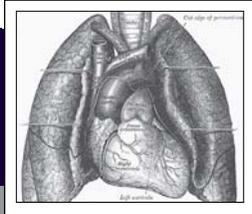
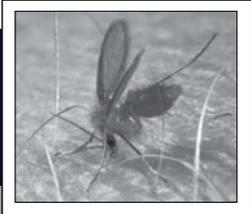




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MEDICAL SURVEILLANCE MONTHLY REPORT

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Leishmaniasis in relation to service in Iraq/Afghanistan, U.S. Armed Forces, 2001 - 2006

Leishmaniasis is a zoonotic disease caused by infection with protozoa of the genus *Leishmania*. The parasites are transmitted to humans through bites of female phlebotomine sand flies. Leishmaniasis is endemic in many tropical, sub-tropical, and temperate regions of the world, including Iraq and Afghanistan.^{1,2}

The clinical expressions of leishmaniasis are diverse and principally determined by the infecting species (which vary geographically) and the immune statuses of hosts.^{1,2} The most common forms of leishmaniasis are cutaneous and visceral. Cutaneous leishmaniasis typically presents as non-painful papules or nodules at sites of sand fly bites. Over weeks to months, the lesions may ulcerate and eventually heal spontaneously. However, the ulcers and scars can be disfiguring or disabling depending on their anatomic locations. In contrast, symptomatic visceral leishmaniasis is a slowly progressing, chronically debilitating, life-threatening illness that produces fever, weakness, weight loss, pancytopenia, and enlargement of the liver and spleen.^{1,2} Visceral leishmaniasis is not generally associated with an initial skin lesion. Not all persons infected with leishmaniasis develop signs or symptoms; but among those who do, times from infection to first clinical manifestations generally range from a week to many months, with much longer periods (up to 14 months) for visceral infections.^{1,2}

During World War II, more than 1,000 U.S. service members were infected with cutaneous leishmaniasis. Most cases were documented during a single outbreak in the Persian Gulf Command in the autumn of 1943.³ During the first Gulf War in 1990-1, there were more than 40 diagnoses of leishmaniasis among hospitalized U.S. service members; and unexpectedly, 12 of the cases were visceral leishmaniasis. Viscerotropism had not been previously associated with the species (*L. tropica*) that was endemic in the region.^{4,5}

In Afghanistan (Operation Enduring Freedom [OEF]) and Iraq (Operation Iraqi Freedom [OIF]), more U.S. service members have been exposed to significant leishmaniasis risk than at any time since World War II. Following a sharp outbreak of cutaneous leishmaniasis in U.S. forces in Iraq in 2003, surveys of female phlebotomine sand flies ($n \approx 24,000$) from areas of U.S. military operations revealed an overall infection prevalence of 1.4%.⁶⁻⁸ By February 2004, more than 500 U.S. service members had been diagnosed with cutaneous leishmaniasis, and two cases of visceral leishmaniasis were reported among service members who had served in Afghanistan.⁶⁻⁸

This report summarizes frequencies, rates, and demographic and military characteristics of U.S. service

members who deployed to OEF or OIF between October 2001 and September 2006 and were subsequently diagnosed (at fixed medical treatment facilities) or reported (as notifiable medical events) with leishmaniasis.

Methods:

The surveillance population included all U.S. military members who deployed to OIF or OEF between 1 October 2001 and 30 September 2006. For surveillance purposes, an incident case was the first hospitalization, ambulatory visit, or reportable medical event record per individual during the surveillance period with a diagnosis (in any position) of "leishmaniasis" (ICD-9-CM: 085.0-085.9). Only one episode of leishmaniasis per individual was included. Incidence rates were calculated (for active components only) as incident cases among deployers per 1,000 person-years of exposure to risk while deployed to OEF/OIF. Because there are long and variable periods from the time of infection to clinical manifestations, and from clinical manifestations to the diagnosis and reporting of leishmaniasis in a fixed medical treatment facility outside of the military operational theater, dates of acquisition of *Leishmania* infections were estimated as the mid-point dates of the periods of deployment to OEF or OIF of affected service members.

Results:

During the 5-year surveillance period, there were 1,287 incident diagnoses/reports of leishmaniasis among OEF/OIF deployers (**Table 1**). Of all affected service members, most were males (96%), in the Army (96%), in the active component (80%), and younger than 30 years old (62%) (**Table 1**).

Four service members had confirmed diagnoses of visceral leishmaniasis. Two had been deployed to Iraq and two to Afghanistan. All other cases were cutaneous leishmaniasis. Among these, 90.3% of service members had served in Iraq, 5.1% in Afghanistan, and 4.6% in both countries.

The peak of clinical diagnoses/reports of leishmaniasis occurred in the late summer and fall of 2003 (**Figure 1**). Progressively smaller secondary peaks of diagnoses/reports of leishmaniasis occurred in the winter and early spring of 2004 and the fall of 2004 (**Figure 1**). There were relatively few diagnoses/reports of leishmaniasis in 2005 and 2006 (**Figure 1**).

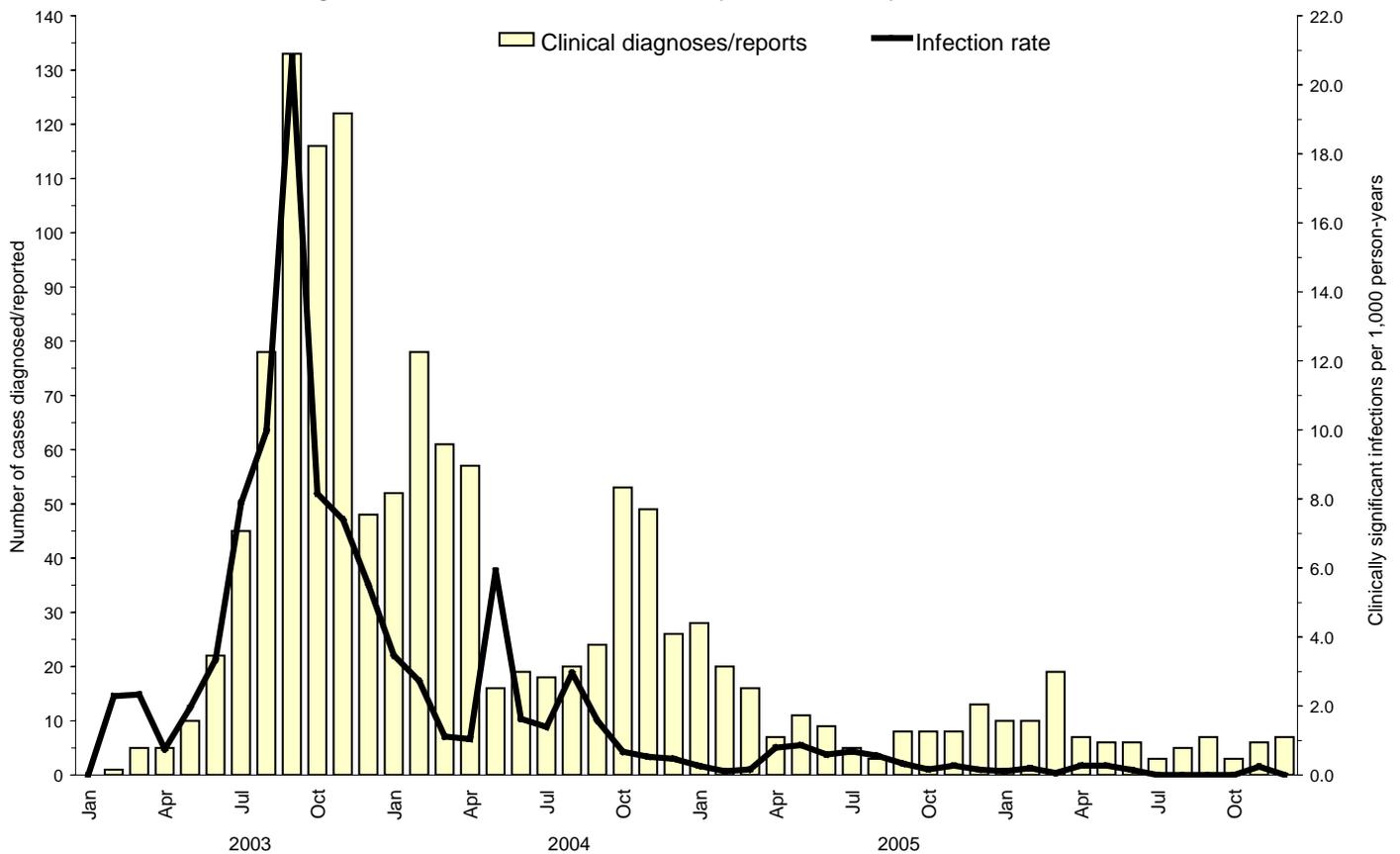
For the entire period, the incidence rate of leishmaniasis in active component deployers was 2.31 cases per 1,000

Table 1. Numbers and characteristics of service members diagnosed with leishmaniasis, U.S. Armed Forces, January 2001-December 2006

	Jan 2001-Dec 2001		Jan 2002-Dec 2002		Jan 2003-Dec 2003		Jan 2004-Dec 2004		Jan 2005-Dec 2005		Jan 2006-Dec 2006		Total						
	Active n	Reserve Rate*	n	%															
Total	0	0	3	33.9	1	495	686.8	90	379	330.5	94	92	65.4	44	63	56.7	26	1,287	100.0
Service																			
Army	0	0	3	47.4	1	481	831.2	89	368	530.2	91	79	88.3	41	58	79.9	23	1,234	95.9
Navy	0	0	0	0.0	0	2	121.7	0	2	34.4	1	3	39.5	0	1	15.0	0	9	0.7
Air Force	0	0	0	0.0	0	8	78.3	1	6	33.6	2	7	34.9	3	2	12.7	0	29	2.3
Marine Corps	0	0	0	0.0	0	4	171.0	0	3	13.9	0	3	12.8	0	2	12.4	3	15	1.2
Gender																			
Female	0	0	0	0.0	0	14	197.7	6	14	128.1	6	7	50.8	1	3	28.0	1	52	4.0
Male	0	0	3	36.9	1	481	740.1	84	365	351.8	88	85	67.0	43	60	59.7	25	1,235	96.0
Race/ethnicity																			
White nonhispanic	0	0	1	16.4	1	362	805.6	61	264	367.0	66	56	62.9	34	42	58.4	18	905	70.3
Black, nonhispanic	0	0	0	0.0	0	76	477.5	25	67	299.9	16	16	55.5	7	10	48.8	3	220	17.1
Hispanic	0	0	2	294.0	0	42	567.3	3	29	221.1	9	8	54.0	2	3	24.4	5	103	8.0
Other	0	0	0	0.0	0	15	393.7	1	19	260.2	3	12	150.7	1	8	122.4	0	59	4.6
Age group																			
<20	0	0	1	238.3	0	29	850.9	2	9	161.8	1	0	0.0	0	1	24.5	1	44	3.4
20-24	0	0	1	31.1	0	223	755.6	17	157	319.5	14	31	53.0	4	15	32.6	4	466	36.2
25-29	0	0	1	48.9	0	111	665.4	10	90	347.9	19	28	84.5	5	21	79.3	3	288	22.4
30-34	0	0	0	0.0	0	83	787.5	11	54	343.7	14	13	65.5	6	8	51.7	4	193	15.0
35-39	0	0	0	0.0	0	35	464.7	21	45	405.2	15	11	76.8	8	9	78.2	7	151	11.7
40+	0	0	0	0.0	1	14	318.5	29	24	328.6	31	9	93.8	21	9	119.6	7	145	11.3

* Rates expressed as incident cases per 100,000 person-years while deployed to OEF/OIF.

Figure 1. Clinical diagnoses/reports of leishmaniasis at U.S. military medical treatment facilities and estimated leishmaniasis infection incidence rates among U.S. service members in OEF/OIF, by month, January 2003-December 2006



person-years of service in OEF/OIF. Using the mid-points of periods of deployment to OEF/OIF as estimated dates of *Leishmania* infection acquisition, the highest numbers and rates of new infections by far were in the late summer and fall of 2003 (Figure 2). A much smaller secondary peak in estimated incidence occurred in the spring and summer of 2004 (Figure 2).

Data analysis by Pablo Aliaga, MPH, Analysis Group, Army Medical Surveillance Activity.

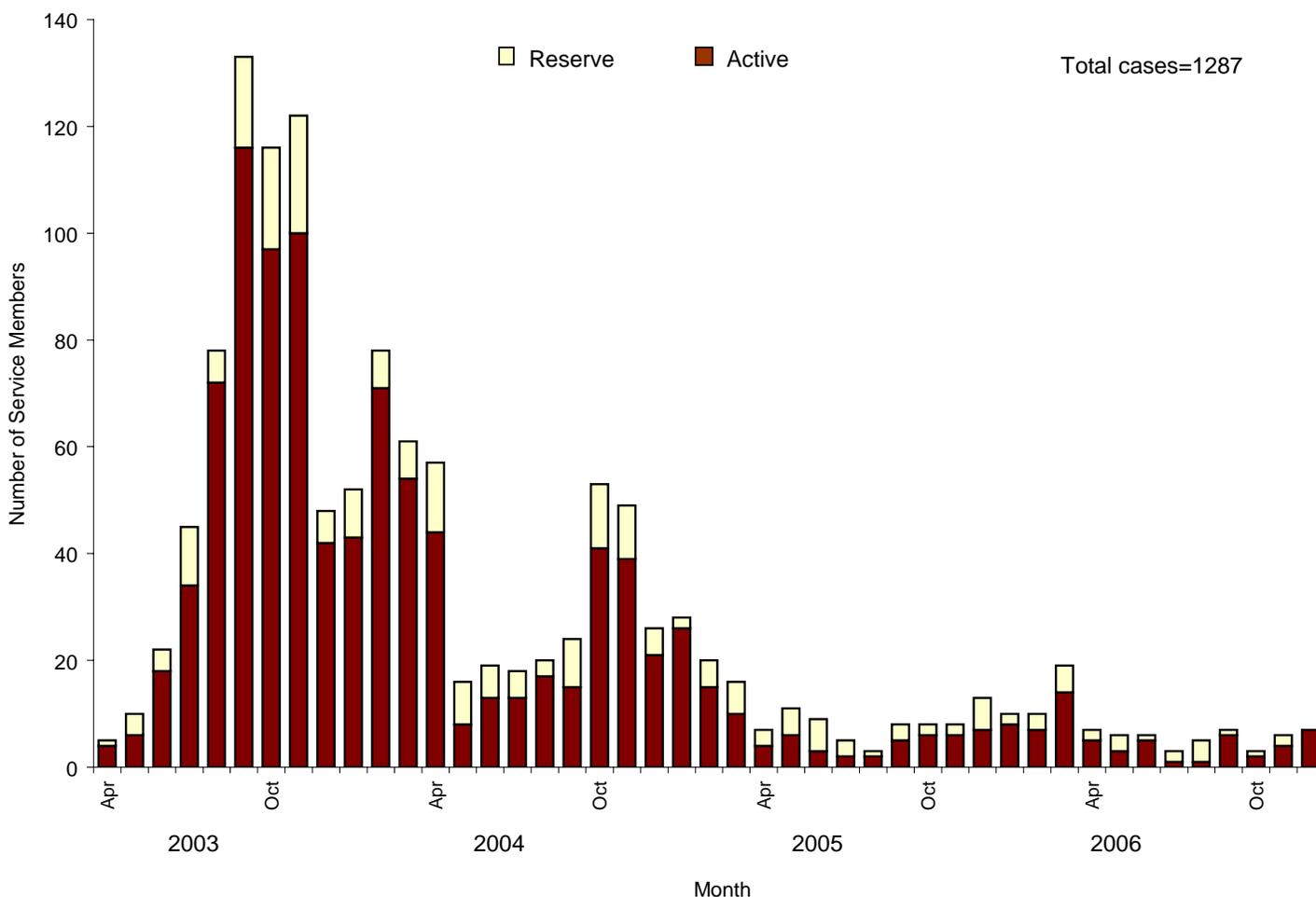
Editorial comment:

Several factors likely contribute to the sharply lower numbers and rates of cases of diagnosed/reported leishmaniasis since 2003. For example, since 2003, there have been improvements in tents and buildings (e.g., air conditioning, sand fly proof windows) on many U.S. installations in Iraq and Afghanistan, and security needs often mandated sleeping in hardened structures. In addition, sand

fly populations near U.S. military troop concentrations have been actively controlled,⁹ and personal protective measures to prevent sand fly bites have been emphasized. Lastly, in recent years, U.S. forces have not been deployed in large numbers in the vicinity of the Iran-Iraq border where the estimated case rate exceeded 200 per 1000 deployed persons in 2003.¹⁰

However, the findings regarding the decreasing numbers of diagnosed/reported cases must be interpreted cautiously. During the 2003 outbreak, Army policy required that soldiers with confirmed diagnoses be evacuated to Walter Reed Army Medical Center for treatment. This conservative policy was based on the Persian Gulf War experience with *L. tropica*— a species associated with possible visceralization, less responsive to treatment, and potential anthroponotic spread. When, in the spring of 2004, it became evident that >95% of Iraq acquired cases were commonly self-healing infections caused by *L. major*, leishmaniasis care was decentralized.¹⁰ Thus, prior to this policy change, virtually all clinically apparent cases were managed outside of the military theater and were likely documented in ambulatory visit and/or reportable

Figure 2. Leishmaniasis, by month of clinical onset/first diagnosis, by component of U.S. Armed Forces, April 2003-December 2006



medical event records that are archived in the Defense Medical Surveillance System. Since 2004, however, cases are treated or clinically followed (to monitor spontaneous healing) in the deployed setting; and such cases would likely not be accounted for in this analysis.

Because of significant variations in incubation times, rates of clinical progression, and health care-seeking behaviors of affected individuals, it is difficult to estimate times of infection acquisition based on dates of diagnosis at fixed medical treatment facilities. For surveillance purposes, we used the midpoints of deployment periods of cases to estimate dates of infection acquisition. However, large units deploy to Iraq and Afghanistan on set schedules; and the midpoints of deployments of affected members of such units are likely to cluster around the midpoints of the large unit rotations. Also, our estimation method assumes that the risk of infection acquisition is uniform throughout the deployment. In actuality, the risk of infection significantly varies by season. For example, during sand fly surveys at Tallil Air Base in 2003-4, Coleman and colleagues found that two well-known vectors of leishmaniasis in Iraq, *P. alexandri* and *P. papatasi*, were most abundant in April and August, respectively, relative to other months.¹¹ In summary, estimates of dates of infection acquisition — and epidemic curves that are based on them — should be considered imprecise estimates of actual infection times.

Visceral leishmaniasis is endemic in Iraq and Afghanistan. Sand flies that are competent vectors of visceral leishmaniasis are prevalent in areas where U.S. forces operate. Yet, fewer cases of visceral leishmaniasis have been diagnosed/reported among participants in OEF/OIF than the first Gulf War. Visceral leishmaniasis can be clinically inapparent for long periods, and its first clinical manifestation can be a non-specific febrile illness.¹² Diagnosis is difficult in the deployed setting, although the serologic rK39 *Leishmania* dipstick assay is available in both theatres and is an effective screening rapid diagnostic tool for symptomatic visceral leishmaniasis.¹³ Physicians and other primary care providers should include leishmaniasis among possible diagnoses among veterans of military service in Iraq, Afghanistan, or Kuwait who have exposure histories and clinical presentations compatible with cutaneous or visceral leishmaniasis.

There are no available vaccines or prophylactic medications against leishmaniasis. Infection confers protection for at least several years against reinfection with similar species of *Leishmania*. Leishmanization (intentional skin infection with *L. major*) has been effectively used to prevent infections in Iran¹⁴, Israel, and the former Soviet Union.

All military personnel who serve in leishmaniasis endemic areas should be informed of the nature of the risks and measures to counter them. Specifically, all service members at risk of leishmaniasis should be trained, equipped, supplied, and supervised to ensure compliance (especially from dusk to dawn) with indicated personal protective measures to include the consistent and proper wear of permethrin-treated uniforms; the consistent use of military issued, DEET-containing insect repellent on exposed skin; and the consistent and proper use of permethrin-treated bednets to prevent sand fly bites.

Naomi E. Aronson, COL, MC, U.S. Army, Infectious Diseases Division, Uniformed Services University of the Health Sciences, contributed to the editorial comments.

References:

1. Magill AJ. Epidemiology of the leishmaniases. *Dermatol Clin* 1995 Jul;13(3):505-23.
2. Centers for Disease Control and Prevention. Fact sheet: Leishmania infection. 2004. Accessed 21 Feb 2006 at: http://www.cdc.gov/NCIDOD/DPD/parasites/leishmania/factsht_leishmania.htm.
3. Most H. Leishmaniasis. In: Internal Medicine in World War II, Volume III, Infectious diseases and general medicine. Washington, D.C., Office of the Surgeon General, 1968.
4. Magill AJ, Grogil M, Gasser RA Jr, Sun W, Oster CN. Visceral infection caused by *Leishmania tropica* in veterans of Operation Desert Storm. *N Engl J Med* 1993 Nov 11;329(20):1503-4.
5. Persian Gulf Veterans Coordinating Board. Unexplained illnesses among Desert Storm veterans: a search for causes, treatment, and cooperation. *Arch Intern Med* 1995 Feb;155(3):262-268.
6. Weina PJ, Neafie RC, Wortmann G, Polhemus M, Aronson NE. Old world leishmaniasis: an emerging infection among deployed US military and civilian workers. *Clin Infect Dis* 2004 Dec 1;39(11):1674-80. Epub 2004 Nov 9.
7. Aronson N, Coleman R, Coyne P, et al. Cutaneous leishmaniasis in U.S. military personnel — Southwest/Central Asia, 2002-2003. *MMWR* 2003;52(42):1009-1012.
8. Centers for Disease Control and Prevention. Update: cutaneous leishmaniasis in U.S. military personnel—Southwest/Central Asia, 2002–2004. *MMWR* 2004; 53:264–5.
9. Memorandum, U.S. Central Command, subject: CENTCOM policy on cutaneous leishmaniasis diagnosis and treatment, 15 November 2004.
10. Aronson NE. Leishmaniasis in American soldiers: parasites from the front. In: Scheld WM, Hughes J, eds. *Emerging infections 7*. Washington, DC: ASM Press. 2007.
11. Coleman RE, Burkett DA, Sherwood V, et al. Impact of phlebotomine sand flies on U.S. military operations at Tallil Air Base, Iraq: 2. Temporal and geographic distribution of sand flies. *J Med Entomol* 2007 Jan;44(1):29-41.
12. Magill AJ, Grogil M, Johnson SC, Gasser RA Jr. Visceral infection due to *Leishmania tropica* in a veteran of Operation Desert Storm who presented 2 years after leaving Saudi Arabia. *Clin Infect Dis* 1994 Oct;19(4):805-6.
13. Chappuis F, Rijal S, Soto A, Menten J, Boelaert M. A meta-analysis of the diagnostic performance of the direct agglutination test and rK39 dipstick for visceral leishmaniasis. *BMJ* 2006 Aug 1;333:723-8.
14. Nadim A, Javadian E, Mohebbali M. The experience of leishmanization in the Islamic Republic of Iran. *Eastern Mediterranean Health Journal* 1997;3(2):284-9.

Hospitalizations among members of active components, U.S. Armed Forces, 2006

This report documents frequencies, rates, and characteristics of hospitalizations of members of the active components of the U.S. Armed Forces during calendar year 2006. Summaries are based on standardized records of hospitalizations in military medical facilities as well as non-military facilities (if the care was reimbursed through the Military Health System). The primary reasons for hospitalizations are summarized based on the first three digits of the ICD-9-CM codes that were reported as primary (first-listed) discharge diagnoses. Hospitalizations not routinely documented with standardized, automated records (e.g., during deployments, field training exercises, shipboard) are not included in this summary.

Frequencies, rates, and trends:

During 2006, there were 68,895 reports of hospitalizations of active component service members (**Table 1**) — approximately one-fourth (24.8%) of their hospitalizations were in non-military facilities (**Figure 1**). The hospitalization rate (all causes) was 50.6 per 1,000 service members per year. The rate in 2006 was slightly higher (+3.2%) than in 2005 but lower than in any other year since 1996 (**Figure 1**).

Hospitalizations, by illness and injury categories:

Over the past five years, there has been remarkable consistency in the distribution of hospitalizations in relation to primary causes (at the major diagnostic category level)

(**Table 1**). For example, in 2006 compared to 2002, the same nine major diagnostic categories of the ICD-9-CM caused the most hospitalizations; and only one (“other”: ICD-9-CM: V00-V72, E81-E99) of the 16 major diagnostic categories changed its frequency rank order by more than one (**Table 1**). Also, as in the past, three diagnostic categories accounted for more than half of all hospitalizations: pregnancy-related conditions (including labor and delivery) (20.9% of the total), mental disorders (15.3% of the total), and injuries and poisonings (14.8% of the total) (**Table 1**).

Between 2002 and 2006, numbers of hospitalizations declined in each of the eight major categories with the most attributable hospitalizations (**Table 1**). During the period, the largest decreases in attributable hospitalizations were for pregnancy-related conditions (2002 vs. 2006: $n=-3,268$), digestive disorders ($n=-1,557$), and signs, symptoms and ill-defined conditions ($n=-878$). The largest relative decreases in hospitalizations during the period were for digestive disorders (2002 vs. 2006, % change: -20.3%), genitourinary disorders (% change: -20.2%), and infectious and parasitic diseases (% change: -19.3%) (**Table 1**).

Between 2002 and 2006, numbers of hospitalizations increased in seven of the nine major diagnostic categories with the fewest attributable hospitalizations (**Table 1**). During the period, the largest increases in attributable hospitalizations were for “other” diagnoses (V and E-coded) (2002 vs. 2006: $n=+653$), circulatory disorders ($n=+171$), and skin and subcutaneous tissue disorders ($n=+148$). The largest relative

Table 1. Hospitalizations, ICD-9 diagnostic categories, US Armed Forces, 2002, 2004, and 2006

Major diagnostic category (ICD-9-CM)	2002		2004		2006	
	n	(Rank)	n	(Rank)	n	(Rank)
Pregnancy complications (630 - 679)	17,680	(1)	16,785	(1)	14,412	(1)
Mental disorders (290 - 319)	10,662	(2)	9,793	(3)	10,548	(2)
Injury and poisoning (800 - 999)	10,280	(3)	12,040	(2)	10,177	(3)
Digestive system (520 - 579)	7,666	(4)	7,058	(4)	6,109	(4)
Musculoskeletal system (710 - 739)	6,395	(5)	6,754	(5)	5,985	(5)
Ill-defined conditions (780 - 799)	4,998	(6)	4,349	(6)	4,120	(6)
Respiratory system (460 - 519)	3,169	(7)	2,640	(8)	2,584	(7)
Genitourinary system (580 - 629)	3,092	(8)	2,927	(7)	2,468	(8)
Circulatory system (390 - 459)	2,278	(9)	2,342	(9)	2,449	(9)
Other (E81-E99 and V00 - V72)	1,634	(12)	1,722	(12)	2,287	(10)
Neoplasms (140 - 239)	1,938	(10)	1,946	(11)	2,036	(11)
Dermatological diseases (680 - 709)	1,785	(11)	1,996	(10)	1,933	(12)
Infectious and parasitic diseases (001-139)	1,422	(13)	1,232	(13)	1,147	(13)
Nervous system (320 - 389)	987	(14)	1,125	(14)	1,032	(14)
Endocrine, nutrition, immunity (240 - 279)	718	(15)	755	(15)	835	(15)
Hematologic disorders (280 - 289)	359	(16)	353	(17)	476	(16)
Congenital anomalies (740 - 759)	309	(17)	365	(16)	297	(17)

increases in hospitalizations were for “other” diagnoses (2002 vs. 2006, % change: +40.0%), hematologic disorders (+32.6%), and disorders of endocrine, nutrition, metabolic and immunity (+16.3%) (Table 1).

Hospitalizations, by gender:

In 2006, the hospitalization rate for all causes was 3.4-times higher among females than males (hospitalization rate, all causes: females: 124.2 per 1,000 person-years [p-yrs]; males: 36.1 per 1,000 p-yrs). However, excluding pregnancy-related hospitalizations (which accounted for 58.7% of all hospitalizations of females), the crude hospitalization rate among females (51.4 per 1,000 per year) was 42% higher than among males.

Hospitalization rates were higher among males than females for injuries and poisonings (male:female, rate ratio [RR]: 1.58; rate difference [RD]: 2.91 per 1,000 p-yrs), skin and subcutaneous tissue disorders (male:female, RR: 1.42; RD: 0.44 per 1,000 p-yrs), circulatory disorders (male:female, RR: 1.36; RD: 0.50 per 1,000 p-yrs), and musculoskeletal/connective tissue disorders (male:female, RR: 1.02; RD: 0.08 per 1,000 p-yrs). Rates were higher among females than males for all other major categories. The largest differences in rates between females and males were for genitourinary disorders (RD: 6.25 per 1,000 p-yrs), neoplasms (RD: 3.24 per 1,000 p-yrs), and mental disorders (RD: 4.02 per 1,000 p-yrs).

Relationships between age and hospitalization rates varied across diagnostic categories (Figure 2). For example, among both males and females, hospitalization rates for neoplasms, circulatory disorders, and musculoskeletal/connective tissue disorders sharply increased with age, while hospitalization rates for mental disorders sharply decreased (Figure 2).

Most frequent diagnoses:

As in the past, in 2006, six diagnoses (as specified by 3-digit codes of the ICD-9-CM) accounted for more than 1,000

hospitalizations each among males: adjustment reactions (n=2,399), affective psychoses (n=1,787), intervertebral disc disorders (n=1,470), symptoms involving the respiratory system and chest (n=1,338), other cellulitis and abscess (n=1,295), and acute appendicitis (n=1,207) (Table 2).

Also, as in the past, in 2006, diagnoses associated with pregnancy, labor, and delivery caused the most hospitalizations by far among females (Table 3). Other than conditions related to pregnancy, leading causes of hospitalizations among females were adjustment reactions (n=666), affective psychoses (n=579), uterine leiomyoma (n=429), other symptoms involving the abdomen/pelvis (n=252), and pain/other symptoms associated with the genital organs (n=211) (Table 3).

Injuries and poisonings:

In 2006, injuries and poisonings accounted for more hospitalizations of U.S. service members than any other category of diagnoses except pregnancy-related conditions and mental disorders (Table 1). Of injury/poisoning-related hospitalizations with reported causes, nearly one-fifth (18.5%) were inflicted intentionally (e.g., enemy weapons; suicide gestures/attempts; fights, assaults, legal interventions); and of those, approximately 70% were considered “battle casualties” (Table 4). As in the past, the most frequently reported causes of unintentional injuries/poisonings were “falls and miscellaneous,” complications of medical/surgical care, guns and explosives (including accidents during war), land transportation accidents, and athletics (Table 4).

In 2006, the diagnoses that caused the most injury/poisoning-related hospitalizations varied by gender. Among both males and females, “other complications of procedures, not elsewhere classified” caused more injury and poisoning-related hospitalizations than any other specific diagnosis (Tables 2,3). However, among males, the next most frequent causes of injury/poisoning-related hospitalizations were fractures of bones of the ankle, face, leg, and forearm (Table

Figure 1. Rate of hospitalization by calendar year, U.S. Armed Forces, 1996-2006

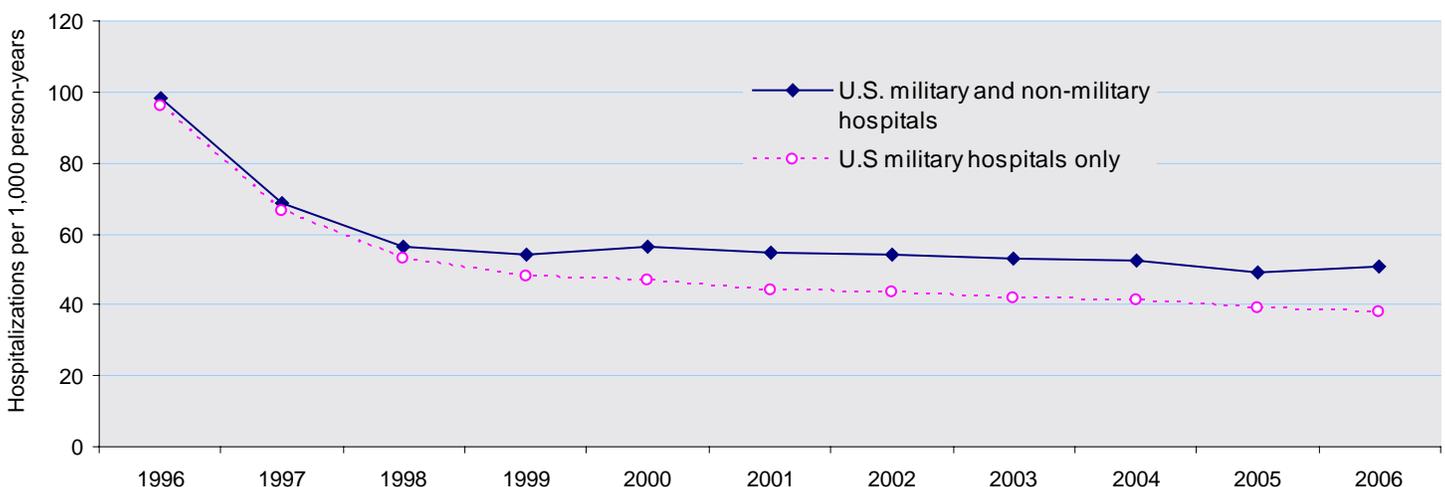
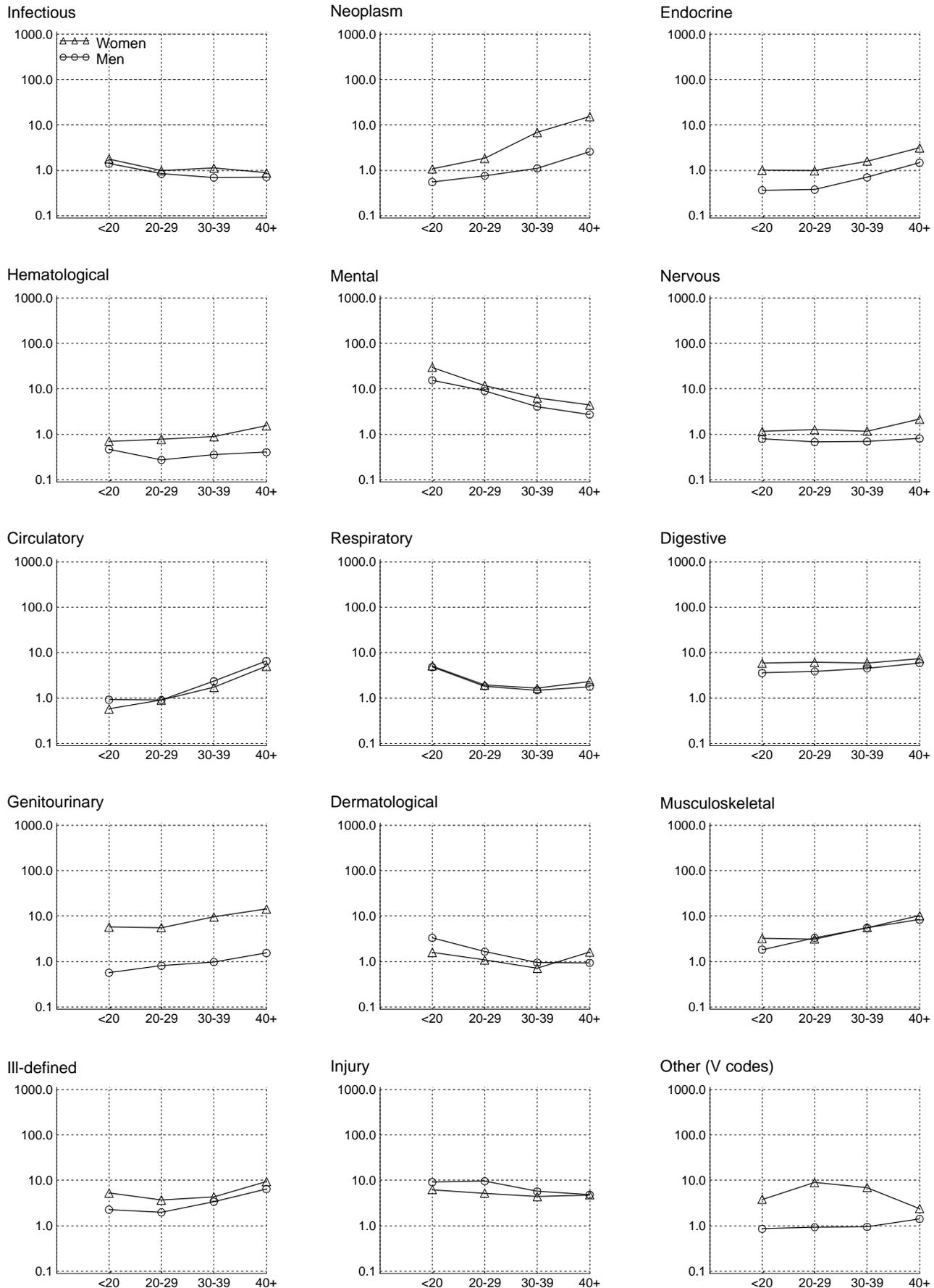


Figure 2. Rate of hospitalizations, by major diagnostic categories, by age and gender, U. S. Armed Forces, 2006



¹ Rates expressed as hospitalizations per 1,000 person-years.

2); while among females, the next most frequent causes of injury/poisoning-related hospitalizations were poisonings (by analgesics, antipyretics, antirheumatics, and psychotropic agents), ankle fractures, and complications of “specified procedures” (Table 3).

Duration of hospitalizations:

As in previous years, in 2006, median durations of

hospitalization varied across diagnostic categories from 1 day (for “signs, symptoms, and ill-defined conditions” and musculoskeletal/connective disorders) to 5 days (for mental disorders) (Figure 3). For all other diagnostic categories, the median durations of hospitalization were 2-3 days (Figure 3).

As in the past, there was significant variability across diagnostic categories in the ranges of durations of hospital-

Table 2. Most frequent diagnoses during hospitalization, by major diagnostic category, males, U.S. Armed Forces, 2006

Diagnostic category (ICD-9-CM codes)	n	%	Diagnostic category (ICD-9-CM codes)	n	%
Infectious and parasitic diseases (001-139)	951		Digestive system (520 - 579)	4,915	
Intestinal infections due to other organisms	119	12.5	Acute appendicitis	1,207	24.6
Meningitis due to enterovirus	115	12.1	Diseases of esophagus	416	8.5
Bacterial infection in condition classified elsewhere	107	11.3	Inguinal hernia	300	6.1
Viral & chlamydial infection	82	8.6	Dentofacial anomalies, including malocclusion	295	6.0
Malaria	76	8.0	Other noninfective gastroenteritis and colitis	290	5.9
Neoplasms (140 - 239)	1,192		Genitourinary system (580 - 629)	1,054	
Cancer of testis	105	8.8	Calculus of kidney and ureter	276	26.2
Cancer of prostate	70	5.9	Acute renal failure	116	11.0
Cancer of thyroid gland	64	5.4	Other disorders of male genital organs	112	10.6
Hodgkins disease	54	4.5	Other disorders of urethra and urinary tract	90	8.5
Myeloid leukemia	53	4.4	Urethral stricture	70	6.6
Endocrine, nutrition, immunity (240 - 279)	592		Dermatological diseases (680 - 709)	1,727	
Diabetes mellitus	190	32.1	Other cellulitis and abscess	1,295	75.0
Disorders of fluid, electrolyte, acid-base balance	122	20.6	Pilonidal cyst	130	7.5
Disorders of lipid metabolism	80	13.5	Cellulitis and abscess of finger and toe	98	5.7
Nontoxic nodular goiter	40	6.8	Other disorders of skin and subcutaneous tissue	31	1.8
Thyrotoxicosis with or without goiter	26	4.4	Other local infections of skin/subcutaneous tissue	27	1.6
Hematologic disorders (280 - 289)	326		Musculoskeletal system (710 - 739)	5,129	
Other and unspecified anemias	79	24.2	Intervertebral disc disorders	1,470	28.7
Iron deficiency anemias	46	14.1	Internal derangement of knee	620	12.1
Purpura and other hemorrhagic conditions	45	13.8	Other derangement of joint	452	8.8
Diseases of white blood cells	44	13.5	Other disorders of bone and cartilage	380	7.4
Other diseases of blood/blood-forming organs	43	13.2	Peripheral enthesopathies and allied syndromes	305	5.9
Mental disorders (290 - 319)	8,337		Congenital anomalies (740 - 759)	240	
Adjustment reaction	2,399	28.8	Other congenital musculoskeletal anomalies	52	21.7
Affective psychosis	1,787	21.4	Anomalies of bulbus cordis and cardiac septal closure	29	12.1
Nondependent abuse of drugs	922	11.1	Other congenital anomalies of circulatory system	26	10.8
Alcohol dependence syndrome	704	8.4	Other and unspecified congenital anomalies	19	7.9
Depressive disorder, nec	565	6.8	Other congenital anomalies of limbs	18	7.5
Nervous system (320 - 389)	776		Ill-defined conditions (780 - 799)	3,258	
Migraine	113	14.6	Involving respiratory system/chest symptoms	1,338	41.1
Epilepsy	59	7.6	General symptoms	776	23.8
Other paralytic syndromes	40	5.2	Other symptoms involving abdomen and pelvis	370	11.4
Mononeuritis of upper limb, mononeuritis multiplex	39	5.0	Symptoms involving head and neck	163	5.0
Other disorders of the nervous system	38	4.9	Symptoms involving digestive system	133	4.1
Circulatory system (390 - 459)	2,178		Injury and poisoning (800 - 999)	9,191	
Cardiac dysrhythmias	421	19.3	Other complications of procedures, nec	715	7.8
Essential hypertension	307	14.1	Fracture of ankle	511	5.6
Other forms of chronic ischemic heart disease	193	8.9	Fracture of face bones	392	4.3
Acute pulmonary heart disease	152	7.0	Fracture of tibia and fibula	370	4.0
Acute myocardial infarction	130	6.0	Fracture of radius and ulna	309	3.4
Respiratory system (460 - 519)	2,173		Other (E81-E99 and V00-V72)	1,071	
Pneumonia, organism unspecified	534	24.6	Specified aftercare following surgery	147	13.7
Peritonsillar abscess	175	8.1	Other rehabilitation: multiple training or therapy	106	9.9
Other diseases of lung	159	7.3	Colostomy	46	4.3
Pneumothorax	158	7.3	Attention to surgical dressings and sutures	44	4.1
Asthma	122	5.6	Other postprocedural status	38	3.5

izations (Figure 4). For example, in 2006, approximately 5% of all hospitalizations for mental disorders were longer than 28 days, while fewer than 5% of hospitalizations for pregnancy-

related conditions, musculoskeletal and connective tissue disorders, or genitourinary disorders exceeded 7 days. Finally, durations of hospitalizations overall have been generally stable since 1996 (Figure 4).

Table 3. Most frequent diagnoses during hospitalization, by major diagnostic category, females, U.S. Armed Forces, 2006

Diagnostic category (ICD-9-CM codes)	n	%	Diagnostic category (ICD-9-CM codes)	n	%
Infectious and parasitic diseases (001-139)	196		Digestive system (520 - 579)	1,194	
Meningitis due to enterovirus	36	18.4	Acute appendicitis	174	14.6
Viral & chlamydial infection	28	14.3	Cholelithiasis	156	13.1
Intestinal infections due to other organisms	19	9.7	Dentofacial anomalies, including malocclusion	126	10.6
Bacterial infection in condition classified elsewhere	14	7.1	Other noninfective gastroenteritis and colitis	80	6.7
Herpes simplex	14	7.1	Other disorders of gallbladder	62	5.2
Neoplasms (140 - 239)	844		Genitourinary system (580 - 629)	1,414	
Uterine leiomyoma	429	50.8	Pain/symptoms associated with female genital organs	211	14.9
Cancer of thyroid gland	54	6.4	Infections of kidney	180	12.7
Benign neoplasm of ovary	51	6.0	Menstrual disorder, abnormal bleeding	174	12.3
Cancer of female breast	25	3.0	Noninflammatory disorder ovary, fallopian tube, broad ligament	158	11.2
Benign neoplasm of thyroid gland	19	2.3	Other disorders of breast	112	7.9
Endocrine, nutrition, immunity (240 - 279)	243		Pregnancy complications (630 - 679)	14,408	
Nontoxic nodular goiter	48	19.8	Trauma to perineum and vulva during delivery	3,665	25.4
Thyrotoxicosis with or without goiter	40	16.5	Other conditions in mother complicating pregnancy	1,135	7.9
Disorders of fluid, electrolyte, acid-base balance	40	16.5	Abnormality of forces of labor	930	6.5
Obesity and other hyperalimentation	25	10.3	Maternal abnormality of organs, soft tissues of pelvis	855	5.9
Acquired hypothyroidism	18	7.4	Hypertension complicating pregnancy, childbirth, puerperium	850	5.9
Hematologic disorders (280 - 289)	150		Dermatological diseases (680 - 709)	206	
Other and unspecified anemias	51	34.0	Other cellulitis and abscess	128	62.1
Iron deficiency anemias	39	26.0	Pilonidal cyst	17	8.3
Diseases of white blood cells	18	12.0	Other disorders of skin and subcutaneous tissue	11	5.3
Purpura and other hemorrhagic conditions	11	7.3	Disorders of sweat glands	9	4.4
Hereditary hemolytic anemias	9	6.0	Contact dermatitis and other eczema	8	3.9
Mental disorders (290 - 319)	2,211		Musculoskeletal system (710 - 739)	856	
Adjustment reaction	666	30.1	Intervertebral disc disorders	178	20.8
Affective psychosis	579	26.2	Other disorders of bone and cartilage	94	11.0
Depressive disorder, not elsewhere classified	253	11.4	Other derangement of joint	79	9.2
Neurotic disorders	160	7.2	Internal derangement of knee	75	8.8
Nondependent abuse of drugs	128	5.8	Other and unspecified disorders of back	61	7.1
Nervous system (320 - 389)	256		Ill-defined conditions (780 - 799)	862	
Migraine	86	33.6	Other symptoms involving abdomen and pelvis	252	29.2
Multiple sclerosis	13	5.1	Involving respiratory system & other chest symptoms	197	22.9
Other conditions of brain	12	4.7	General symptoms	176	20.4
Other demyelinating disease of central nervous system	11	4.3	Symptoms involving digestive system	58	6.7
Epilepsy	11	4.3	Symptoms involving head and neck	38	4.4
Circulatory system (390 - 459)	271		Injury and poisoning (800 - 999)	986	
Cardiac dysrhythmias	46	17.0	Other complications of procedures, not elsewhere classified	164	16.6
Acute pulmonary heart disease	35	12.9	Poisoning by analgesics, antipyretics, antirheumatics	69	7.0
Essential hypertension	34	12.5	Fracture of ankle	65	6.6
Other diseases of endocardium	15	5.5	Poisoning by psychotropic agents	52	5.3
Hemorrhoids	15	5.5	Complications peculiar to certain specified procedures	46	4.7
Respiratory system (460 - 519)	411		Other (E81-E99 and V00-V72)	1,216	
Pneumonia, organism unspecified	77	18.7	Single liveborn	762	62.7
Asthma	60	14.6	Carrier or suspected carrier: group B streptococcus	47	3.8
Chronic disease of tonsils and adenoids	31	7.5	Aftercare following surgery	36	2.9
Peritonsillar abscess	29	7.1	Observation following other accident (e.g., motor vehicle)	31	2.5
Acute tonsillitis	26	6.3	Tuboplasty or vasoplasty after previous sterilization	30	2.4

Table 4. Injury hospitalizations by causal agent,* U.S. Armed Forces, 2006

Cause	No.	%	Cause	No.	%
Unintentional			Air transport	234	2.3
Falls and miscellaneous	1824	17.9	Environmental	201	2.0
Complications of medical/surgical	1116	11.0	Water transport	38	0.4
Guns, explosives (includes accidents during war)	1065	10.5	Intentional		
Land transport	922	9.1	Battle casualty	855	8.4
Athletics	613	6.0	Self-inflicted	257	2.5
Poisons and fire	394	3.9	Non-battle, inflicted by other (e.g., assault)	127	1.2
Machinery, tools	279	2.7	Missing/invalid code	2252	22.1

*Causal agents were determined by codes IAW STANAG 2050.

Editor's note: On 11 December 2007, percentages in the table were corrected from those in the printed and original on-line versions.

Figure 3. Length of hospital stay, by major diagnostic category, U.S. Armed Forces, 2006

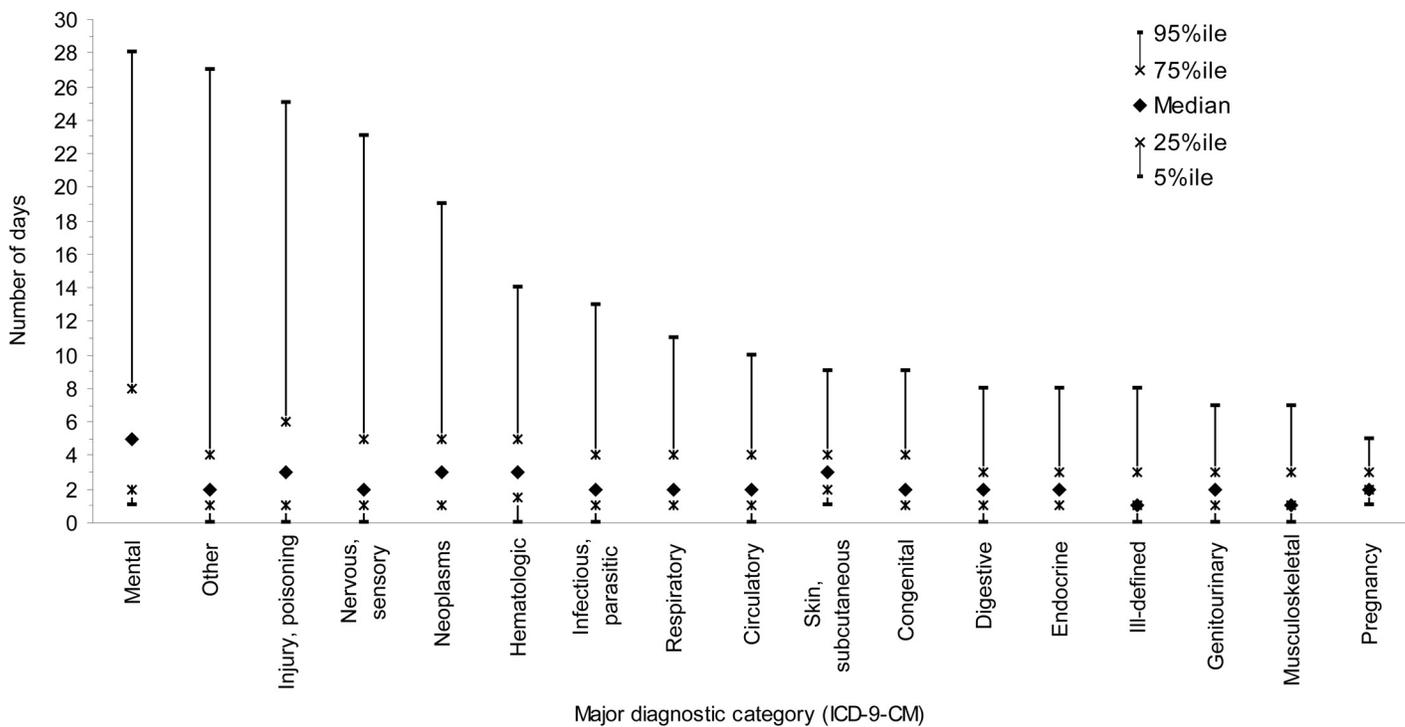
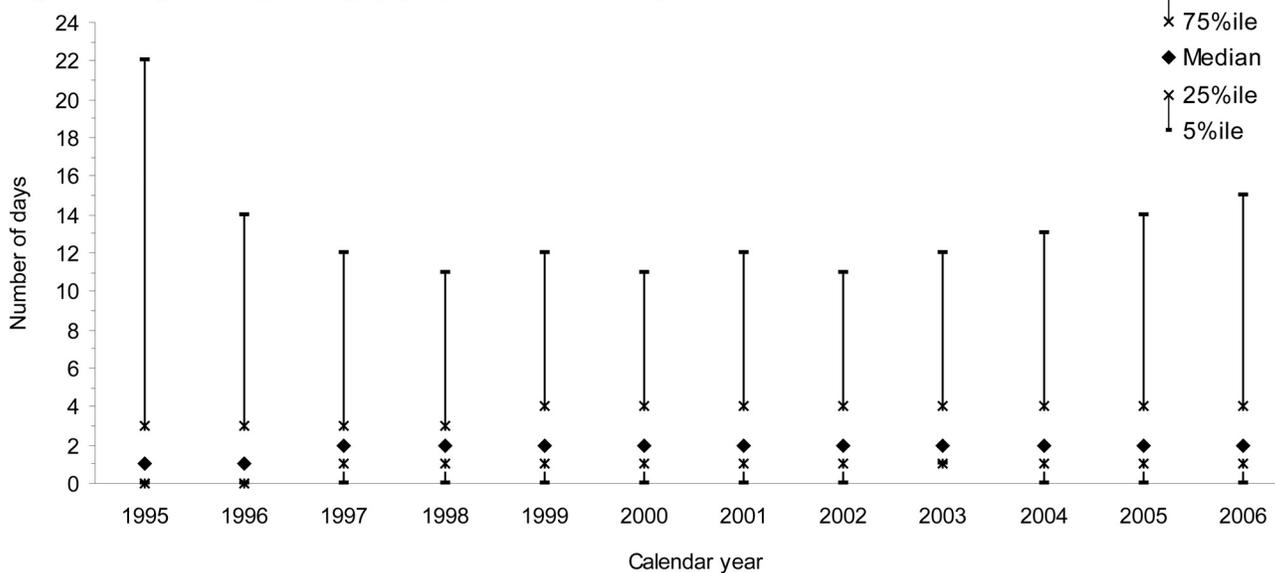


Figure 4. Length of hospital stay, by year, U.S. Armed Forces, 2006



Ambulatory visits among members of active components, U.S. Armed Forces, 2006

This report documents frequencies, rates, and characteristics of ambulatory visits of active component members of the U.S. Armed Forces during 2006. Ambulatory visits of U.S. service members in fixed military and non-military (reimbursed through the Military Health System) medical treatment facilities are documented with standardized, automated records. These records are routinely archived for health surveillance purposes in the Defense Medical Surveillance System which is the source of data for this report. Records of ambulatory visits not documented with automated records (e.g., during deployments, field training exercises, shipboard) are not included.

For this report, all records of ambulatory visits of U.S. service members in 2006 were categorized based on the first three digits of primary (first listed) diagnosis codes (International Classification of Diseases, 9th revision, clinical modifications).

Frequencies, rates, and trends:

During 2006, there were 12,924,759 reports of ambulatory visits of active component service members (Table 1). The crude rate (all causes) was 9,488.6 visits per 1,000 person-years (p-yrs). The ambulatory visit rate in 2006 was slightly higher (+5.7%) than in 2005 and the highest of all years since 1998 (Figure 1).

In 2006, nearly half ($n=6,086,286$; 47.1%) of all ambulatory visits were for "other contact with health services." This category (indicated by "V" codes of the ICD-

9-CM) includes health care not related to a current illness or injury. During 2006, more than 40% of all visits in the "other" category were reported as V70.5 "health examination of defined subpopulations" or V57.1 "other physical therapy." "Health examinations of defined subpopulations" include deployment-related health assessments and aviation, other occupational, periodic, and separation/retirement medical examinations.

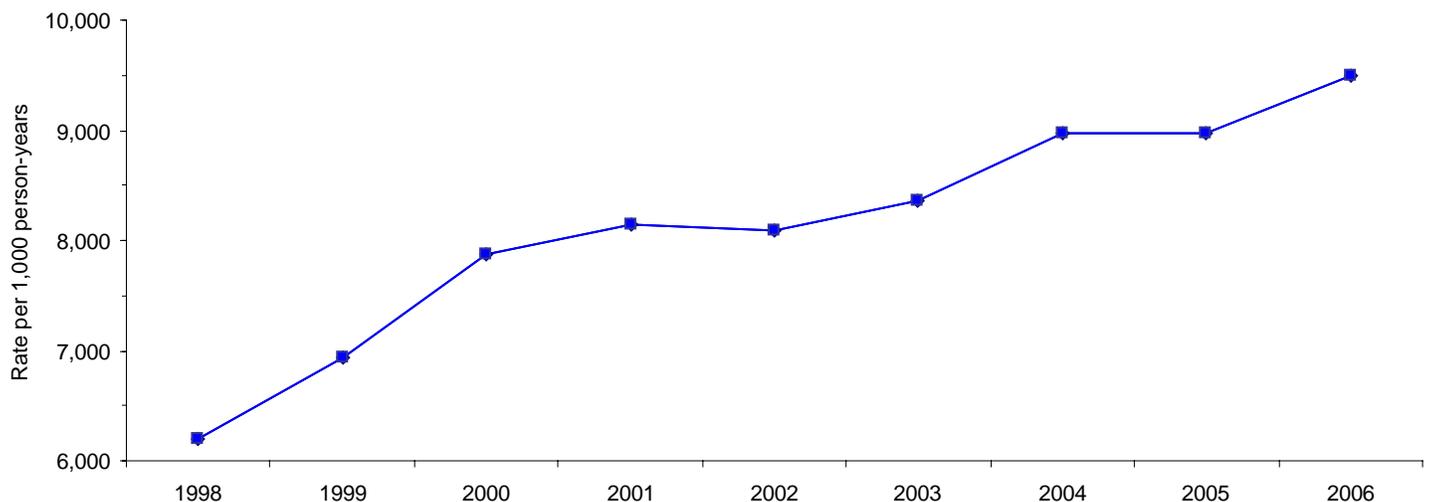
Excluding visits in the "other" category, in 2006, there were 6,838,473 reports of ambulatory visits for illnesses and injuries. The crude rate (all illnesses and injuries) was 5,020.4 visits per 1,000 p-yrs. The rate of ambulatory visits for illnesses and injuries in 2006 was remarkably similar to the rates in recent years (ambulatory visit rate, illnesses and injuries, 2006 vs. 2004: +2.7%; 2006 vs. 2002: +0.8%) (Table 1).

Distribution of visits, by diagnostic categories:

In 2006, the illness and injury-related categories that accounted for the most ambulatory visits were musculoskeletal and connective tissue disorders (23.3%), injuries and poisonings (12.2%), mental disorders (11.0%), signs, symptoms and ill-defined conditions (10.3%), and nervous system and sense organ disorders (10.0%) (Table 1). Thus, nearly half (46.6%) of all illness/injury-related visits were due to musculoskeletal/connective tissue disorders, injuries/poisonings, and mental disorders (Table 1).

Over the past 5 years, the distributions of ambulatory visits by diagnostic categories have remained fairly stable (Table 1). However, since 2002, several diagnostic categories

Figure 1. Rate of ambulatory visits by calendar year, U.S. Armed Forces, 1998-2006



have changed by 2 or more ranks in regard to attributable visits: mental disorders (2004: 7th; 2006: 4th) and digestive disorders (2004: 11th; 2006: 9th) significantly increased in rank order, while respiratory disorders (2002: 5th; 2006: 7th) and infectious and parasitic diseases (2002: 8th; 2006: 10th) significantly decreased (**Table 1**).

Since 2004, the diagnostic category (excluding pregnancy-related) with the largest increase in attributable visits was mental disorders (ambulatory visits, 2006 vs. 2004: $n=+116,985$; % change = +18.4%). In the past two years, there were also large increases in visits for circulatory disorders (ambulatory visits, 2006 vs. 2004: +11,561; +8.1%) and skin and subcutaneous tissue disorders (ambulatory visits, 2006 vs. 2004: +11,559; +3.4%).

Since 2004, the diagnostic categories with the largest decreases in attributable visits were: signs, symptoms, and ill-defined conditions (ambulatory visits, 2006 vs. 2004: -74,670; -9.5%), respiratory disorders (ambulatory visits, 2006 vs. 2004: -46,264; -6.6%), and infectious and parasitic diseases (ambulatory visits, 2006 vs. 2004: -35,912; -12.7%) (**Table 1**).

Ambulatory visits, by gender:

In 2006, males accounted for three-fourths (75.0%) of all illness/injury-related visits; yet, the crude rate among males (4,402.4 per 1,000 p-yrs) was approximately half the crude rate among females (8,659.7 per 1,000 p-yrs). As in the past, rates were higher among females than males for every illness and injury-related category (**Figure 2**).

The same illness and injury-related diagnoses (3-digit level) accounted for the most ambulatory visits among both males and females (**Tables 2,3**). For each of the most frequently reported diagnoses, the rate was higher among females than males: other/unspecified disorders of joints (rate ratio [RR], female:male: 1.75), other/unspecified disorders of the back (RR, female:male: 1.67), disorders of refraction and accommodation (RR, female:male: 1.51), acute upper respiratory infections of multiple/unspecified sites (RR, female:male: 1.96), and adjustment reactions (RR, female:male: 2.10).

Across diagnostic categories, relationships between age and ambulatory visit rates were generally similar among males and females (**Figure 2**). For example, among both males and females, rates of neoplasms, circulatory disorders, and endocrine, metabolic, and nutritional disorders sharply increased with age, while rates of infectious/parasitic diseases and mental disorders generally declined with age (**Figure 2**). As in the past, rates of genitourinary and musculoskeletal/connective tissue disorders were generally stable with age among females but sharply increased with age among males (**Figure 2**).

Dispositions after ambulatory visits:

Approximately three-fourths (78.5%) of illness and injury-related visits resulted in "duty without limitations." One of 20 (5.0%) illness and injury-related visits resulted in "convalescence in quarters" dispositions (**Figure 3**). As in the past, the diagnostic categories with the highest proportions

Table 1. Ambulatory visits, by major diagnostic category, U.S. Armed Forces, 2002, 2004, and 2006

Major diagnostic category (ICD-9-CM)	2002		2004		2006	
	n	(Rank)	n	(Rank)	n	(Rank)
Other (V01-V85 and E81-E96)	4,311,240	(1)	5,756,466	(1)	6,086,286	(1)
Musculoskeletal system (710 - 739)	1,619,944	(2)	1,602,504	(2)	1,593,284	(2)
Injury and poisoning (800 - 999)	988,376	(3)	861,856	(3)	835,737	(3)
Mental disorders (290 - 319)	594,067	(7)	637,320	(7)	754,305	(4)
Ill-defined conditions (780 - 799)	786,195	(4)	782,114	(4)	707,444	(5)
Nervous system (320 - 389)	693,719	(6)	718,885	(5)	683,555	(6)
Respiratory system (460 - 519)	710,137	(5)	701,280	(6)	655,016	(7)
Dermatological diseases (680 - 709)	306,876	(9)	343,199	(8)	354,758	(8)
Digestive system (520 - 579)	225,613	(11)	245,080	(11)	254,612	(9)
Infectious and parasitic diseases (001-139)	308,421	(8)	281,720	(9)	245,808	(10)
Genitourinary system (580 - 629)	238,661	(10)	245,683	(10)	235,201	(11)
Circulatory system (390 - 459)	128,177	(12)	143,191	(12)	154,752	(12)
Endocrine, nutrition, immunity (240 - 279)	126,982	(13)	120,434	(13)	119,260	(13)
Pregnancy complications (630 - 677)	75,551	(15)	91,463	(14)	109,033	(14)
Neoplasms (140 - 239)	85,087	(14)	87,489	(15)	94,377	(15)
Congenital anomalies (740 - 759)	23,309	(16)	22,166	(16)	24,227	(16)
Hematologic disorders (280 - 289)	15,773	(17)	16,743	(17)	17,104	(17)

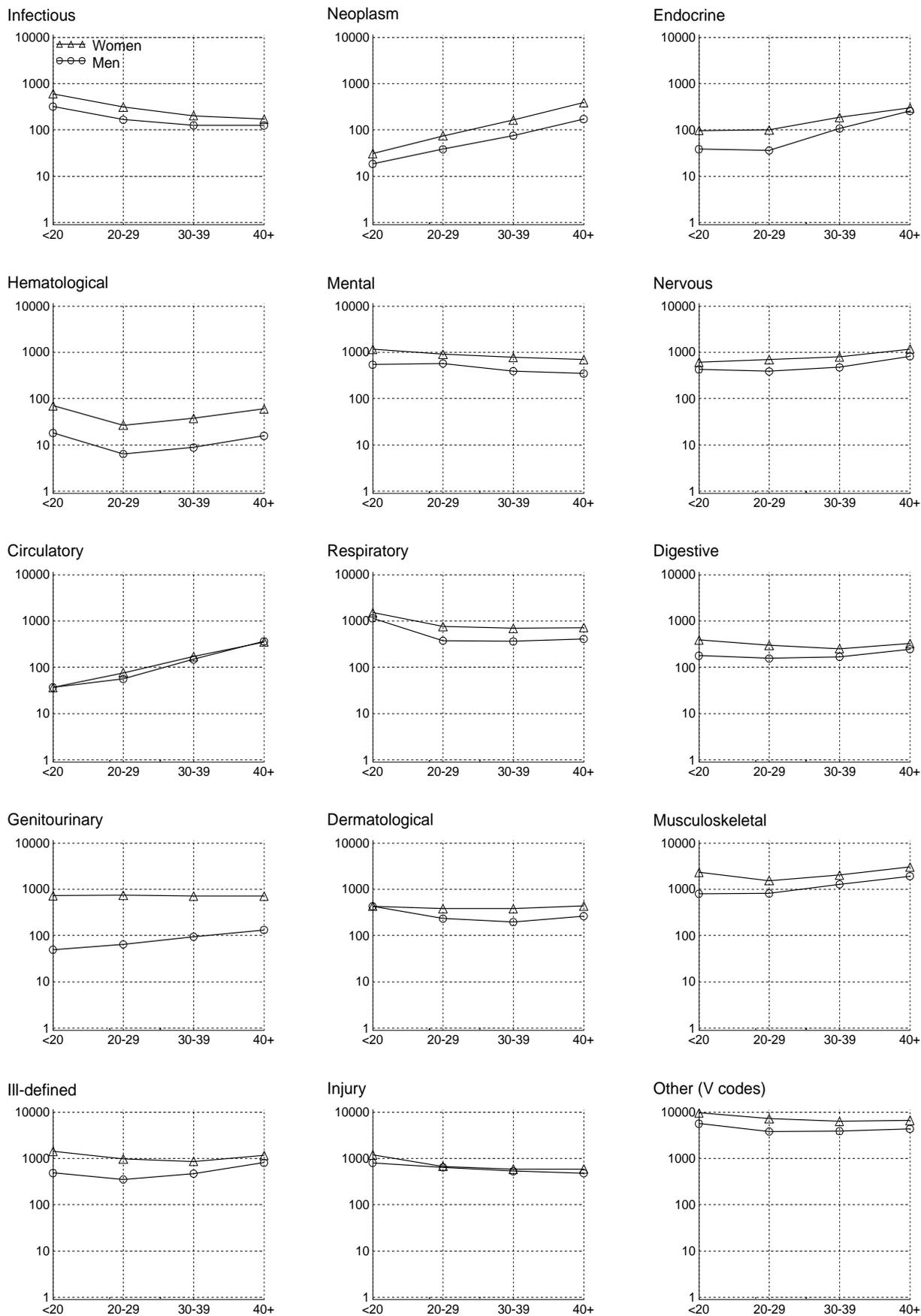
Table 2. Most frequent diagnoses during ambulatory visits, by major diagnostic category, males, U.S. Armed Forces, 2006

Diagnostic category (ICD-9-CM codes)	n	%	Diagnostic category (ICD-9-CM codes)	n	%
Infectious and parasitic diseases (001-139)	187,174		Digestive system (520 - 579)	196,195	
Viral & chlamydial infection	37,642	20.1	Other noninfective gastroenteritis and colitis	54,190	27.6
Other diseases due to viruses and chlamydiae	37,447	20.0	Diseases of esophagus	30,776	15.7
Dermatophytosis	30,634	16.4	Inguinal hernia	13,810	7.0
Intestinal infections due to other organisms	17,131	9.2	Gastritis and duodenitis	10,800	5.5
Streptococcal sore throat and scarlatina	10,312	5.5	Gastrointestinal hemorrhage	9,966	5.1
Neoplasms (140 - 239)	70,762		Genitourinary system (580 - 629)	91,278	
Benign neoplasm of skin	10,389	14.7	Calculus of kidney and ureter	15,821	17.3
Lipoma	8,599	12.2	Other disorders of male genital organs	12,227	13.4
Neoplasm of uncertain behavior, other & unspec sites	7,160	10.1	Other disorders of urethra and urinary tract	11,122	12.2
Neoplasm of unspecified nature	6,403	9.0	Orchitis and epididymitis	10,853	11.9
Cancer of testis	3,260	4.6	Infertility, male	5,543	6.1
Endocrine, nutrition, immunity (240 - 279)	92,061		Dermatological diseases (680 - 709)	277,997	
Disorders of lipid metabolism	35,323	38.4	Other cellulitis and abscess	56,865	20.5
Diabetes mellitus	16,655	18.1	Contact dermatitis and other eczema	41,401	14.9
Obesity and other hyperalimentation	11,407	12.4	Diseases of hair and hair follicles	35,661	12.8
Disorders of fluid, electrolyte, acid-base balance	7,236	7.9	Diseases of sebaceous glands	32,296	11.6
Gout	5,650	6.1	Diseases of nail	16,495	5.9
Hematologic disorders (280 - 289)	10,122		Musculoskeletal system (710 - 739)	1,229,288	
Other and unspecified anemias	2,066	20.4	Other and unspecified disorders of joint	328,308	26.7
Hereditary hemolytic anemias	1,682	16.6	Other and unspecified disorders of back	245,273	20.0
Purpura and other hemorrhagic conditions	1,511	14.9	Peripheral enthesopathies and allied syndromes	93,666	7.6
Other diseases of blood and blood-forming organs	1,504	14.9	Other disorders of soft tissues	79,697	6.5
Diseases of white blood cells	1,410	13.9	Intervertebral disc disorders	78,325	6.4
Mental disorders (290 - 319)	580,264		Congenital anomalies (740 - 759)	17,644	
Adjustment reaction	135,593	23.4	Certain congenital musculoskeletal deformities	5,144	29.2
Alcohol dependence syndrome	106,569	18.4	Congenital anomalies of the integument	2,920	16.5
Nondependent abuse of drugs	98,006	16.9	Other congenital musculoskeletal anomalies	2,372	13.4
Neurotic disorders	58,981	10.2	Other congenital anomalies of limbs	1,970	11.2
Affective psychoses	54,571	9.4	Congenital anomalies of genital organs	790	4.5
Nervous system (320 - 389)	534,703		Ill-defined conditions (780 - 799)	510,363	
Disorders of refraction and accommodation	238,886	44.7	General symptoms	124,560	24.4
Disorders of conjunctiva	37,270	7.0	Involving respiratory system & other chest symptoms	105,626	20.7
Hearing loss	29,864	5.6	Other symptoms involving abdomen and pelvis	59,171	11.6
Organic sleep disorders	20,740	3.9	Symptoms involving digestive system	43,894	8.6
Migraine	20,053	3.8	Symptoms involving head and neck	42,030	8.2
Circulatory system (390 - 459)	131,099		Injury and poisoning (800 - 999)	700,576	
Essential hypertension	61,783	47.1	Sprains and strains of ankle and foot	76,335	10.9
Hemorrhoids	13,679	10.4	Sprains and strains of knee and leg	70,342	10.0
Cardiac dysrhythmias	9,642	7.4	Sprains and strains of other/unspecified parts of back	56,611	8.1
Diseases of capillaries	7,174	5.5	Sprains and strains of shoulder and upper arm	34,822	5.0
Varicose veins of other sites	4,526	3.5	Injury, other and unspecified	31,564	4.5
Respiratory system (460 - 519)	496,514		Other (V01-V85 and E81-E96)	4,677,461	
Acute upper respiratory infection, multiple/unspec site	150,163	30.2	Health examination, deployment-related	1,334,111	28.5
Acute pharyngitis	61,742	12.4	Physical therapy: therapeutic & remedial exercises	737,415	15.8
Allergic rhinitis	59,898	12.1	Examination of ears and hearing	190,438	4.1
Acute bronchitis and bronchiolitis	28,303	5.7	Screening: pulmonary tuberculosis	134,961	2.9
Asthma	25,563	5.1	Flu shot	126,327	2.7

Table 3. Most frequent diagnoses during ambulatory visits by major diagnostic category, females, U.S. Armed Forces, 2006

Diagnostic category (ICD-9-CM codes)	n	%	Diagnostic category (ICD-9-CM codes)	n	%
Infectious and parasitic diseases (001-139)	58,634		Digestive system (520 - 579)	58,417	
Viral & chlamydial infection cond classed elsewhere/site nos	14,979	25.5	Other noninfective gastroenteritis and colitis	20,077	34.4
Candidiasis	7,914	13.5	Functional digestive disorders, not elsewhere classified	7,594	13.0
Other diseases due to viruses and chlamydiae	7,548	12.9	Diseases of esophagus	6,349	10.9
Dermatophytosis	5,271	9.0	Gastritis and duodenitis	4,083	7.0
Intestinal infections due to other organisms	4,675	8.0	Dentofacial anomalies, including malocclusion	1,821	3.1
Neoplasms (140 - 239)	23,615		Genitourinary system (580 - 629)	143,923	
Uterine leiomyoma	4,167	17.6	Pain & other symptoms associated with female genital organs	19,295	13.4
Benign neoplasm of skin	3,308	14.0	Inflammatory disease of cervix, vagina and vulva	19,160	13.3
Cancer of female breast	2,670	11.3	Other disorders of urethra and urinary tract	18,574	12.9
Neoplasm of uncertain behavior, other & unspec sites	1,885	8.0	Menstrual disorder, other abnormal bleeding	18,113	12.6
Neoplasm of unspecified nature	1,621	6.9	Noninflammatory disorders of cervix	15,384	10.7
Endocrine, nutrition, immunity (240 - 279)	27,199		Pregnancy complications (630 - 677)	108,943	
Obesity and other hyperalimentation	5,885	21.6	Other complications of pregnancy, not elsewhere classified	14,380	13.2
Acquired hypothyroidism	4,492	16.5	Other current conditions in mother complicating pregnancy	12,969	11.9
Disorders of lipid metabolism	2,812	10.3	Early or threatened labor	9,298	8.5
Disorders of fluid, electrolyte and acid-base balance	2,604	9.6	Hemorrhage in early pregnancy	8,408	7.7
Ovarian dysfunction	2,015	7.4	Hypertension complicating pregnancy, childbirth & puerperium	6,130	5.6
Hematologic disorders (280 - 289)	6,982		Dermatological diseases (680 - 709)	76,761	
Other and unspecified anemias	2,546	36.5	Diseases of sebaceous glands	14,379	18.7
Iron deficiency anemias	1,820	26.1	Contact dermatitis and other eczema	12,750	16.6
Other diseases of blood and blood-forming organs	689	9.9	Other cellulitis and abscess	9,249	12.0
Hereditary hemolytic anemias	558	8.0	Diseases of hair and hair follicles	6,610	8.6
Purpura and other hemorrhagic conditions	447	6.4	Other disorders of skin and subcutaneous tissue	5,276	6.9
Mental disorders (290 - 319)	174,041		Musculoskeletal system (710 - 739)	363,996	
Adjustment reaction	48,340	27.8	Other and unspecified disorders of joint	97,498	26.8
Affective psychoses	29,702	17.1	Other and unspecified disorders of back	69,681	19.1
Neurotic disorders	24,328	14.0	Other disorders of soft tissues	30,899	8.5
Depressive disorder, not elsewhere classified	21,571	12.4	Nonallopathic lesions, not elsewhere classified	25,806	7.1
Alcohol dependence syndrome	12,138	7.0	Peripheral enthesopathies and allied syndromes	22,413	6.2
Nervous system (320 - 389)	148,852		Ill-defined conditions (780 - 799)	197,081	
Disorders of refraction and accommodation	61,088	41.0	Other symptoms involving abdomen and pelvis	35,199	17.9
Migraine	20,787	14.0	Symptoms involving respiratory system & other chest symptoms	27,619	14.0
Disorders of conjunctiva	10,459	7.0	General symptoms	27,583	14.0
Mononeuritis of upper limb, mononeuritis multiplex	5,729	3.8	Nonspecific abnormal histological/immunological findings	26,086	13.2
Suppurative and unspecified otitis media	4,114	2.8	Symptoms involving digestive system	20,927	10.6
Circulatory system (390 - 459)	23,653		Injury and poisoning (800 - 999)	135,161	
Essential hypertension	8,535	36.1	Sprains and strains of ankle and foot	17,082	12.6
Hemorrhoids	2,983	12.6	Sprains and strains of knee and leg	16,857	12.5
Diseases of capillaries	2,728	11.5	Sprains and strains of other/unspecified parts of back	15,000	11.1
Cardiac dysrhythmias	1,832	7.7	Certain adverse effects, not elsewhere classified	6,181	4.6
Varicose veins of lower extremities	1,433	6.1	Contusion of lower limb and of other & unspecified sites	5,142	3.8
Respiratory system (460 - 519)	158,502		Other (V01-V85 and E81-E96)	1,408,825	
Acute upper respiratory infection of multiple/unspec site	49,983	31.5	Health examination, deployment-related	223,346	15.9
Allergic rhinitis	22,649	14.3	Physical therapy: therapeutic & remedial exercises	198,868	14.1
Acute pharyngitis	19,426	12.3	Routine gynecological examination	98,618	7.0
Asthma	10,911	6.9	Supervision of other normal pregnancy	71,530	5.1
Acute sinusitis	9,816	6.2	Supervision of normal first pregnancy	50,624	3.6

Figure 2: Rate of ambulatory visits, by major diagnostic category, by age and gender, U.S. Armed Forces, 2006



¹ Rates expressed as hospitalizations per 1,000 person-years.

of “quarters” or limited duty dispositions were injuries and poisonings (36.7%), musculoskeletal and connective tissue disorders (30.1%), digestive disorders (28.8%), and respiratory illnesses (26.2%). Musculoskeletal/connective tissue disorders and injuries/poisonings accounted for more than two-thirds of all “limited duty” dispositions, while respiratory illnesses accounted for more than twice as many “quarters” dispositions (n= 83,225) as any other category of diagnoses (Figure 3).

and more than two-thirds of all “limited duty” dispositions among active component service members.

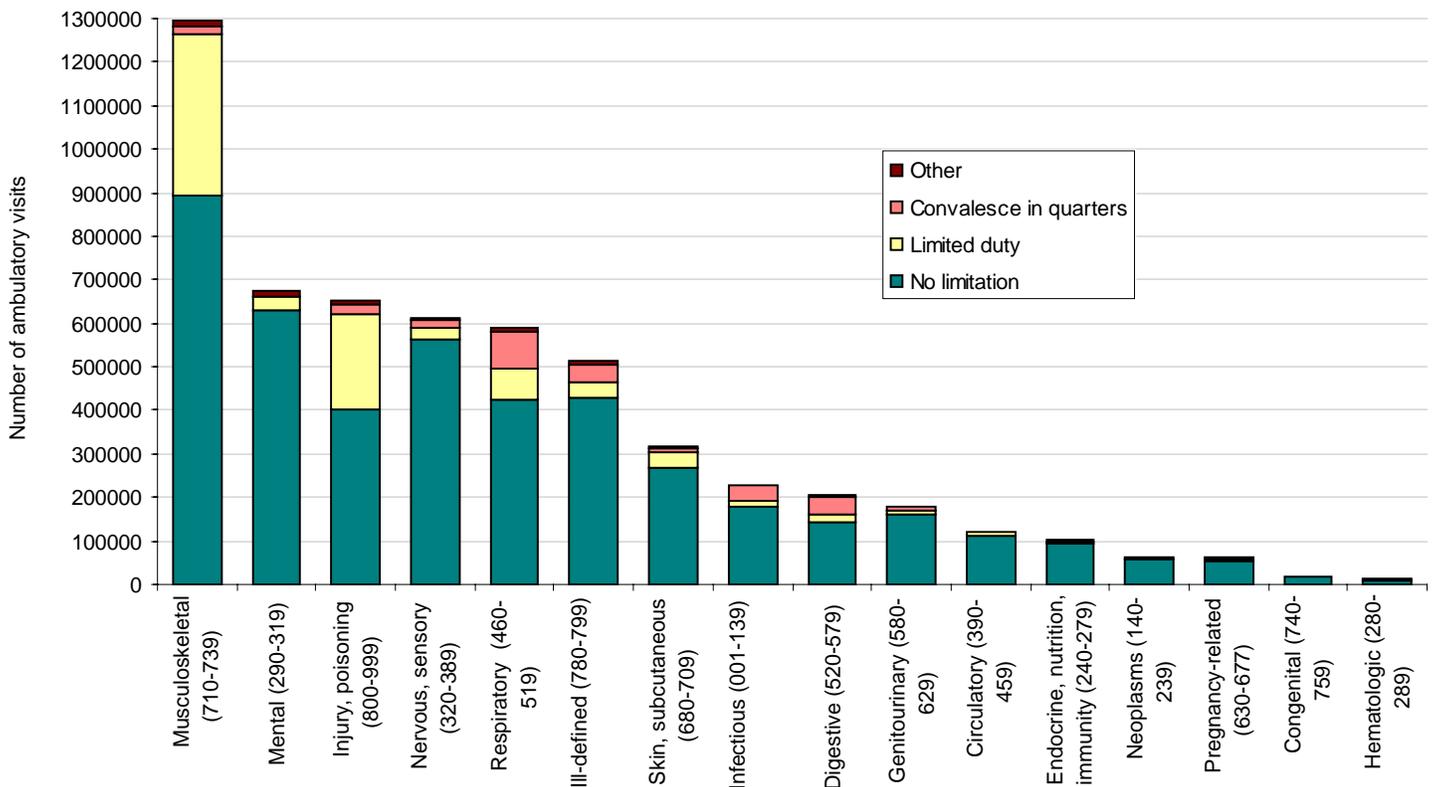
Of note, however, in the past two years, there has been a sharp increase in the number of reported mental health-related visits and in turn, the rank order of mental disorders as a cause of injury and injury-related visits overall. This undoubtedly reflects the U.S. military’s efforts to increase knowledge and awareness – particularly regarding post-traumatic stress-related symptoms – among service members and their leaders; to identify recent redeployers from Afghanistan and Iraq who may benefit from mental health care; and to decrease barriers to and stigmas associated with mental health care seeking.

These findings should be interpreted in light of the fact that records of ambulatory care delivered by unit medics and by deployed medical treatment facilities (including those in Afghanistan, Iraq, and at sea) are not archived in the Defense Medical Surveillance System and thus not included in this report.

Editorial comment:

In the past five years, the distributions of illness and injury-related ambulatory visits in relation to their reported causes have been fairly stable. As in the past, in 2006, musculoskeletal/connective tissue disorders and injuries/poisonings accounted for more than one-third of all visits

Figure 3. Ambulatory visits in relation to reported dispositions, by diagnostic category, active components, U.S. Armed Forces, 2006



Absolute and relative morbidity burdens attributable to various illnesses and injuries, U.S. Armed Forces, 2006

Priorities and resources for primary, secondary, and tertiary illness and injury prevention activities depend on perceptions of their relative “importance.” Several classification systems and morbidity measures have been developed to quantify the “public health burdens” that are attributable to various illnesses and injuries in defined populations and settings.¹ Not surprisingly, different classification systems and morbidity measures lead to different rankings of illness and injury-specific burdens.² For example, in a given population and setting, the illnesses and injuries that account for the most hospitalizations likely differ from those that account for the most outpatient encounters; and the illnesses and injuries that account for the most medical encounters overall likely differ from those that affect the most individuals, have the most debilitating or long-lasting effects, and so on.² Thus, in a given population and setting, the classification system or measure that is used to quantify illness and injury-specific morbidity burdens determines to a large extent conclusions regarding the relative “importance” of various conditions and/or causes.

This annual summary uses several measures to estimate health care burdens attributable to various illnesses and injuries among members of the U.S. Armed Forces.

Methods:

For this summary, we defined illnesses and injuries by grouping related ICD-9-CM coded diagnoses (at the 3-digit level) based on a modified version of the classification system developed for the Global Burden of Disease (GBD) Study.¹ In general, the system groups diagnoses that have common pathophysiologic or etiologic bases and/or significant international health policymaking importance. For our purposes, we isolated some diagnoses (e.g., mental disorders) that were grouped with others in the GBD system to increase military relevance, and we categorized injuries by anatomic sites rather than causes (because external causes of injuries are not routinely reported in military outpatient records).

To estimate the health care burdens attributable to various illnesses and injuries, we summarized the inpatient and outpatient experiences of all active component service members during 2006 to estimate the total numbers of medical encounters for and service members affected by each illness and injury. In addition, we quantified the total hospital bed-days associated with each illness and injury as an indicator of the relative severities and health care costs attributable to them.

Morbidity burdens, by illness and injury category:

As in the past, in 2006, more than twice as many service members received medical care for injuries than any category of morbidity (**Figure 1**). Together, injuries and mental disorders accounted for approximately 40% of all illness and injury-related medical encounters and nearly one-half (49.7%) of all hospital bed days (**Figure 1**). Of note, “maternal” conditions accounted for fewer than 2.0% of all medical encounters but more than 15% of all hospital bed-days (**Figure 1**).

Medical encounters, by specific illness/injury:

In 2006, 11 (8.5% of all) conditions accounted for approximately one-half (49.9%) of all illness and injury-related medical encounters. Among the leading sources of medical encounters were injuries of the back/abdomen, knee, foot/ankle, and arm/shoulder; upper respiratory infections; disorders of refraction/accommodation; and substance abuse disorders (**Table 1**).

Individuals affected, by specific illness/injury:

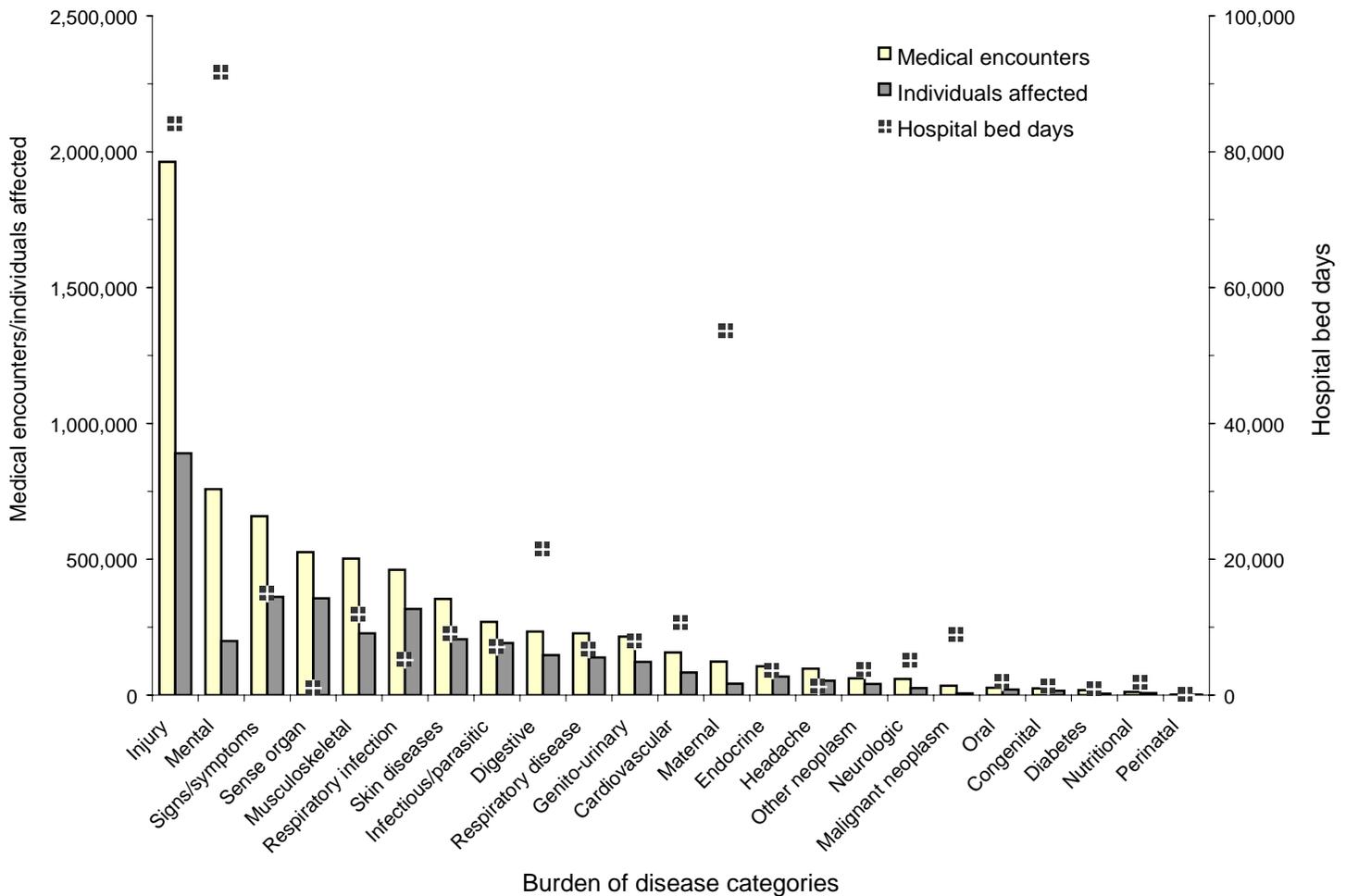
As in recent years, in 2006, more service members received medical care for upper respiratory infections than any other condition (**Table 1**). Six of the 13 conditions that affected the most service members were injuries: of the back/abdomen, foot/ankle, knee, arm/shoulder, head/neck, and “unspecified” (**Table 1**).

Hospital bed-days, by specific illness/injury:

As in the past, in 2006, deliveries of newborn infants (9.9%), mood disorders (9.2%), substance abuse disorders (5.3%), and complications of pregnancy (5.0%) were the leading sources of hospital bed-days (**Table 1**). Ten (7.8% of all) conditions accounted for more than half (51.1%) of all hospital bed-days. The leading sources of hospital bed-days were concentrated among mental disorders (mood, substance abuse, adjustment reaction, anxiety, and psychosis), injuries (back/abdomen, head/neck, leg, arm/shoulder, foot/ankle), and maternal (delivery and complications of pregnancy) (**Table 1**).

Relationships between health care burden indicators:

As in the past, there was a strong correlation between the number of medical encounters attributable to various conditions and the number of individuals affected by

Figure 1. Medical encounters, individuals affected, and hospital bed days, by burden of disease categories, U.S. Armed Forces, 2006

them. For example, 11 of the 12 leading causes of medical encounters were also among the top 12 conditions in regard to service members affected. In contrast, there were not strong relationships between hospital bed-days attributable to various conditions and either individuals affected by or medical encounters attributable to those conditions. For example, delivery of newborn, substance abuse disorders, and pregnancy complications affected relatively few individuals but were among the top five sources of hospital bed-days. Only two conditions — injury of back/abdomen and substance abuse disorders — were among the ten leading causes of both medical encounters and hospital bed-days.

Editorial comment:

Illnesses and injuries are burdens to the U.S. Armed Forces to the extent that they degrade the health, fitness, and operational capabilities of service members and consume

resources for diagnosis, treatment, rehabilitation, and disability compensation. To a significant degree, prevention priorities, practices, research activities, and associated resources should target illnesses and injuries that account for the largest morbidity burdens.

As in past years, the summaries presented here document that relative rankings of illnesses and injuries based on the health care burdens attributable to them significantly vary based on criteria used for grouping diagnoses (e.g., ICD-9-CM, Global Burden of Disease Classifications) and methods used for quantifying associated burdens (e.g., medical encounters, individuals affected, hospital bed-days). Also, as in the past, remarkably few illnesses and injuries — particularly back injuries, pregnancy-related conditions, and mental (including substance abuse) disorders — accounted for most of the total health care burden, regardless of how it is measured. For example, during calendar year 2006, 11 (of 129) conditions accounted for approximately half of all

medical encounters, and ten conditions accounted for more than half of all hospital bed-days.

Throughout military history, injuries, mental disorders (particularly related to combat), and substance abuse disorders have been leading causes of morbidity and lost duty time among service members.³⁻⁶ In 2006 in the U.S. Armed Forces, 14 conditions were among the top 25 in all three burden-related rankings. Of these, six were injuries (to the back/abdomen, knee, foot/ankle, arm/shoulder, head/neck, and unspecified), two were mental disorders (mood and adjustment), and the others were non-specific groups of related diagnoses (“all other” musculoskeletal, skin, digestive, infectious and genito-urinary diseases) (**Table 1**). Clearly, the prevention of injuries of all types and the detection, characterization, and management of mental disorders – including substance abuse and deployment stress-related disorders, e.g., PTSD – should be focuses of military public health and force health protection programs.

In summary, this analysis, like those of recent years, documents that a relatively few illnesses and injuries account for most of the total health care burden of U.S. service members. Illnesses and injuries that account for disproportionately large health care burdens (regardless of the metric used to measure it) should be targeted to

determine their susceptibilities to primary, secondary, and tertiary prevention efforts and given high priorities for prevention resources.

References:

1. The global burden of disease: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. Murray, CJ and Lopez, AD, eds. Harvard School of Public Health (on behalf of the World Health Organization and The World Bank), 1996, 120-2.
2. Brundage JF, Johnson KE, Lange JL, Rubertone MV. Comparing the population health impacts of medical conditions using routinely collected health care utilization data: nature and sources of variability. *Mil Med* 2006 Oct;171(10):937-42.
3. Jones BH, Perrotta DM, Canham-Chervak ML, Nee MA, Brundage JF. Injuries in the military: a review and commentary focused on prevention. *Am J Prev Med*. 2000 Apr;18(3 Suppl):71-84.
4. Ritchie EC, Benedek D, Malone R, Carr-Malone R. Psychiatry and the military: an update. *Psychiatr Clin North Am*. 2006 Sep;29(3):695-707.
5. Cozza KL, Hales RE. Psychiatry in the Army: a brief historical perspective and current developments. *Hosp Community Psychiatry*. 1991 Apr;42(4):413-8.
6. Watanabe HK, Harig PT, Rock NL, Koshes RJ. ch. 5, Alcohol and drug abuse and dependence, in Textbook of Military Medicine series. Military psychiatry: preparing in peace for war. Office of the Surgeon General, Department of the Army. Borden Institute. Washington DC. Viewed on 10 April 2007 at: http://www.bordeninstitute.army.mil/published_volumes/military_psychiatry/MPch5.pdf

Table 1. Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2006

Category*	Medical encounters†		Individuals affected‡		Hospital bed days		Category*	Medical encounters†		Individuals affected‡		Hospital bed days	
	n	Rank	n	Rank	n	Rank		n	Rank	n	Rank	n	Rank
Injury and poisoning							Skin diseases						
Back, abdomen	418,510	(2)	158,993	(5)	15,416	(5)	All other skin diseases	255,375	(9)	136,046	(7)	8,792	(11)
Knee	321,633	(5)	120,151	(10)	4,148	(25)	Contact dermatitis	52,631	(33)	40,418	(24)	104	(97)
Foot, ankle	300,386	(6)	139,748	(6)	6,848	(16)	Sebacaceous gland diseases	46,652	(38)	29,292	(32)	68	(103)
Arm, shoulder	258,145	(8)	97,617	(12)	7,804	(15)	Infectious and parasitic diseases						
Unspecified injury	204,329	(12)	130,299	(8)	6,081	(18)	All other infectious & parasitic	155,926	(15)	102,957	(11)	4,463	(23)
Head and neck	163,755	(14)	81,454	(13)	13,957	(7)	Unspecified viral infection	47,088	(37)	39,470	(27)	356	(76)
Hand and wrist	127,447	(19)	69,041	(16)	3,377	(29)	Diarrheal diseases	26,426	(46)	21,168	(42)	717	(60)
Leg	90,721	(25)	39,248	(29)	11,990	(8)	STDs	25,417	(47)	18,823	(47)	675	(61)
Environmental	25,237	(48)	19,852	(45)	757	(57)	Chlamydia	4,721	(81)	4,320	(72)	19	(113)
Other complications NOS	16,237	(59)	8,862	(59)	8,795	(10)	Tuberculosis	4,519	(83)	3,007	(76)	179	(91)
Other injury from external causes	14,779	(61)	11,679	(56)	236	(86)	Hepatitis B and C	3,013	(90)	1,121	(89)	74	(101)
All other injury	12,573	(66)	8,022	(62)	1,422	(43)	Bacterial meningitis	880	(109)	394	(104)	263	(84)
Poisoning, drugs	4,427	(84)	2,621	(78)	2,743	(34)	Malaria	579	(113)	201	(109)	295	(81)
Poisoning, nondrug	4,319	(85)	3,192	(75)	431	(70)	Tropical cluster	479	(114)	105	(115)	15	(115)
Mental disorders							Intestinal nematode infection	128	(121)	123	(114)		
Substance abuse disorders	223,510	(10)	29,151	(33)	18,667	(3)	Digestive diseases						
Mood	167,835	(13)	40,040	(25)	32,360	(2)	All other digestive diseases	96,799	(22)	50,922	(20)	11,940	(9)
Adjustment	130,649	(18)	42,090	(22)	14,949	(6)	Other gastroenteritis and colitis	74,590	(28)	61,628	(17)	1,112	(50)
Anxiety	109,060	(20)	28,433	(34)	8,582	(13)	Esophagus disease	37,037	(41)	24,144	(40)	1,484	(42)
All other mental disorders	77,349	(27)	39,286	(28)	3,854	(28)	Inguinal hernia	14,417	(63)	6,263	(66)	735	(59)
Tobacco dependence	21,815	(52)	11,912	(55)	1,344	(44)	Appendicitis	7,234	(75)	2,798	(77)	5,337	(20)
Personality	13,666	(65)	5,161	(70)	3,152	(31)	Peptic ulcer disease	1,875	(100)	1,086	(91)	737	(58)
Psychotic	10,103	(69)	1,460	(86)	8,262	(14)	Cirrhosis of the liver	1,498	(103)	964	(95)	103	(98)
Somatoform	3,824	(87)	1,375	(88)	398	(74)	Respiratory diseases						
Signs and symptoms							Allergic rhinitis	81,664	(26)	46,640	(21)	68	(103)
All other signs and symptoms	429,594	(1)	230,215	(2)	8,756	(12)	All other respiratory diseases	50,252	(35)	27,006	(38)	5,377	(19)
Respiratory and chest	134,177	(17)	75,836	(15)	3,937	(26)	Asthma	36,597	(42)	17,313	(49)	631	(62)
Abdomen and pelvis	94,629	(24)	55,783	(18)	2,208	(35)	Chronic sinusitis	34,916	(43)	27,204	(37)	218	(87)
Sense organ diseases							Chronic obstructive pulmonary disease	23,721	(50)	19,974	(43)	372	(75)
Refraction/accommodation	299,949	(7)	216,970	(3)	3	(122)	Genito-urinary diseases						
All other sense organ diseases	210,087	(11)	129,520	(9)	1,019	(52)	All other genito-urinary diseases	135,900	(16)	78,255	(14)	4,543	(22)
Glaucoma	14,496	(62)	8,781	(60)	16	(114)	Female genital pain	19,489	(53)	12,207	(54)	548	(65)
Cataracts	1,611	(102)	911	(96)	13	(116)	Kidney stones	18,661	(55)	7,024	(64)	1,016	(53)
Musculoskeletal diseases							Menstrual disorders	18,292	(56)	12,378	(53)	498	(67)
All other musculoskeletal	363,664	(3)	165,213	(4)	6,483	(17)	Other breast disorders	15,847	(60)	8,728	(61)	416	(72)
Other back problems	95,753	(23)	37,699	(30)	3,338	(30)	Nephritis and nephrosis	5,045	(77)	1,497	(85)	873	(56)
Other knee disorders	18,242	(57)	9,213	(58)	1,095	(51)	Benign prostatic hypertrophy	2,787	(93)	1,880	(81)	3	(122)
Osteoarthritis	11,643	(67)	7,280	(63)	591	(63)	Cardiovascular diseases						
Other shoulder disorders	10,648	(68)	6,575	(65)	312	(79)	Essential hypertension	70,619	(29)	37,322	(31)	1,255	(47)
Rheumatoid arthritis	2,986	(91)	1,080	(92)	41	(107)	All other cardiovascular diseases	70,203	(30)	39,593	(26)	4,864	(21)
Respiratory infections							Ischemic heart disease	8,438	(74)	3,375	(74)	2,199	(36)
Upper respiratory infections	360,182	(4)	250,916	(1)	1,261	(46)	Cerebrovascular disease	4,932	(78)	1,692	(82)	1,804	(40)
Lower respiratory infections	68,973	(31)	41,369	(23)	3,879	(27)	Inflammatory	2,027	(98)	814	(97)	462	(68)
Otitis media	31,970	(45)	24,772	(39)	34	(109)	Rheumatic heart disease	790	(110)	567	(102)	66	(105)

*Categories defined in the Global Burden of Disease Study

†Medical encounters: total hospitalizations and ambulatory visits for the condition

‡Individuals affected: individuals with at least one hospitalizations or ambulatory visit for the condition

Table 1 Continued. Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2006

Category*	Medical encounters†		Individuals affected‡		Hospital bed days		Category*	Medical encounters†		Individuals affected‡		Hospital bed days	
	n	Rank	n	Rank	n	Rank		n	Rank	n	Rank	n	Rank
Maternal conditions							Headache						
Pregnancy complications	64,667	(32)	19,924	(44)	17,514	(4)	Headache	97,948	(21)	53,241	(19)	1,226	(48)
Delivery	47,125	(36)	16,442	(50)	34,955	(1)	Malignant neoplasms						
Ectopic/miscarriage/abortion	8,975	(72)	3,951	(73)	541	(66)	Lymphomas and multiple myeloma	5,718	(76)	700	(98)	1,211	(49)
Puerperium complications	2,336	(96)	1,411	(87)	572	(64)	All other malignant neoplasms	4,808	(79)	976	(94)	2,774	(33)
All other maternal disorders	33	(128)	16	(127)			Melanoma and other skin cancers	4,762	(80)	2,100	(79)	166	(94)
Endocrine disorders							Testicular cancer	3,362	(88)	587	(101)	444	(69)
All other endocrine disorders	51,100	(34)	28,056	(35)	3,143	(32)	Leukemia	3,200	(89)	184	(110)	1,973	(38)
Lipoid metabolism disorders	38,225	(40)	27,894	(36)	262	(85)	Colon and rectum cancers	2,848	(92)	258	(108)	422	(71)
Obesity	17,339	(58)	12,739	(52)	175	(92)	Breast cancer	2,719	(94)	344	(106)	190	(89)
Other neoplasms							Thyroid	1,642	(101)	380	(105)	311	(80)
All other neoplasms	33,359	(44)	22,201	(41)	2,029	(37)	Brain	1,481	(104)	175	(112)	318	(78)
Benign skin neoplasm	13,705	(64)	10,932	(57)	23	(112)	Prostate cancer	1,328	(105)	306	(107)	289	(83)
Lipoma	9,616	(70)	5,974	(67)	41	(107)	Mouth and oropharynx cancers	1,220	(107)	183	(111)	169	(93)
Uterine leiomyoma	4,596	(82)	2,005	(80)	1,528	(41)	Trachea,bronchus and lung cancers	633	(112)	63	(118)	188	(90)
Neurologic conditions							Ovary cancer	338	(115)	60	(119)	102	(99)
All other neurologic conditions	44,861	(39)	19,543	(46)	4,415	(24)	Bladder cancer	271	(116)	84	(116)	33	(110)
Other mononeuritis - upper and lower limbs	8,970	(73)	4,656	(71)	195	(88)	Cervix uteri cancer	187	(118)	41	(121)	30	(111)
Epilepsy	3,886	(86)	1,520	(84)	332	(77)	Pancreas cancer	179	(119)	20	(124)	100	(100)
Multiple sclerosis	2,176	(97)	566	(103)	131	(96)	Stomach cancer	113	(122)	26	(123)	57	(106)
Parkinson disease	93	(123)	39	(122)			Liver cancer	72	(124)	18	(126)	72	(102)
Alzheimer and other dementias	5	(129)	4	(129)			Esophagus cancer	64	(125)	13	(128)		

*Categories defined in the Global Burden of Disease Study

†Medical encounters: total hospitalizations and ambulatory visits for the condition

‡Individuals affected: individuals with at least one hospitalizations or ambulatory visit for the condition

Reportable medical events, active components, U.S. Armed Forces, 2006

In the U.S. Armed Forces, occurrences of medical events of inherent public health and/or military medical importance are reported through service-specific electronic reporting programs: the Army Reportable Medical Events System (RMES), the Air Force Reportable Event Surveillance System (AFRESS), and the Navy Reportable Disease System (NDRS). Army, Air Force, and Navy preventive medicine/public health activities at permanent installations worldwide collect and electronically transmit data regarding notifiable events to their respective service surveillance centers. From these centers, reports are forwarded to the Army Medical Surveillance Activity (AMSA). At AMSA, the data are integrated with personnel and other medical event data in the Defense Medical Surveillance System (DMSS).¹

Since 1998, 70 medical conditions² have been designated as "reportable" by the Department of Defense. The Army began electronic reporting of notifiable events in 1994 and in 2000, the medical surveillance centers of the Navy and Air Force began forwarding their reportable medical event case reports to AMSA. The integration of data from all of the services enables summaries and analyses across the entire U.S. Armed Forces. This report summarizes frequencies, rates, and trends (through calendar year 2006) of reportable medical events among active duty military personnel.

General:

During 2006, there were 14,006 reports of notifiable medical events that affected active component members of the U.S. Armed Forces. During the year, there were an average of 25.1, 8.8, and 4.5 case reports per day from Army, Air Force, and Navy medical treatment facilities, respectively. In 2006 compared to 2005, reports increased by 23% from Navy installations, decreased by 8% from Air Force installations, and were approximately the same from Army installations (Tables 1-3).

Sexually-transmitted infections:

In 2006, as in prior years, sexually-transmitted infections (due to chlamydia, gonorrhea, syphilis, and non-gonococcal urethritis) accounted for approximately 90.3% (n=12,644) of all notifiable event reports among active service members. *Chlamydia trachomatis* was the most frequently reported notifiable condition that affected service members (n=10,375, 74.1% of all reports).

Environmental:

During 2006, military medical facilities reported 567 heat- and 44 cold-related injuries of active service members. The number of reports of heat exhaustion from Army facilities in 2006 was higher than any of the previous four years; in contrast, Navy and Air Force facilities reported fewer or similar numbers of heat injuries in 2006 compared to recent years. The number of cold injury reports overall continued a declining trend (Tables 1-3).

Vaccine preventable illnesses:

In 2006, there were no reports of diphtheria, measles, rabies, rubella, tetanus, or yellow fever among active service members. Of other vaccine preventable diseases, there were significantly more reports of mumps and fewer of influenza in 2006 than 2005 (Tables 1-3).

Arthropod-transmitted diseases:

In 2006, as in 2005, the most frequently reported arthropod-transmitted disease among active service members was malaria (n=104). Reports of cutaneous leishmaniasis, which peaked in 2003, continued to decline in 2006. There were more reported cases of West Nile virus, and similar numbers of Lyme disease, dengue fever, and Rocky Mountain spotted fever in 2006 compared to recent years (Tables 1-3).

Food/water-transmitted infections:

In 2006, the most frequently reported food/water-transmitted infections among service members were salmonella, campylobacter, and giardia. Compared to the previous four years, in 2006, there were more reported cases of salmonella but fewer or similar numbers of other food/water-transmitted infections among active service members. As in prior years, there were three or fewer reported cases of cholera, typhoid fever, and *E. coli* O157:H7 (Tables 1-3).

Editorial comment:

In the military, surveillance of reportable conditions is meant to provide military public health officials with timely information regarding ongoing and emerging significant public health and/or force health protection problems. For example, exposures to significant health threats while deployed can be clinically expressed days to months after

Table 1. Reportable events* at U.S. Army medical treatment facilities† among active component personnel, 2002-2006

Diagnosis†	2002	2003	2004	2005	2006	Diagnosis†	2002	2003	2004	2005	2006
All reportable events	11074	8,761	8,945	9,135	9,162	Listeriosis	0	1	0	0	0
Amebiasis	1	0	1	2	2	Lyme disease	20	11	20	25	21
Anthrax	0	0	0	0	0	Malaria, falciparum	10	4	8	4	4
Biological warfare agent exposure	0	0	1	0	0	Malaria, malariae	0	0	0	0	3
Botulism	0	0	0	0	0	Malaria, ovale	1	0	1	0	1
Brucellosis	0	1	1	2	1	Malaria, unspecified	2	21	16	26	46
Campylobacter	58	36	35	52	46	Malaria, vivax	47	49	25	40	41
Carbon monoxide poisoning	0	0	0	0	2	Measles	0	0	0	1	0
Chemical agent exposure	0	0	0	0	0	Meningococcal meningitis	4	2	1	5	5
Chlamydia	7,393	5,581	5,876	6,055	6,505	Meningococcal septicemia	0	0	0	0	0
Cholera	0	0	0	0	1	Mumps	0	1	0	1	3
Coccidioidomycosis	6	1	2	5	3	Pertussis	1	0	20	7	8
Cold weather, frostbite	50	40	65	27	30	Plague	0	0	0	0	0
Cold weather, hypothermia	0	3	0	1	0	Poliomyelitis	0	0	0	0	0
Cold weather, immersion type	20	12	6	2	2	Q fever	1	3	1	2	2
Cold weather, unspecified	13	9	5	14	5	Rabies, human	0	0	0	0	0
Cryptosporidiosis	0	1	1	1	1	Relapsing fever	0	0	0	1	0
Cyclospora	0	0	1	0	0	Rheumatic fever, acute	0	0	0	0	1
Dengue fever	5	0	1	2	2	Rift Valley fever	0	0	0	0	0
Diphtheria	0	0	0	0	0	Rocky Mountain spotted fever	0	0	6	3	1
E. coli O157:H7	1	0	0	2	2	Rubella	0	0	0	0	0
Ehrlichiosis	0	0	0	0	0	Salmonellosis	46	31	30	26	43
Encephalitis	0	0	0	0	0	Schistosomiasis	0	0	0	0	0
Filariasis	0	0	1	0	0	Shigellosis	17	36	15	12	3
Giardiasis	11	18	19	13	7	Smallpox	0	0	0	0	0
Gonorrhea	2,093	1,317	1,340	1,459	1,383	Streptococcus, group A, invasive	3	4	2	2	8
H. influenzae, invasive	0	2	0	0	1	Syphilis, congenital	0	1	1	0	0
Hantavirus infection	0	2	0	4	1	Syphilis, latent	14	7	11	22	18
Heat exhaustion	272	132	301	364	376	Syphilis, primary/secondary	20	20	37	31	28
Heat stroke	94	93	168	133	109	Syphilis, tertiary	0	4	0	1	1
Hemorrhagic fever	0	1	0	0	0	Tetanus	0	0	0	0	0
Hepatitis A	4	8	7	7	5	Toxic shock syndrome	0	0	0	1	0
Hepatitis B	21	13	24	29	19	Trichinosis	1	0	1	0	1
Hepatitis C	3	6	24	34	22	Trypanosomiasis	0	0	0	0	0
Influenza	16	197	90	249	96	Tuberculosis, pulmonary	5	4	5	3	5
Lead poisoning	0	0	0	0	0	Tularemia	0	1	0	0	0
Legionellosis	1	0	0	0	0	Typhoid fever	0	0	0	0	1
Leishmaniasis, cutaneous	2	518	210	31	10	Typhus fever	0	0	0	0	0
Leishmaniasis, mucocutaneous	0	0	0	0	0	Urethritis, non-gonococcal	784	460	520	396	252
Leishmaniasis, unspecified	0	0	0	1	0	Vaccine, adverse event	6	77	21	21	5
Leishmaniasis, visceral	0	2	2	0	1	Varicella, active duty only	19	23	20	14	19
Leprosy	5	0	1	0	0	West Nile Virus	0	3	1	0	8
Leptospirosis	4	5	1	2	2	Yellow fever	0	0	0	0	0

*Events reported by April 7, 2007

†Tri-Service Reportable Events, May 2004

Table 2. Reportable events* at U.S. Air Force medical treatment facilities† among active component personnel, 2002-2006

Diagnosis†	2002	2003	2004	2005	2006	Diagnosis†	2002	2003	2004	2005	2006
All reportable events	5,615	5,513	4,617	2,894	1,891	Listeriosis	0	0	0	0	0
Amebiasis	1	1	0	2	1	Lyme disease	6	1	5	9	1
Anthrax	0	0	0	0	0	Malaria, falciparum	5	3	1	0	1
Biological warfare agent exposure	0	0	0	0	0	Malaria, malariae	0	0	0	0	0
Botulism	0	0	0	0	0	Malaria, ovale	0	0	0	0	2
Brucellosis	0	0	0	0	0	Malaria, unspecified	0	4	1	0	0
Campylobacter	31	22	27	11	0	Malaria, vivax	2	2	3	1	3
Carbon monoxide poisoning	0	0	0	1	1	Measles	0	0	0	0	0
Chemical agent exposure	0	0	1	0	0	Meningococcal meningitis	0	0	2	2	0
Chlamydia	4,750	4,631	4,025	2,434	1,622	Meningococcal septicemia	0	0	0	0	0
Cholera	0	0	0	0	2	Mumps	1	0	0	0	0
Coccidioidomycosis	2	0	0	1	1	Pertussis	0	2	17	4	4
Cold weather, frostbite	0	0	1	8	4	Plague	0	0	0	0	0
Cold weather, hypothermia	0	0	0	0	0	Poliomyelitis	0	0	0	0	0
Cold weather, immersion type	0	0	0	0	0	Q fever	0	2	0	0	0
Cold weather, unspecified	0	0	1	1	0	Rabies, human	0	0	0	0	0
Cryptosporidiosis	0	0	0	0	0	Relapsing fever	0	0	0	0	0
Cyclospora	0	0	0	0	0	Rheumatic fever, acute	0	0	1	0	0
Dengue fever	0	0	1	0	1	Rift Valley fever	0	0	0	0	0
Diphtheria	0	0	0	0	0	Rocky Mountain spotted fever	1	0	0	1	0
E. coli O157:H7	0	0	2	1	0	Rubella	0	0	0	0	0
Ehrlichiosis	0	0	0	0	0	Salmonellosis	14	18	17	11	5
Encephalitis	0	2	2	0	0	Schistosomiasis	0	0	0	0	0
Filariasis	0	0	0	0	0	Shigellosis	23	12	1	6	1
Giardiasis	13	9	6	10	3	Smallpox	0	0	0	1	0
Gonorrhea	416	460	340	160	146	Streptococcus, group A, invasive	3	3	2	2	0
H. influenzae, invasive	0	0	0	0	1	Syphilis, congenital	0	3	2	0	0
Hantavirus infection	0	0	0	0	1	Syphilis, latent	4	8	6	3	0
Heat exhaustion	20	12	6	0	0	Syphilis, primary/secondary	11	13	16	6	5
Heat stroke	0	0	1	0	0	Syphilis, tertiary	0	0	0	0	0
Hemorrhagic fever	0	0	0	0	0	Tetanus	0	0	0	0	0
Hepatitis A	7	3	2	1	2	Toxic shock syndrome	1	0	0	0	0
Hepatitis B	59	42	27	15	6	Trichinosis	1	2	2	1	0
Hepatitis C	35	15	17	6	2	Trypanosomiasis	0	0	0	0	0
Influenza	176	218	74	179	62	Tuberculosis, pulmonary	3	1	0	1	0
Lead poisoning	0	0	0	0	0	Tularemia	0	0	0	0	0
Legionellosis	2	2	0	0	0	Typhoid fever	0	1	0	0	0
Leishmaniasis, cutaneous	0	3	2	2	0	Typhus fever	0	0	0	0	0
Leishmaniasis, mucocutaneous	0	0	0	0	0	Urethritis, non-gonococcal	18	7	2	1	0
Leishmaniasis, unspecified	0	0	0	1	0	Vaccine, adverse event	0	0	0	3	8
Leishmaniasis, visceral	0	0	0	0	0	Varicella, active duty only	9	10	3	8	6
Leprosy	1	1	0	0	0	West Nile Virus	0	0	1	1	0
Leptospirosis	0	0	0	0	0	Yellow fever	0	0	0	0	0

*Events reported by April 7, 2007

†Tri-Service Reportable Events, May 2004

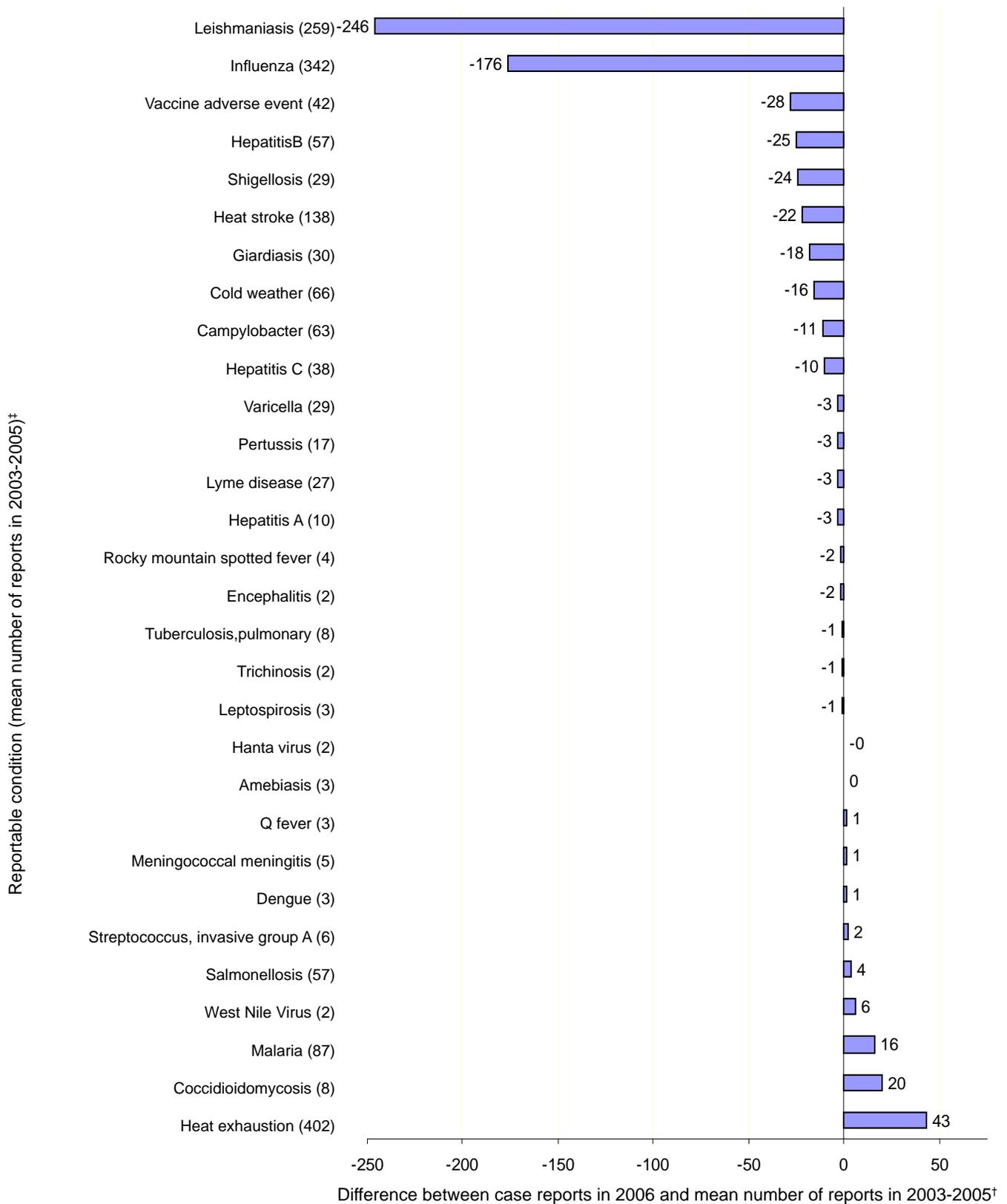
Table 3. Reportable events* at Navy medical treatment facilities† among active component personnel 2002-2006

Diagnosis†	2002	2003	2004	2005	2006	Diagnosis†	2002	2003	2004	2005	2006
All reportable events	3,087	1,726	1,677	1,333	1,641	Listeriosis	0	0	0	0	0
Amebiasis	0	0	0	2	0	Lyme disease	14	3	3	4	3
Anthrax	0	0	0	0	0	Malaria, falciparum	0	3	33	3	2
Biological warfare agent exposure	0	0	0	0	0	Malaria, malariae	0	0	0	0	0
Botulism	0	0	0	0	0	Malaria, ovale	0	0	0	0	0
Brucellosis	0	0	0	0	1	Malaria, unspecified	2	3	4	2	0
Campylobacter	8	1	3	3	8	Malaria, vivax	0	3	0	1	0
Carbon monoxide poisoning	0	0	0	0	0	Measles	0	0	0	0	0
Chemical agent exposure	1	0	0	0	0	Meningococcal meningitis	2	2	0	2	1
Chlamydia	1,936	1,255	1,087	899	1,212	Meningococcal septicemia	1	1	0	0	0
Cholera	1	0	0	0	0	Mumps	0	0	0	0	1
Coccidioidomycosis	7	5	1	9	24	Pertussis	0	0	0	2	2
Cold weather, frostbite	0	0	0	0	0	Plague	0	0	0	0	0
Cold weather, hypothermia	0	0	1	1	1	Poliomyelitis	0	0	0	0	0
Cold weather, immersion type	0	0	0	0	0	Q fever	0	0	0	1	2
Cold weather, unspecified	1	0	0	0	0	Rabies, human	0	0	0	1	0
Cryptosporidiosis	0	0	0	0	0	Relapsing fever	0	0	0	0	0
Cyclospora	0	0	0	0	0	Rheumatic fever, acute	1	0	0	0	0
Dengue fever	0	0	3	2	1	Rift Valley fever	0	0	0	0	0
Diphtheria	0	0	0	0	0	Rocky Mountain spotted fever	0	0	2	0	1
E. coli O157:H7	0	0	0	0	0	Rubella	0	0	0	0	0
Ehrlichiosis	0	0	0	0	0	Salmonellosis	8	18	5	14	15
Encephalitis	0	0	1	1	0	Schistosomiasis	1	0	0	0	0
Filariasis	0	0	0	0	0	Shigellosis	3	5	1	0	2
Giardiasis	6	4	8	2	3	Smallpox	0	0	0	0	0
Gonorrhea	454	240	214	150	234	Streptococcus, group A, invasive	15	2	2	0	0
H. influenzae, invasive	0	0	0	0	0	Syphilis, congenital	1	1	7	0	0
Hantavirus infection	0	0	0	1	0	Syphilis, latent	2	2	3	2	4
Heat exhaustion	168	102	128	160	70	Syphilis, primary/secondary	7	10	14	9	11
Heat stroke	25	8	6	5	8	Syphilis, tertiary	0	0	1	0	0
Hemorrhagic fever	0	0	0	0	0	Tetanus	0	0	0	0	0
Hepatitis A	0	0	2	1	0	Toxic shock syndrome	0	1	0	0	0
Hepatitis B	8	4	8	11	10	Trichinosis	2	0	0	0	1
Hepatitis C	3	3	4	5	7	Trypanosomiasis	0	0	0	0	0
Influenza	2	2	1	16	9	Tuberculosis, pulmonary	3	4	4	2	2
Lead poisoning	0	0	0	0	0	Tularemia	0	0	0	0	0
Legionellosis	0	0	0	0	0	Typhoid fever	0	0	0	0	0
Leishmaniasis, cutaneous	1	0	2	0	0	Typhus fever	0	1	0	0	0
Leishmaniasis, mucocutaneous	0	0	0	0	0	Urethritis, non-gonococcal	393	36	122	20	3
Leishmaniasis, unspecified	0	0	1	0	0	Vaccine, adverse event	3	4	1	0	1
Leishmaniasis, visceral	0	0	0	1	0	Varicella, active duty only	8	3	4	1	2
Leprosy	0	0	0	0	0	West Nile Virus	0	0	0	0	0
Leptospirosis	0	0	1	0	0	Yellow fever	0	0	0	0	0

*Events reported by April 7, 2007

†Tri-Service Reportable Events, May 2004

Figure 1. Number of reportable events* among active component service members during 2006† compared to the average during the period 2003-2005, U.S. Armed Forces



*Sexually transmitted diseases are excluded.

† Events reported by March 23, 2007.

‡ For diseases with three year totals of at least 6 cases. Averages are rounded to the nearest integer.

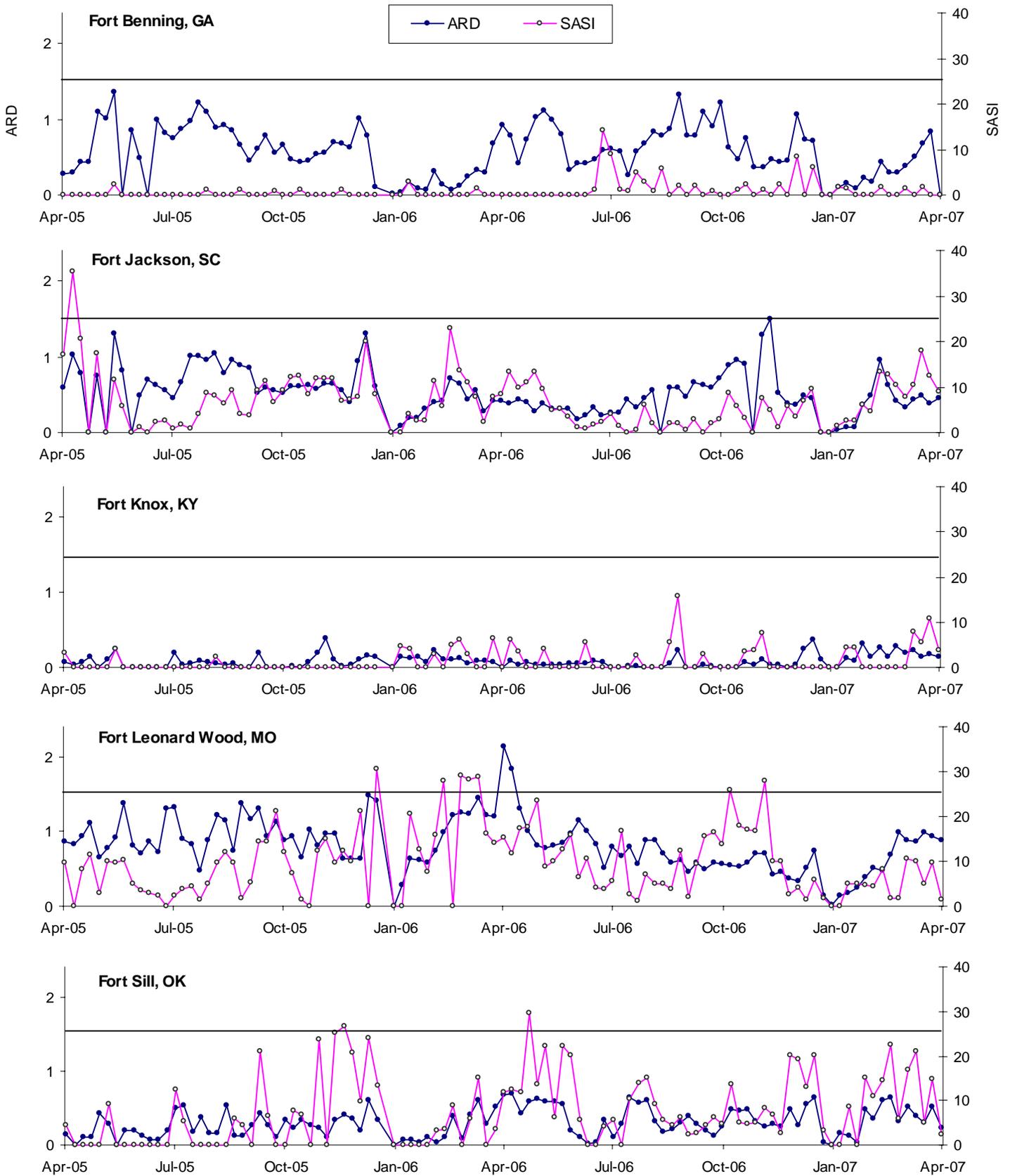
redeploying in many locations and settings. The integration of installation-specific reports at a central level enables the detection and characterization of widely disseminated and/or spreading health threats.

General summaries of reported medical conditions should be interpreted cautiously. For example, notifiable conditions are incompletely reported; and the completeness of reporting varies across Services, medical facilities, locations, settings, and conditions themselves.³⁻⁵ In addition, there are few or no reports of notifiable conditions among service members who are engaged in field training exercises or deployments — unless affected individuals receive care for the conditions at permanent military medical facilities or the cases are reported to military preventive medicine/public health officials at reporting sites. Thus, complete assessments of frequencies, rates, and trends of notifiable conditions require reviews of more than reported cases alone.

References:

1. Rubertone MV, Brundage JF. The Defense Medical Surveillance System and the Department of Defense Serum Repository: glimpses of the future of comprehensive public health surveillance. *Am J Pub Hlth* 2002 Dec;92(12):1900-4.
2. Tri-Service consensus list of reportable medical events: Completeness and timeliness of reporting in the Army, January-June 1998. *MSMR*, 1998;4(8):2-11.
3. Nagaraj BE. Completeness and timeliness of reporting of hospitalized notifiable conditions, active duty service members, U.S. Army medical treatment facilities, 1998-2003. *MSMR*, 2004, 10(4):9-13.
4. Completeness of reporting of hospitalized notifiable conditions among active duty service members, U.S. Naval medical treatment facilities, 1998-2003. *MSMR*, 2004, 10(4):14-7.
5. Completeness of reporting of hospitalized notifiable conditions among active duty service members, U.S. Air Force medical treatment facilities, 1998-2003. *MSMR*, 2004, 10(4):18-21.

Acute respiratory disease (ARD)* and streptococcal pharyngitis (SASI)†, Army basic combat training centers, by year through April, 2007

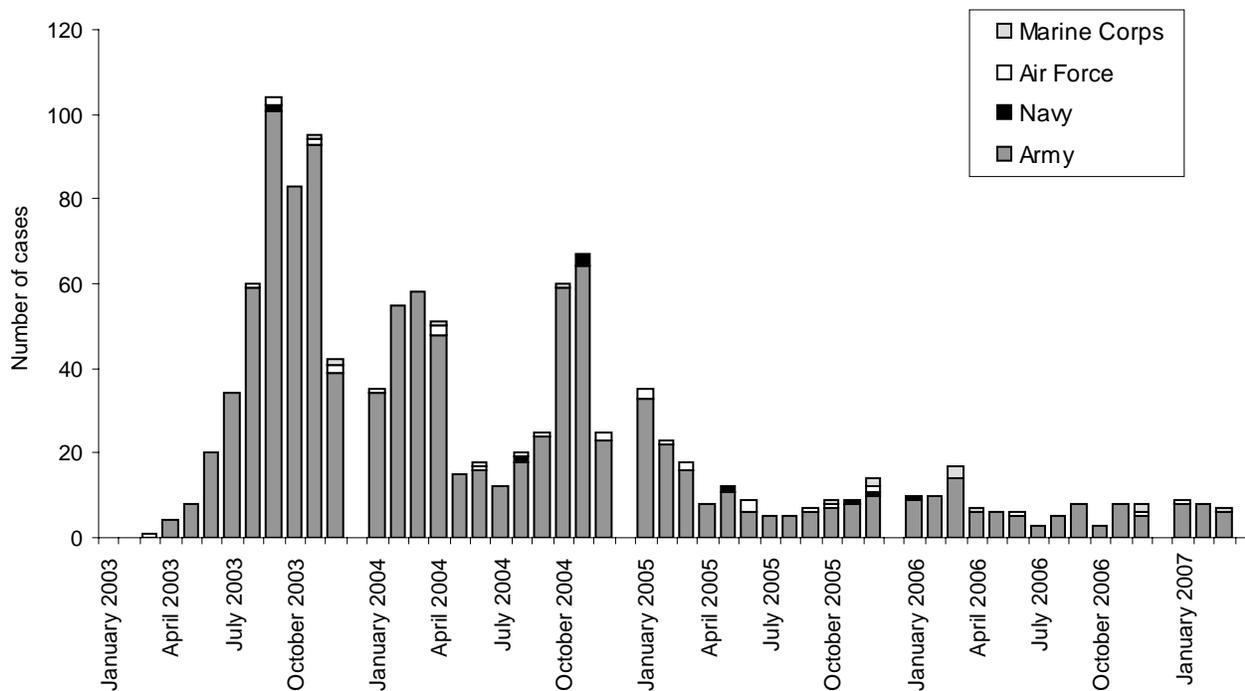


* ARD rate = cases per 100 trainees per week

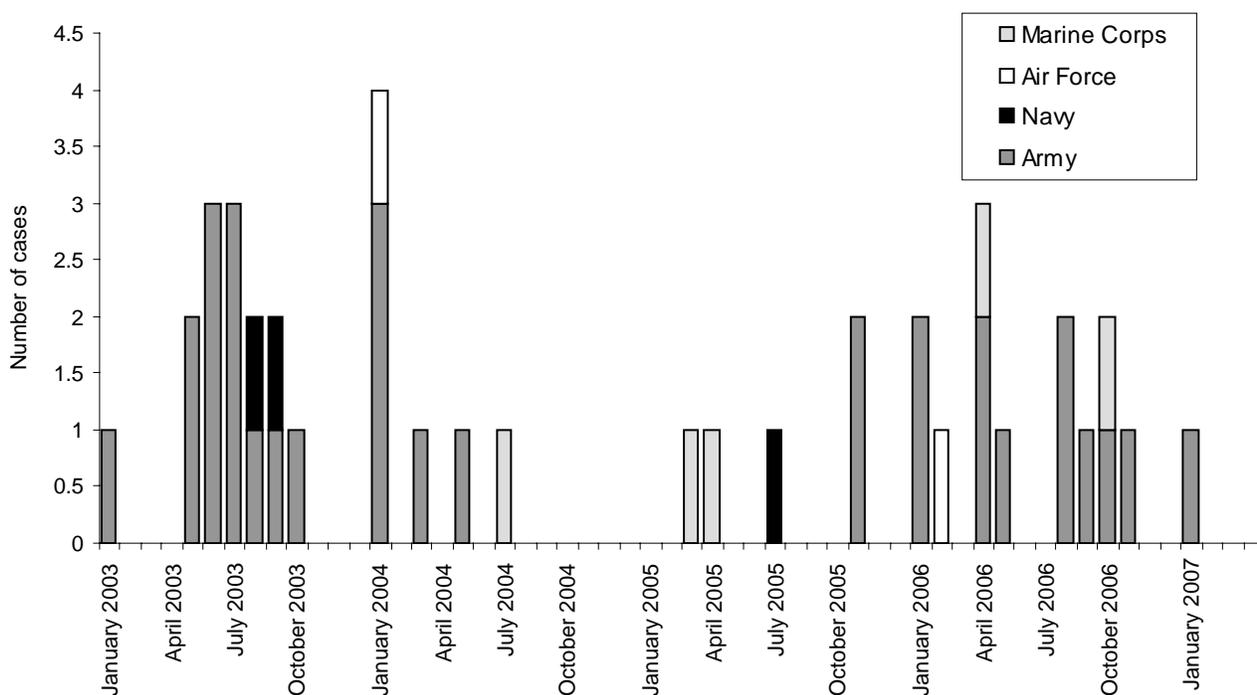
† SASI (Strep ARD Surveillance Index) = (ARD rate) x (rate of Group A beta-hemolytic strep)

Deployment related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - January 2007

Leishmaniasis (ICD-9: 085.0 to 085.9)*



Acute respiratory failure/ARDS (ICD-9: 518.81, 518.82)†



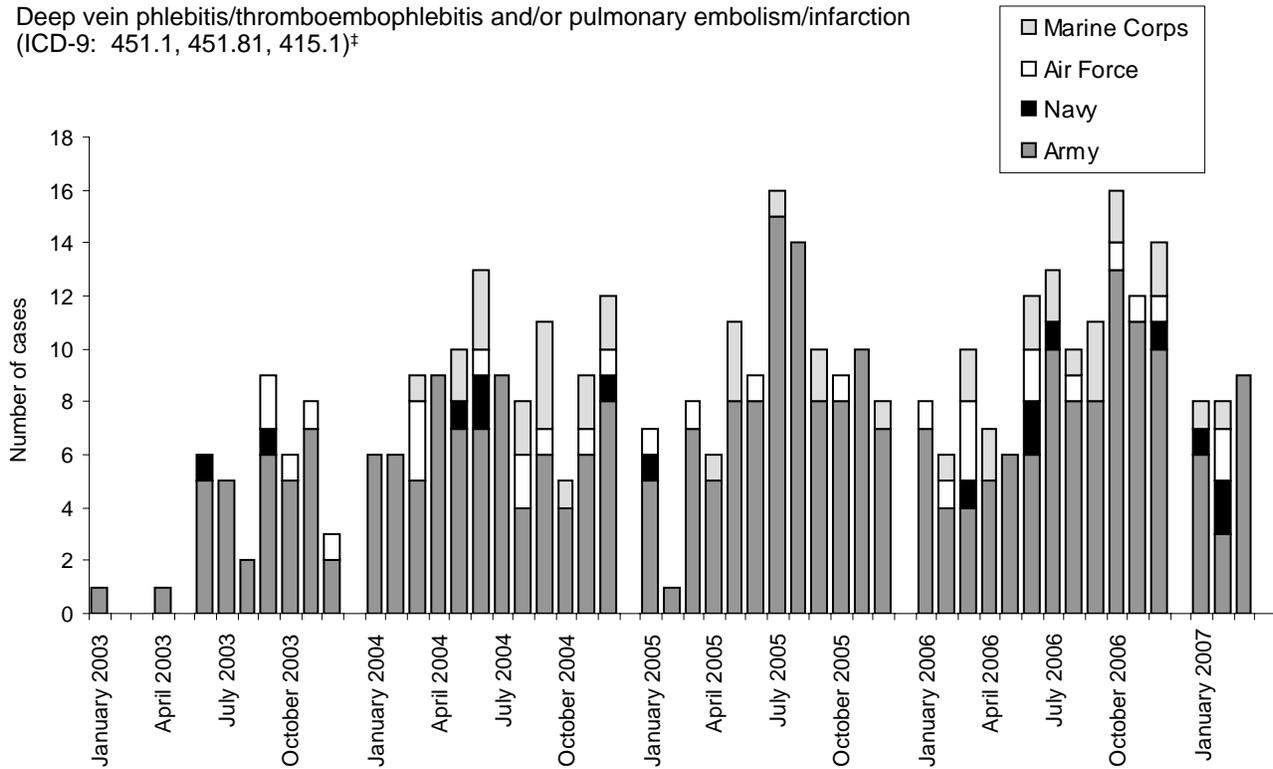
Footnotes:

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

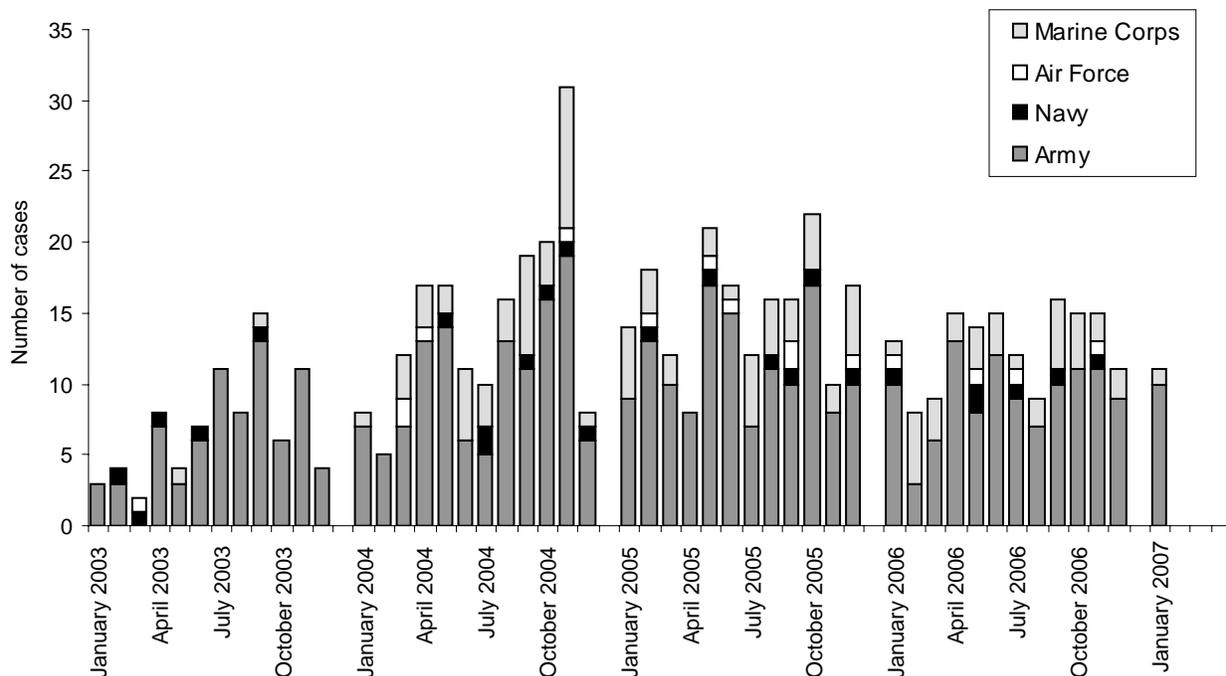
† Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 30 days of returning from OEF/OIF.

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - January 2007

Deep vein phlebitis/thromboembophlebitis and/or pulmonary embolism/infarction
(ICD-9: 451.1, 451.81, 415.1)*



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



Footnotes:

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

§ Indicator diagnosis (one per individual) during a hospitalization of a servicemember during/after service in OEF/OIF.

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