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Fractures Among Active Component, Recruit Trainees, and Deployed Service Members, U.S. Armed Forces, 2003–2012

Jon Claassen, DO, MPH (CPT, USA); Zheng Hu, MS; Patricia Rohrbeck, DrPH, MPH, CPH (Maj, USAF)

Injuries are the leading cause of healthcare encounters and lost work days among military service members in the U.S. Armed Forces. Fractures often entail a lengthy recovery time and can affect the operational ability of both the individual and the unit. From 1 January 2003 through 31 December 2012, active component service members were diagnosed with 244,248 incident fractures (19.4 per 1,000 person-years[p-yrs]). Hand and foot/ankle fractures were the most common types. During the same surveillance period, recruit trainees were diagnosed with 18,773 incident fractures (66.0 per 1,000 p-yrs). Annual incidence rates among trainees declined 38% from 2003 to 2012. Stress fractures were the most common type in this population. From 1 January 2008 through 31 December 2012, deployed service members were diagnosed with 12,328 incident fractures (16.5 per 1,000 p-yrs). The most common sites of fracture among the deployed population were the hand, foot/ankle, and arm. Comments address preventive interventions, stress fractures in trainees, gender differences in incidence, and limitations of the study.

Injuries are the leading cause of healthcare encounters and lost work days among military service members in the U.S. Armed Forces.[1,2] Fractures, defined as breaks in bone or cartilage, comprise a major proportion of those injuries. Among active component service members in the Department of Defense, fractures account for as high as 40% of injury-associated hospitalizations and 10% of injury-related outpatient visits.[1-3] Fractures also account for 26% of combat injuries, 82% of which are open fractures and necessitate medical evacuation.[4] Stress fractures continue to be the leading cause of recruit trainee injury and, after requiring an average of 10–18 weeks for recovery and physical therapy, necessitate repetition of all or part of basic training periods.[5-8] Although fractures are rarely life threatening, they do impose a lengthy recuperation time of weeks to months and can greatly affect the operational ability of both the affected service members and their units.[7,9]

This report summarizes incident fracture counts, rates, and trends in active component service members and recruit trainees over a 10-year surveillance period and in deployed service members over a 5-year surveillance period.

METHODS

The study population included active component service members, recruit trainees, and deployed service members of the Army, Navy, Air Force, Marine Corps, and Coast Guard; each of these three groups was assessed and reported on separately for estimates of incident fracture rates. The active component population excluded recruit trainees and service members during time periods of deployment. The surveillance period for the recruit trainees was restricted to basic training, the length of which varied by service. The deployed population included only active component service members who were deployed to Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), or Operation New Dawn (OND) for more than 30 days. Individuals who were deployed for less than 30 days were included in the active component population. The surveillance period was 1 January 2003 through 31 December 2012 for the active component and recruit trainee populations, and 1 January 2008 through 31 December 2012 for the deployed population.

All data used to determine incident fracture rates were derived from records routinely maintained in the Defense Medical Surveillance System (DMSS), the Theater Medical Data Store (TMDS), and the Transportation Command Regulating and Command and Control Evacuation System (TRAC²ES). DMSS records document both ambulatory encounters and hospitalizations of active component members of the U.S. Armed Forces in fixed military and civilian (if reimbursed through the Military Health System) treatment facilities. Healthcare encounters of deployed service members are documented in the TMDS records, and medical evacuations from the Central Command (CENTCOM) theater of operations are documented in the TRAC²ES. Coast Guard medical encounter data prior to 2007 were incomplete in DMSS and were analyzed only for the period since 2007.

Incident diagnoses of fracture were identified from ICD-9-CM diagnostic codes recorded during hospitalizations and ambulatory medical encounters (Table 1). Service members were considered incident cases if they had one inpatient encounter with an ICD-9 code for a fracture or if they had two outpatient encounters with the same ICD-9 code for a fracture within a 180-day period. Diagnoses could be recorded in any diagnostic position. Multiple fractures in the same anatomic region were considered one incident case, but fractures to different anatomic regions were counted as separate incident cases. Only one incident case per anatomic region per person was counted during the surveillance period.

TABLE 1. ICD-9 codes for fractures by anatomical region or type

Fracture type	ICD-9 code
Pathologic	733.1
Stress	733.93–733.98
Head	800–804
Vertebra	805–806
Ribs	807.0–807.1
Sternum	807.2–807.4
Larynx and trachea	807.5–807.6
Pelvis	808
Arm	810–813, 819
Hand	814–817
Leg	820–823, 828
Foot/ankle	824–826
Unspecified	809, 818, 827, 829

RESULTS

Between January 2003 and December 2012, a total of 244,248 incident fractures (incidence rate: 19.4 cases per 1,000 person-years [p-yrs]) were diagnosed in the active component population **(Table 2)**. The annual rates increased from 18.6 per 1,000 p-yrs in 2003 to 20.7 per 1,000 p-yrs in 2008, and thereafter decreased to 18.2 per 1,000 p-yrs in 2012 **(Figure 1)**. The Marine Corps and the Army had the highest overall rates (24.0 and 23.8 per 1,000 p-yrs, respectively) and the Navy had the lowest rate (15.1 per 1,000 p-yrs) **(Table 2)**. Males had a slightly higher rate (19.4 per 1,000 p-yrs) than females (19.3 per 1,000 p-yrs). Fracture incidence rates declined with increasing age. The incidence rate of fracture was 62% lower among those 40 years and older compared with those aged 18–20 years **(Table 2, Figure 2)**. The fracture type/sites with the highest rates among active component service members were hand fractures (5.8 per 1,000 p-yrs), foot/ankle fractures (4.4 per 1,000 p-yrs), and stress fractures (2.7 per 1,000 p-yrs) **(Table 3, Figure 2)**. The rates of all fracture types were higher in the younger age groups with the exception of rib fracture rates, which increased with age **(Figure 2)**. Males had higher incidence rates than females in all fracture categories except for stress, foot/ankle, pathologic, and pelvis fractures **(Figure 3)**. Of note, the

TABLE 2. Incidence counts and rates of fractures, active component, recruit trainees, and deployed, U.S. Armed Forces, 2003–2012

	Active		Recruit		Deployed[b]	
	Case N	IR[a]	Case N	IR[a]	Case N	IR[a]
Total	244,248	19.4	18,773	66.0	12,328	16.5
Service						
Air Force	50,657	15.9	813	20.5	1,313	11.8
Army	99,104	23.8	9,161	81.9	9,109	18.9
Coast Guard[c]	7,198	18.0	414	88.2	1	0.8
Marine Corps	38,383	24.0	6,411	88.5	1,443	14.7
Navy	48,906	15.1	1,974	35.3	462	8.3
Gender						
Female	36,436	19.3	5,722	129.2	1,113	14.7
Male	207,812	19.4	13,051	54.4	11,215	16.7
Race/ethnicity						
White, non-Hispanic	166,344	21.1	13,190	72.5	8,565	17.7
Black, non-Hispanic	32,020	15.3	1,818	45.0	1,662	13.7
Hispanic	25,020	18.9	2,083	61.8	1,314	16.0
Asian/Pacific Islander/Other	15,809	16.2	1,356	55.1	619	12.9
Unknown	5,055	17.0	326	87.6	168	11.6
Age						
18–20	35,163	32.4	9,052	47.3	935	21.0
21–24	80,830	24.1	5,950	88.8	4,380	19.0
25–29	57,393	19.0	2,507	126.4	3,478	16.6
30–34	30,152	15.5	869	184.6	1,743	15.2
35–39	21,568	13.4	395	293.7	1,033	12.6
40+	19,142	12.3			759	11.3
Grade						
Enlisted (E01–E04)	140,816	26.9	18,773	66.0	7,299	20.5
Enlisted (E05–E09)	77,651	15.0	–	–	3,944	14.0
Officers (O01–O04)	22,364	12.0	–	–	901	9.6
Officers (O05–O10)	1,362	10.8	–	–	31	8.8
Officers (W01–W05)	2,055	12.5	–	–	153	10.3
Occupation						
Admin/supply	52,310	17.7	–	–	3,070	15.8
Combat	50,796	20.8	–	–	4,067	18.6
Health care	18,136	16.8	–	–	759	16.6
Other	123,006	20.2	–	–	4,432	15.3

[a]Rate per 1,000 person-years
[b]Surveillance period: 2008–2012
[c]Surveillance period: 2007–2012

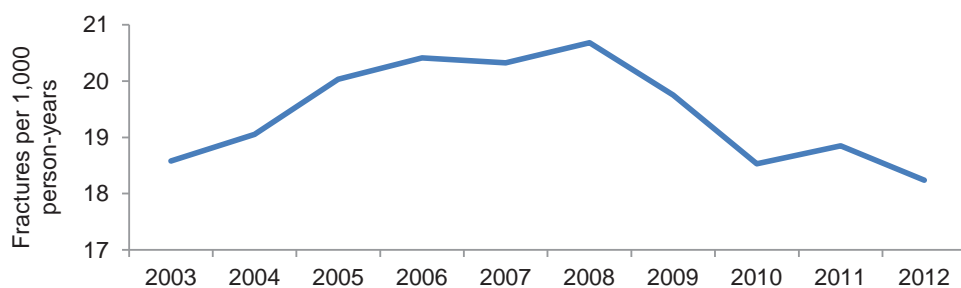**FIGURE 1.** Annual incidence rates of fractures, active component, U.S. Armed Forces, 2003–2012

TABLE 3. Incidence counts and rates (per 1,000 person-years) of fracture types, active component, recruit trainees, and deployed, U.S. Armed Forces, 2003–2012

	Active		Recruit		Deployed[b]	
	Case N	IR[a]	Case N	IR[a]	Case N	IR[a]
Stress	33,593	2.7	11,296	39.7	527	0.7
Stress fracture of tibia or fibula	14,499	1.2	4,461	15.7	177	0.2
Stress fracture of metatarsals	5,186	0.4	1591	5.6	133	0.2
Stress fracture of other bone	11,354	0.9	4,314	15.2	208	0.3
Stress fracture of femoral neck	1,267	0.1	323	1.1	6	0.0
Stress fracture of shaft of femur	513	0.0	198	0.7	2	0.0
Stress fracture of pelvis	774	0.1	409	1.4	1	0.0
Head	18,969	1.5	269	1.0	772	1.0
Skull	2,784	0.2	30	0.1	131	0.2
Nasal	8,092	0.6	125	0.4	301	0.4
Mandible	2,948	0.2	60	0.2	115	0.2
Multiple bone, other facial	5,145	0.4	54	0.2	225	0.3
Vertebra	7,823	0.6	150	0.5	449	0.6
Ribs	4,778	0.4	187	0.7	307	0.4
Sternum	270	0.0	7	0.0	13	0.0
Larynx and trachea	58	0.0	1	0.0	1	0.0
Pelvis	1,664	0.1	122	0.4	125	0.2
Shoulder	9,221	0.7	118	0.4	205	0.3
Clavicle	8,135	0.7	112	0.4	160	0.2
Scapula	1,086	0.1	6	0.0	45	0.1
Arm	22,167	1.8	460	1.6	1,133	1.5
Humerus	3,137	0.3	44	0.2	210	0.3
Radius and ulna	19,020	1.5	416	1.5	921	1.2
Multiple fractures involving both upper limb(s) with rib(s)	10	0.0	0	0.0	2	0.0
Hand	73,308	5.8	1,737	6.1	4,598	6.1
Carpal	11,467	0.9	307	1.1	468	0.6
Metacarpal	29,609	2.4	736	2.6	1,056	1.4
Phalanges of hand	31,968	2.5	689	2.4	3,019	4.0
Multiple fractures of hand bones	264	0.0	5	0.0	55	0.1
Leg	13,985	1.1	751	2.6	1,023	1.4
Femur	2,751	0.2	208	0.7	225	0.3
Patella	1,608	0.1	29	0.1	75	0.1
Tibia and fibula	9,603	0.8	514	1.8	704	0.9
Multiple fractures involving both lower limbs	23	0.0	0	0.0	19	0.0
Foot	54,687	4.4	2,308	8.1	2,675	3.6
Ankle	20,267	1.6	626	2.2	882	1.2
Tarsal and metatarsal bones	22,304	1.8	1,513	5.3	1,045	1.4
Phalanges of foot	12,116	1.0	169	0.6	748	1.0
Unspecified	1,291	0.1	91	0.3	355	0.5
Other trunk	17	0.0	1	0.0	2	0.0
Ill-defined fractures of upper limb	124	0.0	4	0.0	33	0.0
Other, multiple, and ill-defined fractures of lower limb	462	0.0	16	0.1	112	0.2
Fracture of unspecified bones	688	0.1	70	0.3	208	0.3
Pathologic	2,434	0.2	1,276	4.5	145	0.2

[a]Rate per 1,000 person-years
[b]Surveillance period: 2008–2012

rate of stress fractures in females was 2.4 times higher (6.7 per 1,000 p-yrs) than the rate in males (1.9 per 1,000 p-yrs).

During the same surveillance period, recruit trainees were diagnosed with 18,773 incident fractures (66.0 per 1,000 p-yrs) **(Table 2)**. The annual rates decreased from 80.9 per 1,000 p-yrs in 2003 to 50.2 per 1,000 p-yrs in 2012 **(Figure 4)**. The Marine Corps and Coast Guard had the highest rates (88.5 and 88.2 per 1,000 p-yrs, respectively) and the Air Force had the lowest rate (20.5 per 1,000 p-yrs) **(Table 2)**. The rate among female trainees was 1.4 times higher than the rate in males. The fracture types with the highest rates in recruit trainees were stress fractures (39.7 per 1,000 p-yrs), foot/ankle fractures (8.1 per 1,000 p-yrs), and hand fractures (6.1 per 1,000 p-yrs) **(Table 3, Figure 5)**. Among recruit trainees, rates increased dramatically with age **(Table 2)**. The incidence rate among recruit trainees aged 35 years and older (293.7 per 1,000 p-yrs) was 5.2 times higher than the rate among trainees in the youngest age group (47.3 per 1,000 p-yrs) **(Table 2)**. Incidence rates for stress, foot/ankle, hand, leg, arm, and rib fractures were notably higher among recruit trainees aged 35 years or older than among the younger age groups of trainees **(Figure 5)**. The incidence rate of stress fractures in female trainees was 2.2 times higher than the rate in male trainees (94.7 and 29.6 per 1,000 p-yrs, respectively) **(data not shown)**.

Between January 2008 and December 2012, deployed service members were diagnosed with 12,328 incident fractures (16.5 per 1,000 p-yrs) **(Table 2)**. The annual rates ranged between 15.4 per 1,000 p-yrs and 18.0 per 1,000 p-yrs. Deployed service members in the Army had the highest rate (18.9 per 1,000 p-yrs), compared to members of the Navy (8.3 per 1,000 p-yrs) and Coast Guard (0.8 per 1,000 p-yrs) **(Table 2)**. The incidence rate for males was 13% higher than for females. Rates declined with advancing age and the rate for deployed service members aged 40 years or older was 46% lower than that of the youngest age group (18–20 years) **(Table 2)**. The fracture types with the highest rates in this population were those of the hand (6.1 per 1,000 p-yrs), foot/ankle (3.6 per 1,000 p-yrs), and arm (1.5 per 1,000 p-yrs) **(Table 3)**.

FIGURE 2. Incidence rates of fractures by type and age group, active component, U.S. Armed Forces, 2003–2012
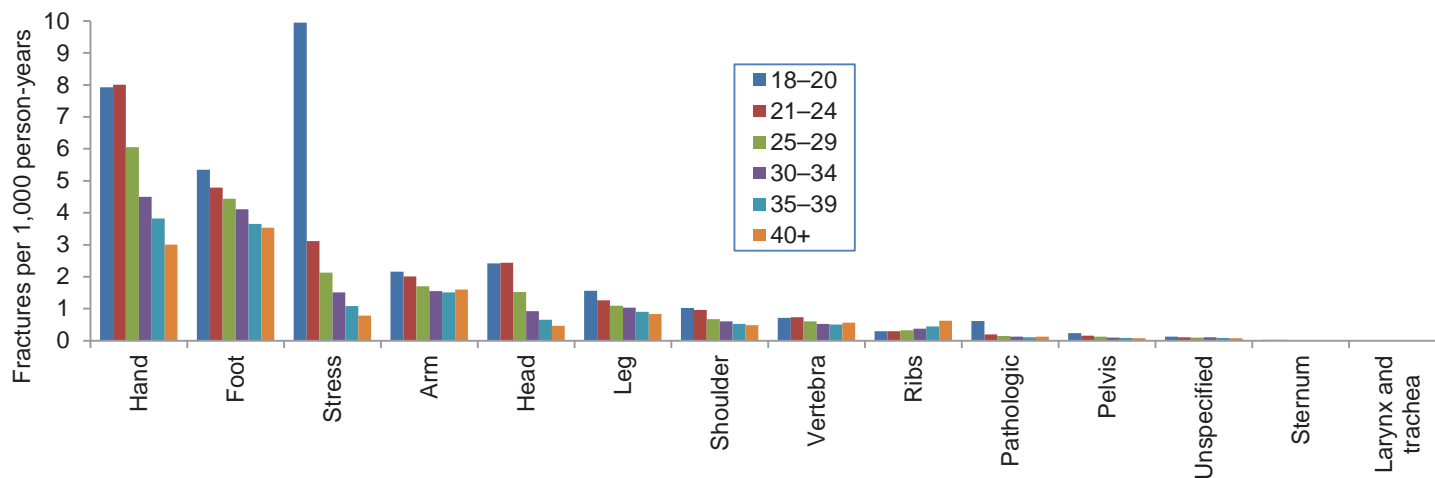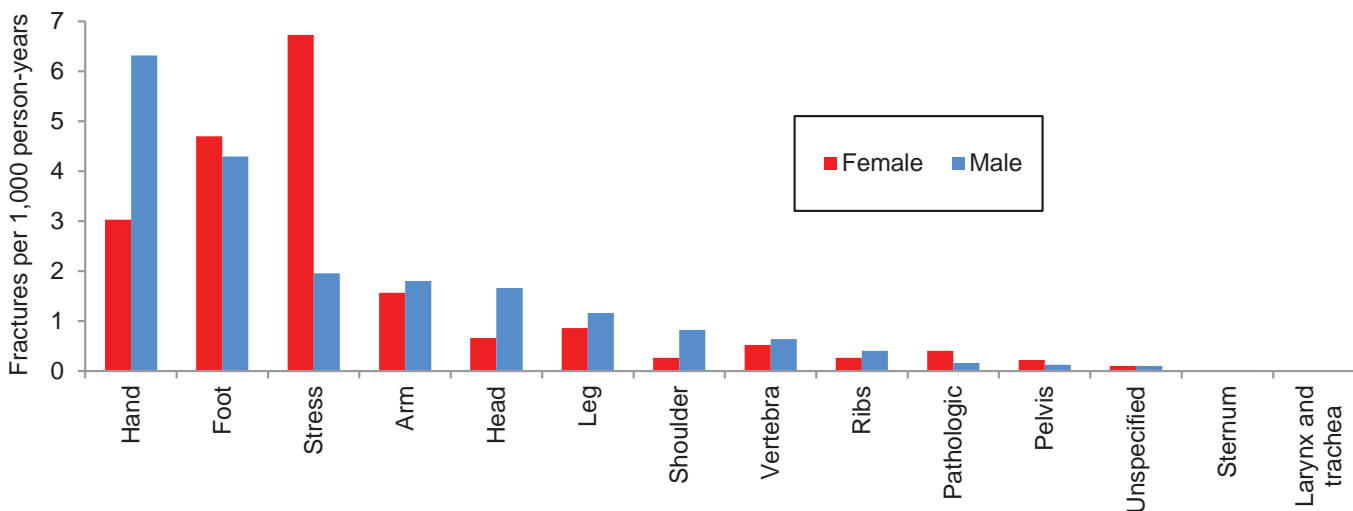

FIGURE 3. Incidence rates of fractures by type and gender, active component, U.S. Armed Forces, 2003–2012

EDITORIAL COMMENT

During the surveillance periods, the overall fracture rates among active component, recruit trainees, and deployed service members were 19.4, 66.0, and 16.5 per 1,000 p-yrs, respectively. Annual incidence rates for the active component peaked in 2008 but had declined by 12% through 2012. Annual rates for recruit trainees have shown a steady decrease during the period; the rate for 2012 reflects a 38% decrease from the 2003 rate. These observations suggest that concerted efforts to reduce fracture injuries through leadership education, discouraging use of physical activity as

punishment, and adjusting physical training schedules over the past 10 years have had a positive impact on fracture incidence, even though selected subpopulations may require continued emphasis on injury prevention.[10,11] Hand fractures were the most common type in the active component, whereas stress fractures were the most frequent type in the recruit population and among female service members. In the deployed setting, the higher rates among service members in the Army and Marine Corps may be related to hazardous duties and tasks such as those associated with combat operations as well as carrying heavy gear for long distances and entering

and exiting large vehicles. One possible explanation for the increase in fracture rates in the active component during 2003–2008 may have been the increased recruiting goal among the Services during the height of OEF and OIF/OND. Accessioning more service members over a short period of time may have increased the proportion of less physically fit individuals who were at greater risk for fracture injuries. Additionally, more intense training to accommodate rapid deployment cycles may have compounded the risk for fractures among service members. On the other hand, basic training sites started implementing injury prevention strategies in 2003 and these

efforts seem to have been associated with demonstrable reductions in injury rates among trainees **(Figure 4)**. It is uncertain whether these initiatives may have affected active component training strategies by 2008, accounting for the start of the fracture rate decline.[6] Continued research is needed to help determine the factors most linked to fracture injuries and to find ways to prevent those injuries.

Stress fractures in recruit trainees have been a recognized problem for a long time.

Many studies have been done to uncover ways to prevent these injuries and have led to several interventions. Among these, prevention of overtraining is the most important. This can be accomplished by gradual, systematic run progressions, grouping service members by physical ability, running for a specified time instead of distance, and allowing appropriate recovery between activities.[12] A 5-minute step test has been shown to identify recruits, females especially, who are at high risk of developing

stress fractures and can therefore be placed on a special fitness regimen.[13] Evidence also suggests that both increasing multi-axial, proprioceptive, and agility training to vary musculoskeletal stress and ensuring proper nutrition for all recruit trainees reduce stress fractures.[12]

Females had higher rates of stress fractures in all three populations compared to males. Research has shown that low physical fitness levels appear to be the major risk factor for stress fractures, and females, as a group, have tended to have lower levels of physical fitness compared to males at the time of entry into military service.[14,15] This disparity in rates of stress fractures could also be associated with anatomical factors. Additional strain on bones of the lower extremities in some females may be attributable to a wider pelvis, shorter stature, and less muscle mass compared to males.[15]

There are some limitations to this report that should be considered when interpreting the results. The diagnoses of fractures were ascertained from the DMSS administrative data reflecting diagnoses recorded in patients' health records. Omission or miscoding of diagnoses would affect the accuracy of the data summary. The surveillance period used for the deployed population was shorter than the surveillance

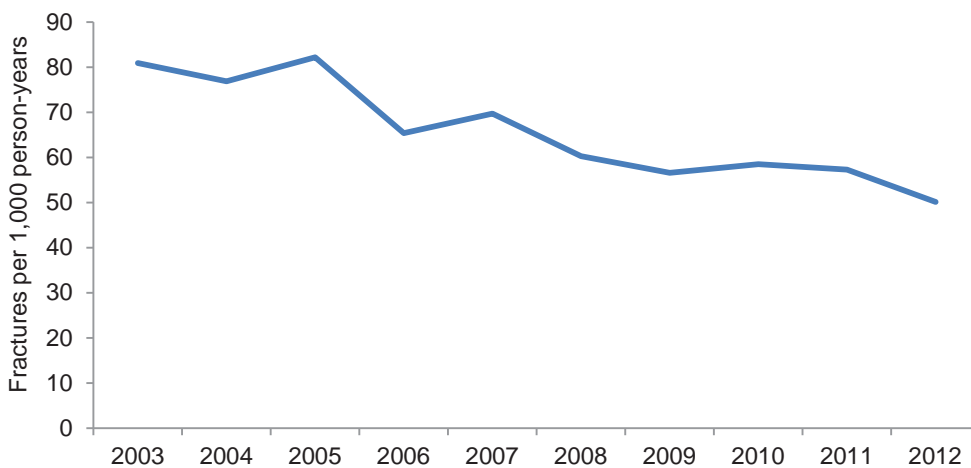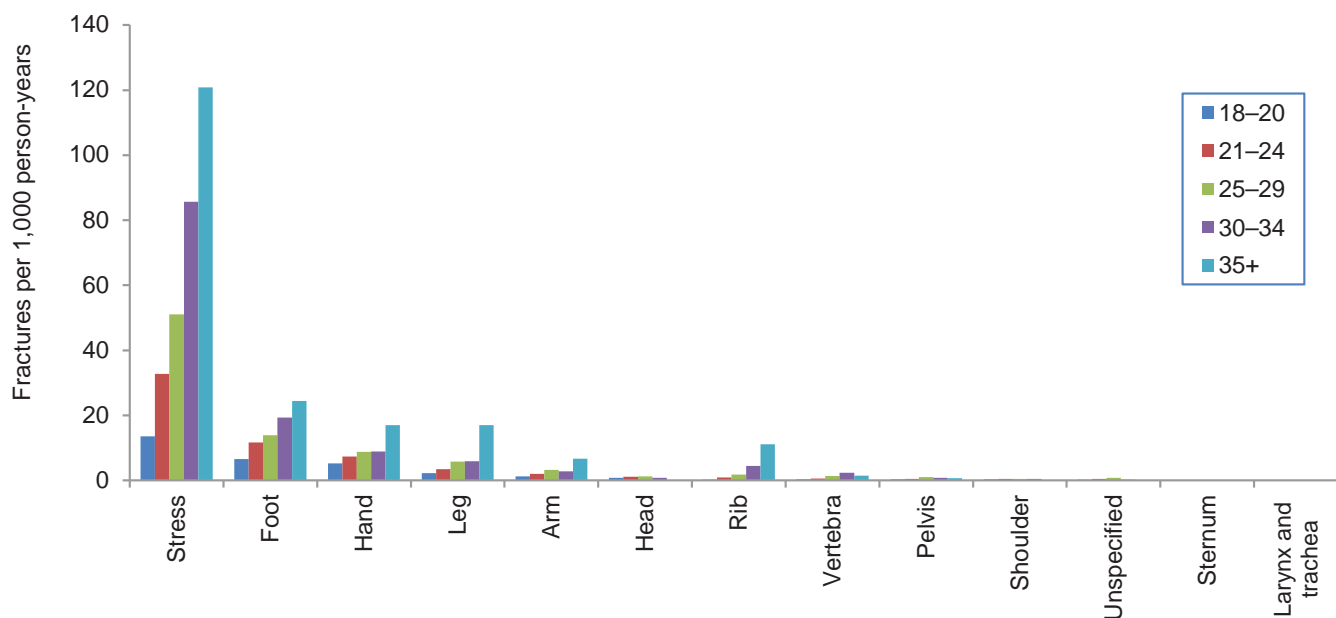**FIGURE 4.** Annual incidence rates of fractures, recruit trainees, U.S. Armed Forces, 2003–2012

FIGURE 5. Incidence rates of fractures by type and age group, recruit trainees, U.S. Armed Forces, 2003–2012

period for the active component and recruit populations due to incomplete deployment medical encounter data in TMDS prior to 2008, so a comparison of the populations for the entire period was not feasible.

Further research would help determine causation of the various fracture types, especially the most common fractures, to implement appropriate preventive measures. Additional information on count and type of fractures occurring during the duty day compared to off-duty activities could help delineate risk factors for certain types of fractures and subpopulations. In the active component, service members need to continue evaluating workplace procedures and workplace safety policies to focus on decreasing hand and foot fracture rates. Although stress fracture rates have decreased considerably in the recruit population, they remain the most common form of fracture in this population, and additional study may be necessary. Fitness programs need to be continually evaluated and adjusted to avoid the repetitive motions that cause stress fractures. Because the Army and Marine Corps had higher incidence rates compared to the Navy and Air Force for recruit trainees, the Services could benefit from collaborating on physical fitness procedures and adapting their basic training programs to lower stress fracture rates. As stated above, low physical fitness levels are a major risk factor for stress fractures.[14,15] Encouraging physical conditioning prior to entering basic training, and performing a 5-minute step test to identify high-risk individuals can also play a role in preventing stress fractures.[13] Further occupational health studies may be appropriate for the deployed population to determine why hand and foot fractures are the most common types of fractures.

Author affiliations: Walter Reed Army Institute of Research, Silver Spring, MD (Dr. Claassen, Preventive Medicine Resident); Armed Forces Health Surveillance Center, Silver Spring, MD (Ms. Hu, Dr. Rohrbeck).

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Diagnoses of Eating Disorders Among Active Component Service Members, U.S. Armed Forces, 2004–2013

During the years 2004–2013, a total of 3,527 service members received incident diagnoses of one of the eating disorders: anorexia nervosa (AN), bulimia nervosa (BN), or "eating disorder, not otherwise specified." The overall incidence rate was 2.5 cases per 10,000 person-years. Of the case-defining diagnoses, BN and AN accounted for the most and least incident cases, respectively. Incidence rates were more than 20 times higher in women than men. Higher rates were found among the younger age groups; white, non-Hispanics; and Marines compared to their respective counterparts. Incidence rates and prevalence of these disorders in service members were lower than estimates from studies of civilian populations and other studies of military populations. Reasons for this observation are discussed. Although diagnoses of eating disorders are disqualifying from entrance into military service, hundreds of cases are diagnosed in service members each year. The serious complications of AN and BN are summarized.

Eating disorders are characterized by significant disturbances of eating behavior; they include anorexia nervosa (AN), bulimia nervosa (BN), and "eating disorder, not otherwise specified" (EDNOS).[1] The diagnostic criteria for these conditions are summarized in **Table 1**.[2] Eating disorders are not associated with loss of appetite, are non-organic in origin (i.e., not caused by a known physical illness), and are not directly attributable to other mental disorders.[2]

Eating disorders are more common among adolescent and young adult women and in industrialized societies; in the U.S., eating disorders affect members of all ethnic groups.[1] Estimates of the incidence or prevalence of these disorders vary widely, depending on the methods used and the populations studied. For example, in a review of the epidemiology of eating disorders, Hsu cited estimates of incidence rates of AN from 1.43 to 50 per 100,000 young women per year, prevalence of AN from 0.2% to 0.5%, and prevalence of BN from 2% to 3%.[3] In most studies, BN is more prevalent than AN.

Published studies of eating disorders among U.S. military members have yielded a wide range of estimates of prevalence.[4-12] Most of these studies have been based on the results of surveys and questionnaires in select populations. Still, despite the differences in methods and results, these studies document that eating disorders are not rare among U.S. military members, and that abnormal eating behaviors appear to be common.

By current Department of Defense (DoD) policy, diagnosis of AN, BN, EDNOS, or an unspecified eating disorder after age 13 is medically disqualifying for accession into military service.[13] Furthermore, service members who are affected by eating disorders that are unresponsive to therapy and/or interfere with the performance of their military duties may be referred to medical evaluation boards and possibly separated from service.[14]

This report documents numbers and rates of medical diagnoses of the three major types of eating disorders as documented in records of medical encounters of active component service personnel over a recent 10-year period.

METHODS

The surveillance period was 1 January 2004 through 31 December 2013. The study population included all active component service members of the Army, Air Force, Marine Corps, Navy, and Coast Guard who served at any time during the surveillance period.

An incident case of one of the three eating disorders was defined by a case-defining diagnosis listed in the first or second diagnostic position of a hospitalization record or in the first diagnostic position of a record of outpatient care. Case-defining diagnoses were AN (ICD-9 code: 307.1), BN (ICD-9 code: 307.51), and EDNOS (ICD-9 code: 307.50).

For summary purposes, each affected service member could be counted as a case of only one eating disorder. To this end, if service members received more than one eating disorder-specific diagnosis, AN and BN were prioritized over EDNOS. If individuals received diagnoses of both AN and BN, the diagnosis recorded first received priority. Individuals were classified as EDNOS cases only if they were not diagnosed with either AN or BN. Service members who received case-defining diagnoses before the surveillance period were excluded from the analysis.

Prevalence of each of the diagnoses of eating disorder was estimated for each year in the 10-year surveillance period by counting those individuals identified as incident cases of an eating disorder who actually had a healthcare encounter for any eating disorder during that year. The number of service members with encounters in

TABLE 1. Criteria for diagnoses of eating disorders (abbreviated)[2]

Anorexia nervosa (ICD-9 Code: 307.1)

    Refusal to maintain a minimally normal body weight (less than 85% of expected)

    Fear of gaining weight or becoming fat, even though underweight

    Disturbed perception of one's body weight; denial of seriousness of low body weight

Restricting type: Restriction of food intake; use of fasting, diet pills, exercise; no binge eating or purging

Binge-eating/purging type: Binge eating and purging behavior to lose weight

Bulimia nervosa (ICD-9 Code: 307.51)

    Recurrent episodes of binge eating

    Recurrent inappropriate compensatory behavior to prevent weight gain

    Self-induced vomiting; misuse of laxatives, diuretics, enemas, other medications

    Fasting or excessive exercise

    Binge eating and compensatory behavior occur weekly for 3 months

    Self-evaluation is unduly influenced by body shape and weight

    The disturbance does not occur exclusively during episodes of anorexia nervosa

Purging type: Use of vomiting, laxatives, diuretics, or enemas

Nonpurging type: Use of other behaviors (e.g., fasting, exercise but not the above)

Eating disorder, not otherwise specified (ICD-9 Code: 307.50)

    Individual does not meet all criteria for any specific eating disorder

    All criteria for anorexia nervosa are met except weight is in normal range

    All criteria for bulimia nervosa are met except frequency or duration of behaviors

    Use of inappropriate compensatory behaviors after eating small amounts of food

    Repeatedly chewing, but not swallowing, large amounts of food

    Binge eating disorder: recurrent binging but no inappropriate compensatory behaviors

TABLE 2. Incident cases and incidence rates, eating disorders, active component, U.S. Armed Forces, 2004–2013

	All eating disorders, total		Anorexia nervosa		Bulimia nervosa		Eating disorder, NOS	
	No.	Rate[a]	No.	Rate[a]	No.	Rate[a]	No.	Rate[a]
Female	2,753	13.3	342	1.7	1,437	6.9	974	4.7
Male	774	0.6	101	0.1	306	0.3	367	0.3
Total	3,527	2.5	443	0.3	1,743	1.2	1,341	0.9
Female/Male RR	21.0		20.0		27.8		15.7	
Female % (all cases)	78%		77%		82%		73%	

[a]Rate per 10,000 person-years
NOS=not otherwise specified
RR=rate ratio

that year was divided by the total number of active component service members who served at least 1 day on active duty in that year. Prevalence estimates were calculated for each of the three eating disorders (AN, BN, and EDNOS).

All data used for analyses were derived from electronic records routinely maintained in the Defense Medical Surveillance System (DMSS) for health surveillance purposes. DMSS records document all hospitalizations and outpatient visits of actively serving U.S. military members in permanent U.S. military and civilian (contracted/purchased care through the Military Health System) medical facilities worldwide.

RESULTS

During the 10-year surveillance period, a total of 3,527 service members received incident diagnoses of eating disorders. The overall incidence rate was 2.5 cases per 10,000 person-years (p-yrs). Of the case-defining diagnoses, BN and AN accounted for the most and least incident cases, respectively **(Table 2)**. Throughout the period, annual incidence rates slightly declined for each disorder and overall **(Figure 1)**. Rates during the first and last year of the period, respectively, were: all disorders, 3.1 and 2.3 per 10,000 p-yrs; BN, 1.5 and 1.2 per 10,000 p-yrs; eating disorders NOS, 1.2 and 0.9 per 10,000 p-yrs; and AN, 0.4 and 0.2 per 10,000 p-yrs (data not shown).

In regard to eating disorders overall, 78% of incident cases affected females, and incidence rates were more than 20 times higher among women (13.3 cases per 10,000 p-yrs) than men (0.6 per 10,000 p-yrs) **(Table 2)**. Over the period, annual incidence rates of each case-defining diagnosis declined among both men and women, with the notable exception of BN among men **(Figures 2 and 3)**. The increase in diagnoses of BN among men caused the overall rate among men to slightly increase during the period.

The distribution of incident diagnoses of all eating disorders by demographic characteristics is shown in **Table 3**. Incidence rates were highest in the youngest age group for both male and female service members and declined with advancing age. Among women, rates were higher among white, non-Hispanic than other racial/ethnic group members. Among men, the rate was slightly higher among Hispanic than white, non-Hispanic service members; however, the latter accounted for 70% of the cases. Rates of diagnoses of eating disorders were higher among members of the Marine Corps than the other services, especially among women. Also, rates were higher among junior enlisted and junior officers compared to their respective counterparts.

TABLE 3. Incident cases and incidence rates, all eating disorders, active component, U.S. Armed Forces, 2004–2013

Males			Females		Female/Male
No.	Rate[a]		No.	Rate[a]	Rate ratio
774	0.6	Total	2,753	13.3	21.0
		Age group			
123	0.8	<21	675	23.9	29.3
236	0.7	21–24	1,039	17.8	24.5
189	0.7	25–29	606	11.9	17.7
95	0.5	30–34	205	6.9	13.4
71	0.5	35–39	123	5.9	12.4
60	0.4	40+	105	5.6	12.4
		Race/ethnicity			
544	0.7	White, non-Hispanic	1,871	18.5	27.0
60	0.3	Black, non-Hispanic	274	4.9	14.6
95	0.7	Hispanic	307	12.6	17.3
20	0.4	Asian/Pacific Islander	82	8.5	20.4
4	0.3	Native American	14	4.8	17.1
51	0.9	Other	205	15.6	17.8
		Service			
299	0.7	Army	913	12.6	19.1
184	0.7	Navy	765	14.9	22.9
149	0.5	Air Force	697	10.7	19.5
125	0.7	Marine Corps	290	23.4	33.4
17	0.5	Coast Guard	88	16.8	35.3
		Rank			
445	0.8	Enlisted (E1–E4)	1,841	19.5	23.1
246	0.5	Enlisted (E5–E9)	528	7.0	14.1
51	0.4	Officers (O1–O3 [W1–W3])	329	13.0	30.5
32	0.4	Officers (O4–O10 [W4–W5])	55	4.7	11.9
		Occupation			
95	0.5	Combat-specific	56	17.2	33.5
37	0.7	Armor/motor transport	73	11.5	16.5
18	0.4	Pilot/aircrew	29	10.2	28.4
207	0.5	Repair/engineer	472	13.6	25.1
165	0.7	Communications/intelligence	851	11.3	16.6
86	1.1	Health care	568	14.2	12.9
166	0.7	Other/unknown	704	15.9	22.1
		Type of eating disorder			
101	0.1	Anorexia	343	1.7	20.1
306	0.3	Bulimia	1,436	6.9	27.7
367	0.3	Unspecified	974	4.7	15.7

[a]Rate per 10,000 person-years

FIGURE 1. Annual incidence rates of eating disorders, active component, U.S. Armed Forces, both sexes, 2004–2013
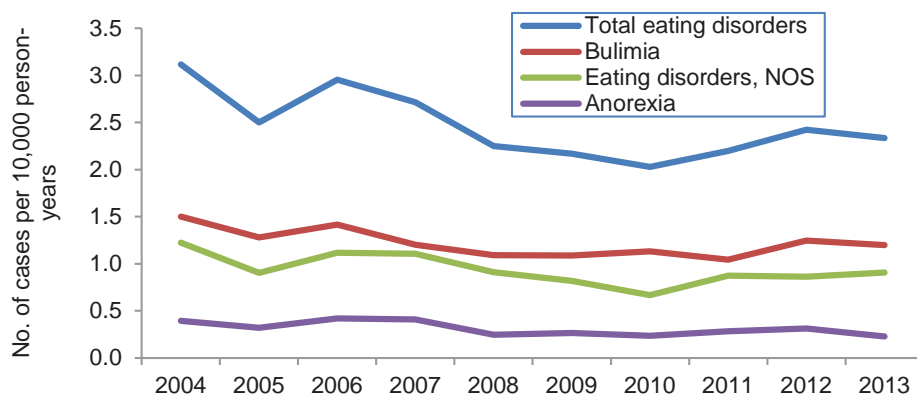
Approximately two-thirds (67%) of all incident diagnoses affected service members in repair/engineer, communications/intelligence, and healthcare occupational categories.

The period prevalence of each of the eating disorders by year was relatively stable during the surveillance period. The peak prevalences for women were as follows: AN, 2.9 cases per 10,000 service women in 2007; BN, 10.4 cases per 10,000 service women in 2007; and EDNOS, 6.0 cases per 10,000 service women in 2007. For men, the peak prevalences were as follows: AN, 0.1 cases per 10,000 service men in 2006; BN, 0.5 cases per 10,000 service men in 2013; and EDNOS, 0.4 cases per 10,000 service men in 2010. **Figure 4** shows, for BN, the trend in estimates of prevalence based on the numbers of service members ever diagnosed with BN during the surveillance period who had healthcare encounters for any of the eating disorders during those years.

EDITORIAL COMMENT

The results of this analysis are consistent with findings in much of the published literature about eating disorders. For example, in this report, incidence rates among women were much higher than among men. Female service members accounted for 78% of all diagnosed eating disorders, even though women account for only 15% of active component service members. Also, as noted in other studies, incidence rates of diagnoses of eating disorders were highest among white, non-Hispanic and the youngest aged service members.

Under the current ICD-9 classification system used in this analysis, binge eating disorder (BED) is not specifically described, so service members diagnosed with BED would be subsumed under the category of EDNOS **(Table 1)**. Some studies indicate that BED is the most common eating disorder, with an estimated prevalence of approximately 2%.[15, 16] In the American Psychiatric Association's (APA) new *Diagnostic and Statistical Manual of Mental Disorders,* 5th Edition, BED has been elevated to the status of an official diagnosis.[17] The APA also recommends that BED

FIGURE 2. Annual incidence rates of specific eating disorders, active component males, U.S. Armed Forces, 2004–2013
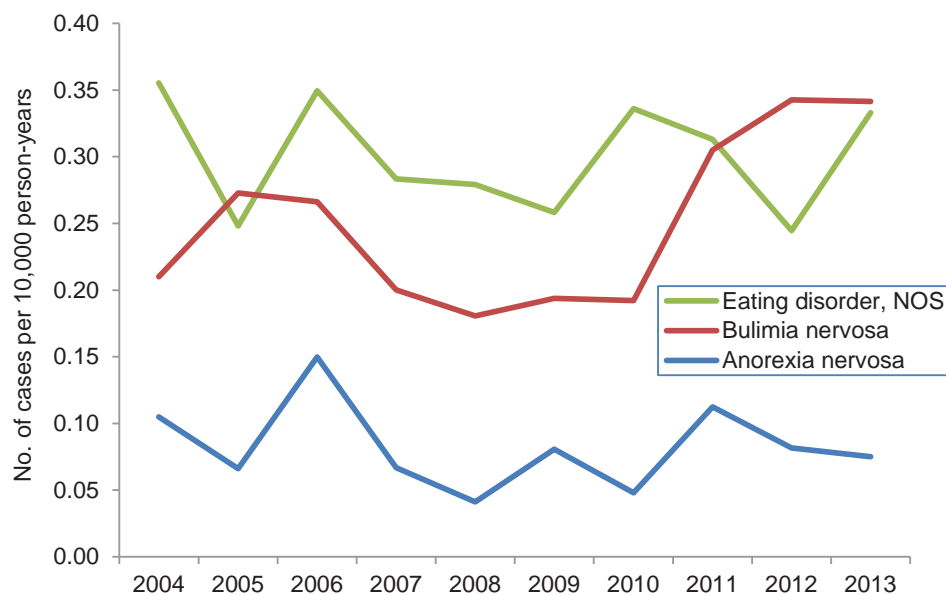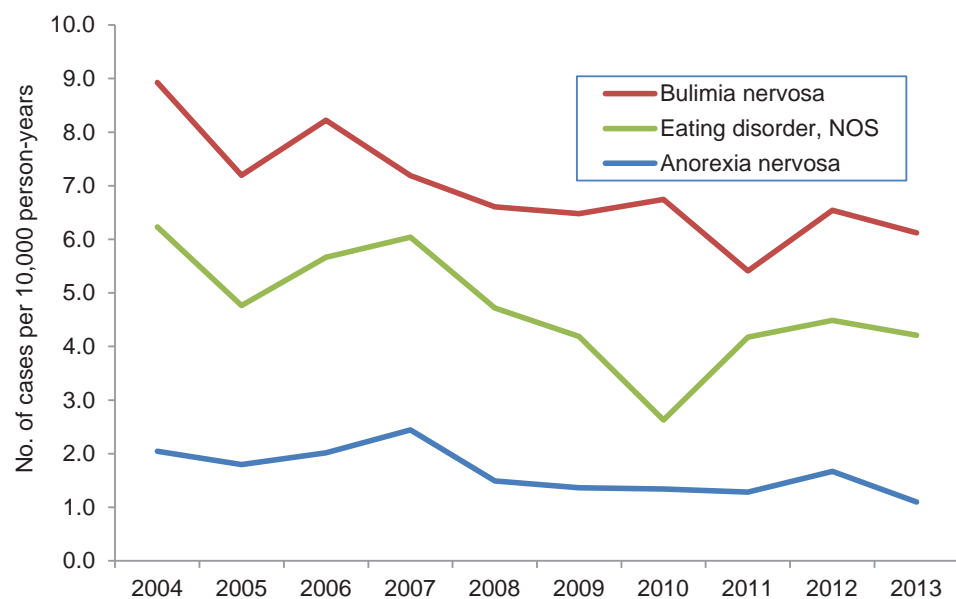

FIGURE 3. Annual incidence rates of specific eating disorders, active component females, U.S. Armed Forces, 2004–2013

be specifically identified in the ICD-10 coding system (under "other eating disorders"), and that it be given its own code in the future.[18]

The incidence rate of AN diagnoses among women documented here (1.7 cases per 10,000 p-yrs) is comparable to the range of rates cited in Hsu's review (0.143 to 5.0 cases per 10,000 young women per year); however, prevalence estimates in female service members for AN and BN were much lower.[3] The estimates of prevalence are otherwise consistent with the published literature with respect to gender differences and the relative frequencies of the three diagnostic categories examined. Both the

incidence rates and prevalence estimates in this analysis are much lower than many of those cited in published estimates in both military and civilian populations. Almost all such previous reports used different estimation methods from those used here and were evaluated in populations very different from the U.S. military as a whole.

There are limitations of this analysis that undoubtedly result in underestimates of the incidence and prevalence of eating disorders among U.S. military members. Of most importance, the outcomes of interest here were diagnoses formally recorded in the health records of service members. Persons with eating disorders usually avoid seeking medical care, at least initially, either because they do not believe they have a medical problem or because they are embarrassed about their behaviors. Concealment of an eating disorder is more feasible for individuals with BN or EDNOS (including BED) because their body weights and appearances are not suggestive of disordered eating, and their binge eating and compensatory behaviors usually take place in private.[1] Service members with these disorders may not have them documented in their medical records unless they seek assistance for or suffer a serious complication of their conditions. Among military personnel, there is reason to believe that some concealment of eating disorders is motivated by concerns that discovery and formal diagnosis may endanger prospects for assignment, training, promotion, or even retention.[11] Persons with AN are more likely to be noticed by their families, friends, or military colleagues and persuaded to seek medical attention because of the emaciation that follows extreme loss of weight. Among military service members, deterioration of not only physical appearance but also duty performance may serve as triggers for supervisors to refer persons with AN for medical evaluation.[11] However, such medical scrutiny likely follows many months or a few years of weight loss, so clear-cut diagnoses of AN often are documented long after the onset of the disorder.

Because DoD standards preclude entrance into military service for individuals with diagnosed eating disorders, it is plausible that the incidence and prevalence of these conditions in

FIGURE 4. Annual prevalence of any eating disorder in bulimia nervosa cases based on healthcare encounters in each year, 2004–2013

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service members are lower than in the civilian population because eating disorders commonly have their onsets during adolescence, so many cases may be diagnosed before the age of eligibility for military accession. Nevertheless, this analysis documents that there are hundreds of new cases diagnosed each year among service members; there are likely many others whose conditions escape medical attention. The published literature documents that, at least in certain select populations, abnormal eating behaviors occur with surprising frequency among military personnel.[4-12] The review by Manos et al. summarizes the literature regarding eating disorders among service members, with special attention to the issue among recruit trainees.[11]

When AN persists, the debilitating effects have adverse impacts on the physical and mental health and social and occupational activities of those affected. In addition, AN that persists or recurs is life threatening. Manos et al. cite studies that estimate crude 10-year mortality rates of 3.3%–5.6% and 20-year rates of 15%–20%.[11] Recognition and treatment of AN is essential. In the Armed Forces, where periodic measurement of service members' height and weight is common, the detection of a body mass index (BMI) of less than 17.5 kg/m^2 should indicate the need for further evaluation.

Because service members with the other eating disorders (BN and EDNOS) usually have body mass indices (BMIs) that are in or near the normal range, their appearances are not indicative of their abnormal eating behaviors. Potential complications of BN and EDNOS that may lead those affected to seek medical care include the consequences of overeating, vomiting, laxative abuse, diuretics, and enemas. An extended period of repeated, induced vomiting may result in erosion of dental enamel by the exposure of the teeth to stomach acid.[11] Although mortality is a much less frequent outcome of BN and EDNOS than AN, purging and metabolic abnormalities may be associated with potentially fatal events such as esophageal tears, gastric ruptures, and cardiac arrhythmias.[19]

Within the Armed Forces, healthcare providers and unit leaders should be aware that serious eating disorders as well as other unrecognized abnormal eating behaviors are relatively common. They should encourage affected service members who indicate interest in obtaining medical care to do so. At stake are the health and well-being of affected service members as well as the military operational effectiveness of those affected and their units.

Erectile Dysfunction Among Male Active Component Service Members, U.S. Armed Forces, 2004–2013

Erectile dysfunction (ED) is considered a common medical disorder and it is the most common sexual complaint reported by men to healthcare providers. The epidemiology of this condition in active component U.S. service members has been unclear. This report describes the counts and rates of newly diagnosed ED in active component servicemen during 2004–2013. There were 100,248 incident cases of ED (rate: 8.4 per 1,000 person-years) during that period. ED cases classified as psychogenic comprised almost half of all ED cases. Annual incidence rates more than doubled between 2004 and 2013. Higher incidence rates were associated with advancing age; black, non-Hispanic ethnicity; marital status of separated, divorced, and widowed; higher level of education; and never having deployed. The editorial comments discuss comparisons with findings in the published literature, the limitations of this study, and possible additional analyses.

Erectile dysfunction (ED) is defined as the persistent inability to achieve and sustain an erection that is adequate for sexual intercourse.[1] Advancing age is the primary risk factor for ED. Other risk factors include lifestyle (e.g., obesity, smoking), chronic health conditions (e.g., diabetes, cardiovascular disease), and mental health disorders (e.g., depression, posttraumatic stress disorder [PTSD]). ED is frequently classified as either psychogenic or organic. Psychogenic ED is related predominantly or exclusively to psychological factors (e.g., depression, stress) while organic ED can be attributed to underlying physical conditions that are neurogenic, hormonal, anatomic, or drug induced.[2,3]

ED is considered a common medical disorder and is the most common sexual complaint reported by men to healthcare providers.[2] In the U.S. civilian population, the prevalence of ED in men aged 20–39 years has been estimated to be 5.1%, while prevalence in men aged 40–59 years was almost three times as high (14.8%).[4] In the Massachusetts Male Aging Study, crude incidence of ED was reported at 25.9 cases per 1,000 person-years, although that study included only men aged 40 years or older.[5] Population-level estimates of ED in the military population are not evident in the literature and the epidemiology of this condition in the active component force is unclear.

This report describes the counts and rates of newly diagnosed ED in active component servicemen during a 10-year surveillance period.

METHODS

The surveillance period was 1 January 2004 through 31 December 2013. The surveillance population included all males who had served at least 1 day in the active component of the Army, Navy, Air Force, Marine Corps, or Coast Guard. The data used in this analysis were derived from the Defense Medical Surveillance System (DMSS), which maintains electronic records of all actively serving U.S. military members' hospitalizations and ambulatory healthcare visits in U.S. military and civilian (contracted/purchased care through the Military Health System [MHS]) medical facilities worldwide.

An incident case of ED was defined by a hospitalization or an ambulatory visit with a qualifying ICD-9-CM code in any diagnostic position or a medical encounter with an ED procedure code (Table 1). The procedure and diagnostic codes used to identify an incident case of ED were taken from the codes used to identify ED medical encounters by the Urologic Diseases in America Project, an ongoing project sponsored by the National Institute of Diabetes and Digestive and Kidney Diseases.[6] An individual could be counted as an incident case of ED only once during the surveillance period. Servicemen who had been diagnosed with ED prior to the surveillance period (i.e., prevalent cases) were excluded from the analysis.

An individual diagnosed with any of the following ICD-9 codes was classified as a psychogenic case: 302.7, 302.70–302.72, or 302.74. An individual given any of the following ICD-9 codes was classified as an organic case: 607.82, 607.84, 607.89, or 607.9. ED cases with ICD-9 codes in both the psychogenic and organic categories in case-defining medical encounters were categorized as unclassified.

Although most results presented in this report utilize the case definition defined above, an additional case definition explored was the same in all respects to the case definition above except that two outpatient visits within 730 days were required to qualify as a case. Estimates of incident ED utilizing this case definition are provided for comparison purposes.

RESULTS

During the 10-year surveillance period, there were 100,248 incident cases of ED in active component servicemen; the overall crude incidence rate was 8.4 per 1,000 person-years (p-yrs). ED cases

TABLE 1. ICD-9 and CPT codes for erectile dysfunction (ED)

Type of ED diagnosis	ICD-9 code
Psychosexual dysfunction	302.7
Psychosexual dysfunction, unspecified	302.70
Hypoactive sexual desire disorder	302.71
With inhibited sexual excitement	302.72
Male orgasmic disorder	302.74
Vascular disorders of the penis	607.82
Impotence of organic origin	607.84
Other specified disorder of the penis	607.89
Unspecified disorder of the penis	607.9
CPT codes for diagnostic procedures for ED (e.g., dynamic cavernosometry)	
54230, 54235, 54240, 54250	
CPT and ICD-9 codes for treatment procedures for ED (e.g., penile revascularization, procedures related to penile prostheses)	
37788, 37790, 54115, 54400, 54401, 54405, 54406, 54408, 54410, 54411, 54415–54417, 64.94–64.97	

FIGURE 1. Annual incidence rates of erectile dysfunction (ED) by type, active component, U.S. Armed Forces, males, 2004–2013
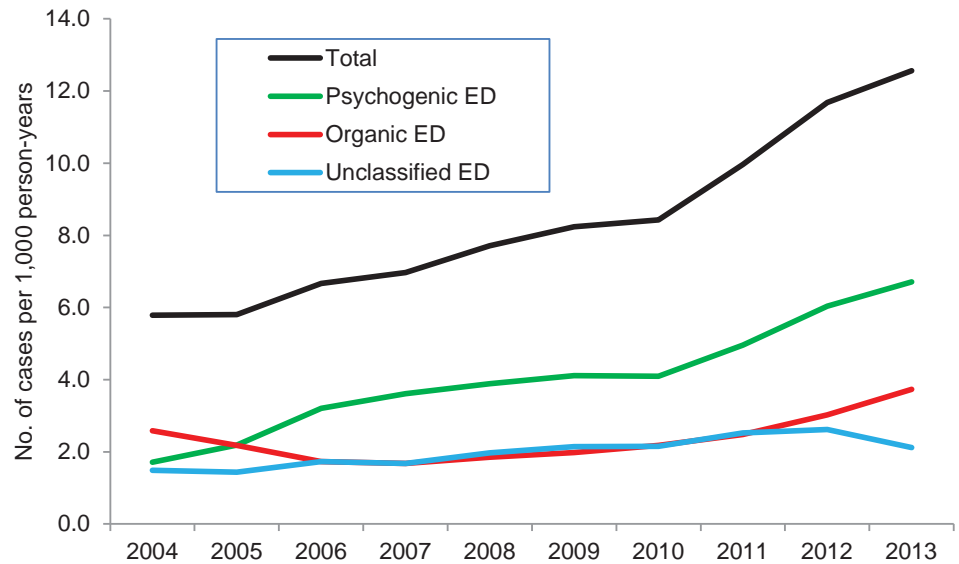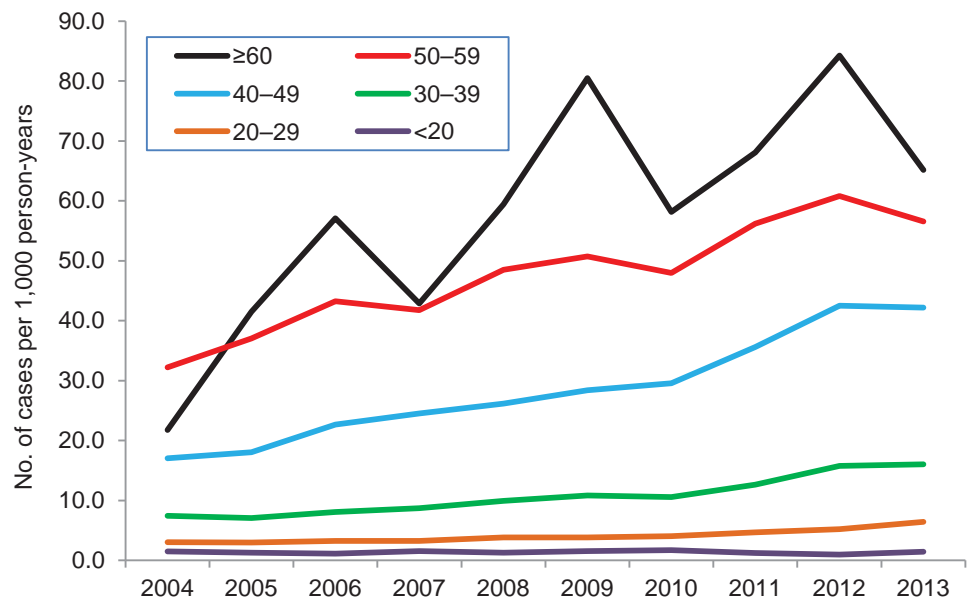

FIGURE 2. Annual incidence rates of erectile dysfunction by age group, active component, U.S. Armed Forces, males, 2004–2013

classified as psychogenic comprised almost half of all ED cases (48%) during the surveillance period **(Table 2)**. Crude incidence rates of ED more than doubled during the surveillance period from 5.8 cases per 1,000 p-yrs in 2004 to 12.6 cases per 1,000 p-yrs in 2013. Incidence rates of psychogenic ED demonstrated a greater increase than organic ED, while incidence rates of unclassified ED remained relatively stable over the period **(Figure 1)**.

As expected, incidence rates were higher in the older age groups and the highest rates were observed in those aged 60 years or older. The incidence rates were sharply higher in service members aged 40 years or older **(Table 2)**. Except for servicemen aged 20 years or younger, incidence rates in all age groups demonstrated a slight increasing trend over the course of the surveillance period **(Figure 2)**.

For the entire period, black, non-Hispanic servicemen had higher crude incidence rates of ED compared to servicemen of other race/ethnicity groups. Separated, divorced, and widowed servicemen had an almost four-fold higher crude incidence rate of ED than servicemen who had never married. Crude incidence rates of ED were lowest in service men with an education level of high school or lower **(Table 2)**.

Over the entire period, servicemen who had never deployed had the highest crude incidence rates of ED (10.1 per 1,000 p-yrs).

When the case definition for ED was modified to require two outpatient visits within 730 days to qualify as an incident ED case, counts and rates of ED were approximately half of the totals reported using a case definition that only required

TABLE 2. Incident cases and incidence rates, erectile dysfunction (ED), active component, U.S. Armed Forces, males, 2004–2013

	No.	Rate[a]
Total	100,248	8.4
Psychogenic ED	48,378	4.0
Organic ED	28,060	2.3
Unclassified ED	23,810	2.0
Age		
<20	1,058	1.4
20–29	27,410	4.1
30–39	34,572	10.7
40–49	32,585	28.3
50–59	4,429	47.4
≥60	194	59.5
Race/ethnicity		
White non-Hispanic	54,790	7.0
Black non-Hispanic	25,687	15.0
Hispanic	10,323	8.1
Asian/Pacific Islander	4,262	9.1
American Indian/ Alaskan Native	570	4.1
Other	4,616	8.1
Marital status		
Single, never married	18,580	3.9
Married	74,310	10.9
Separated/divorced/ widowed	7,358	18.4
Education level		
High school or less	59,425	6.9
Some college	15,080	14.8
College	13,101	9.8
Advanced degree	9,889	13.8
Other	2,753	9.2
Service		
Army	48,445	10.9
Navy	20,281	7.3
Air Force	20,805	7.8
Marine Corps	7,822	4.4
Coast Guard	2,895	8.3
Deployment history (total no.)		
0	29,242	10.1
1–2	50,562	8.4
3 or more	20,444	6.7

[a]Rate per 1,000 person-years

FIGURE 3. Annual incidence rates of erectile dysfunction (ED) by type utilizing alternative case definition, active component, U.S. Armed Forces, males, 2004–2013

one outpatient visit. Additionally, the rate of newly diagnosed ED cases demonstrated a slight decline in 2013 in contrast to the increase seen with the original case definition **(Figure 3)**.
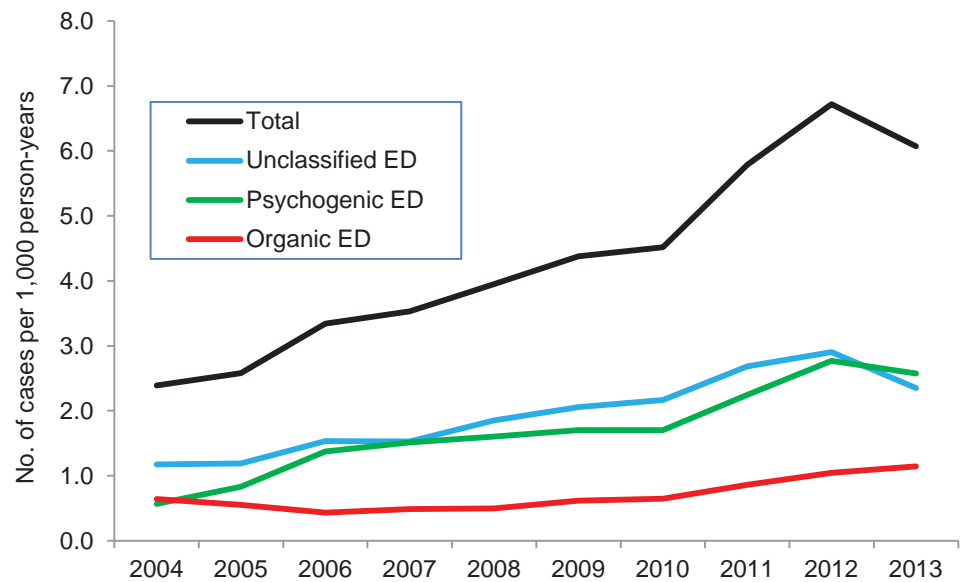
EDITORIAL COMMENT

Between 2004 and 2013, ED was newly diagnosed, on average, in approximately 10,000 active component servicemen per year. The number of men classified as incident cases of ED each year more than doubled during the surveillance period. Although ED does not present a life-threatening challenge and does not affect mission readiness, it is a common condition with a significant impact on quality of life. Since effective oral pharmacologic treatment has become available for the condition, awareness and understanding of ED have increased.

The results of this report are consistent with the published literature in several respects, especially with regard to age-related risk of ED. Similarly, the finding that black, non-Hispanic service members have higher incidence rates of ED mirrors findings in civilian populations. A cross-sectional study examining ED prevalence rates by race and ethnicity in U.S. civilian men aged 40 years or older reported the highest prevalence rates in blacks.[7] Additionally, black, non-Hispanic service members have higher incidence rates of several conditions known to be risk factors for ED (i.e., hypertension, obesity, and diabetes).[8,9] However,

some findings differed from those seen in the civilian literature. For example, Selvin et al. reported that lower levels of education were associated with higher ED prevalence while the results in this study indicated that those with higher levels of education were more likely to be diagnosed with ED.[4]

The findings of this report should be considered in light of some significant limitations. For example, incident cases of ED were ascertained from ICD-9 coded diagnoses in the administrative medical records. This means that a serviceman would have to have sought medical care for ED to be counted as a case in this analysis. Therefore, the numbers in this report underestimate the true incidence of ED in this population as not all servicemen with the condition seek or receive medical care for it. This point is especially relevant with regard to any comparison of the numbers and rates of ED in this study to rates of ED in the medical literature because most studies utilize other sources of data (e.g., questionnaires, surveys) to ascertain cases of ED. In addition, the counts and rates presented in this report are a result of electronic review of the medical records for diagnoses of ED among all servicemen, allowing a truly population-level estimate. This approach contrasts with studies in the published literature that often rely on

relatively small samples to derive estimates of ED prevalence.

It is not surprising that a modification of the case definition to require two outpatient visits would result in fewer newly diagnosed cases of ED, but the magnitude of the difference is noteworthy because it decreased the number of cases by more than 50%. Also, it would appear that approximately half of newly diagnosed cases of ED do not seek medical care for the condition more than once in a 2-year period. This may indicate that a significant proportion of service members are successfully treated in a single visit or do not experience recurrence of the condition. Another possibility may be that some servicemen seek subsequent medical care outside the MHS, and that care is not documented in the healthcare records in DMSS. In 2013, the decline in the number of cases associated with the modified case definition is not surprising because many cases who had their first outpatient encounter in that year did not have an opportunity for a case-defining second encounter before the end of the surveillance period.

These study findings suggest several avenues for additional analyses. For example, examination of the comorbid and co-occurring medical conditions in servicemen with ED might provide insight into the reasons that incidence rates of diagnoses of this condition are increasing. Several studies in veterans have examined the association between mental health diagnoses, especially PTSD, and the occurrence of ED.

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Deployment-related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003–August 2014 (data as of 18 September 2014)

Amputations (ICD-9-CM: 887, 896, 897, V49.6 except V49.61–V49.62, V49.7 except V49.71–V49.72, PR 84.0–PR 84.1, except PR 84.01–PR 84.02 and PR 84.11)[a]
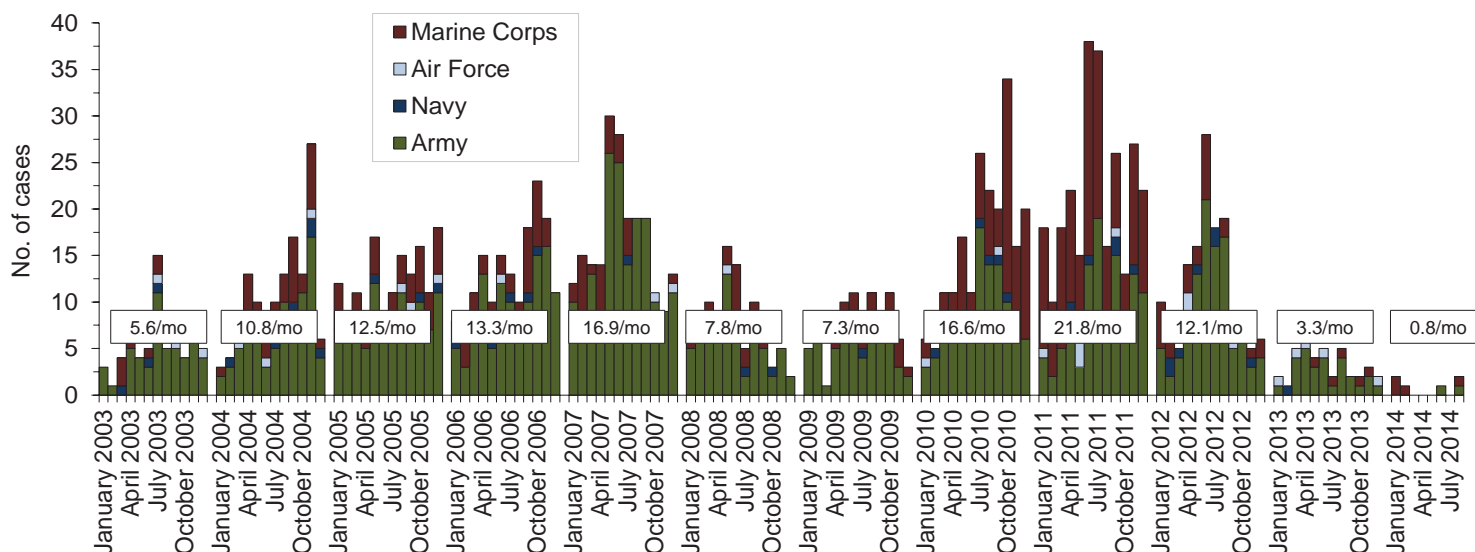
Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: amputations. Amputations of lower and upper extremities, U.S. Armed Forces, 1990–2004. *MSMR*. Jan 2005;11(1):2–6.
[a]Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 365 days of returning from deployment.

Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)[b]
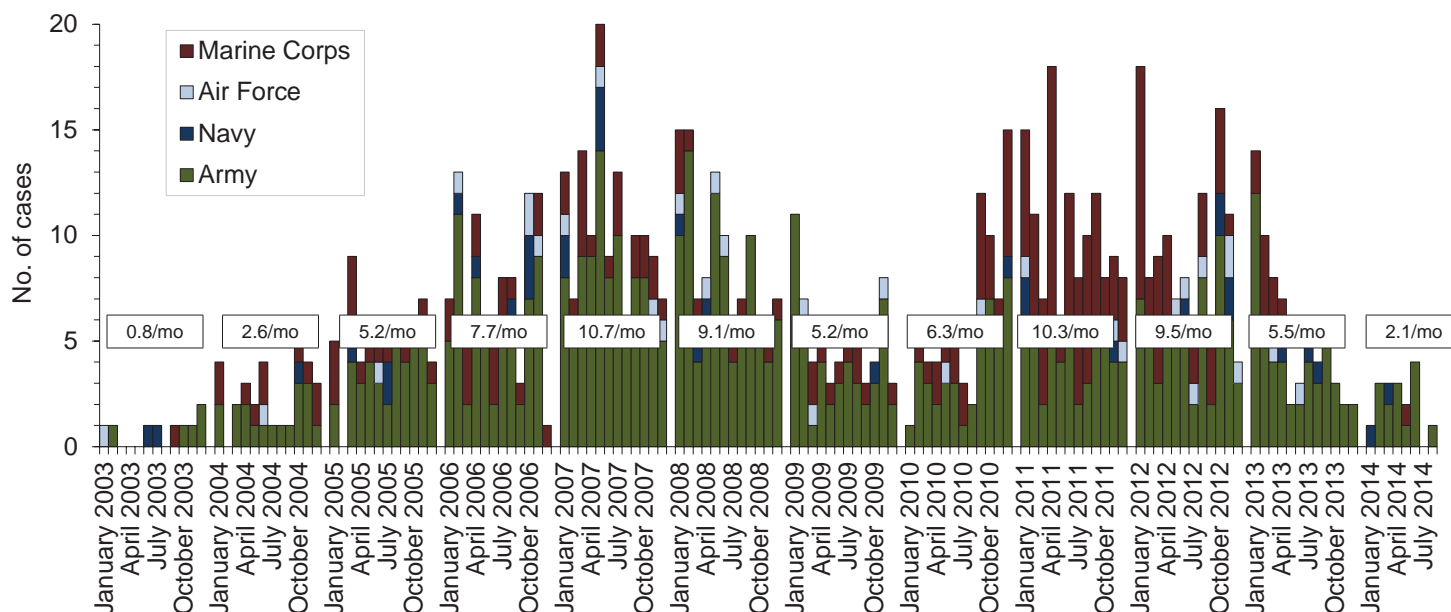
Reference: Army Medical Surveillance Activity. Heterotopic ossification, active components, U.S. Armed Forces, 2002–2007. *MSMR*. Aug 2007; 14(5):7–9.
[b]One diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 365 days of returning from deployment.

Deployment-related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003–August 2014 (data as of 18 September 2014)

Traumatic brain injury (TBI) (ICD-9: 310.2, 800–801, 803-804, 850–854, 907.0, 950.1–950.3, 959.01, V15.5_1–9, V15.5_A–F, V15.52_0–9, V15.52_A–F, V15.59_1–9, V15.59_A–F)[a]
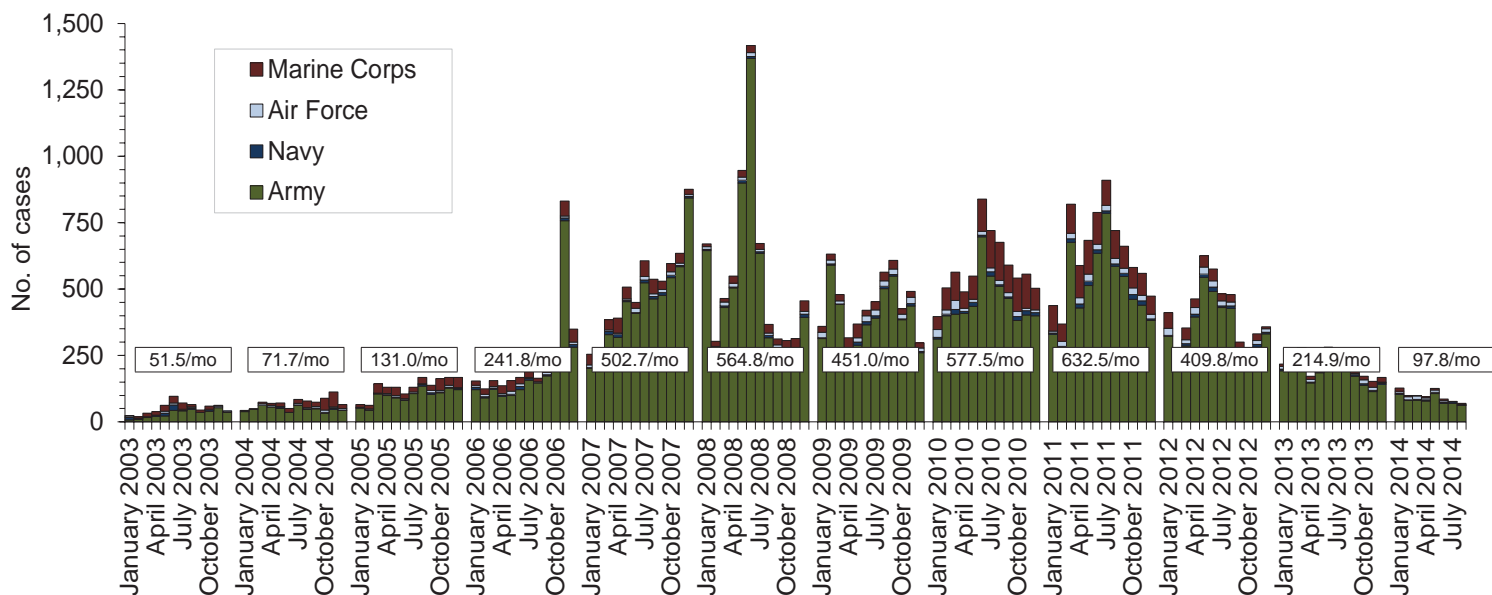
Reference: Armed Forces Health Surveillance Center. Deriving case counts from medical encounter data: considerations when interpreting health surveillance reports. *MSMR*. 2009; 16(12):2–8.
[a]Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 30 days of returning from deployment (includes in-theater medical encounters from the Theater Medical Data Store [TMDS] and excludes 4,579 deployers who had at least one TBI-related medical encounter any time prior to deployment).

Deep vein thrombophlebitis/pulmonary embolus (ICD-9: 415.1, 451.1, 451.81, 451.83, 451.89, 453.2, 453.40–453.42 and 453.8)[b]
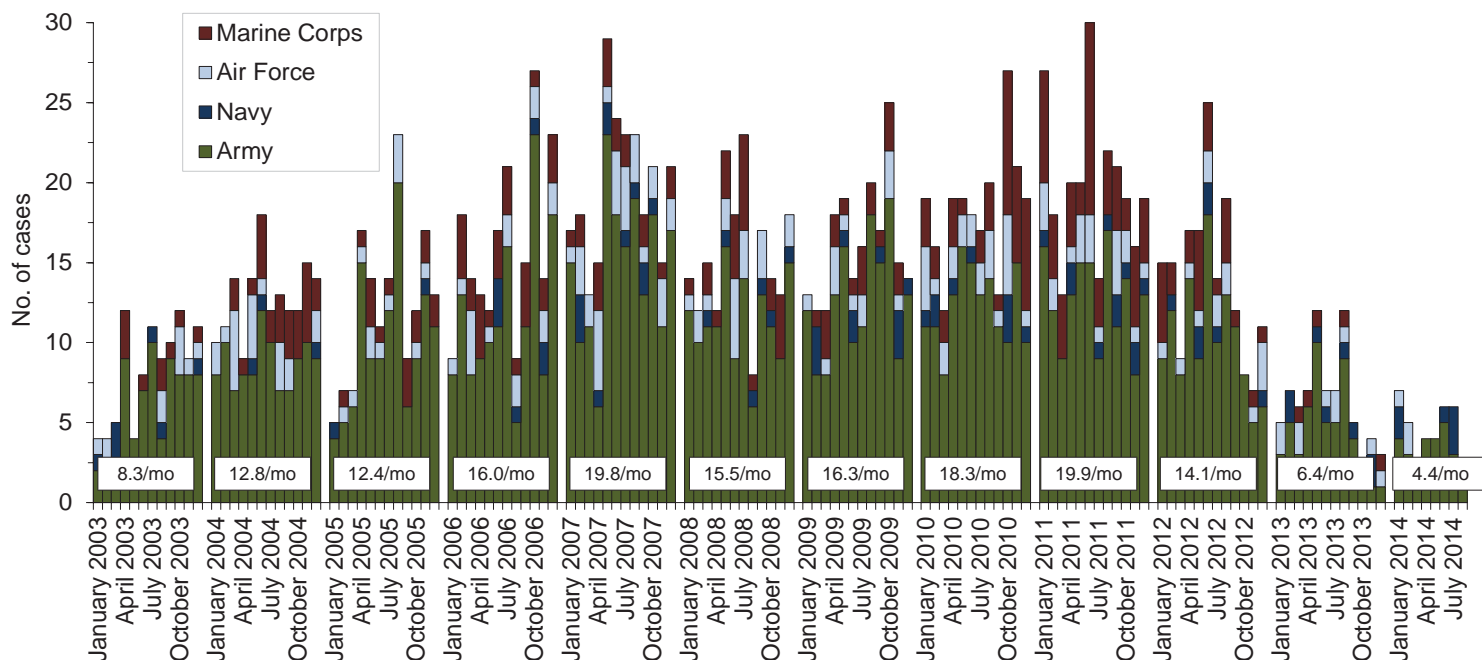
Reference: Isenbarger DW, Atwood JE, Scott PT, et al. Venous thromboembolism among United States soldiers deployed to Southwest Asia. *Thromb Res.* 2006;117(4):379–383.
[b]One diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 90 days of returning from deployment.

Deployment-related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003–August 2014 (data as of 18 September 2014)

Severe acute pneumonia (ICD-9: 518.81, 518.82, 480–487, 786.09)[a]
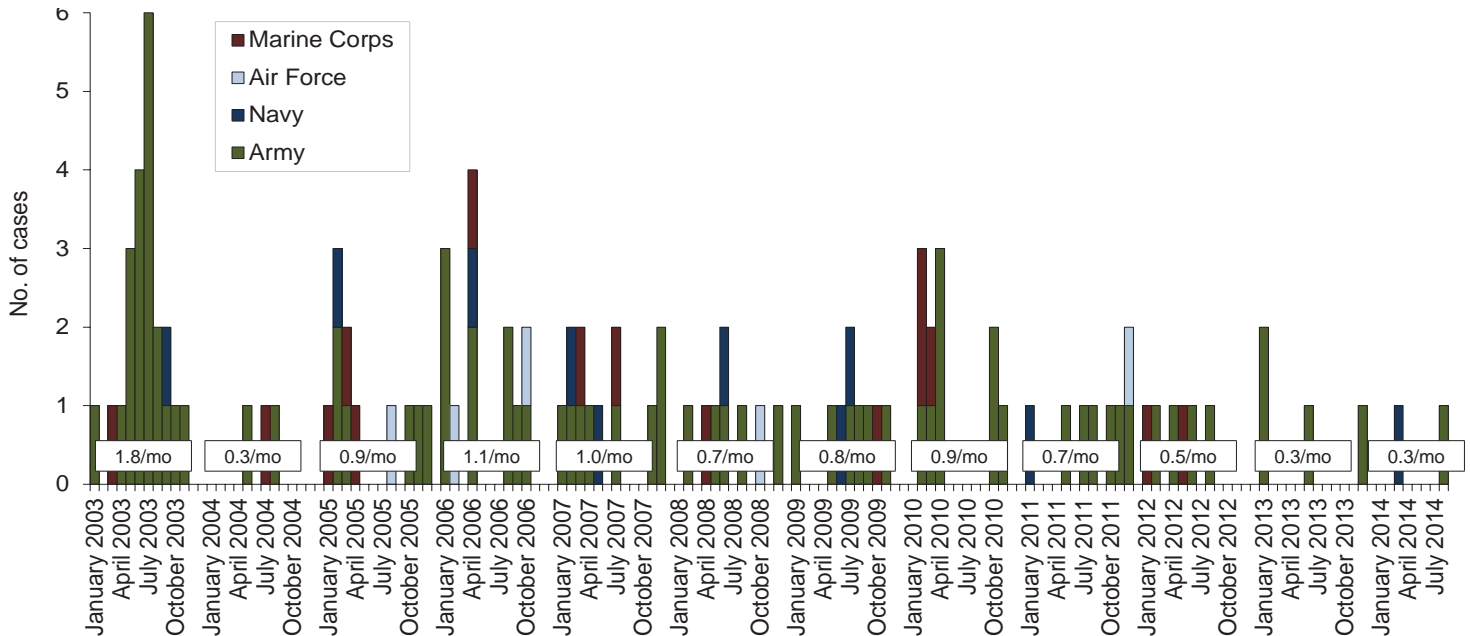
Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: severe acute pneumonia. Hospitalizations for acute respiratory failure (ARF)/acute respiratory distress syndrome (ARDS) among participants in Operation Enduring Freedom/Operation Iraqi Freedom, active components, U.S. Armed Forces, January 2003–November 2004. *MSMR*. Nov/Dec 2004;10(6):6–7.
[a]Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 30 days of returning from OEF/OIF/OND.

Leishmaniasis (ICD-9: 085.0–085.9)[b]
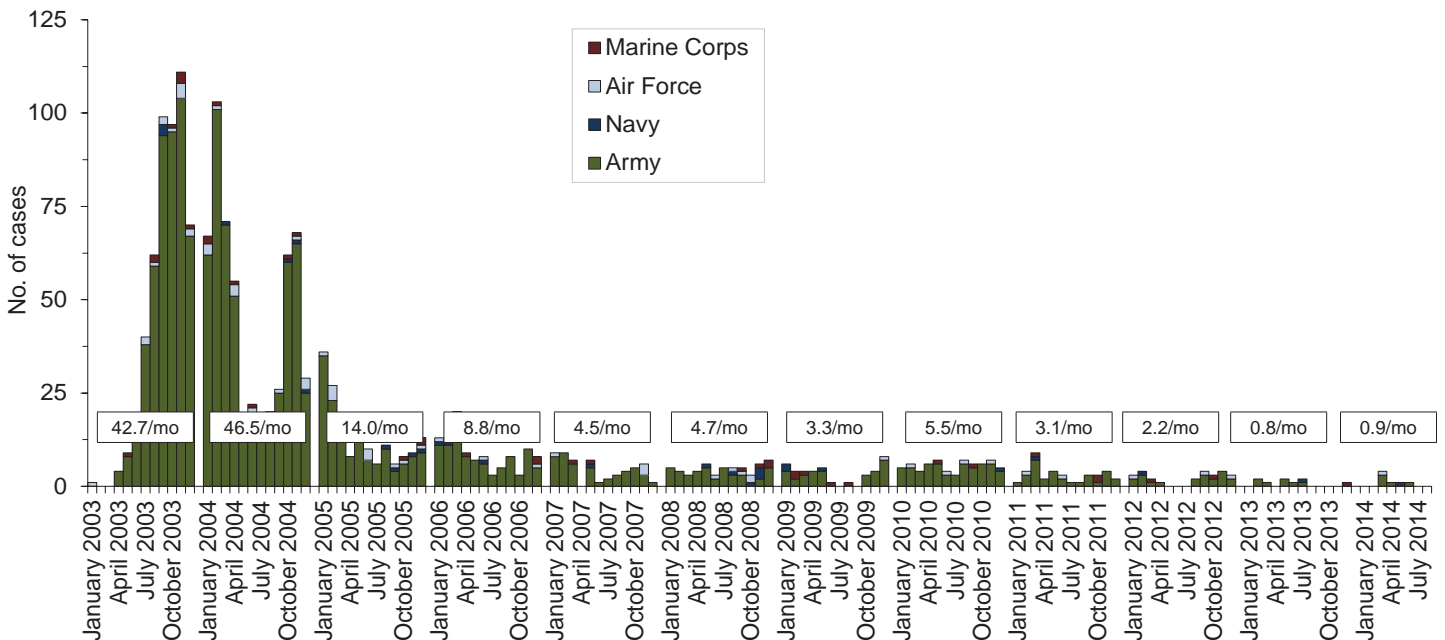
Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: leishmaniasis. Leishmaniasis among U.S. Armed Forces, January 2003–November 2004. *MSMR*. Nov/Dec 2004;10(6):2–4.
[b]Indicator diagnosis (one per individual) during a hospitalization, ambulatory visit, and/or from a notifiable medical event during/after service in OEF/OIF/OND.

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