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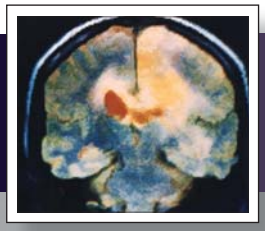

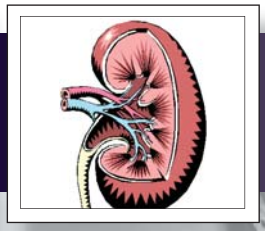

MEDICAL SURVEILLANCE MONTHLY REPORT

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Frequencies, Rates, and Trends of Use of Diagnostic Codes Indicative of Traumatic Brain Injury (TBI), July 1999- June 2008

In the U.S. Military Health System (MHS), traumatic brain injury (TBI) is defined as "traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force that is indicated by new onset or worsening of at least one of the following clinical signs, immediately following the event: any period of loss of or decreased level of consciousness; any loss of memory for events immediately before or after the injury; any alteration in mental state at the time of the injury (confusion, disorientation, slowed thinking, etc.); neurological deficits (weakness, loss of balance, change in vision, praxis, paresis/plegia, sensory loss, aphasia, etc.) that may or may not be transient; intracranial lesion."[1]

Regardless of the setting or circumstances, TBIs cause significant morbidity and disability among military members.[2,3] Outside of combat operations, TBIs are most often related to land transport accidents, falls, assaults, and recreational injuries.[2,3] During recent operations in Afghanistan and Iraq, TBIs have been relatively frequent but potentially underascertained combat-related injuries. Regardless of their causes, TBIs can have significant acute and long-term clinical effects — with consequences for both the Military Health System and the Veterans Affairs Health Care System.

For surveillance purposes, several ICD-9-CM diagnostic codes are considered indicators of TBIs. Some TBI indicator diagnostic codes are more specific than others with regard to the natures, timing, and clinical effects of the underlying injuries:

a. *Specific head and/or brain injuries*: ICD-9-CM codes: 800, 801, 803 (fracture, skull); ICD-9-CM 804 (multiple fractures, skull or face with other bones); ICD-9-CM 850-854 (intracranial injury, e.g., concussion; cerebral laceration, contusion, hemorrhage); ICD-9-CM 950.1-950.3 (injury of optic chiasm, optic pathways, visual cortex);

b. *Current effects of prior brain injury:* ICD-9-CM code: 310.2 ("postconcussion syndrome");

c. *Head injuries of unspecified types, timing, and clinical effects*: ICD-9-CM code: 959.01 ("head injury, unspecified");

d. *History of traumatic brain injury (with or without current effects)*: ICD-9-CM code: V15.5 plus extender 1-9 or A-F ("personal history of traumatic brain injury").

This report documents the frequencies, rates, and trends of reporting of various TBI indicator diagnostic codes during hospitalizations and ambulatory visits of active component members of the U.S. military during the past nine years. Summaries document the variability in uses of various TBI indicator codes from before to after participation of service members in major joint deployments and from before to after the start of combat operations in Afghanistan (OEF) and Iraq (OIF).

Methods:

The surveillance period was 1 July 1999 to 30 June 2008. The surveillance population included all individuals who served in the active component of the U.S. Armed Forces any time during the surveillance period.

For this analysis, all periods of active component service were classified as either pre-deployment or post-deployment based on whether the period was before or after the start date of an individual's first major joint deployment. "Pre-deployment service" included all active component service prior to the start date of each individual's first major joint deployment. "Post-deployment service" included all active component service after the start date of each individual's first major joint deployment. Participation in major joint deployments was ascertained from rosters routinely provided by the Defense Manpower Data Center (DMDC) to the Armed Forces Health Surveillance Center (AFHSC) for integration in the Defense Medical Surveillance System (DMSS).

Primary and secondary case definitions were used to identify and classify incident TBI-related diagnoses during each deployment-related ("pre-deployment" or "post-deployment") period of service. The primary definition of a TBI event was a hospitalization with a TBI indicator diagnosis code (in any position) that specified a current head and/or brain injury or postconcussion syndrome. Hospitalizations with "history of traumatic brain injury" (ICD-9-CM V15.5 plus relevant extender) as the only TBI indicator diagnosis code were not considered primary case-defining events. The secondary definition of a TBI event was an ambulatory visit with a TBI indicator diagnosis code (in any position) that specified a current head and/or brain injury, postconcussion syndrome, and/or "history of TBI" (ICD-9-CM V15.5 plus relevant extender).

To allow comparisons of rates of incident TBI-related diagnoses during the pre-deployment and post-deployment service of the entire surveillance population, each service member could have one incident TBI indicator diagnosis during each deployment-related period of service. For those

with multiple TBI case-defining events during a deployment-related period of service, the definitive encounter for analysis purposes was determined using the following hierarchical classification system:

1x: Primary TBI-defining encounter
- 1a: Hospitalization with a specified injury of the head/brain
- 1b: Hospitalization with postconcussion syndrome (PCS)
- 1c: Hospitalization with an "unspecified" head injury

2x: Secondary TBI-defining encounter
- 2a: Ambulatory visit with a specified injury of the head/brain
- 2b: Ambulatory visit with postconcussion syndrome (PCS)
- 2c: Ambulatory visit with an "unspecified" head injury
- 2d: Ambulatory visit with a history of TBI (V15.5 with a TBI-specific extender) (made available for use as of 1 October 2007)

Specifically, during each deployment-related period of service, TBI-associated hospitalizations (1x) were prioritized over TBI-associated ambulatory visits (2x). If an individual had multiple TBI-related hospitalizations or multiple TBI-related ambulatory visits (and no hospitalizations) during a deployment-related period, encounters for current injuries of the head/brain (1a or 2a) were prioritized over those for postconcussion syndrome (1b or 2b); encounters for postconcussion syndrome were prioritized over those for unspecified head injury (1c or 2c); and encounters for unspecified head injury were prioritized over those for "history of TBI" (2d).

If during a deployment-related period, an individual had multiple TBI-defining medical encounters with the same priority for classification, the earliest was considered the definitive TBI encounter. Finally, the date of the definitive TBI encounter of each individual during each deployment-related period was used as the event date for incidence rate calculations.

Results:

During the nine-year surveillance period, there were 69,860 and 40,338 incident TBI indicator diagnoses during the pre-deployment and post-deployment periods of service, respectively. Crude overall rates of incident TBI-related diagnoses were 8.2 and 10.4 per 1,000 person-years (p-yrs) during pre-deployment and post-deployment service,

Table 1. Number, nature, and rates (per 1,000 person-years) of incident TBI-related diagnoses during the pre-deployment period of service, active component, U.S. Armed Forces, by year, July 1999-June 2008

TBI classification	Jul 1999-Jun 2000	Jul 2000-Jun 2001	Jul 2001-Jun 2002	Jul 2002-Jun 2003	Jul 2003-Jun 2004	Jul 2004-Jun 2005	Jul 2005-Jun 2006	Jul 2006-Jun 2007	Jul 2007-Jun 2008	Overall
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Hospitalized										
1a: current injury	953	1,000	989	896	647	516	512	424	547	6,484
1b: postconcussion	44	39	47	29	23	21	22	27	26	278
1c: unspecified	189	191	197	142	114	60	49	63	44	1,049
subtotal (hosp)	*1,186*	*1,230*	*1,233*	*1,067*	*784*	*597*	*583*	*514*	*617*	*7,811*
% of total	*13.7*	*11.9*	*12.5*	*12.1*	*10.7*	*10.5*	*10.4*	*7.4*	*9.4*	*11.2*
Not hospitalized										
2a: current injury	5,097	5,796	5,065	4,217	3,399	2,734	2,639	3,097	2,930	34,974
2b: postconcussion	357	353	288	341	355	375	426	507	425	3,427
2c: unspecified	2,030	2,982	3,312	3,200	2,815	1,971	1,966	2,802	2,514	23,592
2d: history of TBI									56	56
subtotal (amb)	*7,484*	*9,131*	*8,665*	*7,758*	*6,569*	*5,080*	*5,031*	*6,406*	*5,925*	*62,049*
% of total	*86.3*	*88.1*	*87.5*	*87.9*	*89.3*	*89.5*	*89.6*	*92.6*	*90.6*	*88.8*
TOTAL	8,670	10,361	9,898	8,825	7,353	5,677	5,614	6,920	6,542	69,860
	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
Hospitalized										
1a: current injury	0.71	0.76	0.80	0.84	0.73	0.66	0.75	0.67	0.95	
1b: postconcussion	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.04	0.05	
1c: unspecified	0.14	0.14	0.16	0.13	0.13	0.08	0.07	0.10	0.08	
subtotal (hosp)	*0.89*	*0.93*	*0.99*	*0.99*	*0.89*	*0.77*	*0.85*	*0.82*	*1.07*	0.92
Not hospitalized										
2a: current injury	3.81	4.38	4.08	3.93	3.86	3.52	3.85	4.93	5.07	
2b: postconcussion	0.27	0.27	0.23	0.32	0.40	0.48	0.62	0.81	0.74	
2c: unspecified	1.52	2.25	2.67	2.98	3.20	2.54	2.87	4.46	4.35	
2d: history of TBI									0.10	
subtotal (amb)	*5.60*	*6.90*	*6.98*	*7.23*	*7.46*	*6.55*	*7.33*	*10.20*	*10.26*	*7.28*
TOTAL	6.49	7.83	7.98	8.22	8.35	7.32	8.18	11.01	11.33	8.20

Table 2. Number, nature, and rates (per 1,000 person-years) of incident TBI-related diagnoses during the post-deployment period of service, active component, U.S. Armed Forces, by year, July 1999-June 2008

TBI classification	Jul 1999-Jun 2000	Jul 2000-Jun 2001	Jul 2001-Jun 2002	Jul 2002-Jun 2003	Jul 2003-Jun 2004	Jul 2004-Jun 2005	Jul 2005-Jun 2006	Jul 2006-Jun 2007	Jul 2007-Jun 2008	Overall
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Hospitalized										
1a: current injury	21	50	119	220	548	623	584	697	918	3,780
1b: postconcussion	2	0	3	6	15	22	34	71	84	237
1c: unspecified	7	19	27	23	61	51	42	49	39	318
subtotal (hosp)	*30*	*69*	*149*	*249*	*624*	*696*	*660*	*817*	*1,041*	*4,335*
% of total	*27.0*	*21.3*	*21.3*	*14.5*	*15.7*	*16.5*	*13.4*	*9.9*	*6.5*	*10.7*
Not hospitalized										
2a: current injury	59	170	332	727	1,681	1,944	2,108	4,069	6,634	17,724
2b: postconcussion	2	9	20	82	203	315	801	1,323	3,137	5,892
2c: unspecified	20	76	199	661	1,464	1,268	1,368	2,037	2,309	9,402
2d: history of TBI									2,985	2,985
subtotal (amb)	*81*	*255*	*551*	*1,470*	*3,348*	*3,527*	*4,277*	*7,429*	*15,065*	*36,003*
% of total	*73.0*	*78.7*	*78.7*	*85.5*	*84.3*	*83.5*	*86.6*	*90.1*	*93.5*	*89.3*
TOTAL	111	324	700	1,719	3,972	4,223	4,937	8,246	16,106	40,338
	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
Hospitalized										
1a: current injury	0.91	1.32	0.90	0.67	1.02	1.01	0.86	0.95	1.16	
1b: postconcussion	0.09	0.00	0.02	0.02	0.03	0.04	0.05	0.10	0.11	
1c: unspecified	0.30	0.50	0.20	0.07	0.11	0.08	0.06	0.07	0.05	
subtotal (hosp)	*1.30*	*1.82*	*1.13*	*0.76*	*1.16*	*1.12*	*0.97*	*1.11*	*1.32*	1.12
Not hospitalized										
2a: current injury	2.56	4.50	2.51	2.21	3.12	3.14	3.11	5.54	8.41	
2b: postconcussion	0.09	0.24	0.15	0.25	0.38	0.51	1.18	1.80	3.98	
2c: unspecified	0.87	2.01	1.51	2.01	2.72	2.05	2.02	2.78	2.93	
2d: history of TBI									3.79	
subtotal (amb)	*3.52*	*6.74*	*4.17*	*4.47*	*6.22*	*5.69*	*6.31*	*10.12*	*19.11*	*9.28*
TOTAL	4.82	8.57	5.30	5.23	7.37	6.81	7.29	11.23	20.43	10.40

respectively **(Tables 1,2)**. Among nearly 109,000 service members with a TBI case-defining event, only 1,570 (1.4%) received TBI indicator diagnoses during both their pre-deployment and post-deployment periods of service.

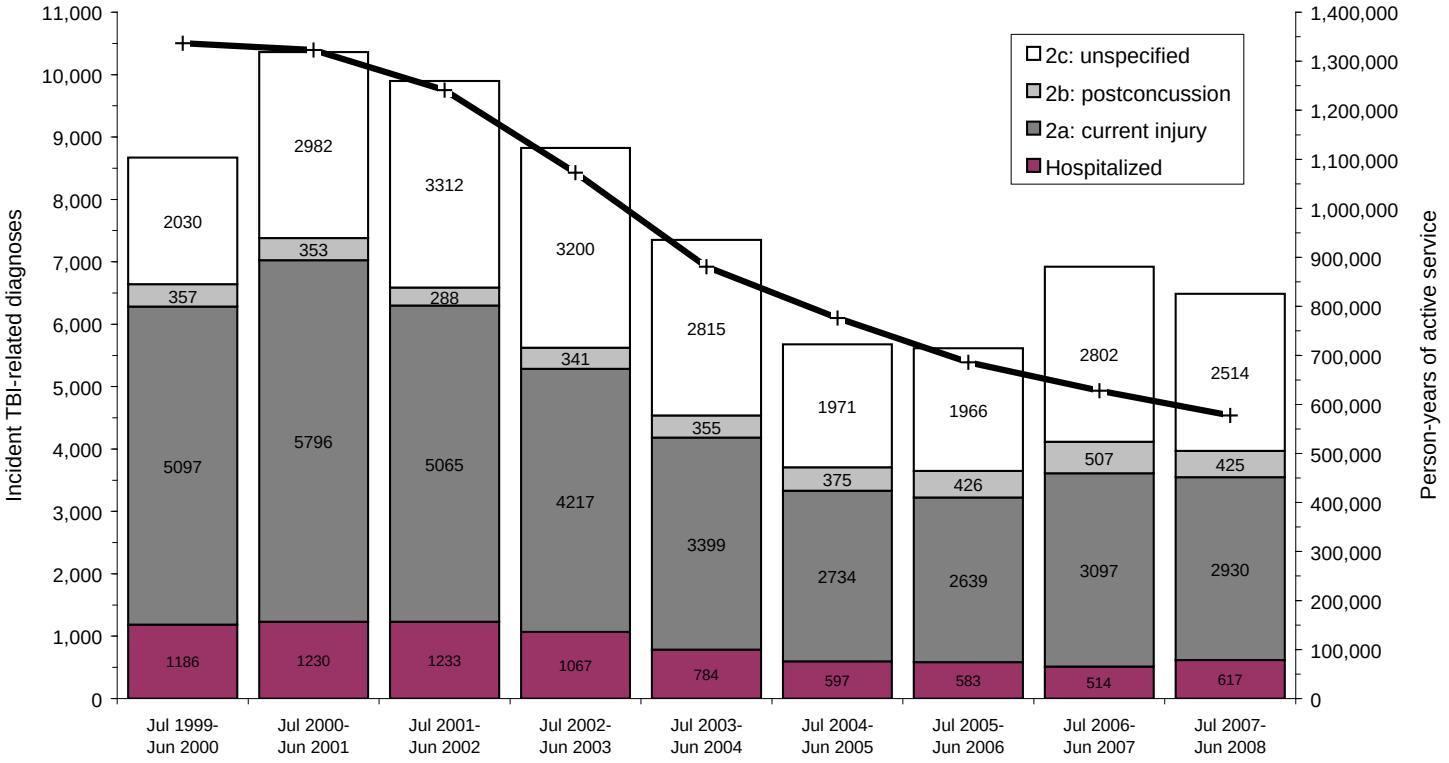
Annual numbers of incident TBI-related diagnoses during pre-deployment service sharply declined from 2000-1 to 2005-6 — and then were higher during the last two years. Total time-at-risk of an incident TBI-related diagnosis prior to any deployment (pre-deployment) monotonically declined through the nine-year period **(Figure 1)**. Thus, during pre-deployment service, incidence rates (IR) of TBI indicator diagnoses were fairly stable during the first seven years (IR, 1999-2006, mean: 7.8 per 1,000 p-yrs; range: 6.5-8.3 per 1,000 p-yrs) and then sharply higher during the last two years (IR, 2006-7: 11.0 per 1,000 p-yrs; 2007-8: 11.3 per 1,000 p-yrs) of the overall period **(Table 1, Figure 2)**.

During pre-deployment service, approximately one (11.2%) of nine incident TBI-related diagnoses were attributable to hospitalizations (classification: 2a-c). During the nine-year period, incidence rates of TBI-related hospitalizations during pre-deployment service remained fairly stable; however, the proportion of all incident TBI events attributable to hospitalizations generally declined (range: 13.7% [1999-2000]-7.4% [2006-7]) **(Table 1)**. Incidence rates of TBI-related hospitalizations for specific head and/or brain injuries (classification: 1a) and postconcussion syndrome (classification: 1b) were approximately one-third higher in the last year than the first year of the period; in contrast, incidence rates of TBI-related hospitalizations for "unspecified" head injuries (classification: 1c) were much lower in the later compared to the earlier years of the period **(Table 1)**.

During pre-deployment service, ambulatory visits for specific head and/or brain injuries (classification: 2a) and "unspecified" head injuries (classification: 2c) accounted for approximately one-half (50.1%) and one-third (33.8%) of all incident TBI-related diagnoses, respectively. Incidence rates of TBI-related ambulatory visits for specific head and/or brain injuries (classification: 2a), postconcussion syndrome (classification: 2b), and "unspecified" head injuries (classification: 2c) were all higher during the later compared to the earlier years of the period **(Table 1, Figure 2)**.

During post-deployment service, approximately one (10.7%) of nine incident TBI-related diagnoses were attributable to hospitalizations (classification: 2a-c). Incidence rates of TBI-related hospitalizations remained fairly stable throughout the period; however, the proportion of incident TBI indicator diagnoses attributable to hospitalizations

Figure 1. Number and nature of incident TBI-related diagnoses, and total time of military service, during pre-deployment, active component, U.S. Armed Forces, by year, July 1999-June 2008



sharply declined from the beginning (1999-2000: 27.0%) to the end (2007-8: 6.5%) of the period **(Table 2)**.

During post-deployment service, more than 80% of all incident TBI indicator diagnoses were ambulatory visits for specific head and/or brain injuries (classification: 2a; 43.9%), "unspecified" head injuries (classification: 2c; 23.3%), or postconcussion syndrome (classification 2b: 14.6%). There was not a clear trend in incidence rates of TBI-related hospitalizations for specific head and/or brain injuries (classification: 1a). However, rates of hospitalization for postconcussion syndrome (classification: 1b) markedly increased during the period, and rates of hospitalization for "unspecified" head injuries (classification: 1c) markedly declined during the last six years of the period **(Table 2)**.

Incidence rates of TBI-related ambulatory visits for specific head and/or brain injuries (classification: 2a) were sharply higher during the last two years of the period. In contrast, rates of ambulatory visits for unspecified head injuries (classification: 2c) were fairly stable through the last several years. Of note, rates of incident ambulatory visits for postconcussion syndrome (classification: 2b) increased throughout the period — but most sharply, by more than 10-fold, over the last four years **(Table 2, Figure 4)**.

Over the nine-year surveillance period, incidence rates of TBI-related hospitalizations were remarkably stable during both pre-deployment and post-deployment service. Overall, the incidence rate of TBI-related hospitalizations was 22% higher during post-deployment (1.12 per 1,000 p-yrs) than pre-deployment (0.92 per 1,000 p-yrs) service; and during each year except 2002-3, the incidence rate of TBI-related hospitalizations was higher during post-deployment than pre-deployment **(Table 1,2; Figure 5)**.

During the first seven years of the surveillance period, incidence rates of TBI-related ambulatory visits were fairly stable during both pre-deployment and post-deployment service. During the last two years, however, rates of incident ambulatory TBI diagnoses sharply increased during both periods — but particularly post-deployment. During each year except the last, the incidence rate of TBI-related ambulatory visits was higher during pre-deployment than post-deployment **(Table 1,2; Figure 5)**.

Finally, during both pre-deployment and post-deployment service, incidence rates of any indicator diagnosis of TBI (in any clinical setting) were fairly stable through the first seven years of the surveillance period. During each of the first seven years except one (2000-1), incidence rates of any TBI-related diagnosis were higher during pre-deployment than post-deployment. However, during pre-deployment service, the rate of any TBI indicator diagnosis increased sharply in 2006-7 and slightly in 2007-8. In contrast, among those who were or had been deployed (post-deployment), the rate of any TBI-related diagnosis increased very sharply in 2006-7 and

Figure 2. Rates of incident TBI-related diagnoses, by the clinical nature of the defining event, during pre-deployment service, active component, U.S. Armed Forces, by year, July 1999-June 2008

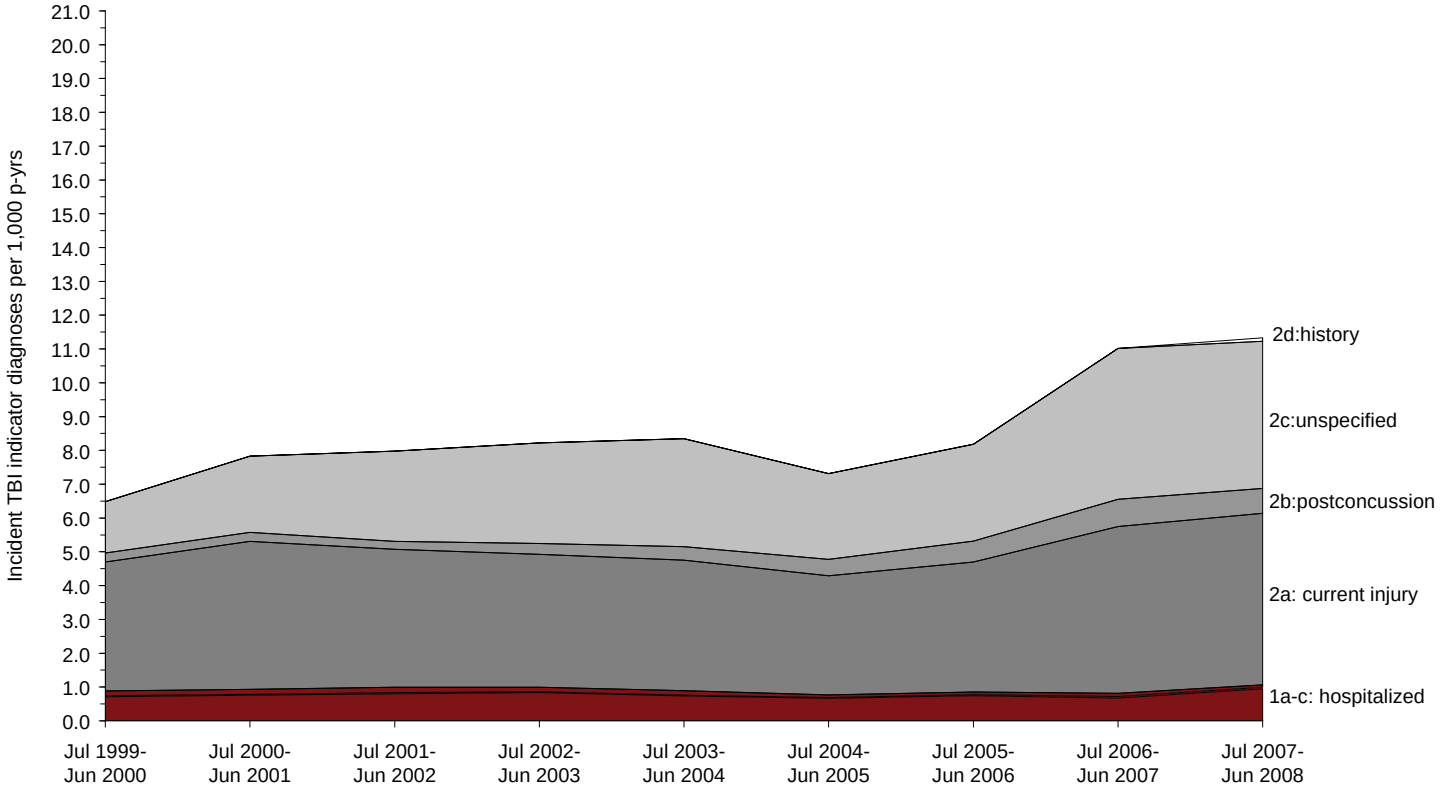


Figure 3. Number and nature of incident TBI-related diagnoses, and total time of military service, during post-deployment, active component, U.S. Armed Forces, by year, July 1999-June 2008

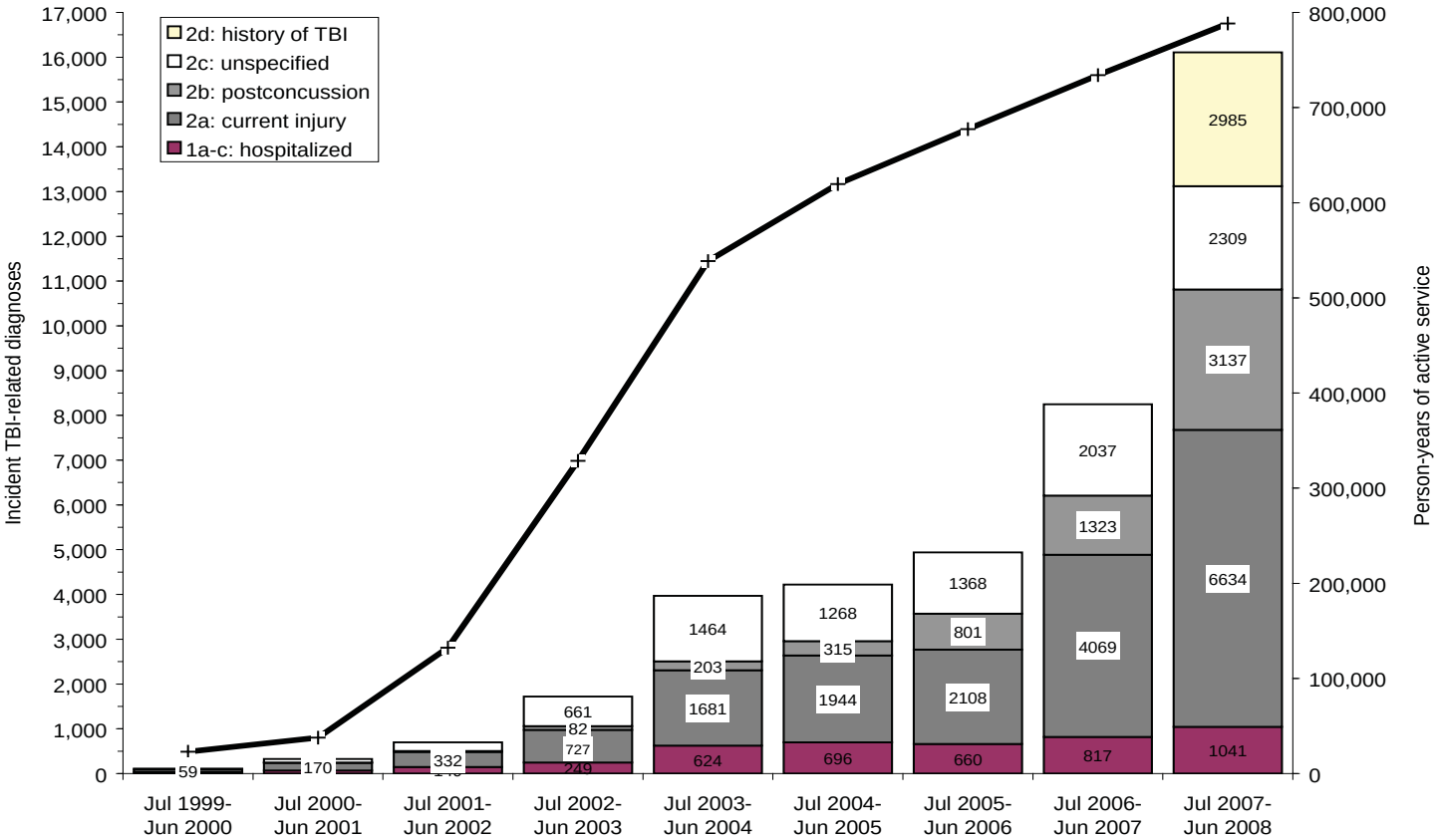
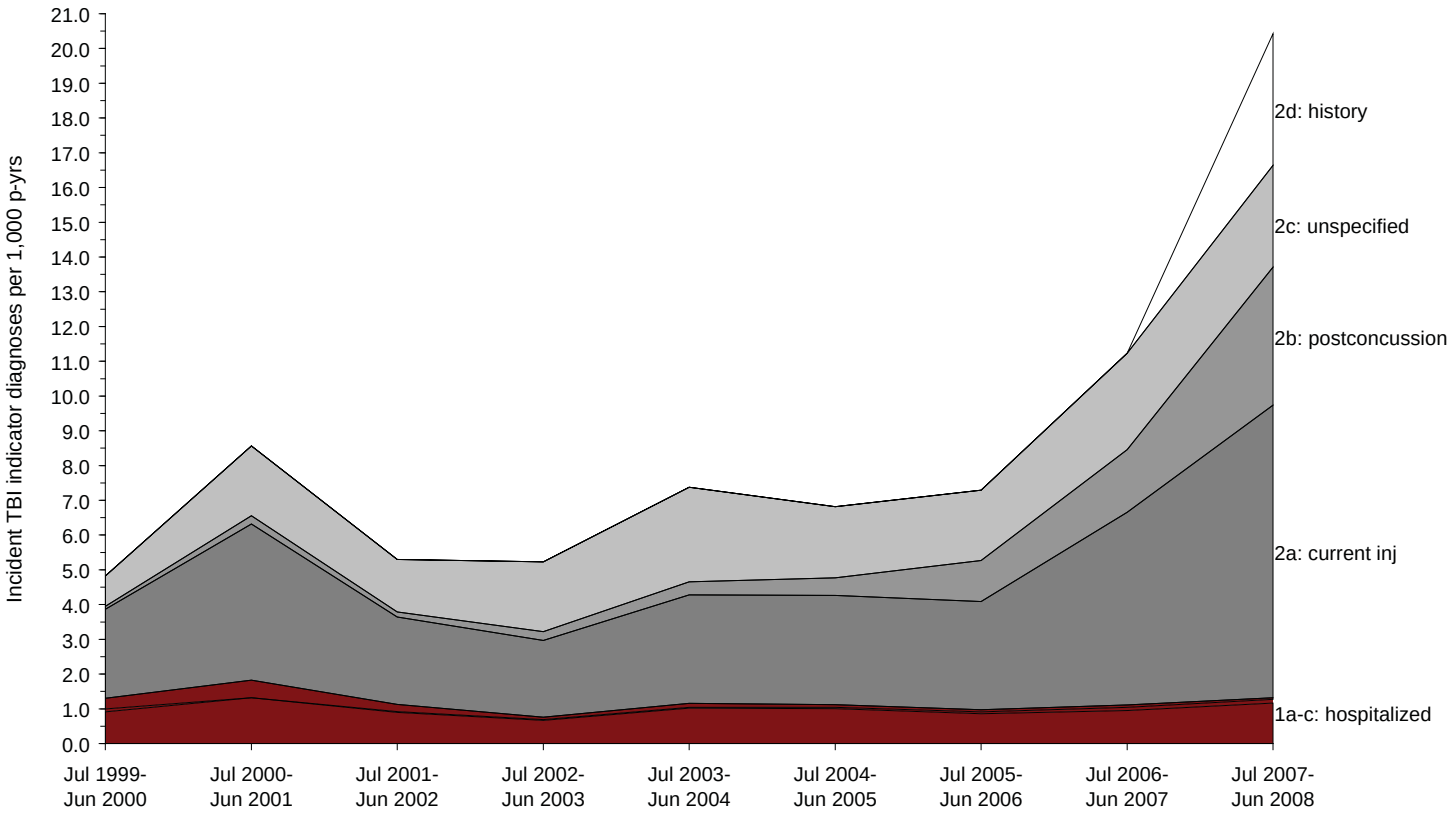


Figure 4. Rates of incident TBI-related diagnoses, by the clinical nature of the defining event, during post-deployment service, active component, U.S. Armed Forces, by year, July 1999-June 2008



even more in 2007-8. As a result, during post-deployment compared to pre-deployment service, the rate of any indicator diagnosis of TBI was slightly higher in 2006-7 and much higher in 2007-8 **(Figure 6).**

Data analysis by Stephen B. Taubman, PhD, Data Analysis Group, Armed Forces Health Surveillance Center.

Editorial comment:

For the last nine years, incidence rates of hospitalized ("severe") TBIs have been fairly stable during pre-deployment and post-deployment periods of service. Of note, among those who were or had ever been deployed (post-deployment), incidence rates of hospitalized TBIs did not markedly change after the initiation of combat operations in Afghanistan or Iraq.

In the U.S. military, the risk of severe TBI unrelated to deployment (e.g., vehicle crashes, assaults, falls, athletic and other recreational injuries) is large and persistent. While the natures of the risks in deployed and non-deployed settings markedly vary, the magnitudes of their effects may be fairly comparable. Over the last nine years, the incidence rate of hospitalized TBIs was 22% higher during post-deployment compared to pre-deployment service. When service members deploy, they exchange one set of risks of TBI for another — but both sets are associated with significant risk of severe TBI. Because many more service members are not deployed than deployed, and because rates of severe TBI are not extremely different before versus after deployment, severe TBIs associated with combat in OEF and OIF are difficult to discern against the large background of severe TBIs that affect all others.

In contrast to hospitalized TBIs, incidence rates of TBI-related visits in outpatient settings were higher during pre-deployment than post-deployment service — except for the last year of the surveillance period. In the last two years of the period, rates of incident ambulatory diagnoses indicative of TBI during post-deployment service increased more than three-fold (from a fairly stable baseline during the previous seven years). Because rates of hospitalized TBIs did not increase during the last two years of the period, the sharp increase in ambulatory diagnoses undoubtedly reflects increased awareness, more complete ascertainment, and broader reporting of current and past TBI cases.

There are limitations of the analysis that should be considered when interpreting the results. For example, the analysis only considered TBI indicator diagnoses reported on administrative records of medical encounters in "fixed" (i.e., not deployed) medical facilities. As a result, TBIs exclusively diagnosed and treated in deployed hospitals and clinics would not be detected as incident cases at the time the

Figure 5. Rates of incident TBI-related diagnoses, by clinical setting (hospitalization or ambulatory), during pre-deployment and post-deployment service, active component, U.S. Armed Forces, by year, July 1999-June 2008

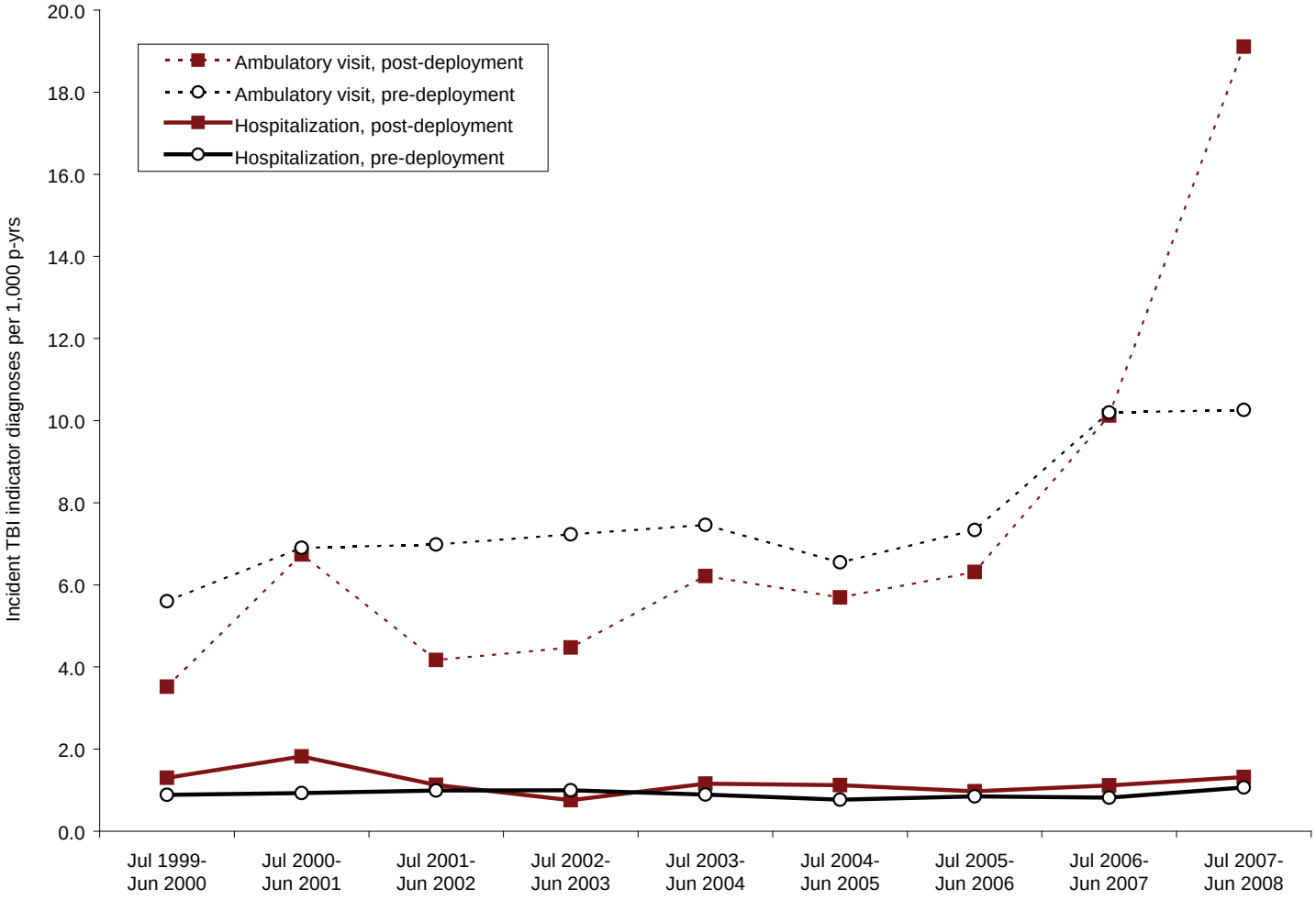
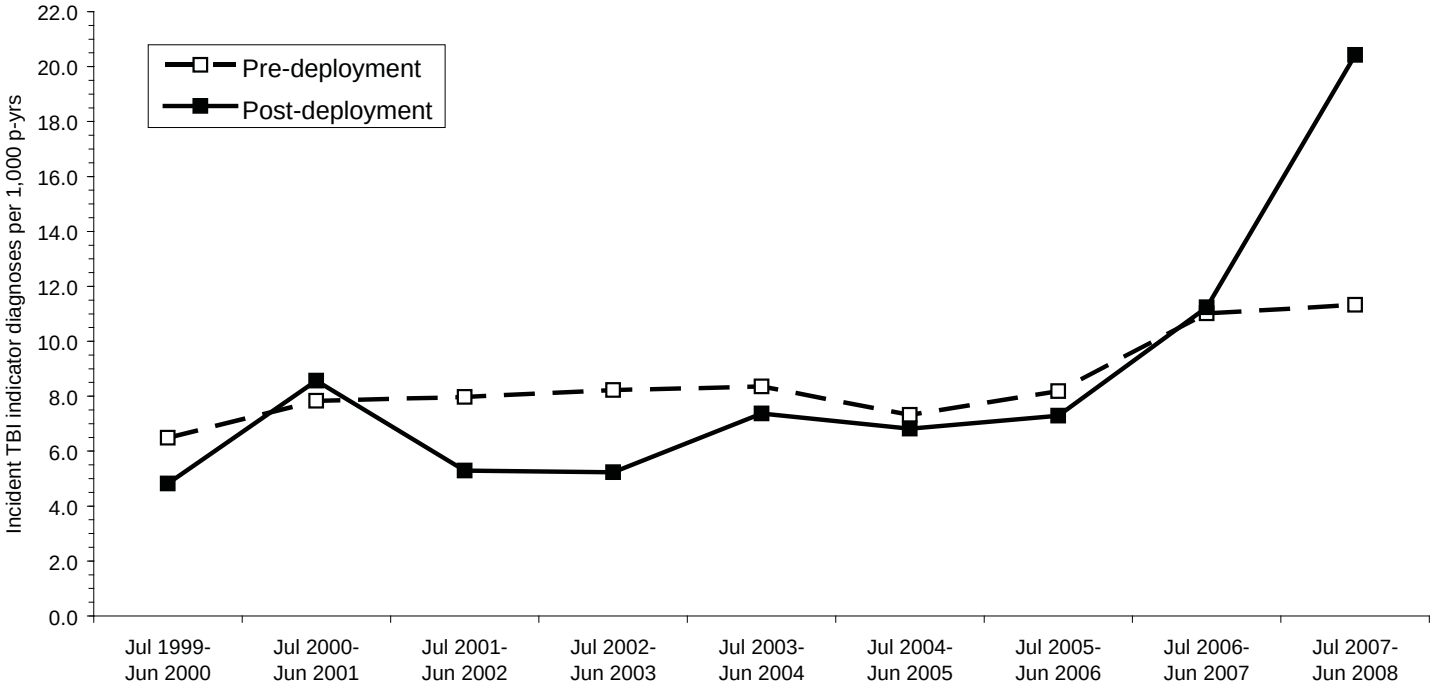


Figure 6. Rates of incident TBI-related diagnoses (in any clinical setting), by deployment-related period of service, active component, U.S. Armed Forces, July 1999-June 2008



injuries occurred (and perhaps not at all). The result would be underascertainment of cases, underestimation of rates, and misclassification of the timing and nature of some cases (e.g., "history of" rather than a current TBI; ambulatory rather a hospitalized case) during post-deployment service. Also, the current analysis identified cases using ICD-9-CM codes considered indicators of traumatic brain injury. Undoubtedly, some individuals considered cases for this report may have had head trauma but no brain injury; and some individuals with true traumatic brain injuries may not have been included as cases — because the underlying injuries were not reported with TBI indicator diagnostic codes (e.g., fractures of face bones). The result would be underascertainment of cases and underestimation of incidence during both deployment-related periods of service. In addition, the analysis restricted each individual to one incident TBI event during each deployment-related period of service and used a hierarchical classification system that prioritized hospitalized over ambulatory events and "current" over previous or unspecified TBI-related injuries. There is the potential that an injury during pre-deployment service could be symptomatic and/or documented in the person's medical history during post-deployment service — if so, a single TBI could be considered an incident event during both the pre- and post-deployment periods of service. Finally, some service members may have multiple TBI events and many medical encounters to evaluate and treat their clinical effects. The limitation of each person to only one TBI diagnosis per deployment-related period provides a limited view of the scope and magnitude of the morbidity and health care burdens associated with TBIs. Still, the findings of this report are informative and potentially useful; however, implications regarding policies and practices require more detailed analyses.

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Non-Traumatic Acute Kidney Injury, Active Component, U.S. Armed Forces, September 2001-September 2008

Acute kidney injury (AKI) is an abrupt decline in renal filtration function with manifestations ranging from slight elevations in serum creatinine to renal failure.[1] AKI from non-traumatic etiologies is rare in young, healthy populations and is usually caused by exertional heat illness (rhabdomyolysis and heat stroke) and/or adverse effects of medications.

Over-the-counter dietary supplements that promote weight loss or muscle gain have become increasingly popular among service members in recent years.[2] According to the 2005 Department of Defense Health Behaviors Survey, approximately one quarter of both male and female service members reported using body-building supplements and weight loss supplements, respectively, during the past year. Deployed service members often use their free time to workout[3] and "performance-enhancing" supplements are available in deployed settings both at base exchanges[4] and through direct orders via the internet.

While dietary supplements may provide health benefits, they also pose health risks that could compromise operational effectiveness. Several recent reports document service member hospitalizations for exercise-induced rhabdomyolysis associated with creatine monohydrate, ephedrine and other commercially available supplements.[5-9] However, since the available data on the nephrotoxicity of such supplements is largely from case reports, it is unclear whether the supplements themselves are a direct cause of adverse events.[10]

This report summarizes the frequencies, rates and causes of non-traumatic AKI among U.S. military members who served in active components since September 2001.

Methods:

The surveillance period was 1 September 2001 through 30 September 2008. The surveillance population included all individuals who served in an active component of a U.S. military service at any time during the surveillance period.

A case of AKI was defined as an inpatient encounter with at least one of four ICD-9-CM diagnosis codes in at least one of the first three diagnostic positions: ICD-9-CM: 580

Table 1. Non-traumatic acute kidney injury-related hospitalizations, active component service members, U.S. Armed Forces, September 2001-September 2008

	Sep-Dec 2001		2002		2003		2004		2005		2006		2007		Jan-Sep 2008		Total (Sep 2001-Sep 2008)	
	No.	Rate*	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Total	68	1.5	228	1.6	211	1.5	256	1.8	258	1.9	293	2.2	347	2.6	318	3.1	1,979	2.0
Service																		
Army	20	1.3	84	1.7	77	1.6	110	2.2	99	2.0	120	2.4	143	2.8	132	3.3	785	2.2
Navy	20	1.6	63	1.7	51	1.4	57	1.5	55	1.5	60	1.7	72	2.2	59	2.4	437	1.7
Air Force	14	1.2	48	1.3	49	1.3	57	1.5	62	1.8	72	2.1	89	2.7	85	3.5	476	1.9
Marine Corps	14	2.4	33	1.9	34	1.9	32	1.8	42	2.4	41	2.3	43	2.4	42	2.9	281	2.2
Sex																		
Male	61	1.6	196	1.7	188	1.6	223	1.9	231	2.0	265	2.3	310	2.7	285	3.2	1,759	2.1
Female	7	1.0	32	1.5	23	1.1	33	1.6	27	1.3	28	1.4	37	1.9	33	2.3	220	1.5
Age																		
<20	6	1.1	25	1.6	21	1.4	20	1.4	20	1.6	22	1.8	29	2.3	22	2.4	165	1.7
20-24	17	1.1	70	1.5	63	1.3	87	1.8	85	1.8	91	1.9	101	2.1	103	2.9	617	1.8
25-29	9	1.1	44	1.7	41	1.5	43	1.5	55	2.0	63	2.2	61	2.1	67	3.0	383	1.9
30-34	12	1.8	23	1.1	26	1.3	33	1.6	35	1.8	32	1.7	44	2.3	31	2.2	236	1.7
35-39	10	1.6	26	1.4	29	1.6	29	1.7	26	1.6	30	1.9	47	2.9	38	3.1	235	1.9
40+	14	3.6	40	3.3	31	2.5	44	3.5	37	2.9	55	4.4	65	5.3	57	6.2	343	3.9
Race/ethnicity																		
White	34	1.2	124	1.4	114	1.3	143	1.6	144	1.7	166	1.9	189	2.2	173	2.7	1,087	1.8
Black	24	2.6	69	2.5	63	2.4	76	2.9	79	3.2	71	3.0	96	4.2	86	5.0	564	3.2
Other	10	1.2	35	1.4	34	1.3	37	1.4	35	1.3	56	2.1	62	2.3	59	2.9	328	1.7
Military occupation																		
Combat	12	1.3	48	1.7	41	1.5	52	1.8	50	1.7	64	2.3	84	2.9	56	2.6	407	2.0
Health Care	8	2.1	22	1.9	17	1.5	23	2.0	19	1.7	32	2.8	35	3.1	37	4.3	193	2.4
Other	48	1.5	158	1.6	153	1.5	181	1.8	189	1.9	197	2.0	228	2.4	225	3.1	1,379	2.0

*Rate per 10,000 person-years.

(acute glomerulonephritis), 583 (nephritis or nephropathy not specified), 584 (acute renal failure), and 586 (renal failure unspecified). One AKI case was allowed per service member per 30-day period. Service members with an AKI hospitalization prior to September 2001 were excluded. To limit the analysis to non-traumatic cases, service members who were hospitalized for traumatic injury (ICD-9-CM: 800-960 and 993-999) were excluded.

To assess AKI trends among deployed service members, a subset of AKI cases related to deployment to Operation Iraqi Freedom or Operation Enduring Freedom (OIF/OEF) was identified. Deployment-related AKI was defined as a hospitalization at either Landstuhl Regional Medical Center (LRMC) or Rota, Spain, during a deployment to OIF/OEF or within 30 days of return (per deployment rosters maintained by the Defense Manpower Data Center).

Finally, frequencies of ICD-9-CM codes potentially indicative of the external causes of AKIs were summarized for all AKI cases. The codes of interest included "E and V codes" as well as codes specific for "late effects" and "poisonings".

Results:

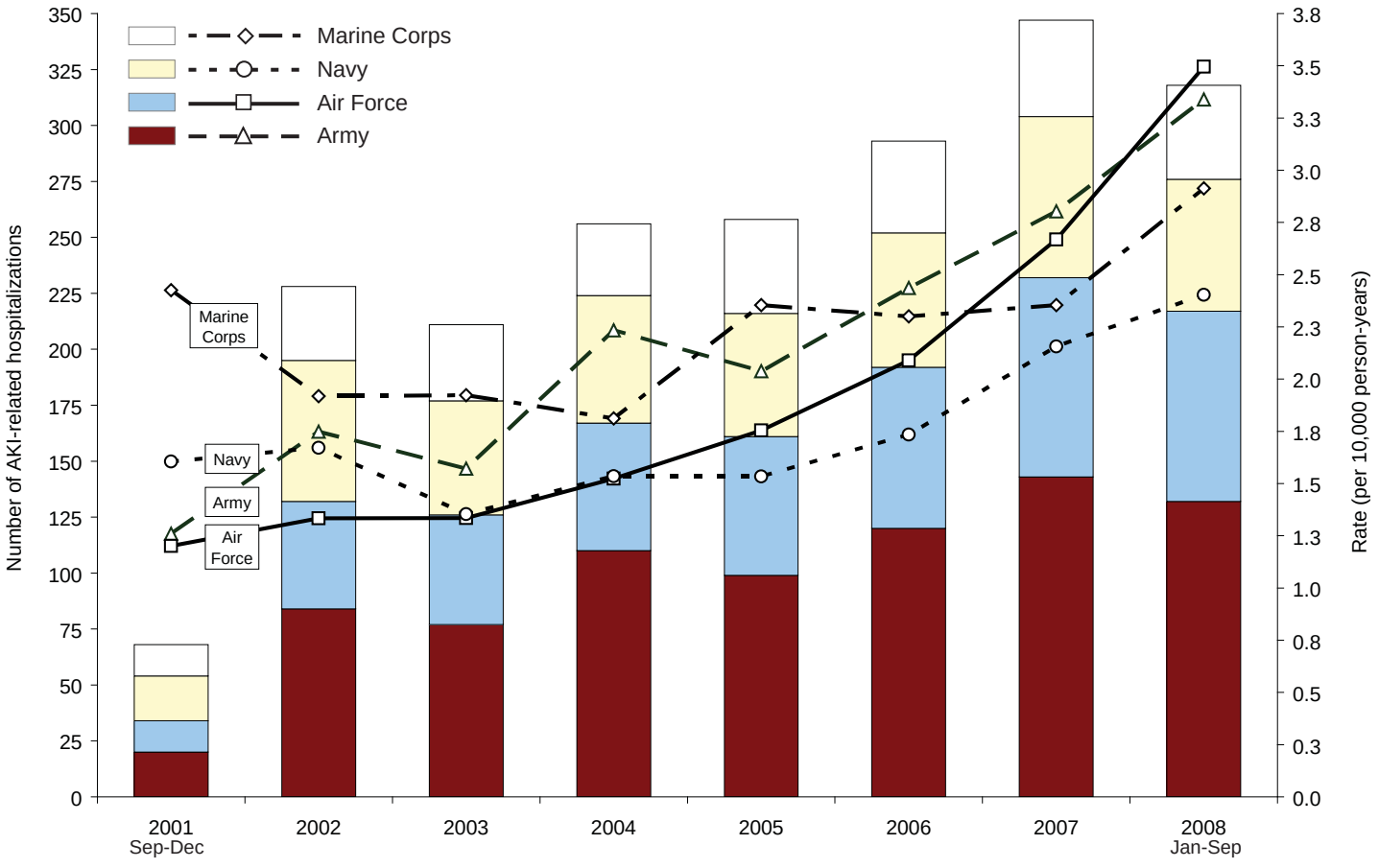
Between January 2001 and September 2008, 1,979 AKI inpatient encounters were experienced by 1,909 service members. Sixty-six (3.5%) service members had more than one AKI-related hospitalization, and 104 (5.3%) of all AKI-related hospitalization records included rhabdomyolysis as a concurrent diagnosis.

The overall rate of AKI during the period was 2.0 per 10,000 person-years (p-yrs) **(Table 1)**. Overall rates were stable between 2001 and 2003 but then doubled between 2003 (n=211, 1.5 per 10,000 p-yrs) and 2008 (n=318, 3.1 per 10,000 p-yrs). Rates among black service members (n=564, 3.2 per 10,000 p-yrs) and service members 40 and older (n=343, 3.9 per 10,000 p-yrs) were notably higher than those of their counterparts **(Table 1)**. Rates of AKI more than doubled during the period among members of both the Air Force and the Army, with the sharpest increase among Air Force members. Rates in the Navy and Marine Corps increased more modestly **(Table 1, Figure 1)**.

Fifty-six service members were hospitalized with AKI during deployment to OEF/OIF. Trends in rates of AKI-related hospitalizations during deployment were generally similar to those overall, including a sharp increase in rates among members of the Army and Air Force between 2006 and 2008 (data not shown).

Approximately one-eighth (n=252; 12.5%) of all AKI-related hospitalization records included ICD-9-CM codes potentially indicative of external causes. The most frequent

Figure 1. Number and rate of acute kidney injury-related hospitalizations, active component, by service and year, U.S. Armed Forces, September 2001-September 2008



potential external causes were "poisoning/toxic effects of drugs/medicinal substances" (principally analgesics and opiates/narcotics) (33%), "drugs/medicinal substances causing adverse effects in therapeutic use" (29%), "accidents due to excessive heat" (26%) and "long-term (current) use of medications" (10%) (data not shown).

Editorial comment:

This report documents an increasing trend in AKI among both deployed and non-deployed service members. Service members who were relatively old (>40 years) and black, non-Hispanic had higher rates than their younger, non-black counterparts. The relatively high rate among black service members could reflect the increased risks of exertional heat illness and acute exertional rhabdomyolysis associated with sickle cell trait.[11]

During the summer of 2008, five service members serving in OIF/OEF were medically evacuated to Walter Reed Army Medical Center due to acute renal failure of unknown etiology. All five service members were previously healthy with little or no history of medical problems. Two of the service members were taking doxycycline for malaria prophylaxis. No other prescription medications were reported. Three of the service members were using dietary supplements for body-building or weight loss in theater — including creatine-containing products and an unknown appetite suppressant.

The question of whether a cause-effect relationship exists between particular dietary supplements and AKI is complex. Supplementation with measured doses of creatine, for example, has not been shown to cause renal impairment among athletes in clinical trials. However, a survey of college athletes using creatine found that 75% were taking more than the recommended dose.[12] A number of manufacturing quality issues call into question the safety of commercially marketed supplements, including discrepancies between label claim and actual contents[13] and the presence of heavy metals, bacteria and other potentially toxic organic substances.[14,15] Service members may use multiple nutritional supplements simultaneously;[5] however, little is known about interactions between supplements and prescription drugs, alcohol,[16] and personal risk factors for heat injury such as sickle cell trait.[11]

Given the uncertainties regarding the content, purity and dose of dietary supplements used by service members, it is plausible that certain supplement regimens could increase the risk of exertional heat illness and/or create nephrotoxic conditions that could contribute to AKI in individuals with exertional heat illness.[7]

Supervisors and health care professionals should be aware of the risk for AKI, especially among service members who may combine physical exertion in hot environments with the consumption of potentially nephrotoxic substances (including prescription medications, illicit drugs and alcohol). Small unit leaders and training cadre should discourage the use of supplements marketed to athletes, recommending instead a sound training program without supplementation as a safe and effective way to "bulk up" or lose weight.

Report by Jaspal Ahluwalia, MD, MPH, CPT, MC, U.S. Army. Data analysis by Vicki Jeffries, Data Analysis Group, Armed Forces Health Surveillance Center.

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Update: Deployment Health Assessments, U.S. Armed Forces, December 2008

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 December 2007 to November 2008, there were 398,838 pre-deployment health assessments, 348,081 post-deployment health assessments, and 308,072 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 November 2008, 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 17,000 and 37,000 **(Figure 1, Table 1)**.

From December 2007 to November 2008, nearly three-fourths (73.0%) 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 (57.7%) and post-deployment reassessments (52.8%). 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, January 2003-November 2008

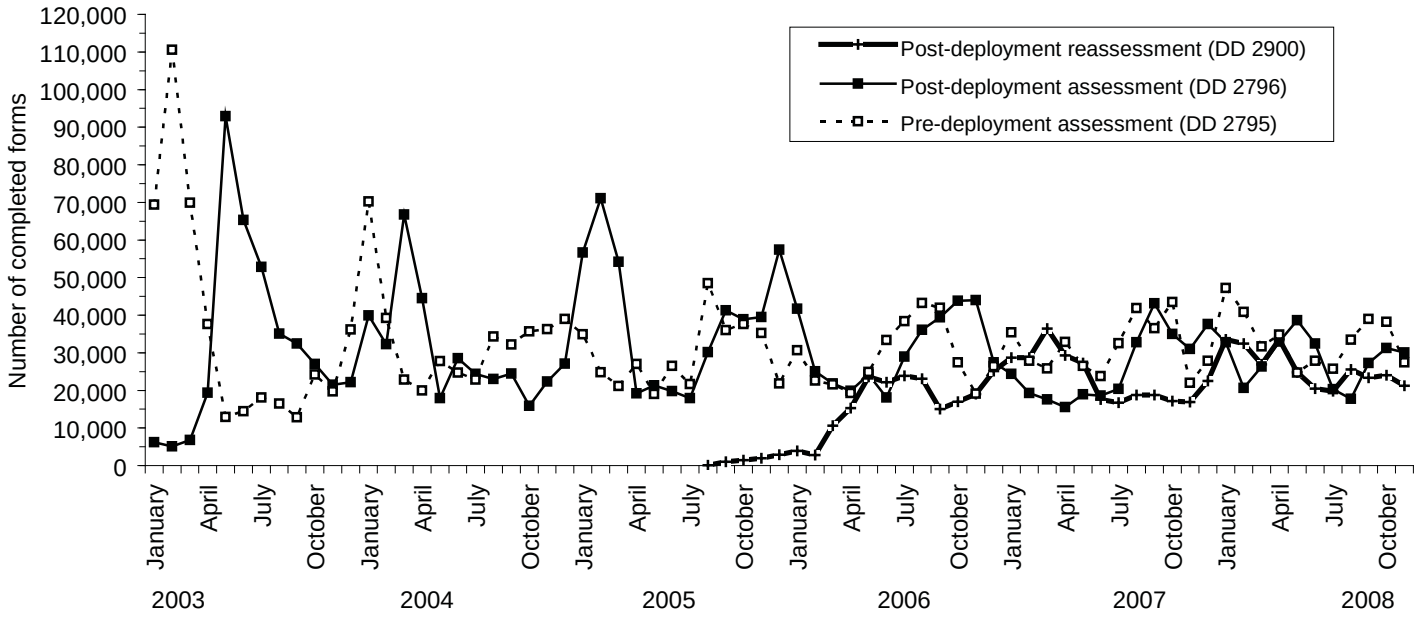


Table 1. Deployment-related health assessment forms, by month, U.S. Armed Forces, December 2007-November 2008

	Pre-deployment assessment DD2795		Post-deployment assessment DD2796		Post-deployment reassessment DD2900	
	No.	%	No.	%	No.	%
Total	**398,838**	**100**	**348,081**	**100**	**308,072**	**100**
2007						
December	27,827	7.0	37,580	10.8	22,517	7.3
2008						
January	47,239	11.8	32,764	9.4	33,570	10.9
February	40,808	10.2	20,659	5.9	32,482	10.5
March	31,715	8.0	26,321	7.6	26,896	8.7
April	34,826	8.7	32,993	9.5	33,509	10.9
May	24,725	6.2	38,626	11.1	24,758	8.0
June	27,880	7.0	32,451	9.3	20,431	6.6
July	25,740	6.5	20,332	5.8	19,785	6.4
August	33,488	8.4	17,753	5.1	25,545	8.3
September	39,010	9.8	27,262	7.8	23,333	7.6
October	38,177	9.6	31,287	9.0	24,034	7.8
November	27,403	6.9	30,053	8.6	21,212	6.9

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 (8.1%) deployers rated their health as "fair" or "poor"; and 3-6 months after returning, one of 7 (13.8%) 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: 8.0%), and highest 3-6 months after return from deployment (mean, by month: 13.6%) **(Figure 3).** From month to month, there was relatively little variability in the proportions of deployers who rated their health as "fair" or "poor" on pre-deployment, post-deployment, and post-deployment reassessment questionnaires **(Figure 3).** Of deployers who completed health assessments prior to and 3-6 months after returning from deployment, approximately one of 6 (16.3%) 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 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

Figure 2. Percent distributions of self-assessed health status as reported on deployment health assesment forms, U.S. Armed Forces, December 2007-November 2008

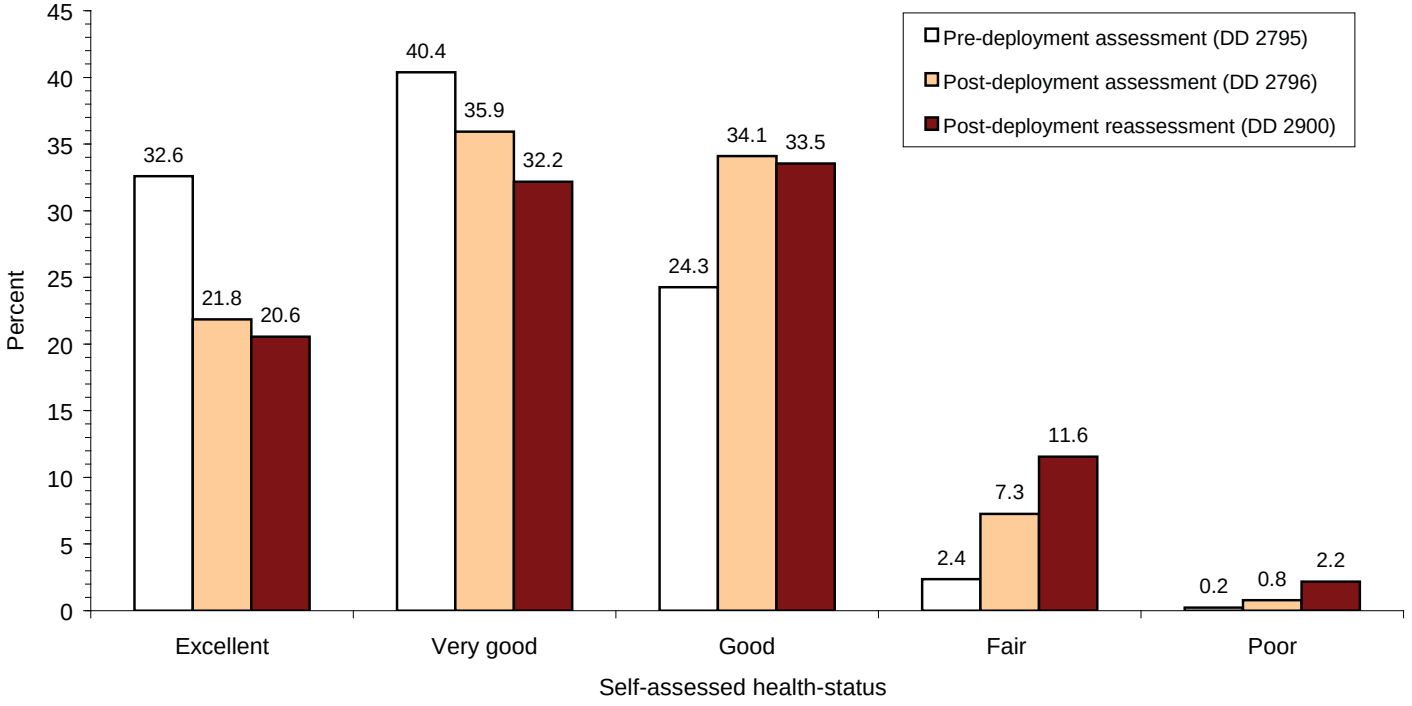
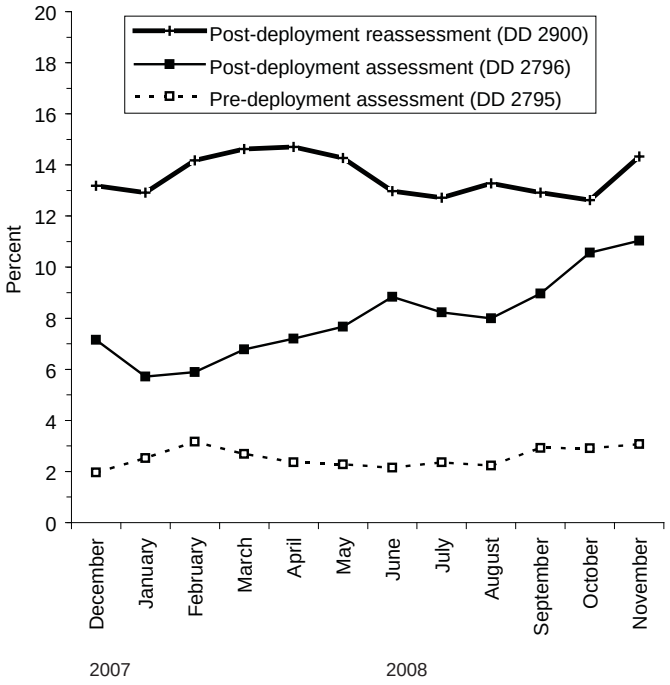


Figure 3. Proportion of deployment health assessment forms with self-assessed health status as "fair" or "poor", U.S. Armed Forces, December 2007-November 2008



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 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]

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, December 2007-November 2008

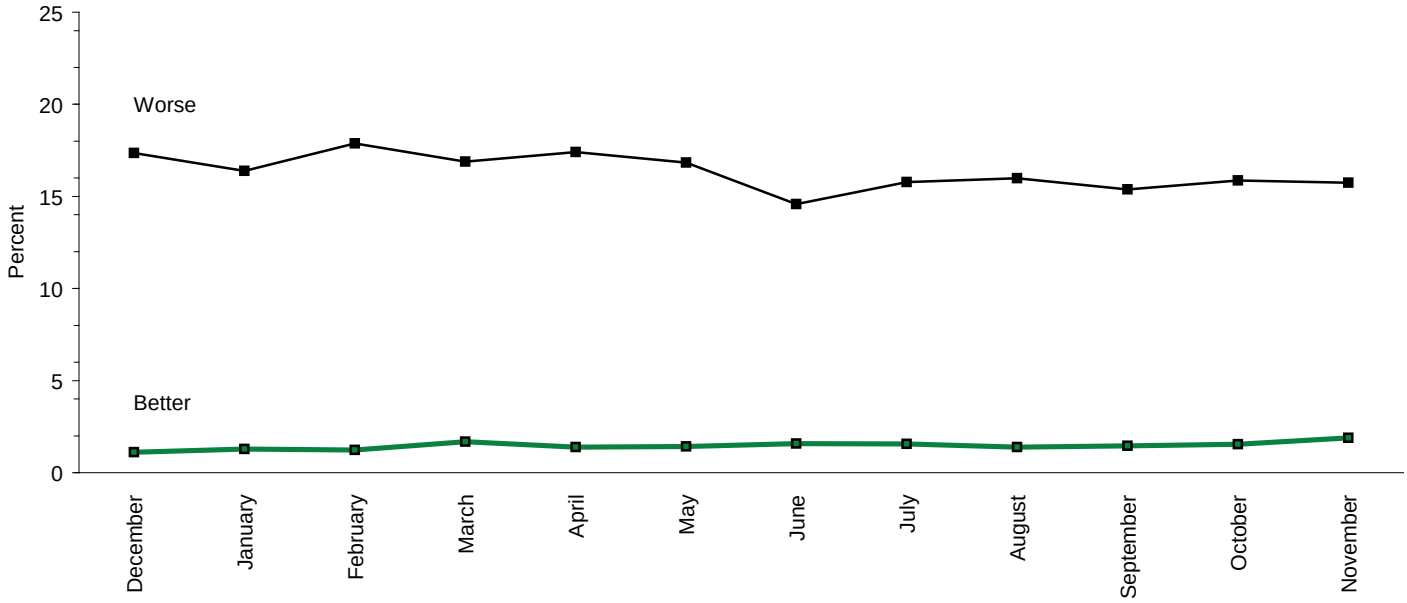


Figure 5. Percent of deployers with mental or behavioral health referrals, by Service and component, by timing of health assessment, U.S. Armed Forces, December 2007-November 2008

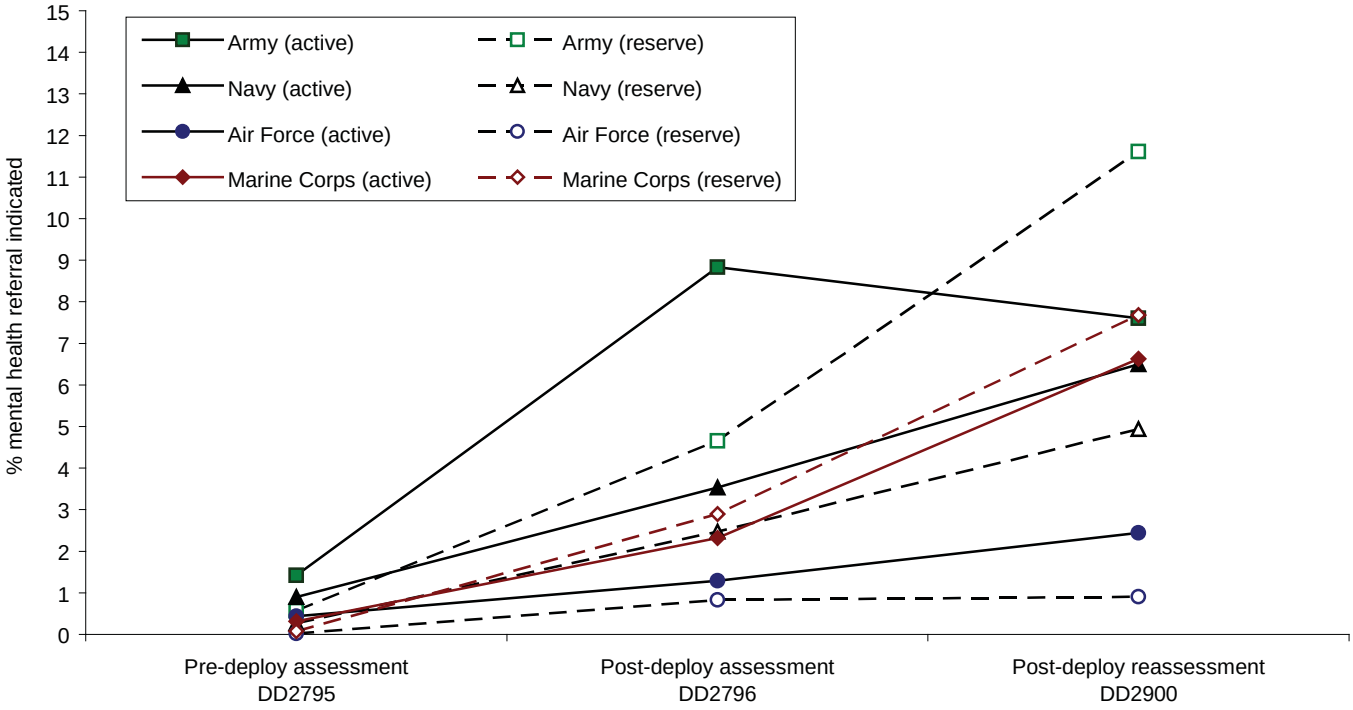


Figure 6. Ratio of percents of deployers who endorse selected questions, Reserve versus active component, on pre-deployment health assessments (DD2795) and post-deployment health reassessments (DD2900), U.S. Armed Forces, December 2007-November 2008

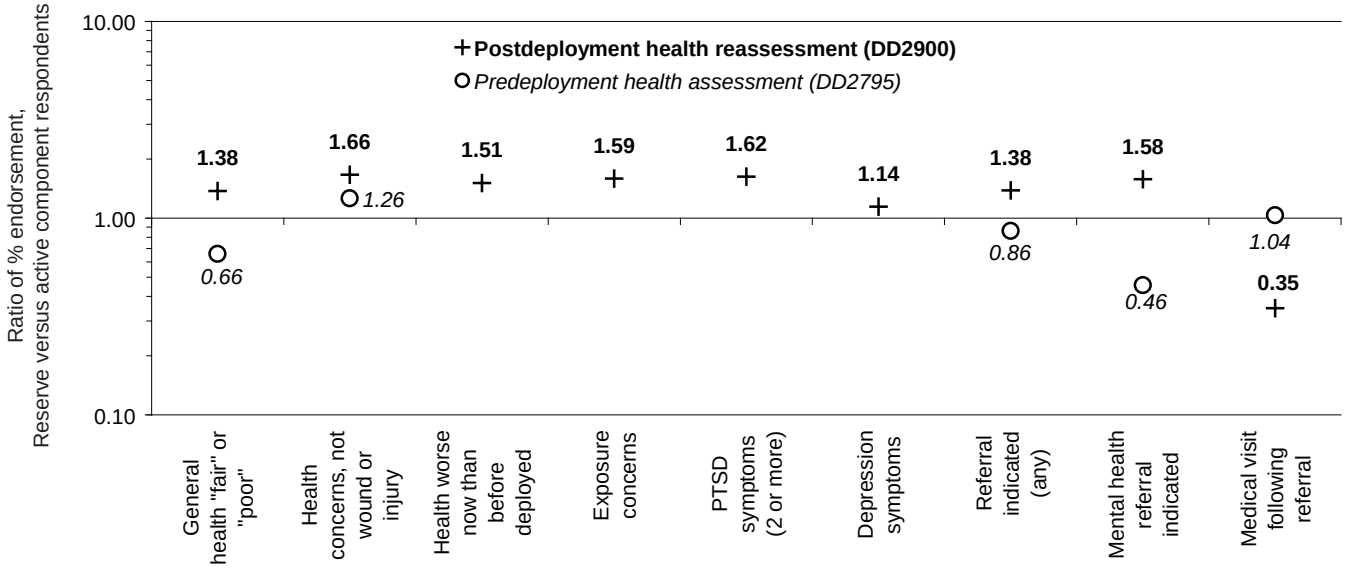


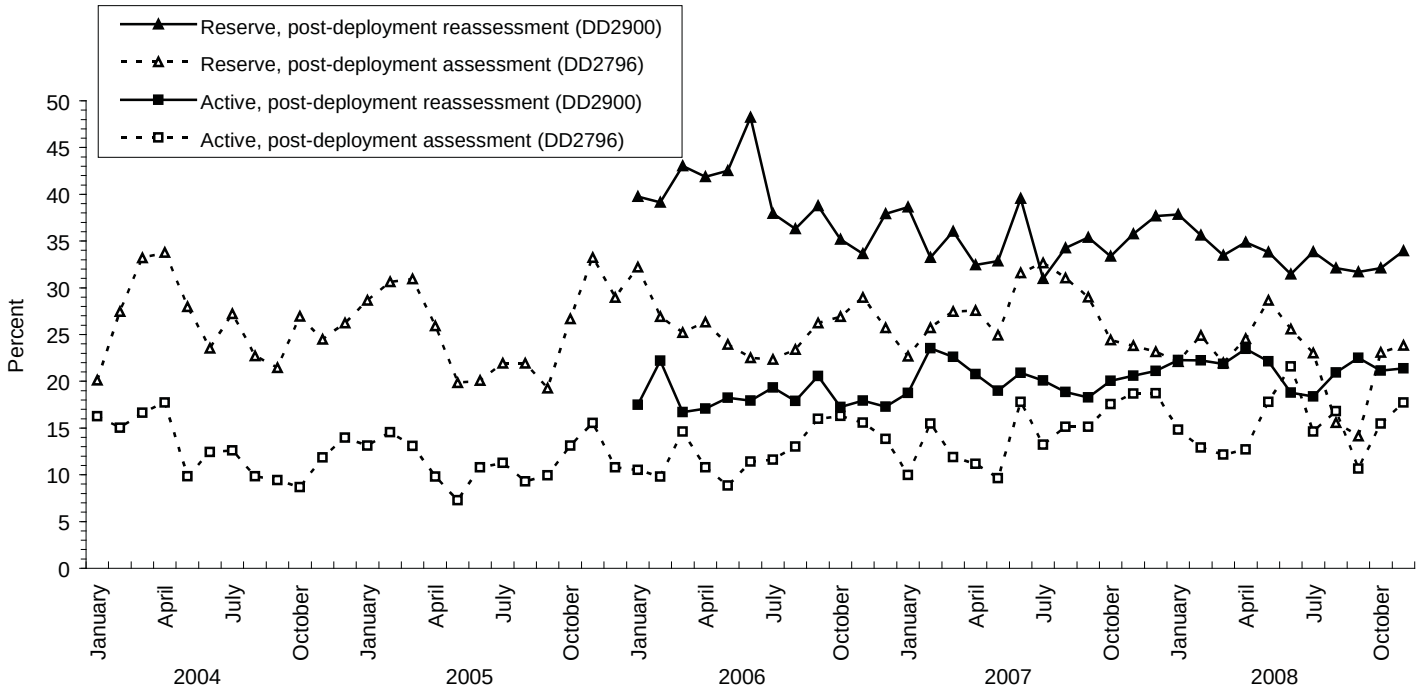
Table 2. Percentage of service members who endorsed selected questions/received referrals on health assessment forms, U.S. Armed Forces, December 2007-November 2008

	Army			Navy			Air Force			Marine Corps			All service members		
Active component	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900
	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”	4.2	9.9	16.8	1.6	3.0	6.6	0.5	2.9	4.5	1.9	3.7	10.1	2.8	7.2	12.0
Health concerns, not wound or injury	12.3	27.1	35.2	5.1	9.8	18.9	2.4	9.9	14.5	3.8	9.0	27.0	8.3	20.0	27.7
Health worse now than before deployed	na	11.6	28.6	na	2.7	14.2	na	3.7	9.8	na	3.7	20.1	na	8.3	21.6
Exposure concerns	na	20.6	24.9	na	10.8	15.6	na	8.8	15.6	na	8.2	21.9	na	15.8	21.6
PTSD symptoms (2 or more)	na	13.8	18.1	na	3.7	8.8	na	2.8	3.3	na	3.6	11.4	na	9.4	12.7
Depression symptoms (any)	na	15.9	37.6	na	4.7	26.6	na	4.1	15.7	na	7.5	33.9	na	11.6	30.9
Referral indicated by provider (any)	5.9	33.7	24.7	5.9	16.7	19.3	1.6	11.7	9.1	5.3	15.0	28.7	4.7	25.4	21.3
Mental health referral indicated*	1.4	8.8	7.6	0.9	3.5	6.5	0.4	1.3	2.4	0.3	2.3	6.6	1.0	6.0	6.1
Medical visit following referral†	98.4	99.0	98.0	88.4	91.0	91.8	76.8	94.5	96.7	73.1	74.4	72.5	89.8	96.8	89.4
	Army			**Navy**			**Air Force**			**Marine Corps**			**All service members**		
Reserve component	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900
	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”	2.2	10.7	19.5	0.5	4.7	9.8	0.3	3.6	4.7	1.2	5.6	10.3	1.8	8.9	16.5
Health concerns, not wound or injury	12.9	37.8	53.2	3.3	17.8	33.8	1.1	14.1	14.1	3.9	23.8	39.6	10.5	31.9	46.0
Health worse now than before deployed	na	16.2	37.9	na	7.8	23.8	na	5.5	10.0	na	6.1	25.6	0.0	13.4	32.7
Exposure concerns	na	27.0	37.5	na	21.5	29.2	na	13.3	19.9	na	16.1	30.6	0.0	23.7	34.2
PTSD symptoms (2 or more)	na	11.7	24.8	na	3.6	12.5	na	1.8	2.6	na	3.1	16.3	0.0	9.1	20.6
Depression symptoms (any)	na	15.6	40.3	na	6.6	26.9	na	3.4	13.8	na	9.7	30.6	0.0	12.7	35.4
Referral indicated by provider (any)	4.7	30.6	34.7	3.4	18.9	18.4	0.8	13.6	5.7	6.1	28.4	28.5	4.1	26.8	29.4
Mental health referral indicated*	0.6	4.7	11.6	0.3	2.5	4.9	0.0	0.8	0.9	0.1	2.9	7.7	0.5	3.8	9.6
Medical visit following referral†	95.5	97.5	31.0	77.2	78.5	32.9	54.3	62.1	37.9	80.7	62.2	29.1	92.9	91.4	31.2

*Includes behavioral health, combat stress and substance abuse referrals.

†Record of inpatient or outpatient visit within 6 months after referral

Figure 7. Proportion of service members who endorse exposure concerns on post-deployment health assessments, U.S. Armed Forces, January 2004-November 2008



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2. Assistant Secretary of Defense (Health Affairs). Memorandum for the Assistant Secretaries of the Army (M&RA), Navy (M&RA), and Air Force (M&RA), subject: Post-deployment health reassessment (HA policy: 05-011), dated 10 March 2005. Washington, DC.
3. Rubertone MV, Brundage JF. The Defense Medical Surveillance System and the Department of Defense serum repository: glimpses of the future of public health surveillance. *Am J Public Health*. 2002 Dec;92(12):1900-4.
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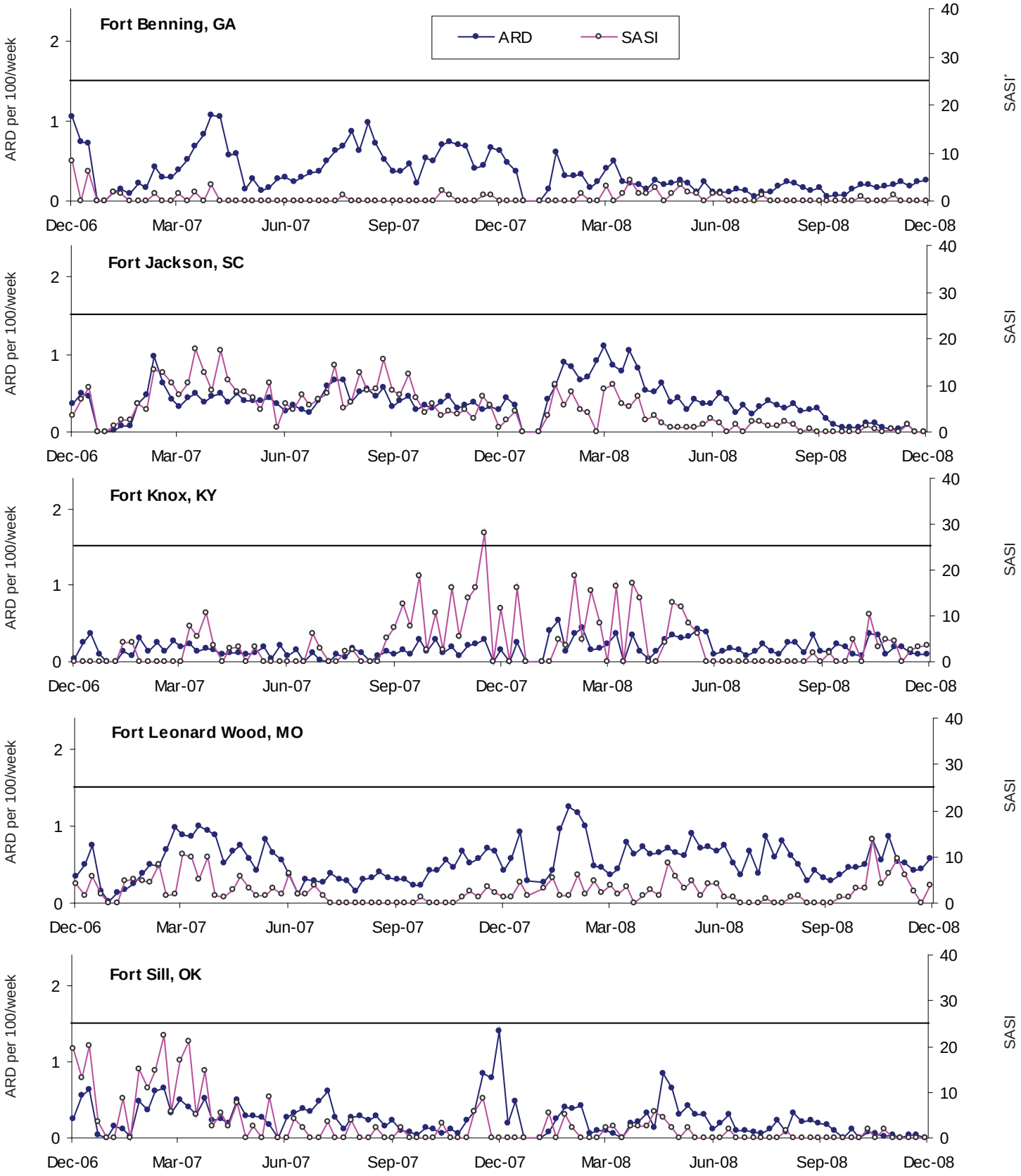
5. Browne T, Hull L, Horn O, et al. Explanations for the increase in mental health problems in UK reserve forces who have served in Iraq. *Br J Psychiatry*. 2007 Jun;190:484-489.

Acute respiratory disease (ARD) and streptococcal pharyngitis rates (SASI*), basic combat training centers, U.S. Army, by week, December 2006-December 2008



* 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 30 November 2007 and 30 November 2008

Army

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
NORTH ATLANTIC																
Washington, DC Area	248	306	1	2	3	5	7	1	1	1	.	.	6	3	1	6
Aberdeen, MD	19	80	.	.	1	.	.	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	215	264	8	8	2	.	8	14	3	4	.	.	.	.	1	.
FT Bragg, NC	1,184	1,555	2	.	.	.	20	19	2	2	.	.	.	.	.	.
FT Drum, NY	198	252	.	.	.	.	.	.	.	.	.	.	2	.	.	.
FT Eustis, VA	177	523	.	1	.	.	.	2	.	.	.	.	.	.	.	1
FT Knox, KY	236	515	2	2	.	.	2	1	4	.	.	.	2	.	.	.
FT Lee, VA	320	306	.	.	1	.	1	.	1	.	.	.	2	4	1	2
FT Meade, MD	79	226	.	.	.	1	1	.	.	1	.	.	.	.	.	.
West Point, NY	42	92	.	.	.	.	.	.	.	.	.	.	3	1	.	.
GREAT PLAINS																
FT Sam Houston, TX	488	726	1	.	2	1	5	13	1	12	.	.	4	.	7	.
FT Bliss, TX	175	548	.	.	.	.	.	14	.	1	.	.	.	.	.	.
FT Carson, CO	576	762	3	4	5	5	1	3	.	.	.	.	.	1	.	.
FT Hood, TX	1,951	2,171	14	6	3	3	14	37	9	6	.	.	.	.	1	2
FT Huachuca, AZ	91	103	1	.	.	.	6	2	.	2	.	.	.	1	.	.
FT Leavenworth, KS	46	49	1	.	.	.	.	.	2	.	.	.	.	.	.	.
FT Leonard Wood, MO	334	462	.	2	1	4	1	1	1	1	.	.	.	1	11	1
FT Polk, LA	204	166	.	1	3	.	5	1	.	1	.	.	.	.	1	1
FT Riley, KS	326	532	2	3	.	1	5	3	.	.	.	.	.	2	2	.
FT Sill, OK	167	210	.	.	.	.	2	3	.	.	.	.	.	1	1	.
SOUTHEAST																
FT Gordon, GA	613	820	.	1	.	.	6	14	.	19	.	.	1	1	.	2
FT Benning, GA	376	328	1	2	1	1	6	5	5	1	.	.	1	.	1	.
FT Campbell, KY	700	280	1	1	.	.	.	.	3	2	.	.	.	.	.	.
FT Jackson, SC	288	372	.	.	.	.	2	.	.	.	.	.	1	1	.	.
FT Rucker, AL	83	82	1	2	.	2	1	4	13	.	.	.	2	1	.	.
FT Stewart, GA	900	875	2	6	.	1	26	25	10	3	.	.	3	7	2	.
WESTERN																
FT Lewis, WA	702	1,161	3	11	4	.	1	4	1	2	.	.	.	.	1	.
FT Irwin, CA	89	71	1	.	.	.	2	2	1	1	.	.	.	.	.	.
FT Wainwright, AK	214	318	.	5	.	.	1	2	.	.	.	.	.	.	.	.
PACIFIC																
Hawaii	632	814	24	35	2	4	14	16	.	3	.	.	1	5	.	.
Japan	51	41	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Korea	573	727	.	.	.	.	.	1	.	.	.	.	.	.	2	1
OTHER LOCATIONS																
Germany	757	1,200	6	11	1	3	8	24	11	5	.	.	.	5	1	2
Unknown	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**13,054**	**16,937**	**74**	**104**	**29**	**31**	**145**	**211**	**68**	**67**	**0**	**0**	**28**	**34**	**33**	**18**

*Events reported by November 7, 2007 and 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.

Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years through 30 November 2007 and 30 November 2008

Army

Reporting locations	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
NORTH ATLANTIC																
Washington, DC Area	12	17	5	1	139	134	22	26	5	8	.	.	.	.	.	15
Aberdeen, MD	.	3	.	.	10	15	3	3	.	.	.	.	.	.	.	.
FT Belvoir, VA	1	.	1	.	152	165	21	13	2	2	.	.	.	1	.	.
FT Bragg, NC	1	1	4	10	801	995	143	199	2	1	71	84	1	.	132	151
FT Drum, NY	2	4	2	.	137	188	24	19	.	.	.	.	.	.	.	.
FT Eustis, VA	1	.	.	.	143	196	12	33	.	4	.	.	.	.	10	1
FT Knox, KY	1	2	1	.	186	203	29	45	.	3	.	.	.	.	2	2
FT Lee, VA	3	2	.	1	248	212	33	67	3	2	.	.	1	.	12	5
FT Meade, MD	1	1	.	.	66	58	8	5	1	.	1	.	1	.	.	.
West Point, NY	22	33	.	.	13	28	.	2	.	.	.	.	.	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	1	.	.	2	260	364	56	82	3	19	.	.	.	1	6	5
FT Bliss, TX	1	.	.	.	131	392	31	78	1	7	.	.	.	.	.	.
FT Carson, CO	.	.	1	.	410	565	56	57	1	.	12	13	1	.	.	.
FT Hood, TX	2	1	5	1	1,421	1,552	273	351	2	1	92	77	.	.	27	.
FT Huachuca, AZ	.	1	.	.	65	78	18	14	1	.	.	.	.	1	.	3
FT Leavenworth, KS	1	1	.	.	37	44	5	4	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	1	.	.	.	228	191	33	25	1	.	.	.	2	3	20	7
FT Polk, LA	.	.	15	.	100	108	33	30	1	2	.	.	.	.	43	20
FT Riley, KS	.	6	.	1	243	338	21	48	.	1	.	1	.	1	19	8
FT Sill, OK	.	.	1	.	92	83	22	18	2	.	.	.	1	.	34	9
SOUTHEAST																
FT Gordon, GA	1	.	.	.	445	472	87	99	4	.	.	.	.	.	6	1
FT Benning, GA	.	.	2	.	233	203	64	68	.	1	.	.	1	.	45	20
FT Campbell, KY	.	1	.	.	539	162	79	14	.	1	.	.	.	.	15	6
FT Jackson, SC	.	.	.	.	153	308	40	40	3	1	.	1	.	.	87	20
FT Rucker, AL	.	2	.	.	54	55	3	10	1	2	.	.	.	.	5	2
FT Stewart, GA	.	2	.	3	626	643	118	113	3	4	1	.	.	.	63	39
WESTERN																
FT Lewis, WA	.	.	3	5	599	962	75	91	.	1	9	14	.	.	.	.
FT Irwin, CA	1	.	1	.	57	49	5	8	.	.	.	.	.	.	18	11
FT Wainwright, AK	.	1	.	.	174	226	12	29	.	1	.	.	11	12	.	1
PACIFIC																
Hawaii	1	.	.	1	502	612	51	64	.	.	.	.	.	.	3	2
Japan	.	.	.	.	17	24	5	4	.	.	.	1	.	.	.	.
Korea	.	.	13	.	471	637	57	69	1	4	1	.	20	.	8	4
OTHER LOCATIONS																
Germany	25	44	8	18	455	733	149	136	2	7	3	.	.	8	37	18
Unknown	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**78**	**122**	**62**	**43**	**9,207**	**10,995**	**1,588**	**1,864**	**39**	**72**	**190**	**191**	**39**	**27**	**592**	**350**

‡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 30 November 2007 and 30 November 2008

Navy

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
NATIONAL CAPITOL AREA																
NNMC Bethesda, MD	44	107	1	2	.	2	2	8	.	.	.	.	1	3	.	.
NHC Annapolis, MD	0	35	.	1	.	.	.	1	.	.	.	.	.	.	.	.
NHC Patuxent River, MD	20	19	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NHC Quantico, VA	0	96	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE EAST																
NH Beaufort, SC	297	91	.	.	.	.	.	1	1	1	.	.	.	.	.	.
NH Camp Lejeune, NC	340	364	.	.	.	.	7	11	.	.	.	.	.	.	.	.
NH Charleston, SC	3	37	.	.	.	.	.	1	.	1	.	.	.	.	.	.
NH Cherry Point, NC	170	156	.	.	.	.	2	6	.	.	.	.	.	.	3	.
NH Corpus Christi, TX	8	6	.	.	.	.	.	.	.	1	.	.	.	.	.	.
NHC Great Lakes, IL	170	545	.	.	1	.	3	.	.	.	.	.	.	7	.	2
NH Guantanamo Bay, Cuba	6	8	.	.	.	1	1	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	267	231	2	.	1	.	23	35	6	3	.	.	.	3	.	2
NH Naples, Italy	7	28	.	1	.	.	.	.	.	.	.	.	.	1	.	.
NHC New England, RI	11	33	.	1	.	.	.	1	.	.	.	.	.	.	.	1
NH Pensacola, FL	103	136	.	1	3	.	7	5	3	1	.	.	.	.	5	.
NMC Portsmouth, VA	428	491	.	.	.	.	.	.	.	2	.	.	.	3	.	.
NH Rota, Spain	0	23	.	5	.	.	.	3	.	.	.	.	.	.	.	.
NH Sigonella, Italy	18	50	.	.	.	.	.	.	.	.	.	.	.	.	.	1
NAVY MEDICINE WEST																
NH Bremerton, WA	1	65	.	1	.	.	.	1	.	.	.	.	.	.	.	.
NH Camp Pendleton, CA	14	167	.	2	.	1	1	3	.	1	.	.	.	.	.	.
NH Guam-Agana, Guam	31	63	.	.	.	.	1	.	.	.	.	.	.	.	.	3
NHC Hawaii, HI	0	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Lemoore, CA	1	35	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	0	68	.	.	.	.	.	2	.	.	.	.	.	1	.	.
NH Okinawa, Japan	96	51	.	.	.	1	.	.	.	.	.	.	.	.	1	.
NMC San Diego, CA	339	383	3	.	2	.	3	2	2	1	.	.	29	15	.	1
NH Twentynine Palms, CA	1	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NH Yokosuka, Japan	12	75	.	.	.	.	.	.	.	.	.	.	.	3	.	.
NAVAL SHIPS																
COMNAVAIRLANT/CINCLANTFLEET	11	21	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	41	48	.	.	.	.	.	2	.	.	.	.	.	.	1	.
OTHER LOCATIONS																
Unknown	27	132	.	.	.	.	2	.	.	.	.	.	.	.	2	2
Total	**2,466**	**3,673**	**6**	**14**	**7**	**5**	**52**	**82**	**12**	**11**	**0**	**0**	**30**	**36**	**12**	**12**

*Events reported by November 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.

Sentinel reportable events for service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers* for calendar years through 30 November 2007 and 30 November 2008

Navy

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
NATIONAL CAPITOL AREA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NNMC Bethesda, MD	4	10	.	2	27	60	2	6	2	1	.	.	.	.	.	.
NHC Annapolis, MD	.	6	.	.	.	19	.	1	.	1	.	.	.	.	.	1
NHC Patuxent River, MD	.	3	.	.	16	13	.	1	2	.	.	.	.	.	.	.
NHC Quantico, VA	.	2	.	1	.	41	.	5	.	.	.	.	.	.	.	46
NAVY MEDICINE EAST																
NH Beaufort, SC	.	1	1	.	206	18	23	1	2	.	.	.	.	.	57	67
NH Camp Lejeune, NC	12	.	1	.	267	196	32	51	.	.	.	39	.	.	17	64
NH Charleston, SC	.	1	.	.	3	26	.	3	.	1	.	.	.	.	.	1
NH Cherry Point, NC	.	1	.	.	146	103	8	20	1	.	.	.	.	.	3	4
NH Corpus Christi, TX	.	.	.	.	7	2	1	3	.	.	.	.	.	.	.	.
NHC Great Lakes, IL	.	.	.	.	143	491	16	40	.	2	.	.	.	.	.	.
NH Guantanamo Bay, Cuba	.	.	.	.	5	7	.	.	.	.	.	.	.	.	.	.
NH Jacksonville, FL	.	.	.	.	173	140	29	13	5	2	.	.	.	.	8	.
NH Naples, Italy	.	.	.	.	6	22	1	2	.	.	.	.	.	.	.	.
NHC New England, RI	.	6	.	.	8	20	1	3	2	.	.	.	.	1	.	.
NH Pensacola, FL	1	1	.	.	59	83	9	13	.	3	.	.	.	.	12	21
NMC Portsmouth, VA	1	1	.	1	356	385	69	86	.	3	.	.	.	.	.	.
NH Rota, Spain	.	.	.	.	.	14	.	1	.	.	.	.	.	.	.	.
NH Sigonella, Italy	.	.	.	1	18	38	.	4	.	1	.	.	.	.	.	4
NAVY MEDICINE WEST																
NH Bremerton, WA	.	.	.	1	1	54	.	3	.	.	.	.	.	.	.	.
NH Camp Pendleton, CA	.	.	.	.	11	136	1	18	1	.	.	.	.	.	.	.
NH Guam-Agana, Guam	.	.	.	3	25	42	4	13	.	.	.	.	.	.	.	.
NHC Hawaii, HI	.	.	.	.	.	90	.	5	.	1	.	.	.	.	.	.
NH Lemoore, CA	.	2	.	.	.	24	.	.	.	.	.	.	.	.	.	.
NH Oak Harbor, WA	.	.	.	.	.	50	.	2	.	1	.	.	.	.	.	.
NH Okinawa, Japan	.	.	.	1	66	33	17	8	.	.	.	.	.	.	8	5
NMC San Diego, CA	1	3	.	1	220	288	36	30	5	5	.	.	.	.	.	1
NH Twentynine Palms, CA	.	.	.	.	.	6	1	.	.	.	.	.	.	.	.	3
NH Yokosuka, Japan	.	.	.	.	10	61	.	9	.	.	.	.	.	.	1	.
NAVAL SHIPS																
COMNAVAIRLANT/CINCLANTFLEET	.	.	.	.	9	17	2	4	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	.	.	.	.	28	30	11	9	.	.	.	7	.	.	1	.
OTHER LOCATIONS																
Unknown	.	20	2	1	18	88	2	7	1	.	.	.	.	.	.	5
Total	**19**	**57**	**4**	**12**	**1,828**	**2,597**	**265**	**361**	**21**	**21**	**0**	**46**	**0**	**1**	**107**	**222**

‡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 30 November 2007 and 30 November 2008

Air Force

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Air Combat Cmd	1,581	1,609	2	4	4	7	10	18	.	5	.	.	9	29	7	3
Air Education & Training Cmd	746	841	1	1	1	7	18	11	18	1	.	.	4	1	10	8
Lackland, TX	0	90	.	1	.	.	.	1	.	2	.	.	.	.	.	.
USAF Academy, CO	46	41	.	1	.	.	2	.	.	.	.	.	.	.	.	.
Air Force Dist. of Washington	30	36	.	.	.	.	.	.	1	.	.	.	1	2	.	.
Air Force Materiel Cmd	530	650	1	2	2	1	20	7	2	10	.	.	.	.	2	.
Air Force Special Ops Cmd	171	237	.	.	.	.	3	3	1	.	.	.	.	4	.	.
Air Force Space Cmd	355	407	2	1	3	2	8	6	1	1	.	.	2	2	1	1
Air Mobility Cmd	720	934	1	1	2	2	12	10	2	2	.	.	4	8	3	9
Pacific Air Forces	524	531	1	7	2	4	4	5	1	.	.	.	5	9	10	3
PACAF Korea	143	165	.	.	.	.	.	.	.	.	.	.	8	1	1	.
U.S. Air Forces in Europe	275	393	3	1	.	1	1	7	1	.	.	.	2	3	.	1
Other	654	619	5	4	4	5	8	14	.	8	.	.	4	2	2	.
Total	**5,775**	**6,553**	**16**	**23**	**18**	**29**	**86**	**82**	**27**	**29**	**0**	**0**	**39**	**61**	**36**	**25**

*Events reported by November 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

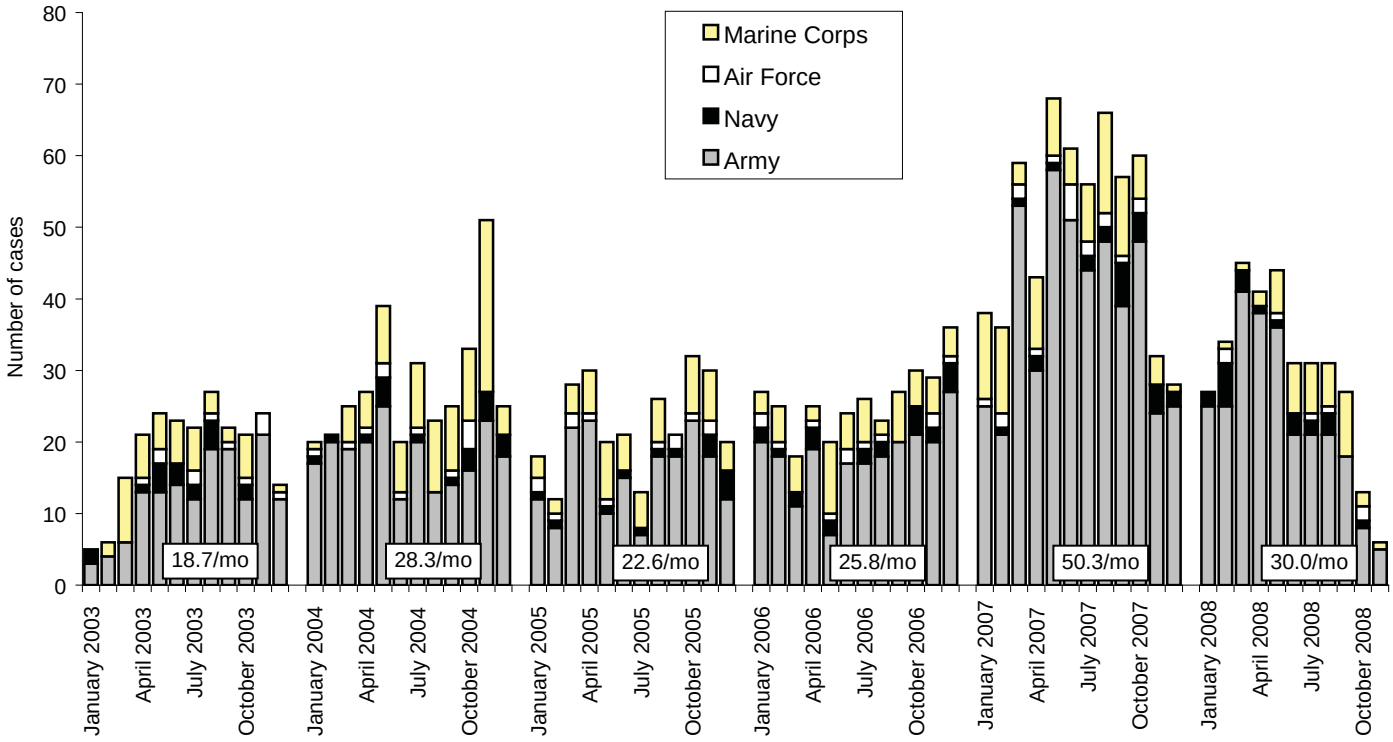
Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Air Combat Cmd	12	3	.	.	1,107	1,055	92	81	6	2	3	3	.	4	6	1
Air Education & Training Cmd	2	4	.	.	563	531	82	48	1	5	.	.	1	1	1	5
Lackland, TX	.	.	.	.	.	77	.	7	.	1	.	.	.	.	.	.
USAF Academy, CO	.	1	.	.	39	37	3	.	.	.	.	.	.	1	.	.
Air Force Dist. of Washington	.	1	.	.	27	24	1	3	.	.	.	.	.	.	.	.
Air Force Materiel Cmd	7	9	2	1	417	422	53	56	1	3	.	.	.	.	.	.
Air Force Special Ops Cmd	.	1	.	1	135	185	20	30	.	1	.	.	.	.	12	.
Air Force Space Cmd	2	5	.	.	304	299	23	16	1	.	.	.	.	.	.	.
Air Mobility Cmd	7	15	.	1	598	649	53	74	3	4	.	.	.	5	3	8
Pacific Air Forces	3	.	1	.	437	415	31	26	.	1	.	.	1	1	.	.
PACAF Korea	.	.	.	.	108	136	5	4	5	.	.	.	2	.	1	.
U.S. Air Forces in Europe	4	13	.	2	220	297	14	33	.	1	.	.	.	.	.	.
Other	2	6	.	1	577	502	36	29	2	2	.	.	.	.	.	5
Total	**39**	**58**	**3**	**6**	**4,532**	**4,629**	**413**	**407**	**19**	**20**	**3**	**3**	**4**	**12**	**23**	**19**

‡Primary and secondary.

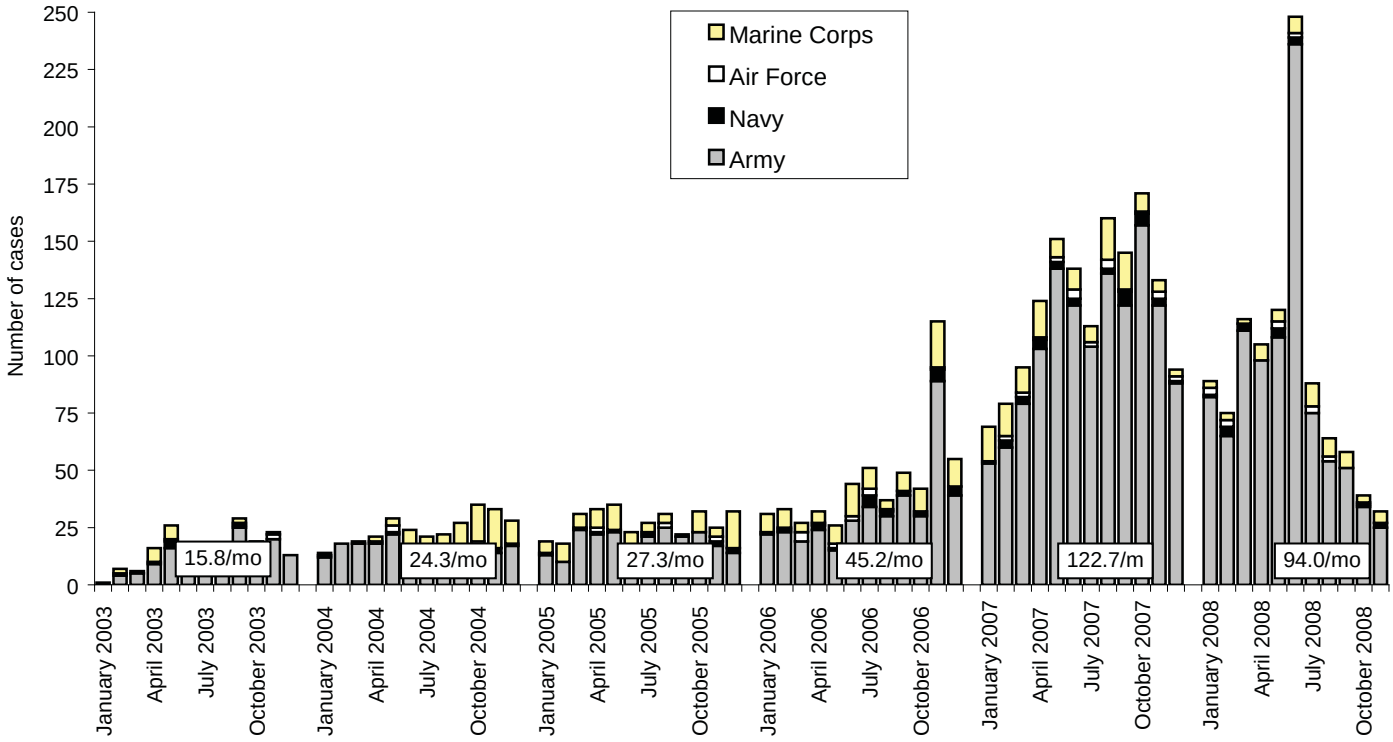
§Urethritis, non-gonococcal (NGU).

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - November 2008

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)†



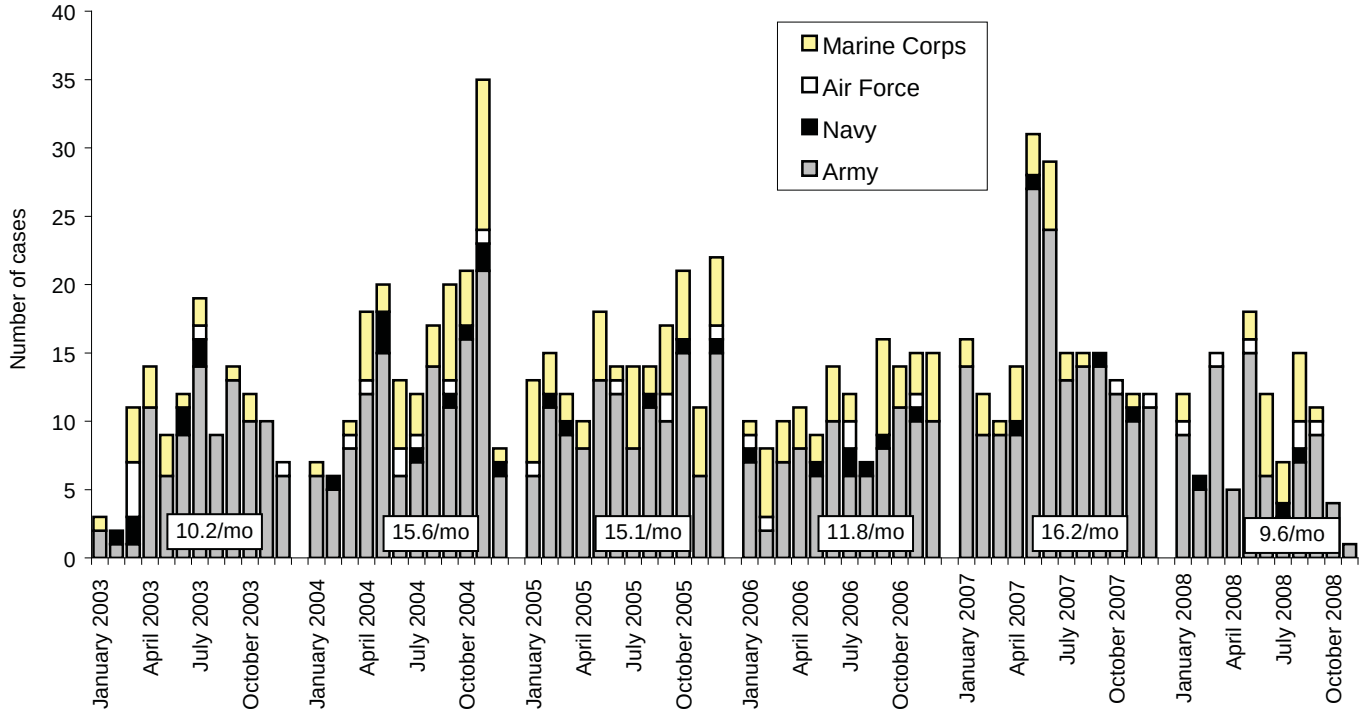
Reference: Army Medical Surveillance Activity. Traumatic brain injury among members of active components, U.S. Armed Forces, 2002-2007. *MSMR*. Aug 2007; 14(5):2-6.

*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.

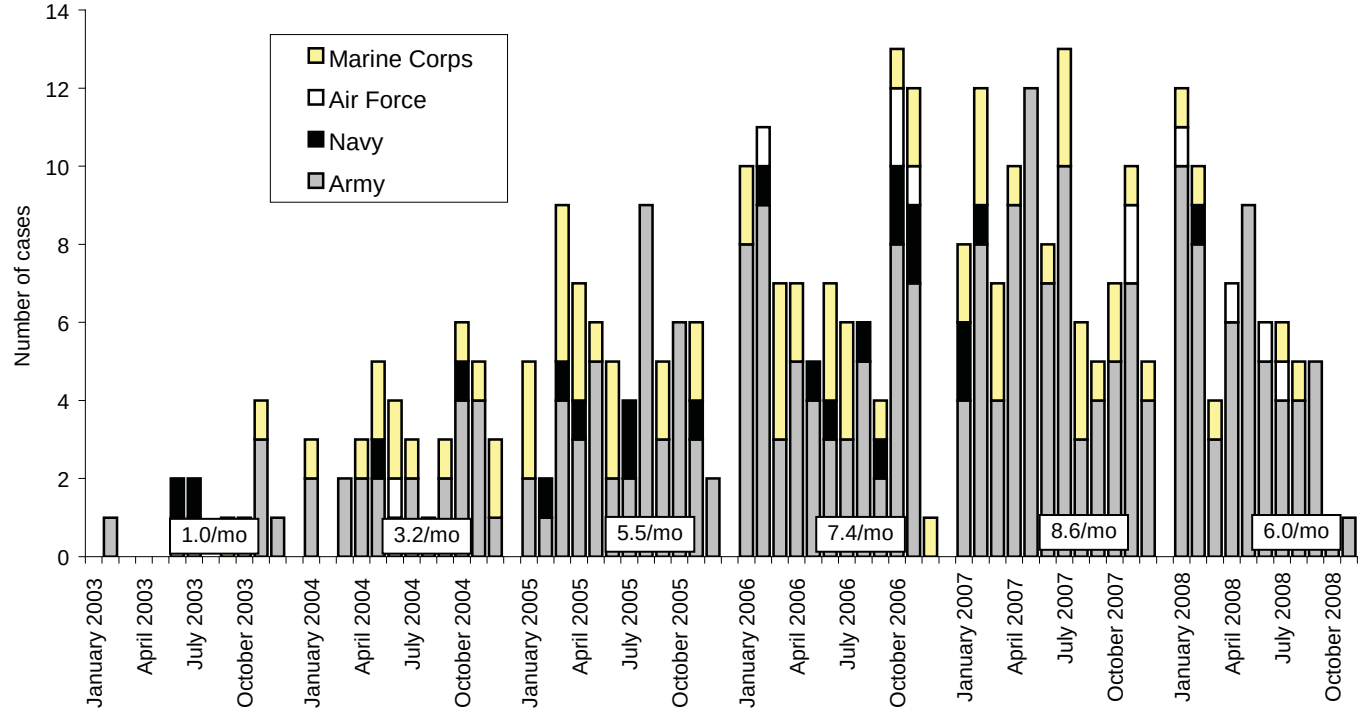
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - November 2008

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



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.

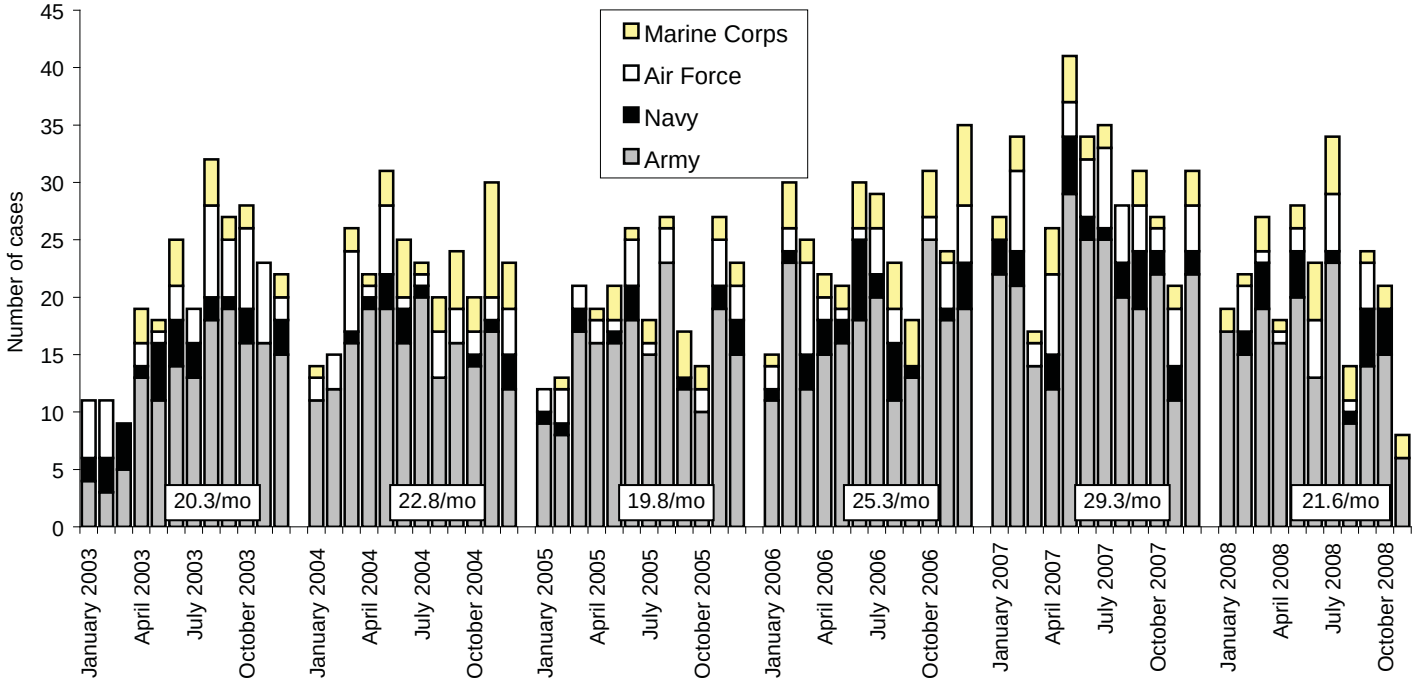
Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)†



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.

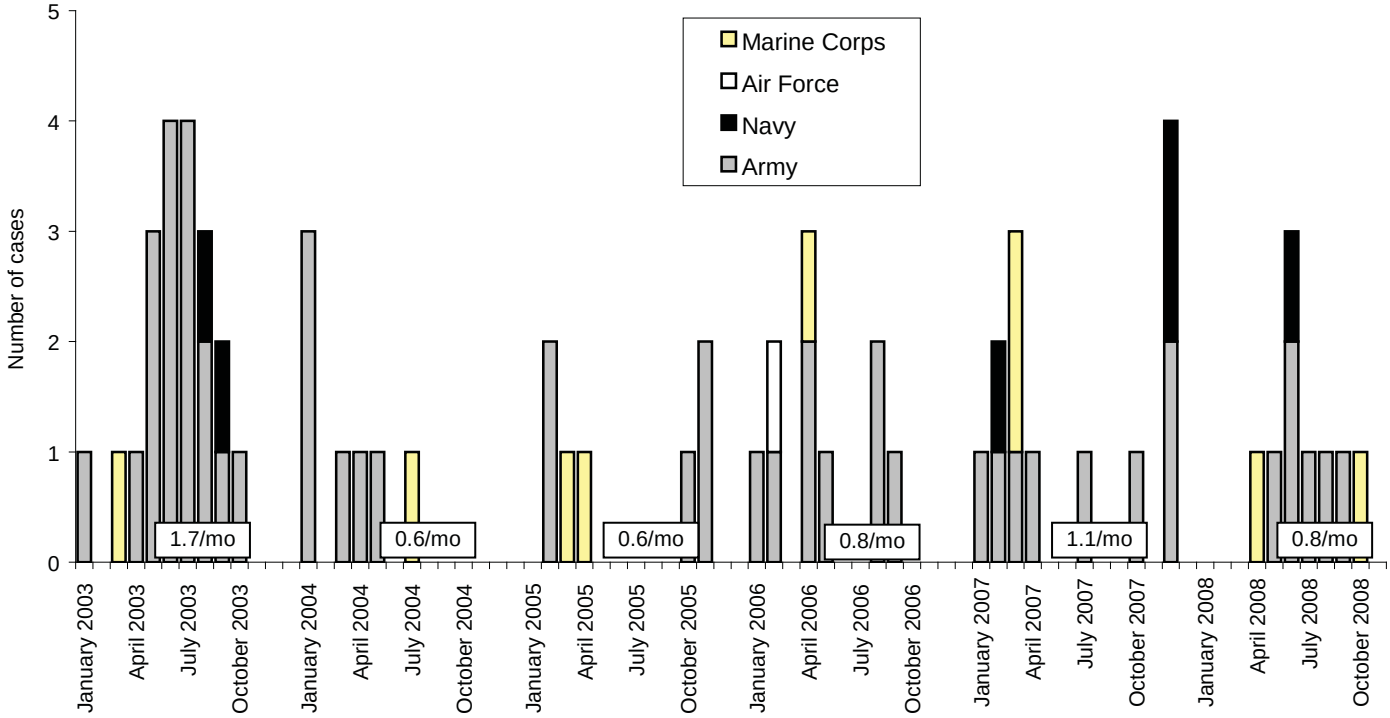
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - November 2008

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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