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Relationships between the Nature and Timing of Mental Disorders Before and After Deploying to Iraq/Afghanistan, Active Component, U.S. Armed Forces, 2002-2008

Among U.S. military members, mental disorders are the leading cause of hospital bed days and the second leading cause of medical encounters.[1] In addition, mental disorders that are associated with participation in combat operations, e.g., post-traumatic stress disorder, degrade the health, fitness, operational effectiveness, and morale of affected service members and their units.[2,3] Since the beginning of combat operations in Iraq and Afghanistan, studies have documented the natures, high prevalences, and correlates of risk of mental disorders among U.S. combat veterans.[2,3] Policies and practices have been instituted to decrease barriers to care for affected service members.[4]

Many illnesses and injuries of service members produce chronic, recurrent, and/or periodic exacerbations of debilitating symptoms — particularly if courses of treatment and/or rehabilitation are interrupted. Several studies have documented strong relationships between service members' medical histories prior to deploying and their medical experiences during and after deploying. In general, deployers who are hospitalized for illnesses or injuries prior (particularly shortly prior) to the time of deployment are relatively likely to have significant illnesses or injuries during and after deploying — particularly from the same conditions.[5,6]

In response to mental disorders and other illnesses associated with participation in the first Gulf War, the U.S. military enhanced its force health protection efforts. Since the mid-1990s, service members have completed predeployment medical questionnaires that are used to assess each individual's preparedness to participate in major joint overseas operations. Several questions on the predeployment health assessment relate to the individual's current mental health and past medical history. In addition, the complete health records of individuals are abstracted prior to deployment and are available to care providers during deployment; abstracted health records summarize past and current significant medical problems and treatments.

This report describes the natures and frequencies of mental disorder-related medical encounters of active component U.S. service members before and after their first deployment to Afghanistan or Iraq. In addition, the report assesses relationships between natures and timing of predeployment and postdeployment mental disorder-related medical encounters. The findings may inform policies and practices regarding predeployment medical assessments of future deploying service members.

Methods:

The surveillance period was 1 January 2002 to 31 December 2008. The surveillance population included all individuals who served in the active component of the U.S. Armed Forces and deployed to Iraq or Afghanistan during the surveillance period.

The "index deployment" was defined as the first deployment to Iraq or Afghanistan of each member of the surveillance population. For this analysis, only the "index deployment" of each service member was considered. The "start date" of each index deployment was ascertained from records of deployment participation routinely provided to the Armed Forces Health Surveillance Center for integration in the Defense Medical Surveillance System.

For each individual, all medical encounters with a mental disorder as the primary (first listed) diagnosis were classified as "predeployment" or "postdeployment" based on whether they occurred before or after the start date of each individual's index deployment. All predeployment and postdeployment mental disorder-related encounters were grouped by diagnostic categories (per the classification scheme used by Seal et al[7]) — "adjustment reaction" ICD-9-CM: 309.0-309.9 excluding 309.81; "substance abuse" ICD-9-CM: 303, 304, 305 excluding 305.1; "anxiety disorder" ICD-9-CM: 300.00-300.09, 300.20-300.29, 300.30-300.39; "post-traumatic stress disorder (PTSD)" ICD-9-CM: 309.81; "depressive disorders" ICD-9-CM: 296.20-296.35, 296.50-296.55, 296.90, 300.4 and "other" mental disorders (all other ICD-9-CM: 290.0-319.0) — and then sorted chronologically within each category. For each category of mental disorders, each individual's most recent encounter before deploying and first encounter after deploying were retained for analysis.

For summary purposes, the main unit of measurement was the cumulative incidence percentage (CI%) which was defined as the proportion of deployers with a predeployment or postdeployment medical encounter for any or a specific category of mental disorder. Deployers with no mental disorder-related medical encounters prior to deployment were considered the referent group for calculating postdeployment relative CI%s.

Results:

During the 7-year surveillance period, 1,009,279 active component service members had at least one documented deployment to OEF/OIF; of these, 78,067 (7.7%) and 214,871 (21.3%) had at least one mental disorder-related medical encounter prior to and following the start of their index deployment, respectively **(Table 1)**.

More than 40% of deployers with any predeployment mental disorder-related diagnosis had at least one mental disorder-related encounter after deploying. In contrast, fewer than 20% of deployers with no predeployment mental

Table 1. Percentages of service members with mental disorder diagnoses prior to and after the start of each individual's first deployment to OIF/OEF, by category of mental disorder, active components, U.S. Armed Forces, January 2002-December 2008

	Any MH diagnosis		Adjustment reaction		Substance abuse		Anxiety disorder		PTSD		Depression		Other mental disorder	
	% before deploying	% after deploying	% before deploying	% after deploying	% before deploying	% after deploying	% before deploying	% after deploying	% before deploying	% after deploying	% before deploying	% after deploying	% before deploying	% after deploying
Total	7.73	21.29	2.43	8.09	2.38	4.93	0.99	3.97	0.11	3.70	0.96	3.49	3.42	11.48
Service														
Army	9.00	27.24	3.23	12.07	2.90	6.17	1.00	5.26	0.12	5.90	1.05	4.32	3.90	15.02
Navy	6.62	15.99	1.47	4.34	2.44	4.84	0.84	2.53	0.11	1.33	0.76	2.56	2.93	8.26
Air Force	8.25	19.13	2.80	6.95	1.25	2.58	1.51	3.97	0.12	1.21	1.34	3.62	4.12	11.09
Marine Corps	5.10	14.90	1.08	3.79	2.29	4.54	0.48	2.44	0.07	4.16	0.51	2.35	1.92	6.64
Coast Guard	7.37	20.44	1.55	5.78	2.48	5.78	1.44	4.42	0.04	0.85	0.89	3.53	2.68	11.21
Sex														
Female	13.58	27.51	5.26	12.19	1.46	2.70	2.36	6.06	0.42	3.06	2.77	7.26	7.60	16.71
Male	7.01	20.52	2.07	7.58	2.50	5.21	0.82	3.72	0.07	3.78	0.73	3.02	2.91	10.83
Race ethnicity														
Black non-hispanic	7.11	20.79	2.26	7.88	1.87	4.57	0.72	2.73	0.11	3.01	0.73	2.92	3.37	11.52
Hispanic	6.99	20.76	2.06	7.94	2.48	5.28	0.83	3.72	0.11	4.09	0.76	3.21	2.89	10.61
Other	7.09	19.17	2.08	6.85	2.22	4.33	0.94	3.29	0.11	3.34	0.85	3.15	3.13	10.34
White non-hispanic	8.13	21.81	2.58	8.35	2.53	5.06	1.09	4.46	0.11	3.87	1.07	3.75	3.57	11.78
Age														
<20	5.10	25.32	2.01	9.98	1.46	8.74	0.44	4.09	0.05	5.13	0.42	3.84	2.11	12.32
20-24	8.54	21.95	2.65	8.49	3.35	6.55	0.89	3.93	0.11	3.86	0.87	3.39	3.34	10.88
25-29	8.27	20.68	2.57	8.41	2.52	3.91	1.12	4.26	0.13	3.59	1.05	3.64	3.74	11.37
30-34	7.27	21.06	2.41	8.14	1.43	2.71	1.18	4.33	0.11	3.55	1.12	3.86	3.66	12.59
35-39	6.92	18.99	2.03	6.13	1.02	1.72	1.24	3.70	0.12	2.98	1.27	3.28	3.80	12.18
40+	6.65	16.83	1.68	4.55	0.74	1.03	1.23	2.90	0.11	2.25	1.26	2.82	3.92	11.36
Military occupation														
Combat	6.10	21.09	1.82	8.00	2.49	5.59	0.55	3.79	0.07	5.24	0.53	2.88	2.25	11.01
Health care	12.16	29.66	4.22	11.69	2.15	4.18	1.95	6.49	0.20	7.17	2.17	5.95	6.41	17.13
Other	8.01	20.68	2.51	7.83	2.36	4.74	1.08	3.84	0.11	2.81	1.02	3.53	3.63	11.20

Table 2. Percentages of U.S. service members who received mental disorder diagnoses after deploying to OEF/OIF (absolute and relative to deployers with no mental disorder diagnoses before deploying), in relation to categories of mental disorder diagnoses prior to deploying, January 2002-December 2006

		Mental disorder diagnoses after deploying													
Mental disorder diagnosis before deploying	Number of deployers	Any mental disorder after deploying		Adjustment reaction		Substance abuse		Anxiety		PTSD		Depression		Other	
		%	Relative %	%	Relative %	%	Relative %	%	Relative %	%	Relative %	%	Relative %	%	Relative %
None	931,212	19.5	1.00	7.4	1.00	4.4	1.00	3.5	1.00	3.4	1.00	3.0	1.00	10.5	1.00
Any mental disorder diagnosis	78,067	42.1	2.16	16.3	2.20	11.5	2.61	9.8	2.79	6.7	1.96	10.0	3.38	23.8	2.28
Adjustment reaction	24,487	46.2	2.36	23.4	3.16	8.3	1.90	11.1	3.17	8.0	2.33	12.5	4.22	27.4	2.62
Substance abuse	24,059	39.7	2.03	12.0	1.62	24.5	5.59	6.2	1.77	6.1	1.78	5.4	1.84	16.4	1.56
Anxiety disorder	9,959	52.0	2.66	19.1	2.58	7.2	1.65	25.7	7.36	8.0	2.33	13.8	4.69	29.7	2.84
PTSD	1,085	56.6	2.90	20.0	2.70	8.2	1.87	15.9	4.57	26.9	7.81	17.0	5.75	34.3	3.28
Depression	9,670	56.4	2.89	20.6	2.79	7.9	1.80	14.0	4.02	8.4	2.43	27.2	9.23	36.9	3.53
Other mental disorder	34,560	43.9	2.25	17.1	2.30	7.4	1.68	10.2	2.93	6.9	2.00	12.0	4.08	29.0	2.78

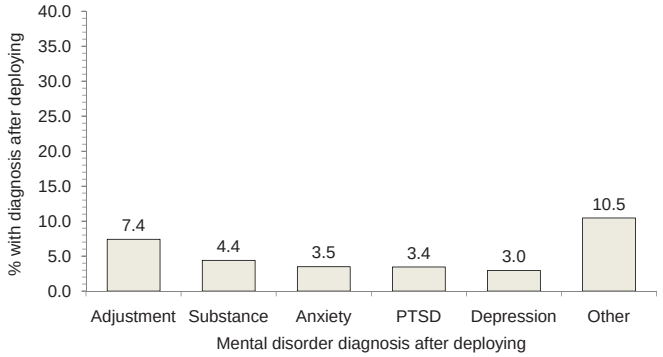
disorder-related diagnoses had a postdeployment mental disorder-related encounter. Compared to those with no predeployment mental disorder diagnoses, deployers with posttraumatic stress disorder (PTSD) or depression prior to deploying were nearly 3-times more likely to have a mental disorder-related encounter after deploying (% with any postdeployment mental disorder encounter, by predeployment diagnosis: PTSD: 56.6%; depression: 56.4%; no predeployment mental disorder: 19.5%) **(Table 1)**.

For each category of mental disorders except "other," deployers with at least one encounter for the respective category prior to deploying were the most likely by far to have at least one encounter for the same category after deploying. For example, compared to deployers with no predeployment mental disorder diagnoses, those with depression, PTSD, or anxiety disorder prior to deploying were 9.23-, 7.81-, and 7.36-times more likely to receive the respective diagnoses after deploying **(Table 2)**.

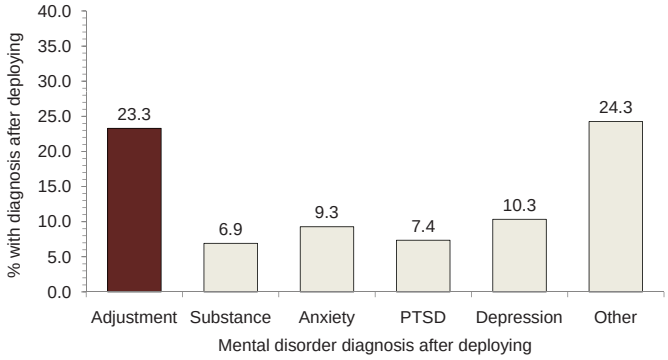
Relatively few deployers with no mental disorder diagnoses before deploying were diagnosed with depression (3.0%), PTSD (3.4%), anxiety disorder (3.5%), and/or substance abuse (4.4%) after deploying — slightly more were diagnosed with adjustment disorder (7.4%) or "other" mental disorders (10.5%) after deploying. In contrast, among deployers with any mental disorder encounter before deploying, the most likely diagnosis (excluding "other") after deploying was the diagnosis during the most recent encounter before deploying. For example, deployers whose last mental disorder-related diagnoses before deploying were adjustment disorder, substance abuse, anxiety disorder, PTSD, or depression were

Figure 2a-g. Cumulative incidence percentages (%) of mental disorder-related medical encounters of various types after deploying to Iraq/Afghanistan, in relation to each deployer's most recent mental disorder-related encounter before deploying, active components, January 2002- December 2008

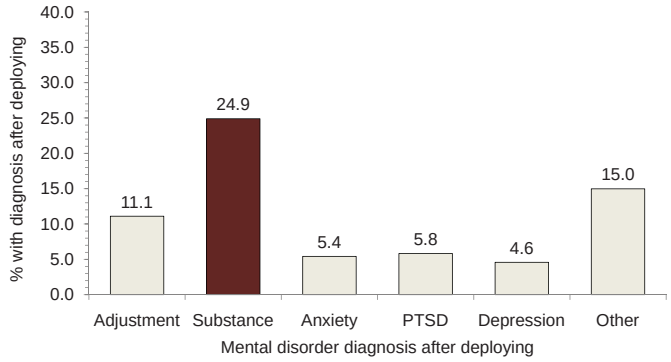
a. No mental disorder diagnosis before deploying



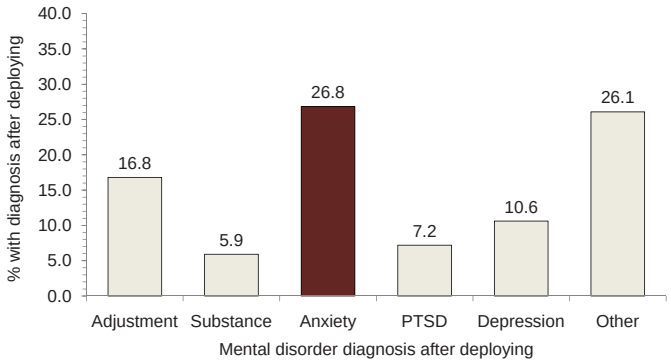
b. Most recent diagnosis before deploying: adjustment reaction



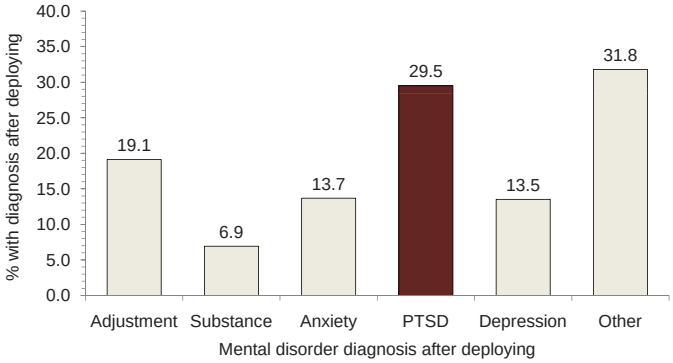
c. Most recent diagnosis before deploying: Substance abuse



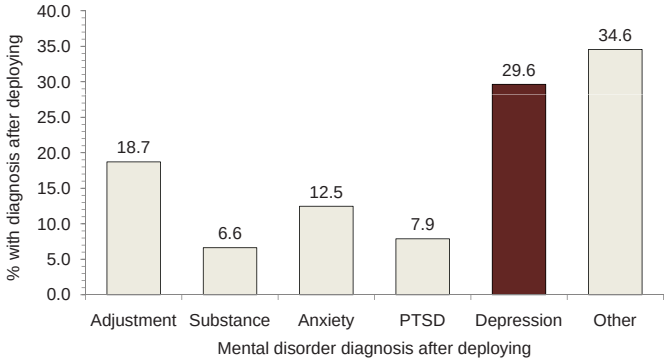
d. Most recent diagnosis before deploying: anxiety disorder



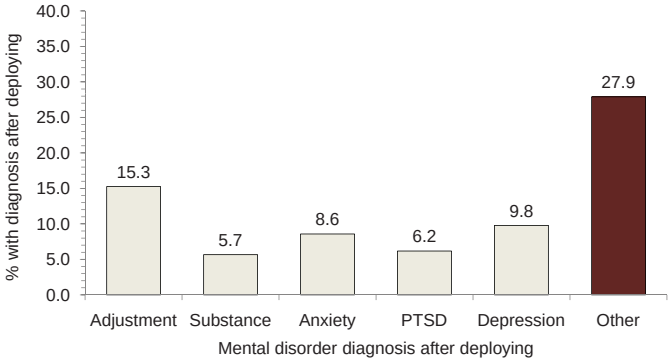
e. Most recent diagnosis before deploying: PTSD



f. Most recent diagnosis before deploying: depression



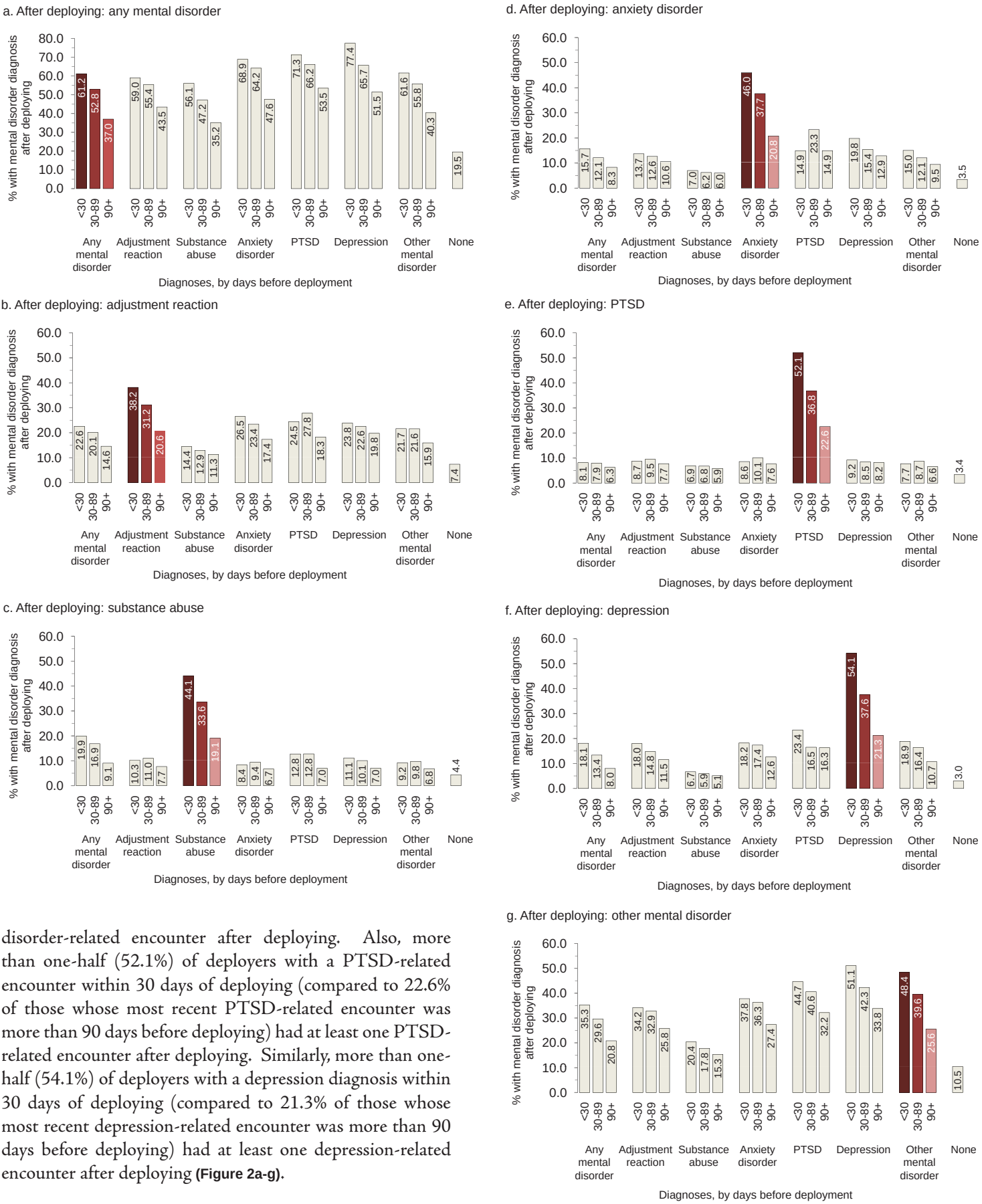
g. Most recent diagnosis before deploying: other mental disorder



much more likely to receive the respective than any other diagnosis after deployment **(Figure 1a-g)**.

Finally, of deployers who received one or more categories of mental disorder diagnoses before deploying, the proportions with mental disorder-related encounters after deploying — in general and in specific categories — were strongly related to the time from the most recent respective encounter to the time of deployment. For example, of deployers with any predeployment mental disorder-related encounter, more than 60% of those whose last encounter was within 30 days of deploying (compared to 37% of those whose last encounter was more than 90 days of deploying) had at least one mental

Figure 3a-g. Cumulative incidence percentages (%) of mental disorder-related medical encounters, by diagnostic category, after deploying to Iraq/Afghanistan, in relation to the timing of each deployer's most recent mental disorder-related encounter of each type before deploying, active components, January 2002-December 2008



disorder-related encounter after deploying. Also, more than one-half (52.1%) of deployers with a PTSD-related encounter within 30 days of deploying (compared to 22.6% of those whose most recent PTSD-related encounter was more than 90 days before deploying) had at least one PTSD-related encounter after deploying. Similarly, more than one-half (54.1%) of deployers with a depression diagnosis within 30 days of deploying (compared to 21.3% of those whose most recent depression-related encounter was more than 90 days before deploying) had at least one depression-related encounter after deploying **(Figure 2a-g)**.

Editorial comment:

This report documents very strong relationships between the natures and timing of mental disorder-related medical encounters before and after deploying to Iraq or Afghanistan.

Among deployers with no documented mental disorders prior to deploying, relatively few received mental disorder diagnoses after deploying. Of note, in this group, there was not a predominant category of mental disorders among those who did receive diagnoses after deploying.

In sharp contrast, deployers who received care for mental disorders prior to deploying were more than twice as likely as their counterparts to have a mental disorder-related encounter after deploying. Among these deployers, the natures of their mental disorders before deploying were very strong predictors of the types of mental disorder diagnoses they received after deploying. Also, the recency of the last medical encounter for a mental disorder before deploying was strongly related to the probability of a mental disorder-related encounter — particularly for the same condition — after deploying.

There are many limitations to the analysis that should be considered when interpreting the results. For example, the analysis considered only the first deployment to Iraq or Afghanistan of each service member. It is plausible that findings related to the first deployment are not generalizable to second and subsequent deployments. For example, risks of mental disorders — in general and of specific types — may change with additional combat experience and/or more exposures to deployment-related stresses. Also, this analysis used cumulative incidence % as the main unit of measure of case occurrence. The measure does not account for variability in total time exposed to risk or the timing of postdeployment mental disorders in relation to index deployments (e.g., a service member who deployed to Afghanistan in 2002 may have had a "postdeployment mental disorder" in 2008). Clearly, comparisons of mental disorder "attack rates" across different groups, periods, and settings may be unreliable and/or misleading. In addition, during the period, there were changes in the completeness and accuracy of clinical reporting of mental disorder-specific diagnoses — because of increased awareness of deployment stress-related symptoms, extensive mental health-related education and outreach efforts, decreased barriers to seeking care, lessening of stigmas associated with mental health problems, and others. As a result, mental disorder-specific diagnoses may have increased during the period even if the actual incidence of mental disorders was stable. Also, cases for this analysis required only single clinical encounters with mental disorder-specific diagnoses. However, mental disorder-specific diagnostic codes were undoubtedly used during screening visits of and/or to "rule out" diagnoses among some returning deployers. On the other hand, some encounters for mental disorders are documented with ICD-9-CM codes that were not used to ascertain cases for this analysis (e.g., counseling); also, some individuals with mental disorders receive care in other than medical clinic settings (e.g., chaplains, family counselors). Thus, case counts for this analysis may significantly over- or underestimate true case incidence.

Even in light of the significant limitations, the findings of this analysis suggest that reviews of medical records should be incorporated into predeployment health assessments. Such reviews may provide useful information and insights regarding the current mental health status, fitness, and readiness for deployment of individuals — as well as the most important threats to their short and long term mental health. Of course, more detailed analyses of past experiences of deployers are necessary before policies and practices regarding medical record reviews prior to deployment can be efficiently and effectively implemented.

Data summaries conducted by Stephen B. Taubman, PhD, Data Analysis Group, AFHSC.

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Diabetes Mellitus, Active Component, U.S. Armed Forces, 1997-2007

Diabetes mellitus is a chronic metabolic disorder that leads to abnormally high levels of glucose in the blood. It is caused by a decreased ability to produce or use insulin. Type 1, or insulin-dependent, diabetes is typically first diagnosed in childhood. Type 2, or non-insulin-dependent, diabetes is usually diagnosed later in life. Of note, rates of diagnoses of type 2 diabetes, and prevalences of obesity and metabolic syndrome, have reportedly increased in recent decades in the general U.S. population.[1,2]

Diabetes mellitus is a disqualifying condition for entry to U.S. military service[3]; still, several hundred service members are diagnosed with diabetes annually. This report estimates frequencies, incidence rates, trends and correlates of risk of clinical diagnosis of diabetes mellitus among 17 to 40-year old active component members of the U.S. military during the past 11 years.

Methods:

The surveillance period was January 1997 to December 2007. The surveillance population included all individuals who served in an active component of the U.S. military any time during the surveillance period.

Cases of diabetes mellitus were ascertained from medical records routinely maintained in the Defense Medical Surveillance System (DMSS). For this summary, an incident case was defined as two or more medical encounters (inpatient or outpatient) within a three-month period with primary diagnoses (first-listed) of diabetes mellitus (ICD-9-CM: 250.00-250.99). Each individual was considered an incident case only once during the surveillance period. Females hospitalized for labor and delivery within six months of an incident diagnosis were excluded from analysis.

For surveillance purposes, individuals were classified as type 1 or type 2 cases based on the diagnoses reported during their two case-defining medical encounters. If individuals received both type 1 and type 2 diabetes diagnoses during their case-defining medical encounters, they were classified as "unspecified" cases for this analysis.

Annual crude incidence rates were calculated by dividing the number of incident diabetes cases by the total person-time of active component service during each year, overall and for each demographic and military subgroup of interest.

Results:

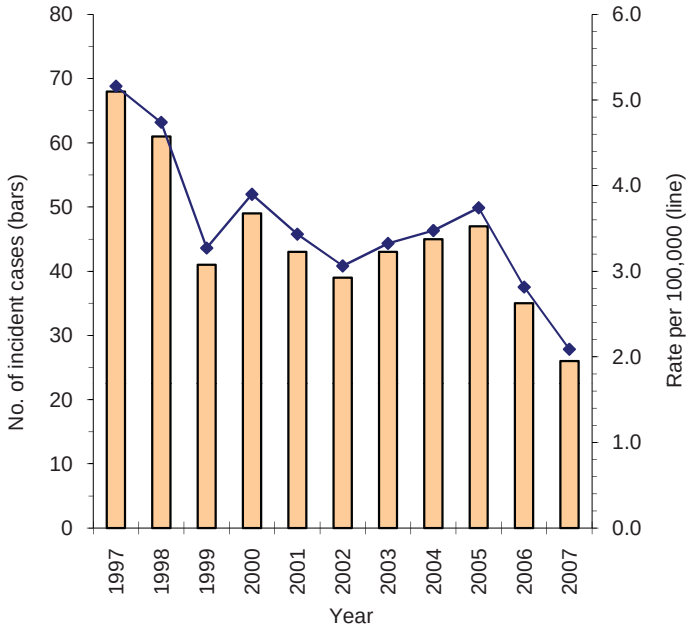
Between 1997 and 2007, there were 8,781 incident cases of diabetes mellitus among service members aged 17-40 years. The overall incidence rate (IR) of any type of diabetes was 62.8 per 100,000 person-years (p-yrs) **(Table 1)**. Fewer than 6% of incident cases were Type 1, 80% were type 2 and 14% were not consistently reported as type 1 or type 2 ("unspecified") **(Table 1)**.

During the 11-year period, there were 497 incident cases of type 1 diabetes (mean cases per year: 45). The overall incidence rate was 3.6 per 100,000 p-yrs **(Table 1)**. During the period, incidence rates of type 1 diabetes generally declined (annual IRs, 1997: 5.2 per 100,000 p-yrs; 2007: 2.1 per 100,000 p-yrs) **(Figure 1)**.

American Indians/Native Alaskans and black non-Hispanics had the highest incidence rates (unadjusted) of type 1 diabetes. The type 1 incidence rate among Air Force members was slightly higher (4.0 per 100,000 p-yrs) than among members of the other services. Of note, the rate of type 1 diabetes among males older than 30 (4.2 per 100,000 p-yrs) exceeded the rates among those younger (IRs, 17-20 years: 3.4 per 100,000 p-yrs; 21 to 30 years: 3.6 per 100,000 p-yrs). On average, females and service members of race/ethnic groups other than "black" or "white" experienced fewer than five incident cases of type 1 diabetes per year **(Table 1)**.

During the 11-year period, there were 7,032 incident cases of type 2 diabetes (mean cases per year: 639). The overall incidence rate was 50.3 per 100,000 p-yrs **(Table 1)**. Among service members 17-30 years old, rates of type 2 diabetes remained fairly stable during the period; however, among those over 30, incidence rates generally increased from 1998 (99.2 per 100,000 p-yrs) to 2002 (140.6 per 100,000

Figure 1. Incident cases and rates of type 1 diabetes mellitus among service members 17-40 years old, by year, active components, U.S. Armed Forces 1997-2007



p-yrs) and then were stable through 2006 **(Figure 2)**.

Overall rates (unadjusted) of type 2 diabetes were relatively high among males older than 30 (n=4,639; IR: 127.0 per 100,000 p-yrs), black non-Hispanics (n=2,484; IR: 93.7 per 100,000 person-years), Asian/Pacific Islanders (n=538; IR: 92.4), females older than 30 (n=445; IR: 88.9) and members of the Navy (n=2,891; IR: 78.4) **(Table 1)**.

Editorial comment:

This report documents that rates of incident diagnoses of diabetes mellitus have been generally stable among U.S. military members during the past 11 years. The finding does not reflect the sharp increase in incidence of diabetes diagnoses since 1997 in the general U.S. population.[1,2]

Each year for the past decade, approximately 800 service members have received incident clinical diagnoses of diabetes mellitus. The National Health and Nutrition Examination survey estimated that among American adults ages 20-39 with diabetes, approximately 40% were undiagnosed.[1] Because diabetes disqualifies individuals from entering active military service, and because active service members have mandatory medical examinations, free access to health care, etc, prevalences of both diagnosed and undiagnosed diabetes are undoubtedly much lower among active U.S. service members than similarly aged U.S. civilians.

The findings of this report should be interpreted with consideration of several limitations. For example, for this analysis, incident cases were identified from diagnosis codes recorded on administrative records of medical encounters. The reliability of diagnoses of diabetes on such records is not known (e.g., ambulatory encounters that raise clinical suspicion of or "rule out" diabetes may be incorrectly documented with diagnostic codes specific for diabetes). To increase the likelihood that cases documented with ambulatory diagnoses were "true cases," our surveillance case definition required at least two ambulatory visits with primary diagnoses of diabetes within a three-month period. Also, this report summarized frequencies and rates of incident *diagnoses* (not actual occurrences) of diabetes — overall and in various subgroups — which may not accurately reflect the actual incidence and distribution of the disease in the U.S. military.

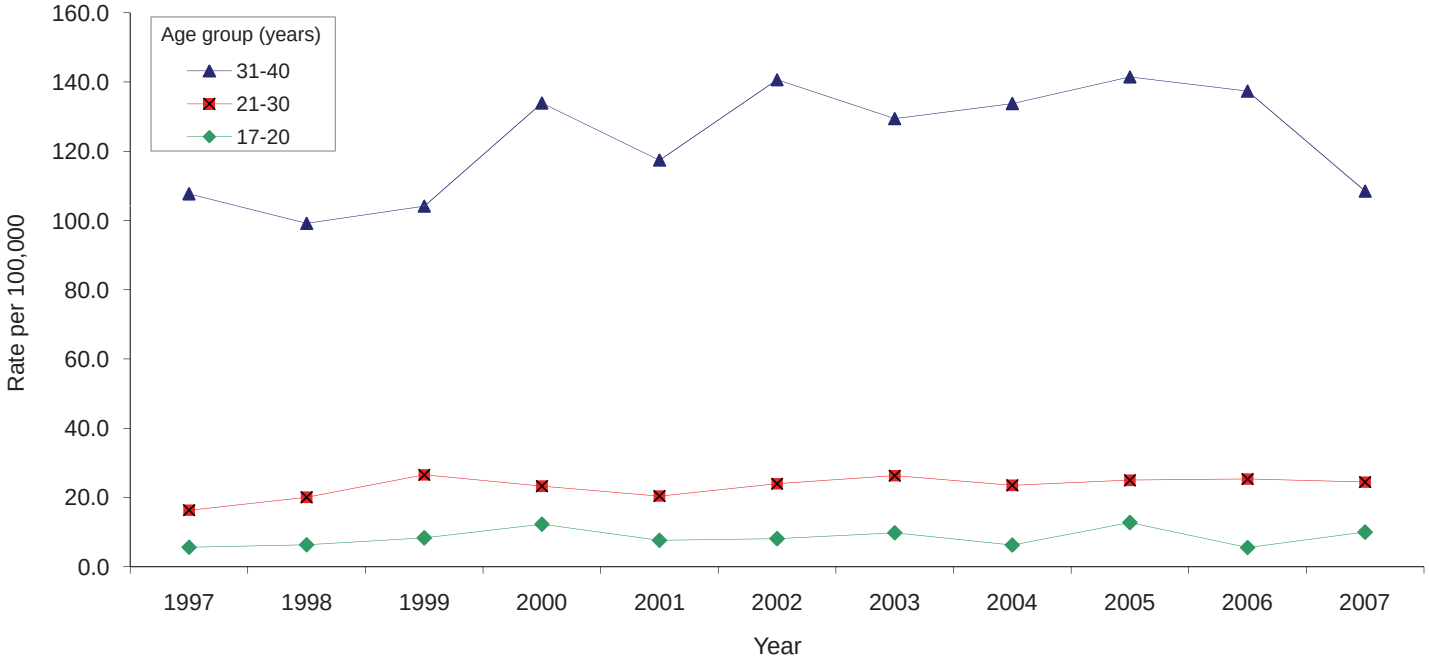
If certain subgroups of service members are relatively more informed regarding risk factors and disease symptoms and/or more frequently screened (e.g., during periodic medical examinations), then higher proportions of detectable cases may be ascertained among them. Also, clinical suspicion, diagnosis, and reporting of "new" cases may be more complete and timely in some Services or subgroups than others. Thus, if one Service is more aggressive than others in diagnosing clinically detectable cases, rates of diagnoses may be higher — even if actual disease incidence is not — among members of that Service. In light of the above, higher crude rates of diagnoses of diabetes in the Navy may reflect, at least in part, different demographic makeup, more effective health education programs, and/or more complete and timely case ascertainment in the Navy than the other Services.

Table 1. Incident cases of diabetes mellitus* among service members 17-40 years old, active component, U.S. Armed Forces, January 1997-December 2007

	Type 1		Type 2		Unspecified		Any diabetes	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Total	497	3.6	7,032	50.3	1,252	9.0	8,781	62.8
Service								
Army	163	3.3	2,087	42.4	411	8.4	2,661	54.1
Navy	132	3.6	2,891	78.4	398	10.8	3,421	92.8
Air Force	140	4.0	1,742	49.4	343	9.7	2,225	63.1
Marine Corps	62	3.4	312	16.9	100	5.4	474	25.6
Race/ethnic								
White, non-Hispanic	295	3.4	2,997	34.6	665	7.7	3,957	45.7
Black, non-Hispanic	127	4.8	2,484	93.7	373	14.1	2,984	112.6
Hispanic	47	3.1	758	50.7	123	8.2	928	62.0
Asian/Pacific Islander	10	1.7	538	92.4	44	7.6	592	101.7
American Indian/Native Alaskan	11	5.3	80	38.9	15	7.3	106	51.5
Other/unknown	7	1.8	175	45.1	32	8.2	214	55.1
Gender and age								
Males	449	3.8	6,212	52.1	1,134	9.5	7,795	65.4
17-20	64	3.4	135	7.2	107	5.7	306	16.3
21-30	233	3.6	1,438	22.5	525	8.2	2,196	34.3
31-40	152	4.2	4,639	127.0	502	13.7	5,293	144.9
Females	48	2.3	820	40.0	118	5.8	986	48.1
17-20	9	2.4	54	14.4	21	5.6	84	22.3
21-30	30	2.6	321	27.4	60	5.1	411	35.0
31-40	9	1.8	445	88.9	37	7.4	491	98.1

* Primary diagnoses (dx1) of diabetes mellitus (ICD-9-CM: 250.00-250.99) during 2 or more medical encounters within a 3-month period.

Figure 2. Incidence rates of type 2 diabetes mellitus, by age group, active component, U.S. Armed Forces, 1997-2007



Not surprisingly, most incident diagnoses of diabetes among military members were reported as type 2 cases. Among young adults, risk of type 2 diabetes is increased among those who are overweight and sedentary. All U.S. military services have height/weight and physical fitness standards that are enforced during standardized periodic testing. Still, to some extent, differences in diabetes incidence among the services may reflect differences in the frequencies and intensities of military and/or leisure time physical activity. A recent survey of health-related behaviors found that members of the Navy and Air Force were less likely than those in the Army and Marine Corps to engage in physical activity.[4]

Reported by David Greenburg, MD, MPH, Department of Medicine, Madigan AMC, Tacoma, WA; Harry W. Haverkos, MD, Preventive Medicine and Biometrics, USUHS, Bethesda, MD; and Robert Vigersky, MD, Director, Diabetes Research Institute, Walter Reed AMC, Washington, DC

References:

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Update: Deployment Health Assessments, U.S. Armed Forces, January 2009

The force health protection strategy of the U.S. Armed Forces is designed to deploy healthy, fit, and medically ready forces, to minimize illnesses and injuries during deployments, and to evaluate and treat physical and psychological problems (and deployment-related health concerns) following deployment.

In 1998, the Department of Defense initiated health assessments of all deployers prior to and after serving in major operations outside of the United States.[1] In March 2005, the Post-Deployment Health Reassessment (PDHRA) program was begun to identify and respond to health concerns that persisted until or emerged within three to six months after returning from deployment.[2]

This report summarizes responses to selected questions on deployment health assessments completed since 2003. In addition, it documents the natures and frequencies of changes in responses from pre-deployment to post-deployment.

Methods:

Completed deployment health assessment forms are transmitted to the Armed Forces Health Surveillance Center (AFHSC) where they are incorporated into the Defense Medical Surveillance System (DMSS).[3] In the DMSS, data recorded on health assessment forms are integrated with data that document demographic and military characteristics and medical encounters (e.g. hospitalizations, ambulatory visits) at fixed military and other (contracted care) medical facilities of the Military Health System. For this analysis, DMSS was searched to identify all pre (DD2795) and post (DD2796) deployment health assessment forms completed since 1 January 2003 and all post-deployment health reassessment (DD2900) forms completed since 1 August 2005.

Results:

During the 12-month period from February 2008 to January 2009, there were 400,458 pre-deployment health assessments, 360,500 post-deployment health assessments, and 306,829 post-deployment health reassessments completed at field sites, forwarded to the Armed Forces Health Surveillance Center, and archived in the Defense Medical Surveillance System **(Table 1)**.

Between January 2003 and January 2009, there were peaks and troughs in the numbers of pre-deployment and post-deployment health assessments that generally corresponded to times of departure and return of large numbers of deployers **(Figure 1)**. Since April 2006, the numbers of post-deployment health reassessments (PDHRA) completed per month have fluctuated in a range between approximately 16,000 and 36,000 **(Figure 1, Table 1)**.

From January to December 2008, nearly three-fourths (72.8%) of deployers rated their "health in general" as "excellent" or "very good" during pre-deployment health assessments. Smaller proportions of returned deployers rated their health as "excellent" or "very good" during post-deployment assessments (58.5%) and post-deployment reassessments (53.9%). There were increases in the proportions of deployers who rated their health as "fair" or "poor" from pre-deployment to post-deployment and from

Figure 1. Total deployment health assessment and reassessment forms, by month, U.S. Armed Forces, February 2003-January 2009

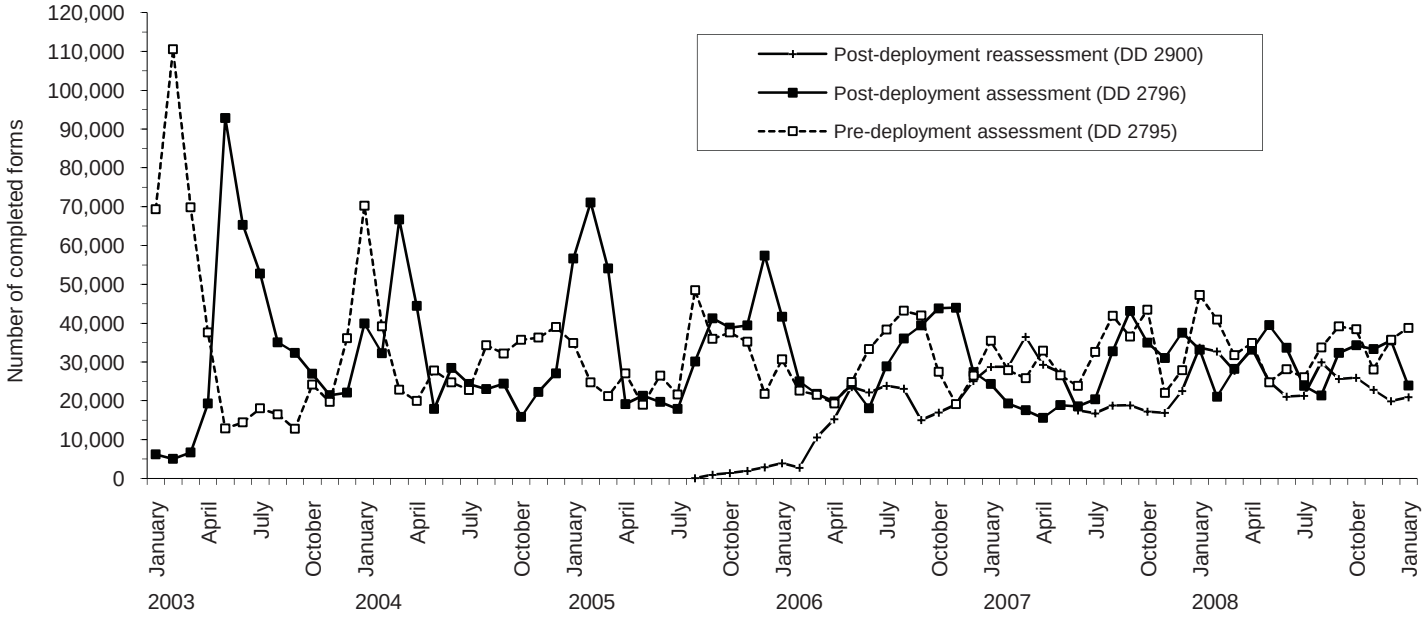


Table 1. Deployment-related health assessment forms, by month, U.S. Armed Forces, February 2008-January 2009

	Pre-deployment assessment DD2795		Post-deployment assessment DD2796		Post-deployment reassessment DD2900	
	No.	%	No.	%	No.	%
Total	**400,458**	**100**	**360,500**	**100**	**306,829**	**100**
2008						
February	40,883	10.2	21,033	5.8	32,719	10.7
March	31,788	7.9	28,246	7.8	27,768	9.0
April	34,870	8.7	33,196	9.2	33,658	11.0
May	24,786	6.2	39,513	11.0	25,001	8.1
June	28,093	7.0	33,687	9.3	21,062	6.9
July	26,074	6.5	23,885	6.6	21,323	6.9
August	33,715	8.4	21,386	5.9	29,921	9.8
September	39,164	9.8	32,374	9.0	25,663	8.4
October	38,437	9.6	34,335	9.5	25,949	8.5
November	28,091	7.0	33,329	9.2	22,867	7.5
December	35,749	8.9	35,565	9.9	19,927	6.5
2009						
January	38,808	9.7	23,951	6.6	20,971	6.8

immediate post-deployment to 3-6 months after returning. For example, prior to deploying, less than one of 40 (2.6%) deployers rated their health as "fair" or "poor"; upon returning from deployment, one of 14 (8.5%) deployers rated their health as "fair" or "poor"; and 3-6 months after returning, one of 7 (13.3%) deployers rated their health as "fair" or "poor" **(Figure 2)**.

In the past 12 months, the proportion of deployers who assessed their general health as "fair" or "poor" was consistently low before deployment (mean, by month: 2.6%), higher at return from deployment (mean, by month: 8.3%), and highest 3-6 months after return from deployment (mean, by month: 13.0%) **(Figure 3)**. There was relatively little variability in the proportions of deployers who rated their health as "fair" or "poor" on pre-deployment and post-deployment reassessment questionnaires **(Figure 3)**. However, the proportions of deployers who rated their health as "fair" or "poor" on the post-deployment questionnaire generally increased during the year from less then 6% in February 2008 to nearly 11% in November 2008 **(Figure 3)**. Of deployers who completed health assessments both prior to and 3-6 months after returning from deployment, nearly one of 6 (15.6%) indicated significant declines (i.e., change of 2 or more categories on a 5-category scale) in their perceived general health states between the assessments **(Figure 4)**.

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. Among Reserve component members of the Army and Marine Corps, health and exposure-related concerns and indications for referrals were much greater 3-6 months after return from deployment (DD2900) than at the time of return deployment (DD2796). Of note, at the time of return, active component soldiers were the most likely of all deployers to receive mental health referrals; however, 3-6 months after returning, Reserve component members of the Army and

Figure 2. Percent distributions of self-assessed health status as reported on deployment health assesment forms, U.S. Armed Forces, February 2008-January 2009

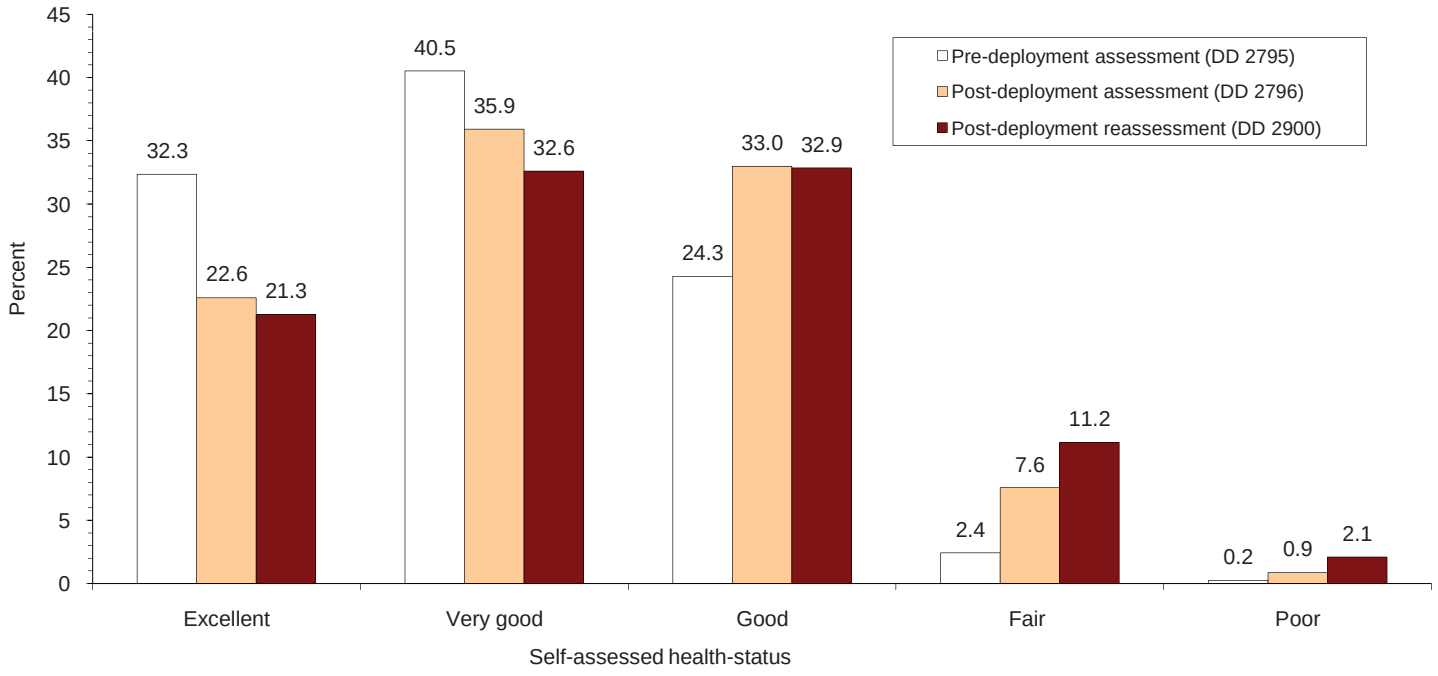
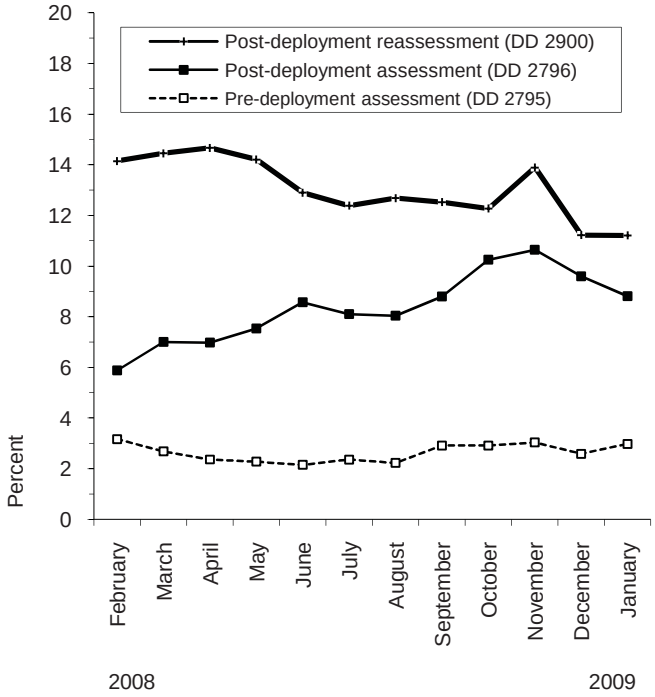


Figure 3. Proportion of deployment health assessment forms with self-assessed health status as "fair" or "poor", U.S. Armed Forces, February 2008-January 2009



Marine Corps were the most likely of all deployers to receive mental health referrals **(Table 2, Figures 5,6).**

Finally, in general, soldiers and Reserve component members were more likely than their respective counterparts to report "exposure concerns"; and both active and Reserve component members were more likely to report "exposure concerns" 3-6 months after compared to the time of return from deployment **(Table 2, Figures 6,7).**

Editorial comment:

A consistent finding of deployment-related health assessments is that deployers rate their general health worse when they return from deployment compared to before deploying, regardless of the Service or component. Deployments are inherently physically and psychologically demanding; and there are more – and more significant – threats to the physical and mental health of service members when they are conducting combat operations away from their families in hostile environments compared to when serving at their permanent duty stations (active component) or when living in their civilian communities (Reserve component).

Another consistent finding of deployment-related health surveillance is that, as a group, returned service members rate their general health worse and are more likely to report exposure concerns 3-6 months after returning from deployment compared to the time of return. Symptoms of post deployment stress disorder (PTSD) may emerge or worsen within several months after a life threatening experience (such as military service in a war zone). PTSD among U.S. veterans of combat duty in Iraq has been associated with higher rates of physical health problems after return from deployment.[4] Among British veterans of the Iraq war, Reservists reported more "ill health" than their active counterparts. Roles, traumatic experiences, and unit cohesion while deployed were associated with medical outcomes after

Figure 4. Proportion of service members whose self-assessed health status improved ("better") or declined ("worse") (by 2 or more categories on 5-category scale) from pre-deployment to reassessment, by month, U.S. Armed Forces, February 2008-January 2009

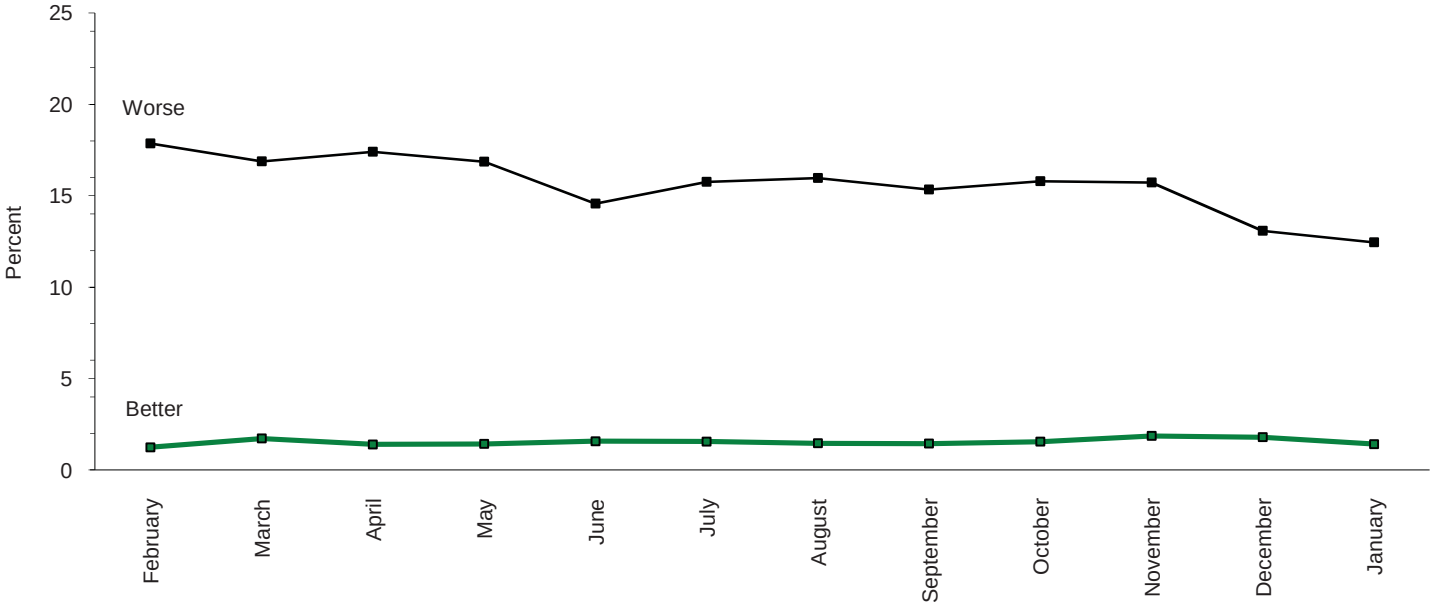


Table 2. Percentage of service members who endorsed selected questions/received referrals on health assessment forms, U.S. Armed Forces, February 2008-January 2009

	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
Active component	n= 134,919	n= 124,776	n= 94,595	n= 16,043	n= 11,914	n= 8,285	n= 58,589	n= 51,268	n= 50,759	n= 30,930	n= 27,307	n= 40,743	n= 240,481	n= 215,265	n= 194,382
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	4.3	10.7	16.5	1.5	4.8	6.6	0.5	3.4	4.4	1.9	5.9	9.6	3.0	7.8	11.8
Health concerns, not wound or injury	12.5	24.9	33.3	4.7	13.9	16.1	1.8	7.3	12.9	3.5	12.9	23.1	8.6	18.1	25.5
Health worse now than before deployed	na	6.5	28.4	na	0.8	14.1	na	1.9	9.4	na	1.0	19.3	na	4.1	21.4
Exposure concerns	na	19.6	24.3	na	14.5	15.0	na	10.3	15.8	na	10.3	19.6	na	15.6	20.9
PTSD symptoms (2 or more)	na	12.1	17.6	na	4.7	7.9	na	2.7	3.1	na	4.3	10.2	na	8.1	12.2
Depression symptoms (any)	na	9.2	37.5	na	1.3	26.0	na	2.0	15.5	na	2.2	32.9	na	5.8	30.7
Referral indicated by provider (any)	5.5	32.9	24.0	5.6	22.0	16.7	1.5	11.7	8.3	4.3	20.1	25.3	4.4	25.1	20.1
Mental health referral indicated*	1.5	8.4	7.3	0.8	4.1	6.0	0.5	1.2	2.3	0.3	2.4	5.5	1.1	5.4	5.7
Medical visit following referral†	98.4	98.1	97.1	90.0	76.0	92.5	78.5	94.7	96.6	67.0	69.3	73.3	90.9	93.0	90.5
	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
Reserve component	n= 67,781	n= 50,870	n= 75,284	n= 3,836	n= 3,980	n= 4,724	n= 15,113	n= 14,152	n= 14,003	n= 2,731	n= 3,137	n= 3,155	n= 89,461	n= 72,139	n= 97,166
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	2.1	10.8	19.3	0.5	7.9	9.5	0.3	4.4	4.8	0.6	8.5	9.7	1.7	9.4	15.6
Health concerns, not wound or injury	13.1	36.8	51.2	3.1	27.2	30.9	0.9	11.6	13.7	2.9	24.1	35.9	10.5	31.3	42.5
Health worse now than before deployed	na	12.7	37.6	na	3.4	23.1	na	2.6	10.1	na	2.9	24.7	na	9.9	31.1
Exposure concerns	na	25.4	36.3	na	34.2	27.7	na	15.7	20.5	na	19.1	29.0	na	23.9	32.6
PTSD symptoms (2 or more)	na	11.3	25.0	na	5.1	11.2	na	2.0	2.6	na	4.7	13.9	na	9.0	19.5
Depression symptoms (any)	na	12.3	40.0	na	3.0	26.3	na	1.7	13.9	na	4.8	32.4	na	9.6	34.1
Referral indicated by provider (any)	4.5	32.8	34.0	3.3	28.8	18.3	0.7	14.2	5.8	5.6	35.5	30.8	3.9	29.6	27.9
Mental health referral indicated*	0.5	4.9	12.0	0.3	3.1	4.8	0.0	0.7	1.0	0.1	2.9	9.8	0.4	4.0	9.5
Medical visit following referral†	96.2	98.0	29.5	88.6	86.5	36.1	59.1	61.7	40.2	81.1	59.7	29.7	94.4	90.1	30.0

*Includes behavioral health, combat stress and substance abuse referrals.
†Record of inpatient or outpatient visit within 6 months after referral

Figure 5. Percent of deployers with mental or behavioral health referrals, by Service and component, by timing of health assessment, U.S. Armed Forces, February 2008-January 2009

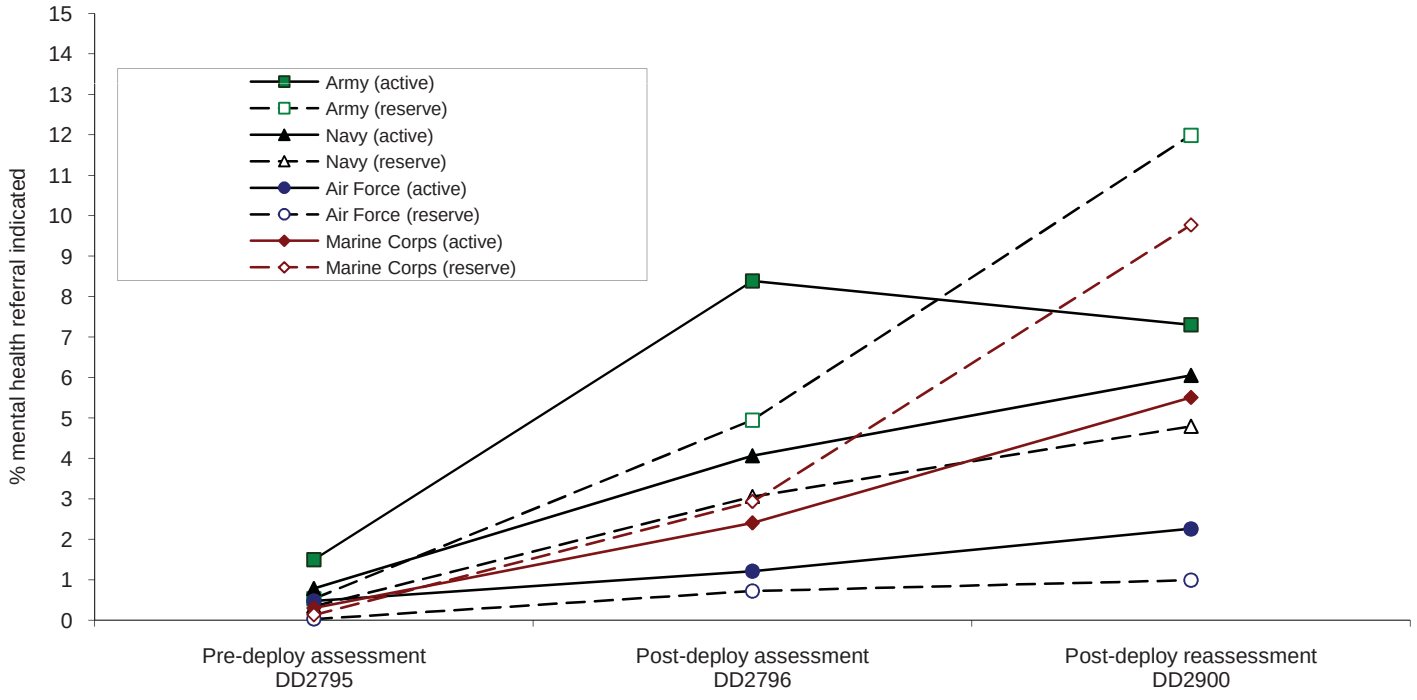


Figure 6. Ratio of percents of deployers who endorse selected questions, Reserve versus active component, on pre-deployment health assessments (DD2795) and post-deployment health reassessments (DD2900), U.S. Armed Forces, February 2008-January 2009

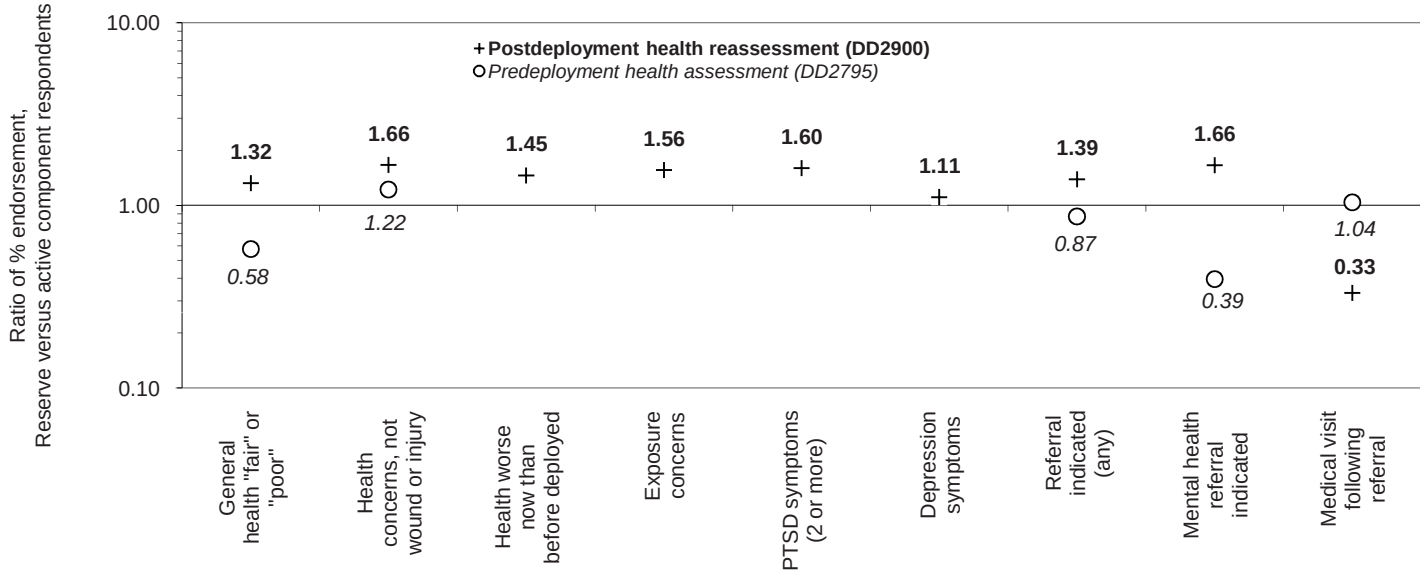
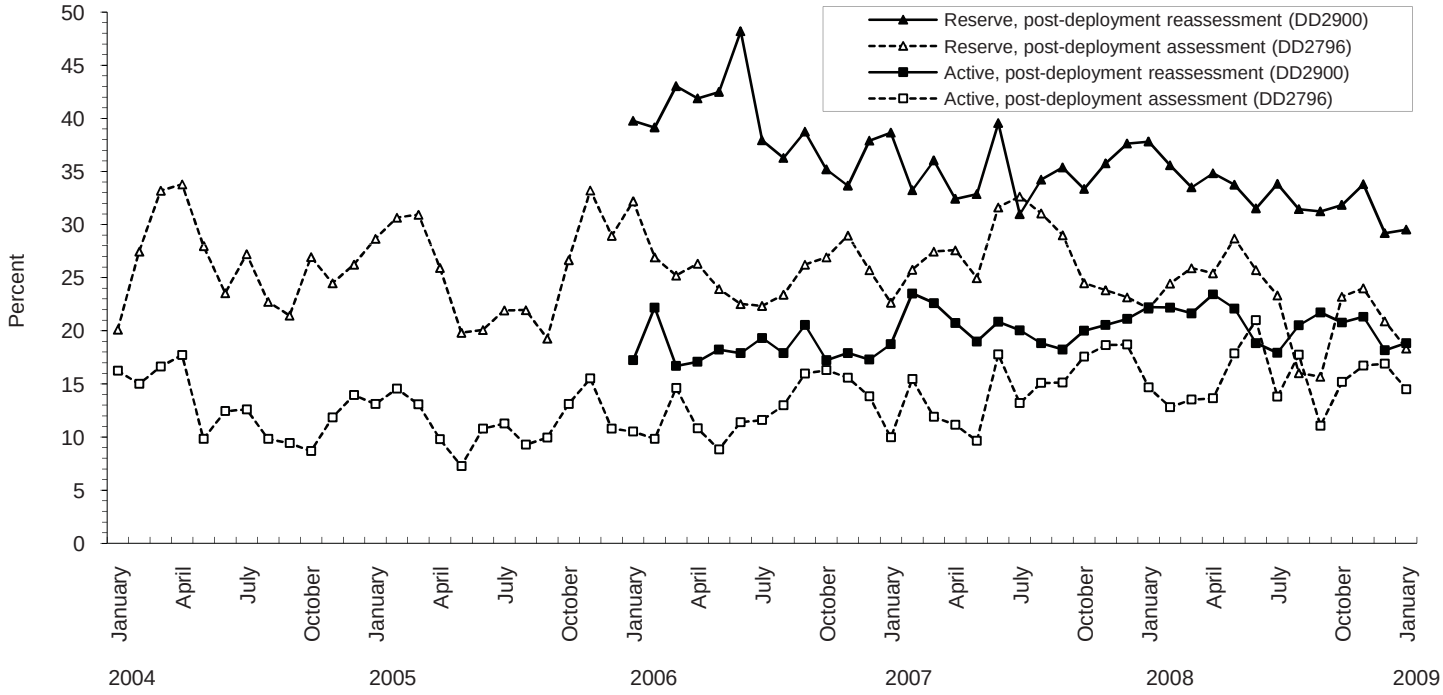


Figure 7. Proportion of service members who endorse exposure concerns on post-deployment health assessments, U.S. Armed Forces, January 2004-January 2009



returning; however, PTSD symptoms were more associated with problems at home (e.g., reintegration into family, work, and other aspects of civilian life) than with events in Iraq.[5]

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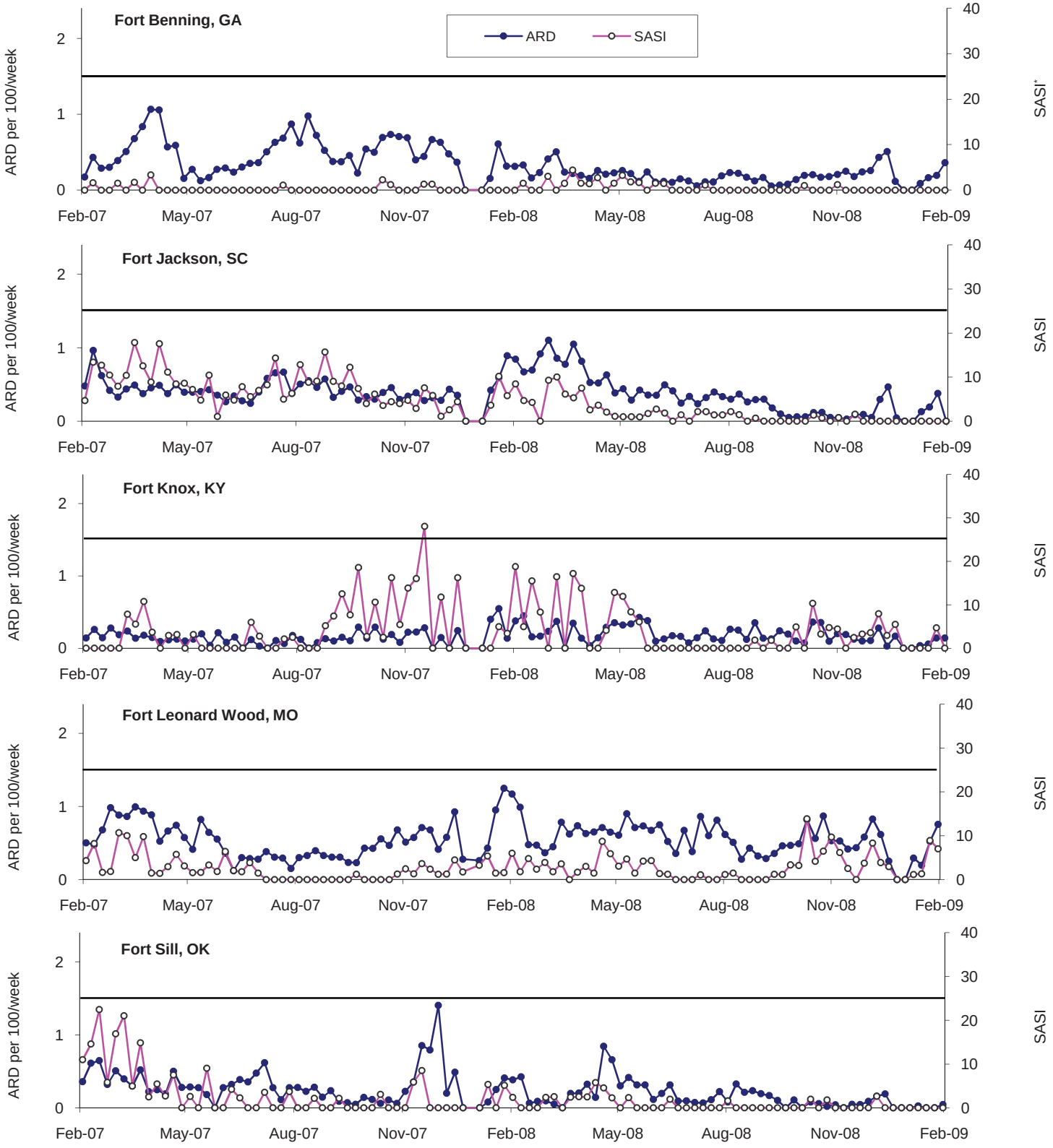
5. Browne T, Hull L, Horn O, et al. Explanations for the increase in mental health problems in UK reserve forces who have served in Iraq. *Br J Psychiatry*. 2007 Jun;190:484-489.

Acute respiratory disease (ARD) and streptococcal pharyngitis rates (SASI*), basic combat training centers, U.S. Army, by week, February 2007-February 2009



* Streptococcal-ARD surveillance index (SASI) = ARD rate x % positive culture for group A streptococcus
ARD rate = cases per 100 trainees per week
ARD rate ≥ 1.5 or SASI ≥ 25.0 for 2 consecutive weeks are surveillance indicators of epidemics

Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years through 31 January 2008 and 31 January 2009

Army

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
NORTH ATLANTIC																
Washington, DC Area	25	39	.	.	1	.	.	.	.	.	.	.	.	.	3	.
Aberdeen, MD	0	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	10	21	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Bragg, NC	127	135	.	.	.	.	.	2	.	.	.	.	.	2	.	.
FT Drum, NY	26	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Eustis, VA	81	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Knox, KY	66	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Lee, VA	27	76	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Meade, MD	11	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.
West Point, NY	5	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.
GREAT PLAINS																.
FT Sam Houston, TX	125	64	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Bliss, TX	56	71	.	.	.	.	1	.	.	.	.	.	.	1	.	.
FT Carson, CO	75	47	.	1	.	.	.	.	.	.	.	.	.	.	.	.
FT Hood, TX	90	148	.	.	.	.	2	1	.	1	.	.	.	.	.	.
FT Huachuca, AZ	1	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Leavenworth, KS	5	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	85	39	.	.	.	.	.	.	.	.	.	.	1	.	.	.
FT Polk, LA	4	30	.	.	.	1	.	.	.	.	.	.	.	.	.	.
FT Riley, KS	35	36	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Sill, OK	9	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SOUTHEAST																
FT Gordon, GA	81	68	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Benning, GA	36	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Campbell, KY	16	18	.	.	.	.	.	1	.	.	.	.	.	.	.	.
FT Jackson, SC	12	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Rucker, AL	8	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Stewart, GA	63	93	.	.	1	.	1	.	.	.	.	.	1	.	.	.
WESTERN																
FT Lewis, WA	86	134	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Irwin, CA	0	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.
FT Wainwright, AK	0	18	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PACIFIC																
Hawaii	51	75	2	2	1	.	1	1	.	.	.	.	.	.	.	.
Japan	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Korea	62	85	.	.	.	.	.	.	.	.	.	.	.	.	1	.
OTHER LOCATIONS																
Germany	20	91	1	3	.	.	.	1	.	.	.	.	.	.	.	1
Unknown	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	1,299	1,385	4	6	3	1	5	6	0	2	0	0	2	3	4	1

*Events reported by January 7, 2008 and 2009

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years through 31 January 2008 and 31 January 2009

Army

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
NORTH ATLANTIC																
Washington, DC Area	.	1	.	.	10	17	2	2	.	1	.	.	.	.	.	.
Aberdeen, MD	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.
FT Belvoir, VA	.	.	.	.	3	14	.	4	.	.	.	.	.	.	.	.
FT Bragg, NC	.	.	.	.	97	103	18	21	.	.	8	5	.	.	.	.
FT Drum, NY	1	.	.	.	19	.	4	.	.	.	.	.	.	.	.	.
FT Eustis, VA	.	.	.	.	28	11	1	4	.	.	.	.	.	.	.	.
FT Knox, KY	.	.	.	.	13	10	2	2	.	.	.	.	.	.	.	.
FT Lee, VA	.	.	.	.	16	64	11	12	.	.	.	.	.	.	.	.
FT Meade, MD	.	.	.	.	1	4	.	.	.	.	.	.	.	.	.	.
West Point, NY	2	.	.	.	3	4	.	.	.	.	.	.	.	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	.	.	.	.	23	37	6	8	1	.	.	.	.	.	.	.
FT Bliss, TX	.	.	.	.	22	32	9	5	.	1	.	.	.	.	.	.
FT Carson, CO	.	.	.	.	34	30	7	1	.	.	2	.	.	.	.	.
FT Hood, TX	.	.	.	.	57	87	8	27	.	1	4	9	.	.	.	.
FT Huachuca, AZ	.	.	.	.	1	6	.	.	.	.	.	.	.	.	.	.
FT Leavenworth, KS	.	.	.	.	5	5	.	2	.	1	.	.	.	.	.	.
FT Leonard Wood, MO	.	.	.	.	28	23	3	2	.	.	.	.	2	.	.	.
FT Polk, LA	.	.	.	.	2	27	2	2	.	.	.	.	.	.	.	.
FT Riley, KS	.	.	1	.	17	23	2	7	.	.	.	.	1	1	.	.
FT Sill, OK	.	.	.	.	5	16	2	4	.	.	.	.	.	.	.	.
SOUTHEAST																
FT Gordon, GA	.	.	.	.	40	53	25	8	.	.	.	.	.	.	.	.
FT Benning, GA	.	.	.	2	22	2	11	.	.	.	.	.	.	.	.	.
FT Campbell, KY	.	.	.	.	6	14	.	3	.	.	.	.	.	.	.	.
FT Jackson, SC	.	.	.	.	9	.	3	.	.	.	.	.	.	.	.	.
FT Rucker, AL	1	.	.	.	4	3	3	1	.	.	.	.	.	.	.	.
FT Stewart, GA	.	.	.	.	51	75	7	10	.	2	.	.	.	.	.	.
WESTERN																
FT Lewis, WA	.	.	.	.	71	95	7	11	.	.	1	2	.	.	.	.
FT Irwin, CA	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
FT Wainwright, AK	.	.	.	.	.	15	.	3	.	.	.	.	.	.	.	.
PACIFIC																
Hawaii	.	.	.	.	36	64	4	4	.	.	.	.	.	.	.	.
Japan	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.
Korea	.	.	.	.	48	81	7	2	.	.	.	.	.	1	.	.
OTHER LOCATIONS																
Germany	.	.	.	.	11	21	2	1	1	.	.	.	2	.	.	.
Unknown	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**4**	**1**	**1**	**2**	**682**	**941**	**146**	**147**	**2**	**6**	**15**	**16**	**5**	**2**	**0**	**0**

‡Primary and secondary.

§Urethritis, non-gonococcal (NGU).

Sentinel reportable events for service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers* for calendar years through 31 January 2008 and 31 January 2009

Navy

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
NATIONAL CAPITOL AREA																
NNMC Bethesda, MD	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Annapolis, MD	0	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	1	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Quantico, VA	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE EAST																
NH Beaufort, SC	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Camp Lejeune, NC	6	7	.	.	.	.	1	.	.	.	.	.	.	.	.	.
NH Charleston, SC	0	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Cherry Point, NC	13	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Corpus Christi, TX	1	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Great Lakes, IL	40	6	.	.	.	.	.	.	.	.	.	.	1	.	.	.
NH Guantanamo Bay, Cuba	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	14	3	.	.	.	.	4	.	.	.	.	.	1	.	.	.
NH Naples, Italy	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC New England, RI	7	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.
NH Pensacola, FL	5	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NMC Portsmouth, VA	10	38	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Rota, Spain	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Sigonella, Italy	0	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1
NAVY MEDICINE WEST																
NH Bremerton, WA	0	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Camp Pendleton, CA	3	6	.	.	1	.	.	.	.	.	.	.	.	.	.	.
NH Guam-Agana, Guam	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Hawaii, HI	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Lemoore, CA	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Okinawa, Japan	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NMC San Diego, CA	10	24	.	.	.	.	.	1	.	.	.	.	.	3	.	.
NH Twentynine Palms, CA	3	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	0	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVAL SHIPS																
COMNAVAIRLANT/CINCLANTFLEET	2	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS																
Unknown	2	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**122**	**113**	**0**	**0**	**1**	**0**	**6**	**1**	**0**	**0**	**0**	**0**	**2**	**3**	**0**	**1**

*Events reported by January 7, 2009

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events for service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers* for calendar years through 31 January 2008 and 31 January 2009

Navy

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
NATIONAL CAPITOL AREA																
NNMC Bethesda, MD	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.
NHC Annapolis, MD	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
NHC Quantico, VA	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE EAST																
NH Beaufort, SC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
NH Camp Lejeune, NC	.	.	.	.	3	5	2	2	.	.	.	.	.	.	.	.
NH Charleston, SC	.	.	.	.	.	2	.	1	.	.	.	1	.	.	.	.
NH Cherry Point, NC	.	.	.	.	12	3	1	.	.	.	.	.	.	.	.	.
NH Corpus Christi, TX	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
NHC Great Lakes, IL	.	.	.	.	35	6	3	.	.	.	.	.	.	.	.	.
NH Guantanamo Bay, Cuba	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	.	.	.	.	5	2	2	.	1	.	.	.	.	.	.	.
NH Naples, Italy	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC New England, RI	.	.	.	.	5	.	.	.	.	.	.	.	1	.	.	.
NH Pensacola, FL	.	.	.	.	3	.	1	.	.	.	.	.	.	.	.	.
NMC Portsmouth, VA	.	.	.	.	9	28	.	9	.	.	.	.	.	.	.	.
NH Rota, Spain	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Sigonella, Italy	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE WEST																
NH Bremerton, WA	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.
NH Camp Pendleton, CA	.	.	.	.	1	6	.	.	.	.	.	.	.	.	.	.
NH Guam-Agana, Guam	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Hawaii, HI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Lemoore, CA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
NH Okinawa, Japan	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NMC San Diego, CA	.	.	.	1	7	13	2	2	.	.	.	.	.	.	.	1
NH Twentynine Palms, CA	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
NAVAL SHIPS																
COMNAVAIRLANT/CINCLANTFLEET	.	.	.	.	1	6	1	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS																
Unknown	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.
Total	**1**	**0**	**0**	**1**	**89**	**81**	**13**	**14**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**

‡Primary and secondary.

§Urethritis, non-gonococcal (NGU).

Sentinel reportable events for service members and beneficiaries at U.S. Air Force medical facilities, cumulative numbers* for calendar years through 31 January 2008 and 31 January 2009

Air Force

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Air Combat Cmd	170	49	1	.	1	.	1	.	3	.	.	.	3	.	.	.
Air Education & Training Cmd	109	90	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Air Force Dist. of Washington	36	17	.	.	.	.	.	.	.	.	.	.	1	1	.	.
Air Force Materiel Cmd	72	29	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Air Force Special Ops Cmd	15	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Air Force Space Cmd	43	24	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Air Mobility Cmd	113	52	.	.	.	1	.	.	.	.	.	.	1	1	.	1
Pacific Air Forces	79	46	2	.	1	.	1	.	.	.	.	.	1	1	.	1
U.S. Air Forces in Europe	63	30	1	.	.	.	.	.	.	.	.	.	.	.	1	.
U.S. Air Force Academy	3	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other	45	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**748**	**354**	**4**	**0**	**2**	**1**	**3**	**0**	**3**	**0**	**0**	**0**	**6**	**4**	**1**	**2**

*Events reported by December 7, 2008

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility

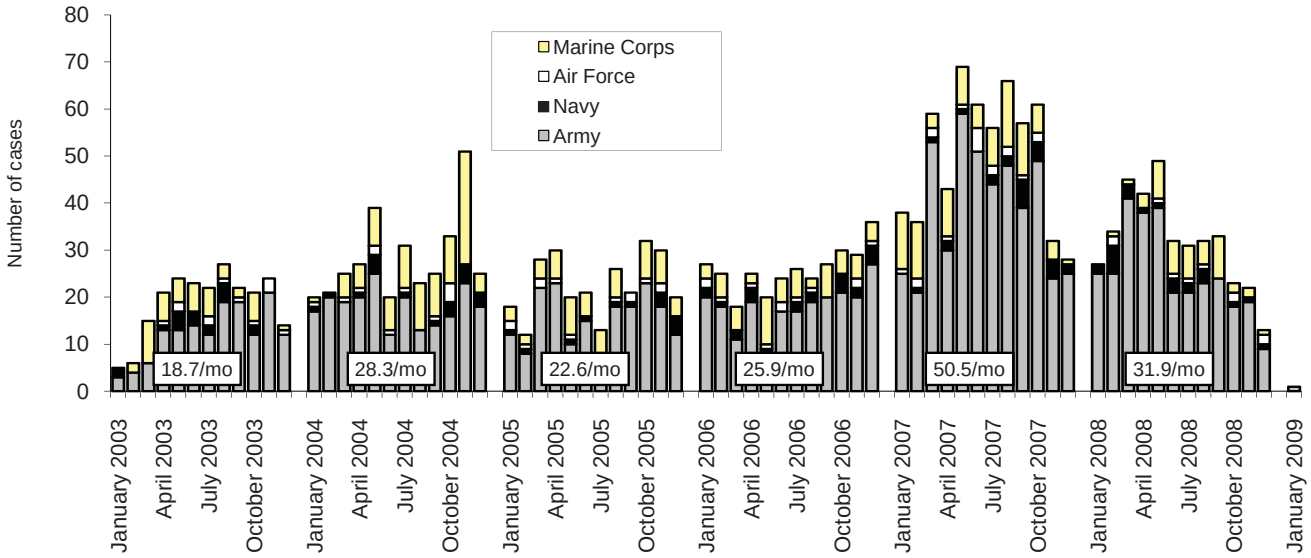
Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Air Combat Cmd	.	.	.	.	90	41	12	3	.	.	.	.	1	1	.	.
Air Education & Training Cmd	1	.	.	.	48	58	2	5	.	1	.	.	.	.	.	.
Air Force Dist. of Washington	.	.	.	.	14	14	2	2	1	.	.	.	.	.	.	.
Air Force Materiel Cmd	1	.	.	.	44	23	7	3	1	1	.	.	.	.	.	.
Air Force Special Ops Cmd	.	.	.	.	15	11	.	1	.	.	.	.	.	.	.	.
Air Force Space Cmd	.	.	.	.	23	23	3	.	.	.	.	.	.	.	.	.
Air Mobility Cmd	.	1	.	.	79	33	5	8	.	.	.	.	2	3	1	.
Pacific Air Forces	.	.	.	.	54	18	3	3	.	.	.	.	.	3	.	.
U.S. Air Forces in Europe	.	.	.	.	49	20	6	3	.	.	.	.	.	1	.	.
U.S. Air Force Academy	.	.	.	.	3	2	.	.	.	.	.	.	.	.	.	.
Other	.	.	.	.	31	.	.	.	.	.	.	.	.	.	.	.
Total	**2**	**1**	**0**	**0**	**450**	**243**	**40**	**28**	**2**	**2**	**0**	**0**	**3**	**8**	**1**	**0**

‡Primary and secondary.

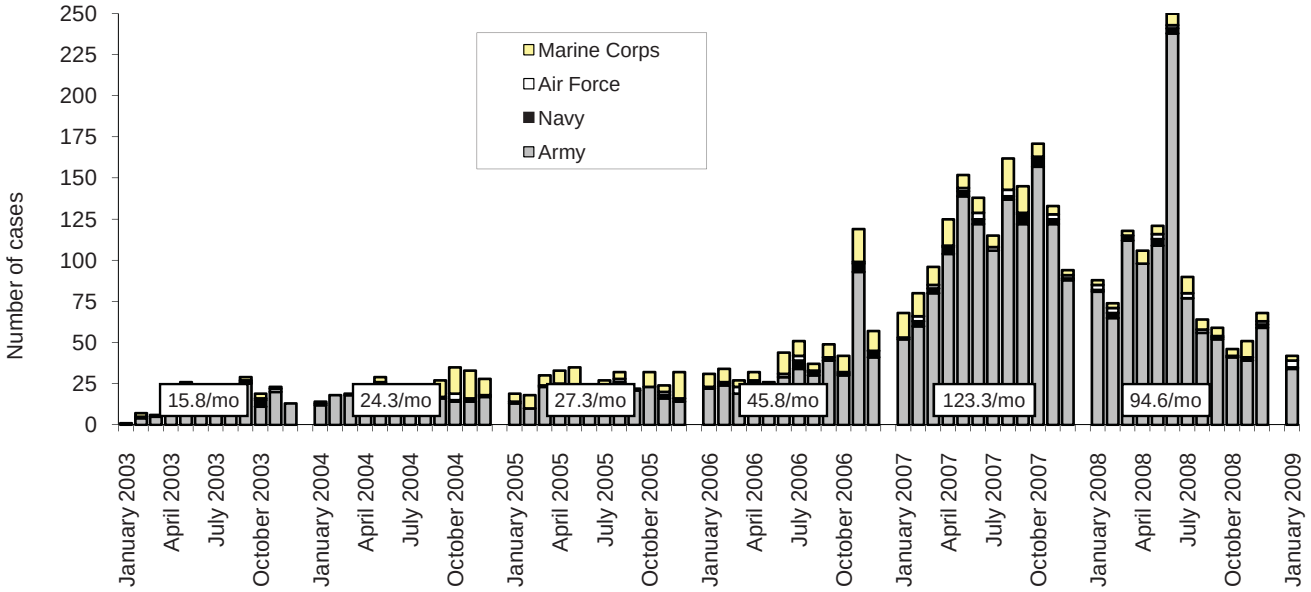
§Urethritis, non-gonococcal (NGU).

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - January 2009

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



Traumatic brain injury, multiple ambulatory visits (without hospitalization),
(ICD-9: 310.2, 800-801, 803-804, 850-854, 950.1-950.3, 959.01, V15.5_1-9, V15.5_A-F)†



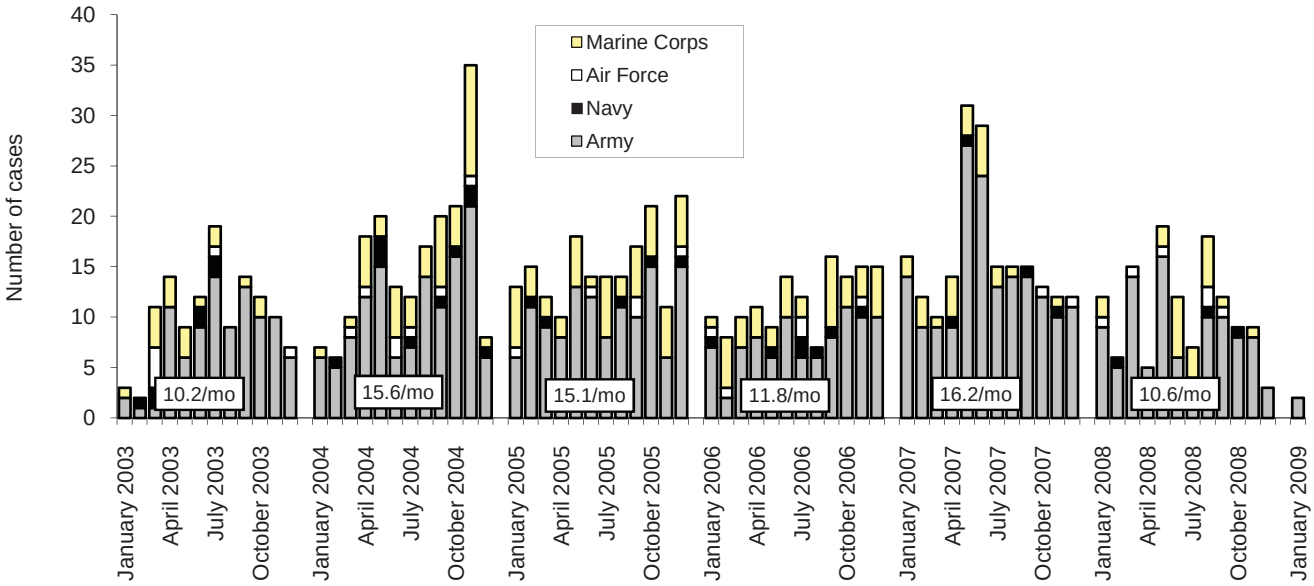
Reference: Armed Forces Health Surveillance Center. Frequencies, rates and trends of use of diagnostic codes indicative of traumatic brain injury (TBI), July 1999-June 2008. *MSMR*. Dec 2008; 15(10):2-9.

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

†Two or more ambulatory visits at least 7 days apart while deployed to/within 365 days of returning from OEF/OIF.

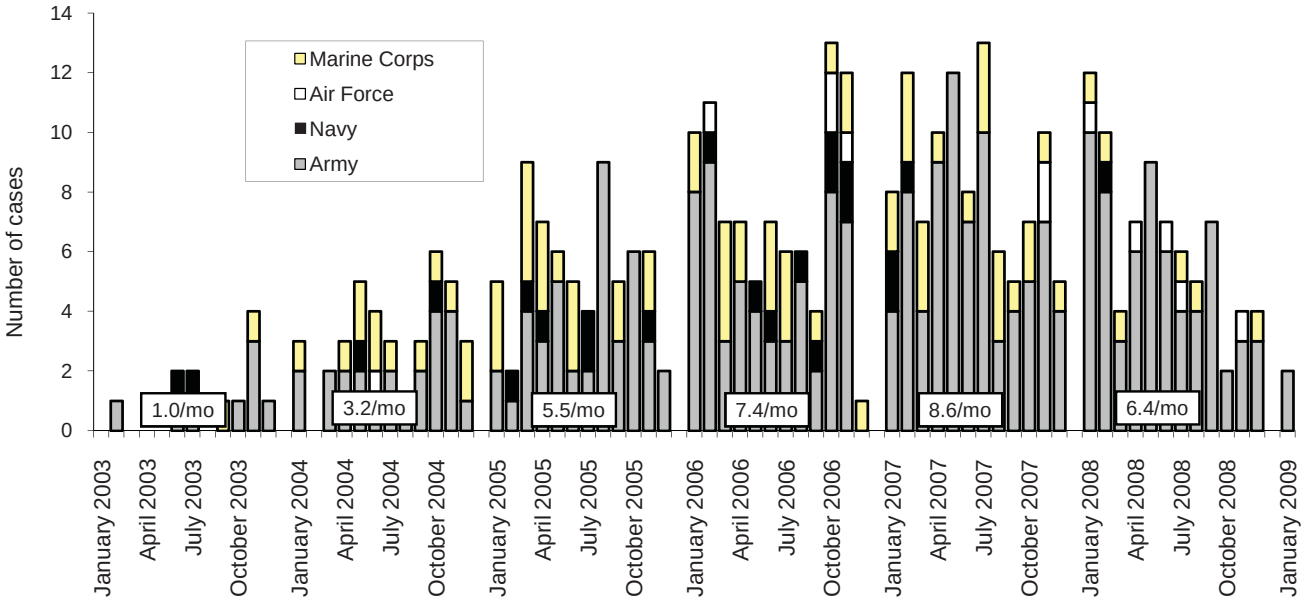
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - January 2009

Amputations (ICD-9: 887, 896, 897, V49.6 to V49.7, PR 84.0 to PR 84.1)*



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.
*Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 365 days of returning from OEF/OIF.

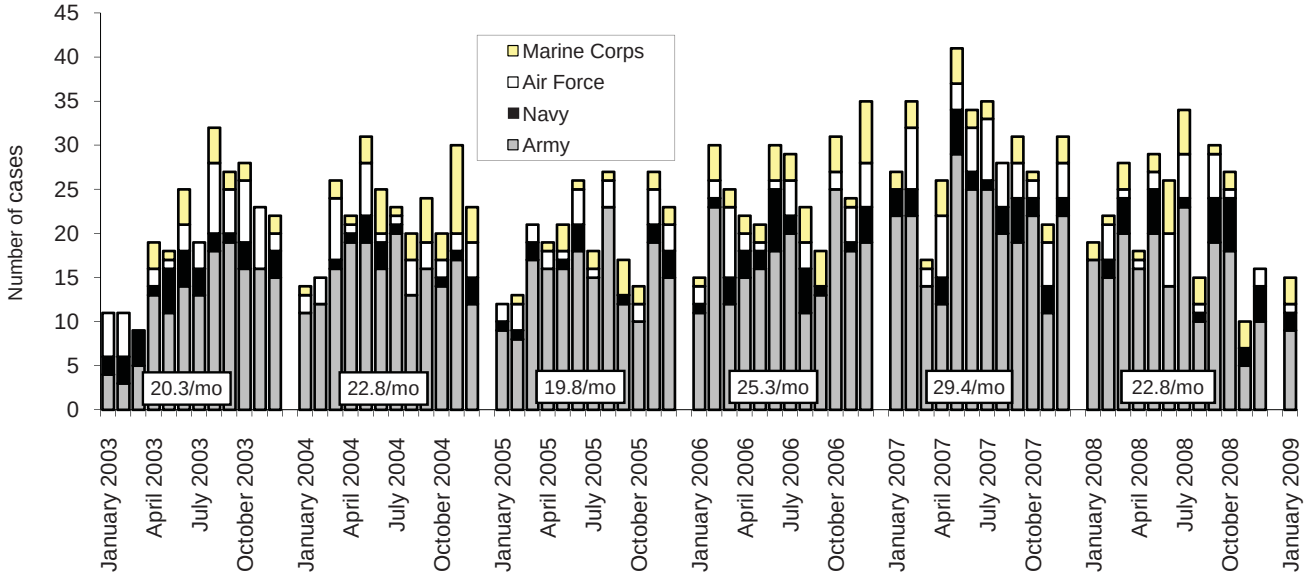
Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)†



Reference: Army Medical Surveillance Activity. Heterotopic ossification, active components, U.S. Armed Forces, 2002-2007. *MSMR*. Aug 2007; 14(5):7-9.
†One diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart while deployed to/within 365 days of returning from OEF/OIF.

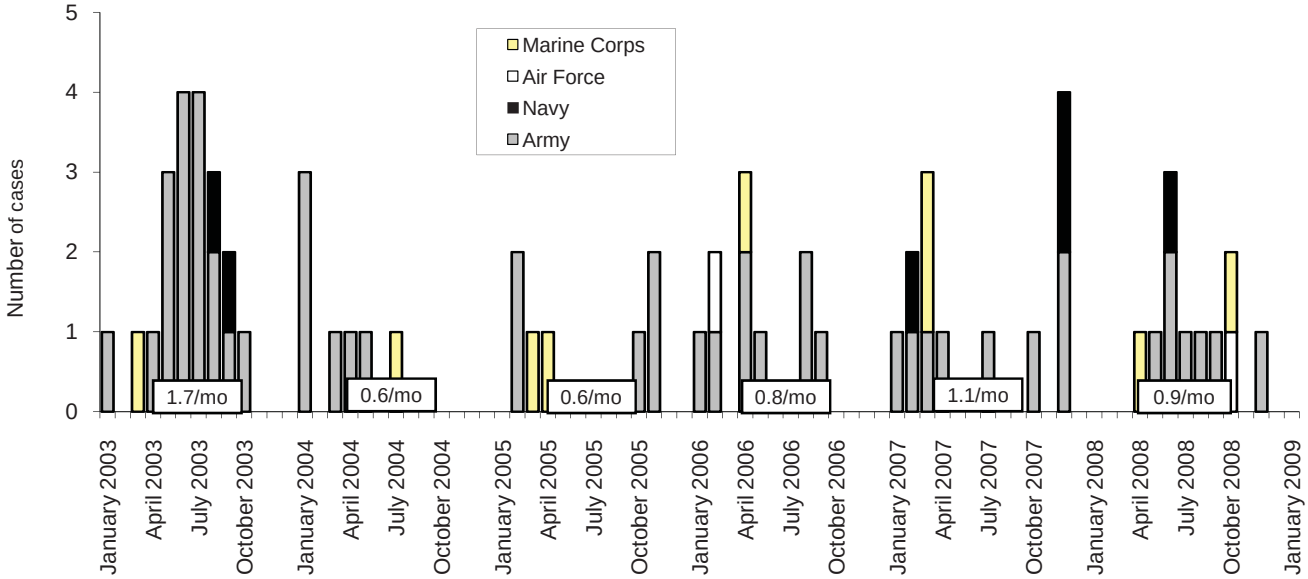
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - January 2009

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)*



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.
*Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 90 days of returning from OEF/OIF.

Severe acute pneumonia (ICD-9: 518.81, 518.82, 518.3, 480-487, 786.09)†



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.
†Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 30 days of returning from OEF/OIF.

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