Uploaded to VFC Website

▶▶ ▶▶ February 2013 ◀◀ ◀◀

This Document has been provided to you courtesy of Veterans-For-Change!

Feel free to pass to any veteran who might be able to use this information!

For thousands more files like this and hundreds of links to useful information, and hundreds of "Frequently Asked Questions, please go to:

Veterans-For-Change

Veterans-For-Change is a 501(c)(3) Non-Profit Corporation
Tax ID #27-3820181

If Veteran's don't help Veteran's, who will?

We appreciate all donations to continue to provide information and services to Veterans and their families.

https://www.paypal.com/cgi-bin/webscr?cmd=_s-xclick&hosted_button_id=WGT2M5UTB9A78

Note: VFC is not liable for source information in this document, it is merely provided as a courtesy to our members.

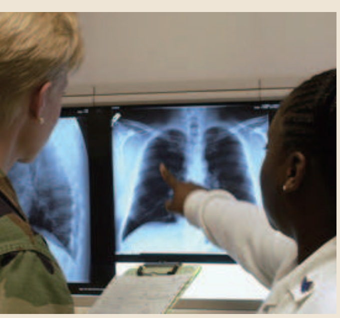
11901 Samuel, Garden Grove, CA 92840-2546

SEPTEMBER 2012

Volume 19
Number 9

MSMR

MEDICAL SURVEILLANCE MONTHLY REPORT



A publication of the Armed Forces Health Surveillance Center

Injuries Due to Firearms and Air Guns Among U.S. Military Members Not Participating in Overseas Combat Operations, 2002-2011

During 2002-2011, active component U.S. service members sustained 4,657 firearm-related injuries in circumstances other than deployment to the wars in Iraq/Afghanistan; 35 percent of the injuries were fatal. The highest firearm-related injury rates affected service members in law enforcement/security and combat occupations. Of fatal injuries, 28 percent and 24 percent were suicides and homicides, respectively; among service members 30 and older, 84 percent of noncombat firearm-related deaths were suicides and 14 percent were homicides. In circumstances other than war, rates of both fatal and non-fatal firearm-related injuries are much lower among military members than civilian males aged 18-44. During the period, rates of nonfatal firearm-related injuries among non-deployed military members increased sharply, peaking in 2008. The trend reflects that among U.S. civilian males aged 18-44. However, firearm-related fatality rates were stable among civilians but increased among military members. The increase in rates of firearm-related fatalities among non-deployed military members reflects the increase in rates of suicides by firearms. Rates of injuries due to BB, pellet or paintball guns also increased during the period.

The Centers for Disease Control and Prevention define a firearm-related injury as "a gunshot wound or penetrating injury from a weapon that uses a power charge to fire a projectile."[1] Firearm injuries are a leading cause of injury death in the United States. In 2010, among U.S. civilians, there were 31,513 firearm-related deaths from firearm injuries (compare to 35,080 deaths from motor vehicle accidents)[2] and more than twice as many nonfatal firearm injuries.[3] The majority of firearm-related deaths (61%) were suicides.

Firearm-related injuries exclude injuries from air guns (i.e., BB, pellet and paintball guns). International Classification of Diseases (ICD-9-CM) diagnostic codes to indicate wounds due to projectiles from BB/pellet guns and paintball guns were created in 1997 and 2002, respectively. At close range, projectiles from air guns can inflict injuries similar to those caused by powder-charged bullets from small-caliber handguns.[4] In 2010, there were an estimated 13,851 injuries from BB and pellet guns among U.S. civilians.[3]

As compared to their civilian counterparts, non-deployed U.S. service members have a greater risk of injury from guns due to occupational exposures (e.g., weapons training). In addition, military members may be more likely than civilians to own guns and/or to engage in recreational shooting. Suicide by firearms is more common among male and female service members than their civilian counterparts. On the other hand, some aspects of military service may be protective against gun-related injury (e.g., firearm-related knowledge and experience, full-time employment, routine drug testing).

During 1990-1999, gunshot wounds not related to combat were the cause of 446 deaths and 1,919 hospitalized injuries among U.S. service members.[5] Nearly half of the fatal injuries were suicides; accidents (72%) and assaults (21%) accounted for most of the nonfatal injuries.

This report summarizes numbers, rates, trends, and characteristics of fatal and nonfatal injuries caused by firearms and air guns among U.S. military members not deployed to overseas combat operations during a recent ten-year period.

METHODS

The surveillance population included all military members who served in an active component of the Army, Navy, Air Force, Marine Corps or Coast Guard at any time during January 2002-December 2011. Outcomes of interest were gun-related injuries that occurred in circumstances other than deployment to overseas combat operations (e.g., Iraq, Afghanistan). Firearm-related deaths were identified from official death records maintained by the Armed Forces Medical Examiner System (AFMES). Deaths among members of the Coast Guard are not included in AFMES

TABLE 1. Case-defining codes for deaths and injuries related to firearms and air guns

Firearm-related fatality	Armed Forces Medical Examiner System underlying cause of death codes for "discharge of firearms"
Firearm-related injury (non-fatal)	ICD-9-CM: E922.0-E922.3, E922.8, E922.9, E955.0-E955.4, E965.0-E965.4, E970, E985.0-E985.4 North Atlantic Treaty Organization Standard Agreement (STANAG 2050): codes for "bullets or other projectile (e.g., shotgun pellets) from small arms weapon" in the category of "guns, explosives and related agents, except when used as instrumentalities of war in wartime"
Air gun-related injury	ICD-9-CM: E922.4, E922.5, E955.6, E955.7, E968.6, E985.6, E985.7

and thus not summarized in this report. Nonfatal injuries due to firearms and air guns were identified by diagnostic codes (ICD-9-CM) recorded in standardized records of inpatient and outpatient encounters in military and non-military medical facilities documented in the Defense Medical Surveillance System (DMSS).

For surveillance purposes, death by firearm was defined by a death record with an "underlying cause of death" code for "discharge of firearms." Because there is no underlying cause of death code indicative of "death by air gun," such deaths, if any, are not summarized specifically in this report. A nonfatal gun-related injury was defined by an inpatient or outpatient record with both an injury (ICD-9-CM: 800-959) and an "external cause of injury" code indicative of firearms or air guns **(Table 1)**. Only one gun-related injury event per individual during the surveillance period was included in analyses. For summary purposes, injuries that resulted in deaths were prioritized over those that required hospitalizations or ambulatory visits; and hospitalized cases were prioritized over outpatient cases.

Deaths and injuries that occurred during overseas deployments were excluded from analysis. Also, individuals were excluded if they a) were medically evacuated from an overseas operational theater within 10 days prior to the first record of their firearm-related injury; or b) had combat-related injuries (per cause of injury codes reported on standardized records of relevant medical encounters) within 180 days before or 7 days after the first record of a firearm-related injury. Noncombat firearm-related hospitalizations at Landstuhl Regional Medical Center were included if the affected individuals were stationed in Germany when they were injured.

Injuries from firearms and air guns were summarized by military and demographic characteristics and intent of injury (accidental, intentionally self-inflicted, assaultive, undetermined, as indicated by cause of injury or death codes). Death rates were summarized in relation to the cumulative time of active military service of members of the surveillance population during the surveillance period (person-years at risk).

TABLE 2. Demographic and military characteristics of service members with fatal and nonfatal gun-related injuries, active component members not deployed to overseas combat operations, U.S. Armed Forces, 2002-2011

	Firearm-related deaths		Firearm-related injuries		Air gun-related injuries[a]	
	No.	Rate[b]	No.	Rate[b]	No.	Rate[b]
Total	1,623	11.7	3,033	21.2	724	5.1
Service						
Army	830	16.1	1,631	31.7	371	7.2
Navy	275	7.9	451	13.0	104	3.0
Air Force	277	8.1	390	11.3	115	3.3
Marine Corps	241	12.9	497	26.6	123	6.6
Coast Guard	n/a	n/a	64	16.0	11	2.7
Sex						
Female	76	3.7	197	9.5	46	2.2
Male	1,547	13.0	2,836	23.2	678	5.5
Race/ethnicity						
Black, non-Hispanic	270	11.2	653	26.9	89	3.7
White, non-Hispanic	1,061	12.1	1,881	20.8	516	5.7
Hispanic	138	9.5	290	19.4	71	4.8
Other	154	11.7	209	15.3	48	3.5
Age						
< 20	134	13.7	321	32.3	107	10.8
20-24	718	15.4	1,466	30.7	370	7.7
25-29	378	12.3	673	21.2	129	4.1
30-34	158	7.9	286	13.8	59	2.8
35-39	141	8.3	185	10.5	41	2.3
40+	94	6.4	102	6.7	18	1.2
Marital status						
Single	794	13.8	1,558	26.3	398	6.7
Married	754	9.9	1,380	17.6	302	3.9
Divorced/separated	75	13.6	92	16.1	24	4.2
Military occupation						
Combat	473	17.9	956	35.3	188	6.9
Security/law enforcement	105	18.4	198	34.7	46	8.1
Other	1,045	9.8	1,879	17.0	490	4.4

[a]BB, pellet and paintball guns
[b]Rate per 100,000 person-years

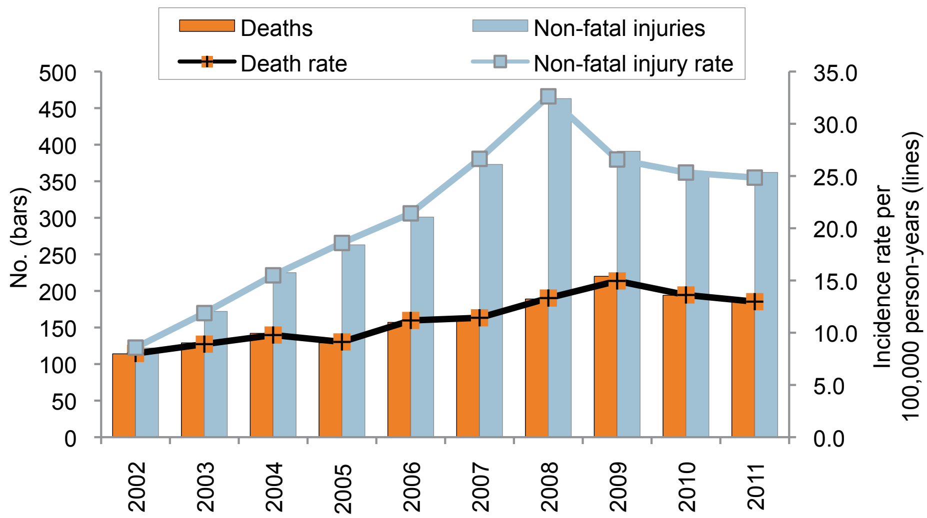
RESULTS

Firearms

During the ten years from 2002 through 2011, active component service members sustained 4,657 firearm-related injuries outside of combat theaters; more than one-third (35%) of the injuries were fatal **(Table 2)**. The proportions of firearm-related injuries that were fatal ("case fatality ratio") increased with age (<20 years: 31%, 20-29 years: 36%, 30+ years: 44%) **(data not shown)**.

Rates and trends: Among non-deployed active component members, the overall rates of fatal and nonfatal firearm-related injuries were 11 and 22 per 100,000 person-years (p-yrs), respectively **(Table 2)**. The highest firearm-related injury rates affected service members in law enforcement/security occupations and combat occupations; the rates in these occupational groups were similar to each other (fatal: 18 per 100,000 p-yrs, nonfatal: 37 per 100,000 p-yrs) and twice the rates

FIGURE 1. Fatal and nonfatal firearm-related injuries, active component members not deployed to overseas combat operations, U.S. Armed Forces, 2002-2011



among service members in "other" military occupations.

Compared to their respective counterparts, firearms-related fatality and injury rates were markedly higher among members of the Army, males, and service members younger than 25 years. Firearm-related fatality rates were similar across racial/ethnic groups; however, the rate of nonfatal injuries was markedly higher among black, non-Hispanic than white, non-Hispanic, Hispanic, or other racial/ethnic group members **(Table 2)**.

Among non-deployed service members, rates of firearm-related fatalities generally increased from 2002 (8 per 100,000 p-yrs) to 2009 (15 per 100,000 p-yrs) and then declined slightly through 2011 (13 per 100,000 p-yrs) **(Figure 1)**. In contrast, annual rates of nonfatal injuries more than tripled from 2002 (9 per 100,000 p-yrs) through 2008 (33 per 100,000 p-yrs) before declining through 2011 (25 per 100,000 p-yrs). Annual numbers of injuries that required hospital care remained relatively stable during the period (range: 26 to 51). As such, the sharp increase in rates of nonfatal injuries from 2002 through 2008 was largely attributable to increasing numbers of injuries treated in outpatient settings **(Figure 2)**. Of note in this regard, only 13 percent of all nonfatal firearm-related injures were documented with hospitalization records; the majority by far were documented with outpatient records only.

Intent: Of all incident firearm-related injuries, nearly half were accidental and nonfatal (range: 38-55% per year); approximately one-fourth (28%; range: 23-32% per year) were intentionally self-inflicted and fatal (i.e., suicides); 8 percent were intentionally inflicted by others and nonfatal (i.e., assaults); and 7 percent were intentionally inflicted by others and fatal (i.e., homicides) **(Figure 3a)**. Of note, the proportions of noncombat firearm-related deaths that were due to homicides and suicides markedly differed with age. For example, approximately one-quarter (24%) of all noncombat firearm-related deaths among teenaged service members were homicides; however, among service members 30 and older, 84 percent of noncombat firearm-related deaths were suicides and 14 percent were homicides.

During the period overall, most fatal events (78%) were suicides, and most nonfatal events (73%) were accidents **(Figure 3b)**. Also, increases in rates of fatal and nonfatal firearm-related injuries overall were primarily attributable to increases in suicides and accidents, respectively **(Figure 4)**.

FIGURE 2. Firearm-related injuries, by disposition, active component service members not deployed to overseas combat operations, 2002-2011

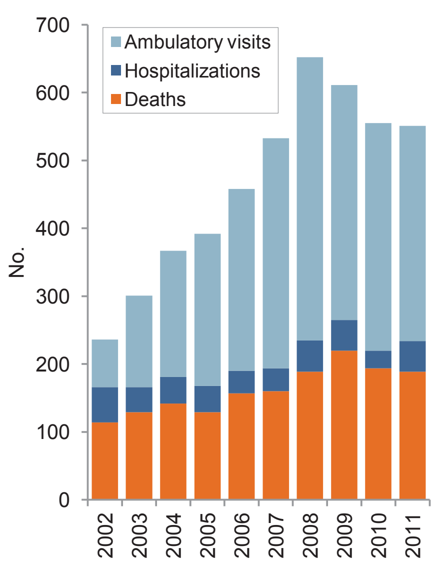
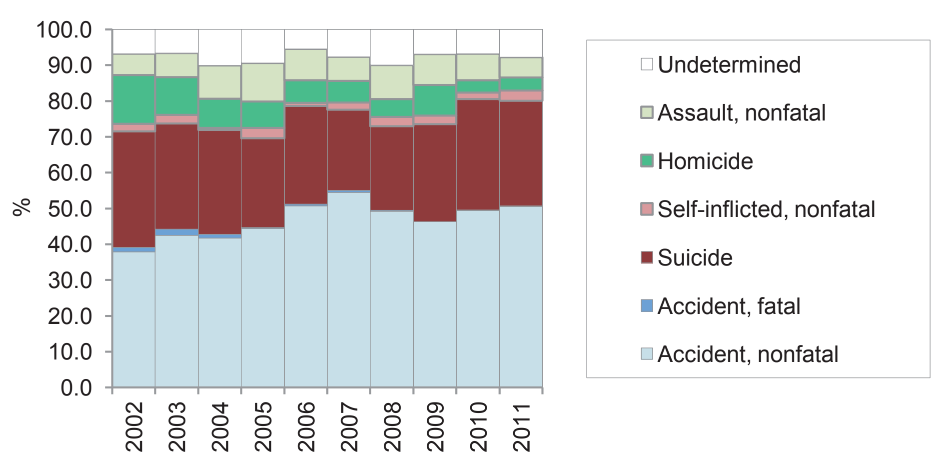


FIGURE 3A. Fatal and nonfatal firearm-related injuries (n=4,657) among service members not deployed to overseas combat operations, by intent of injury, active and reserve components, 2002-2011



Air guns

During the period, an additional 724 active component members sustained injuries due to BB, pellet or paintball guns ("air guns") (overall rate, active component, 5.1 per 100,000 p-yrs) **(Table 1)**. The incidence rate of air gun-related injuries was higher among teenagers (10.8 per 100,000 p-yrs) than any other demographic or military subgroup and declined sharply with age. Rates of air gun-related injuries were more than twice as high among Army and Marine Corps members and males compared to their respective counterparts; also, the rate was higher among service members in law enforcement/security (8.1 per 100,000 p-yrs) than other military occupational groups.

Relatively few (4%) air gun injuries were documented with hospitalization records **(data not shown)**. Numbers and incidence rates of air gun-related injuries increased during the first six years of the period, peaked in 2008 (n=112) and then remained relatively stable **(Figure 5)**. BB/pellet guns were reported as the causes of nearly three-quarters of air gun-related injuries overall; however, the proportions attributable to paintball guns markedly increased during the period (range, per year: 14-33%).

FIGURE 3B. Fatal (n=1,623) and nonfatal (n=3,033) firearm-related injuries, by age and intent of injury, active component service members not deployed to overseas combat operations, U.S. Armed Forces, 2002-2011

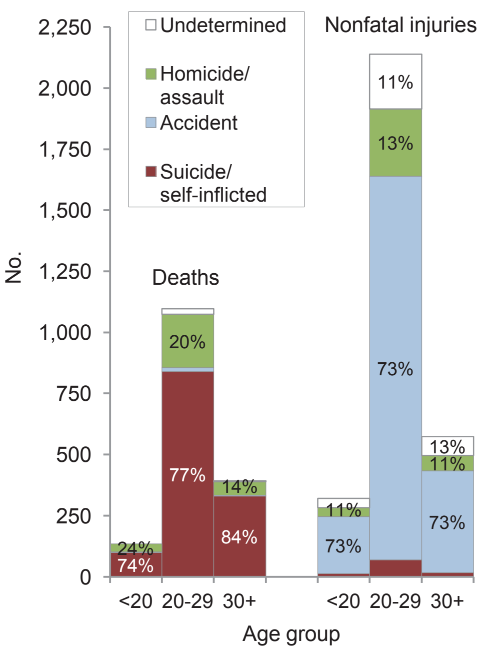
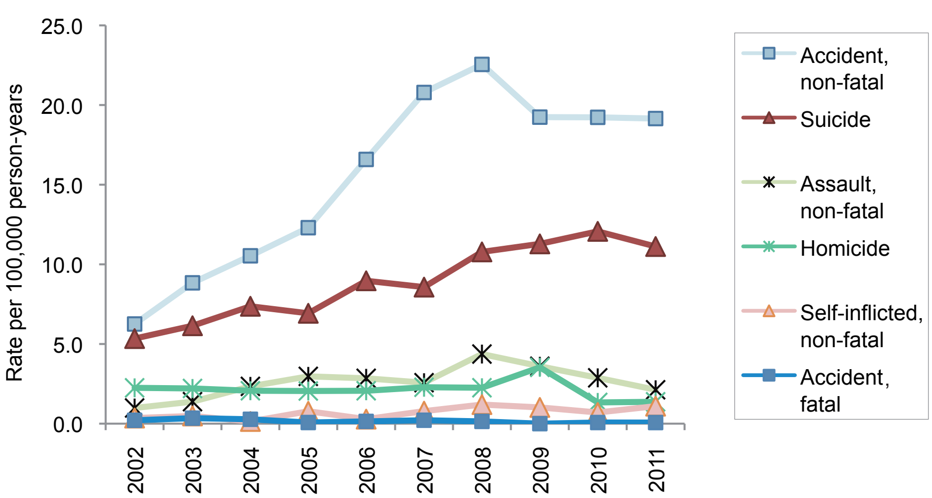


FIGURE 4. Rates of fatal and nonfatal firearm-related injuries, by intent, active component service members not deployed to overseas combat operations, U.S. Armed Forces, 2002-2011

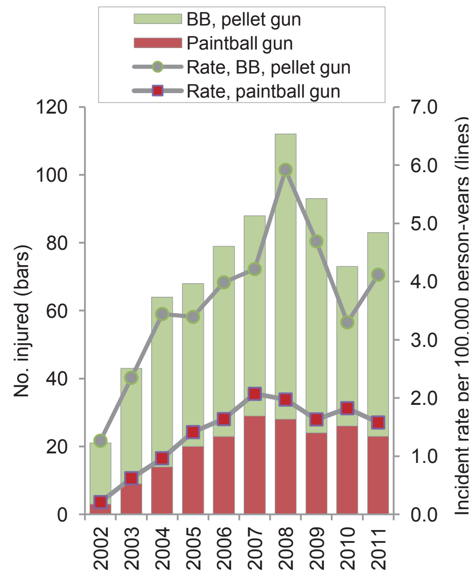


EDITORIAL COMMENT

During a long period of continuous war-fighting in Afghanistan and Iraq, rates of nonfatal firearm-related injuries among non-deployed military members increased sharply, peaking in 2008. The trend reflects that among U.S. civilian young and middle-aged (18-44 years) adult males.[3] However, during the period, firearm-related fatality rates were fairly stable among civilians but increased among military members. Of note, the increase in rates of firearm-related fatalities among non-deployed military members overall reflects the increase in rates of suicides by firearms. Also, both fatal and nonfatal firearm-related injury rates varied little in relation to the race-ethnicities of military members; among civilians, rates of firearm-related deaths and injuries markedly vary across racial groups.

This report documents that during the past decade, in circumstances other than combat, an average of 466 service members per year sustained firearm-related injuries; 72 service members per year were injured by air guns (i.e., BB, pellet and paintball guns). Rates of firearm-related and airgun-related injuries among non-deployed active component military members are lower than those estimated among civilian males aged 18-44.[3] However, direct comparisons of gun-related injury rates in civilian and military populations are potentially misleading. For example, military members differ from civilians with respect to underlying health status and access to healthcare, educational attainment, employment security, gender and age distributions,

FIGURE 5. Air gun-related injuries, by year and type of gun, active component service members, 2002-2011



firearm-related knowledge and experience, and so on. Estimates of nonfatal injuries among U.S. civilians are based on emergency room visits at a sample of approximately 100 hospitals.[6] In contrast, nonfatal injuries among military members in this report were counted using a database of standardized records of all inpatient and outpatient encounters of U.S. service members. Accurate coding of causes of injuries and deaths often vary between data sources.[7]

This report underestimates the numbers of noncombat firearm-related deaths and injuries among U.S. military members. For example, the analysis did not account for the experiences of members of the Reserve and National Guard ("reserve component members"). Between periods of their active military service, many reserve component members become ineligible for care within the Military Health System. When not in active service, injuries and deaths of reserve component members are documented by civilian health care providers and other civil authorities; however, such records are not routinely available for military health surveillance purposes. Nevertheless, 247 documented firearm-related deaths and 783 nonfatal injuries among nondeployed reserve component members – not summarized in this report – were captured in the Defense Medical Surveillance System records during 2002-2011. If included, they would represent 18 percent of all nondeployed firearm-related deaths/injuries among U.S. service members during the period. The 102 air gun-related injuries among reserve component members would account for 12 percent of such injuries during the period.

Also, because this report excluded events that occurred during deployments, it excludes the deaths of service members who completed suicides by firearms while deployed to the wars in Iraq/Afghanistan. During 2008-2010, an annual average of 35 U.S. service members died from self-inflicted firearms injuries while deployed.[8] Finally, this analysis relied on "external cause of injury" codes (E codes) reported in standardized medical records to identify guns as the mechanisms of related injuries. However, E codes are incompletely recorded in administrative medical records, perhaps in part because they do not affect billing and reimbursement.

Finally, repeat events among individuals were not assessed due to difficulties in distinguishing follow-up care from new firearm-related incidents (e.g., service members with firearm-related spinal cord injuries were treated over many months). Service members with histories of firearm-related injuries may be at relatively high risk for repeat firearm-related injuries.[9]

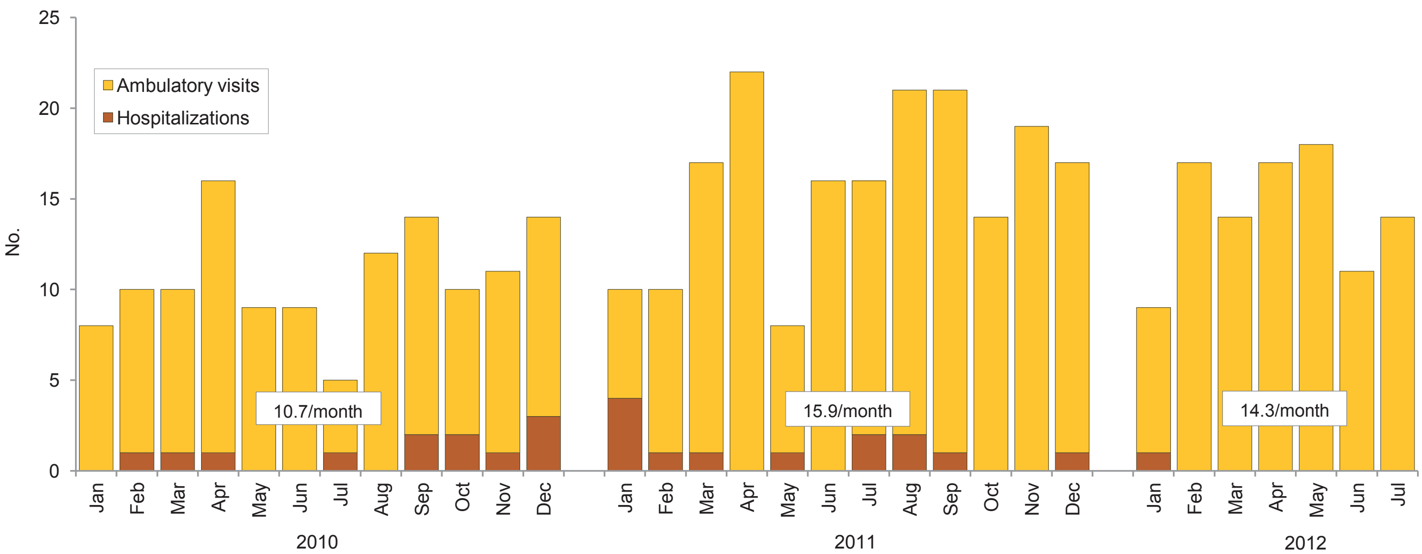
In this analysis, rates of firearm-related deaths and injuries were higher among non-deployed service members in combat-specific and security/law enforcement occupations than other military occupational groups. However, the underlying motives, precipitating incidents, other relevant circumstances (e.g., duty-related, off-duty interpersonal violence) related to the events considered here were not available for analyses. For many cases, the relationships of the shooter to the victim (self or other) were documented; however, the relationships were not documented for unintentional firearm-related deaths/injuries which accounted for nearly half of all of the events considered here. Hemenway and colleagues have asserted that information regarding the victim and shooter is necessary to inform strategies for preventing unintentional firearms-related injuries.[10] Such detailed information is not routinely available for military health surveillance purposes. However, routinely collected data do document that increases over the past decade in firearm-related deaths and injuries have been largely attributable to increases in suicides and accidents, respectively. The military services have made suicide prevention and military occupational safety programs extremely high priorities. The effects of these programs should be discernible in firearms-related mortality and injury data that are routinely collected for military health surveillance purposes. Analyses such as that summarized here should be conducted periodically to monitor trends of firearms-related deaths and injuries – particularly, suicides and accidental injuries – and trends of air gun-related injuries – particularly, paint ball injuries.

REFERENCES

1. Gotsch KE, Annest JL, Mercy JA, Ryan GW. Surveillance for fatal and nonfatal firearm-related injuries --- United States, 1993—1998. *MMWR*. 2001 Apr;50(SS02):1-32. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5002a1.htm
2. Murphy SL, Xu JQ, Kochanek KD. Deaths: preliminary data for 2010. National vital statistics reports, 2012. Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_04.pdf
3. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2010). Available at: http://www.cdc.gov/injury/wisqars/index.html
4. Nguyen MH, Annest JL, Mercy JA, et al. Trends in BB/pellet gun injuries in children and teenagers in the United States, 1985-99. *Inj Prev.* 2002 Sep;8(3):185-191.
5. Army Medical Surveillance Activity. Noncombat gunshot injuries among the active duty service members, 1990-1999. *Medical Surveillance Monthly Report (MSMR)*. 2000 Nov 6(9):2,7-9.
6. Consumer Product Safety Commission, National Electronic Injury Surveillance System, CPSC Document #3002. http://www.cpsc.gov/cpscpub/pubs/3002.html. Accessed 1 October 2012.
7. Barber C, Hemenway D. Too many or too few unintentional firearm deaths in official U.S. mortality data? *Accid Anal Prev.* 2011 May;43(3):724-731.
8. Kinn JT, Luxton DD, Reger MA, et al. Department of Defense Suicide Event Report: Calendar Year 2010 Annual Report. Tacoma, WA: National Center for Telehealth and Technology, Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury; 2011.
9. Ponzer S, Bergman B, Brismar B. Morbidity and injury recurrence in victims of firearm injuries. *Public Health.* 1996 Jan;110(1):42-46.
10. Hemenway D, Barber C, Miller M. Unintentional firearm deaths: a comparison of other-inflicted and self-inflicted shootings. *Accid Anal Prev*. 2010 Jul;42(4):1184-1188.

Health Care Encounters for Injuries Associated with a Gun Mechanism or Component, U.S. Armed Forces

FIGURE. Medical encounters (n=419) for injuries due to “mechanism or component of firearm and air gun” (ICD-9-CM:E928.7), by month, active component, U.S. Armed Forces, January 2010-July 2012



In October 2009, a new “external cause of injury” code was added to The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM): E928.7 “Other accidental causes, mechanism or component of firearm and air gun.” This code was intended to identify gun-related injuries other than gunshot wounds that resulted from mishandling or mechanical malfunction of a gun. These include injuries due to gun recoil, powder burns, explosion of gun parts, or being pinched between moving parts of a gun (e.g., slide mechanism, trigger). Gun recoil is the most frequent cause of injury due to gun mechanism among U.S. civilians.[1] Injuries from gun mechanisms and components are unintentional, self-inflicted and largely preventable through training in proper gun handling.[1]

During January 2010 through July 2012, 400 active component U.S. service members were treated for injuries during 419 medical encounters for which the code E928.7 was recorded **(Figure)**. Approximately 6 percent of such encounters (n=26) were hospitalizations. Most encounters involved members of the Army (60.1%), and the Army and Marine Corps had much higher overall rates of injuries than the other service branches.

The annual average number of encounters per month increased 49 percent from 2010 (10.7/month) to 2011 (15.9/month) but declined slightly during the first seven months of 2012 (14.3/month).

The vast majority (91%) of medical encounters for injuries due to gun mechanisms were reported by military medical facilities in the United States; 7 percent of encounters occurred in Europe; Japan and Korea accounted for <2 percent each.

REFERENCES

1. Hootman JM, Annest JL, Mercy JA, et al. National estimates of non-fatal firearm related injuries other than gunshot wounds. *Inj Prev*. 2000 Dec;6(4):268-274.

Images in Health Surveillance: West Nile Virus Vectors and Prevention

The United States is experiencing one of the worst outbreaks of West Nile virus (WNV) since its introduction into the U.S. in 1999.[1] As of 11 September 2012, 2,636 cases of West Nile virus disease in humans – and 118 deaths – have been reported to the Centers for Disease Control and Prevention (CDC).[2] The number of human cases reported to the CDC thus far in 2012 is higher than the number reported at a comparable time of any year since 2003. Also, by 11 September 2012, WNV infections had been documented in humans, birds, or mosquitoes in 48 states. Of note, however, two thirds of human cases were reported from just six states (Texas, Louisiana, South Dakota, Mississippi, Michigan, and Oklahoma) and approximately 40 percent of human cases were reported from Texas.[2]

The Department of Defense (DoD) and its public health hubs have also been closely monitoring the outbreak; the U.S. Army Public Health Command Vector-borne Disease report of 11 September 2012 reported seven WNV cases in U.S. Army service members and beneficiaries.[3] The first reported DoD beneficiary death occurred in a 77-year old military retiree at San Antonio Military Medical Center. The DoD also performs routine and comprehensive mosquito surveillance to monitor WNV activity.

WNV survives and persists in nature through a bird-mosquito transmission cycle; mosquitoes that feed on infected birds can subsequently transmit the virus to humans. Most people who become infected with WNV do not become sick; however, a small proportion can develop symptoms, and severe cases can be life-threatening. Those at the highest risk of symptomatic disease are members of the youngest and oldest age groups, those with weakened immune systems, and pregnant women.

West Nile fever is the mild form of the disease; it has signs and symptoms similar to other viral infections, e.g., fever, headache, muscle aches, rash, abdominal pain, nausea, vomiting, and diarrhea. In severe cases, WNV infections can cause brain inflammation and damage (i.e., West Nile encephalitis or West Nile meningitis), permanent muscle weakness, and in some cases, death.

The primary vector for West Nile virus is the adult female mosquito of the genus *Culex*. Other mosquitoes of *Aedes* and *Ochlerotatus* genera can also transmit the virus. *Culex* mosquitoes are brown, medium-sized mosquitoes that thrive in both urban and rural areas. These mosquitoes are most active at dusk and dawn; during the day they rest in cool, dark spaces such as vegetation or in and around houses. *Culex* species are enzootic, or "maintenance," vectors of WNV; such mosquitoes are highly efficient in maintaining and amplifying WNV in bird populations.[4] *Culex* species prefer feeding on birds; however, they also feed on humans and other mammals. As such, they can transmit WNV to multiple hosts.

Outbreaks of human WNV infections depend on several factors including abundant bird and mosquito populations, and the transmission efficiency and biting behavior of indigenous mosquito populations. Drought and high temperatures may also contribute to outbreaks of WNV. In times of drought, flowing water stagnates and standing water sources become smaller. The concentration of organic material in such water creates ideal breeding sites for *Culex* mosquitoes and gathering sites for birds. The convergence of mosquito breeding and bird gathering sites enables WNV to amplify within the bird and mosquito populations.[5,6]

Mosquito vectors of WNV

Culex quinquefasciatus Say and *Culex pipiens* Linnaeus: *Culex quinquefasciatus* Say, the southern house mosquito, and *Culex pipiens* Linnaeus, the northern house mosquito, are distributed across the United States and can transmit WNV, St. Louis encephalitis and dog heartworm **(Figures 1,2)**. Outside of the U.S. both species can transmit the filarial nematode that causes lymphatic filariasis *(Wuchereria bancrofti)*, Chikungunya virus, and Rift Valley fever virus.[7]

Cx. quinquefasciatus and *Cx. pipiens* feed at dusk, night, and dawn on birds and mammals including humans. Gravid adult female mosquitoes seek out polluted, nutrient rich water sources to lay their eggs. Any containers that collect and allow water to stagnate (e.g., bird baths, discarded tires, blocked gutters) or areas with poor drainage and abundant organic matter (e.g., roadside drainage ditches, partially dried up stream beds) are ideal for completion of the mosquito lifecycle (i.e., egg, larvae, pupae, adult).[7,8,9]

FIGURE 1. *Culex quinquefasciatus*

CDC/James Gathany

FIGURE 2. *Culex pipiens*

Culex tarsalis Coquillett: *Culex tarsalis* Coquillett is the main vector of WNV in the Western U.S.; it can also transmit the viruses that cause Western equine encephalitis, St. Louis encephalitis, and California encephalitis **(Figure 3)**. *Cx. tarsalis* feed at dusk and dawn on small mammals and birds. Larger mammals like humans and horses are not preferred hosts; however, *Cx. tarsalis* mosquitoes will feed on them given the opportunity. For gravid adult females lifecycle completion is possible in a range of water conditions (i.e., clear or polluted). Common breeding sites include irrigation ditches, large ponds, marshes, and domestic sites such as rain barrels, tree holes, and ornamental ponds.[7,10]

Bridge vectors of WNV

Several container-breeding *Aedes* and *Ochlerotatus* species are potential bridge vectors for WNV. A bridge vector transmits the virus from birds to humans; however,

FIGURE 3. *Culex tarsalis*

because of feeding preferences, they do not maintain WNV in the bird population.[4] Later in the summer when WNV has been amplified in the bird population, these mosquitoes readily feed on both birds and humans thus increasing the risk of transmission of WNV to humans.[4,11]

Aedes albopictus Skuse: *Aedes albopictus* Skuse, the Asian tiger mosquito, is an invasive, i.e., non-native, mosquito that was introduced into the U.S. in the mid-1980s

FIGURE 4. *Aedes albopictus*

and is now distributed across the country **(Figure 4)**.[11] Because of their short flight range, these mosquitoes are common around dwellings and breed in any object capable of holding water (e.g., buckets, flower pots, toys, and trash). *Ae. albopictus* is an aggressive, opportunistic mosquito that feeds during the daytime as well as at dusk and dawn. For a gravid female, one blood meal may come from multiple sources; thus, they have the potential to transmit disease more readily between hosts. *Ae. albopictus* is an efficient vector of West Nile, Yellow fever, St. Louis encephalitis, Eastern equine encephalitis, dengue, and Chikungunya viruses.[4,11]

Ochlerotatus japonicus Theobald: *Ochlerotatus japonicus* Theobald was introduced to the U.S. in the late 1990s and has rapidly colonized the northeastern and midwestern U.S. The mosquito is an

FIGURE 5. *Ochlerotatus japonicus*

aggressive, opportunistic feeder, with a preference for human hosts **(Figure 5)**.[12] *Oc. japonicus* can breed in numerous natural and artificial water sources ranging from rock pools and stream beds to catch basins, discarded tires, and common artificial containers associated with human habitation.[13] It is a suspected vector of Japanese encephalitis in Asia, and a potential bridge vector for WNV.[4]

Prevention of West Nile virus spread

The prevention of WNV infections and associated illnesses relies on reducing contacts between competent mosquito vectors and humans. As such, the removal of standing water – which eliminates potential breeding sites – near homes and parks is an important countermeasure. The average time of maturation from mosquito egg to adult is one week; therefore, dumping artificial containers (e.g., buckets, tarps, bird baths) once a week can significantly decrease the numbers of biting and breeding adult mosquitoes. Furthermore, the use of microbial pesticides (larvicides) in ponds, catch basins, and irrigation ditches is a safe and natural method of reducing mosquito larvae. More information about use of larvicides can be found at: www.epa.gov/opp00001/health/mosquitoes/larvicides4mosquitoes.htm.

Personal protective measures to prevent mosquito bites such as using insect repellent, wearing long sleeves and long pants, and limiting outdoor activities during peak biting times (dusk and dawn) can also decrease the risk of WNV infection. More information about avoidance of mosquito bites can be found at: www.cdc.gov/ncidod/dvbid/westnile/prevention_info.htm.

REFERENCES

1. Lanciotti RS, Roehrig JT, Deubel V, et al. Origin of West Nile virus responsible for an outbreak of encephalitis in the northeastern United States. *Science*. 1999;286(5448):2333-2337.
2. Centers for Disease Control and Prevention. 2012 West Nile virus update: September 11. Found at: http://www.cdc.gov/ncidod/dvbid/westnile/index.htm. Accessed 17 September 2012.
3. U.S. Army Public Health Command. Army Vector-borne Disease Report. 11 September 2012. Found at: http://phc.amedd.army.mil/Periodical%20Library/ArmyWeeklyVector-borneDiseaseReport_11Sep12.pdf. Accessed 17 September 2012.
4. Turell MJ, Dohm DJ, Sardelis MR, et al. An update on the potential of North American mosquitoes (Diptera: Culicidae) to transmit West Nile virus. *J Med Entomol.* 2005;42(1):57-62.
5. Shaman J, Day JF, Stieglitz M. Drought-induced amplification and epidemic transmission of West Nile virus in southern Florida. *J.Med. Entomol.* 2005;42(2):134-141.
6. Epstein PR, Defilippo C. West Nile virus and drought. *Global change and human health.* 2001;2(2):105-107.
7. Carpenter SJ, LaCasse WJ. Mosquitoes of North America (north of Mexico). USA: University of California Press; 1974: 296.
8. University of Florida Institute of Food and Agricultural Sciences- Department of Entomology and Nematology. *Culex quinquefasciatus* Say. Found at: http://entnemdept.ufl.edu/creatures/aquatic/southern_house_mosquito.htm. Accessed 28 August 2012.
9. Molaei G, Andreadis TG, Amstrong PM, Anderson JF, Vossbrinck CR. Host feeding patterns of *Culex* mosquitoes and West Nile virus transmission, northeastern United States. *Emerg Infect Dis.* 2006;12(3):1-12.
10. Reisen, W. The western encephalitis mosquito, *Culex tarsalis. Wing Beats*;1993:4(2):16.
11. Moore CG, Mitchell CJ. *Aedes albopictus* in the United States: ten-year presence and public health implications. *Emerg. Infect. Dis.* 1997;3(3):329-334.
12. Molaei G, Farajollahi A, Scott JJ, et al. Human bloodfeeding by the recently introduced mosquito, *Aedes japonicus japonicus*, and public health implications. *J Am Mosq Control Assoc.* 2009;25(2):210-214.
13. Andreadis TG, Wolfe RJ. Evidence for reduction of native mosquitoes with increased expansion of invasive *Ochlerotatus japonicus japonicus* (Diptera: Culicidae) in the Northeastern United States. *J.Med.Entomol.* 2010;47(1):43-52.

Coccidioidomycosis, Active Component, U.S. Armed Forces, January 2000-June 2012

Coccidioidomycosis, also known as "Valley Fever," is an infectious illness caused by inhalation of the spores of *Coccidioides immitis* or *Coccidioides posadasii*, which are naturally occurring fungi found primarily in the soil of large areas of the southwestern United States and Central and South America. Approximately 60 percent of infected individuals are asymptomatic; common complaints in symptomatic patients are flu like symptoms including fever, cough, malaise, fatigue, dyspnea and headache. Although most infections, whether diagnosed or not, are self-limited in duration, in rare cases the infection spreads beyond the respiratory tract and may involve the skin, bones and joints, or the central nervous system (coccidiodal meningitis). The risk of such spread is especially high in persons with compromised immune systems.[1,2]

Coccidioidomycosis has long been a significant occupational hazard for U.S. military members who are assigned or train in endemic areas. Because of its non-specific clinical manifestations and delayed onset of symptoms, affected military members may present for care outside of endemic areas; in such cases, correct diagnoses and indicated treatments may be delayed.[3]

In the civilian U.S. population, incidence rates of coccidioidomycosis have increased dramatically over the past decade. Between 2000-2007, rates in California almost tripled (2.4 cases per 100,000 population vs 7.4 cases per 100,000 population) and Arizona reported even greater increases.[4,5] In contrast, incidence rates in active component military members over the same time period did not demonstrate a consistently increasing trend; between January 2000 and June 2012, incidence rates ranged from a low of 0.15 per 10,000 person-years in 2003 to 0.41 per 10,000 person-years in 2006 **(Table)**.

Previous *MSMR* analyses of the location of coccidioidomycosis diagnoses among U.S. service members demonstrated that approximately 50 percent of incident cases were diagnosed in California and 18 percent in Arizona.[6] Since 2010, about 36 percent of incident coccidioidomycosis cases have been diagnosed in California overall, although since December 2011, more incident cases were diagnosed in California than any other location **(Figure)**. A future *MSMR* article will examine rates and trends of coccidioidomycosis diagnoses among all beneficiaries of the Military Health System.

For this summary, an incident case of coccidioidomycosis was defined as one notifiable medical event; or a single hospitalization; or two or more ambulatory visits within 14 days that included the diagnosis code ICD-9-CM: 114.x ("coccidioidomycosis").

Providers of health care to U.S. military members should consider coccidioidomycosis a potential cause of febrile, respiratory, infectious illnesses among those currently or previously exposed to endemic areas.

FIGURE. Coccidioidomycosis cases by month and location of diagnosis, January 2010-June 2012

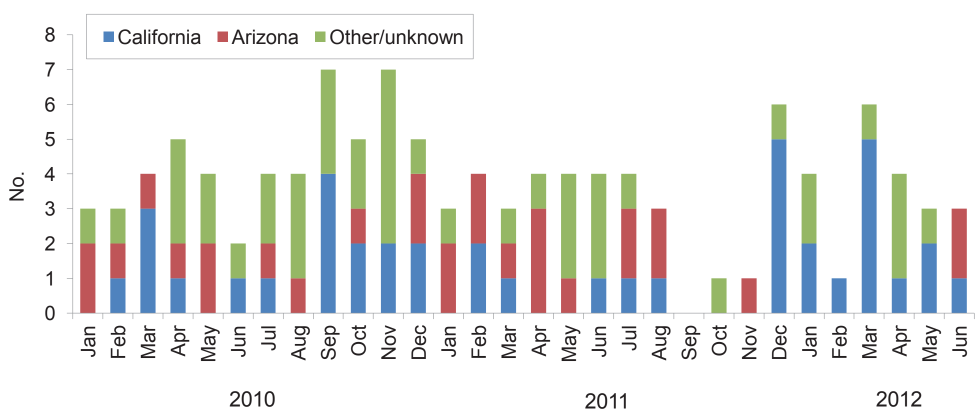


TABLE. Incident diagnoses of cocidioidomycosis, active component, U.S. Armed Forces, 2000-2012

Year	No.	Rate[a]
2000	29	0.21
2001	41	0.31
2002	30	0.21
2003	22	0.15
2004	28	0.19
2005	40	0.28
2006	57	0.41
2007	39	0.28
2008	42	0.30
2009	46	0.32
2010	53	0.36
2011	37	0.25
2012[b]	21	0.29
Total	485	0.27

[a]Rate per 100,000 person-years
[b]Through 30 June

REFERENCES

1. Ampel NM. New perspectives on coccidioidomycosis. *Proc Am Thorac Soc*.15 May 2010;7(3):181-185.
2. Saubolle MA, McKellar PP, Sussland D. Epidemiologic, clinical, and diagnostic aspects of coccidioidomycosis. *J Clin Microbiology*. January 2007;45(1):26-30.
3. Crum-Cianflone NF. Coccidioidomycosis in the U.S. military. *Ann N Y Acad Sci*. 2007;1111(1):112-121.
4. Centers for Disease Control. Increase in coccidioidomycosis-California, 2000-2007. *MMWR*. 13 Feb 2009;58(5):105-109.
5. Sunenshine RH, Anderson S, Erhart L, et al. Public health surveillance for coccidioidomycosis in Arizona. *Ann N Y Acad Sci*. Sep 2007;1111:96-102.
6. Armed Forces Health Surveillance Center. Surveillance Snapshot: Coccidioidomycosis diagnoses by location, active component, 2000-2009. *MSMR*. 2010;17(12):13.

Update: Pneumonia-Influenza and Severe Acute Respiratory Illnesses, Active Component, U.S. Armed Forces, July 2000-June 2012

Pneumonias are among the leading causes of hospitalizations of U.S. service members. During July 2000-June 2012, there were 13,291 incident hospitalizations for pneumonia and influenza. The most cases during any "respiratory illness year" (July-June) were in 2002-2003 (n=1,359); the fewest cases were in 2010-2011 (n=937). During 28 of the 31 months from December 2009 through June 2012, there were fewer pneumonia and influenza-related hospitalizations than expected (relative to the means for the respective months overall). The relatively few hospitalizations for pneumonia-influenza in recent years reflect, at least in part, the effectiveness of influenza vaccines against the predominant circulating strains of influenza viruses. During the period, on average, there were approximately three hospitalizations for "severe acute respiratory illnesses" (SARI) (e.g., acute respiratory failure or distress) per month; however, numbers of SARI-related hospitalizations generally increased during the period. The cause(s) of this increase are not clear.

Historically, military populations have been at high risk of acute respiratory illnesses.[1-4] Upper respiratory infectious illnesses are extremely common among U.S. service members, particularly among recruits and during fall-winter "cold and influenza" seasons. Upper respiratory illnesses are among the leading causes of medical encounters and lost work time of service members.[5,6] Acute infections of the lower respiratory tract (e.g., pneumonias) are less frequent but more debilitating than upper respiratory illnesses. Consistently, pneumonias are among the leading causes of hospitalizations of service members.[7] Finally, there are sporadic cases and rare outbreaks of severe, life threatening acute respiratory illnesses, usually in recruit camps and during training and operational deployments.[8-10] In 2003, there were 19 cases of severe acute respiratory illnesses among U.S. service members deployed to Iraq and other countries in the Central Command (CENTCOM) area of responsibility. Two of the cases were fatal. Despite extensive investigation, the etiologies of the cases were not identified.[10]

This report summarizes frequencies, seasonal variability, and general trends of hospitalizations of active component U.S. service members for "pneumonia and influenza" and severe acute respiratory illnesses (e.g., acute respiratory failure, acute respiratory distress) during the past 12 years.

METHODS

The surveillance period was 1 July 2000 to 30 June 2012. The surveillance population included all individuals who served in an active component of the U.S. Armed

TABLE 1. Incident hospitalized cases of pneumonia-influenza and severe acute respiratory illness, by calendar quarter, active component, U.S. Armed Forces, July 2000-June 2012

Pneumonia-influenza															Mean cases per month	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total	No.	Relative no.
Jan-Mar		323	286	296	253	285	237	301	375	357	222	338	220	3,493	97.0	1.20
Apr-Jun		207	200	337	241	264	211	274	255	345	183	215	185	2,917	81.0	ref
Jul-Sep	199	226	309	361	285	271	223	317	225	407	177	224		3,224	89.6	1.11
Oct-Dec	317	270	417	495	296	261	276	276	277	395	207	170		3,657	101.6	1.25
Total	516	1,026	1,212	1,489	1,075	1,081	947	1,168	1,132	1,504	789	947	405	13,291	92.3	.

Severe acute respiratory illness															Mean cases per month	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total	No.	Relative no.
Jan-Mar		10	9	11	6	9	7	9	13	10	15	8	16	123	3.4	1.14
Apr-Jun		7	5	9	11	10	5	14	7	11	6	8	15	108	3.0	ref
Jul-Sep	2	4	7	12	11	8	11	11	10	14	4	12		106	2.9	0.98
Oct-Dec	7	7	14	11	5	14	11	14	10	12	12	6		123	3.4	1.14
Total	9	28	35	43	33	41	34	48	40	47	37	34	31	460	3.2	.

Forces any time during the surveillance period. The Defense Medical Surveillance System was searched for relevant diagnoses among standardized records of all hospitalizations in fixed (e.g., not deployed or at sea) military and non-military (purchased care) medical facilities.

For surveillance purposes, a case of "pneumonia-influenza (P&I)" was defined as a hospitalization with a primary (first-listed) diagnosis of "pneumonia and influenza" (ICD-9-CM: 480-488); or a primary diagnosis of "acute respiratory infection" (ICD-9: 460-466) *plus* a secondary diagnosis (in any one of the diagnostic positions 2 through 8) of "pneumonia and influenza" (ICD-9: 480-488).

A case of "severe acute respiratory illness (SARI)" was defined as a hospitalization with a diagnosis of "acute respiratory failure" (ICD-9: 518.81) or "other pulmonary insufficiency" (which includes "acute respiratory distress, acute respiratory insufficiency, adult respiratory distress syndrome [ARDS]") (ICD-9: 518.82) *plus* a diagnosis "acute respiratory infection" (ICD-9: 460-466) or "pneumonia and influenza" (ICD-9: 480-488). One of these case-defining diagnoses was required to be listed in the primary diagnostic position.

For surveillance purposes, each "respiratory illness year" was considered 1 July through 30 June of the following year. For each service member during each respiratory illness year, only one incident episode each of pneumonia-influenza and severe acute respiratory illness was included in analyses.

RESULTS

Pneumonia-influenza:

During the period, there were 13,291 incident hospitalizations for pneumonia and influenza **(Table 1)**. The most cases during any respiratory illness year were in 2002-2003 (n=1,359); the fewest cases during any year were in 2010-2011 (n=937).

In general, there were more cases during fall and winter (mean cases per month, October-December: 101.6; January-March: 97.0) than spring and summer (mean cases per month, April-June: 81.0; July-September: 89.6) seasons **(Table 1)**. During the period, P&I-related hospitalizations tended to sharply increase from late summer through early fall, remain relatively high from late fall through winter, and sharply decrease through spring **(Figure 1)**. On average, the most cases per month were in October (mean: 106.2) and November (mean: 101.5) and the fewest in June (mean: 74.1). During the period, the most cases in any month were in December 2002 (n=200) and the fewest in June 2010 (n=33) **(Figure 1)**.

Numbers of P&I-related hospitalizations were consistently relatively high during March-December 2003, February-September 2007, January-May 2008, and January-November 2009; during each month of these periods, there were "excess" P&I-related hospitalizations relative to the means for the respective months overall **(Figure 2)**. In contrast, there were extended periods of relatively few P&I-related hospitalizations from July-October 2000, March 2001-July 2002, August 2005-January 2007, December 2009-December 2010, and April 2011-June 2012. Of note, during 28 of the 31 months from December 2009 through June 2012, there were fewer P&I-related hospitalizations than "expected" (relative to the means for the respective months overall) **(Figure 2)**.

Severe acute respiratory illness:

During the period, there were 460 incident hospitalizations for severe acute

FIGURE 1. Hospitalizations for pneumonia-influenza, by month, active component, U.S. Armed Forces, July 2000-June 2012

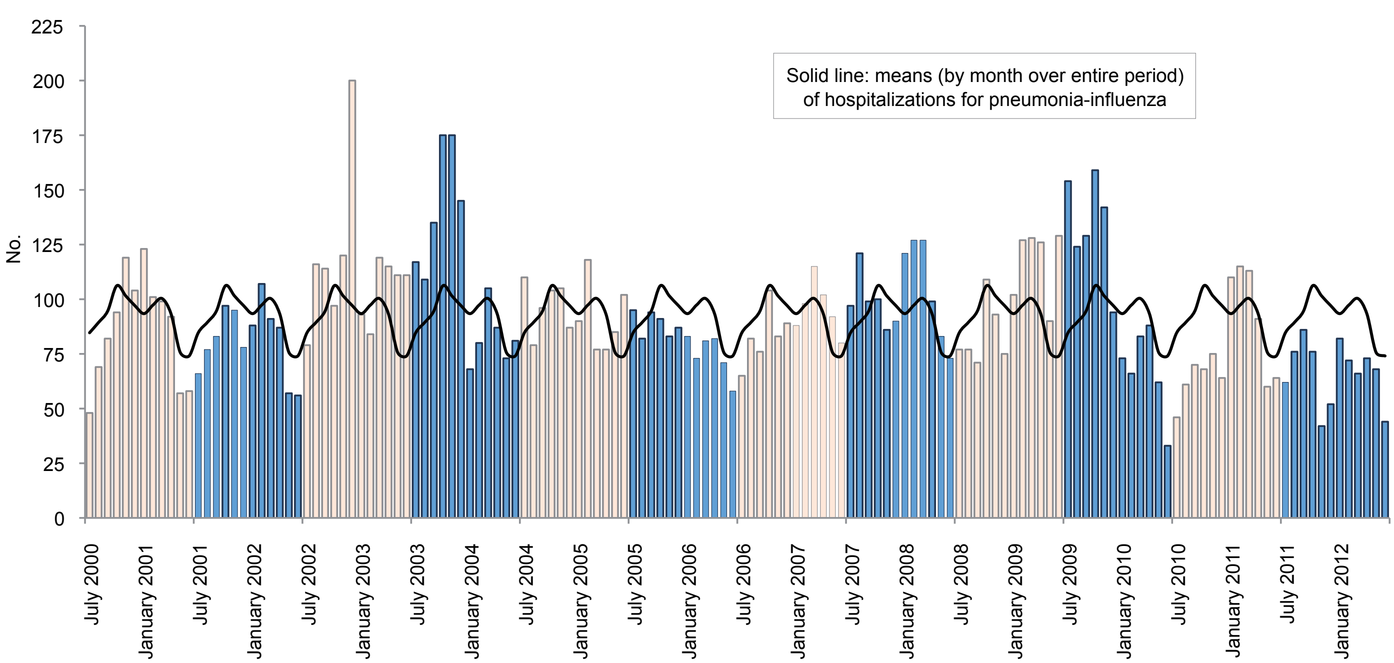
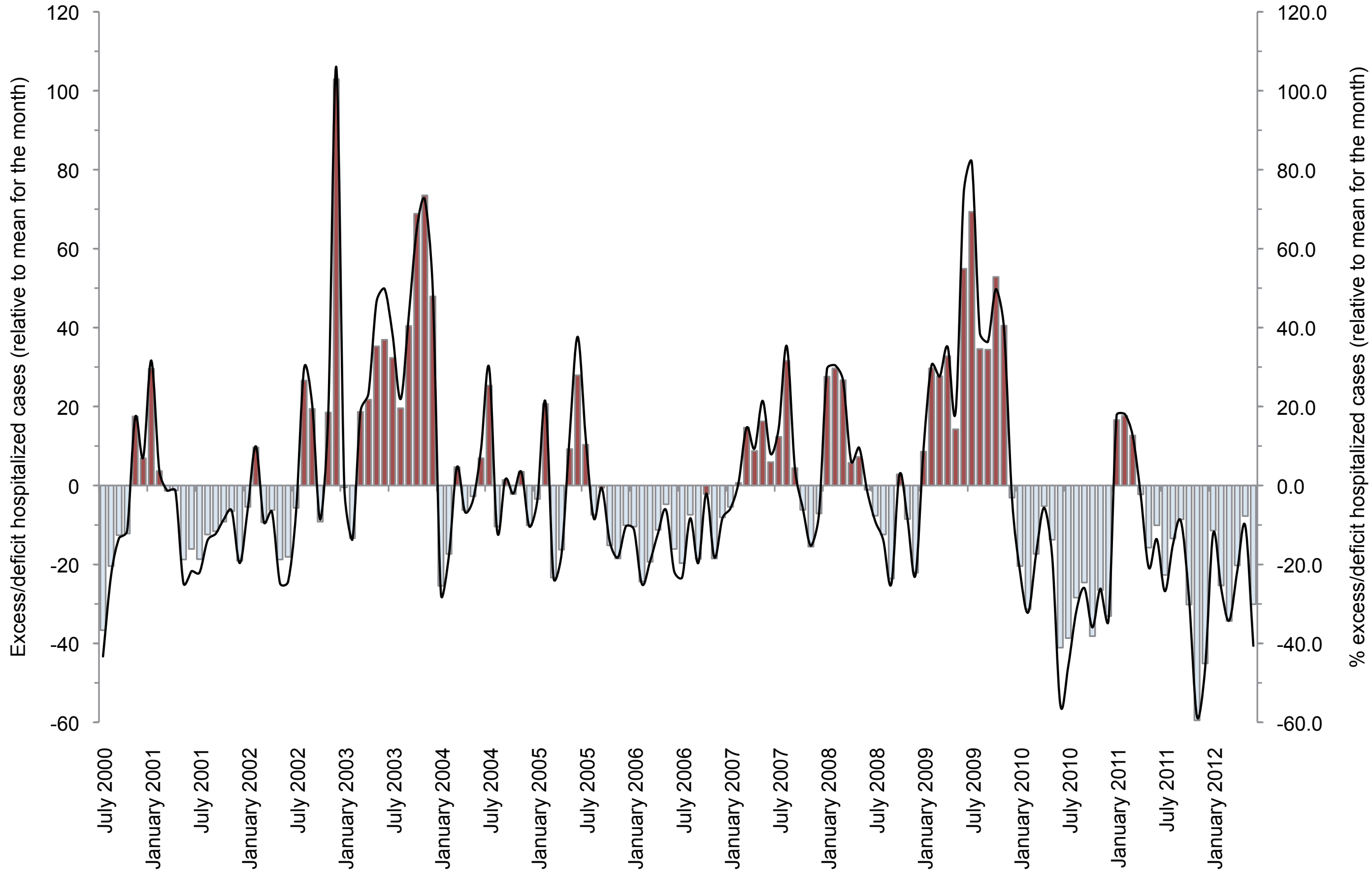


FIGURE 2. Number (bars) and percentage (line) of excess/deficit of hospitalizations for pneumonia-influenza, relative to the mean number for the respective month for the entire period, U.S. Armed Forces, July 2000-June 2012



respiratory illnesses (SARI). The most cases during any year were in 2011-2012 (n=49); the fewest cases during any year were in 2001-2002 (n=25) **(Table 1)**.

Over the entire period, on average, there were approximately three SARI-related hospitalizations per month; however, numbers of SARI-related hospitalizations generally increased during the period **(Table 1, Figures 3,4)**. Of note in this regard, during each month from February-June 2012, there were more SARI-related hospitalizations than expected (relative to the means for the respective months overall); and in March 2012, there were more SARI-related hospitalizations (n=9) than in any other month of the period **(Figures 3,4)**.

In contrast to the distinct seasonality of pneumonia-influenza incidence, there was no consistent month-to-month or seasonal variability in SARI-related hospitalizations; overall, there were only slightly fewer SARI-related cases in the spring and summer than the fall and winter seasons **(Table 1, Figure 3)**.

EDITORIAL COMMENT

Compared to the general experience since 2000, in the past few years – particularly since December 2009, there have been relatively few hospitalizations for pneumonia-influenza (relative to seasonal norms). In particular, during the 2011-2012 fall-winter season, there were consistently fewer pneumonia-influenza-related hospitalizations than expected based on recent past experience. U.S. military members receive annual influenza immunizations. The recent experience regarding pneumonia-influenza reflects, at least in part, the effectiveness of recent influenza vaccines against the predominant circulating strains of influenza viruses.

In contrast to recent influenza and pneumonia experience, there have been more hospitalizations for severe acute respiratory illnesses among active military members during the winter-spring seasons of 2012 compared to recent prior years. Of note in this regard, there were more severe acute respiratory illness-related hospitalizations than expected (compared to month-specific averages) each month from February through June 2012 and more SARI-related hospitalizations in March 2012 than in any other month of the past 12 years. Because the case definition used for this analysis required both a diagnosis of respiratory infection and respiratory illness-specific primary diagnosis (indicative of the primary reason for hospitalization), it is unlikely that recent increases in severe acute respiratory illness cases reflect complications of combat-related trauma or associated care.

In response to the cluster of “severe acute pneumonitis” cases among deployed

FIGURE 3. Hospitalizations for severe acute respiratory illness, by month, active component, U.S. Armed Forces, July 2000-June 2012

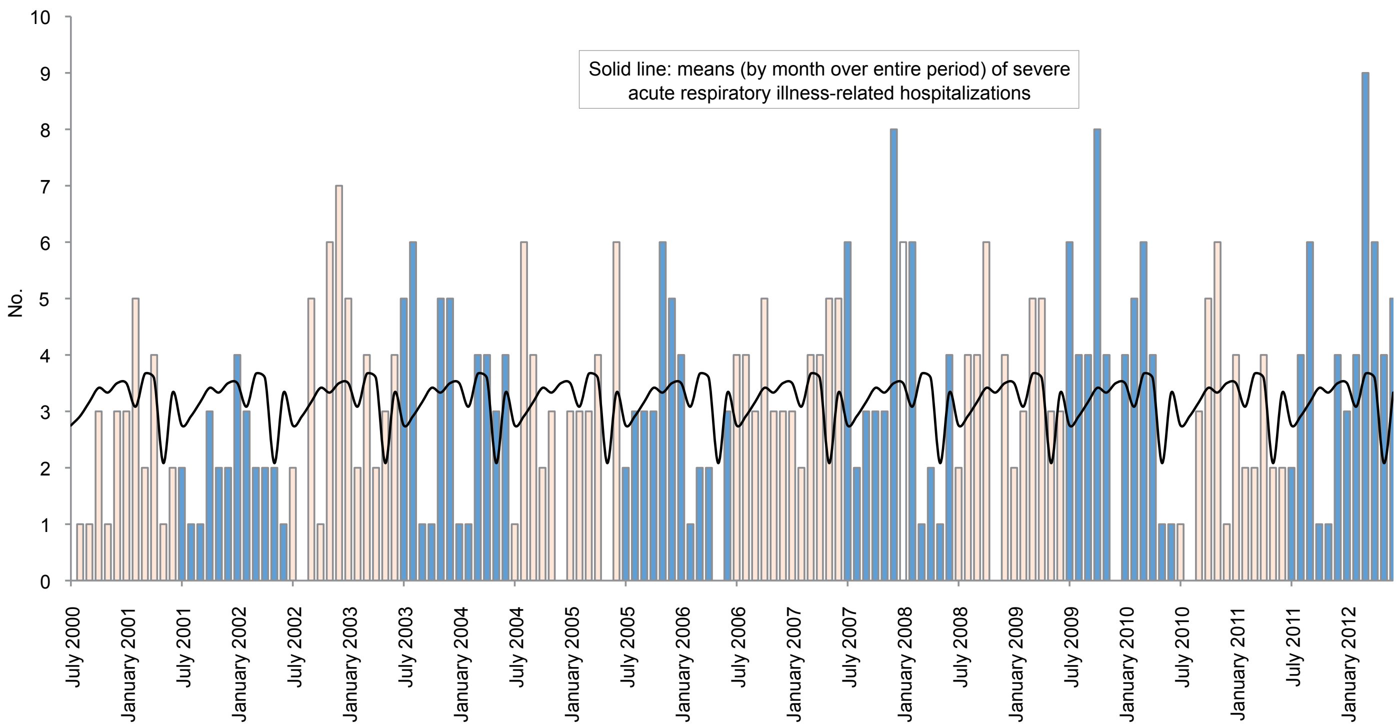
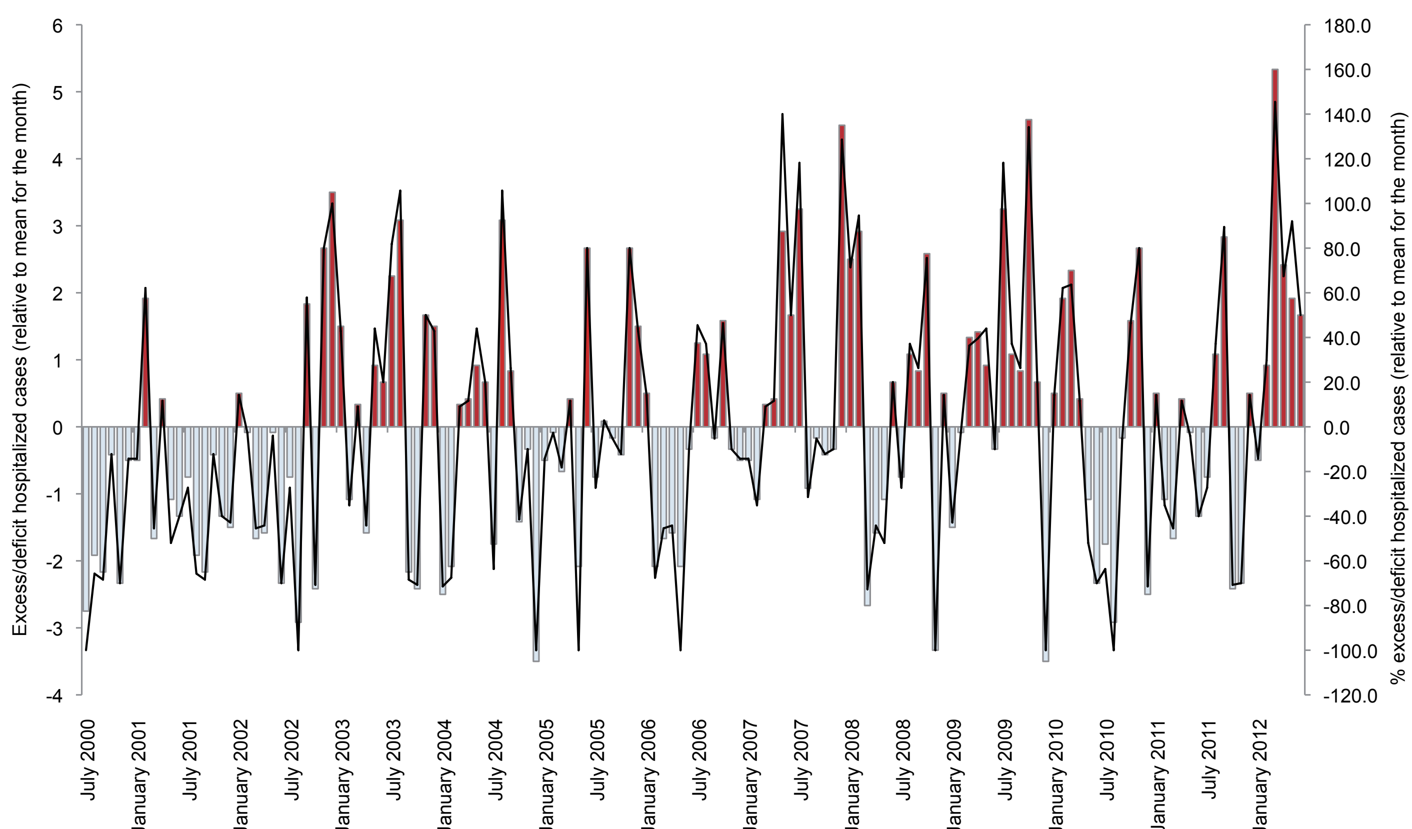


FIGURE 4. Number (bars) and percentage (line) of excess/deficit of hospitalizations for severe acute respiratory illness, relative to the mean number for the respective month for the entire period, U.S. Armed Forces, July 2000-June 2012



service members in the spring-summer of 2003,[10] the *MSMR* has tracked incident episodes of "severe acute pneumonia" among service members deployed to or within 30 days of returning from service in Afghanistan or Iraq (using a case definition similar but not identical to that used for this report). Since 2004, there have been consistently few cases per month of severe acute pneumonia temporally related to deployment (range, cases per month: 0-3; annual mean cases per month: 0.5-1.1);[11] it is unlikely that deployment-related cases account for the recent increase in SARI cases among military members overall. It is also unlikely that the recent increase in SARI-related cases reflects the emergence and subsequent spread of a novel A/H1N1 influenza strain in 2009.[12] All military members are vaccinated annually against predominant strains of influenza (including A/H1N1); and since 2010, there have been relatively low rates of pneumonia and influenza-related hospitalizations among military members. Finally, in recent years, adenovirus type 14 has become a significant pathogen – with potential to cause severe disease – among U.S. military trainees.[13,14] Some recent severe acute respiratory illness-related hospitalizations of military members may be related to adenovirus type 14 infections.

In summary, this analysis documents the seasonality of pneumonia-influenza incidence among U.S. service members. From July 2000 through June 2012, the fewest pneumonia-influenza hospitalizations were in June and the most in October. In most years of the period, there were sharp increases in pneumonia-influenza hospitalizations beginning in the late summer (July-August). The findings suggest that annual activities to counter seasonal pneumonia-influenza risk should be conducted as soon as possible after the current year's vaccines become available. Also, this analysis documents recent increases in numbers of hospitalizations for severe acute respiratory illnesses; the cause(s) of the increase are not clear. Continued surveillance of acute respiratory illnesses with severe clinical manifestations among military members is indicated.

REFERENCES

1. Sartin JS. Infectious diseases during the Civil War: the triumph of the "Third Army". *Clin Infect Dis.* 1993 Apr;16(4):580-584.
2. Oxford JS, Sefton A, Jackson R, et al. World War I may have allowed the emergence of "Spanish" influenza. *Lancet Infect Dis.* 2002 Feb;2(2):111-114.
3. Gray GC, Callahan JD, Hawksworth AW, et al. Respiratory diseases among U.S. military personnel: countering emerging threats. *Emerg Infect Dis.* 1999 May-Jun;5(3):379-385.
4. Gray GC, Mitchell BS, Tueller JE, et al. Pneumonia hospitalizations in the US Navy and Marine Corps: rates and risk factors for 6,522 admissions, 1981-1991. *Am J Epidemiol.* 1994 Apr 15;139(8):793-802.
5. Armed Forces Health Surveillance Center. Ambulatory visits among members of the active component, U.S. Armed Forces, 2011. *MSMR*. 2012 Apr; 19(4):17-22.
6. Armed Forces Health Surveillance Center. Absolute and relative morbidity burdens attributable to various illnesses and injuries, U.S. Armed Forces, 2011. *MSMR*. 2012 Apr; 19(4):4-9.
7. Armed Forces Health Surveillance Center. Hospitalizations among members of the active component, U.S. Armed Forces, 2011. *MSMR*. 2012 Apr;19(4):10-16.
8. Crum NF, Russell KL, Kaplan EL, et al. Pneumonia outbreak associated with group a Streptococcus species at a military training facility. *Clin Infect Dis.* 2005 Feb 15;40(4):511-518.
9. Centers for Disease Control and Prevention. Outbreak of group A streptococcal pneumonia among Marine Corps recruits—California, November 1-December 20, 2002. *MMWR*. 2003 Feb 14:52(6);106-109.
10. Centers for Disease Control and Prevention. Severe acute pneumonitis among deployed U.S. military personnel—Southwest Asia, March--August 2003. *MMWR*. 2003 Sep 12:52(36);857-859.
11. Armed Forces Health Surveillance Center. Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003-June 2012. Severe acute pneumonia. *MSMR*. 2012 Jul; 19(7):27.
12. Armed Forces Health Surveillance Center. Preliminary report: Outbreak of novel H1N1 influenza aboard USS Boxer, 29 June-31 July 2009. *MSMR*. 2012 Sep; 16(9):8-9.
13. Tate JE, Bunning ML, Lott L, et al. Outbreak of severe respiratory disease associated with emergent human adenovirus serotype 14 at a U.S. Air Force training facility in 2007. *J Infect Dis.* 2009 May 15;199(10):1419-1426.
14. Johns MC, Ludwig SL, Hawksworth A. Preliminary report: febrile acute respiratory disease caused by adenovirus Type 14, U.S. Coast Guard Training Center, Cape May, New Jersey, March 2009. *MSMR*. 2009 Mar;16(5):10-11.

Brief Report

Pneumonia and Influenza Among Military Members and Other Beneficiaries of the U.S. Military Health System, 2007-2012

During the past five "influenza seasons" among both military members and other beneficiaries of the U.S. military health system, there has been distinct seasonality in the incidence of pneumonia and influenza (P&I) cases.

Among military members, during each influenza season except 2009-10, there were small peaks of cases each fall followed by larger peaks each winter. Cases during the winters peaked within the first two to nine weeks of the respective calendar years **(Figure 1)**.

In contrast to the other seasons, during 2009-10, there was a peak of cases during the summer and a much larger peak during the fall. The largest peak of cases during the five year period of interest for this report was in the fall 2009 (week 43: 3,704). The smallest peak of cases during any influenza season during the surveillance period was in the winter 2012 (week 9: 766 cases) **(Figure 1)**.

Among non-service member beneficiaries of the U.S. military health system, during each influenza season except 2009-10, cases of P&I steadily increased through each fall and peaked each winter. During each season except 2009-10, the winter peaks among non-service member beneficiaries were nearly simultaneous to those among military members. Also, as among military members, the largest and smallest annual peaks of cases among non-service member beneficiaries were in the fall 2009 and winter 2012, respectively **(Figure 1)**.

During the 2009-10 season, among non-service member beneficiaries, cases sharply increased to a large peak and then sharply declined through the fall of 2009. In contrast to the experience of military members, however, the decline in cases through the fall was interrupted just before the end of the calendar year, and a secondary

FIGURE 1. Pneumonia/influenza cases among military members and non-service member beneficiaries of the Military Health System, by week, July 2007-July 2012

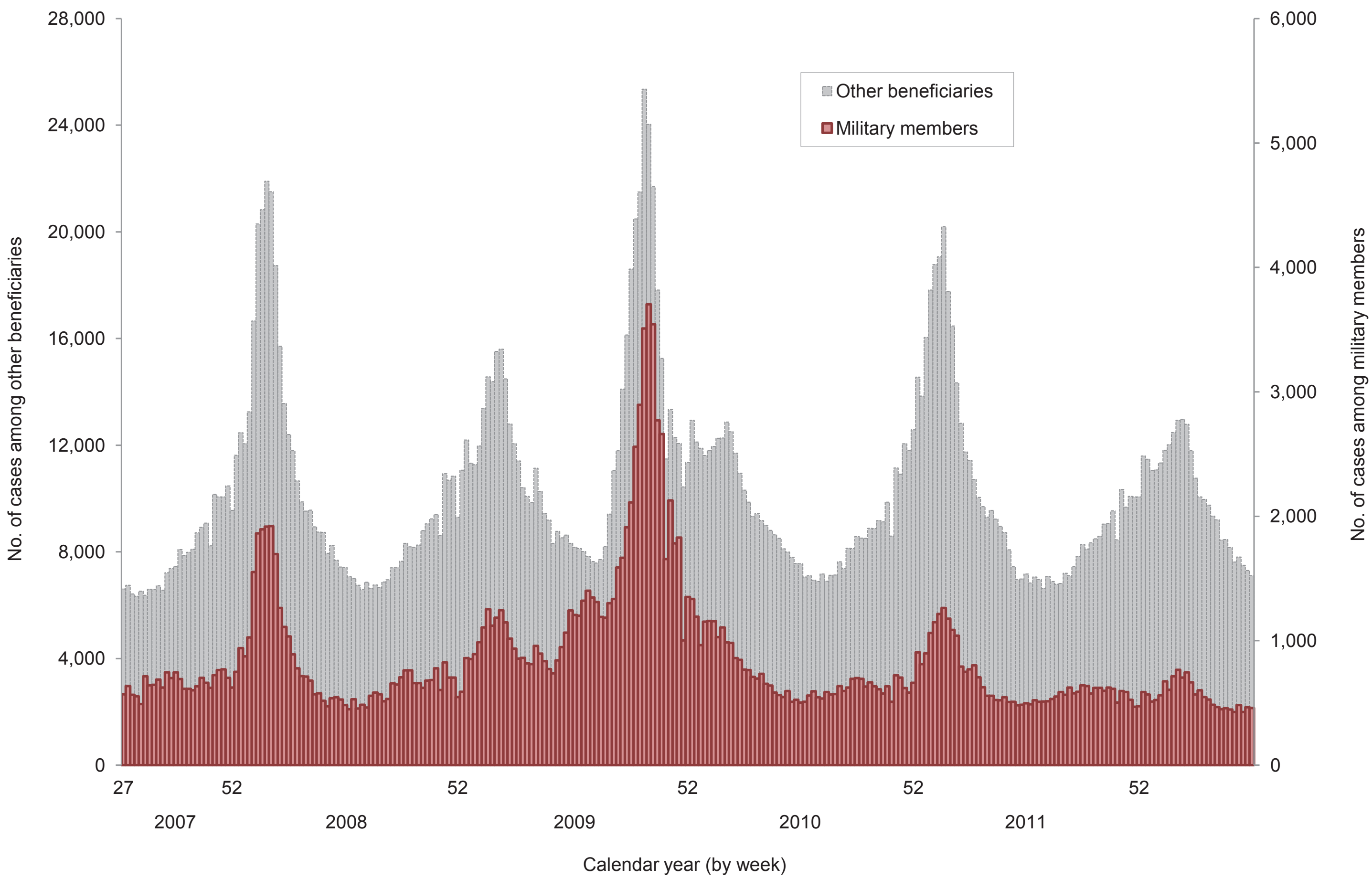
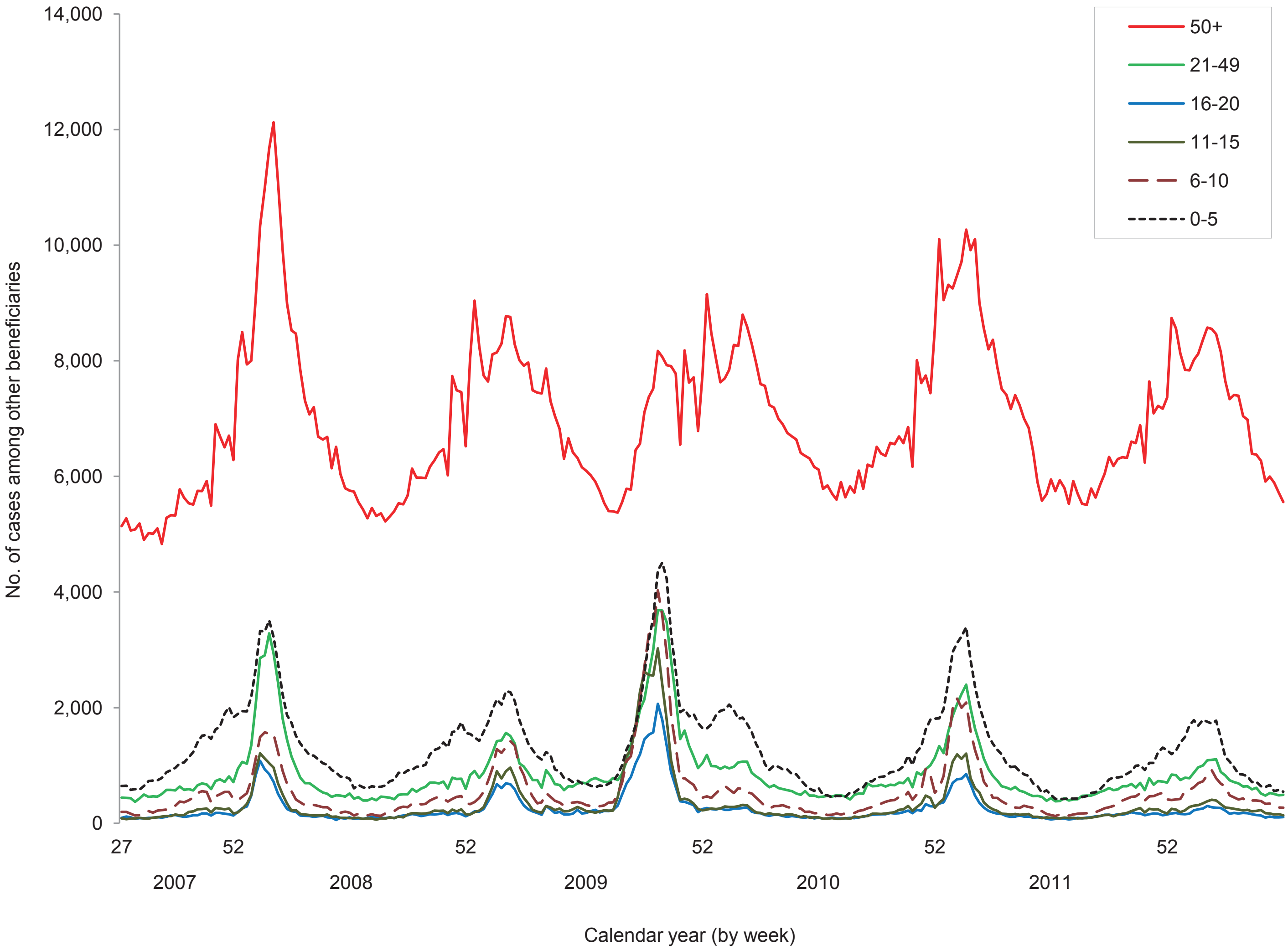


FIGURE 2. Pneumonia/influenza cases among non-service member beneficiaries of the Military Health System, by age group and week, July 2007-July 2012



peak of cases occurred during the first two months of 2010 **(Figure 1)**.

Beginning in spring 2009, a novel strain of influenza A/H1N1 virus emerged into and rapidly spread among humans throughout the United States and elsewhere. The virus was the predominant circulating strain of human influenza virus throughout 2009 and subsequent years. Of the five influenza seasons (July-June) considered here, 2009-10 was notable for its peak during the fall rather than the winter season, and the rapidity of the onset, the velocity of the increase, and the high peak numbers of cases among both military members and non-service member beneficiaries **(Figure 1)**.

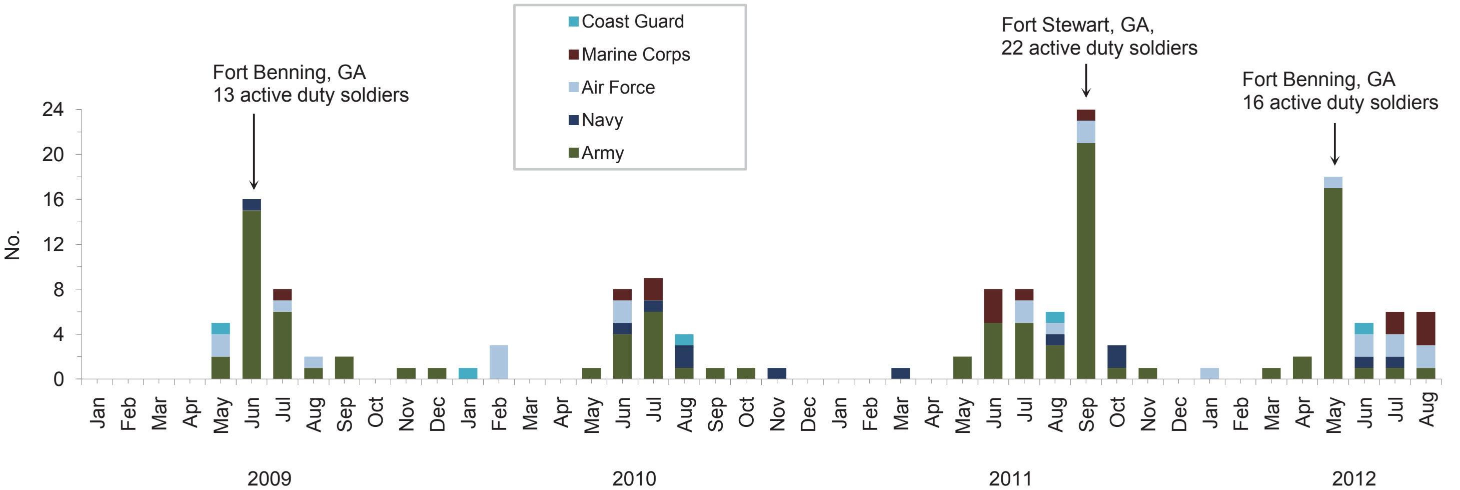
Of note, the 2009-10 season was fairly typical for non-service member beneficiaries who were 50 years and older. For example, among older beneficiaries, there were larger peaks of cases during 2007-8 and 2010-11 than the 2009-10 season; also, during the 2009-10 season, the peak of cases was in the winter rather than fall **(Figure 2)**. The findings reflect the infectious disease experiences of many individuals who were in their mid-fifties or older in 2009; many of these individuals had presumably acquired immunity to the 2009 pandemic strain during exposures to antigenically similar influenza viruses that circulated in the mid-late 1950s.[1]

REFERENCES

1. Jacobs JH, Archer BN, Baker MG, et al. Searching for sharp drops in the incidence of pandemic A/H1N1 influenza by single year of age. *PLoS One*. 2012;7(8):e42328. Epub 2012 Aug 2.

Lightning-related Medical Encounters, Active and Reserve Components, U.S. Armed Forces, January 2009-August 2012

FIGURE. Incident lightning-related medical encounters (ICD-9-CM: 994.0 "effects of lightning" or E907 "accident caused by lightning") in any diagnostic position, by month and service branch, active and reserve components, U.S. Armed Forces, January 2009-August 2012



According to the National Weather Service (NWS), lightning strikes an average of 400 people per year in the United States and kills 54 of them. To date in 2012, the NWS has documented 27 deaths from lightning in 16 states.[1]

Members of the Armed Forces regularly participate in outdoor training and operational activities in all weather conditions and often in geographic regions associated with higher rates of lightning-associated morbidity and mortality (i.e., rural areas in southern and eastern coastal states).[2]

From January 2009 through August 2012, there were 156 service members of the active and reserve components with documented health care encounters associated with lightning strikes **(Figure)**. In 2009 and 2010, the monthly averages of affected service members were 2.9 (n=35) and 2.4 (n=29), respectively. In 2011, the monthly average was much higher (4.4 per month [n=53]). Thus far in 2012, there have been 39 service members with lightning-related encounters.

A majority of individuals affected during the period were members of the active component (n=136, 87.2%) and more than two-thirds (66.0%) were soldiers. Twelve individuals were hospitalized; the remainder were treated in outpatient settings.

Over half (56.4%) of all incident lightning-related encounters occurred in Georgia (n=61), Florida (n=15), and Colorado (n=12). Two installations in Georgia, Fort Benning (n=29) and Fort Stewart (n=24), reported more than one-third of all incident lightning-related encounters. During the period there were at least three lightning events that affected groups of individuals.

In mid-August of this year, 10 New Jersey Army National Guardsmen were slightly injured by a lightning strike during training at Fort Drum, New York. The guardsmen were evaluated by unit medics at the site and returned to duty. Due to a lag in data reporting, medical encounters for this event have not been reported to the Defense Medical Surveillance system; therefore, these individuals were not included in the overall numbers in this report.

A previous *MSMR* report described several incidents of lightning strikes that

TABLE. Lightning Protection[a]

- Prepare for lightning by checking weather forecasts and watching for signs of approaching storms. Most strikes occur June through August between 1200 and 1800 hours local time.
- In the event of a thunderstorm, cease all outdoor training.
- Move personnel into a building if possible. Tents and open shelters are not safe.
- If no building is available, move personnel into a closed metal-topped vehicle or boat cabin; dense woods; a low area, ditch or ravine; or the foot of a hill or cliff.
- Keep personnel from fences, electrical wiring, vehicles, heavy equipment or other possible conductors of electricity.
- When marching in formation, increase the minimum distance and interval to twice that normally maintained.
- Do not use radios or associated equipment; move away from TV antennas, relay antennas, or vehicles with whip antennas.
- Move a safe distance away from metal machinery, approximately 100 feet.
- Do not group together under a tree; do not huddle together if caught in an open area.
- Avoid high places, hilltops, lone trees, flagpoles, open spaces, lakes or deep standing water, tents, small, unprotected buildings in the open and canvas top vehicles.
- When indoors, stay away from possible conductors of electricity such as electrical wiring, plumbing and landline phones. Cell phones are safe to use.
- Do not use personal plug-in appliances such as hair dryers, toothbrushes, or razors.

[a]Reprinted from Medical Surveillance Monthly Report (*MSMR*). 2001 Aug;7(7):4.

affected groups of service members.[3] Military units in close formation outdoors during a thunderstorm are at risk of suffering injuries to multiple service members from a single lightning strike. When lightning reaches the earth's surface, the electrical energy radiates outward from the point of entry through the surrounding ground (or water). Persons standing near a lightning strike can be injured by the electrical energy traveling through the ground. The severity of such an injury decreases with increasing distance from the lightning strike. When seeking safety during a thunderstorm, dispersal of a group of service members will lessen the number of individuals injured in the event of a lightning strike.[4]

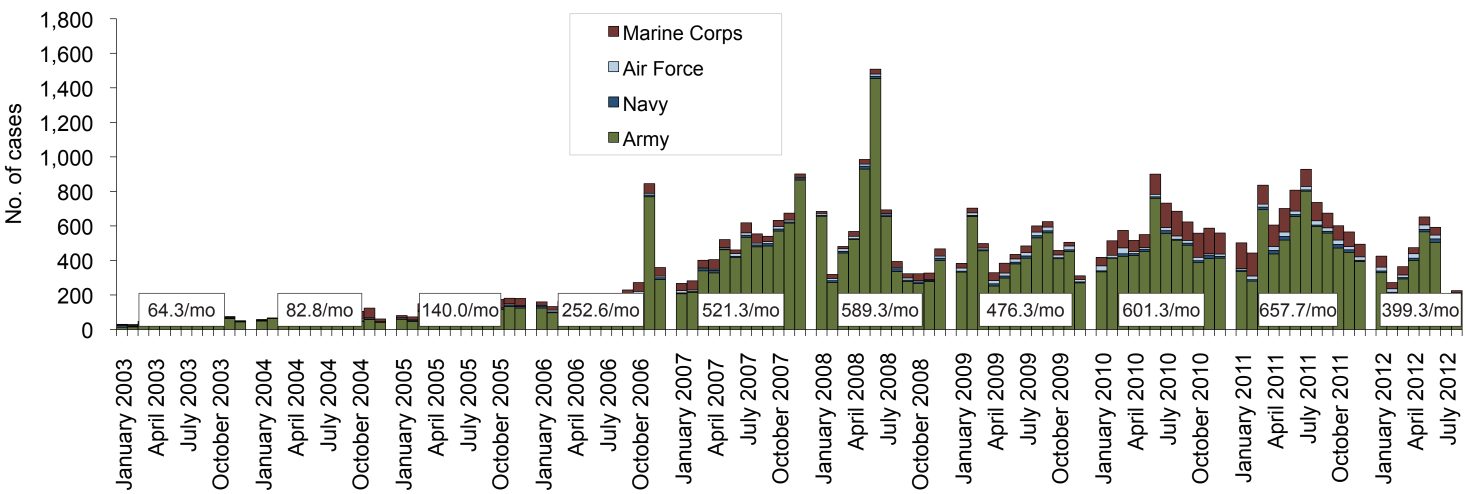
Summer is the peak season for lightning-related encounters because of the increase in thunderstorms and in outdoor activity. The NWS recommends taking refuge in a large indoor shelter or a fully enclosed vehicle immediately after thunder is first heard until 30 minutes after the last clap of thunder. More information on lightning-related injury prevention for personnel can be found in the **Table** and at: www.lightningsafety.com/nlsi_pls/US-Army-Lightning-Protection-Safety-Guide.pdf.

REFERENCES

1. National Weather Service. Lightning safety. Found at: http://www.lightningsafety.noaa.gov/fatalities.htm. Accessed on: September 19, 2012.
2. Centers for Disease Control. Lightning-associated injuries and deaths among military personnel- United States, 1998-2001. *MMWR*. 2002;51(38);859-862.
3. Armed Forces Health Surveillance Center. Lightning strike injuries, active component, U.S. Armed Forces, 1999-2008. *MSMR*. 2009;16(6):6-10.
4. Rock, PB and Mader, TH. Additional Medical Problems in Mountain Environments. In: Pandolf KB, Burr RE, eds. *The Borden Compendium-Medical Aspects of Harsh Environments*.Vol 2. Washington, DC: Office of the Surgeon General at TMM Publications; 2002:844-845.

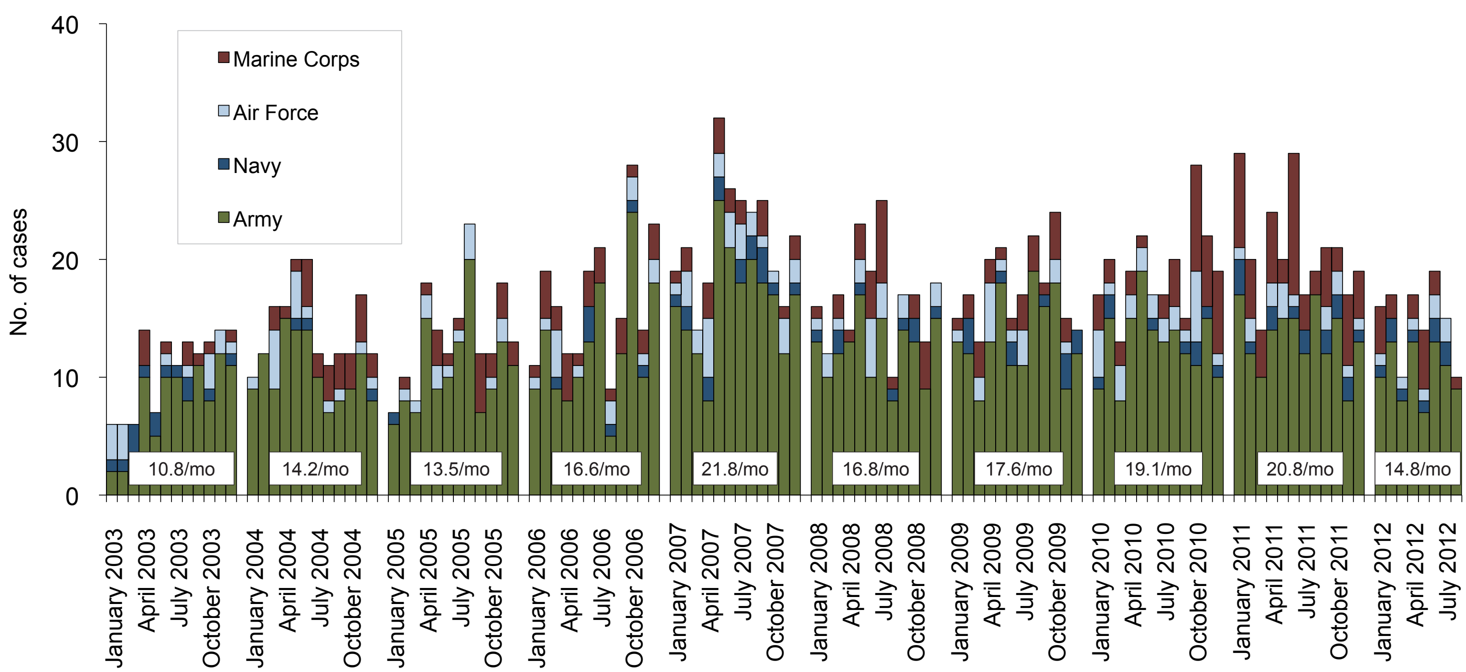
Deployment-Related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003-August 2012 (data as of 21 September 2012)

Traumatic brain injury (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*. Dec 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 OEF/OIF. (Includes in-theater medical encounters from the Theater Medical Data Store [TMDS] and excludes 3,084 deployers who had at least one TBI-related medical encounter any time prior to OEF/OIF).

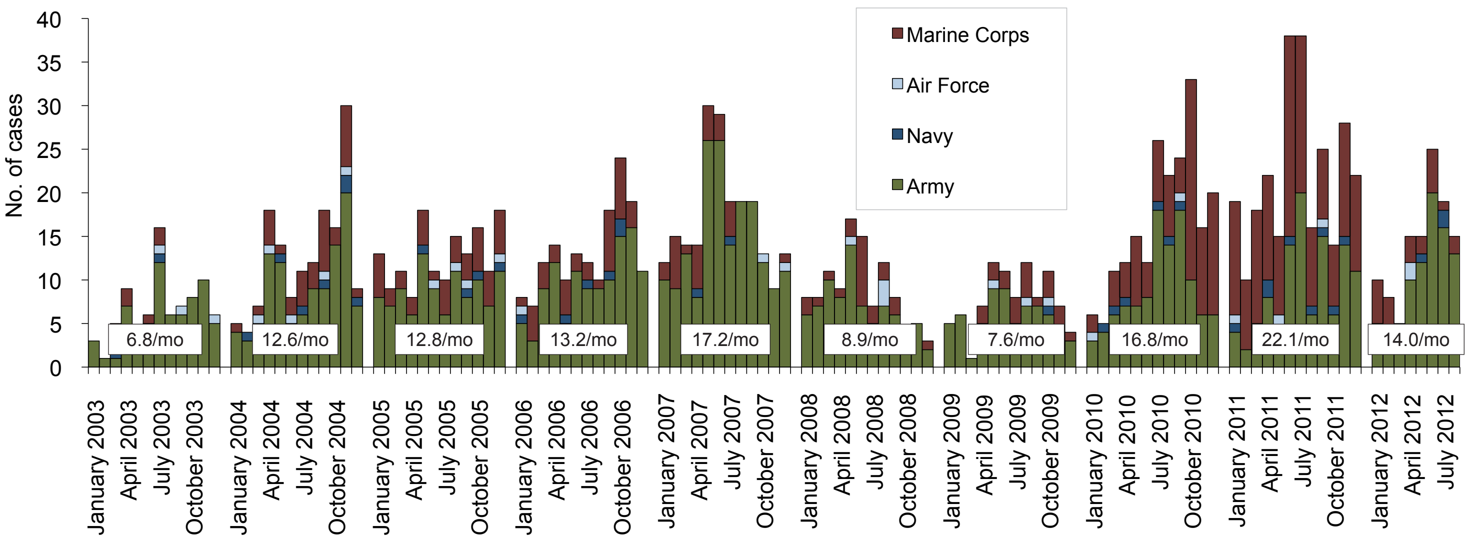
Deep vein thrombophlebitis/pulmonary embolus (ICD-9: 415.1, 451.1, 451.81, 451.83, 451.89, 453.2, 453.40 - 453.42 and 453.8)[b]



Reference: Isenbarger DW, Atwood JE, Scott PT, et al. Venous thromboembolism among United States soldiers deployed to Southwest Asia. *Thromb Res*. 2006;117(4):379-83.
[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 OEF/OIF.

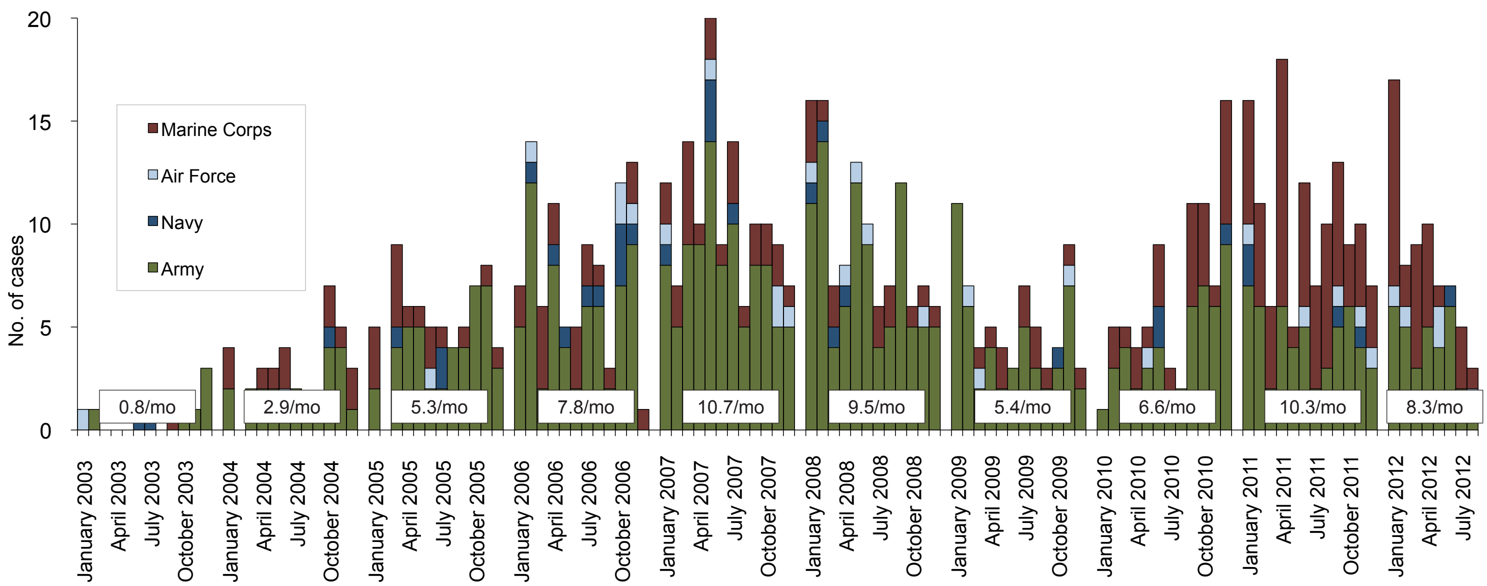
Deployment-Related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003-August 2012 (data as of 21 September 2012)

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 OEF/OIF/OND.

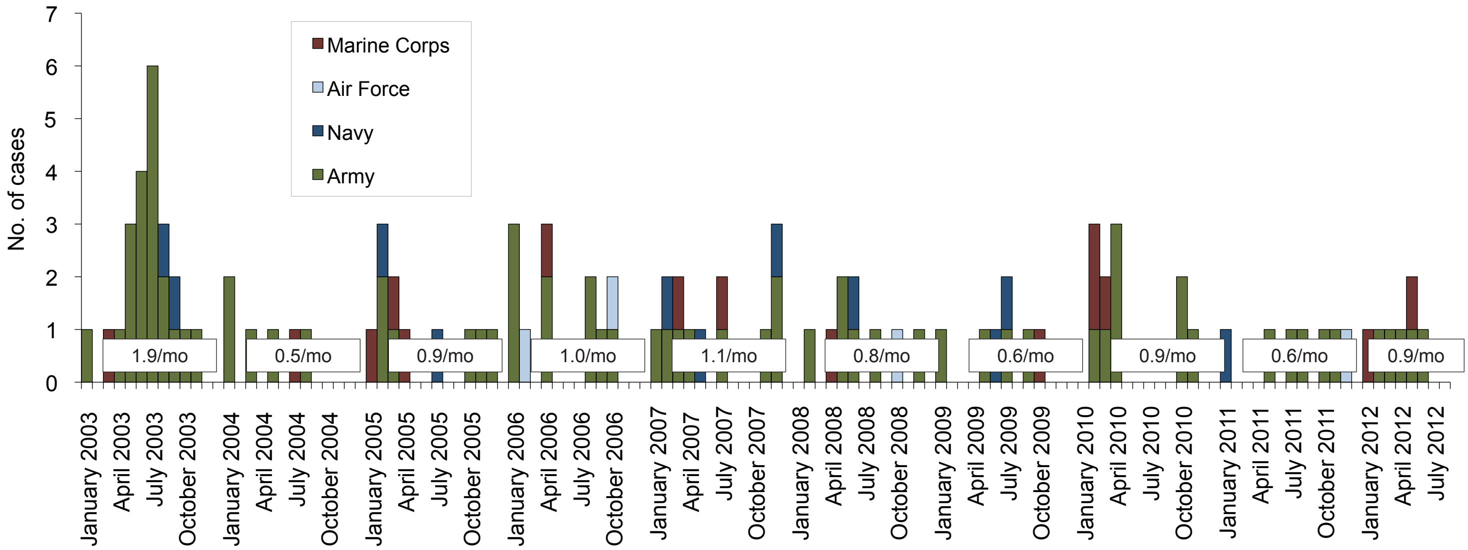
Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)[b]



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 OEF/OIF/OND.

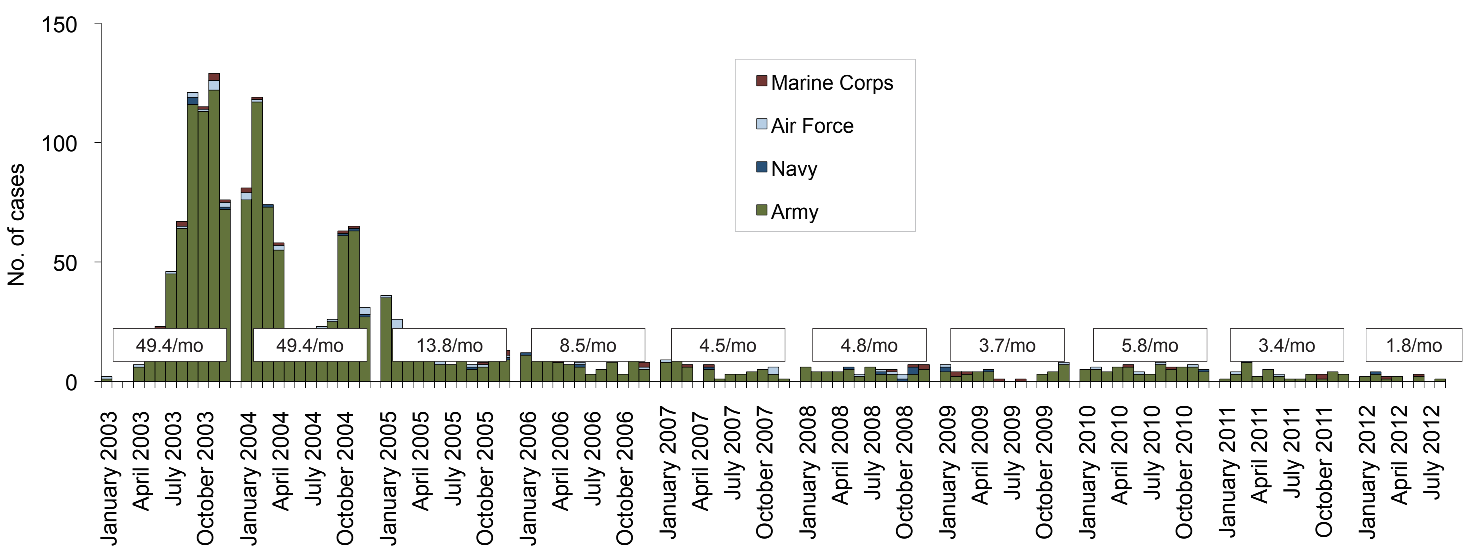
Deployment-Related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003-August 2012 (data as of 21 September 2012)

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.

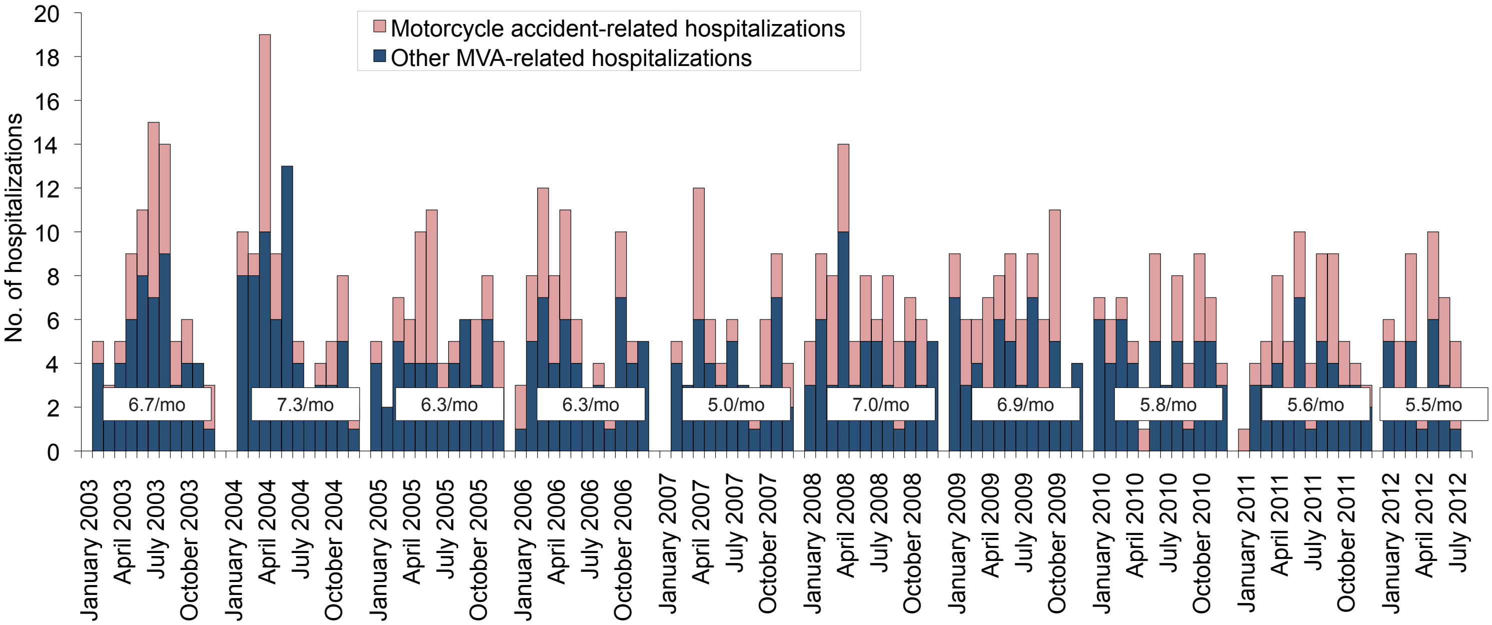
Leishmaniasis (ICD-9: 085.0 to 085.9)[b]



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.

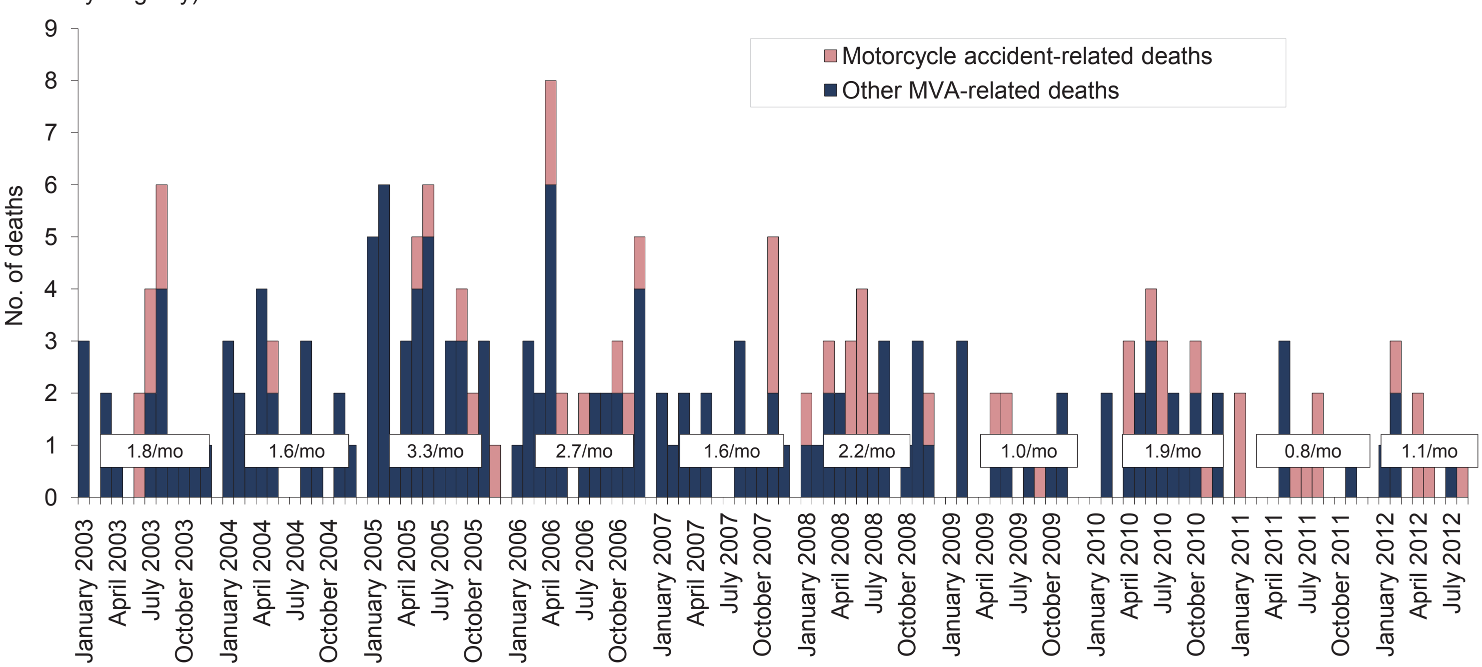
Deployment-Related Conditions of Special Surveillance Interest, U.S. Armed Forces, by Month and Service, January 2003-August 2012 (data as of 21 September 2012)

Hospitalizations outside of the operational theater for motor vehicle accidents occurring in non-military vehicles (ICD-9-CM: E810-E825; NATO Standard Agreement 2050 (STANAG): 100-106, 107-109, 120-126, 127-129)



Note: Hospitalization (one per individual) while deployed to/within 90 days of returning from OEF/OIF/OND. Excludes accidents involving military-owned/special use motor vehicles. Excludes individuals medically evacuated from CENTCOM and/or hospitalized in Landstuhl, Germany within 10 days of another motor vehicle accident-related hospitalization.

Deaths following motor vehicle accidents occurring in non-military vehicles and outside of the operational theater (per the DoD Medical Mortality Registry)



Reference: Armed Forces Health Surveillance Center. Motor vehicle-related deaths, U.S. Armed Forces, 2010. Medical Surveillance Monthly Report (MSMR). Mar 11;17(3):2-6.
Note: Death while deployed to/within 90 days of returning from OEF/OIF/OND. Excludes accidents involving military-owned/special use motor vehicles. Excludes individuals medically evacuated from CENTCOM and/or hospitalized in Landstuhl, Germany within 10 days prior to death.

Medical Surveillance Monthly Report (MSMR)
Armed Forces Health Surveillance Center
11800 Tech Road, Suite 220 (MCAF-CS)
Silver Spring, MD 20904

THE MEDICAL SURVEILLANCE MONTHLY REPORT (MSMR), in continuous publication since 1995, is produced by the Armed Forces Health Surveillance Center (AFHSC). The *MSMR* provides evidence-based estimates of the incidence, distribution, impact and trends of illness and injuries among United States military members and associated populations. Most reports in the *MSMR* are based on summaries of medical administrative data that are routinely provided to the AFHSC and integrated into the Defense Medical Surveillance System for health surveillance purposes.

All previous issues of the *MSMR* are available online at www.afhsc.mil. Subscriptions (electronic and hard copy) may be requested online at www.afhsc.mil/msmrSubscribe or by contacting AFHSC at (301) 319-3240. E-mail: msmr.afhsc@amedd.army.mil

Submissions: Instructions to authors are available at www.afhsc.mil/msmr.

ISSN 2158-0111 (print)
ISSN 2152-8217 (online)