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Medical Experiences of Servicemembers within One Year after Returning from Deployments in Central Asia/Middle East, Active Components, U.S. Armed Forces

Since October 2001, more than 900,000 members of the U.S. military have participated in military operations (e.g., combat, counterinsurgency, peacekeeping, humanitarian, training) in Central Asia and/or the Middle East. The medical threats that servicemembers have encountered while deployed vary depending on the times, locations, natures, intensities, and durations of their activities. In turn, there are numerous and varied concerns regarding the potential effects of deployment on the health of servicemembers after they return.[1]

Since October 2003, the DoD has conducted health assessments of all servicemembers after they deploy overseas. The assessments are designed primarily to identify, assess, and treat the medical concerns of individuals as soon as possible after they return.[1] Findings from these assessments have been summarized periodically; however, there have not been systematic analyses of the medical experiences of deployment veterans in general or in relation to their military counterparts.

For this report, we compared the medical experiences of servicemembers within one year after returning from Central Asia and/or the Middle East with those of all other individuals in active military service during the same period.

Methods: The surveillance period was defined as 1 December 2001 through 31 December 2005. The surveillance population included all individuals who served in an active component of the U.S. Armed Forces any time during the surveillance period. For this summary, the surveillance population was divided into two dynamic cohorts: "recent redeployers" (military servicemembers within 365 days of returning from deployment to Central Asia or the Middle East) and "all others." Records that document the dates of participation of servicemembers in Operation Enduring Freedom (Central Asia) and Operation Iraqi Freedom (Middle East) are routinely transmitted from the Defense Manpower Data System to the Army Medical Surveillance Activity for integration in the Defense Medical Surveillance System. These records were used to identify all active military service within 365 days of each individual's return from Operation Enduring Freedom or Operation Iraqi Freedom.

All medical encounters of active servicemembers during the surveillance period where the primary (first listed) diagnosis was an illness or injury-related condition (as specified by 3-digit codes of the ICD-9-CM) were ascertained from electronic records of hospitalizations and ambulatory visits that are routinely collected by the U.S. Military Health System and integrated in the Defense Medical Surveillance System. To reduce the impact of multiple visits for the same illness or injury, for each individual, only one encounter per condition per 30-day period was included for analysis. Frequencies, rates, and rate ratios (recent redeployers versus all others) of incident diagnoses were calculated for each cohort. In addition, for each condition, "excess" incident diagnoses among recent redeployers were calculated by subtracting the "expected" number of diagnoses from the number "observed." "Expected" numbers of diagnoses were estimated by multiplying the rate of incident diagnoses in the "all others" (referent) cohort by the total service (person-time) of the "recent redeployers" cohort.

Results:

General: During the period, active servicemembers within one year of redeploying from OEF/OIF had 2,079,085 incident diagnoses (rate: 2,074.0 diagnoses/1,000 person-years [p-yrs]) of illnesses or injuries. During the same period, servicemembers who were not recent redeployers had 17,042,741 incident diagnoses (rate: 3,253.5 diagnoses/1,000 p-yrs) of illnesses or injuries. Thus, the rate of incident diagnoses of illnesses and injuries (overall) among redeployers was approximately one-third lower than the rate among all others (relative rate [RR], redeployers versus others: 0.64).

Major diagnostic categories: Among recent redeployers, the highest rates of incident diagnoses by major categories of the ICD-9-CM were for "musculoskeletal disorders," "injuries and poisonings," and "signs, symptoms and ill-defined

conditions" (Figure 1). During the first year after redeploying, there were monotonic increases in rates of incident diagnoses for "respiratory disorders," "circulatory disorders," "signs, symptoms, and ill-defined conditions," and "pregnancy-related conditions" (Figure 1).

Specific illnesses/injuries: The diagnoses (3-digit codes of ICD-9-CM) that accounted for the most incident encounters among recent redeployers were remarkably similar to those among all others (Table 1). For example, the eight leading causes of incident encounters among recent redeployers and all others were identical (Table 1). Also, 19 diagnoses were among the 20 leading causes of incident encounters among both recent redeployers and all others (Table 1). Of note, of the 19 leading causes of incident encounters in both cohorts, the biggest difference in rank order was for "adjustment reaction" which was ninth among recent redeployers and 19th among all others. Even so, rates were lower among redeployers than all others for all of the 20 leading causes of incident encounters among redeployers (including adjustment reactions) (Table 1).

Condition-specific relative rates (unadjusted): The distribution of unadjusted relative rates (recent redeployers versus all others) for all diagnoses was relatively symmetrical around a median of 0.63 (25-75%: 0.50-0.78; 10-90%ile: 0.35-1.03) (Figure 2). Fewer than one-ninth of all diagnoses (n=101, 11.1%) had relative rates greater than 1.0. Of the 46 diagnoses with relative rates in the top 5% of all relative rates (RRs>1.33), more than 90% were "injuries and poisonings" (n=25) or "infectious and parasitic diseases" (n=17) (Table 2). The only non-injury, non-infectious disease-related diagnoses with relative rates in the top 5% were "carcinoma *in situ* of respiratory system" (RR: 1.52), "other nutritional deficiencies" (RR: 1.43), "acute reaction to stress"

Figure 1. Rates of incident diagnoses of illnesses and injuries, by time since redeployment from Central Asia/Middle East, by major diagnostic categories of ICD-9-CM, active components, U.S. Armed Forces.

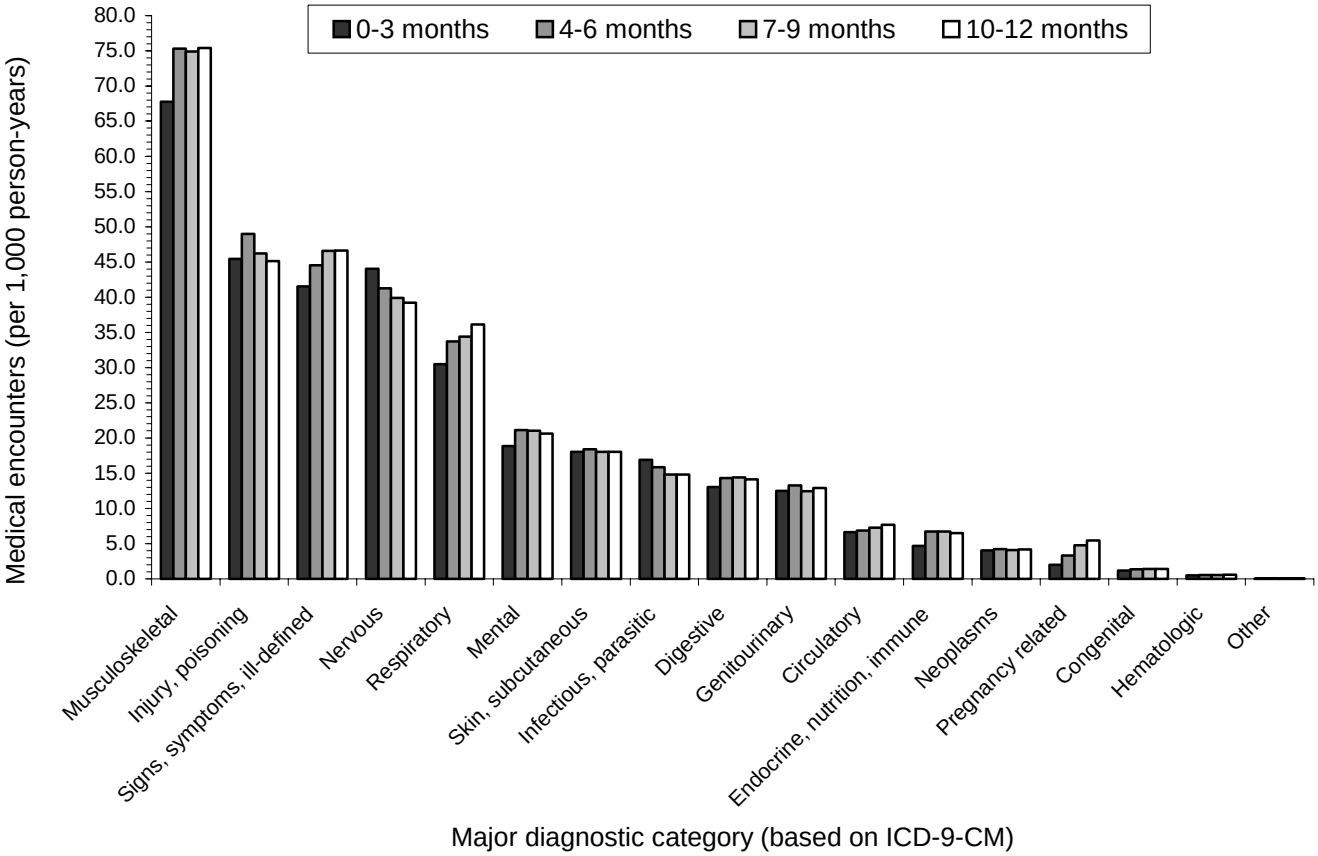

Table 1. Diagnoses (at the 3-digit level of ICD-9-CM) with the highest rates (top 5%) of incident medical encounters among recent redeployers (and comparable rates among others), active components, U.S. Armed Forces

Diagnosis (3-digit ICD-9-CM)		Redeployers Number	Redeployers Rate[1]	Others Number	Others Rate[1]	Rel rate
367	Disorders of refraction and accommodation	132,819	13,249.3	1,031,234	19,686.3	0.67
719	Other and unspecified disorders of joint	114,398	11,411.7	869,088	16,590.9	0.69
799	Other ill-defined & unknown causes of morbidity & mortalty	89,337	8,911.8	607,426	11,595.8	0.77
724	Other and unspecified disorders of back	87,763	8,754.8	625,904	11,948.5	0.73
465	Acute upper respiratory infection of multiple or unspec site	61,958	6,180.6	831,496	15,873.3	0.39
729	Other disorders of soft tissues	38,679	3,858.4	341,312	6,515.7	0.59
786	Symptoms involving resp system, other chest symptoms	36,936	3,684.5	293,759	5,607.9	0.66
726	Peripheral enthesopathies and allied syndromes	35,061	3,497.5	307,298	5,866.3	0.60
309	Adjustment reaction	31,134	3,105.8	175,945	3,358.8	0.92
780	General symptoms	28,573	2,850.3	260,918	4,980.9	0.57
845	Sprains and strains of ankle and foot	28,559	2,848.9	240,063	4,582.8	0.62
462	Acute pharyngitis	27,565	2,749.7	250,841	4,788.6	0.57
789	Other symptoms involving abdomen and pelvis	27,278	2,721.1	228,912	4,369.9	0.62
558	Other noninfective gastroenteritis and colitis	26,830	2,676.4	224,779	4,291.0	0.62
847	Sprains and strains of other and unspecified parts of back	26,554	2,648.9	181,833	3,471.2	0.76
477	Allergic rhinitis	25,709	2,564.6	217,918	4,160.1	0.62
844	Sprains and strains of knee and leg	24,827	2,476.6	204,651	3,906.8	0.63
784	Symptoms involving head and neck	21,145	2,109.3	187,564	3,580.6	0.59
728	Disorders of muscle, ligament and fascia	20,916	2,086.5	161,888	3,090.4	0.68
692	Contact dermatitis and other eczema	20,208	2,015.8	168,945	3,225.2	0.63
787	Symptoms involving digestive system	20,049	2,000.0	163,244	3,116.3	0.64
079	Viral, chlamydial infection cond classed elsewhere/site nos	19,466	1,941.8	276,789	5,283.9	0.37
305	Nondependent abuse of drugs	18,259	1,821.4	120,336	2,297.2	0.79
717	Internal derangement of knee	18,174	1,812.9	153,213	2,924.8	0.62
706	Diseases of sebaceous glands	17,772	1,772.8	139,835	2,669.5	0.66
401	Essential hypertension	17,756	1,771.2	163,952	3,129.8	0.57
078	Other diseases due to viruses and chlamydiae	17,700	1,765.7	119,607	2,283.3	0.77
959	Injury, other and unspecified	17,350	1,730.7	117,487	2,242.8	0.77
727	Other disorders of synovium, tendon and bursa	17,157	1,711.5	132,641	2,532.1	0.68
782	Symptoms involving skin and other integumentary tissue	16,881	1,684.0	130,022	2,482.1	0.68
795	Nonspecific abnormal histologic, immunologic findings	16,514	1,647.3	104,828	2,001.2	0.82
461	Acute sinusitis	15,867	1,582.8	168,461	3,215.9	0.49
300	Neurotic disorders	15,608	1,557.0	124,029	2,367.7	0.66
722	Intervertebral disc disorders	15,453	1,541.5	112,246	2,142.8	0.72
389	Hearing loss	15,145	1,510.8	102,755	1,961.6	0.77
311	Depressive disorder, nec	14,089	1,405.4	100,952	1,927.2	0.73
110	Dermatophytosis	13,950	1,391.6	110,059	2,101.0	0.66
372	Disorders of conjunctiva	13,920	1,388.6	136,310	2,602.2	0.53
723	Other disorders of cervical region	13,404	1,337.1	102,222	1,951.4	0.69
530	Diseases of esophagus	13,079	1,304.7	98,869	1,887.4	0.69
704	Diseases of hair and hair follicles	12,793	1,276.2	104,218	1,989.5	0.64
840	Sprains and strains of shoulder and upper arm	12,572	1,254.1	87,427	1,669.0	0.75
739	Nonallopathic lesions, nec	11,914	1,188.5	86,082	1,643.3	0.72
272	Disorders of lipoid metabolism	11,391	1,136.3	111,525	2,129.0	0.53
924	Contusion of lower limb, other, and unspec sites	11,266	1,123.8	97,672	1,864.6	0.60
682	Other cellulitis and abscess	11,106	1,107.9	102,333	1,953.5	0.57

[1] Rates are expressed as incident diagnoses per 100,000 person-years.

(RR: 1.39), and "pneumopathy due to inhalation of other dust " (RR: 1.36) (Table 2).

Of the 10 diagnoses with the highest relative rates overall, four were related to traumatic amputations and six were infectious diseases (Table 2). Of the six infectious diseases with the highest relative rates, two were artifacts of miscoding (i.e., tuberculosis, mosquito-borne viral encephalitis), and two others were very rare (i.e., brucellosis, glanders) among both redeployers and others. Thus, there were only two infectious disease diagnoses—leishmaniasis and amebiasis—with relative rates among the top 10 overall that were not rare or artifacts of miscoding (Table 2).

"Excess" incident diagnoses among redeployers: The largest excesses of incident diagnoses among recent redeployers relative to others were for "tuberculosis of other organs" (likely due to miscoding of skin tests), "anthrax" (likely due to miscoding of immunizations), "leishmaniasis," and "acute reaction to stress" (Table 3). Of the 50 conditions with the most excess incident diagnoses among redeployers, more than three-fourths were directly (n=37) or indirectly (n=2: "other disorders of tympanic membrane," including ruptures; "nonpsychotic disease due to organic brain injury") related to injuries; approximately one-sixth (n=8) were infection-related (of which four were likely related to miscoding of tests [e.g., tuberculosis] or immunizations [e.g., anthrax, mosquito-borne viral encephalitis]; and only three were unrelated to injuries or infectious diseases—"acute reaction to stress," "redundant prepuce and phimosis," and "other nutritional deficiencies." Thus, traumatic injuries plus "leishmaniasis" and "acute reactions to stress" were the leading causes by far of excess incident diagnoses among redeployers (Table 3).

Data summaries by Jenny C. Lay, MPH, Analysis Group, Army Medical Surveillance Activity.

Figure 2. Distribution of relative rates (unadjusted) of all diagnoses (at 3-digit level of ICD-9-CM), recent redeployers versus all others, active components, U.S. Armed Forces.

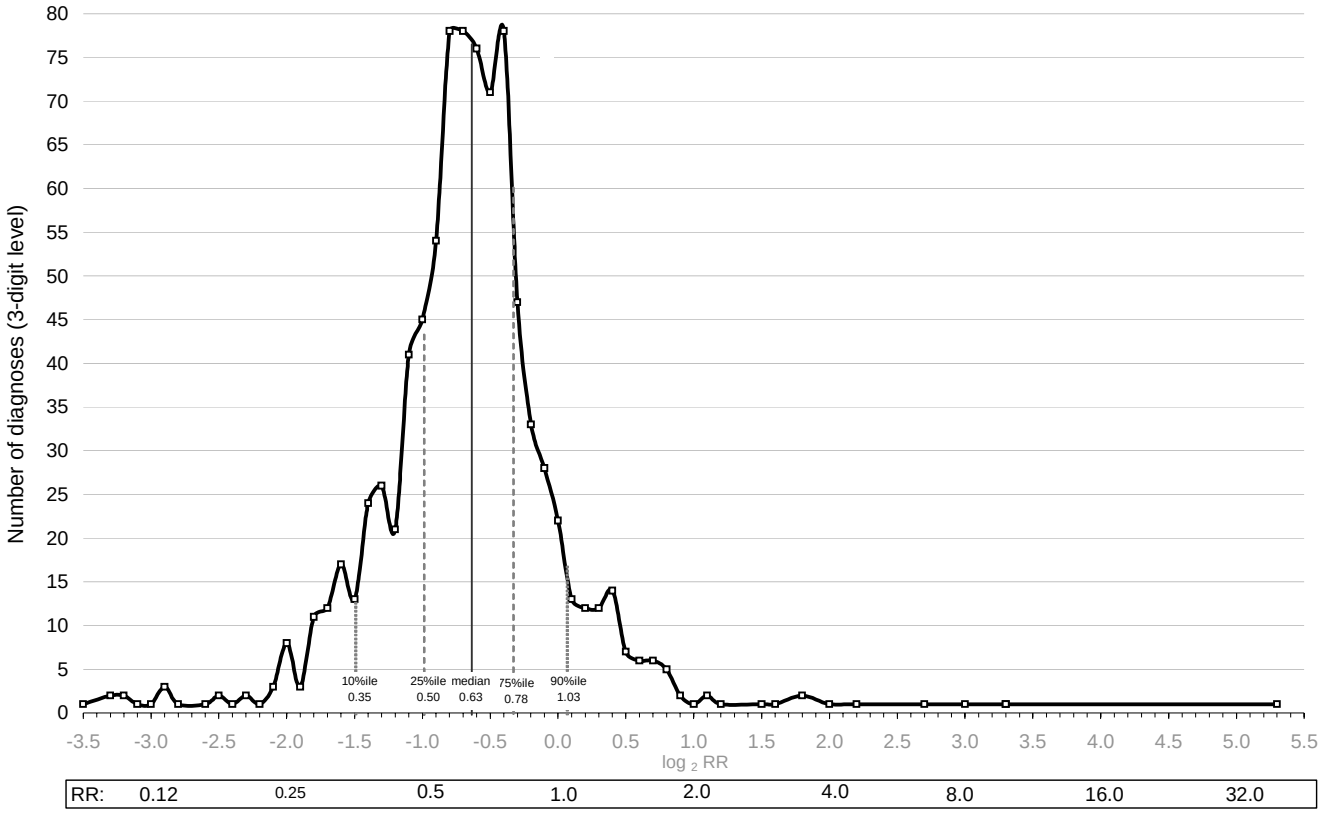

Table 2. Diagnoses (at the 3-digit level of ICD-9-CM) with the highest relative rates (top 5%), recent redeployers versus others, active components, U.S. Armed Forces

Diagnosis (3-digit ICD-9-CM)			Redeployed		Others		
			No.	Rate[1]	No.	Rate[1]	Rel rate
085	Infectious	Leishmaniasis	1,105	110.2	151	2.9	38.24
887	Injury	Traumatic amputation of arm and hand	238	23.7	122	2.3	10.19
897	Injury	Traumatic amputation of leg(s)	498	49.7	320	6.1	8.13
896	Injury	Traumatic amputation of foot	68	6.8	55	1.0	6.46
062	Infectious	Mosquito-borne viral encephalitis	189	18.9	209	4.0	4.73
024	Infectious	Glanders	3	0.3	4	0.1	3.92
006	Infectious	Amebiasis	67	6.7	98	1.9	3.57
017	Infectious	Tuberculosis of other organs	4,576	456.5	7,040	134.4	3.40
895	Injury	Traumatic amputation of toe(s)	54	5.4	96	1.8	2.94
023	Infectious	Brucellosis	8	0.8	15	0.3	2.79
011	Infectious	Pulmonary tuberculosis	1,164	116.1	2,740	52.3	2.22
022	Infectious	Anthrax	2,162	215.7	5,179	98.9	2.18
116	Infectious	Blastomycotic infection	6	0.6	15	0.3	2.09
084	Infectious	Malaria	220	21.9	572	10.9	2.01
890	Injury	Open wound of hip and thigh	746	74.4	2,050	39.1	1.90
048	Infectious	Other enterovirus diseases of CNS	8	0.8	23	0.4	1.82
801	Injury	Fracture, base of skull	287	28.6	855	16.3	1.75
101	Infectious	Vincent's angina	12	1.2	36	0.7	1.74
869	Injury	Internal injury to unspec/ill-defined organs	58	5.8	177	3.4	1.71
885	Injury	Traumatic amputation of thumb	60	6.0	186	3.6	1.69
951	Injury	Injury to other cranial nerve(s)	86	8.6	267	5.1	1.68
874	Injury	Open wound of neck	191	19.1	613	11.7	1.63
875	Injury	Open wound of chest (wall)	195	19.5	630	12.0	1.62
018	Infectious	Miliary tuberculosis	20	2.0	66	1.3	1.58
860	Injury	Traumatic pneumothorax, hemothorax	210	20.9	693	13.2	1.58
863	Injury	Injury to gastrointestinal tract	142	14.2	470	9.0	1.58
880	Injury	Open wound of shoulder and upper arm	558	55.7	1,853	35.4	1.57
804	Injury	Multi fractures inv skull/face with othr bones	80	8.0	267	5.1	1.57
950	Injury	Injury to optic nerve and pathways	38	3.8	127	2.4	1.56
020	Infectious	Plague	5	0.5	17	0.3	1.54
231	Neoplasm	Carcinoma in situ of resp system	9	0.9	31	0.6	1.52
803	Injury	Other, unqualified skull fractures	164	16.4	574	11.0	1.49
864	Injury	Injury to liver	92	9.2	324	6.2	1.48
800	Injury	Fracture, vault of skull	160	16.0	575	11.0	1.45
269	Endo, nutr	Other nutritional deficiencies	119	11.9	436	8.3	1.43
886	Injury	Traumatic amputation of other finger(s)	299	29.8	1,102	21.0	1.42
308	Mental	Acute reaction to stress	3,547	353.8	13,330	254.5	1.39
861	Injury	Injury to heart and lung	144	14.4	545	10.4	1.38
046	Infectious	Slow virus infection of CNS	5	0.5	19	0.4	1.38
083	Infectious	Other rickettsioses	11	1.1	42	0.8	1.37
504	Resp	Pneumopathy due to inhalation of othr dust	6	0.6	23	0.4	1.36
941	Injury	Burn of face, head and neck	440	43.9	1,691	32.3	1.36
137	Infectious	Late effects of tuberculosis	65	6.5	253	4.8	1.34
811	Injury	Fracture, scapula	269	26.8	1,050	20.0	1.34
904	Injury	Injury to blood vessels of leg, unspec sites	104	10.4	406	7.8	1.34
877	Injury	Open wound of buttock	196	20	772	14.7	1.33

[1] Rates are expressed as incident diagnoses per 100,000 person-years.

Table 3. Diagnoses (at the 3-digit level of ICD-9-CM) that accounted for the most "excess" incident medical encounters among recent redeployers versus others, active components, U.S. Armed Forces

Diagnosis (3-digit ICD-9-CM)			Post-deployed		Not deployed		
			No.	Rate[1]	No.	Rate[1]	"Excess" cases, postdeployed
017	Infectious	Tuberculosis of other organs	4,576	456.5	7,040	134.4	3,229
022	Infectious	Anthrax	2,162	215.7	5,179	98.9	1,171
085	Infectious	Leishmaniasis	1,105	110.2	151	2.9	1,076
308	Mental	Acute reaction to stress	3,547	353.8	13,330	254.5	996
011	Infectious	Pulmonary tuberculosis	1,164	116.1	2,740	52.3	640
897	Injury	Traumatic amputation, leg(s)	498	49.7	320	6.1	437
891	Injury	Open wound, knee, leg (except thigh), ankle	2,004	199.9	8,430	160.9	391
890	Injury	Open wound, hip and thigh	746	74.4	2,050	39.1	354
384	Nervous	Other disorders of tympanic membrane	1,627	162.3	7,149	136.5	259
958	Injury	Certain early complications of trauma	1,070	106.7	4,376	83.5	233
310	Mental	Nonpsychotic dis due to organic brain inj	1,053	105.0	4,302	82.1	230
887	Injury	Traumatic amputation, arm and hand	238	23.7	122	2.3	215
880	Injury	Open wound, shoulder and upper arm	558	55.7	1,853	35.4	203
062	Infectious	Mosquito-borne viral encephalitis	189	18.9	209	4.0	149
801	Injury	Fracture, base of skull	287	28.6	855	16.3	123
941	Injury	Burn, face, head, neck	440	43.9	1,691	32.3	116
084	Infectious	Malaria	220	21.9	572	10.9	111
812	Injury	Fracture, humerus	881	87.9	4,067	77.6	103
805	Injury	Fracture, vertebral col wo mention spin crd inj	1,205	120.2	5,763	110.0	102
605	GU	Redundant prepuce and phimosis	875	87.3	4,059	77.5	98
955	Injury	Injury, periph nerve(s), shoulder girdle, arm	841	83.9	3,931	75.0	89
886	Injury	Traumatic amputation, other finger(s)	299	29.8	1,102	21.0	88
871	Injury	Open wound, eyeball	399	39.8	1,631	31.1	87
136	Infectious	Other, unspec infectious, parasitic dis	406	40.5	1,688	32.2	83
860	Injury	Traumatic pneumothorax, hemothorax	210	20.9	693	13.2	77
875	Injury	Open wound, chest (wall)	195	19.5	630	12.0	74
874	Injury	Open wound, neck	191	19.1	613	11.7	74
854	Injury	Intracranial injury of other, unspecified nature	993	99.1	4,821	92.0	70
956	Injury	Injury, periph nerve(s), pelvic girdle, leg	320	31.9	1,306	24.9	70
811	Injury	Fracture, scapula	269	26.8	1,050	20.0	68
821	Injury	Fracture, other, unspecified parts of femur	808	80.6	3,886	74.2	64
896	Injury	Traumatic amputation, foot	68	6.8	55	1.0	57
803	Injury	Other, unqualified skull fractures	164	16.4	574	11.0	54
863	Injury	Injury, gastrointestinal tract	142	14.2	470	9.0	52
806	Injury	Fracture, vertebral col with spinl crd lesion	260	25.9	1,091	20.8	51
800	Injury	Fracture, vault of skull	160	16.0	575	11.0	50
877	Injury	Open wound, uttock	196	19.6	772	14.7	48
006	Infectious	Amebiasis	67	6.7	98	1.9	48
852	Injury	Subarach, sub-, extra-dural hemor due to inj	196	19.6	805	15.4	42
861	Injury	Injury, heart and lung	144	14.4	545	10.4	40
851	Injury	Cerebral laceration, contusion	211	21.0	907	17.3	37
895	Injury	Traumatic amputation, toe(s)	54	5.4	96	1.8	36
269	Endo, nutr	Other nutritional deficiencies	119	11.9	436	8.3	36
951	Injury	Injury, other cranial nerve(s)	86	8.6	267	5.1	35
864	Injury	Injury, liver	92	9.2	324	6.2	30
804	Injury	Multiple fractures, skull/face w oth bones	80	8.0	267	5.1	29
827	Injury	Other, multi, ill-defined fractures, lower limb	252	25.1	1,178	22.5	27
904	Injury	Injury, blood vessels of leg, unspec sites	104	10.4	406	7.8	26
885	Injury	Traumatic amputation, thumb	60	6.0	186	3.6	24
869	Injury	Internal injury, unspec/ill-defined organs	58	5.8	177	3.4	24

[1] Rates are expressed as incident diagnoses per 100,000 person-years.

Editorial comment: This report documents that servicemembers who recently returned from deployments in Central Asia/Middle East receive new diagnoses of illnesses and injuries (at facilities that document all encounters with standardized electronic records) much less often than their counterparts. There are several likely/potential explanations for the finding. First, deployers are inherently healthier than their counterparts ("healthy deployer effect") because there are medical conditions that require treatment and rehabilitation that preclude the participation of affected individuals in major deployments.[2] Second, servicemembers are less likely to seek medical care (other than for emergencies) while on leave compared to normal duty times. During the first year after returning from OEF/OIF, redeployers may spend more time on leave than their counterparts. Third, given identical illnesses or injuries, servicemembers in units that regularly deploy may be less likely than their counterparts to seek care from a provider that electronically documents all medical encounters — due, for example, to differences in the availability of unit-level ("aid bag") care for minor illnesses and injuries; geographic proximity to and logistical ease of accessing care at a fixed facility; personal, peer, and unit thresholds for seeking care. Fourth, there may be systematic errors in the deployment rosters that were used to allocate person-time and medical encounters to the "recent redeployers" and "all others" cohorts. For these and perhaps other reasons, the results of this unadjusted analysis should be interpreted with caution, and point estimates of relative rates for specific diagnoses should be considered biased.

Of note, the conditions that caused the most incident diagnoses among recent redeployers and all others were almost identical. Not surprisingly, the illnesses and injuries that are most common among military members in general are also the most common among recent redeployers. In turn, the detection of conditions associated with deployment exposures requires methods that can discern diagnoses with high relative rates and low absolute rates in the redeployed cohort against a background of diagnoses with high absolute rates in both cohorts. To this end, for this report, we focused attention on diagnoses that were extreme in regard to relative rates and "excess" incident diagnoses among recent redeployers. The findings are informative.

In regard to relative rates, the distribution of relative rates across all diagnoses was fairly symmetric and centered at approximately 0.63. More than 90% of diagnoses with relative rates in the top 5% were injury or infectious disease related. Infectious diseases with relative rates in the top 5% included four that were likely due to miscoding plus leishmaniasis, amebiasis, malaria, pulmonary tuberculosis, and "other rickettsioses" (which includes Q fever, a disease that has caused at least one outbreak among U.S. servicemembers deployed in Iraq[3]). Other diagnoses with relative rates in the top 5% (and at least 10 incident diagnoses among recent redeployers) include "acute reaction to stress" and "other nutritional deficiencies" which are plausibly related to Afghanistan and/or Iraq service.

Similarly, of the 50 diagnoses that accounted for the most "excess" incident encounters among recent redeployers, 47 (94%) were injury- or infection-related. Of note, the two diagnoses that accounted for the most "excess" incident encounters (i.e., tuberculosis of other organs, anthrax) reflected miscoding. Of diagnoses that were likely reported reliably, those with the largest excesses among recent redeployers were leishmaniasis (estimated excess incident diagnoses: 1,076) and acute reaction to stress (estimated excess incident diagnoses: 996). Malaria, amebiasis, and "other nutritional deficiencies" were other non-injury-related conditions with relatively large excesses of diagnoses among redeployers.

In summary, the results of this preliminary analysis document the importance of traumatic injuries, endemic infectious diseases, and acute reactions to stress as causes of excess morbidity among recent redeployers compared to other military members. Very few other conditions emerged as potentially significant, deployment-related illnesses that merit more detailed investigation, e.g., "nutritional deficiencies." Finally, the results reported here are preliminary and must be interpreted with caution. For example, relative rates were not adjusted for effects of differences between the cohorts, e.g., age, grade, military service, gender. Additional analyses that control for the effects of potentially confounding differences between the cohorts are planned.

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Numbers, Rates, and Patterns of Hospital Readmissions, U.S. Military Health System, January 2004 - January 2005

For approximately 15 years, hospital readmission rates (especially within 30 days of discharge for the same or related conditions) have been considered a quality of care indicator.[1] However, crude readmission rates reflect not only quality of care but also burdens of chronic disease in the catchment populations of hospitals;[2] also, some readmissions are elective and not reflective of quality of care.

Studies have estimated that between 9% and 48% of all readmissions are potentially preventable[3] (because they are associated with potentially substandard care during index hospitalizations).[4] In addition, about one in five persons with initial "preventable" admissions have at least one preventable readmission within six months of discharge.[5] Not surprisingly, higher rates of preventable readmissions are associated with shorter times between discharges and readmissions.[1]

This report updates a similar examination of readmission rates in U.S. military hospitals during calendar year 2001.[6] It reports on similar data for 2004 and newly examines the proportion of readmissions flagged as "preventable" in administrative hospitalization records.

Methods: The Standard Inpatient Data Record (SIDR) is used to document all hospitalizations in U.S. Military Health System (MHS) hospitals. SIDR records are routinely transmitted to and incorporated in other data repositories such as the Defense Medical Surveillance System (DMSS) and the MHS Management Analysis and Reporting Tool (M2). This report summarizes all SIDR records from 1 January 2004 through 30 January 2005 (as updated in the M2 through September 2005).

For this analysis, records of hospitalizations that overlapped in time (less than 0.5% of the total) with earlier hospitalizations of the same individuals were excluded. In addition, all hospitalization records with disposition codes indicating deaths, transfers to other hospitals, or departures against medical advice were excluded. Also, hospitalizations that were contiguous in time with other hospitalizations of the same individual and had either a disposition code indicating a transfer to another DoD facility, a zero length of stay, or a different facility code (DMSID) than the subsequent record were excluded. Finally, hospitalizations with less than a full day's length of stay and a diagnosis related group (DRG) code for radiation or chemotherapy were excluded. Of note, records of hospitalizations with radiation or chemotherapy DRGs and lengths of stay of one day or more were retained. Also, because elective readmissions could not be accurately identified, they were included in the analyses.

The remaining live discharge events between 1 January and 31 December 2004 provided denominators for readmission rate calculations. Crude rates of readmission within 10 days and 30 days of discharges were calculated for each hospital and each military service-specific medical department. Distributions of time lags between discharges and subsequent readmissions were calculated, as were frequencies of DRGs assigned to hospitalizations with subsequent rates of readmissions. (For DRG summaries by service, 5,896 hospitalizations of MHS beneficiaries in non-military and Veterans Administration (VA) hospitals were excluded.) Although illness severity can affect readmission rates, no case mix adjustments were undertaken for this report.

Results: In calendar year 2004, a total of 282,598 non-transfer, non-overlapping live discharges from U.S. military hospitals were identified. Of the 259,097 beneficiaries who were discharged from MHS hospitals during the year, 31,631 (12.2%) were readmitted one or more times during the period of follow-up. Readmissions (n=46,701) accounted for 15.3% of all admissions during the 13-month surveillance period.

Overall, 4.7% and 8.3% of all hospitalized patients were readmitted within 10 days and 30 days of discharge, respectively. Readmission rates across the Service medical departments were similar to the MHS-wide rate (Table 1). More than one-fourth (28.7%) of all readmissions occurred within 10 days and approximately one-half (50.4%) occurred within

Figure 1. Distribution of hospitals, by percentages of patients readmitted within 10 days and 30 days of discharge, U.S. Military Health System, 2004.

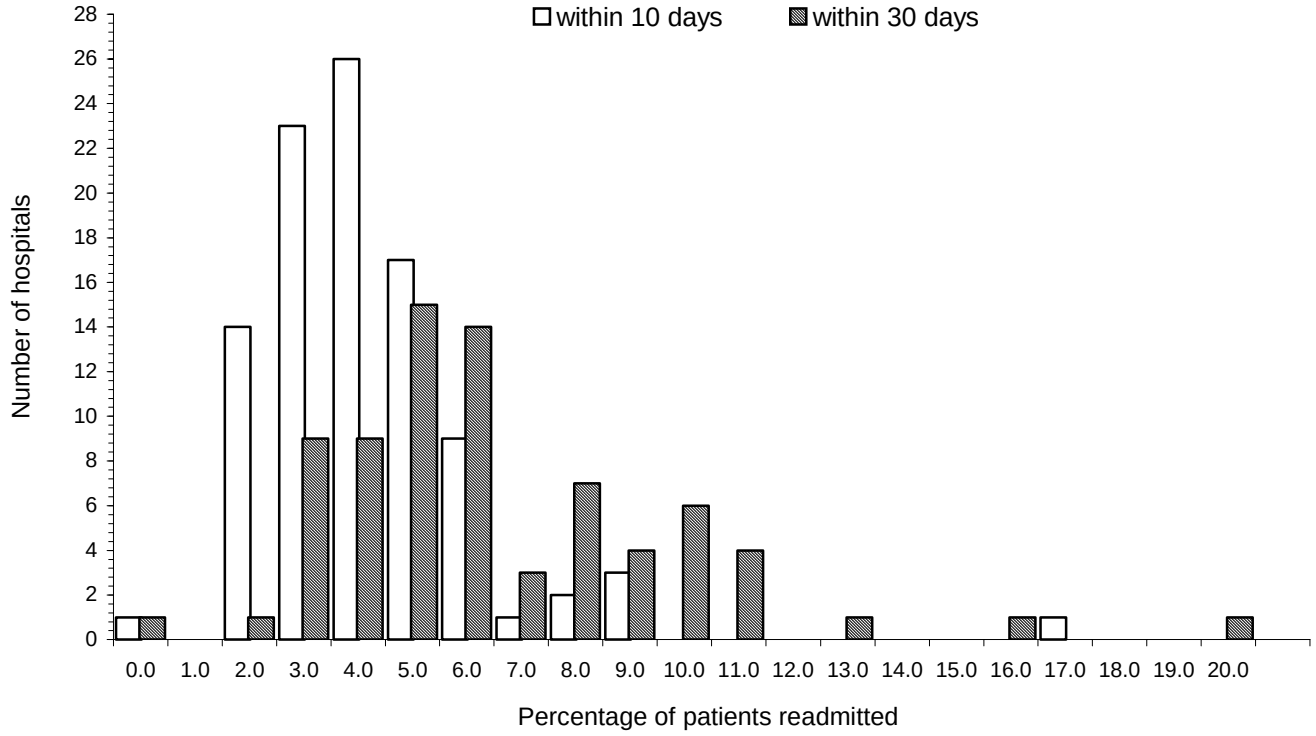

Table 1. Unadjusted readmission rates within 0-10 and 0-30 days of hospital discharge, by service-specific medical department, U.S. Military Health System, CY2004

Medical department	Total discharges[1]	Readmission rate: Within 10 days % ± SD[2]	Readmission rate: Within 30 days % ± SD[2]
Army	131,368	5.2 ± 3.0	8.8 ± 3.8
Navy	90,387	4.3 ± 1.6	7.7 ± 2.5
Air Force	54,947	4.4 ± 1.8	8.2 ± 2.9
Other[3]	5,896	3.8 ± 1.0	7.7 ± 2.7
Total	282,598	4.7 ± 2.3	8.3 ± 3.1

1. Excludes transfers and single day chemotherapy or radiation therapy discharges.
2. Standard deviation.
3. Includes one Veterans Administration and five private facilities.

30 days of prior discharges. Not surprisingly, as the number of hospitalizations of individuals increased, the intervals between hospitalizations decreased (Table 2).

Overall, there was a wide range in both the 10- and 30-day readmission rates across hospitals (Figure 1). There was more variation and generally higher readmission rates among large and tertiary care facilities compared to smaller hospitals (Figures 2). For example, among tertiary care medical centers with at least 4,000 non-transfer discharges in 2004, 10-day readmission rates varied from 3.2% to 17.3%, and 30-day readmission rates varied from 5.9% to 19.9%. In general, facilities that treated the largest numbers of combat-related casualties had the highest readmission rates.

Of the ten diagnosis-related groups (DRG) with the highest readmission rates, five were associated with pregnancy or childbirth (Table 3). The five pregnancy and childbirth-related DRGs with the highest readmission rates accounted for 3,444 readmissions (14.6% of the total) within 30 days of discharge (Table 3). (Of note, the MHS uses a modified set of diagnosis-related group (DRG) codes that better classify neonatal cases. MHS-specific code 630 "Neonate, birth weight >2.5 kg, without significant OR procedures, with other problems" was among the DRGs most frequently associated with subsequent readmissions within 30 days.) The DRGs with the highest readmission rates at Air Force hospitals differed slightly from those in the MHS overall (Table 3).

Finally, approximately one of every 11 readmissions (n=2,100, 8.9%) within 30 days were considered "preventable" (based on criteria that account for specific chronic disease diagnoses, DRGs, and patient ages) (Table 4). Of note, more than one-fourth of all preventable readmissions were associated with "congestive heart failure." In the most extreme single case, a patient with congestive heart failure was readmitted 37 times during the 13-month surveillance period.

Editorial comments: Compared to 2001,[6] in the U.S. Military Health System during 2004 there were slightly lower crude readmission rates within 10 and 30 days of hospital discharge. Furthermore, the range of readmission rates in general increased, and the variation in readmission rates in relation to hospital size increased. As in 2001, readmission rates did not significantly vary across the Service medical departments.

Variation in readmission rates is related at least in part to differences in case-mixes. For example, patients admitted to tertiary care facilities are often referred from other facilities and/or are more seriously injured or ill. Because no case-mix adjustments were done for this summary, sources of observed variation cannot be more clearly attributed. Of note, however, there was considerable variation in readmission rates among tertiary care facilities with likely similar case-mixes.

A large proportion of admissions to military hospitals are for obstetrical care, even among active duty patients.[7] In turn, it is not surprising that DRGs related to pregnancy and childbirth are major sources of readmissions to military hospitals within 30 days of discharge. From a quality improvement standpoint, a focus on pregnancy and childbirth-related readmissions might yield relatively greater benefits in military compared to non-military hospitals.

An important finding of this analysis is that nearly 9% of 30-day readmissions were flagged as "preventable," even though the preventable flag only considers a handful of ambulatory and chronic disease

Table 2. Number of readmissions and median time between discharge and subsequent readmission, by the number of the readmission event per person, U.S. Military Health System, calendar year 2004

Readmission event, per individual	Number of events	Days since prior	
		Median	Range[1]
1st	31,567	33	388
2nd	8,341	30	372
3rd	3,179	27	316
4th	1,487	21	292
5th	781	21	264
6th	459	21	177
7th	276	17	211
8th	175	16	210
9th	117	15	125
10th	82	15	194
11th – 37th[2]	237	3-24	0-124

[1] Includes 30-day follow-up period through January 2005.
[2] Four individuals had 22 readmissions each, three had 23 readmissions each, one had 37 readmissions.

diagnoses. Nominally "preventable" readmissions may reflect the complexity of the underlying problems of some "high risk" patients. Identifying such "high risk" patients prior to their discharges from initial hospitalizations is not only important to the long-term care of such patients but may also reduce readmissions and associated costs.[5]

In summary, the quality improvement efforts of the Military Health System that are directed at reducing readmission rates should focus on nominally "preventable" readmissions and on readmissions associated with obstetrical care.

Data analysis and report by David R. Arday, MD, MPH; CAPT, USPHS; Clinical Quality Division,Office of the Chief Medical Officer, TRICARE Management Activity.

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Figure 2. Relationships* between total hospital discharges and readmissions within 10 days and 30 days, U.S. military hospitals, 2004.

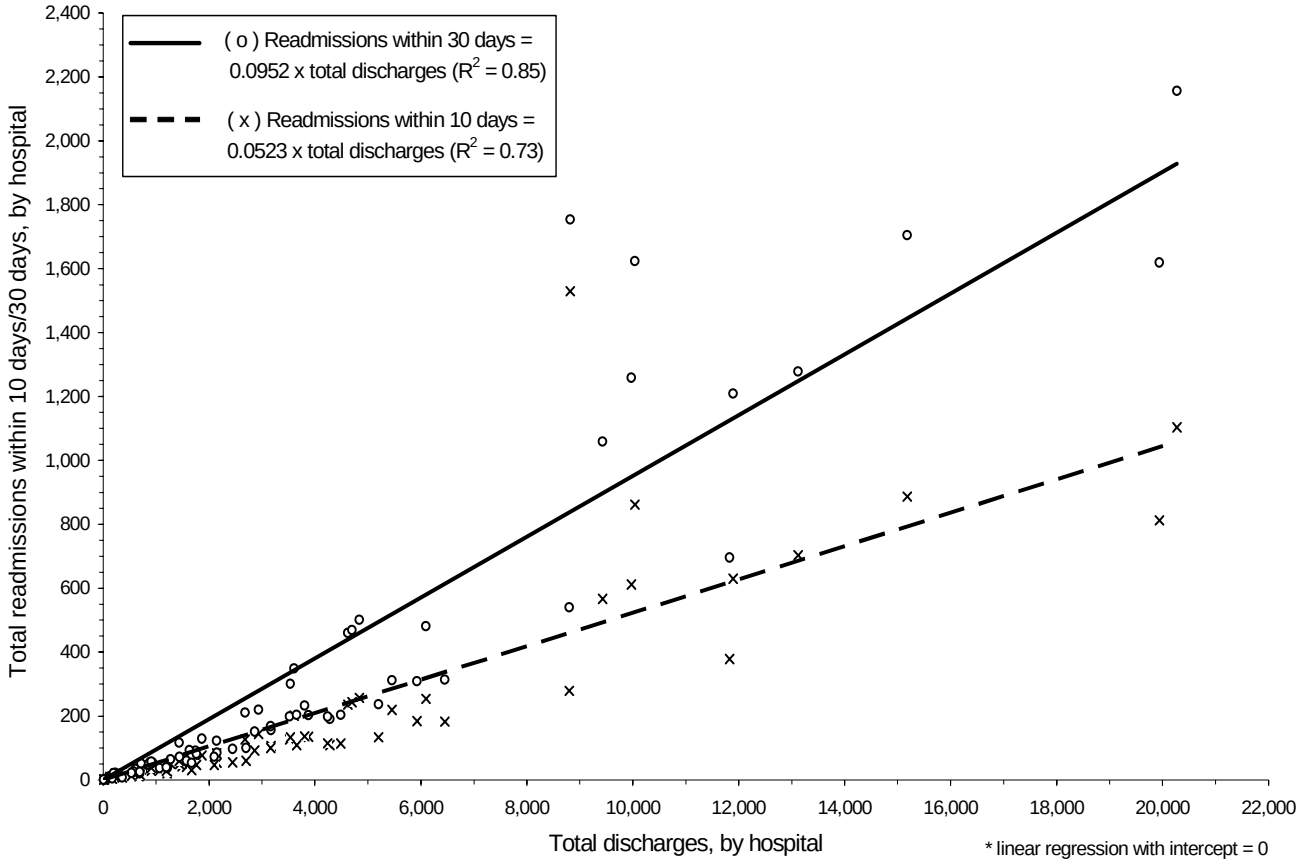

Table 3. Top ten diagnosis-related groups (DRGs), based on number of readmissions within 30 days in U.S. Military Health System hospitals, calendar year 2004

		Overall			Parent medical department: Army			Navy			Air Force		
Diagnosis-related group (DRG)		Rank	Discharges w/ readmns w/i 30 days[1] No.	%	Rank	Discharges w/ readmns w/i 30 days[1] No.	%	Rank	Discharges w/ readmns w/i 30 days1 No.	%	Rank	Discharges w/ readmns w/i 30 days[1] No.	%
391	Normal newborn	1	1,124	4.8	1	429	3.7	1	492	7.0	1	182	4.0
383	Other antepartum diagnoses w/ medical complications	2	878	3.7	2	409	3.5	2	353	5.0	3	113	2.5
379	Threatened abortion	3	616	2.6	5	245	2.1	3	304	4.4	15	59	1.3
410	Chemotherapy, w/o acute leukemia as a secondary diagnosis	4	565	2.4	6	189	1.6	4	263	3.8	4	111	2.5
127	Heart failure and shock	5	539	2.3	4	251	2.2	7	131	1.9	2	148	3.3
430	Psychoses	6	508	2.2	3	322	2.8	9	123	1.8	30	34	0.8
630	Neonate, birth wt >2.5 kg, w/o significant OR proc, w/ oth probs	7	433	1.8	13	161	1.4	5	211	3.0	15	59	1.3
384	Other antepartum diagnosis w/o medical complications	8	393	1.7	9	177	1.5	6	147	2.1	14	65	1.4
182	Esophagitis, gastroenteritis, misc oth digestive, age >17 w/ complications	9	379	1.6	8	179	1.6	11	100	1.4	6	92	2.0
143	Chest pain	10	385	1.5	10	169	1.5	13	85	1.2	5	94	2.1

[1] Discharges associated with readmissions within 30 days, not total discharges.

Table 4. Preventable admission indicator flag, by disease diagnosis, associated with readmissions to MTFs within 30 days of prior discharge, calendar year 2004

Preventable admission diagnosis flag[1]		% of all readmissions
Congestive heart failure	590	2.5
Bacterial pneumonia	358	1.5
Chronic obstructive pulmonary disease	279	1.2
Urinary tract infection, renal disease	239	1.0
Diabetes	227	1.0
Cellulitis	194	0.8
Asthma	76	0.3
Gastroenteritis	76	0.3
Angina	61	0.3
Total	2,100	8.9

[1] Admissions nominally "preventable" based on recorded diagnoses, DRG, and age criteria.

Update: Pre- and Post-deployment Health Assessments U.S. Armed Forces, January 2003-March 2006

The June 2003 issue of the *MSMR* summarized the background, rationale, policies, and guidelines related to pre-deployment and post-deployment health assessments of servicemembers.[1-10] Briefly, prior to deploying, the health of each servicemember is assessed to ensure his/her medical fitness and readiness for deployment. At the time of redeployment, the health of each servicemember is again assessed to identify medical conditions and/or exposures of concern to ensure timely and comprehensive evaluation and treatment.

Completed pre- and post-deployment health assessment forms are routinely sent (in hard copy or electronic form) to the Army Medical Surveillance Activity (AMSA) where they are archived in the Defense Medical Surveillance System (DMSS).[11] In the DMSS, data recorded on pre- and post-deployment health assessments are integrated with data that document demographic characteristics, military experiences, and medical encounters of all servicemembers (e.g., hospitalizations, ambulatory visits, immunizations).[11] The continuously expanding DMSS database can be used to monitor the health of servicemembers who participated in major overseas deployments.[11-13]

The overall success of deployment force health protection efforts depends at least in part on the completeness and quality of pre- and post-deployment health assessments. This report summarizes characteristics of servicemembers who completed pre-and post-deployment forms since 1 January 2003, responses to selected questions on pre- and post-deployment forms, and changes in responses of individuals from pre-deployment to post-deployment.

Methods: For this update, the DMSS was searched to identify all pre- and post-deployment health assessments (DD Form 2795 and DD Form 2796, respectively) that were completed after 1 January 2003.

Results: From 1 January 2003 to 31 March 2006, 1,252,096 pre-deployment health assessments and 1,264,441 post-deployment health assessments were completed at field sites, shipped to AMSA, and integrated in the DMSS database (Table 1).

In general, the distributions of self-assessments of "overall health" were similar among pre- and post-deployment form respondents (Figure 1). For example, both prior to and after deployment, the most frequent descriptor of "overall health" was "very good." Of note, however, relatively more pre- (33%) than post- (23%) deployment respondents assessed their overall health as "excellent"; while more post- (41%) than pre- (25%) deployment respondents assessed their overall health as "good," "fair," or "poor" (Figure 1).

Among servicemembers (n=637,880) who completed both a pre- and a post-deployment health assessment, less than half (45%) chose the same descriptor of their overall health before and after deploying (Figures 2, 3). Of those (n=351,819) who changed their assessments from pre- to post-deployment, three-fourths (75%) changed by a single category (on a five category scale) (Figure 3); and of those who changed by more than one category, nearly 5-times as many indicated a decrement in overall health (n=71,727; 11% of all respondents) as an improvement (n= 15,159; 2% of all respondents) (Figure 3).

On post-deployment forms, 22% of active and 40% of Reserve component respondents reported "medical/dental problems" during deployment (Table 2). Among active component respondents, "medical/dental problems" were more frequently reported by soldiers and Marines than by members of the other Services. Among Reservists, members of the Army reported "medical/dental problems" more often than members of the other Services (Table 2).

Approximately 4% and 6% of active and Reserve component respondents, respectively, reported "mental health concerns." "Mental health concerns" were reported relatively more frequently among soldiers (active: 6%; Reserve: 7%) than members of the other Services (Table 2). From 7% (active component, Navy) to 26% (active and Reserve components, Army) of post-deployment forms documented that "referrals" were indicated (Table 2);

Table 1. Total pre- and post-deployment health assessments, by month and year, US Armed Forces, January 2003-March 2006

	Pre-deployment		Post-deployment	
	No.	%	No.	%
Total	**1,252,096**	**100.0**	**1,264,441**	**100.0**
2003				
January	69,390	5.5	6,221	0.5
February	110,571	8.8	5,077	0.4
March	69,853	5.6	6,754	0.5
April	37,598	3.0	19,349	1.5
May	12,881	1.0	92,840	7.3
June	14,416	1.2	65,378	5.2
July	18,060	1.4	52,880	4.2
August	16,513	1.3	35,148	2.8
September	12,793	1.0	32,446	2.6
October	24,167	1.9	27,044	2.1
November	19,694	1.6	21,541	1.7
December	36,153	2.9	22,241	1.8
2004				
January	70,204	5.6	39,725	3.1
February	39,198	3.1	32,228	2.5
March	22,842	1.8	65,992	5.2
April	19,933	1.6	44,222	3.5
May	27,795	2.2	17,820	1.4
June	24,516	2.0	28,293	2.2
July	22,775	1.8	24,256	1.9
August	34,272	2.7	22,933	1.8
September	31,822	2.5	24,268	1.9
October	35,435	2.8	15,667	1.2
November	35,810	2.9	21,985	1.7
December	38,465	3.1	26,803	2.1
2005				
January	34,324	2.7	55,425	4.4
February	24,688	2.0	69,805	5.5
March	20,754	1.7	53,367	4.2
April	26,801	2.1	19,094	1.5
May	18,645	1.5	21,061	1.7
June	25,125	2.0	19,215	1.5
July	21,413	1.7	16,834	1.3
August	46,519	3.7	29,322	2.3
September	34,008	2.7	38,296	3.0
October	36,166	2.9	37,023	2.9
November	34,380	2.7	37,671	3.0
December	20,288	1.6	54,617	4.3
2006				
January	27,432	2.2	34,608	2.7
February	19,308	1.5	14,768	1.2
March	17,089	1.4	12,224	1.0

and 91% and 85% of all active and Reserve component respondents, respectively, had hospitalizations and/or medical encounters within 6 months after documented post-deployment referrals (Table 2).

Overall, approximately 16% of all post-deployment forms indicated deployment-related "exposure concerns" (Table 3). The proportion of respondents who reported exposure concerns significantly varied from month to month. In general, in the active components, rates of exposure concerns increased through calendar year 2003 and have been stable or slightly declining since (Figure 4). In the Reserve components, rates of exposure concerns increased through the Spring of 2004 and have been relatively high (20% to 35%) since (Figure 4). Reports of exposure concerns have been generally higher in the Army than the other services and in the Reserve compared to the active component. Finally, prevalences of exposure concerns increase monotonically with age (Tables 3, 4).

Figure 1. Percent distributions of self-assessed health status, pre- and post-deployment, U.S. Armed Forces, January 2003- March 2006.

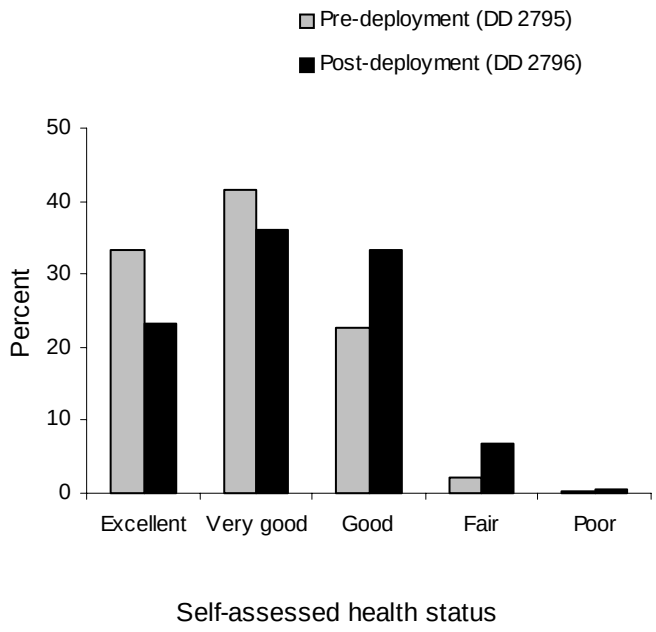

Figure 2. Self-assessed health status on post-deployment form, in relation to self-assessed health status on pre-deployment form, U.S. Armed Forces, January 2003- March 2006.

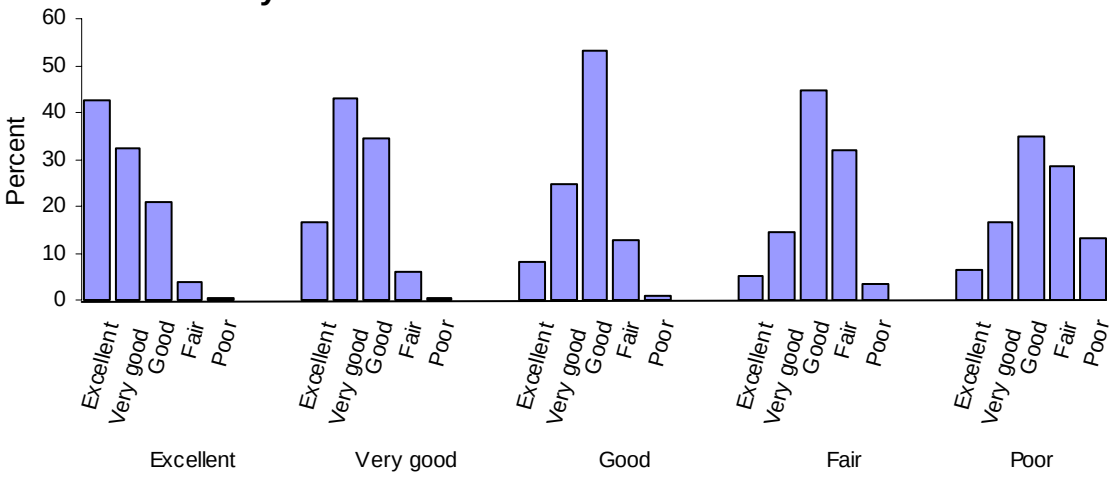

Table 2. Responses to selected questions from post-deployment forms (DD2796) by service and component, U.S. Armed Forces, January 2003-March 2006

	Army	Navy	Air Force	Marines	Total
Active component					
SMs with DD 2796 in DMSS	**274,057**	**97,351**	**112,521**	**85,916**	**569,845**
Electronic version	77%	3%	68%	11%	53%
General health ("fair" or "poor")	9%	5%	2%	6%	6%
Medical/dental problems during deploy	30%	12%	12%	20%	22%
Currently on profile	11%	2%	2%	3%	6%
Mental health concerns	6%	2%	1%	2%	4%
Exposure concerns	17%	5%	4%	11%	12%
Health concerns	13%	6%	5%	9%	10%
Referral indicated	26%	7%	10%	13%	18%
Medical visit following referral[1]	97%	71%	90%	65%	91%
Post deployment serum[2]	94%	80%	89%	87%	89%
Reserve component					
SMs with DD 2796 in DMSS	**261,702**	**15,157**	**42,211**	**19,720**	**338,790**
Electronic version	70%	16%	58%	17%	63%
General health ("fair" or "poor")	11%	6%	2%	8%	10%
Medical/dental problems during deploy	44%	36%	15%	35%	40%
Currently on profile	14%	4%	2%	3%	12%
Mental health concerns	7%	3%	1%	3%	6%
Exposure concerns	26%	19%	8%	25%	23%
Health concerns	22%	21%	10%	22%	20%
Referral indicated	26%	20%	11%	23%	24%
Medical visit following referral[1]	89%	79%	57%	54%	85%
Post deployment serum[2]	94%	88%	69%	86%	90%

[1] Inpatient or outpatient visit within 6 months after referral.

[2] Only calculated for DD 2796 completed since 1 June 2003.

Editorial comment: Since January 2003, approximately three-fourths of U.S. servicemembers have assessed their overall health as "very good" or "excellent" when they are mobilized and/or prior to deploying overseas; and approximately 60% have assessed their overall health as "very good" or "excellent" at the end of their deployments. Most of the changes in assessments of overall health from pre- to post-deployment have been relatively minor (i.e., one category on a 5-category scale). Still, however, approximately one of nine post-deployers have indicated relatively significant declines (i.e., two or more categories) in their overall health from pre- to post-deployment. The findings are attributable at least in part to the extreme physical and psychological stresses associated with mobilization, overseas deployment, and harsh and dangerous living and working conditions.[14,15]

The deployment health assessment process is specifically designed to identify, assess, and follow-up as necessary all servicemembers with concerns regarding their health and/or deployment-related exposures. Overall, for example, approximately one-fifth of all post-deployers had "referral indications" documented on post-deployment health assessments; and of those, most had documented outpatient visits and/or hospitalizations within 6 months after they returned.

Of interest, "exposure concerns" among post-deploying respondents significantly vary from month to month. Since the beginning of 2004, exposure concerns have been consistently much more common among Reserve compared to active component members. Among both active and Reserve component members, exposure concerns significantly increase with age, and in both components, servicemembers older than 40 are approximately twice as likely as those younger than 20 to report exposure concerns.

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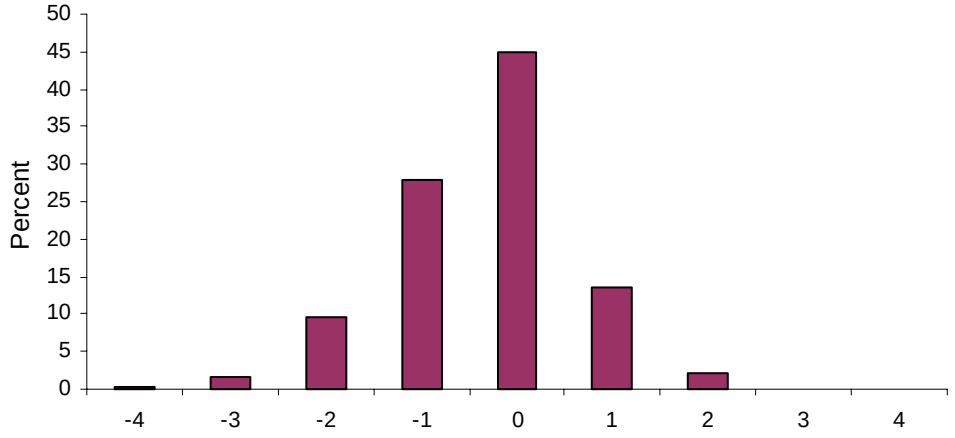
Figure 3. Distribution of changes in self-assessed health statuses as reported on pre and post-deployment forms, U.S. Armed Forces, January 2003-March 2006.



Change in self-assessment of overall health status, pre- to post-deployment, calculated as: post deployment response - pre-deployment response, using the following scale for health status: 1="poor"; 2="fair"; 3="good"; 4="very good"; and 5="excellent".

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Table 3. Reports of exposure concerns on post-deployment health assessments, U.S. Armed Forces, January 2003-March 2006

	Total[1]	Exposure concerns	% with exposure concerns
Total	**901,916**	**143,440**	**15.9**
Component			
Active	565,813	65,836	11.6
Reserve	336,103	77,604	23.1
Service			
Army	532,202	113,723	21.4
Navy	111,139	7,407	6.7
Air Force	153,885	8,192	5.3
Marine Corps	104,690	14,118	13.5
Age (years)			
<20	23,921	1,928	8.1
20-29	479,075	63,326	13.2
30-39	249,403	44,161	17.7
>39	149,498	34,025	22.8
Gender			
Male	801,042	125,751	15.7
Female	100,871	17,689	17.5
Race/ethnicity			
Black non-Hispanic	155,918	26,860	17.2
Hispanic	88,495	15,303	17.3
Other	2,158	227	10.5
White non-Hispanic	591,591	90,964	15.4
Grade			
Enlisted	786,327	123,658	15.7
Officer	115,582	19,781	17.1

[1]Totals do not include non-responses/missing data.

Figure 4. Proportion of post-deployment forms that include reports of exposure concerns, U. S. Armed Forces January 2003-March 2006.

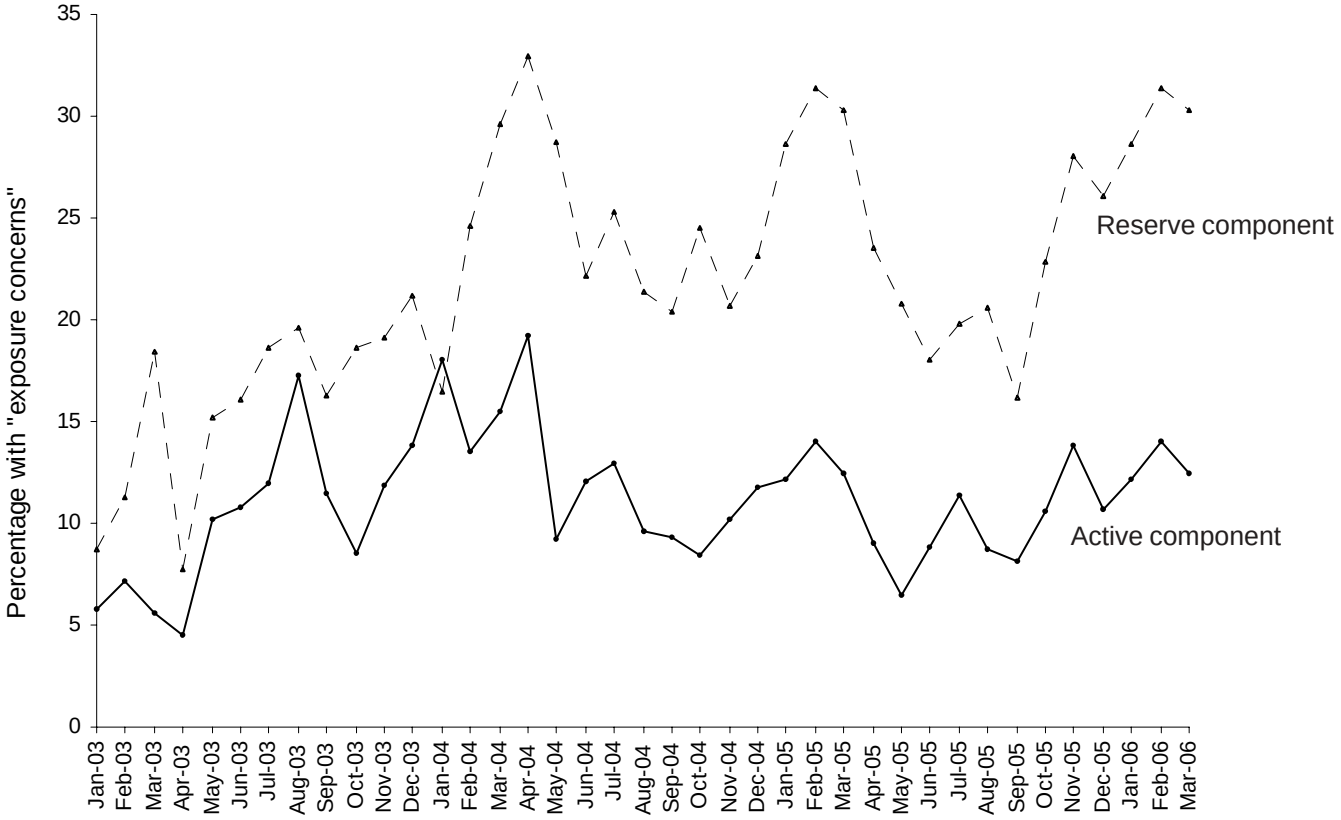
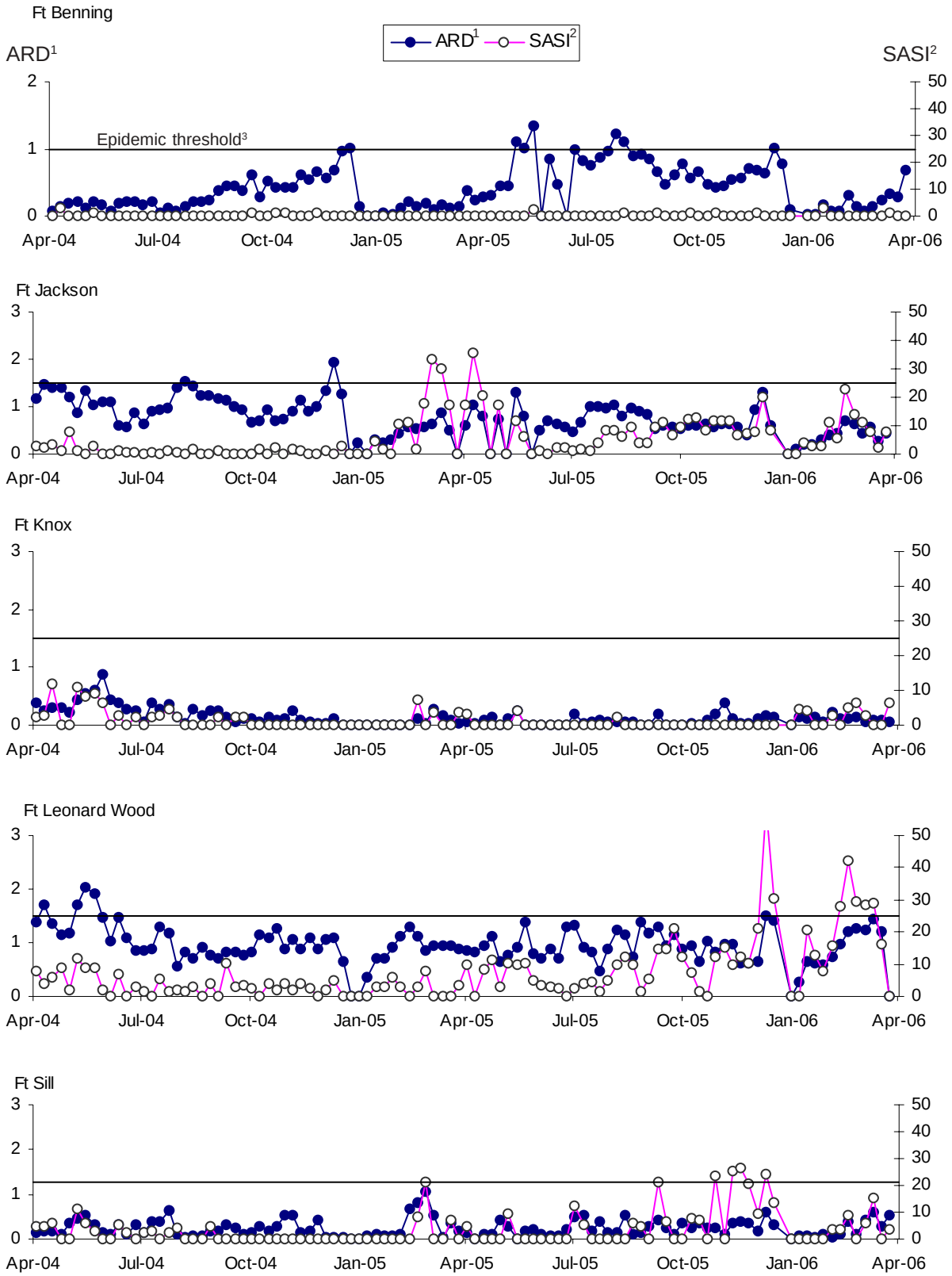


Table 4. Proportion of post-deployment forms that include reports of exposure concerns, by age group and component, U.S. Armed Forces, January 2003-March 2006

Age group	Active	Reserve
<20	6.5	13.9
20-29	10.6	20.5
30-39	13.3	23.9
>39	16.1	26.0

Note: 1 person missing due to unknown age group.

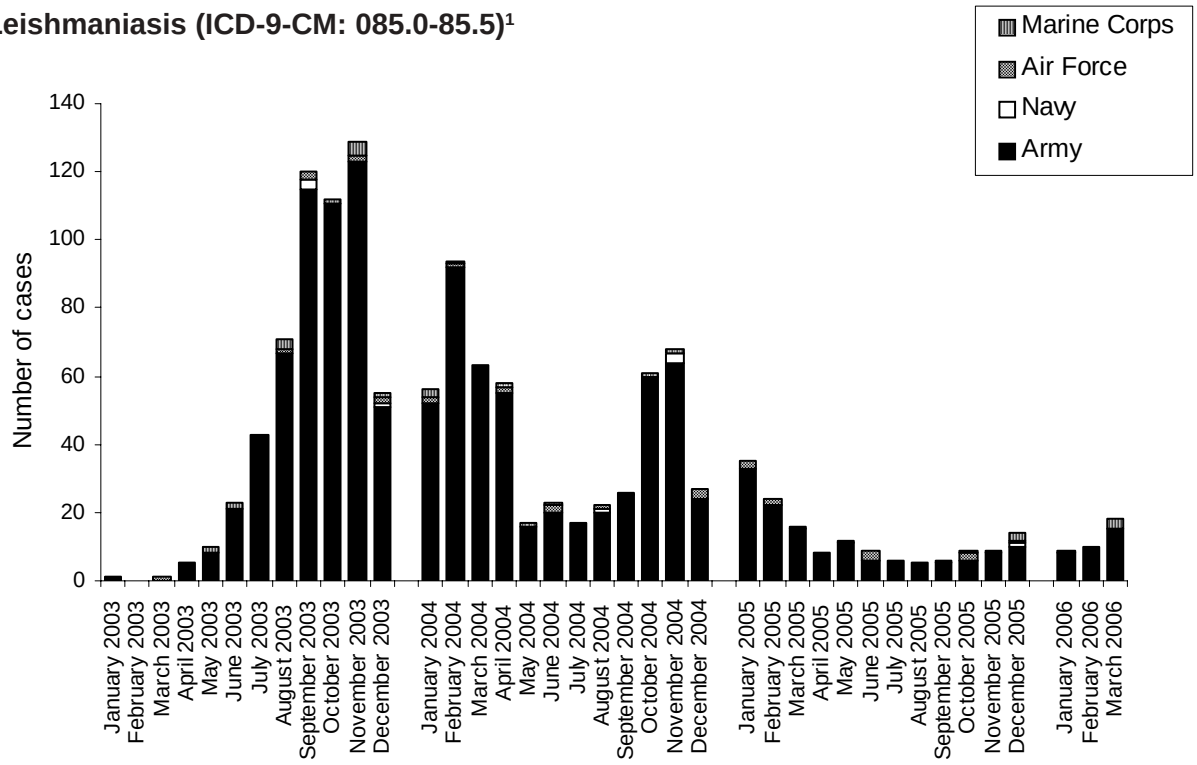
Acute respiratory disease (ARD) and streptococcal pharyngitis (SASI), Army basic training centers, by week through March 31, 2006



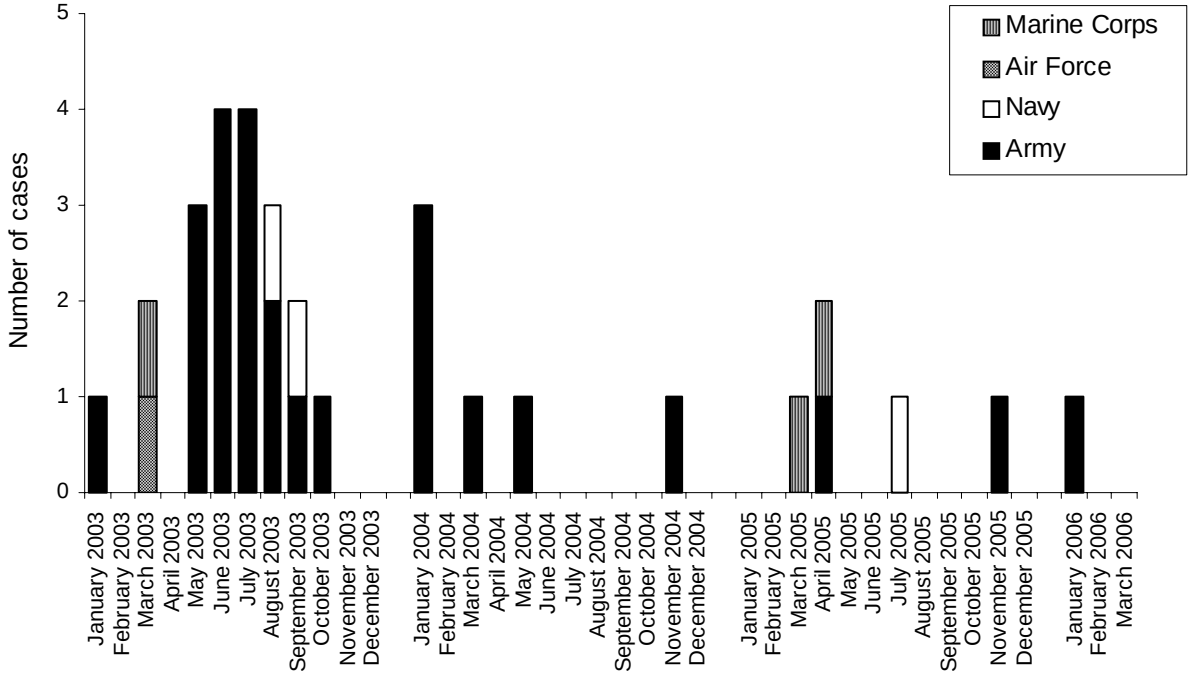
[1] ARD rate = cases per 100 trainees per week
[2] SASI (Strep ARD surveillance index) = (ARD rate)x(rate of Group A beta-hemolytic strep)
[3] ARD rate >=1.5 or SASI>=25.0 for 2 consecutive weeks indicates an "epidemic"

Deployment related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003-March 2006

Leishmaniasis (ICD-9-CM: 085.0-85.5)[1]



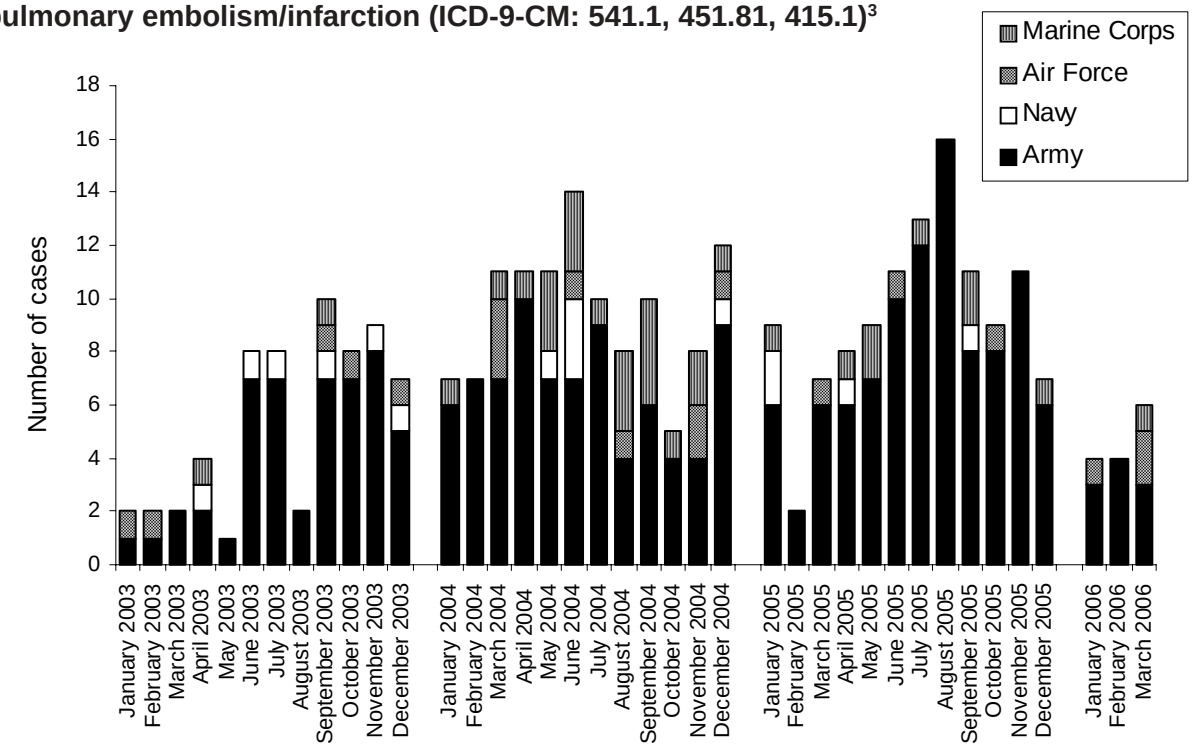
Acute respiratory failure/ARDS (ICD-9-CM: 518.81, 518.82)[2]



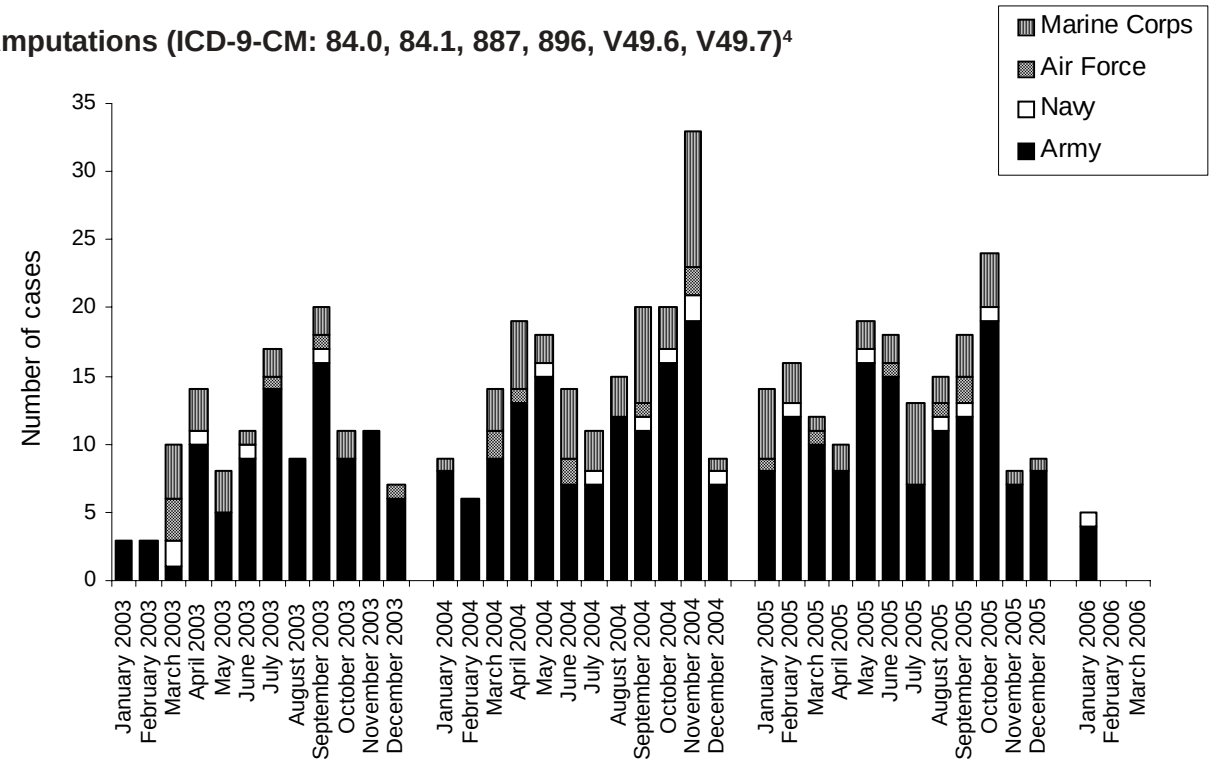
Footnotes:
[1] Indicator diagnosis (one per individual) during a hospitalization, ambulatory vist, and/or from a notifiable medical event during/after service in OEF/OIF.
[2] indicator diagnosis (one per individual) during a hospitalization while deployed to/within 30 days of returning from OEF/OIF.

(Con't.) Deployment related conditions od special surveillance interest, U.S. Armed Forces, by month and service, January 2003-March 2006

Deep vein phlebitis/thromboembophlebitis and/or pulmonary embolism/infarction (ICD-9-CM: 541.1, 451.81, 415.1)[3]



Amputations (ICD-9-CM: 84.0, 84.1, 887, 896, V49.6, V49.7)[4]



Footnotes:
[3] Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 30 days of returning from OEF/OIF.
[4] Indicator diagnosis (one per individual) during a hospitalization of a servicemember during/after service in OEF/OIF.

Sentinel reportable events for all beneficiaries[1] at U.S. Army medical facilities, cumulative numbers[2] for calendar years through March 31, 2005 and 2006

Reporting location	Number of reports all events[3]		Food-borne								Vaccine Preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
NORTH ATLANTIC																
Washington, DC Area	190	96	.	.	.	1	.	.	.	.	1	.	1	.	1	1
Aberdeen, MD	46	0	.	.	.	.	1	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	146	118	2	2	2	1	.	1	.	.	.	.	.	.	.	.
FT Bragg, NC	469	417	2	5	2	3	.	.	.	.	.	.	.	.	.	1
FT Drum, NY	75	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Eustis, VA	102	63	.	.	1	.	.	.	.	.	.	.	.	.	.	.
FT Knox, KY	90	61	.	.	2	.	.	.	.	.	.	.	.	.	.	.
FT Lee, VA	50	143	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Meade, MD	27	34	.	.	.	.	.	.	.	.	.	.	1	.	.	.
West Point, NY	24	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	137	122	.	.	.	.	.	.	.	1	2	.	.	.	.	.
FT Bliss, TX	176	216	1	.	1	1	2	1	.	1	.	.	.	.	2	2
FT Carson, CO	277	221	2	.	.	3	.	.	.	.	.	.	.	.	.	.
FT Hood, TX	575	549	1	.	.	2	2	.	.	.	.	.	.	.	.	.
FT Huachuca, AZ	21	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Leavenworth, KS	11	7	.	.	1	.	.	.	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	127	87	.	.	.	1	.	.	.	.	.	.	.	4	.	.
FT Polk, LA	68	62	.	2	.	.	.	.	.	2	.	.	.	.	1	.
FT Riley, KS	107	95	.	1	.	.	.	.	.	.	.	.	.	.	.	.
FT Sill, OK	45	77	.	.	.	1	1	.	.	.	.	.	.	1	.	.
SOUTHEAST																
FT Gordon, GA	92	120	.	.	.	.	.	.	.	.	.	6	.	.	.	.
FT Benning, GA	64	81	.	2	1	.	2	.	.	.	.	.	.	.	1	.
FT Campbell, KY	342	57	.	.	1	.	2	.	.	.	.	.	1	.	.	.
FT Jackson, SC	36	66	.	.	.	.	.	.	2	.	.	.	.	.	.	.
FT Rucker, AL	7	12	.	1	.	.	.	.	.	.	.	.	.	.	.	.
FT Stewart, GA	172	122	.	.	.	.	.	1	5	.	9	1	.	1	.	.
WESTERN																
FT Lewis, WA	183	157	2	.	1	.	.	.	.	.	.	.	.	.	11	1
FT Irwin, CA	13	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Wainwright, AK	53	60	.	.	.	1	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS																
Hawaii	204	258	2	6	2	5	.	.	.	.	.	.	.	.	1	.
Europe	528	253	6	5	4	2	.	.	2	1	2	1	1	1	.	1
Korea	121	155	.	.	.	.	.	.	.	.	.	1	.	1	.	.
Total	**4,578**	**3,763**	**18**	**24**	**18**	**21**	**10**	**3**	**9**	**5**	**14**	**9**	**4**	**8**	**17**	**6**

[1] Includes active duty servicemembers, dependents, and retirees.

[2] Events reported by April 7, 2005 and 2006.

[3] Seventy events specified by Tri-Service Reportable Events, Version 1.0, July 2000.

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

(Cont'd) Sentinel reportable events for all beneficiaries[1] at U.S. Army medical facilities, cumulative numbers[2] for calendar years through March 31, 2005 and 2006

Reporting location	Arthropod-borne				Sexually Transmitted								Environmental			
	Lyme Disease		Malaria		Chlamydia		Gonorrhea		Syphilis[4]		Urethritis[5]		Cold		Heat	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
NORTH ATLANTIC																
Washington, DC Area	.	.	.	1	52	45	8	8	3	.	.	.	1	.	.	.
Aberdeen, MD	.	.	.	.	12	.	2	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	.	.	.	.	52	39	13	12	.	.	.	.	.	.	.	.
FT Bragg, NC	.	.	.	2	341	305	67	39	2	2	34	47	1	1	4	7
FT Drum, NY	.	.	.	.	24	10	4	3	.	.	.	.	1	.	.	.
FT Eustis, VA	.	.	.	.	43	42	12	13	.	.	.	.	2	.	.	.
FT Knox, KY	.	.	.	.	50	44	4	10	.	.	.	.	1	3	.	.
FT Lee, VA	.	.	.	.	40	97	9	20	.	.	.	.	1	.	.	.
FT Meade, MD	.	.	.	.	24	30	2	4	.	.	.	.	.	.	.	.
West Point, NY	3	.	.	.	15	7	.	.	.	.	.	.	1	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	.	.	.	.	78	84	24	30	2	1	.	.	.	.	1	.
FT Bliss, TX	.	.	.	1	56	96	5	13	.	1	.	.	.	.	.	.
FT Carson, CO	.	.	.	.	148	121	19	24	.	.	10	9	1	.	.	.
FT Hood, TX	.	.	.	.	277	318	131	80	.	.	92	5	.	.	.	1
FT Huachuca, AZ	.	.	.	.	15	11	4	1	.	.	.	.	.	1	1	.
FT Leavenworth, KS	.	.	.	.	9	6	.	1	.	.	.	.	1	.	.	.
FT Leonard Wood, MO	.	.	.	.	54	53	17	4	.	.	1	.	4	.	1	.
FT Polk, LA	.	.	.	.	49	44	14	14	1	.	.	.	.	.	.	.
FT Riley, KS	.	1	.	.	48	76	20	11	.	.	.	.	5	.	.	.
FT Sill, OK	.	.	.	.	11	11	9	7	.	2	.	.	.	.	.	.
SOUTHEAST																
FT Gordon, GA	.	.	.	.	51	74	4	16	.	.	.	.	.	.	.	.
FT Benning, GA	.	.	.	.	43	61	14	15	.	.	.	.	1	.	1	1
FT Campbell, KY	.	.	.	.	219	49	52	6	.	.	.	.	1	.	2	.
FT Jackson, SC	.	.	.	.	25	59	7	7	.	.	.	.	.	.	.	.
FT Rucker, AL	.	.	.	.	3	11	4	.	.	.	.	.	.	.	.	.
FT Stewart, GA	.	.	.	.	93	84	38	29	.	.	7	3	.	.	1	.
WESTERN																
FT Lewis, WA	.	.	3	1	119	114	20	25	.	.	22	13	.	.	.	.
FT Irwin, CA	.	.	.	.	8	14	5	2	.	.	.	.	.	.	.	.
FT Wainwright, AK	.	.	1	1	33	33	2	3	.	.	.	.	13	16	.	.
OTHER LOCATIONS																
Hawaii	.	.	2	.	112	188	20	35	.	.	.	.	.	.	.	2
Europe	2	4	.	1	299	159	83	60	1	.	1	.	5	.	.	.
Korea	.	.	.	.	100	112	16	33	.	1	.	.	3	2	1	.
Total	**5**	**5**	**6**	**7**	**2,503**	**2,397**	**629**	**525**	**9**	**7**	**167**	**77**	**42**	**23**	**12**	**11**

[4] Primary and secondary.

[5] Urethritis, non-gonococcal (NGU).

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

Commander
U.S. Army Center for Health Promotion
and Preventive Medicine
ATTN: MCHB-TS-EDM
5158 Blackhawk Road
Aberdeen Proving Ground, MD 21010-5422

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Inquiries regarding content or material to be considered for publication should be directed to: Editor, Army Medical Surveillance Activity, Building T-20, Room 213 (Attn: MCHB-TS-EDM), 6900 Georgia Avenue, NW, Washington, D.C. 20307-5001. E-mail: editor@amsa.army.mil

To be added to the mailing list, contact the Army Medical Surveillance Activity @ (202) 782-0471, DSN 662-0471. E-mail: msmr@amsa.army.mil