Afghanistan and Iraq and many more combat-specific casualties; it is not surprising, therefore, that the Army has endured more mental disorder-related casualties and larger manpower losses than the other Services.

Finally, this analysis documented that 14 percent of all mental disorder hospitalizations were among individuals with prior mental disorder hospitalizations during the period. Other studies of mental health hospitalizations among military members have shown that a small proportion of patients account for disproportionately large number of hospital bed days.²

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Childbirth, Deployment, and Diagnoses of Mental Disorders Among Active Component Women, January 2002-June 2009

Among members of the U.S. Armed Forces in 2009, mental disorders accounted for more hospitalizations and more hospital bed days than any other category of diagnoses.¹ Also in 2009, pregnancy and childbirth accounted for 13 percent of all hospital bed days and more hospitalizations than any other category of diagnosis except mental disorders. As of 2009, females accounted for approximately 14 percent of the active component and 10 percent of all U.S. military deployers to Afghanistan (Operation Enduring Freedom [OEF]) and Iraq (Operation Iraqi Freedom [OIF]). Among female OEF/OIF deployers, mental disorders are more prevalent after OEF/OIF service than before.² Thus, in recent years, many women in the military have deployed overseas at least once and have had one or more children while in service; yet, there is relatively little knowledge regarding the effects of long-term deployments on the health of recently delivered mothers and their newborn children.

During the past four years, each of the Services has changed their policies regarding periods of deferment from deployment following childbirth. The revised policies aim to achieve the interrelated goals of protecting the health and welfare of newborn infants and their mothers while sustaining a healthy, fit, and deployment ready force.³⁻⁸ In June 2007, the Navy lengthened its postpartum deferment from 4 months to 12 months, while the Marine Corps shortened its deferment from 12 months to 6 months.^{5,7,8} In August 2008, the Army lengthened its deferment from 4 months to 6 months;^{3,4} and in September 2009, the Air Force made a similar change.⁶ Thus, currently, the Army, Air Force, and Marine Corps specify postpartum deferment periods of six months, and the Navy's deferment period is 12 months.

This report assesses the relationship between the length of time between childbirth and subsequent deployment among first time mothers in active service and the risk of a mental disorder diagnosis after returning from deployment. The analysis also compares the findings to the recent policy changes regarding the period of deferment from deployment after childbirth.

Methods:

The surveillance period was 1 January 2002 to 30 June 2010. The surveillance cohort consisted of all women who delivered their first child while serving in the active component of the Army, Navy, Air Force or Marine Corps between 1 January 2002 and 30 June 2009, subsequently deployed to OEF/OIF, and returned from deployment

no later than 31 December 2009. Women who had any documented deliveries and/or two or more dependents prior to 1 January 2002 were not included in the surveillance cohort. Deliveries were ascertained from hospitalization records with diagnostic codes indicative of live births (**Table 1**). Only the first documented delivery of each cohort member during the surveillance period was included in analyses.

For this analysis, the outcome of interest was a mental disorder diagnosis within six months after returning from the first postpartum deployment. Mental disorder diagnoses were ascertained from hospitalization and outpatient encounter records that included at least one mental disorder-specific diagnostic code in any diagnostic position (**Table 1**). Women who received mental disorder diagnoses prior to deployment were excluded from the analysis, unless they were made during the first six months of active military service (mental health problems are relatively common among recruits, and many do not persist or indicate long term mental health issues).

The risk factor of primary interest for this analysis was the time from delivery of a first child while in active service until the first postpartum deployment to OEF/OIF. In turn, the surveillance cohort was divided into four subgroups based on "exposure levels": deployment less than 6 months, 6-12 months, 12-24 months, and more than 24 months after giving birth.

All data were derived from electronic medical, deployment, and personnel records routinely maintained in the Defense Medical Surveillance System (DMSS) for health surveillance purposes.

Results:

Between January 2002 and June 2009, 12,326 female active component members gave birth, deployed, and returned from deployment before the end of 2009. Of these women, 3,802 (30.9%) had received one or more mental disorder diagnoses prior to their first postpartum deployment and were excluded

Table 1. Diagnostic codes (ICD-9-CM) used to define live birth and mental health diagnosis

Live birth
650.XX
640-649, 651-669 with a 5th digit of 1 or 2 ("delivered")
V27 (outcome of delivery) indicating "liveborn"
Mental health diagnosis (excludes "tobacco use disorder" ICD-9: 305.1)
290.XX-319.XX

Table 2. Demographic characteristics of postpartum deployers with no mental health diagnosis prior to deployment, active component, U.S. Armed Forces, January 2002-December 2009

	All Women	Time between birth and deployment							
		< 6 months		6-12 months		12-24 months		>24 months	
		No.	%	No.	%	No.	%	No.	%
Total	8,524	1,183	13.9	2,359	27.7	2,789	32.7	2,193	25.7
Age									
<20	761	124	10.5	232	9.8	236	8.5	169	7.7
20-24	5,187	772	65.3	1,511	64.1	1,705	61.1	1,199	54.7
25-29	1,682	215	18.2	422	17.9	542	19.4	503	22.9
30-34	655	60	5.1	135	5.7	224	8.0	236	10.8
35-39	205	10	0.8	52	2.2	69	2.5	74	3.4
40+	34	2	0.2	7	0.3	13	0.5	12	0.5
Marital status									
Single	3,495	532	45.0	989	41.9	1,103	39.5	871	39.7
Married	4,780	611	51.6	1,283	54.4	1,609	57.7	1,277	58.2
Separ/Div	249	40	3.4	87	3.7	77	2.8	45	2.1
Race/ethnicity									
Black	3,285	432	36.5	927	39.3	1,075	38.5	851	38.8
White	3,075	437	36.9	854	36.2	1,016	36.4	768	35.0
Hispanic	1,213	191	16.1	330	14.0	391	14.0	301	13.7
Asian	532	73	6.2	136	5.8	169	6.1	154	7.0
Pacific Islander	180	32	2.7	47	2.0	63	2.3	38	1.7
Other	239	18	1.5	65	2.8	75	2.7	81	3.7
Years of service									
0-4 years	6,585	996	84.2	1,939	82.2	2,143	76.8	1,507	68.7
5-9 years	1,372	144	12.2	298	12.6	468	16.8	462	21.1
10-14 years	486	39	3.3	101	4.3	143	5.1	203	9.3
15+	81	4	0.3	21	0.9	35	1.3	21	1.0
Service									
Army	3,543	803	67.9	1,151	48.8	955	34.2	634	28.9
Navy	2,075	156	13.2	429	18.2	768	27.5	722	32.9
Air Force	2,390	191	16.1	643	27.3	848	30.4	708	32.3
Marine Corps	516	33	2.8	136	5.8	218	7.8	129	5.9

from subsequent analyses; thus, the final analysis summarized the experience of 8,524 women.

Women who deployed more than one year after giving birth were generally older, had served longer and were more likely to be married than women who deployed less than one year after childbirth (**Table 2**). Of all new mothers who deployed within six months after delivering, more than two-thirds (67.9%) were in the Army (**Table 2, Figure 1**). In the Navy and Air Force, relatively high proportions of the deployments of new mothers were more than 24 months after giving birth (32.9% and 32.3%, respectively) (**Table 2, Figures 2-3**). In the Marine Corps, 67.2 percent of all new mothers who deployed did so more than one year after giving birth (**Table 2, Figure 4**).

Table 3. Incidence rates and rate ratios for mental health conditions diagnosed after return from postpartum deployment, by exposure group, active component, U.S. Armed Forces, January 2002-June 2010

Exposure level: Time between birth and deployment	Cases: Individuals with a mental health diagnosis following deployment	Incidence rate (per 1,000 p-yrs)	Incidence rate ratio (95% CI)
< 6 months	93	166.4	1.36 (1.04-1.76)
6-12 months	152	135.6	1.11 (0.88-1.39)
12-24 months	163	122.6	1.00 (referent)
> 24 months	110	104.7	0.85 (0.66-1.09)

Of the 8,524 new mothers who deployed, 518 (6.1%) received at least one mental health diagnosis within six months after they returned. The most frequent post-deployment mental health diagnoses among these women were adjustment reaction (n=252, 40.6%), depressive disorders (n=165, 26.6%), anxiety disorders (n=65, 10.5%), and substance abuse disorders (n=23, 3.7%) (**data not shown**).

Within six months after returning from deployment, the rate of any mental disorder diagnosis was 37 percent higher among women who deployed within six months of childbirth (166.4 per 1,000 person-years [p-yrs]) compared to those who deployed later. Rates of postdeployment mental disorder diagnoses continuously declined among women who deployed 6-12 months (135.6 per 1,000 p-yrs), 12-24 months (122.6 per 1,000 p-yrs), and more than 24 months (104.7 per 1,000 p-yrs) after giving birth (**Table 3**). These rates suggest an inverse relationship between the length of time from birth to deployment and the likelihood of a subsequent mental health disorder diagnosis.

Editorial comment:

This report documents a 37 percent higher incidence of post-deployment mental disorder diagnoses among first time mothers who deployed within six months (compared to longer) after giving birth. Among first-time mothers overall, the lowest rate of post-deployment mental disorder diagnoses affected those who deployed greater than 24 months after giving birth. The findings generally support the recent policy changes of the Army, Navy, and Air Force that lengthened the periods of postpartum deployment deferrals.

The findings of this report and current deployment deferral policies are generally consistent with relevant recommendations and recent findings regarding breastfeeding, mother and infant attachment, maternal emotional status and stress responses, and the ability of women at various times after childbirth to meet military body composition and physical fitness standards. For example, both the American

Figure 1. Relationship between date of childbirth and date of deployment for Army women, active component, 1 January 2002-31 December 2009

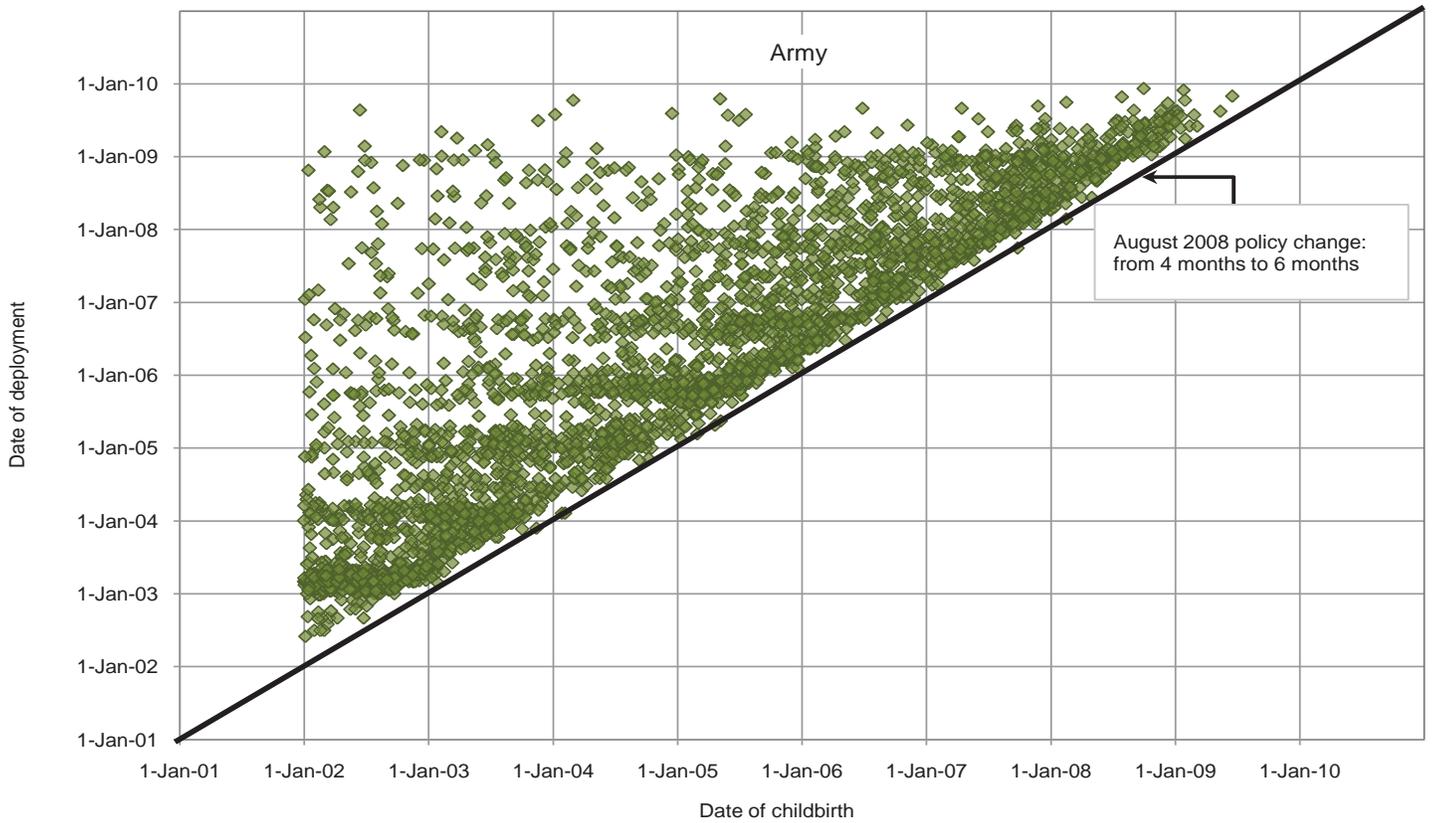
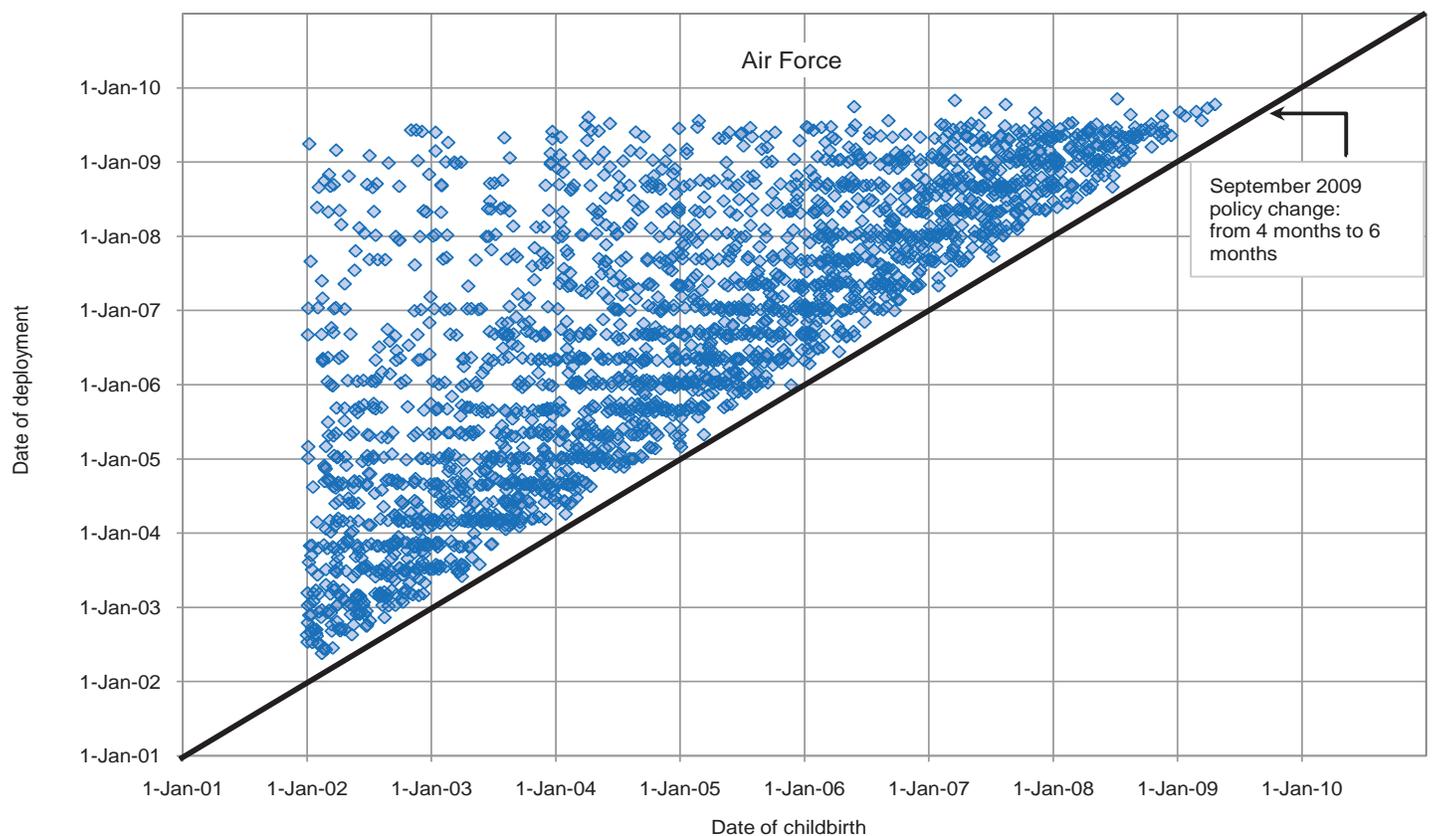


Figure 2. Relationship between date of childbirth and date of deployment for Air Force women, active component, 1 January 2002-31 December 2009



Note: In Figures 1-4, each data point represents a service member and is positioned according to when she gave birth (on the x-axis) and when she deployed (on the y-axis). Thus, the vertical distance of a point from the diagonal line represents the interval between birth and deployment.

Figure 3. Relationship between date of childbirth and date of deployment for Navy women, active component, 1 January 2002-31 December 2009

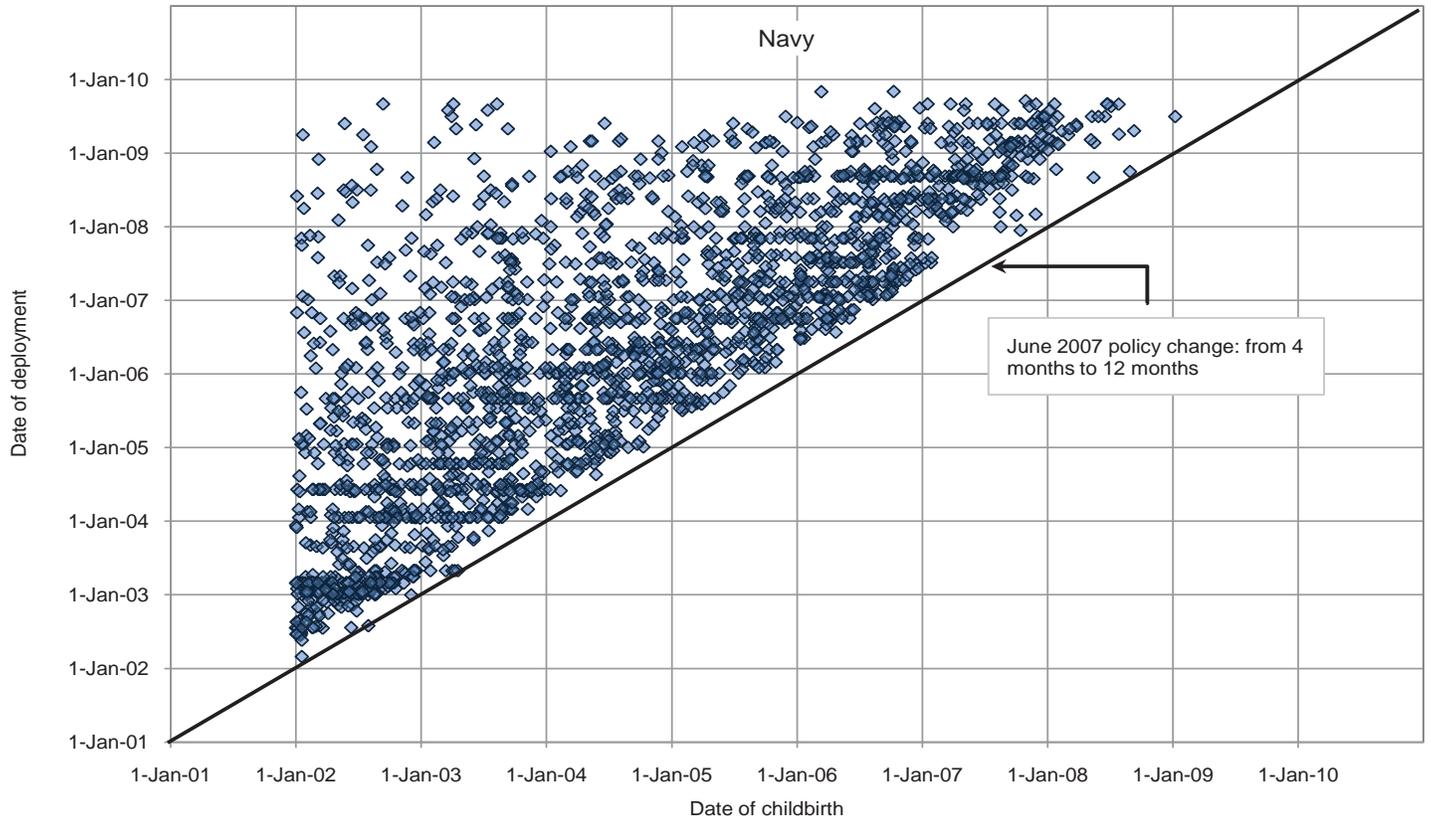
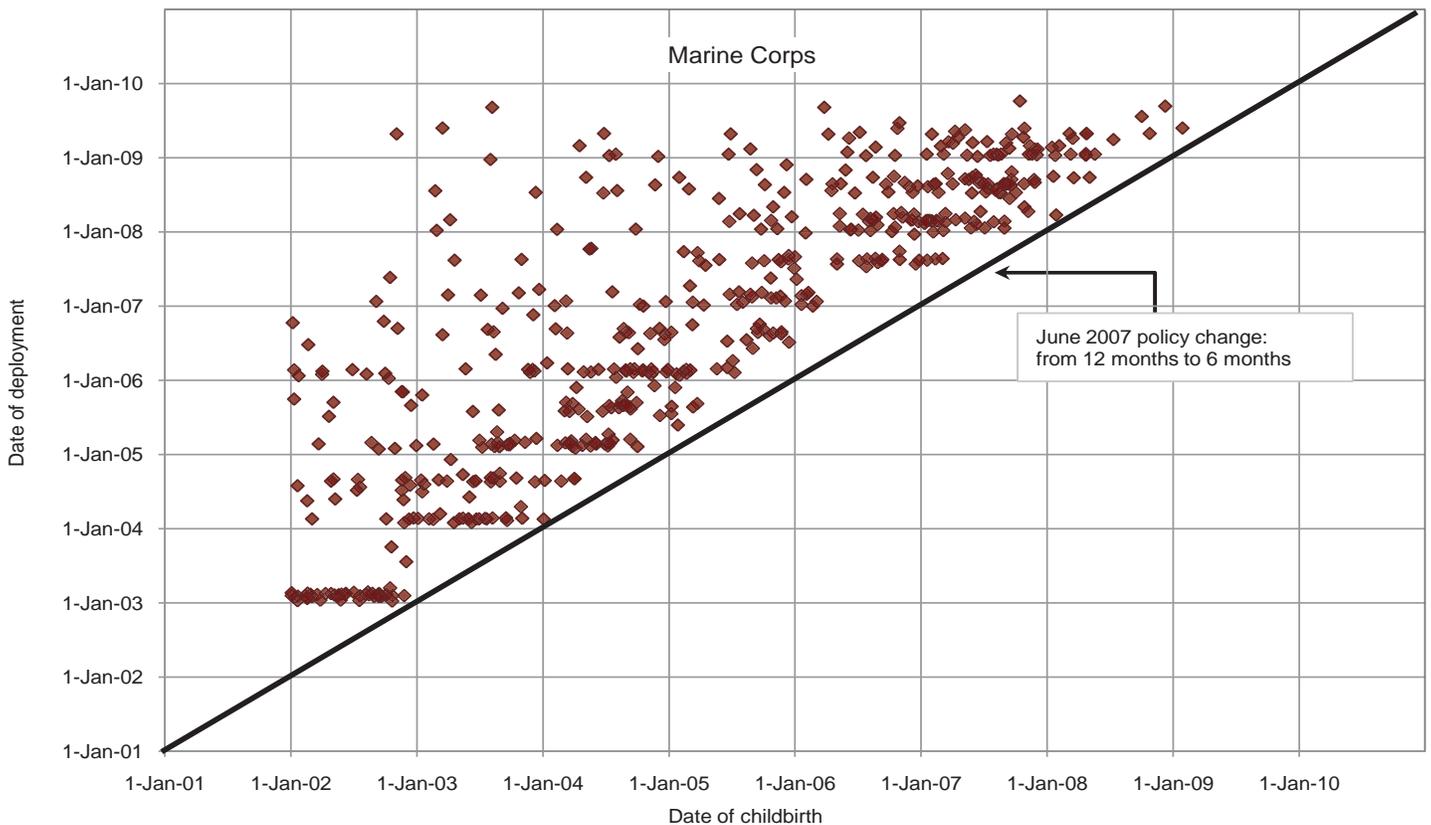


Figure 4. Relationship between date of childbirth and date of deployment for Marine Corps women, active component, 1 January 2002-31 December 2009



Note: In Figures 1-4, each data point represents a service member and is positioned according to when she gave birth (on the x-axis) and when she deployed (on the y-axis). Thus, the vertical distance of a point from the diagonal line represents the interval between birth and deployment.

Academy of Pediatrics and the American Academy of Family Physicians recommend exclusive breastfeeding during the first 6 months of life, with continued breastfeeding through at least 12 months.^{9,10} Also, some studies have found that the first year of life is key to the attachment relationship that forms between infants and their mothers;¹¹ others have suggested that breastfeeding may have important health effects for mothers, especially in relation to emotional status and stress responses.¹²

There are several limitations of this analysis that should be considered when interpreting the results. For example, the analysis did not account for the potentially confounding effects of age, grade, years of service, marital status, military occupation, service, experiences and activities while deployed, number of prior deployments, and length of deployment. These factors likely vary across the four exposure-defined subgroups; in addition, they may be correlates of risk of postdeployment mental disorders. Also, because records of medical encounters in deployed settings are not centrally available for health surveillance purposes, this analysis did not account for mental disorder diagnoses during deployment; in turn, cumulative incidence rates of mental disorder diagnoses reported here likely underestimate actual rates among deployed new mothers. Also, some mental disorders are treated by providers in settings in which mental disorder-specific diagnoses are not routinely documented or reported (e.g., social workers, chaplains); as a result, mental disorder-specific diagnoses documented on centrally available medical records do not account for all mental disorders among new mothers who had been deployed.

Of note, this summary focused on women who gave birth to their first child during the surveillance period; in turn, the results should not be generalized to all mothers who deploy after childbirth. For example, there are likely differences in the experiences of women who leave one versus several children when they deploy. Additionally, other medical conditions in a mother or her child may affect her mental health status and

risk of developing a mental disorder. Finally, records that are routinely maintained for health surveillance purposes contain little information regarding birth order or family situation; thus, it is difficult to assess other family or social factors that may affect mental health and/or periods of deferment from deployment after childbirth.

Reported by: Roxanne Danielson, LT, MC, USN.

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Update: Deployment Health Assessments, U.S. Armed Forces, November 2010

Since January 2003, peaks and troughs in the numbers of pre- and post-deployment health assessment forms transmitted to the Armed Forces Health Surveillance Center generally corresponded to times of departure and return of large numbers of deployers. Between April 2006 and March 2010, the number of post-deployment reassessment (PDHRA) forms per month ranged from 17,000 to 36,000 (Table 1, Figure 1).

During the past 12 months, the proportions of returned deployers who rated their health as “fair” or “poor” were 8-11% on post-deployment health assessment questionnaires and 10-14% on PDHRA questionnaires (Figure 2).

In general, on post-deployment assessments and reassessments, deployers in the Army and in reserve components were more likely than their respective counterparts to report health and exposure-related concerns (Table 2, Figure 3). Both active and reserve component members were more likely to report exposure concerns three to six months after, compared to the time of return from deployment (Figure 3).

At the time of return from deployment, soldiers serving in the active component were the most likely of all deployers to receive mental health referrals; however, three to six months after returning, active component soldiers were less likely than Army Reservists to receive mental health referrals (Table 2).

Finally, during the past three years, reserve component members have been more likely than active component service members to report “exposure concerns” on postdeployment assessments and reassessments (Figure 3).

Table 1. Deployment-related health assessment forms, by month, U.S. Armed Forces, November 2009-October 2010

	Pre-deployment assessment DD2795		Post-deployment assessment DD2796		Post-deployment reassessment DD2900	
	No.	%	No.	%	No.	%
Total	411,156	100	424,846	100	318,401	100
2009						
November	32,345	7.9	32,934	7.8	20,743	6.5
December	31,069	7.6	36,581	8.6	29,147	9.2
2010						
January	55,679	13.5	34,249	8.1	25,822	8.1
February	31,481	7.7	27,776	6.5	27,085	8.5
March	32,597	7.9	44,765	10.5	35,890	11.3
April	32,222	7.8	33,572	7.9	24,896	7.8
May	38,266	9.3	35,429	8.3	22,761	7.1
June	30,471	7.4	45,348	10.7	24,661	7.7
July	30,382	7.4	46,834	11.0	22,903	7.2
August	38,046	9.3	37,249	8.8	31,380	9.9
September	32,811	8.0	27,388	6.4	27,592	8.7
October	25,787	6.3	22,721	5.3	25,521	8.0

Figure 2. Proportion of deployment health assessment forms with self-assessed health status as “fair” or “poor”, U.S. Armed Forces, November 2009-October 2010

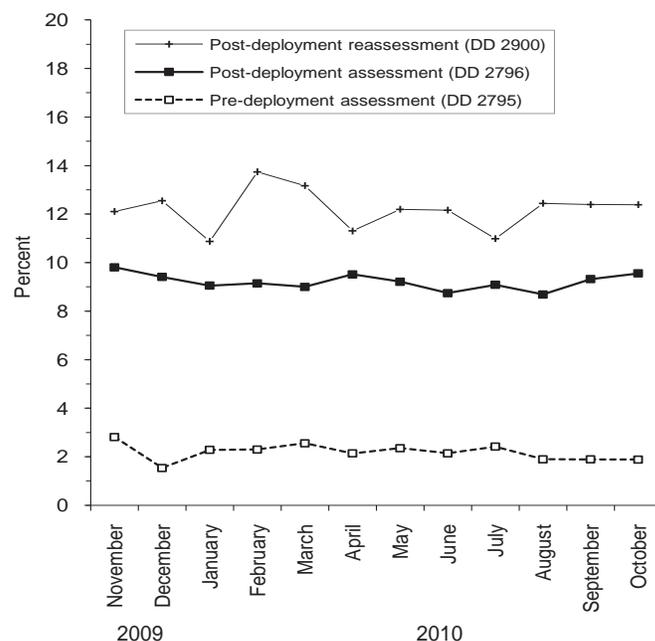


Figure 1. Total deployment health assessment and reassessment forms, by month, U.S. Armed Forces, January 2003-October 2010

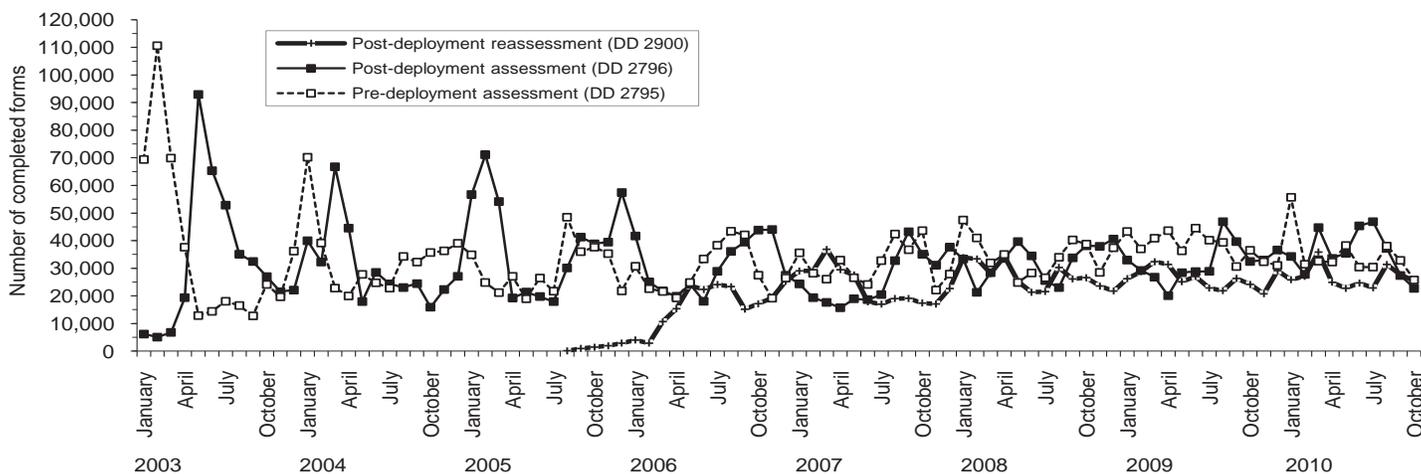


Table 2. Percentage of service members who endorsed selected questions/received referrals on health assessment forms, U.S. Armed Forces, November 2009-October 2010

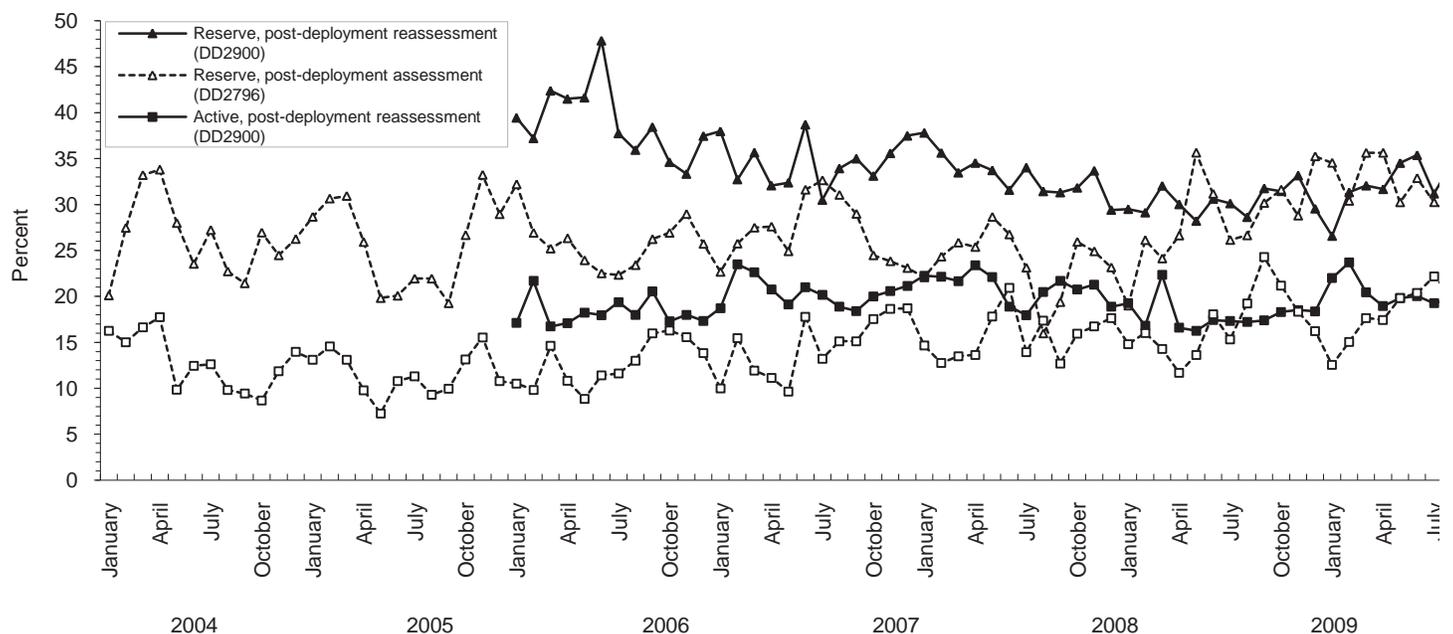
Active component	Army			Navy			Air Force			Marine Corps			All service members		
	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900
	n=148,288	n=143,004	n=119,657	n=18,007	n=15,055	n=14,130	n=59,546	n=54,198	n=51,321	n=32,198	n=28,852	n=30,810	n=258,039	n=241,109	n=215,918
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	3.7	9.8	14.8	1.2	4.6	5.9	0.4	3.2	4.2	1.4	7.8	10.1	2.5	7.8	11.0
Health concerns, not wound or injury	14.4	26.3	26.2	3.1	12.0	14.7	1.3	5.4	10.7	2.5	11.8	18.2	9.1	19.0	20.6
Health worse now than before deployed	na	21.4	25.0	na	11.6	13.5	na	8.1	8.6	na	16.9	19.4	na	17.3	19.5
Exposure concerns	na	20.5	22.0	na	19.0	21.0	na	10.6	14.4	na	15.5	23.5	na	17.5	20.3
PTSD symptoms (2 or more)	na	8.8	11.7	na	6.0	8.0	na	2.6	2.7	na	7.6	9.8	na	7.1	9.0
Depression symptoms (any)	na	30.4	33.0	na	22.6	24.6	na	13.2	13.7	na	26.4	30.3	na	25.6	27.5
Referral indicated by provider (any)	4.9	34.8	28.9	3.9	22.1	17.8	2.0	12.1	7.1	2.6	20.6	29.0	3.9	27.2	23.0
Mental health referral indicated ^a	1.3	7.3	15.8	0.5	3.0	5.6	0.5	1.5	2.2	0.2	2.0	5.7	0.9	5.1	10.4
Medical visit following referral ^b	99.0	99.8	98.3	88.9	88.8	94.1	85.3	95.5	97.6	50.3	80.3	94.5	90.7	96.3	97.3

Reserve component	Army			Navy			Air Force			Marine Corps			All service members		
	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900
	n=67,175	n=75,276	n=71,060	n=5,136	n=4,426	n=5,143	n=16,762	n=14,987	n=15,140	n=1,982	n=3,898	n=6,864	n=91,055	n=98,587	n=98,207
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	1.1	11.8	16.6	0.5	9.8	10.6	0.3	5.1	5.1	0.8	7.3	10.6	0.9	10.5	14.1
Health concerns, not wound or injury	16.9	34.7	42.8	1.3	32.1	32.1	0.6	9.7	15.1	1.7	24.2	35.9	12.7	30.4	37.5
Health worse now than before deployed	na	26.5	31.7	na	20.3	20.7	na	13.1	11.0	na	21.4	25.8	na	24.0	27.5
Exposure concerns	na	34.1	34.1	na	43.0	36.0	na	18.4	21.8	na	14.9	31.5	na	31.4	32.1
PTSD symptoms (2 or more)	na	9.0	18.3	na	6.1	12.9	na	3.0	3.1	na	5.2	14.0	na	7.8	15.4
Depression symptoms (any)	na	30.8	34.2	na	25.8	25.2	na	15.3	13.8	na	30.1	27.4	na	28.2	30.1
Referral indicated by provider (any)	3.6	36.7	37.8	3.5	30.0	24.7	0.5	16.8	8.8	2.3	31.4	33.7	3.0	33.2	32.4
Mental health referral indicated ^a	0.4	4.9	14.0	0.2	2.8	7.3	0.0	1.0	1.5	0.2	2.2	11.1	0.3	4.1	11.5
Medical visit following referral ^b	89.8	99.3	39.7	96.1	96.2	46.4	60.0	69.4	48.2	68.0	82.8	37.1	89.1	96.3	40.1

^aIncludes behavioral health, combat stress and substance abuse referrals.

^bRecord of inpatient or outpatient visit within 6 months after referral.

Figure 3. Proportion of service members who endorsed exposure concerns on post-deployment health assessments, U.S. Armed Forces, January 2004-October 2010



Sentinel reportable events among service members and beneficiaries at U.S. Army medical facilities, cumulative numbers^a for calendar years through 31 October 2009 and 31 October 2010



Army

Reporting locations	Number of reports all events ^b		Food-borne						Vaccine preventable					
			Campylo-bacter		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella ^c	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NORTHERN														
Aberdeen Proving Ground, MD	45	35	.	.	.	.	.	.	1	.	.	.	.	.
Fort Belvoir, VA	222	198	9	10	3	7	.	6	.	.	.	.	.	.
Fort Bragg, NC	1,505	1,034	6	20	19	9	.	2	.	.	2	.	.	.
Fort Dix, NJ	0	0	.	.	.	.	.	.	.	.	.	.	.	.
Fort Drum, NY	51	89	.	.	.	.	.	.	.	.	.	.	.	.
Fort Eustis, VA	215	176	.	.	3	2	.	.	.	.	.	.	.	.
Fort George G Meade, MD	38	13	1	.	1	.	.	.	.	.	.	.	.	.
Fort Knox, KY	185	270	.	1	.	2	.	2	.	.	.	.	.	1
Fort Lee, VA	514	454	.	.	.	.	.	.	.	.	.	.	.	.
Fort Monmouth, NJ	47	36	.	.	.	1	.	.	.	1	2	1	.	.
Walter Reed AMC, DC	160	143	1	2	.	4	.	.	.	.	1	.	1	.
West Point Military Reservation, NY	95	57	1	.	.	2	.	.	.	.	1	.	.	.
SOUTHERN														
Fort Benning, GA	382	192	1	.	.	.	1	1	1	.	.	1	.	.
Fort Campbell, KY	333	510	.	1	.	7	.	3	.	.	.	.	1	.
Fort Gordon, GA	607	603	3	3	15	22	3	5	.	.	3	.	1	.
Fort Hood, TX	1,738	1,702	8	6	19	11	14	39	.	.	2	1	.	.
Fort Jackson, SC	542	432	.	.	.	.	.	.	.	.	2	.	.	.
Fort Polk, LA	538	335	.	.	1	2	3	3	.	.	.	.	.	.
Fort Rucker, AL	65	83	8	1	4	8	.	.	.	.	.	1	.	.
Fort Sam Houston, TX	515	413	1	.	7	13	2	2	.	.	1	1	1	.
Fort Sill, OK	600	398	.	.	.	.	4	1	.	.	.	.	.	.
Fort Stewart, GA	1,030	547	.	1	31	25	15	5	.	.	.	2	.	2
WESTERN														
Fort Bliss, TX	256	618	.	4	1	3	1	2	1	.	5	4	.	.
Fort Carson, CO	597	549	5	5	3	3	.	2	1	.	.	.	.	.
Fort Huachuca, AZ	75	79	1	.	.	2	.	.	.	.	.	.	.	.
Fort Leavenworth, KS	55	33	.	.	1	1	.	.	.	.	.	.	.	.
Fort Leonard Wood, MO	319	290	2	1	.	4	.	.	1	.	.	.	1	.
Fort Lewis, WA	946	717	5	8	7	3	1	2	.	1	.	.	.	.
Fort Riley, KS	302	337	1	2	3	1	.	2	.	.	.	.	.	.
Fort Wainwright, AK	189	265	.	2	.	.	.	.	.	.	.	.	.	.
NTC and Fort Irwin, CA	106	107	.	.	1	.	1	.	.	.	.	.	.	.
PACIFIC														
Hawaii	695	670	32	33	17	23	5	5	.	1	3	.	.	1
Japan	3	6	.	.	.	.	.	.	.	.	.	.	.	.
Korea	441	426	.	2	.	.	.	.	.	.	.	.	.	.
EUROPEAN														
Heidelberg	162	148	11	15	5	11	.	2	1	.	.	.	.	.
Landstuhl	562	365	3	2	3	2	.	4	.	.	1	2	1	.
Bavaria	348	512	5	4	6	7	.	.	.	.	.	.	.	.
CENTCOM LOCATIONS														
CENTCOM	188	191	.	.	.	2	1	.	1	.	.	1	.	.
Total	14,671	13,033	104	123	150	177	51	88	7	3	23	14	6	4

^aEvents reported by Nov 8, 2009 and 2010

^bSixty-seven medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, June 2009.

^cService member cases only.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events among service members and beneficiaries at U.S. Army medical facilities, cumulative numbers^a for calendar years through 31 October 2009 and 31 October 2010



Army

Reporting location	Arthropod-borne				Sexually transmitted						Environmental				Travel associated				
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis		Cold ^c		Heat ^c		Q Fever		Tuberculosis		
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	
NORTHERN																			
Aberdeen Proving Ground, MD	.	.	.	.	37	29	5	6	2	.	.	.	.	.	.	.	.	.	.
Fort Belvoir, VA	.	.	.	.	192	152	18	23	.	.	.	.	.	.	.	.	.	.	.
Fort Bragg, NC	.	.	.	4	1,151	779	222	142	4	1	1	8	100	69	.	.	.	.	.
Fort Dix, NJ	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fort Drum, NY	.	2	.	.	48	76	3	10	.	.	.	.	.	.	.	1	.	.	.
Fort Eustis, VA	.	1	.	.	183	150	29	17	.	2	.	.	.	4	.	.	.	.	.
Fort George G Meade, MD	1	.	.	.	35	8	.	5	.	.	.	.	.	.	.	.	.	.	.
Fort Knox, KY	1	.	.	1	161	239	23	17	.	.	.	.	.	6	.	.	.	.	1
Fort Lee, VA	1	1	.	.	462	411	49	41	2	.	.	.	.	1	.	.	.	.	.
Fort Monmouth, NJ	15	15	.	.	27	16	2	.	1	2	.	.	.	.	.	.	.	.	.
Walter Reed AMC, DC	10	9	.	2	118	99	17	19	11	6	.	.	.	1	.	.	1	1	.
West Point Military Reservation, NY	27	13	.	.	62	32	4	5	.	.	.	.	.	5	.	.	.	.	.
SOUTHERN																			
Fort Benning, GA	.	1	5	.	271	116	62	22	2	.	.	.	38	51	.	.	1	.	.
Fort Campbell, KY	5	.	.	.	221	448	60	42	1	.	.	.	45	9	.	.	.	.	.
Fort Gordon, GA	.	.	.	.	491	479	83	87	.	.	.	.	8	7	.	.	.	.	.
Fort Hood, TX	.	.	.	1	1,352	1,361	313	267	10	8	.	.	19	7	.	.	1	1	.
Fort Jackson, SC	.	1	.	.	290	209	46	30	2	1	.	8	202	183	.	.	.	.	.
Fort Polk, LA	.	.	.	1	347	246	52	38	1	1	.	.	134	44	.	.	.	.	.
Fort Rucker, AL	.	2	.	.	49	62	4	5	.	.	.	.	.	4	.	.	.	.	.
Fort Sam Houston, TX	.	1	.	1	394	337	80	48	11	10	.	.	17	.	.	.	1	.	.
Fort Sill, OK	.	.	.	1	532	297	43	47	.	1	.	.	21	51	.	.	.	.	.
Fort Stewart, GA	.	2	1	.	771	423	119	59	6	.	.	.	80	28	6	.	1	.	.
WESTERN																			
Fort Bliss, TX	.	.	.	3	209	513	33	77	5	5	.	.	.	6	.	.	1	1	.
Fort Carson, CO	.	.	.	2	533	500	55	37	.	.	.	.	.	.	.	.	.	.	.
Fort Huachuca, AZ	.	1	.	.	68	67	4	2	1	1	.	.	1	6	.	.	.	.	.
Fort Leavenworth, KS	4	1	.	.	44	28	3	2	2	1	.	.	1	.	.	.	.	.	.
Fort Leonard Wood, MO	.	.	.	.	277	244	28	33	.	1	.	.	8	7	.	.	1	1	.
Fort Lewis, WA	.	.	.	.	854	654	74	44	2	1	.	.	1	3	.	.	2	1	.
Fort Riley, KS	.	1	1	.	253	299	40	28	1	.	1	.	2	4	.	.	.	.	.
Fort Wainwright, AK	.	.	.	5	169	237	16	12	.	1	9	1	1	.	1	.	1	.	.
NTC and Fort Irwin, CA	.	.	.	.	93	97	5	7	2	1	.	.	4	2	.	.	.	.	.
PACIFIC																			
Hawaii	.	.	1	.	565	529	57	70	5	2	.	.	3	3	1	.	6	3	.
Japan	.	.	.	.	3	5	.	1	.	.	.	.	.	.	.	.	.	.	.
Korea	.	.	.	4	417	366	16	38	2	2	1	8	5	6	.	.	.	.	.
EUROPEAN																			
Heidelberg	11	7	.	.	116	96	17	16	.	1	.	.	.	.	.	.	1	.	.
Landstuhl	24	10	2	8	426	250	63	55	8	3	.	.	28	28	.	.	3	1	.
Bavaria	14	8	4	2	290	412	27	78	.	1	1	.	1	.	.	.	.	.	.
CENTCOM LOCATIONS																			
CENTCOM	1	.	.	3	172	161	10	19	1	4	.	.	.	.	2	1	.	.	.
Total	114	76	14	38	11,683	10,427	1,682	1,449	82	54	6	33	719	535	10	2	20	10	

Sentinel reportable events among service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers^a for calendar years through 31 October 2009 and 31 October 2010



Navy

Reporting locations	Number of reports all events ^b		Food-borne						Vaccine preventable					
			Campylobacter		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella ^c	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NATIONAL CAPITOL AREA														
NNMC Bethesda, MD	154	153	3	3	2	3	.	3	3	1	5	16	.	.
NHC Annapolis, MD	6	28	.	.	.	.	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	27	14	.	.	.	2	.	.	.	.	.	.	.	.
NHC Quantico, VA	102	90	1	.	1	.	3	.	.	.	.	1	.	.
NAVY MEDICINE EAST														
NH Beaufort, SC	347	66	.	.	.	.	.	.	1	.	3	.	.	.
NH Camp Lejeune, NC	507	483	1	.	13	15	1	1	.	.	.	1	.	.
NH Charleston, SC	3	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Cherry Point, NC	3	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Corpus Christi, TX	2	11	.	.	.	.	.	1	.	.	.	.	.	.
NHC Great Lakes, IL	392	496	.	.	1	.	.	.	1	.	12	4	.	1
NH Guantanamo Bay, Cuba	0	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	233	186	.	3	16	19	1	.	.	.	.	7	.	.
NH Naples, Italy	1	0	.	.	.	.	.	.	.	.	.	.	.	.
NHC New England, RI	0	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Pensacola, FL	209	114	1	1	8	2	2	.	.	.	.	.	.	.
NMC Portsmouth, VA	175	333	.	.	.	6	.	.	.	.	1	4	.	1
NH Rota, Spain	0	0	.	.	.	.	.	.	.	.	.	.	.	.
NH Sigonella, Italy	1	2	.	.	.	.	.	.	.	.	.	.	1	.
NAVY MEDICINE WEST														
NH Bremerton, WA	6	3	.	.	.	.	.	.	.	.	.	1	.	.
NH Camp Pendleton, CA	6	1	.	.	.	.	.	.	.	.	.	.	.	.
NH Guam-Agana, Guam	31	88	.	.	3	1	.	.	.	.	.	.	.	.
NHC Hawaii, HI	18	452	.	5	.	3	.	.	.	.	.	.	.	.
NH Lemoore, CA	48	65	.	.	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	97	66	3	1	2	.	1	.	.	4	4	1	.	.
NH Okinawa, Japan	39	251	.	.	.	3	.	.	.	.	.	1	.	.
NMC San Diego, CA	743	992	8	9	12	12	1	2	.	.	52	24	1	.
NH Twentynine Palms, CA	1	3	.	.	.	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	32	59	.	.	.	.	.	.	.	.	3	1	.	.
NAVAL SHIPS														
COMNAVAIRLANT/CINCLANTFLEET	22	24	.	.	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	67	35	.	.	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS														
Other	3,224	3,098	14	13	23	36	5	4	1	.	11	20	2	6
Total	6,496	7,113	31	35	81	102	14	11	6	1	91	84	5	8

^aEvents reported by Nov 8, 2010^bSixty-seven medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, June 2009.^cService member cases only.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events among service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers^a for calendar years through 31 October 2009 and 31 October 2010



Navy

Reporting location	Arthropod-borne				Sexually transmitted						Environmental				Travel associated			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis		Cold ^c		Heat ^c		Q Fever		Tuberculosis	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
NATIONAL CAPITOL AREA																		
NNMC Bethesda, MD	12	25	.	2	119	66	9	10	1	22	.	.	.	.	.	1	.	1
NHC Annapolis, MD	.	2	.	.	5	25	.	.	1	1	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	6	2	.	.	18	8	2	2	1	.	.	.	.	.	.	.	.	.
NHC Quantico, VA	1	1	.	.	76	49	10	4	.	.	.	6	10	29	.	.	.	.
NAVY MEDICINE EAST																		
NH Beaufort, SC	.	.	.	.	326	60	16	6	1	.	.	.	.	.	.	.	.	.
NH Camp Lejeune, NC	2	7	2	3	345	348	78	47	.	1	1	2	62	56	1	2	1	.
NH Charleston, SC	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.
NH Cherry Point, NC	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Corpus Christi, TX	.	2	.	.	2	7	.	1	.	.	.	.	.	.	.	.	.	.
NHC Great Lakes, IL	1	2	.	.	351	443	22	39	.	3	.	.	3	2	.	1	1	1
NH Guantanamo Bay, Cuba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	1	2	1	.	195	136	19	13	.	2	.	.	.	3	.	.	.	1
NH Naples, Italy	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC New England, RI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Pensacola, FL	.	1	.	.	158	99	22	9	1	2	.	.	14	.	2	.	1	.
NMC Portsmouth, VA	.	10	3	4	137	247	28	45	4	11	.	.	.	2	.	.	2	3
NH Rota, Spain	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Sigonella, Italy	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE WEST																		
NH Bremerton, WA	.	.	.	.	6	2	.	.	.	.	.	.	.	.	.	.	.	.
NH Camp Pendleton, CA	.	.	.	.	6	1	.	.	.	.	.	.	.	.	.	.	.	.
NH Guam-Agana, Guam	.	.	.	.	24	76	3	10	.	1	.	.	.	.	.	.	1	.
NHC Hawaii, HI	.	.	.	.	17	403	1	40	.	1	.	.	.	.	.	.	.	.
NH Lemoore, CA	1	.	.	.	42	62	5	3	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	1	.	.	1	84	55	1	3	.	1	.	1	.	.	.	.	.	.
NH Okinawa, Japan	.	.	.	1	39	208	.	19	.	.	.	.	.	17	.	1	.	1
NMC San Diego, CA	3	2	3	1	533	808	84	81	18	26	.	.	22	27	2	.	4	.
NH Twentynine Palms, CA	.	.	.	.	.	2	.	1	1	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	1	.	.	.	28	55	.	2	.	1	.	.	.	.	.	.	.	.
NAVAL SHIPS																		
COMNAVAIRLANT/CINCLANTFLEET	.	.	1	.	21	18	.	6	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	.	.	.	.	59	31	7	4	1	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS																		
Other	30	44	7	20	2,627	2,234	330	349	9	18	9	8	151	341	.	.	5	5
Total	59	100	17	32	5,224	5,445	638	694	38	90	10	17	262	477	5	5	15	12

Sentinel reportable events among service members and beneficiaries at U.S. Air Force medical facilities,^a cumulative numbers for calendar years through 31 October 2009 and 31 October 2010^b



Air Force

Reporting locations	Number of reports all events ^b		Food-borne						Vaccine preventable					
			Campylobacter		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella ^c	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Air Combat Cmd	1,302	1,412	6	2	16	16	2	3	2	1	5	15	3	3
Air Education & Training Cmd	1,413	1,265	4	12	21	18	7	5	3	3	12	20	.	2
Air Force Dist. of Washington	174	162	.	4	2	.	.	1	.	.	3	2	.	.
Air Force Materiel Cmd	528	520	3	5	17	16	.	1	1	.	10	1	.	.
Air Force Special Ops Cmd	161	161	1	1	11	17	.	1	.	.	.	1	.	.
Air Force Space Cmd	318	294	2	.	8	7	.	.	1	1	2	2	.	.
Air Mobility Cmd	724	648	4	4	8	8	5	.	1	3	8	7	1	.
Pacific Air Forces	512	747	3	1	7	8	.	2	.	1	5	4	2	1
U.S. Air Forces in Europe	537	452	4	4	6	9	.	.	.	.	4	1	1	6
U.S. Air Force Academy	63	71	1	.	3	1	.	.	.	.	.	2	.	.
Other	79	55	1	1	3	5	.	2	.	.	.	.	.	.
Total	5,811	5,787	29	34	102	105	14	15	8	9	49	55	7	12

Reporting location	Arthropod-borne				Sexually transmitted						Environmental				Travel associated			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis		Cold ^c		Heat ^c		Q Fever		Tuberculosis	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Air Combat Cmd	13	10	.	.	1,138	1,217	100	119	6	6	5	5	5	14	.	.	1	1
Air Education & Training Cmd	7	.	4	2	1,207	1,077	129	119	6	4	3	.	9	1	.	.	1	2
Air Force Dist. of Washington	8	6	.	.	149	125	12	20	.	.	.	.	4	.	.	.	.	.
Air Force Materiel Cmd	11	5	.	1	442	438	39	45	3	2	.	.	2	6	.	.	.	.
Air Force Special Ops Cmd	1	.	.	1	136	132	10	4	1	1	1	1	.	.	.	1	.	1
Air Force Space Cmd	1	1	.	2	287	265	14	14	1	.	.	1	1	1	.	.	1	.
Air Mobility Cmd	23	18	1	2	599	553	54	45	2	3	15	2	1	3	1	.	1	.
Pacific Air Forces	1	.	1	1	424	663	49	57	4	1	10	.	6	6	.	.	.	2
U.S. Air Forces in Europe	20	22	2	2	453	366	42	38	2	2	1	.	.	1	.	.	2	1
U.S. Air Force Academy	1	2	1	1	54	62	3	3	.	.	.	.	.	.	.	.	.	.
Other	.	1	5	1	40	37	7	2	.	1	1	1	20	2	1	2	1	.
Total	86	65	14	13	4,929	4,935	459	466	25	20	36	10	44	38	2	3	7	7

^aAFRESS data interruption occurred in August/September of 2010 during scheduled relocation of USAFSAM servers.

^b Events reported by Nov 8, 2010

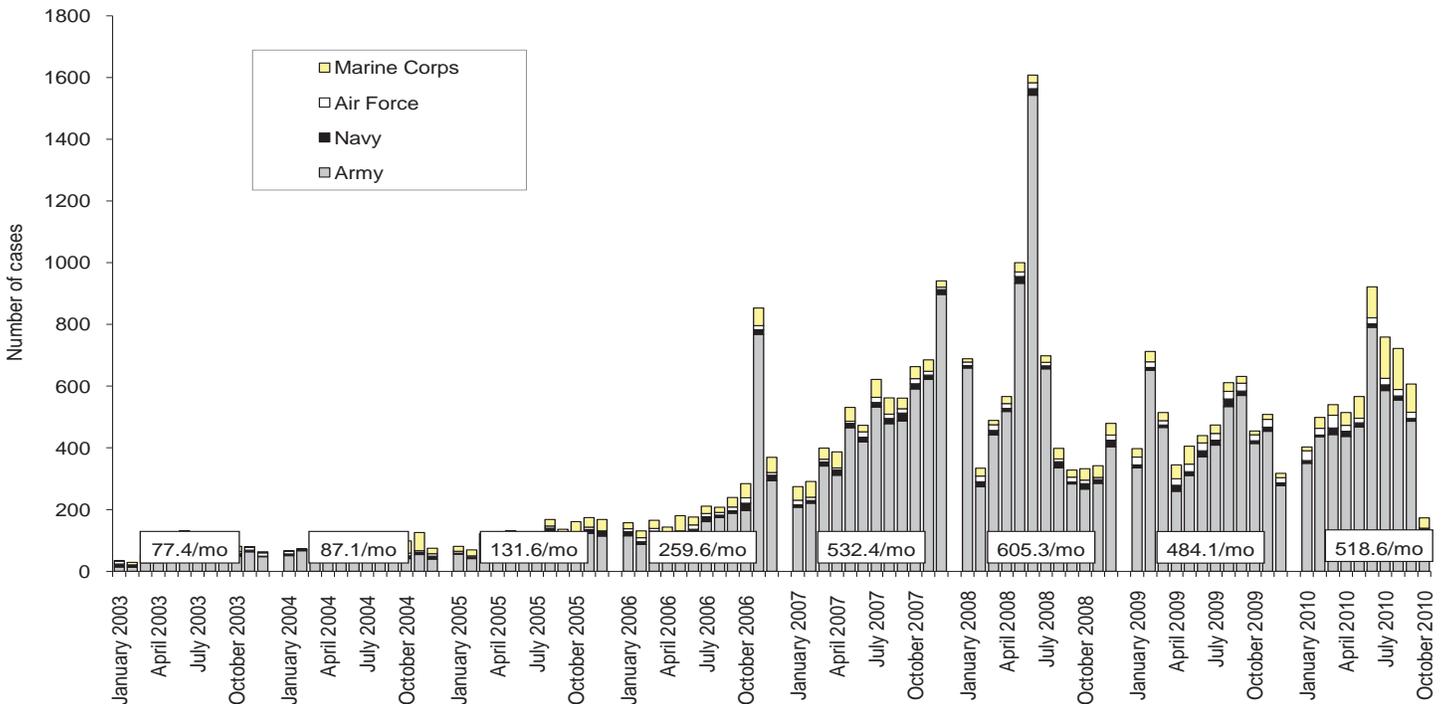
^cSixty-seven medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, June 2009.

^dService member cases only.

Note: Completeness and timeliness of reporting vary by facility.

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - October 2010 (data as of 28 November 2010)

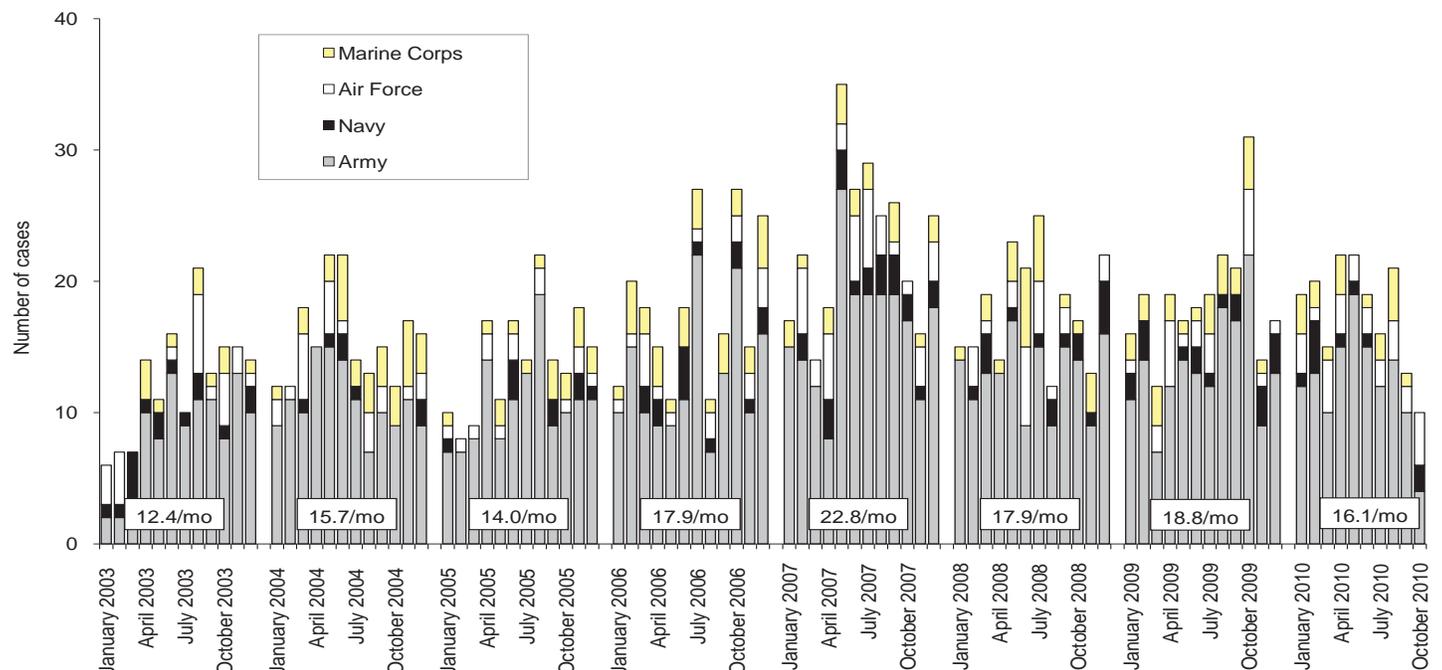
Traumatic brain injury (ICD-9: 310.2, 800-801, 803-804, 850-854, 907.0, 950.1-950.3, 959.01, V15.5_1-9, V15.5_A-F, V15.59_1-9, V15.59_A-F)^a



Reference: Armed Forces Health Surveillance Center. Deriving case counts from medical encounter data: considerations when interpreting health surveillance reports. *MSMR*. Dec 2009; 16(12):2-8.

^aIndicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 30 days of returning from OEF/OIF. (Includes in-theater medical encounters from the Theater Medical Data Store [TMDS] and excludes 2,567 deployers who had at least one TBI-related medical encounter any time prior to OEF/OIF).

Deep vein thrombophlebitis/pulmonary embolus (ICD-9: 415.1, 451.1, 451.81, 451.83, 451.89, 453.2, 453.40 - 453.42 and 453.8)^b

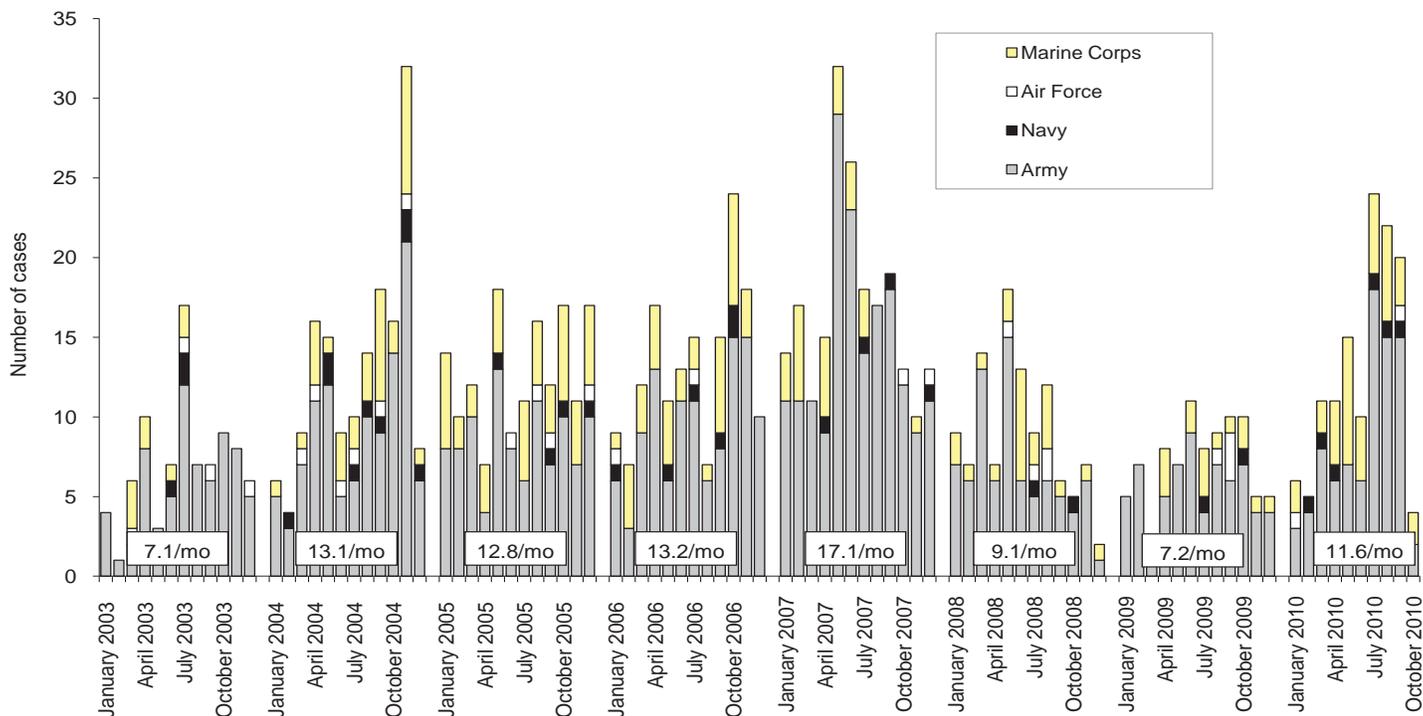


Reference: Isenbarger DW, Atwood JE, Scott PT, et al. Venous thromboembolism among United States soldiers deployed to Southwest Asia. *Thromb Res*. 2006;117(4):379-83.

^bOne diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 90 days of returning from OEF/OIF.

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - October 2010 (data as of 28 November 2010)

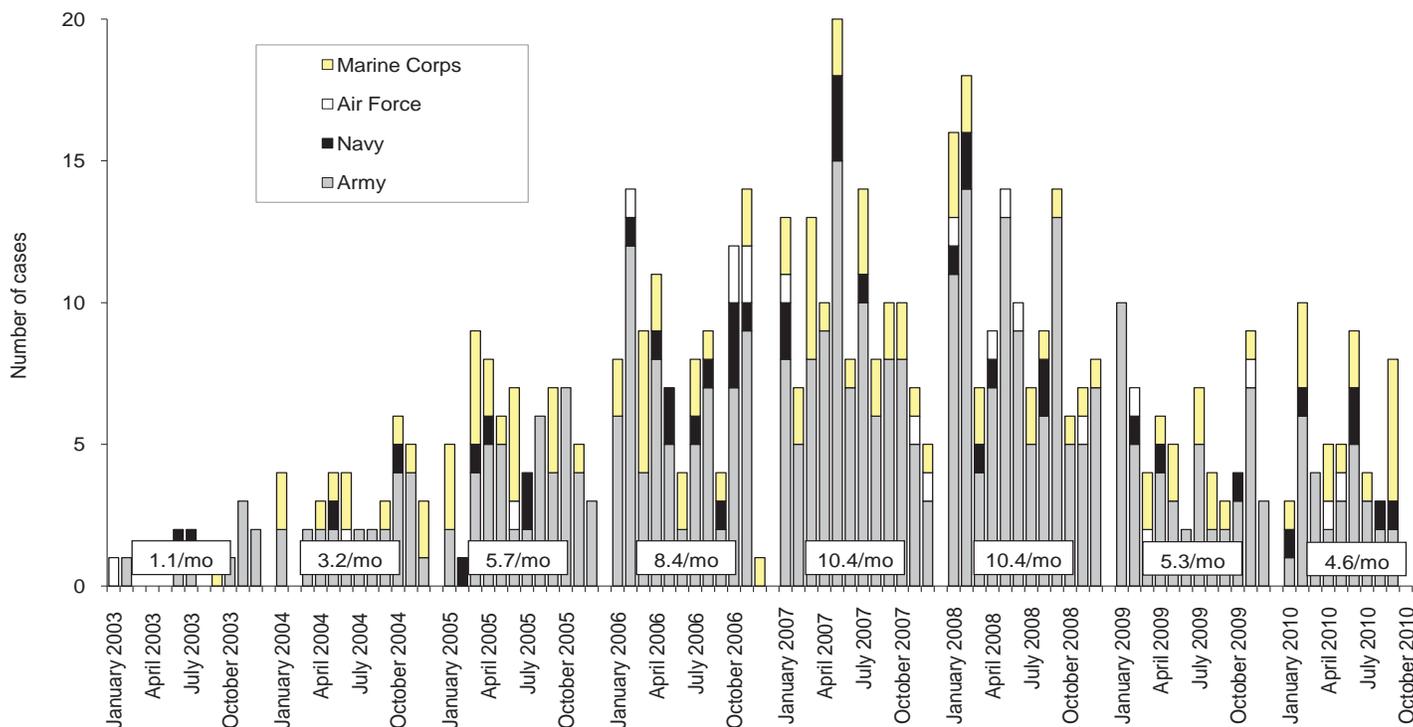
Amputations (ICD-9: 887, 896, 897, V49.6 except V49.61-V49.62, V49.7 except V49.71-V49.72, PR 84.0-PR 84.1, except PR 84.01-PR 84.02 and PR 84.11)^a



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: amputations. Amputations of lower and upper extremities, U.S. Armed Forces, 1990-2004. *MSMR*. Jan 2005;11(1):2-6.

^aIndicator diagnosis (one per individual) during a hospitalization while deployed to/within 365 days of returning from OEF/OIF.

Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)^b

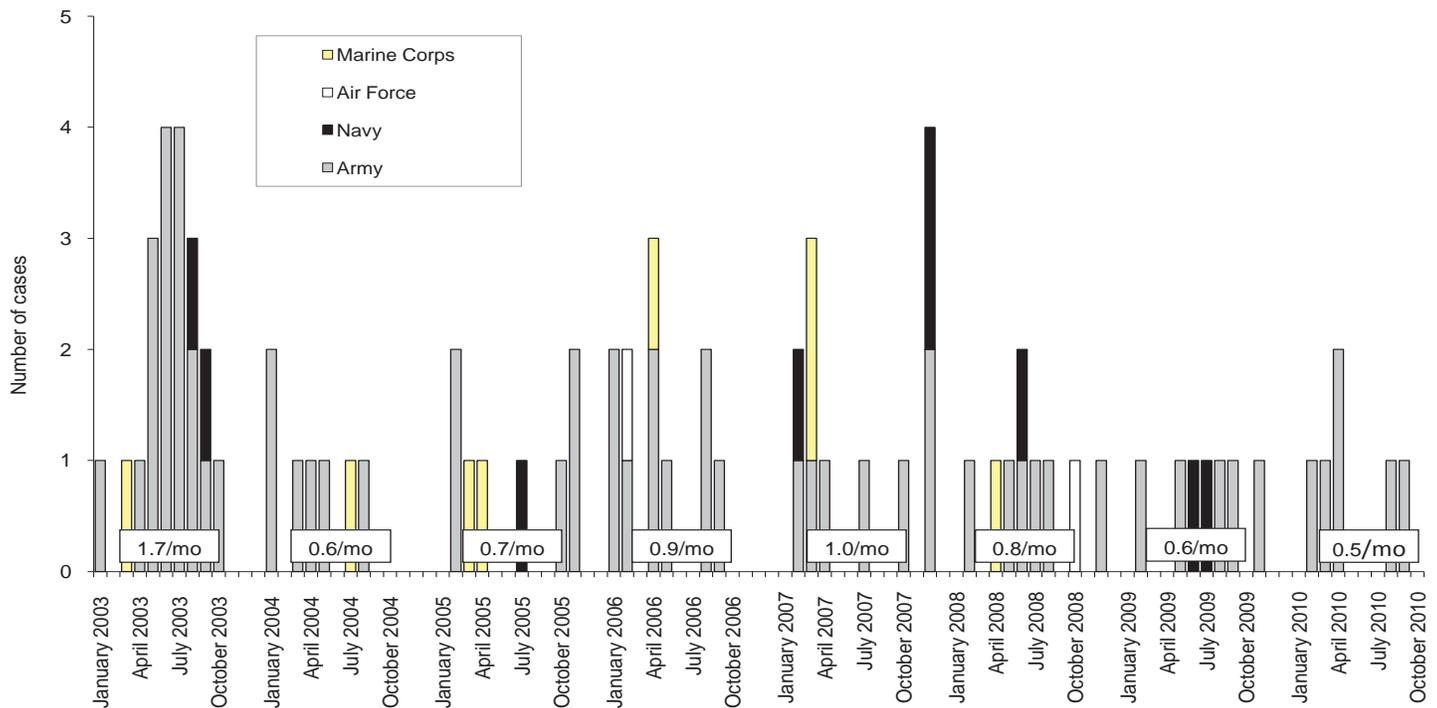


Reference: Army Medical Surveillance Activity. Heterotopic ossification, active components, U.S. Armed Forces, 2002-2007. *MSMR*. Aug 2007; 14(5):7-9.

^bOne diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 365 days of returning from OEF/OIF.

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - October 2010 (data as of 28 November 2010)

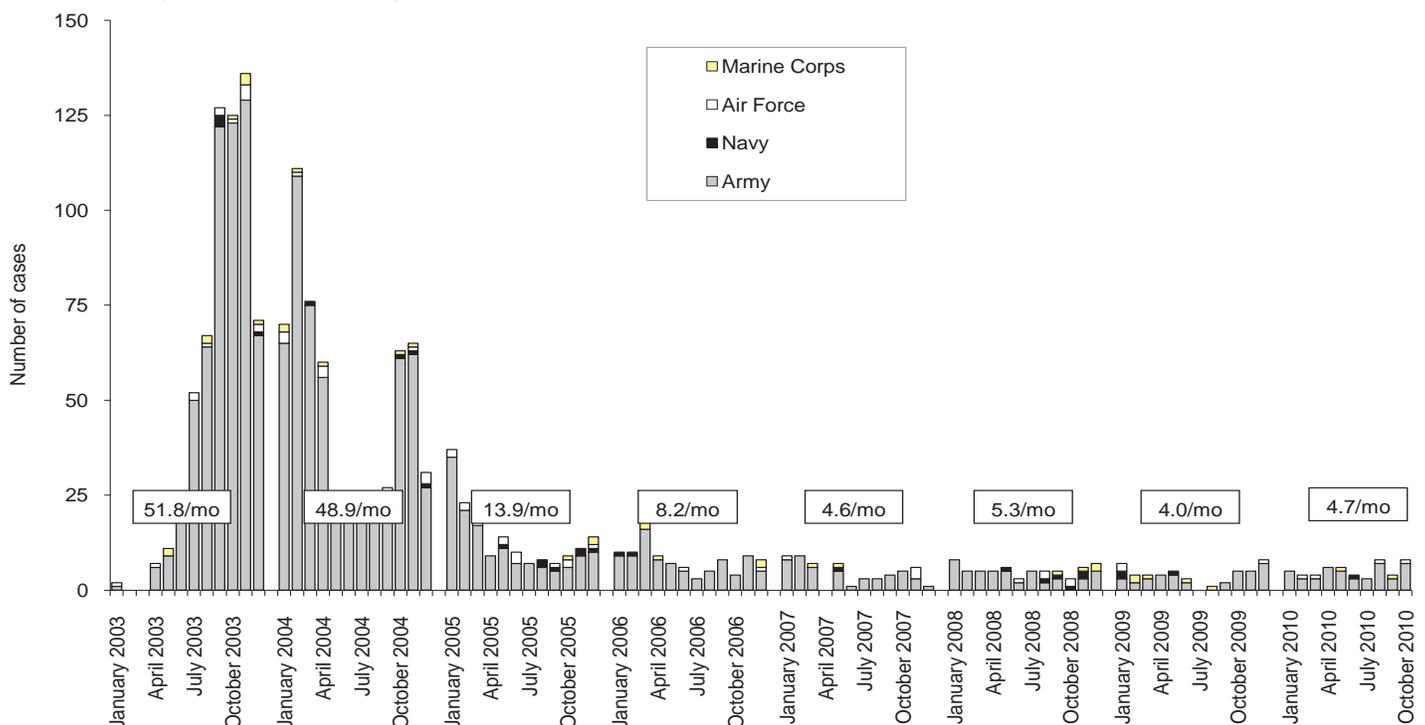
Severe acute pneumonia (ICD-9: 518.81, 518.82, 480-487, 786.09)^a



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: severe acute pneumonia. Hospitalizations for acute respiratory failure (ARF)/acute respiratory distress syndrome (ARDS) among participants in Operation Enduring Freedom/Operation Iraqi Freedom, active components, U.S. Armed Forces, January 2003-November 2004. *MSMR*. Nov/Dec 2004;10(6):6-7.

^aIndicator diagnosis (one per individual) during a hospitalization while deployed to/within 30 days of returning from OEF/OIF.

Leishmaniasis (ICD-9: 085.0 to 085.9)^b



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: leishmaniasis. Leishmaniasis among U.S. Armed Forces, January 2003-November 2004. *MSMR*. Nov/Dec 2004;10(6):2-4.

^bIndicator diagnosis (one per individual) during a hospitalization, ambulatory visit, and/or from a notifiable medical event during/after service in OEF/OIF.

Commander
U.S. Army Public Health Command (Provisional)
MCHB-IP-EDM
5158 Blackhawk Road
Aberdeen Proving Ground, MD 21010-5403

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