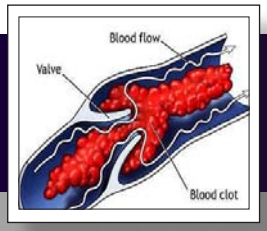
VOL. 16 • NO. 08
AUGUST 2009

MSMR

A publication of the Armed Forces Health Surveillance Center



MEDICAL SURVEILLANCE MONTHLY REPORT

INSIDE THIS ISSUE:

Summary tables and figures

Read the MSMR online at: http://www.afhsc.mil

Updates: Routine Screening for Antibodies to HIV-1, Civilian Applicants for U.S. Military Service and U.S. Armed Forces, Active and Reserve Components

Since October 1985, the U.S. military has conducted routine screening for antibodies to HIV-1 among civilian applicants for U.S. military service. Since 1986, all members of the active and reserve components of the U.S. Armed Forces have been periodically screened for antibodies to HIV-1. This report summarizes prevalences and trends of HIV-1 antibody seropositivity among civilian applicants for military service who have been screened since 1990. It also summarizes incident (first time per individual) diagnoses of HIV-1 antibody seropositivity among members of the active and reserve components of the Services.

Methods:

Among civilian applicants for U.S. military service and U.S. service members, prevalences of HIV-1 antibody seropositivity were assessed by matching specimen numbers and serologic test results to the personal identifiers of individuals who provided the specimens. Data for civilian applicants for U.S. military service and U.S. Army members were accessed from records routinely maintained in the Defense Medical Surveillance System. Data for the U.S. Air Force and U.S. Navy/Marine Corps were provided by the Air Force and Navy, respectively,

For summary purposes, an incident diagnosis of HIV-1 antibody seropositivity was defined as two "positive" results from serologic testing of two different specimens from the same individual (or one "positive" result from serologic testing of the last specimen provided by an individual). Annual prevalences of HIV-1 seropositivity among civilian applicants for service were calculated by dividing the number of applicants identified as HIV-1 antibody seropositive by the number of applicants tested each year. For calendar year summaries of routine screening of U.S. service members, denominators were the numbers of individuals in each component or Service who were tested at least once during each year of interest.

Results:

Civilian applicants for U.S. Military service

During the 18-month period from January 2008 to June 2009, 610,277 tests for antibodies to HIV-1 were conducted among 534,617 civilian applicants for military service. During the period, 256 applicants were detected with antibodies to HIV-1 (seroprevalence: 0.48 per 1,000 tested) **(Table 1)**.

Among civilian applicants overall, annual prevalences of HIV-1 antibody seropositivity steadily increased from 2003 (0.35 per 1000) to 2008 (0.51 per 1000). Since 2003, seroprevalences increased by 57% among males but were stable among females **(Table 1, Figure 1)**.

Among male applicants, the seroprevalence in 2008 (0.58 per 1000) was higher than in any year since 1995. Among female applicants, the seroprevalence in 2008 (0.24 per 1000) continued a stable trend since 1996 **(Table 1, Figure 1)**.

As in the past, in 2008, the seroprevalence was sharply higher among applicants who were Black non-Hispanic (2.19 per 1,000) than White non-Hispanic (0.20 per 1,000) or Hispanic/other (0.26 per 1,000) racial/ethnic identities **(Table 2, Figure 2)**.

U.S. Army

Active component: During the 18-month period from January 2008 through June 2009, 702,713 tests for antibodies to HIV-1 were conducted among 610,211 soldiers in the active component of the U.S. Army. During the period, 139 soldiers (0.23 per 1,000 persons tested) were detected with antibodies to HIV-1 **(Table 3)**.

During calendar year 2008, 91 soldiers were detected with antibodies to HIV-1. The overall prevalence of seropositivity was 0.24 per 1,000 soldiers tested; on average, one new HIV-1 infected soldier was detected per 5,008 screening tests **(Table 3)**.

During the 1990s, overall prevalences of HIV-1 seropositivity among active component soldiers declined by 50% (from 0.36 to 0.17 per 1,000); and from 2000 through 2007, seroprevalences were stable. However, in 2008, there were more incident diagnoses of HIV-1 infection and a higher prevalence of HIV-1 antibody seropositivity than in any year since 1994 — the increases in the number and prevalence of seropositive individuals overall were entirely attributable to increases among men. In 2008, the prevalence of HIV-1 antibody seropositivity among female soldiers was lower than in any year (except 2004) since 1990 **(Table 3, Figure 3)**.

Of the 1,524 active component soldiers diagnosed with HIV-1 infections since 1990, 405 (26.6%) remain in service **(Table 3, Figure 3)**.

Army National Guard: During the 18-month period from January 2008 through June 2009, 293,511 tests for antibodies to HIV-1 were conducted among 262,351 members of the U.S. Army National Guard. During the period, 67 soldiers (0.26 per 1,000 persons tested) were detected with antibodies to HIV-1 **(Table 4)**.

During 2008, there were 38 incident diagnoses of HIV-1 infection among National Guard soldiers. The overall prevalence of seropositivity was 0.23 per 1,000 soldiers tested. The annual prevalence in 2008 was consistent with annual prevalences (which have been fairly stable) since 2003. During the year, there were no incident diagnoses of HIV-1 infection among female members of the Army National Guard **(Table 4, Figure 4)**.

In 2008, on average, one new HIV-1 infected soldier was detected per 4,853 screening tests. Of 788 National Guard soldiers diagnosed with HIV-1 infection since 1990, 144 (18.3%) remain in military service **(Table 4)**.

Army Reserve: During the 18-month period from January 2008 through June 2009, 130,715 tests for antibodies to HIV-1 were conducted among 118,714 soldiers in the U.S. Army Reserve. During the period, 51 soldiers (0.43 per 1,000 tested) were detected with antibodies to HIV-1 **(Table 5)**.

During calendar year 2008, there were 36 incident diagnoses of HIV-1 infection among U.S. Army Reserve soldiers; the overall seropositivity was 0.48 per 1,000 soldiers tested. In 2008, on average, one new HIV-1 infected soldier was detected per 2,356 screening tests **(Table 5)**. Of 676 Reservists diagnosed with HIV-1 since 1990, 161 (23.8%) remain in service **(Table 5, Figure 5)**.

Data summaries by Tannya Martin, Data Analysis Group, Armed Forces Health Surveillance Center.

U.S. Air Force

Active component: From January 2008 through June 2009, 360,740 tests for antibodies to HIV-1 were conducted among 330,794 members of the active component of the U.S. Air Force. During the period, 56 airmen (0.17 per 1,000 tested) were detected with antibodies to HIV-1. On average, one new HIV-1 infection was detected per 6,442 screening tests **(Table 6).**

The seroprevalence among active component airmen tested in 2008 was slightly lower than in 2007 and generally similar to annual prevalences since 1997. Of note, there has not been an incident diagnosis of HIV-1 infection among a female active component Air Force member since 2006 **(Table 6).**

Air National Guard: From January 2008 through June 2009, 30,444 tests for antibodies to HIV-1 were conducted among 28,025 members of the Air National Guard. During the period, four airmen (0.14 per 1,000 tested) were detected with antibodies to HIV-1. No female Air National Guard member has been diagnosed with HIV-1 infection since 2007 (and only two since 1996) **(Table 7).**

The overall prevalence in 2008 was lower than in any year since 2001. On average, in 2008, one new HIV-1 infection was detected per 10,304 screening tests of Air National Guard members **(Table 7).**

Air Force Reserve: From January 2008 through June 2009, 35,521 tests for antibodies to HIV-1 were conducted among 33,340 members of the U.S. Air Force Reserve. During the period, eight airmen (0.24 per 1,000 tested) were detected with antibodies to HIV-1. On average, in 2008, one new HIV-1 infection was detected per 5,891 screening tests **(Table 8).** The seroprevalence among those tested in 2008 was relatively low compared to recent prior years **(Table 8).**

Data summaries for the U.S. Air Force provided by Donna J. Foxx, Capt, USAF, BSC.

U.S. Navy

Active duty: In 2008, 87 sailors on active duty in the U.S. Navy (0.36 per 1,000 tested) were newly detected with antibodies to HIV-1 **(Table 9).** The prevalence of seropositivity in 2008 continued a trend of generally increasing prevalences since 1999 **(Table 9).**

U.S. Marine Corps

Active duty: In 2008, 16 active duty members of the U.S. Marine Corps (0.14 per 1,000 tested) were newly detected with antibodies to HIV-1 **(Table 10).** The prevalence of seropositivity in 2008 was similar to annual prevalences in recent prior years **(Table 10).**

Data summaries for the U.S. Navy and Marine Corps provided by Adam W. Armstrong, CDR, MC, USN.

Editorial comment:

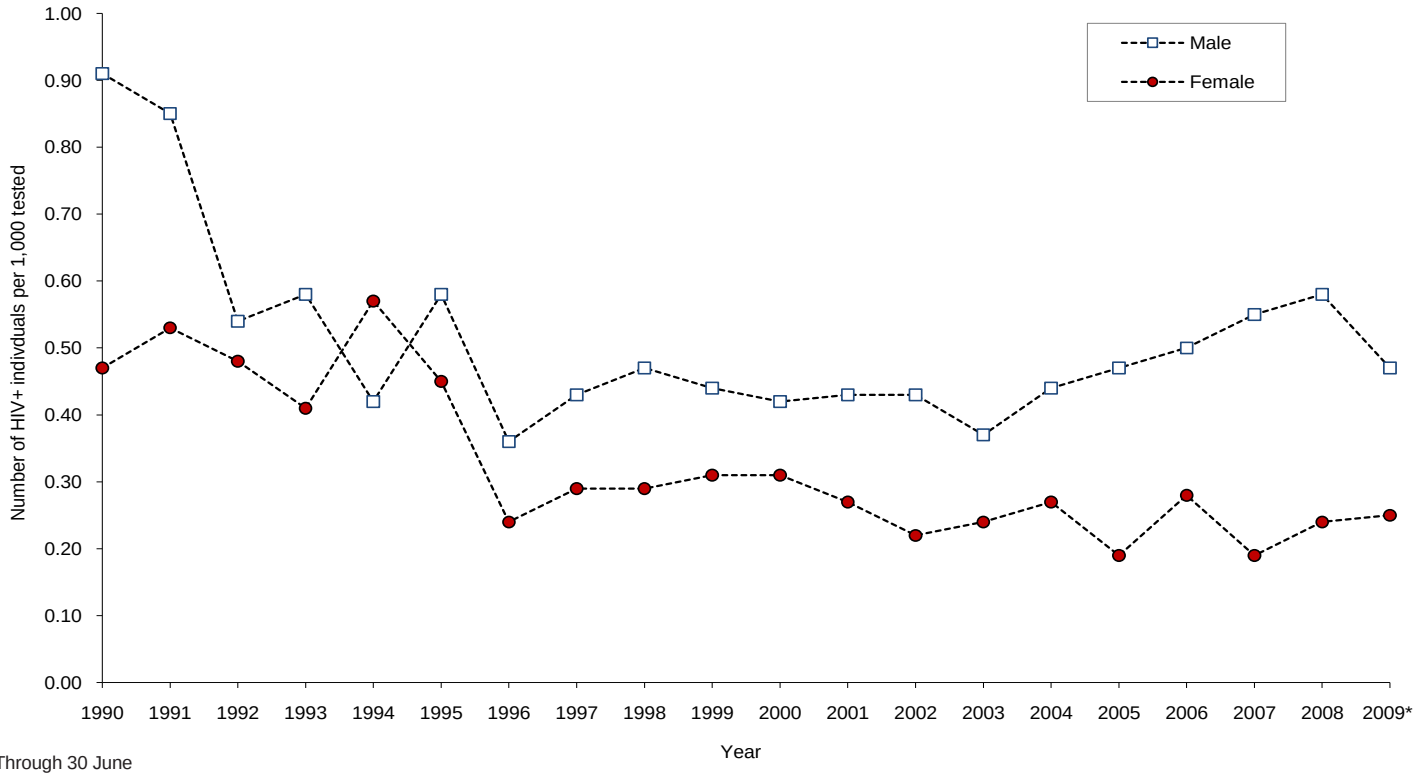
The U.S. military began routine screening for antibodies to HIV-1 among civilian applicants for all military Services in October 1985. Routine periodic screening of all members of all components of the Services began shortly thereafter. During the "first rounds" of HIV-1 antibody testing in the Services, detections of "new" infections were relatively

frequent because most service members had not previously been tested; in turn, both longstanding (prevalent) and recently acquired (incident) infections were subject to detection through routine screening. By 1990, nearly all service members had been tested at least once — as civilian applicants for military service and/or while serving in the military. As a result, routine periodic screening detected infections that had been acquired since the last negative test (incident infections).

Results of routine, periodic screening for HIV-1 in dynamic (i.e., continuously changing) military populations must be interpreted cautiously; in particular, comparisons of seropositivity from year to year across Services and components can be misleading. For example, prevalences of seropositivity in repeatedly screened populations depend not only on rates at which new infections are acquired but also on testing frequencies. Even if rates of acquisition of HIV-1 infections (infection incidence rates) were identical in two serially tested populations, prevalences of seropositivity would be different if the intervals between testing rounds were not the same (because the longer the interval, the more undetected infections accumulate between testing rounds). Thus, for example, increases or declines in observed seroprevalences during routine periodic screening could reflect changes in rates of infection acquisition and/or decreases or increases, respectively, in test intervals. In turn, differences in observed seroprevalences across Services or components could reflect differences in rates of infection acquisition and/or differences in testing policies and practices.

With the above caveats in mind, the monitoring of results and trends of HIV-1 seroprevalences in various military populations can help target and focus prevention initiatives. The results presented here suggest that, in general, prevalences of HIV-1 infection among civilian applicants for military service and among active and reserve component members of the services are relatively low, particularly among females.

Figure 1. Diagnoses of HIV-1 infections by gender, civilian applicants for U.S. military service, January 1990-June 2009



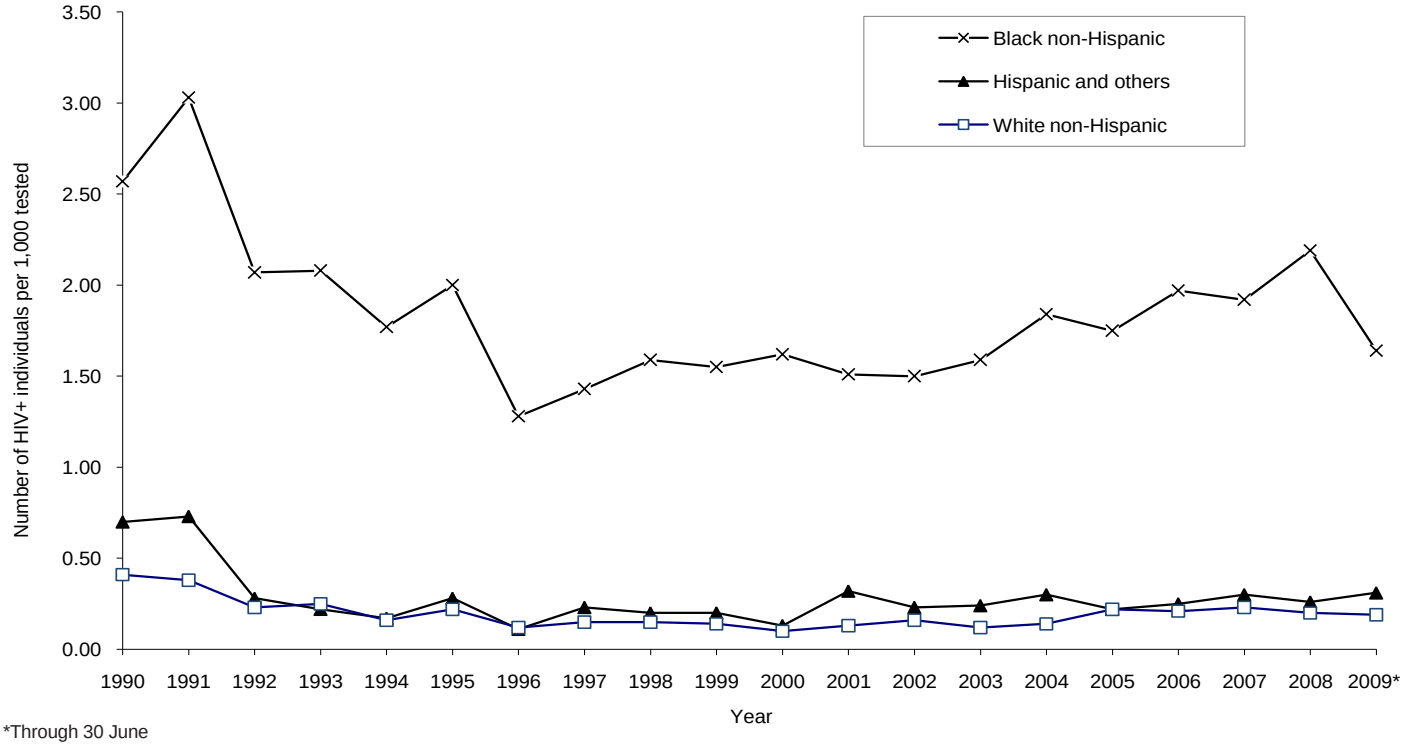
*Through 30 June

Table 1. Diagnoses of HIV-1 infections by gender, civilian applicants for U.S. military service, January 1990-June 2009

Year	Total HIV tests	Total persons tested	Male tested	Female tested	Total HIV-1(+)	HIV-1(+) Male	HIV-1(+) Female	Overall rate per 1000 tested	Male rate per 1000 tested	Female rate per 1000 tested
1990	461,866	424,111	357,853	66,258	356	325	31	0.84	0.91	0.47
1991	435,117	394,555	335,994	58,561	317	286	31	0.80	0.85	0.53
1992	387,843	348,082	285,474	62,608	185	155	30	0.53	0.54	0.48
1993	360,998	318,133	259,770	58,363	174	150	24	0.55	0.58	0.41
1994	329,012	288,069	229,675	58,394	130	97	33	0.45	0.42	0.57
1995	294,954	245,671	194,927	50,744	136	113	23	0.55	0.58	0.45
1996	327,396	277,381	218,297	59,084	94	80	14	0.34	0.36	0.24
1997	356,389	309,739	245,471	64,268	126	108	18	0.41	0.43	0.29
1998	336,566	292,653	229,702	62,951	126	108	18	0.43	0.47	0.29
1999	363,327	314,519	246,756	67,763	130	109	21	0.41	0.44	0.31
2000	388,946	337,984	263,878	74,106	134	111	23	0.40	0.42	0.31
2001	413,130	352,899	278,510	74,389	140	120	20	0.40	0.43	0.27
2002	415,046	361,584	284,028	77,556	139	122	17	0.38	0.43	0.22
2003	361,566	316,504	253,764	62,740	110	95	15	0.35	0.37	0.24
2004	307,229	264,977	212,811	52,166	107	93	14	0.40	0.44	0.27
2005	319,131	268,720	215,748	52,972	111	101	10	0.41	0.47	0.19
2006	353,907	301,869	241,316	60,553	137	120	17	0.45	0.50	0.28
2007	350,371	299,365	240,767	58,598	143	132	11	0.48	0.55	0.19
2008	400,505	349,711	283,021	66,690	180	164	16	0.51	0.58	0.24
2009*	209,772	184,906	149,925	34,981	76	68	8	0.41	0.47	0.25
Total	**7,173,071**	**6,251,432**	**5,027,719**	**1,223,713**	**3,051**	**2,657**	**394**	**0.49**	**0.53**	**0.32**

*Through 30 June

Figure 2. Diagnoses of HIV-1 infections by race/ethnicity, civilian applicants for U.S. military service, January 1990-June 2009



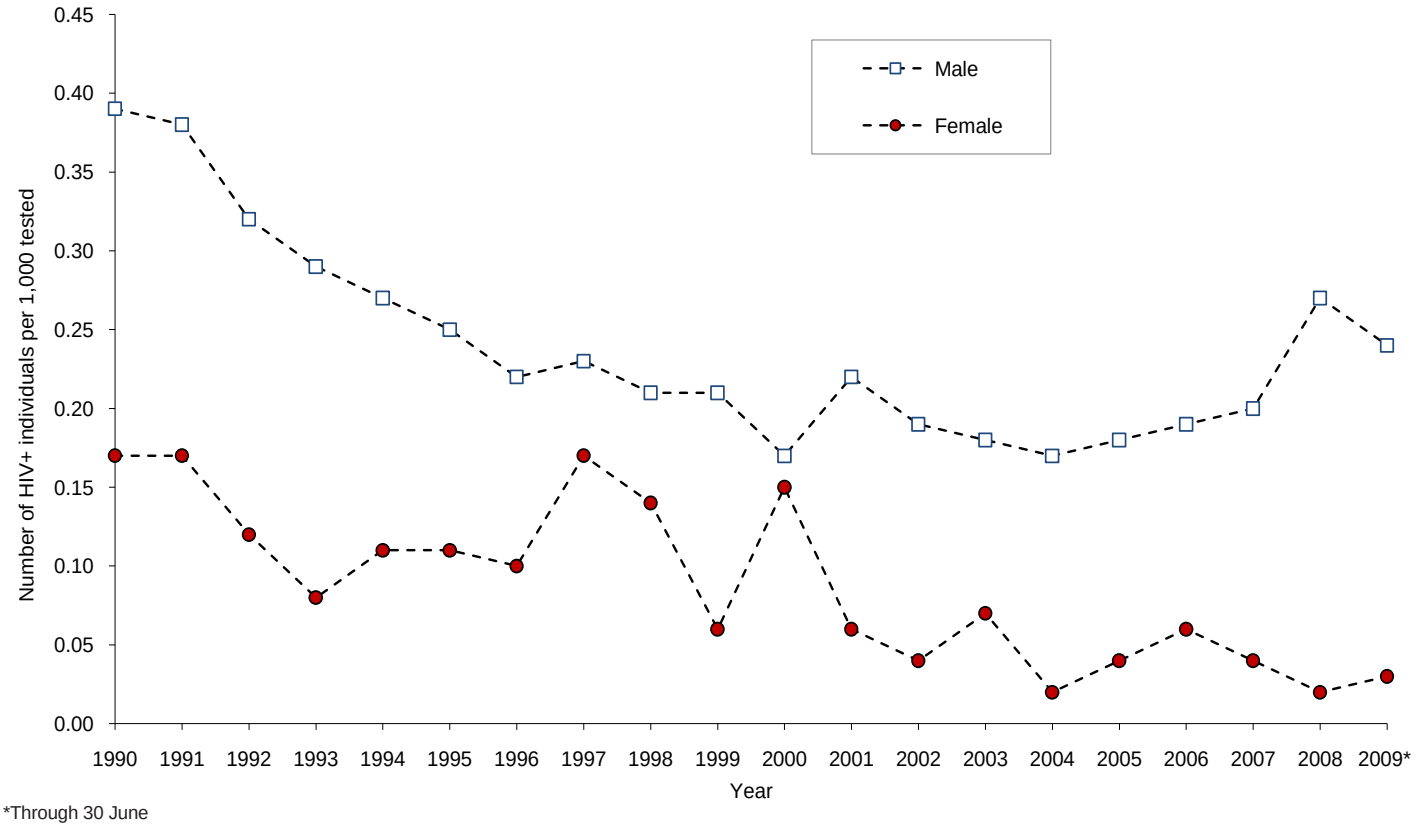
*Through 30 June

Table 2. Diagnoses of HIV-1 infections by race/ethnicity, civilian applicants for U.S. military service, January 1990-June 2009

Year	Total HIV tests	Total persons tested	White non-hispanic tested	Black non-hispanic tested	Hispanic and others tested	Total HIV-1(+)	White non-hispanic HIV-1(+)	Black non-hispanic HIV-1(+)	Hispanic and others HIV-1(+)	Overall rate per 1000 tested	White non-hispanic rate per 1000 tested	Black non-hispanic rate per 1000 tested	Hispanic and others rate per 1000 tested
1990	461,866	424,111	302,219	77,862	44,030	356	125	200	31	0.84	0.41	2.57	0.70
1991	435,117	394,555	296,500	57,113	40,942	317	114	173	30	0.80	0.38	3.03	0.73
1992	387,843	348,082	251,564	56,625	39,893	185	57	117	11	0.53	0.23	2.07	0.28
1993	360,998	318,133	228,723	52,319	37,091	174	57	109	8	0.55	0.25	2.08	0.22
1994	329,012	288,069	193,197	52,679	42,193	130	30	93	7	0.45	0.16	1.77	0.17
1995	294,954	245,671	161,464	44,593	39,614	136	36	89	11	0.55	0.22	2.00	0.28
1996	327,396	277,381	181,388	52,263	43,730	94	22	67	5	0.34	0.12	1.28	0.11
1997	356,389	309,739	194,304	57,886	57,549	126	30	83	13	0.41	0.15	1.43	0.23
1998	336,566	292,653	187,780	54,622	50,251	126	29	87	10	0.43	0.15	1.59	0.20
1999	363,327	314,519	206,118	58,769	49,632	130	29	91	10	0.41	0.14	1.55	0.20
2000	388,946	337,984	220,537	64,259	53,188	134	23	104	7	0.40	0.10	1.62	0.13
2001	413,130	352,899	238,702	60,299	53,898	140	32	91	17	0.40	0.13	1.51	0.32
2002	415,046	361,584	247,689	57,387	56,508	139	40	86	13	0.38	0.16	1.50	0.23
2003	361,566	316,504	218,716	44,622	53,166	110	26	71	13	0.35	0.12	1.59	0.24
2004	307,229	264,977	179,346	35,929	49,702	107	26	66	15	0.40	0.14	1.84	0.30
2005	319,131	268,720	184,711	33,691	50,318	111	41	59	11	0.41	0.22	1.75	0.22
2006	353,907	301,869	208,769	40,533	52,567	137	44	80	13	0.45	0.21	1.97	0.25
2007	350,371	299,365	204,837	41,675	52,853	143	47	80	16	0.48	0.23	1.92	0.31
2008	400,505	349,711	238,190	53,456	57,975	180	48	117	15	0.51	0.20	2.19	0.26
2009*	209,772	184,906	115,873	24,415	44,618	76	22	40	14	0.41	0.19	1.63	0.32
Total	**7,173,071**	**6,251,432**	**4,260,627**	**1,021,087**	**969,718**	**3,051**	**878**	**1,903**	**27**	**0.49**	**0.21**	**1.86**	**0.28**

*Through 30 June

Figure 3. Diagnoses of HIV-1 infection, by gender, active component, U.S. Army, January 1990-June 2009



*Through 30 June

Table 3. Diagnoses of HIV-1 antibody seropositivity, by gender, active component, U.S. Army, January 1990-June 2009

Year	Total HIV tests	Total persons tested	Males tested	Females tested	Total new HIV-1 (+)	New HIV-1 (+) Male	New HIV-1 (+) Female	Overall rate per 1000 tested	Male rate per 1000 tested	Female rate per 1000 tested	HIV-1(+) still in AD at year 2009
1990	505,188	423,149	369,949	53,200	154	145	9	0.36	0.39	0.17	2
1991	448,792	385,831	337,378	48,453	136	128	8	0.35	0.38	0.17	3
1992	500,253	419,865	367,800	52,065	125	119	6	0.30	0.32	0.12	6
1993	447,215	364,221	316,185	48,036	95	91	4	0.26	0.29	0.08	7
1994	413,639	339,234	292,300	46,934	84	79	5	0.25	0.27	0.11	6
1995	463,508	340,352	292,869	47,483	78	73	5	0.23	0.25	0.11	12
1996	434,005	326,211	278,507	47,704	66	61	5	0.20	0.22	0.10	9
1997	427,476	312,697	264,603	48,094	69	61	8	0.22	0.23	0.17	11
1998	397,427	312,206	262,822	49,384	62	55	7	0.20	0.21	0.14	12
1999	357,705	291,948	245,264	46,684	54	51	3	0.18	0.21	0.06	7
2000	354,032	289,102	242,042	47,060	48	41	7	0.17	0.17	0.15	19
2001	385,096	311,812	261,839	49,973	61	58	3	0.20	0.22	0.06	19
2002	420,526	331,470	278,605	52,865	56	54	2	0.17	0.19	0.04	19
2003	494,780	366,069	308,700	57,369	61	57	4	0.17	0.18	0.07	25
2004	483,251	374,075	318,852	55,223	54	53	1	0.14	0.17	0.02	24
2005	439,105	349,555	297,869	51,686	57	55	2	0.16	0.18	0.04	29
2006	454,540	372,864	320,079	52,785	65	62	3	0.17	0.19	0.06	36
2007	407,836	347,176	296,766	50,410	60	58	2	0.17	0.20	0.04	40
2008	455,736	384,270	332,459	51,810	91	90	1	0.24	0.27	0.02	73
2009*	246,977	225,941	194,883	31,058	48	47	1	0.21	0.24	0.03	46
Total	**8,537,087**	**6,868,048**	**5,879,749**	**988,299**	**1,524**	**1,438**	**86**	**0.22**	**0.24**	**0.09**	**405**

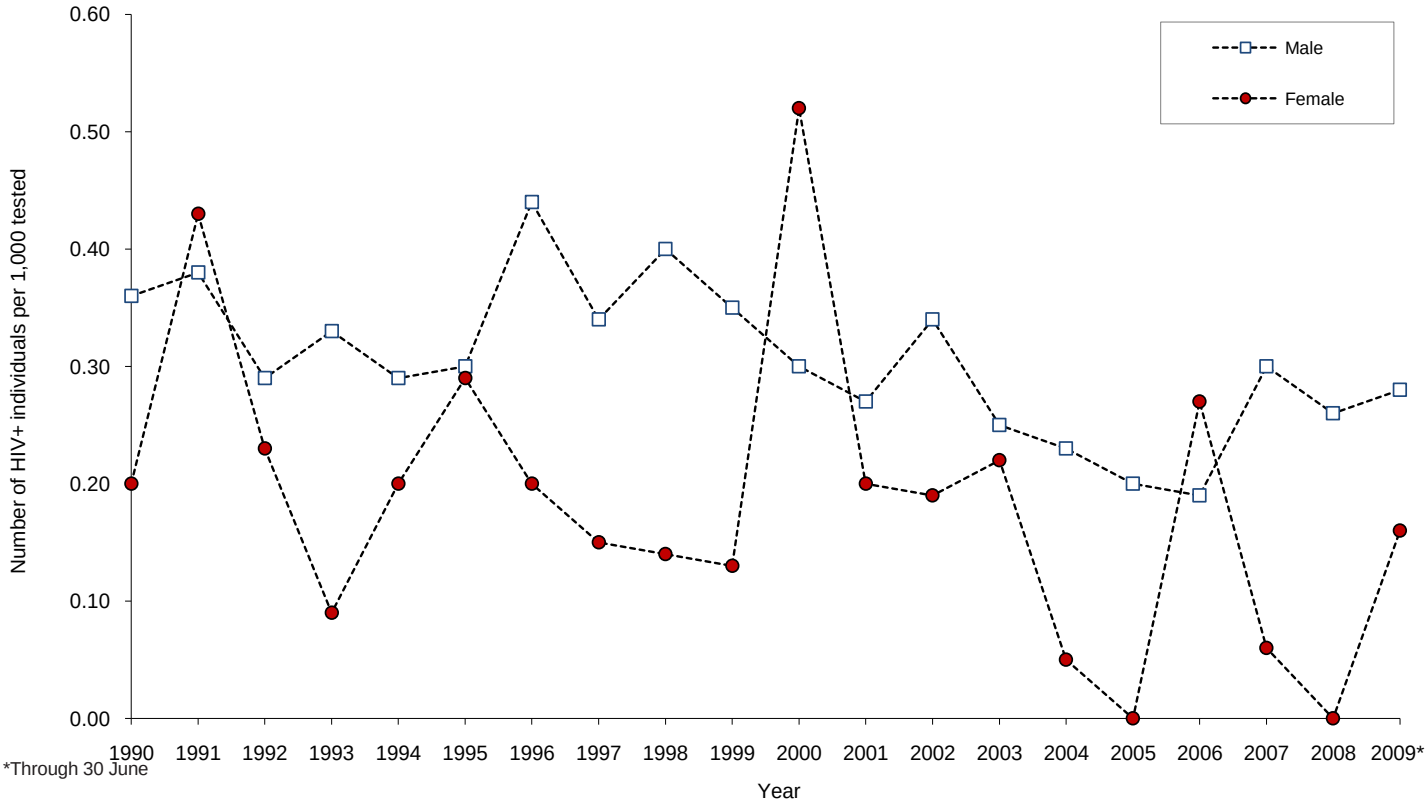
*Through 30 June

Table 4. Incident diagnoses of HIV-1 infection, by gender, Army National Guard, January 1990-June 2009

Year	Total HIV tests	Total persons tested	Males tested	Females tested	Total new HIV-1 (+)	New HIV-1 (+) Male	New HIV-1 (+) Female	Overall rate per 1000 tested	Male rate per 1000 tested	Female rate per 1000 tested	HIV-1(+) still in NG at year 2009
1990	231,024	213,778	198,714	15,064	75	72	3	0.35	0.36	0.20	0
1991	191,256	178,701	166,938	11,763	68	63	5	0.38	0.38	0.43	2
1992	252,702	235,720	218,432	17,288	68	64	4	0.29	0.29	0.23	0
1993	168,746	158,782	147,082	11,700	49	48	1	0.31	0.33	0.09	0
1994	200,001	186,369	171,688	14,681	52	49	3	0.28	0.29	0.20	0
1995	147,848	140,799	130,429	10,370	42	39	3	0.30	0.30	0.29	5
1996	65,427	61,680	56,567	5,113	26	25	1	0.42	0.44	0.20	0
1997	75,156	70,847	64,196	6,651	23	22	1	0.32	0.34	0.15	1
1998	82,246	78,156	70,817	7,339	29	28	1	0.37	0.40	0.14	1
1999	88,781	82,654	74,681	7,973	27	26	1	0.33	0.35	0.13	4
2000	78,358	73,964	66,226	7,738	24	20	4	0.32	0.30	0.52	5
2001	105,077	95,954	86,156	9,798	25	23	2	0.26	0.27	0.20	1
2002	117,033	106,358	95,674	10,684	35	33	2	0.33	0.34	0.19	2
2003	230,100	176,998	158,541	18,457	43	39	4	0.24	0.25	0.22	11
2004	217,706	175,248	156,815	18,433	37	36	1	0.21	0.23	0.05	8
2005	228,045	186,448	167,790	18,658	33	33	0	0.18	0.20	0.00	14
2006	148,786	131,300	116,436	14,864	26	22	4	0.20	0.19	0.27	14
2007	157,193	143,535	127,273	16,262	39	38	1	0.27	0.30	0.06	21
2008	184,397	164,072	144,378	19,694	38	38	0	0.23	0.26	0.00	29
2009*	109,114	98,279	85,637	12,642	29	27	2	0.30	0.28	0.16	26
Total	**3,078,996**	**2,759,642**	**2,504,504**	**255,138**	**788**	**745**	**43**	**0.29**	**0.30**	**0.17**	**144**

*Through 30 June

Figure 4. Diagnoses of HIV-1 infection, by gender, Army National Guard, January 1990-June 2009



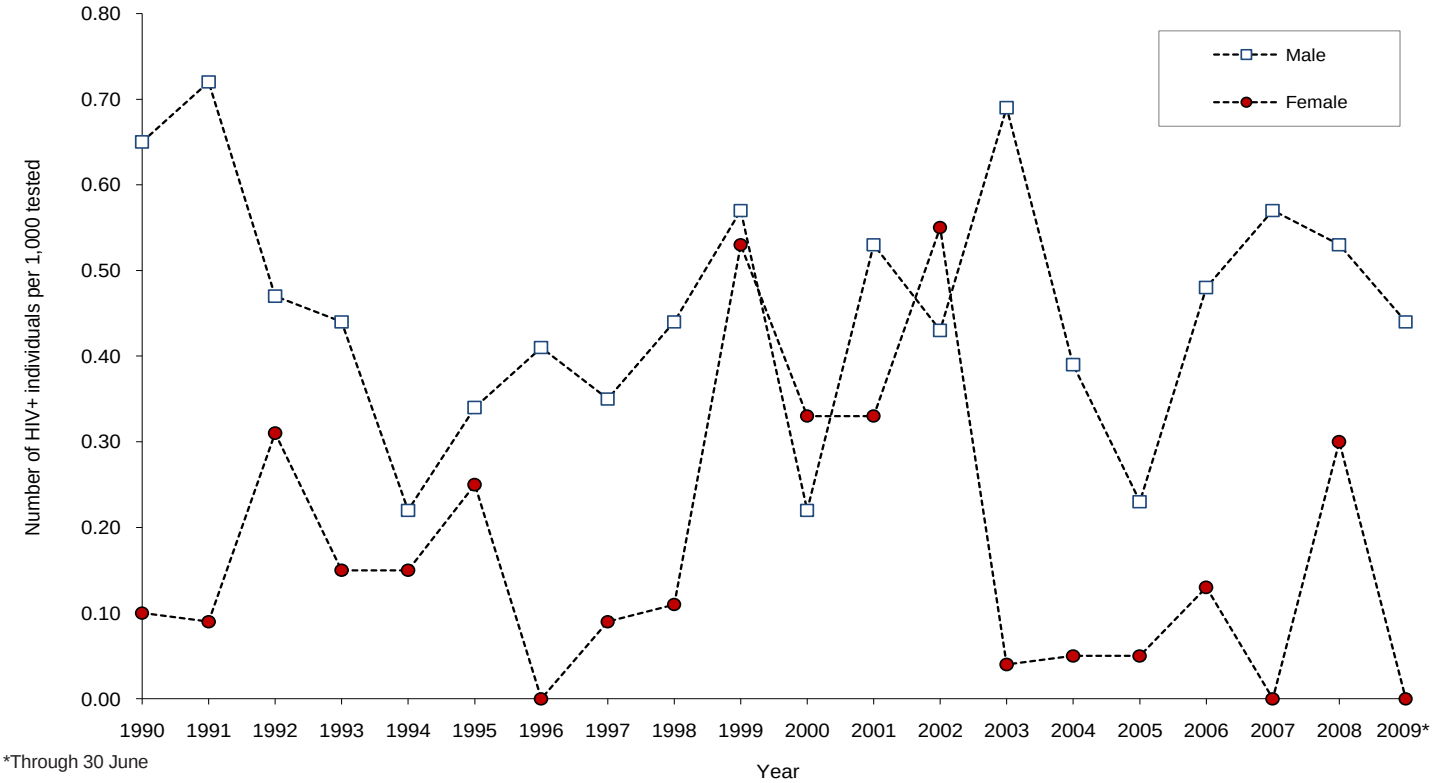
*Through 30 June

Table 5. Incident diagnoses of HIV-1 infection, by gender, Army Reserve, January 1990-June 2009

Year	Total HIV tests	Total persons tested	Males tested	Females tested	Total new HIV-1 (+)	New HIV-1 (+) Male	New HIV-1 (+) Female	Overall rate per 1000 tested	Male rate per 1000 tested	Female rate per 1000 tested	HIV-1(+) still in Reserve at year 2009
1990	176,060	153,403	122,383	31,020	83	80	3	0.54	0.65	0.10	0
1991	122,887	111,716	89,094	22,622	66	64	2	0.59	0.72	0.09	0
1992	183,681	160,624	128,013	32,611	70	60	10	0.44	0.47	0.31	1
1993	147,357	130,566	104,232	26,334	50	46	4	0.38	0.44	0.15	0
1994	137,367	123,096	97,025	26,071	25	21	4	0.20	0.22	0.15	1
1995	106,089	96,126	75,769	20,357	31	26	5	0.32	0.34	0.25	2
1996	55,326	50,295	39,311	10,984	16	16	0	0.32	0.41	0.00	0
1997	49,344	45,113	34,493	10,620	13	12	1	0.29	0.35	0.09	0
1998	41,403	38,779	29,589	9,190	14	13	1	0.36	0.44	0.11	1
1999	44,016	39,412	29,895	9,518	22	17	5	0.56	0.57	0.53	3
2000	40,187	36,707	27,578	9,129	9	6	3	0.25	0.22	0.33	4
2001	55,853	50,196	38,052	12,144	24	20	4	0.48	0.53	0.33	7
2002	63,415	56,626	43,913	12,713	26	19	7	0.46	0.43	0.55	11
2003	158,195	113,153	88,218	24,935	62	61	1	0.55	0.69	0.04	21
2004	120,308	99,421	77,715	21,706	31	30	1	0.31	0.39	0.05	8
2005	101,569	87,014	68,827	18,187	17	16	1	0.20	0.23	0.05	8
2006	82,472	71,764	56,265	15,499	29	27	2	0.40	0.48	0.13	20
2007	91,073	81,863	64,382	17,481	37	37	0	0.45	0.57	0.00	26
2008	84,815	75,542	59,039	16,503	36	31	5	0.48	0.52	0.30	33
2009*	45,900	43,172	34,110	9,062	15	15	0	0.35	0.44	0.00	15
Total	**1,907,317**	**1,664,588**	**1,307,900**	**356,688**	**676**	**617**	**59**	**0.41**	**0.47**	**0.17**	**161**

*Through 30 June

Figure 5. Diagnoses of HIV-1 infection, by gender, Army Reserve, January 1990-June 2009



*Through 30 June

Table 6. Diagnoses of HIV-1 infections, by gender, active component, U.S. Air Force, January 1996-June 2009

Year	Total HIV tests	Total persons tested*	Males tested	Females tested	Total new HIV-1 (+)	New HIV-1 (+), males	New HIV-1 (+), females	HIV-1 (+) per 1000 tested, overall	HIV-1 (+) per 1000 tested, males	HIV-1 (+) per 1000 tested, females
1996	123,922	123,801	93,143	30,385	36	34	2	0.29	0.37	0.07
1997	144,977	144,834	109,312	33,512	24	21	3	0.17	0.19	0.09
1998	179,396	178,826	134,975	39,489	34	34	0	0.19	0.25	0.00
1999	203,096	201,349	155,480	43,244	20	19	1	0.10	0.12	0.02
2000	228,590	226,224	175,157	48,578	26	24	2	0.11	0.14	0.04
2001	239,369	237,980	183,467	51,958	35	35	0	0.15	0.19	0.00
2002	258,981	257,756	198,449	56,132	38	36	2	0.15	0.18	0.04
2003	261,593	260,764	201,029	57,027	30	28	2	0.12	0.14	0.04
2004	271,384	271,297	208,618	59,835	19	18	1	0.07	0.09	0.02
2005	245,644	235,706	186,073	48,648	26	24	2	0.11	0.13	0.04
2006	251,161	228,686	182,501	46,185	34	32	2	0.15	0.18	0.04
2007	229,556	204,424	162,738	41,686	40	40	0	0.20	0.25	0.00
2008	242,203	212,257	191,413	50,790	37	37	0	0.17	0.19	0.00
2009**	118,537	118,537	95,110	23,427	19	19	0	0.16	0.20	0.00
Total	**2,998,409**	**2,902,441**	**2,277,465**	**630,896**	**418**	**401**	**17**	**0.15**	**0.19**	**0.03**

*Total persons tested includes missing genders

**Through 30 June

Table 7. Diagnoses of HIV-1 infections, by gender, Air National Guard, U.S. Air Force, January 1996-June 2009

Year	Total HIV tests	Total persons tested*	Males tested	Females tested	Total new HIV-1 (+)	New HIV-1 (+), males	New HIV-1 (+), females	HIV-1 (+) per 1000 tested, overall	HIV-1 (+) per 1000 tested, males	HIV-1 (+) per 1000 tested, females
1996	24,407	24,383	20,532	3,657	0	0	0	0.00	0.00	0.00
1997	24,473	24,454	20,137	3,494	0	0	0	0.00	0.00	0.00
1998	28,514	28,492	23,041	3,908	0	0	0	0.00	0.00	0.00
1999	28,787	28,761	23,893	4,173	0	0	0	0.00	0.00	0.00
2000	36,128	36,115	29,992	5,207	0	0	0	0.00	0.00	0.00
2001	43,087	43,075	34,180	5,882	1	1	0	0.02	0.03	0.00
2002	41,120	41,088	33,666	6,057	8	8	0	0.19	0.24	0.00
2003	41,956	41,922	34,808	6,036	7	7	0	0.17	0.20	0.00
2004	43,704	43,666	35,313	7,166	10	9	1	0.23	0.25	0.14
2005	37,999	35,643	28,903	6,093	11	11	0	0.31	0.38	0.00
2006	15,275	14,100	11,269	2,831	8	8	0	0.57	0.71	0.00
2007	15,296	14,044	11,321	2,723	2	1	1	0.14	0.09	0.37
2008	20,607	18,188	16,874	3,733	2	2	0	0.11	0.12	0.00
2009**	9,837	9,837	8,142	1,695	2	2	0	0.20	0.25	0.00
Total	**411,190**	**403,768**	**332,071**	**62,655**	**51**	**49**	**2**	**0.14**	**0.16**	**0.04**

*Total persons tested includes missing genders

**Through 30 June

Table 8. Diagnoses of HIV-1 infections, by gender, Air Force Reserve, U.S. Air Force, January 1996-June 2009

Year	Total HIV tests	Total persons tested*	Males tested	Females tested	Total new HIV-1 (+)	New HIV-1 (+), males	New HIV-1 (+), females	HIV-1 (+) per 1000 tested, overall	HIV-1 (+) per 1000 tested, males	HIV-1 (+) per 1000 tested, females
1996	16,614	16,612	12,790	3,709	1	1	0	0.06	0.08	0.00
1997	18,561	18,555	14,101	4,143	0	0	0	0.00	0.00	0.00
1998	19,027	19,003	14,346	4,141	2	2	0	0.11	0.14	0.00
1999	14,120	14,095	10,613	3,159	3	2	1	0.21	0.19	0.32
2000	13,283	13,272	10,157	2,719	0	0	0	0.00	0.00	0.00
2001	12,599	12,593	9,347	2,212	9	9	0	0.71	0.96	0.00
2002	22,452	22,432	16,989	4,440	10	10	0	0.45	0.59	0.00
2003	35,683	35,654	27,162	7,139	9	9	0	0.25	0.33	0.00
2004	31,237	31,234	23,675	6,584	6	6	0	0.19	0.25	0.00
2005	35,874	23,927	18,566	5,032	12	12	0	0.50	0.65	0.00
2006	22,982	21,432	16,746	4,686	8	8	0	0.37	0.48	0.00
2007	26,824	24,953	19,579	5,374	6	5	1	0.24	0.26	0.19
2008	23,565	21,384	18,236	5,329	4	4	0	0.19	0.22	0.00
2009**	11,956	11,956	9,299	2,657	4	4	0	0.33	0.43	0.00
Total	**304,777**	**287,102**	**221,606**	**61,324**	**74**	**72**	**2**	**0.26**	**0.33**	**0.04**

*Total persons tested includes missing genders

**Through 30 June

Table 9. Diagnoses of HIV-1 infection, U.S. Navy, 1990-2008

Year	Total new HIV-1 (+)	Overall rate per 1000 tested
1990	249	0.55
1991	186	0.50
1992	186	0.47
1993	161	0.38
1994	118	0.30
1995	87	0.23
1996	94	0.26
1997	61	0.17
1998	58	0.17
1999	57	0.16
2000	77	0.21
2001	85	0.24
2002	84	0.28
2003	87	0.29
2004	84	0.30
2005	79	0.28
2006	85	0.33
2007	75	0.32
2008	87	0.36

Table 10. Diagnoses of HIV-1 infection, U.S. Marine Corps, 1990-2008

Year	Total new HIV-1 (+)	Overall rate per 1000 tested
1990	49	0.28
1991	37	0.26
1992	29	0.20
1993	41	0.25
1994	28	0.17
1995	18	0.11
1996	22	0.14
1997	22	0.13
1998	13	0.08
1999	14	0.10
2000	23	0.16
2001	16	0.11
2002	13	0.09
2003	13	0.09
2004	18	0.15
2005	16	0.12
2006	15	0.11
2007	20	0.16
2008	16	0.14

Deep Vein Thromboembolism Among Members of Active and Reserve Components, U.S. Armed Forces, 1999-2008

Deep vein thrombosis (DVT) is the formation of a blood clot in a deep vein, usually of a lower extremity. Pain, tenderness, and the recent onset of swelling in one leg are clinical indicators of DVT. The most serious complication of DVT is pulmonary embolism, a life threatening condition.

Pulmonary embolism occurs when all or part of a blood clot in a deep vein breaks loose, travels to and through the right side of the heart, and embeds in one or more pulmonary blood vessels. If a pulmonary embolism (PE) significantly obstructs blood flow to the lungs, blood cells are unable to acquire oxygen in the lungs and deliver it to vital organs. Signs and symptoms of pulmonary embolism include the sudden onset of shortness of breath, chest pain, collapse and death. Pulmonary embolism is among the most common preventable causes of death of hospitalized patients. In the United States, DVT and PE, collectively called venous thromboembolism (VTE), cause approximately 150,000 deaths annually and 5-10% of all hospitalized deaths.[1,2]

In the general United States population, the annual incidence of VTE is estimated as 1 per 1,000 persons; over the past several decades, the incidence has remained fairly stable.[1,3] Major risk factors for VTE include active cancer, major trauma, heart disease, major surgery, neurologic disease (e.g., paralysis of lower extremities), hypercoagulable states, and prolonged periods of inactivity and immobilization; among women, risk factors include pregnancy and the puerperium, oral contraceptive use, and hormone replacement therapy. In the United States, African-Americans and Asian-Pacific Islanders have relatively high and low rates of VTE, respectively. Risk factors for VTE are relatively common among the elderly; not surprisingly, VTE incidence increases sharply with age. While many risk factors for VTE are known, the condition often affects relatively young individuals with no apparent risk factors ("idiopathic VTE"). Approximately one-fourth of individuals who present to emergency departments with PEs have no predisposing risk factors.[4,5]

In the U.S. military, VTE is a significant concern of the medical staffs that support combat operations in Afghanistan (OEF) and Iraq (OIF). OEF/OIF participants may be at increased risk of VTE after prolonged air or ground travel in confined spaces (e.g., overseas deployments, convoys in arid environments), during medical evacuations (particularly, of long duration), or when hospitalized with severe injuries (e.g., amputations, penetrating wounds, fractures, burns).[6] In 2006, Isenbarger and colleagues reported that the rate of VTE among deployed U.S. soldiers was lower than the rate in the general U.S. population and similar to the rate among nondeployed U.S. soldiers.[7] Still, from 2006 through 2008, approximately 18 incident episodes of VTE per month were diagnosed among service members who had recently returned (within 90 days) from Iraq/Afghanistan.[8] This report estimates numbers and rates of risk factor associated and idiopathic VTE among active and Reserve component members of the U.S. Armed Forces from 1999 through 2008.

Methods:

The surveillance period was 1 January 1999 through 31 December 2008. The surveillance population included all individuals who served in an active or Reserve component of the U.S. Armed Forces any time during the surveillance period. Individuals with any diagnosis of VTE prior to the start of the surveillance period were not included in the analysis.

Reports of all hospitalizations and ambulatory medical encounters were searched to identify all incident diagnoses of VTE among U.S. military members. For this analysis, an incident case of VTE was defined as either an inpatient encounter or two or more outpatient encounters (not more than 90 days apart) that included diagnoses of DVT or PE in any diagnostic position. The following ICD-9-CM codes were indicators of case-defining diagnoses:

415	Acute cor pulmonale
415.1	Pulmonary embolism and infarction
451.1	Phlebitis and thrombophlebitis, of deep vessels of lower extremities
451.11	Phlebitis and thrombophlebitis, femoral vein (deep) (superficial)
451.19	Phlebitis and thrombophlebitis, other (femoropopliteal vein, popliteal vein, tibial vein)
451.81	Phlebitis and thrombophlebitis, iliac vein
451.83	Phlebitis and thrombophlebitis, of deep veins of upper extremities
451.89	Phlebitis and thrombophlebitis, of other sites, axillary vein, jugular vein, subclavian vein
453.2	Other venous embolism and thrombosis, of vena cava
453.4	Venous embolism and thrombosis of deep vessels of lower extremity
453.41	Venous embolism and thrombosis of deep vessels of proximal lower extremity
453.42	Venous embolism and thrombosis of deep vessels of distal lower extremity
453.8	Venous embolism and thrombosis, of other specified veins

All incident cases of VTE were classified as "risk factor associated" or "idiopathic." Idiopathic cases were those that affected service members with no documentation of the following conditions in their electronic medical records (based on ICD-9-CM diagnostic and procedure codes): diagnosis/treatment of malignant neoplasm or inpatient surgical procedure within 3 months prior to the incident diagnosis of VTE; fracture of lower extremity or pelvis; crush injury of lower limb; embolism secondary to trauma; central venous instrumentation; myocardial infarction; stroke; burn; chronic obstructive pulmonary disease; venous injury; venous compression; obesity; embolic complication of pregnancy and peurperium; oral contraceptive use; hormone replacement therapy; hypercoagulable blood disorder. Cases that affected service members who returned from a major overseas deployment within one month prior to VTE diagnosis were considered "risk factor associated" because of the recent transoceanic air travel.

Incidence rate calculations were made for active component members only (since person-time at risk was not precisely known for reserve component members). All data used for analyses were derived from records maintained in the Defense Medical Surveillance System (DMSS).

Results:

During the 10-year surveillance period, there were 3,300 incident diagnoses and 64 deaths directly attributable to VTE among U.S. military members; reserve component members accounted for approximately one-fourth of both VTE cases (n=854, 25.9%) and VTE-related deaths (n=16, 25.0%). Of all VTE cases, approximately one-fourth (n=835, 25.3%) were hospitalized. Among active component members, the overall incidence rate of VTE was 17.3 per 100,000 person-years (p-yrs) **(Table 1, Figure 1).**

Of all cases, 1,518 (46.0%) were associated with known risk factors; of these, approximately one-third (n=486, 32.0%) were hospitalized **(Table 1, Figures 2,3).** Of all risk factor associated cases, 224 (14.8%) were hospitalized during or within 30 days after returning from OEF/OIF. For 125 (55.8%) of these cases, the incident diagnosis of VTE occurred during an OEF/OIF-related hospitalization; for the others, the median days between an OIF/OEF-related hospitalization and the diagnosis of VTE was 21. Among active component members, the overall incidence rate of risk factor associated VTE was 8.0 per 100,000 person-years **(Figure 1).**

More than one-half (n=1,782, 54.0%) of all VTE cases had no documented risk factors ("idiopathic"); approximately one of five idiopathic cases (n=349, 19.6%) were hospitalized **(Table 1, Figures 2,3).** Among active component members, the overall incidence rate of idiopathic VTE was 9.3 per 100,000 person-years **(Figure 1).**

Among active component members, incidence rates of hospitalized cases of VTE were fairly stable from 1999 through 2004 and then sharply increased through 2008 **(Figure 3).** In contrast, rates of ambulatory treated cases of VTE increased more than 8-fold from 1999 through 2006 and then steeply declined through 2008 **(Figure 3).**

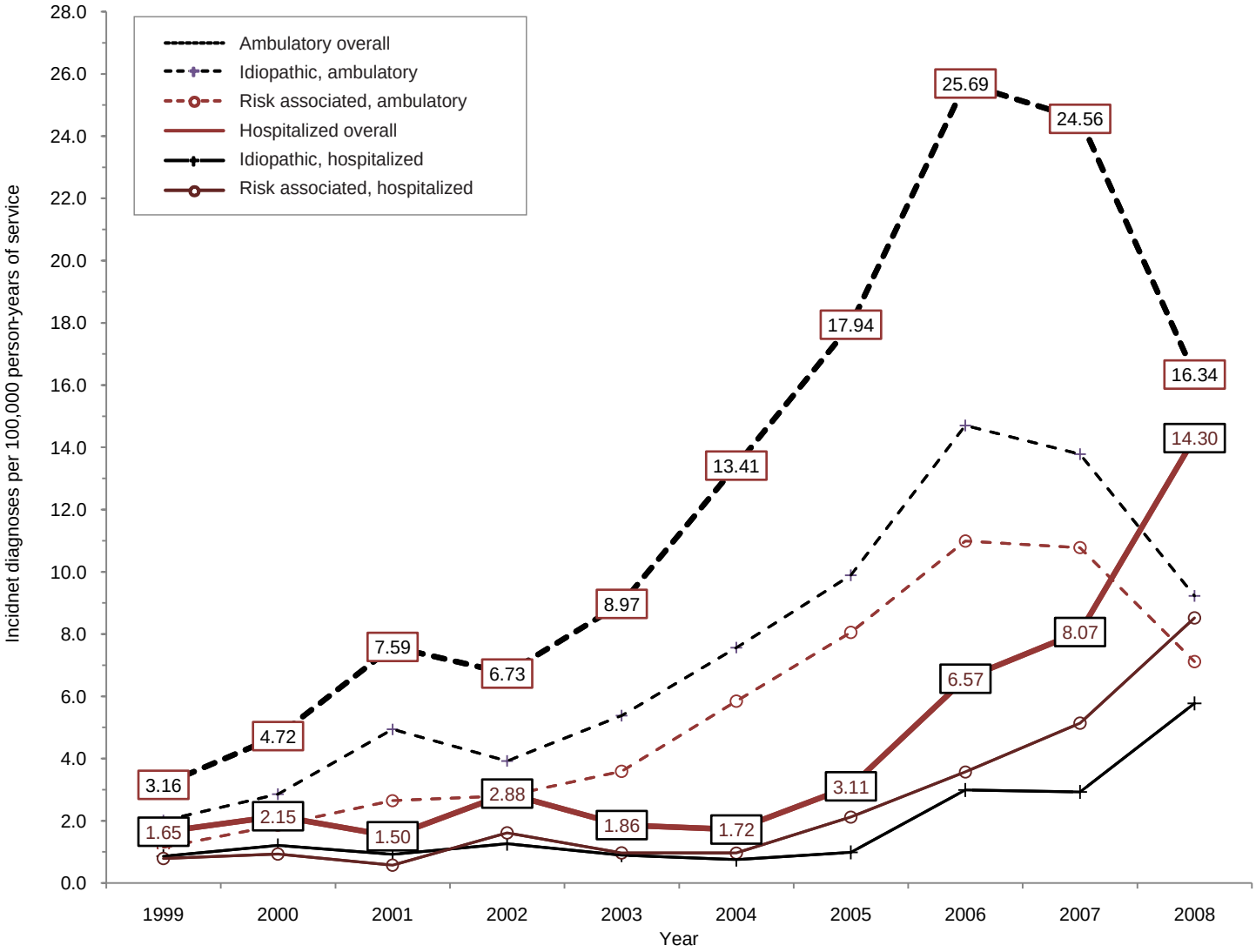
Editorial comment:

This summary documents large and persistent increases in incident diagnoses of venous thromboembolism among U.S. military members from 1999 through 2006. Because combat injuries and life saving treatments (e.g., surgeries, transcontinental air evacuations) are associated with increased risk of VTE, it is not surprising that numbers and rates of VTE increased after the beginning of widespread combat operations in Afghanistan and Iraq.

Table 1. Incident diagnoses of venous thromboembolism (VTE), among members of active and reserve components, U.S. Armed Forces, 1999-2008

		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Risk associated												
	Hospitalized	15	16	11	26	17	22	38	62	102	177	486
	Ambulatory	19	30	44	49	83	113	169	194	193	138	1,032
	Subtotal	*34*	*46*	*55*	*75*	*100*	*135*	*207*	*256*	*295*	*315*	*1,518*
Idiopathic												
	Hospitalized	16	18	15	21	13	17	19	51	65	114	349
	Ambulatory	32	52	85	84	105	147	185	284	261	198	1,433
	Subtotal	*48*	*70*	*100*	*105*	*118*	*164*	*204*	*335*	*326*	*312*	*1,782*
Total												
	Hospitalized	31	34	26	47	30	39	57	113	167	291	835
	Ambulatory	51	82	129	133	188	260	354	478	454	336	2,465
	Overall	*82*	*116*	*155*	*180*	*218*	*299*	*411*	*591*	*621*	*627*	*3,300*

Figure 1. Rate of incident diagnoses of venous thromboembolism (VTE), among active component members, U.S. Armed Forces, 1999-2008

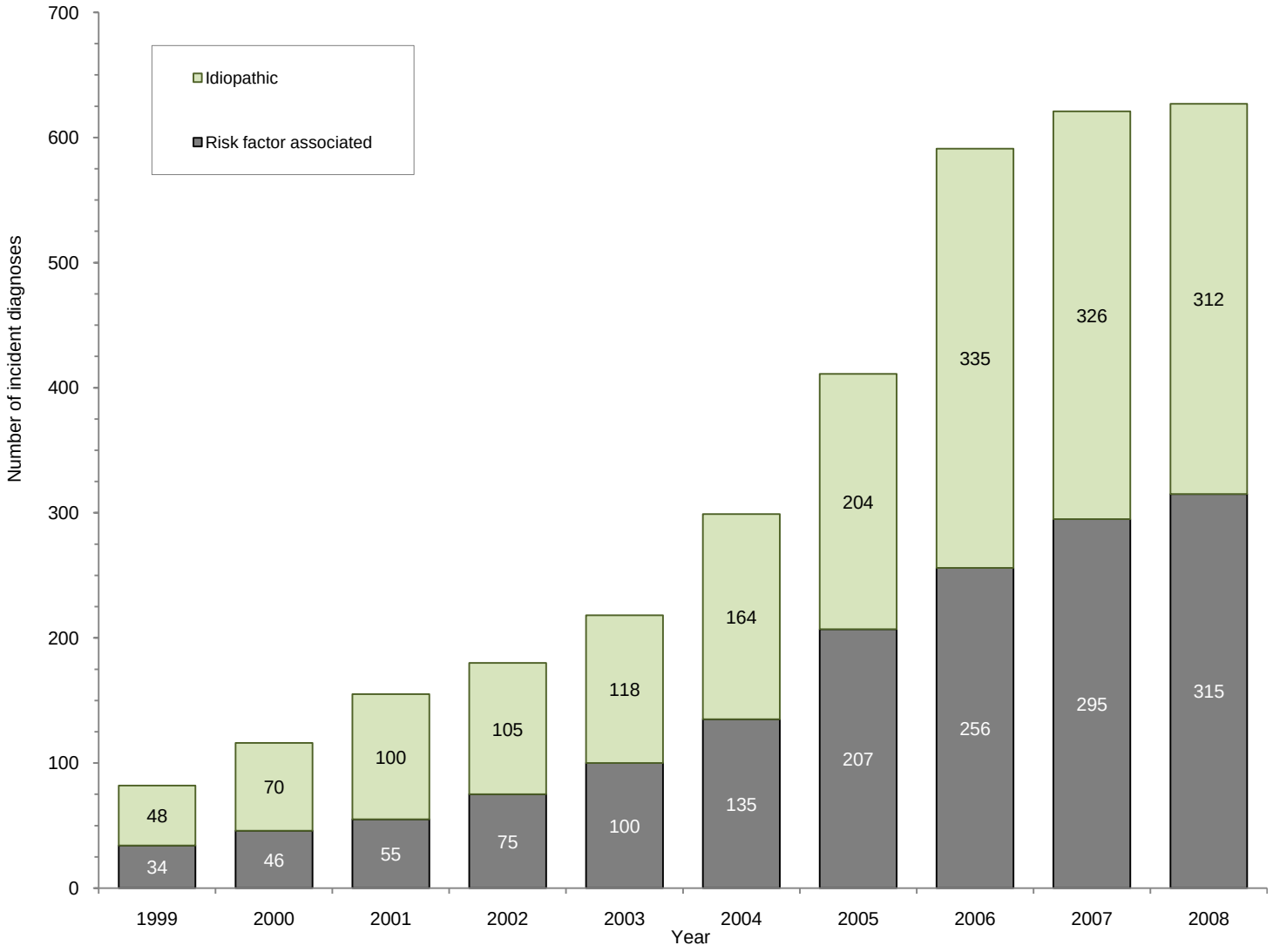


Hospitalized cases of VTE remained fairly stable from 1999 through 2004 (with a small but transient peak in 2002) but sharply increased from 2005 through 2008. Of note, risk factor associated cases began to increase in 2005, while idiopathic cases began to increase one year later. It is difficult to suggest an epidemiologic or pathophysiologic explanation for such a lag; perhaps, the lag reflects an increase in clinical awareness and case reporting that began with providers of care to the highest risk patients (e.g., combat wounded).

Non-hospitalized ("ambulatory") cases of VTE — both risk factor associated and idiopathic — increased from 1999 through 2001 (prior to the onsets of OEF or OIF) and again from 2002 through 2006. In 2007 and 2008, ambulatory cases sharply declined while hospitalized cases sharply increased. The discordance in incidence trends between ambulatory and hospitalized cases since 2006 is counterintuitive. It seems unlikely that the clinical severity of VTE cases significantly changed after 2006; perhaps, there were systemic changes in clinical sensitivity, diagnostic evaluation, case reporting, and/or clinical management of VTE cases throughout the military healthcare system.

Of note in regard to temporal changes in case reporting, in October 2004 (effective 1 January 2005), several VTE-relevant diagnoses were added to the inventory of diagnosis codes in the ICD-9-CM: 453.40: "venous embolism and thrombosis of unspecified deep vessels of lower extremity"; 453.41: "venous embolism and thrombosis of deep vessels of proximal lower extremity"; and 453.42: "venous embolism

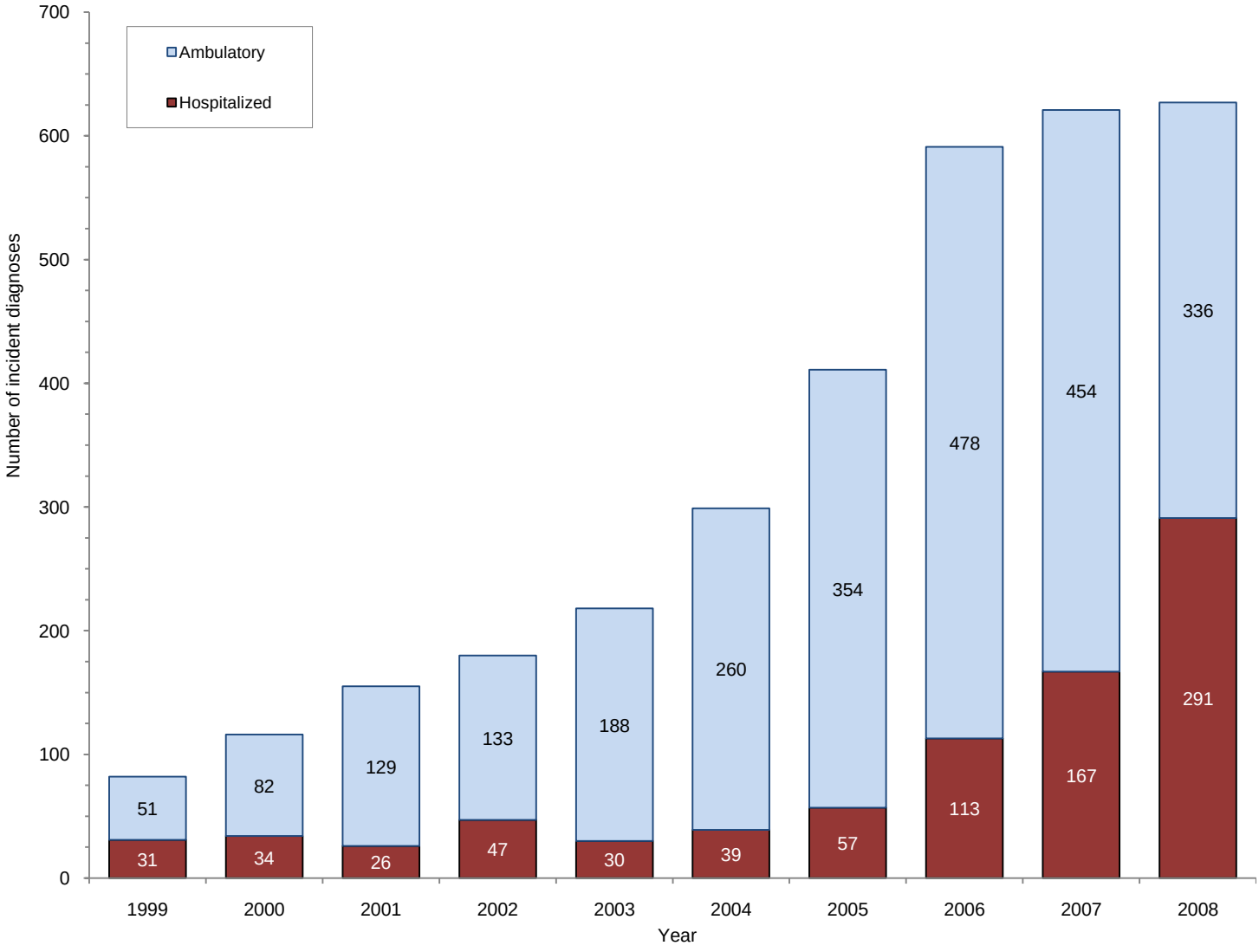
Figure 2. Incident diagnoses of "risk factor associated" and "idiopathic" venous thromboembolism, active and reserve components, U.S. Armed Forces, 1999-2008



and thrombosis of deep vessels of distal lower extremity." Previously, these conditions would likely have been coded as ICD-9-CM 453.8 "venous embolism and thrombosis, other specified veins" or 453.9 "venous embolism and thrombosis, unspecified site." Conditions reported with the latter code would not have been ascertained as cases for this analysis. Of note, on 1 October 2009, 21 new VTE-related ICD-9-CM codes will become effective; the new codes will enable the differentiation of the previous VTE-related diagnoses as "acute" or "chronic."

In addition to difficulties related to changes in diagnostic codes, there are other limitations to the analysis that should be considered when interpreting the results. For example, estimates of VTE cases, rates, and trends based on administrative records that do not include laboratory or radiographic test results, treatments, or provider notes may be unreliable — and the reliability of such estimates may change over time. In addition, there are no standard definitions of "secondary" (risk factor associated) and "idiopathic" in regard to VTE; in turn, such classifications are inherently subjective. For this analysis, there was likely significant misclassification of risk relationships in regard to prior long-haul air travel. OIF/OEF deployment was used as proxy for intercontinental air travel which, in turn, was considered a risk factor for VTE. However, other long-haul air travel of service members for military assignments or personal reasons (e.g., continental U.S. to and from Europe, Africa, Asia, Pacific Islands) were not accounted for as "risk factors." Finally, there are multiple

Figure 3. Number of hospitalized and ambulatory cases of VTE, active and reserve components, U.S. Armed Forces, 1999-2008



inherited and acquired hypercoagulability blood syndromes that are significant risk factors for VTE; these include Protein C deficiency, Protein S deficiency, Antithrombin III deficiency, Factor V Leiden disorder, Prothrombin G-A^{20210} gene variant, increased Factor XI, increased Factor VIII and hyperhomocystinemia.[4] Of these conditions, only two can be documented with specific ICD-9-CM codes: increased Factor XI and increased Factor VIII. The coding gap may be responsible for some misclassification of risk among VTE cases.

Finally, in November 2008, the U.S. Central Command (CENTCOM) Joint Theater Trauma System Clinical Practice Guideline for the prevention of deep venous thrombosis and pulmonary embolus in combat casualties was updated.[6] The guideline directs "… providers at each step in the aeromedical evacuation chain to evaluate patients for DVT prophylaxis and make adjustments in therapy as clinically appropriate. It is recommended to begin DVT prophylaxis therapy as soon as coagulopathy is corrected in patients not otherwise at increased risk of bleeding." The guideline can be reviewed at: < http://www.usaisr.amedd.army.mil/cpgs/DVTII0811.pdf >.

Data analysis, report, and comment provided by Randall Freeman, MAJ, MC, U.S. Army. Data summaries provided by Stephen Taubman, PhD, Analysis Group, Armed Forces Health Surveillance Center (AFHSC).

References:

1. Park B, Messina L, Dargon P, et al. Recent trends in clinical outcomes and resource utilization for pulmonary embolism in the United States: findings from the nationwide inpatient sample. *Chest.* 2009 Jun 12. [Epub ahead of print].
2. Lee LC, Shah K. Clinical manifestation of pulmonary embolism. *Emerg Med Clin North Am.* 2001 Nov;19(4):925-42.
3. Silverstein MD, Heit JA, Mohr DN, et al. Trends in the incidence of deep vein thrombosis and pulmonary embolism – A 25-year population-based study. *Arch Intern Med*. Mar 1998;158:585-593.
4. Heit JA. The epidemiology of venous thromboembolism in the community: implications for prevention and management. *J Thromb Thrombolysis.* 2006 Feb;21(1):23-9.
5. White RH. The epidemiology of venous thromboembolism. *Circulation*. 2003 Jun 17;107(23 Suppl 1):I4-8.
6. U.S. Army Institute of Surgical Research. Joint Theater Trauma System Clinical Practice Guidelines. No. 8, Prevention of deep venous thrombosis. Accessed on 31 August 2009 at: < http://www.usaisr.amedd.army.mil/cpgs.html >.
7. 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.
8. Armed Forces Health Surveillance Center. Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - June 2009 (data as of 23 June 2009). *Medical Surveillance Monthly Report (MSMR).* 2009 Jul;16(7):18.

Update: Deployment Health Assessments, U.S. Armed Forces, July 2009

Since January 2003, peaks and troughs in the numbers of pre- and post-deployment health assessment forms transmitted to the Armed Forces Health Surveillance Center generally corresponded to times of departure and return of large numbers of deployers. Since April 2006, numbers of post-deployment health reassessments (PDHRA) transmitted per month have ranged from 17,000 to 36,000 **(Table 1, Figure 1).**

During the past 12 months, the proportions of returned deployers who rated their health as "fair" or "poor" were 8-11% on post-deployment health assessment questionnaires and 11-14% on PDHRA questionnaires **(Figure 2).**

In general, on post-deployment assessments and reassessments, deployers in the Army and in reserve components were more likely than their respective counterparts to report health and exposure-related concerns **(Table 2, Figure 2).** Both active and reserve component members were more likely to report exposure concerns three to six months after compared to the time of return from deployment **(Figure 3).**

At the time of return from deployment, soldiers serving in the active component were the most likely of all deployers to receive mental health referrals; however, three to six months after returning, active component soldiers were less likely than Army and Marine Corps Reservists to receive mental health referrals **(Table 2).**

Finally, during the past three years, reserve component members have been more likely than active to report "exposure concerns" on post-deployment assessments and reassessments **(Figure 3).**

Table 1. Deployment-related health assessment forms, by month, U.S. Armed Forces, August 2008-July 2009

	Pre-deployment assessment DD2795		Post-deployment assessment DD2796		Post-deployment reassessment DD2900	
	No.	%	No.	%	No.	%
Total	**446,907**	**100**	**352,402**	**100**	**309,206**	**100**
2008						
August	33,839	7.6	22,849	6.5	30,130	9.7
September	39,289	8.8	33,520	9.5	25,909	8.4
October	38,677	8.7	38,066	10.8	26,327	8.5
November	28,438	6.4	37,815	10.7	23,417	7.6
December	36,779	8.2	40,364	11.5	21,466	6.9
2009						
January	42,929	9.6	31,739	9.0	25,614	8.3
February	36,392	8.1	28,303	8.0	27,595	8.9
March	37,939	8.5	23,682	6.7	30,450	9.8
April	41,205	9.2	18,465	5.2	29,828	9.6
May	34,467	7.7	27,950	7.9	24,147	7.8
June	40,749	9.1	27,989	7.9	24,198	7.8
July	36,204	8.1	21,660	6.1	20,125	6.5

Figure 2. Proportion of deployment health assessment forms with self-assessed health status as "fair" or "poor", U.S. Armed Forces, August 2008-July 2009

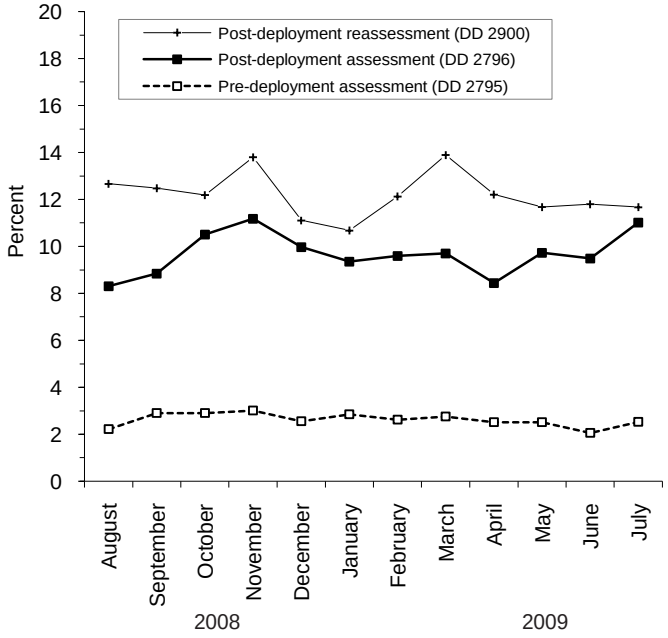


Figure 1. Total deployment health assessment and reassessment forms, by month, U.S. Armed Forces, January 2003-July 2009

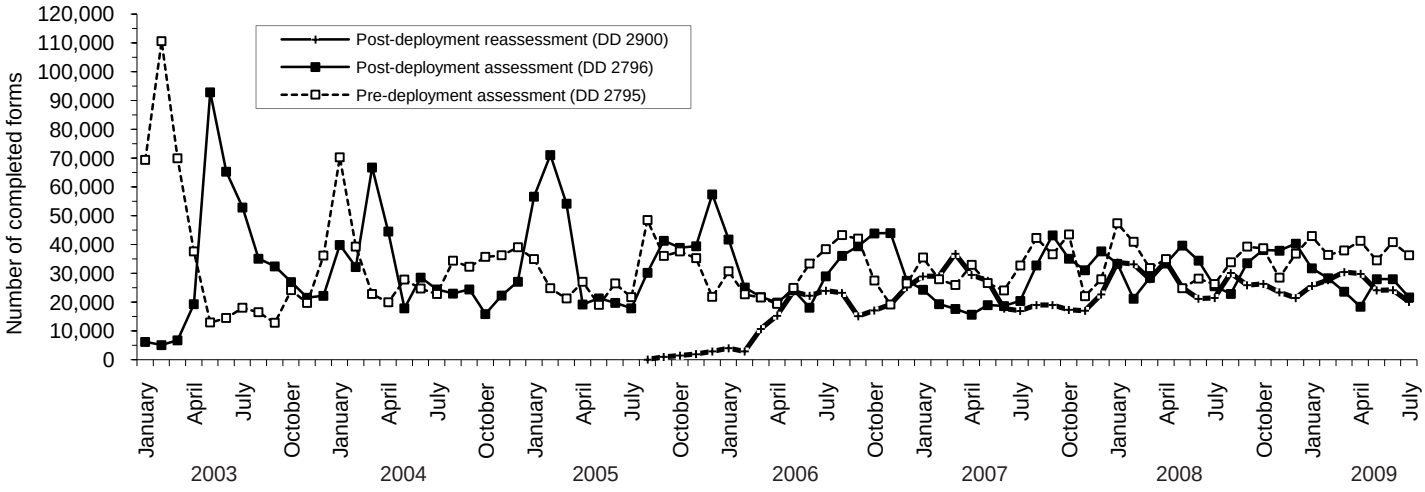


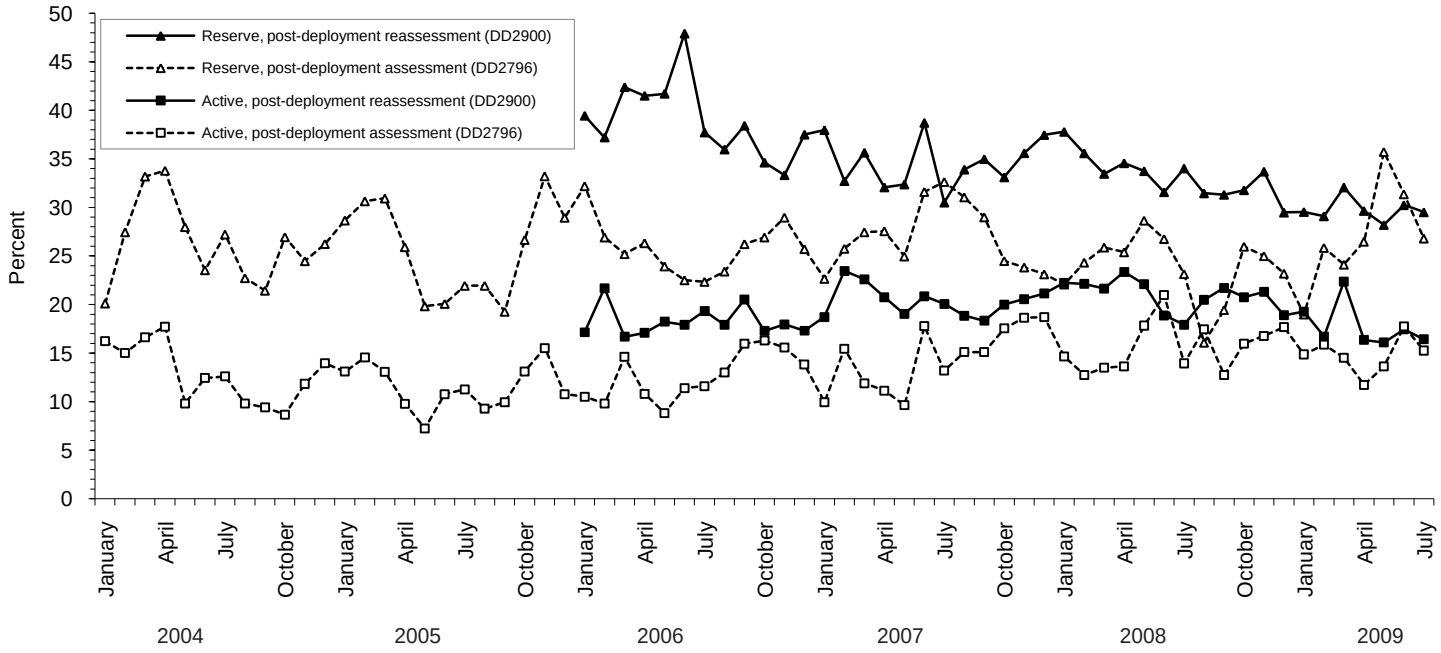
Table 2. Percentage of service members who endorsed selected questions/received referrals on health assessment forms, U.S. Armed Forces, August 2008-July 2009

	Army			Navy			Air Force			Marine Corps			All service members		
Active component	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900
	n= 155,577	n= 123,542	n= 118,833	n= 11,710	n= 12,748	n= 14,355	n= 58,616	n= 52,260	n= 52,378	n= 21,217	n= 27,771	n= 31,067	n= 247,120	n= 216,321	n= 216,633
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	4.0	11.2	14.8	1.4	4.5	6.0	0.5	3.7	4.3	1.7	6.6	9.1	2.9	8.4	10.8
Health concerns, not wound or injury	17.4	25.4	25.0	4.0	14.5	13.7	1.4	5.8	11.0	3.2	13.7	17.4	11.8	18.5	19.8
Health worse now than before deployed	na	24.8	26.3	na	12.2	13.5	na	8.9	9.1	na	14.5	18.0	na	18.9	20.1
Exposure concerns	na	16.0	20.7	na	19.2	16.3	na	10.4	15.0	na	15.3	20.0	na	14.7	18.9
PTSD symptoms (2 or more)	na	10.2	13.6	na	4.5	7.0	na	2.2	2.7	na	4.6	8.6	na	7.2	9.8
Depression symptoms (any)	na	34.0	34.1	na	22.1	24.3	na	13.8	14.6	na	26..8	30.2	na	27.5	28.2
Referral indicated by provider (any)	5.1	33.2	20.4	5.3	24.1	15.2	1.6	10.5	6.8	2.7	21.2	21.9	4.1	25.6	17.0
Mental health referral indicated*	0.9	7.1	6.4	0.6	4.1	5.9	0.5	1.1	2.0	0.3	2.4	4.5	0.8	4.9	5.1
Medical visit following referral†	93.1	99.0	95.7	86.8	87.7	90.7	77.6	96.3	97.8	66.4	73.5	79.1	89.5	93.8	92.6

	Army			Navy			Air Force			Marine Corps			All service members		
Reserve component	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassess DD2900
	n= 87,773	n= 55,902	n= 59,155	n= 3,280	n= 3,334	n= 6,174	n= 15,844	n= 15,281	n= 7,804	n= 2,022	n= 2,025	n= 5,617	n= 108,919	n= 76,542	n= 88,750
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	1.9	12.4	18.7	0.5	9.1	8.3	0.3	5.3	4.8	1.4	8.8	9.4	1.6	10.8	14.6
Health concerns, not wound or injury	14.6	34.3	46.9	2.6	29.6	29.4	0.6	9.3	14.1	3.4	19.4	32.5	12.0	28.7	38.2
Health worse now than before deployed	na	27.0	35.6	na	21.8	22.0	na	13.5	10.9	na	22.4	24.7	na	24.0	29.0
Exposure concerns	na	24.7	34.2	na	33.3	27.8	na	19.9	21.4	na	20.7	26.9	na	24.0	30.7
PTSD symptoms (2 or more)	na	9.6	22.8	na	6.1	10.3	na	2.1	2.9	na	5.9	12.9	na	7.8	17.3
Depression symptoms (any)	na	32.7	38.5	na	28.2	24.5	na	14.0	14.2	na	33.2	30.2	na	28.8	32.2
Referral indicated by provider (any)	3.7	39.4	34.3	3.9	31.3	17.8	0.7	13.5	5.5	3.3	26.0	28.8	3.3	33.5	27.0
Mental health referral indicated*	0.5	5.3	13.1	0.4	3.5	4.6	0.0	0.6	0.9	0.5	2.2	9.3	0.4	4.2	9.8
Medical visit following referral†	95.1	97.5	33.9	92.2	92.2	36.7	38.2	66.5	39.8	33.3	65.2	23.4	91.3	93.6	33.4

*Includes behavioral health, combat stress and substance abuse referrals.
†Record of inpatient or outpatient visit within 6 months after referral.

Figure 3. Proportion of service members who endorsed exposure concerns on post-deployment health assessments, U.S. Armed Forces, January 2004-July 2009



Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years through 31 July 2008 and 31 July 2009

Army

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
NORTH ATLANTIC																
Washington, DC Area	229	272	1	1	3	1	1	.	.	.	1	.	2	3	6	1
Aberdeen, MD	23	35	.	.	.	.	.	.	.	.	.	1	.	.	.	.
FT Belvoir, VA	168	171	5	4	.	.	3	2	2	.	.	.	.	.	.	.
FT Bragg, NC	976	1,121	.	4	.	.	9	11	.	.	.	.	.	2	.	.
FT Drum, NY	204	39	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Eustis, VA	445	160	1	.	.	1	1	2	.	.	.	.	.	.	1	.
FT Knox, KY	422	144	2	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Lee, VA	199	348	.	.	.	.	.	.	.	.	.	.	3	.	1	.
FT Meade, MD	199	48	.	.	1	.	.	.	1	.	.	.	.	.	.	.
West Point, NY	76	132	.	1	.	.	.	.	.	.	.	.	1	1	.	.
GREAT PLAINS																
FT Sam Houston, TX	504	673	.	1	.	3	7	2	11	.	.	.	.	1	.	2
FT Bliss, TX	339	462	.	.	.	.	7	1	.	1	.	1	.	5	.	.
FT Carson, CO	530	557	2	2	3	.	2	1	.	.	.	.	1	.	.	.
FT Hood, TX	1,415	1,457	5	7	1	.	18	12	5	8	.	.	.	.	2	.
FT Huachuca, AZ	61	71	.	.	.	.	1	.	1	.	.	.	1	.	.	.
FT Leavenworth, KS	31	45	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	371	355	1	1	2	.	1	.	1	.	1	1	1	.	1	1
FT Polk, LA	108	385	1	.	.	3	.	1	1	2	.	.	.	.	1	.
FT Riley, KS	363	383	.	1	.	.	1	2	.	.	.	.	2	.	.	.
FT Sill, OK	165	189	.	.	.	.	.	.	.	3	.	.	.	.	.	.
SOUTHEAST																
FT Gordon, GA	613	583	1	1	.	.	9	5	13	3	.	.	1	1	2	1
FT Benning, GA	267	184	1	.	1	.	5	.	1	1	.	1	.	.	.	.
FT Campbell, KY	223	330	1	.	.	.	.	.	2	.	.	.	.	.	.	.
FT Jackson, SC	181	650	.	.	.	.	.	.	.	.	.	.	1	2	.	.
FT Rucker, AL	47	39	.	7	.	.	2	1	.	.	.	.	.	.	.	.
FT Stewart, GA	488	743	3	.	1	.	9	17	1	11	1	.	7	.	.	.
WESTERN																
FT Lewis, WA	728	971	4	2	.	.	1	4	2	1	.	.	.	.	.	.
FT Irwin, CA	22	104	.	.	.	.	.	1	1	1	.	.	.	.	.	.
FT Wainwright, AK	255	148	5	.	.	.	1	.	.	.	.	.	.	.	.	.
PACIFIC																
Hawaii	494	822	25	20	1	.	11	11	3	2	1	.	4	2	.	.
Japan	34	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Korea	450	575	.	.	.	.	.	.	.	.	.	.	.	.	1	.
OTHER LOCATIONS																
Germany	797	1,175	8	11	2	1	11	8	1	1	1	1	3	1	.	1
Unknown	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**11,427**	**13,374**	**67**	**63**	**15**	**9**	**100**	**81**	**46**	**34**	**5**	**5**	**27**	**18**	**15**	**6**

*Events reported by Aug 8, 2008 and 2009

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years through 31 July 2008 and 31 July 2009

Army

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
NORTH ATLANTIC																
Washington, DC Area	11	13	1	.	83	96	18	10	6	12	.	1	.	.	15	.
Aberdeen, MD	.	.	.	.	2	27	.	4	.	2	.	.	.	.	.	.
FT Belvoir, VA	.	.	.	.	98	131	5	14	.	.	.	.	.	.	.	.
FT Bragg, NC	1	.	8	.	628	848	131	158	1	3	49	16	.	2	54	40
FT Drum, NY	3	.	.	.	146	25	14	3	.	.	.	.	.	.	.	.
FT Eustis, VA	.	.	.	.	134	128	21	22	3	.	.	.	.	.	1	.
FT Knox, KY	1	1	.	.	124	108	27	16	1	.	.	.	.	.	2	.
FT Lee, VA	2	1	1	.	130	297	48	31	.	2	.	.	.	.	3	.
FT Meade, MD	1	1	.	.	34	34	2	.	.	.	.	.	.	.	.	.
West Point, NY	27	10	.	.	19	43	.	2	.	.	.	.	.	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	.	.	.	.	186	276	54	55	17	10	.	.	1	.	4	13
FT Bliss, TX	.	.	.	.	232	209	43	33	5	5	.	.	.	.	.	.
FT Carson, CO	.	.	.	.	365	401	33	41	.	.	12	.	.	1	.	.
FT Hood, TX	.	.	.	.	1,014	931	198	215	.	5	52	122	.	.	.	11
FT Huachuca, AZ	1	.	.	.	44	50	9	3	.	.	.	.	.	.	3	1
FT Leavenworth, KS	1	2	.	.	26	37	4	3	.	1	.	.	.	.	.	1
FT Leonard Wood, MO	.	.	.	.	117	215	13	21	1	.	.	.	3	1	6	3
FT Polk, LA	.	.	.	.	72	237	24	30	1	1	.	.	.	.	7	85
FT Riley, KS	4	.	1	1	210	233	19	37	1	1	1	1	1	1	1	3
FT Sill, OK	.	.	.	.	55	112	10	15	.	.	.	.	.	.	8	18
SOUTHEAST																
FT Gordon, GA	.	.	.	.	301	357	78	60	.	.	.	.	.	.	1	4
FT Benning, GA	.	.	.	5	167	132	52	33	1	1	.	.	.	.	12	2
FT Campbell, KY	.	5	.	.	118	221	5	60	1	1	.	.	.	.	6	34
FT Jackson, SC	.	.	.	.	138	202	21	31	.	1	.	.	.	.	20	119
FT Rucker, AL	1	.	.	.	33	28	7	2	1	.	.	.	.	.	2	.
FT Stewart, GA	.	.	2	.	357	517	65	93	2	5	.	.	.	.	23	71
WESTERN																
FT Lewis, WA	.	.	2	.	576	636	58	61	1	1	12	5	.	.	.	1
FT Irwin, CA	.	.	.	.	10	69	1	1	.	1	.	.	.	.	10	3
FT Wainwright, AK	1	.	.	.	173	110	21	6	1	.	.	.	12	1	1	1
PACIFIC																
Hawaii	.	.	1	.	356	392	47	43	.	3	.	.	.	.	.	1
Japan	.	.	.	.	19	3	3	.	.	.	.	.	.	.	.	.
Korea	.	.	.	.	388	537	43	25	4	2	.	.	.	1	3	4
OTHER LOCATIONS																
Germany	21	29	9	4	462	732	108	83	7	9	.	.	8	1	4	15
Unknown	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total	**75**	**62**	**25**	**10**	**6,817**	**8,374**	**1,182**	**1,211**	**54**	**66**	**126**	**145**	**25**	**8**	**186**	**430**

‡Primary and secondary.
§Urethritis, non-gonococcal (NGU).

Sentinel reportable events for service members and beneficiaries at U.S. Air Force medical facilities, cumulative numbers* for calendar years through 31 July 2008 and 31 July 2009

Air Force

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Air Combat Cmd	1,304	1,029	3	3	5	5	11	5	4	1	4	.	29	1	4	2
Air Education & Training Cmd	600	1,187	1	3	3	3	8	13	3	2	3	3	3	3	5	3
Air Force Dist. of Washington	157	227	.	.	.	.	2	1	.	.	.	.	2	2	.	.
Air Force Materiel Cmd	495	396	2	.	1	1	5	3	4	.	2	.	.	4	.	2
Air Force Special Ops Cmd	135	112	.	1	.	.	2	1	.	.	.	.	3	.	.	.
Air Force Space Cmd	259	189	1	1	2	1	5	4	1	.	.	1	2	.	1	2
Air Mobility Cmd	674	542	1	4	2	2	7	3	2	2	.	.	4	3	8	2
Pacific Air Forces	559	535	6	2	5	2	4	3	.	.	3	.	8	4	3	3
U.S. Air Forces in Europe	364	421	1	3	.	1	1	3	.	.	.	.	4	3	1	3
U.S. Air Force Academy	15	150	.	.	.	2	.	1	.	.	.	.	.	.	.	.
Other	456	112	3	1	5	1	8	2	5	.	1	.	1	.	.	1
Total	**5,018**	**4,900**	**18**	**18**	**23**	**18**	**53**	**39**	**19**	**5**	**13**	**4**	**56**	**20**	**22**	**18**

*Events reported by Aug 8, 2009

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

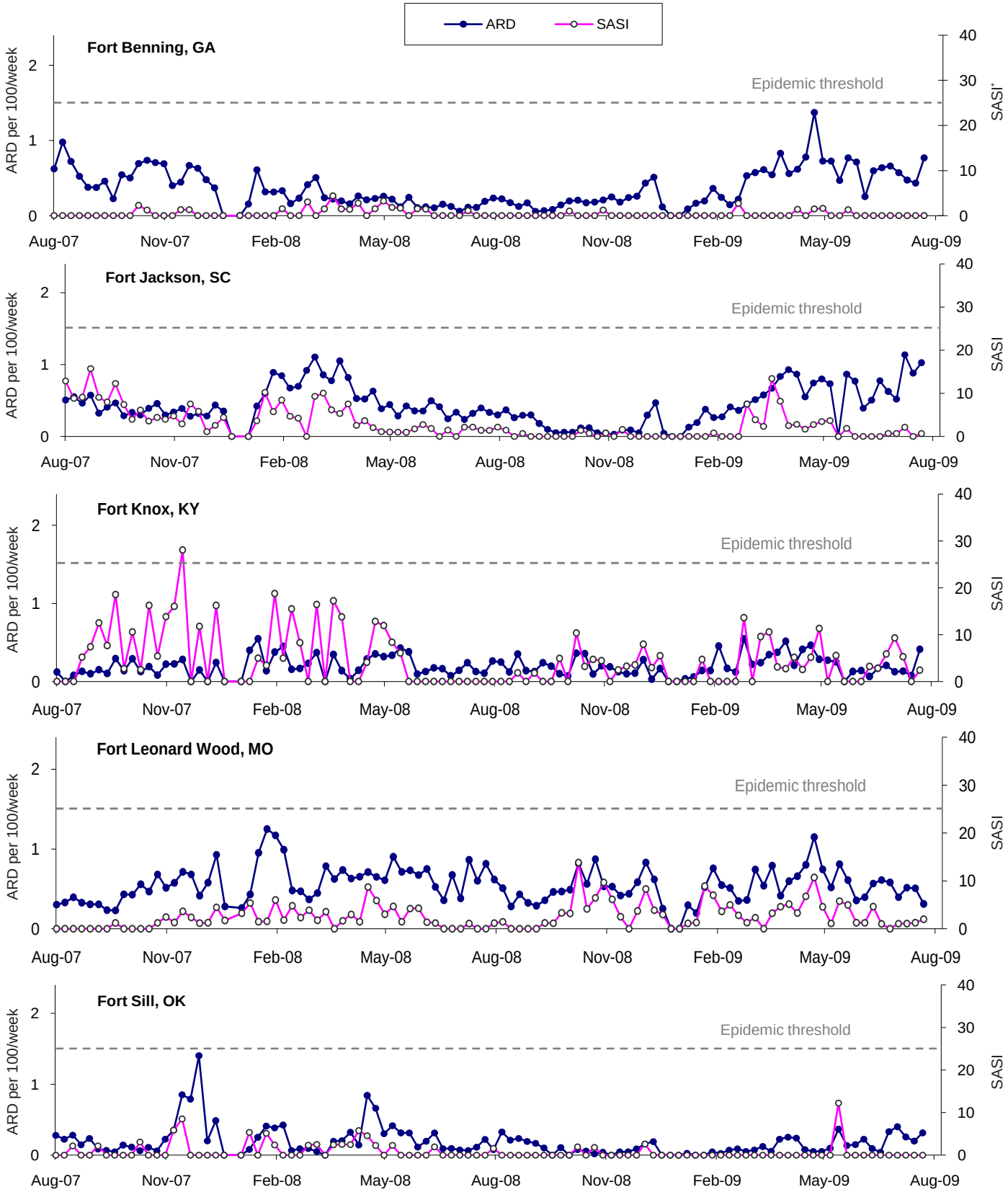
Note: Completeness and timeliness of reporting vary by facility

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Air Combat Cmd	4	6	.	.	757	669	80	59	3	3	1	.	4	4	3	7
Air Education & Training Cmd	4	3	.	2	362	686	32	71	4	3	.	.	.	.	4	3
Air Force Dist. of Washington	3	5	.	.	99	100	12	7	1	.	.	.	.	.	.	.
Air Force Materiel Cmd	9	8	1	.	287	259	47	27	3	2	.	.	.	1	.	.
Air Force Special Ops Cmd	.	1	1	.	112	84	8	2	.	1	.	.	.	1	.	.
Air Force Space Cmd	1	.	.	.	160	127	11	4	.	.	.	.	.	.	.	1
Air Mobility Cmd	11	9	.	1	423	366	47	37	2	1	.	.	4	9	5	.
Pacific Air Forces	.	.	.	1	451	214	24	18	1	2	.	.	.	10	.	6
U.S. Air Forces in Europe	8	6	3	1	287	294	21	26	.	2	.	.	.	2	.	.
U.S. Air Force Academy	1	.	.	1	13	28	.	1	.	.	.	.	1	.	.	.
Other	6	.	.	1	367	26	21	5	1	.	.	.	.	1	1	13
Total	**47**	**38**	**5**	**7**	**3,318**	**2,853**	**303**	**257**	**15**	**14**	**1**	**0**	**9**	**28**	**13**	**30**

‡Primary and secondary.

§Urethritis, non-gonococcal (NGU).

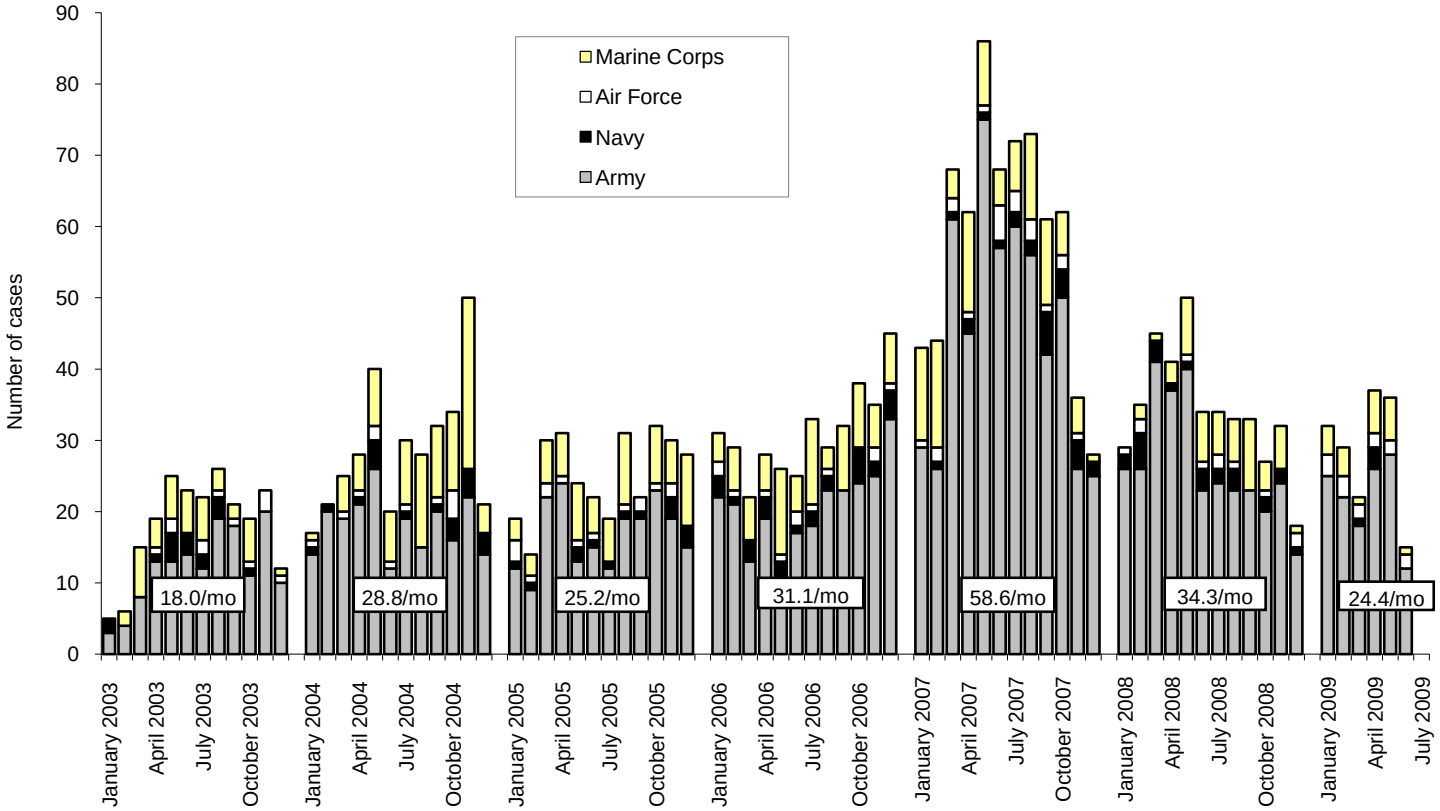
Acute respiratory disease (ARD) and streptococcal pharyngitis rates (SASI*), basic combat training centers, U.S. Army, by week, August 2007-August 2009



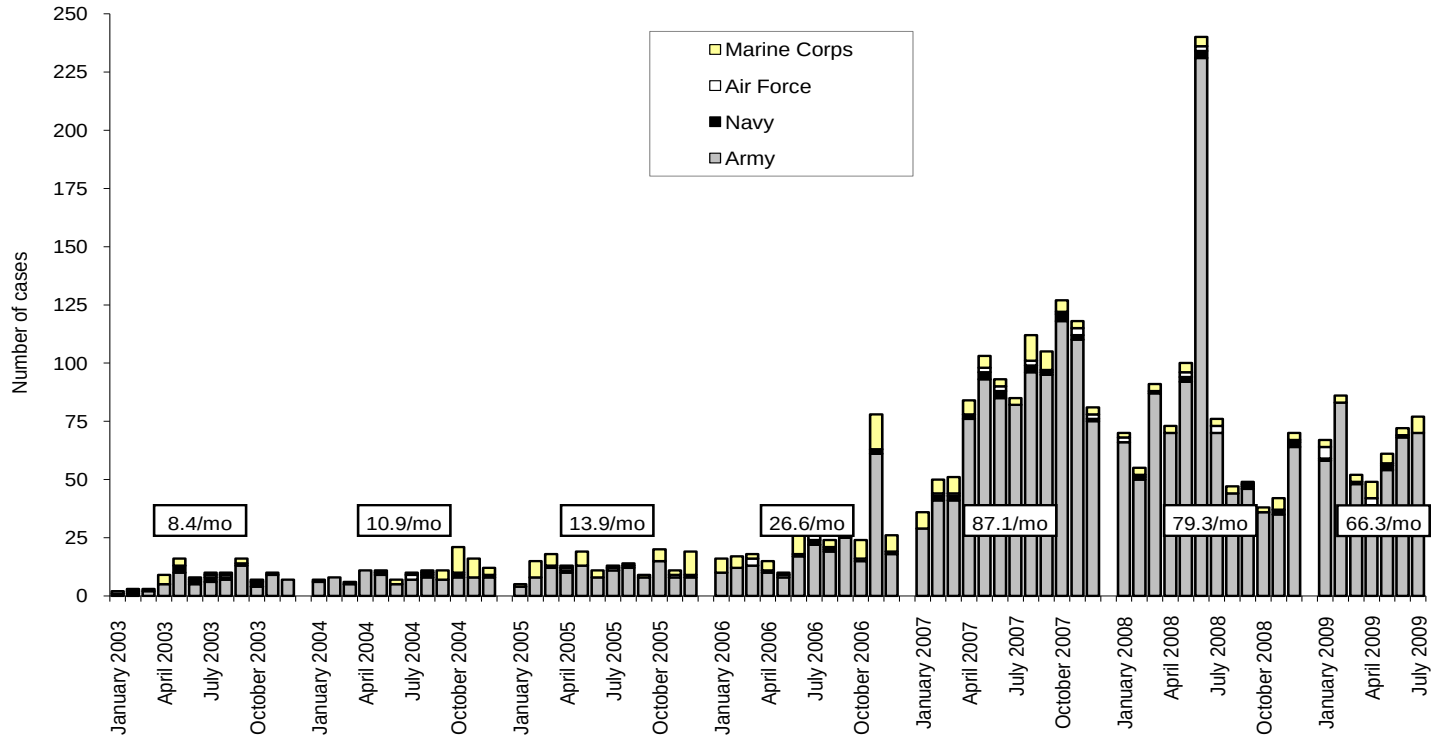
* Streptococcal-ARD surveillance index (SASI) = ARD rate x % positive culture for group A streptococcus
ARD rate = cases per 100 trainees per week
ARD rate $\geq$ 1.5 or SASI $\geq$ 25.0 for 2 consecutive weeks are surveillance indicators of epidemics

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - July 2009 (data as of 18 August 2009)

Traumatic brain injury, hospitalizations (ICD-9: 310.2, 800-801, 803-804, 850-854, 950.1-950.3, 959.01, V15.5_1-9, V15.5_A-F)*



Traumatic brain injury, multiple ambulatory visits (without hospitalization),
(ICD-9: 310.2, 800-801, 803-804, 850-854, 950.1-950.3, 959.01, V15.5_1-9, V15.5_A-F)†



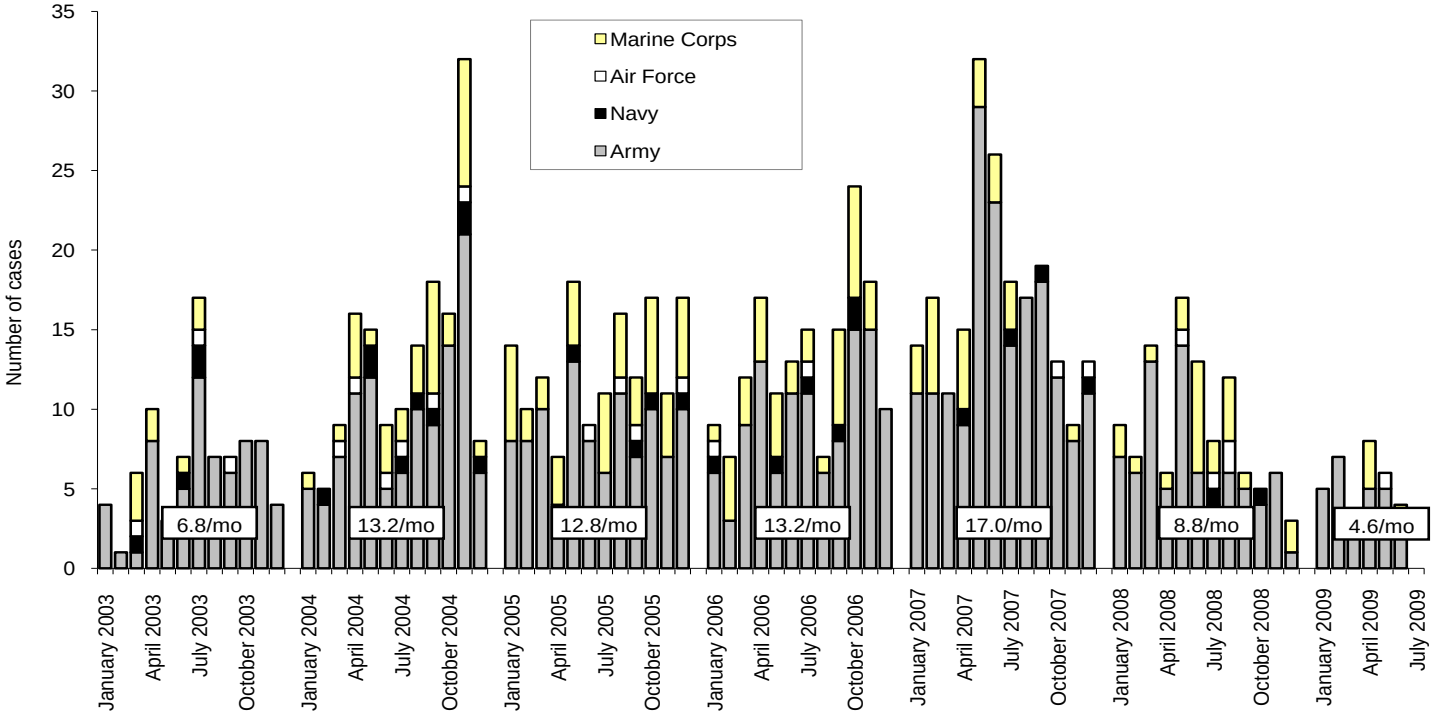
Reference: Armed Forces Health Surveillance Center. Frequencies, rates and trends of use of diagnostic codes indicative of traumatic brain injury (TBI), July 1999-June 2008. MSMR. Dec 2008; 15(10):2-9.

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

†Two or more ambulatory visits at least 7 days apart (one case per individual) while deployed to/within 30 days of returning from OEF/OIF.

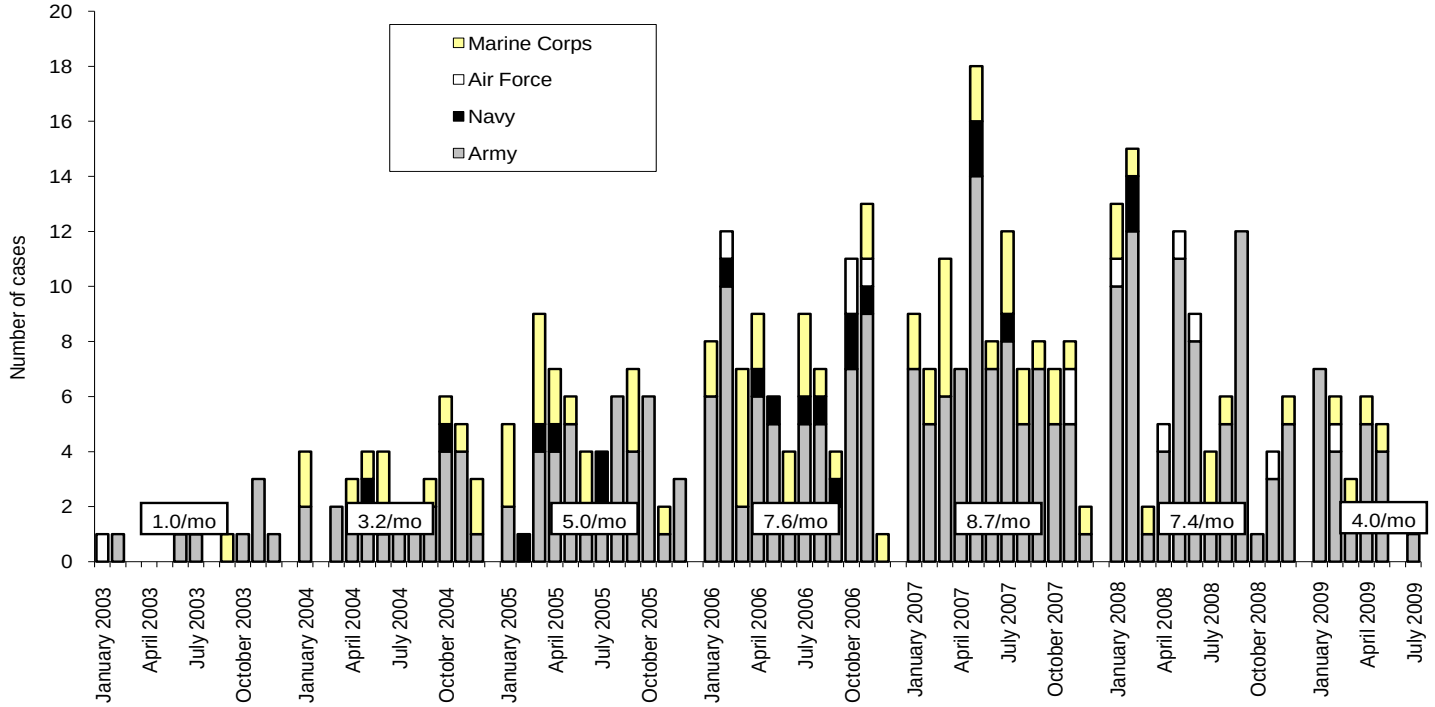
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - July 2009 (data as of 18 August 2009)

Amputations (ICD-9: 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)*



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.
*Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 365 days of returning from OEF/OIF.

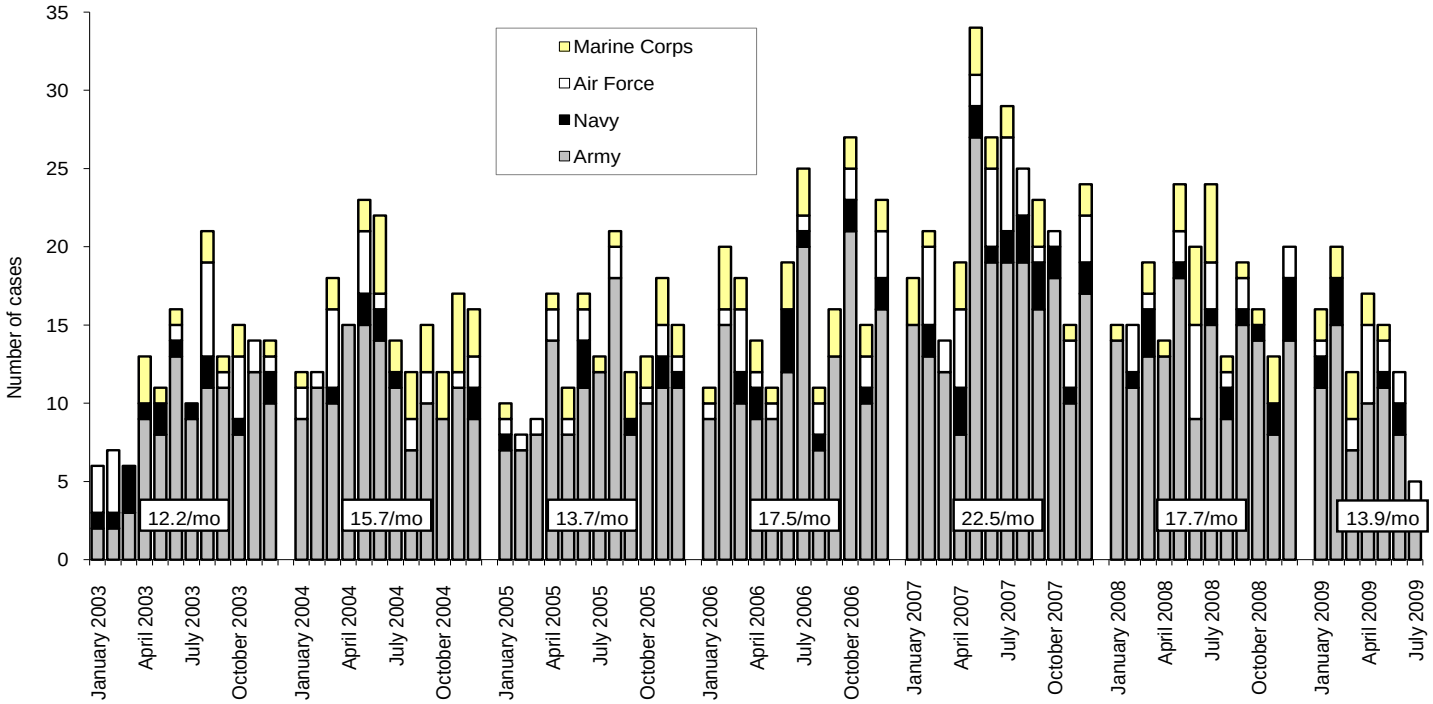
Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)†



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

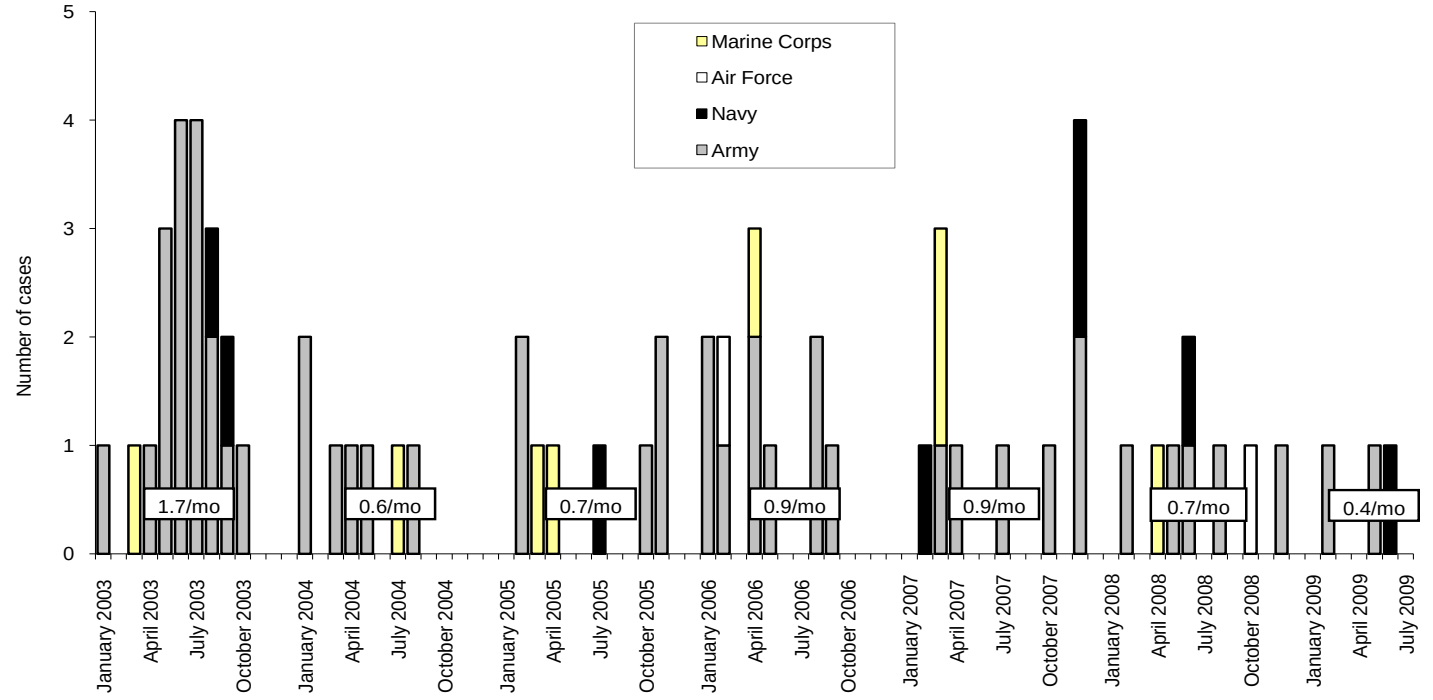
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - July 2009 (data as of 18 August 2009)

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



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

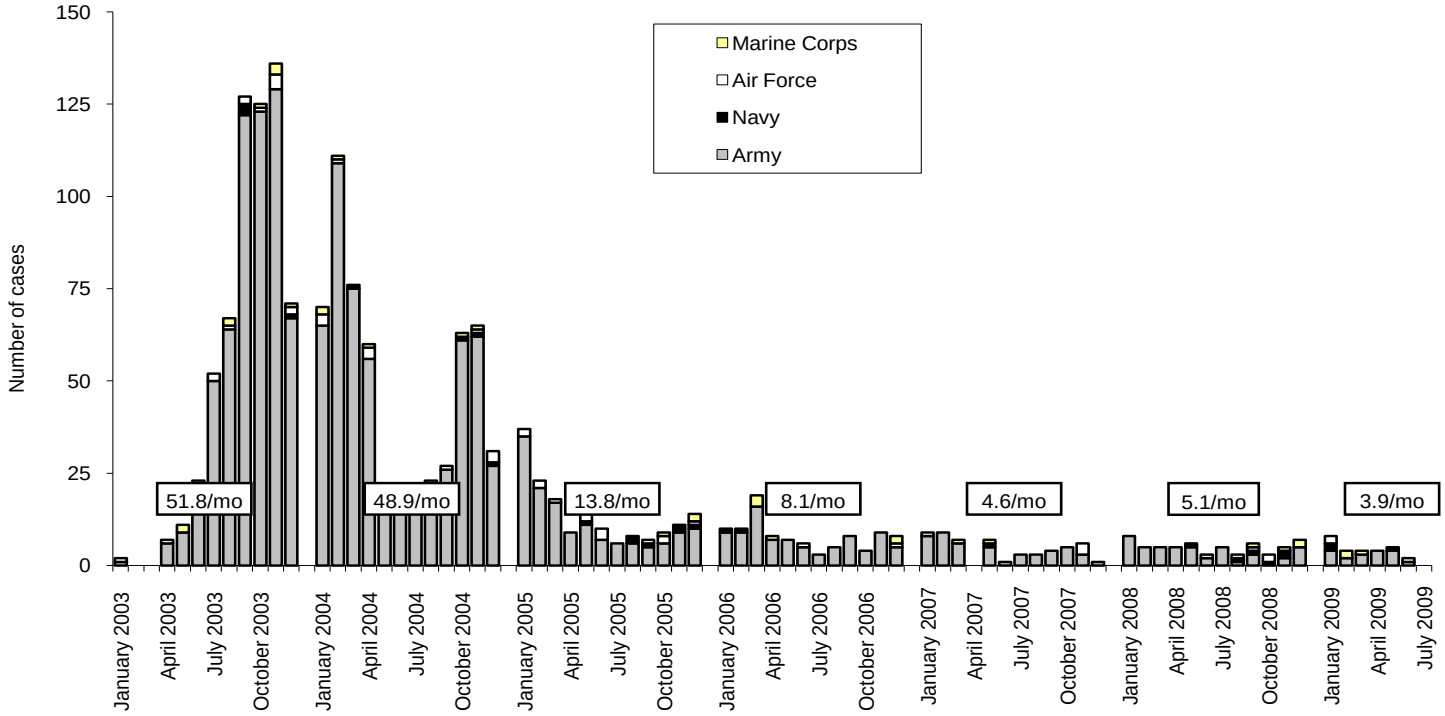
Severe acute pneumonia (ICD-9: 518.81, 518.82, 480-487, 786.09)†



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

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003 - July 2009 (data as of 18 August 2009)

Leishmaniasis (ICD-9: 085.0 to 085.9)*



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.

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

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

OFFICIAL BUSINESS

STANDARD
U.S. POSTAGE
PAID
APG, MD
PERMIT NO. 1

The *Medical Surveillance Monthly Report* (MSMR) is prepared by the Armed Forces Health Surveillance Center (AFHSC).

Data in the MSMR are provisional, based on reports and other sources of data available to AFHSC.

Inquiries regarding content or material to be considered for publication should be directed to: Editor, Armed Forces Health Surveillance Center, 2900 Linden Lane, Suite 200 (Attn: MCHB-TS-EDM), Silver Spring, MD 20910. E-mail: msmr.afhsc@amedd.army.mil

Subscriptions may be requested online at www.afhsc.army.mil or by contacting the Armed Forces Health Surveillance Center at (301) 319-3240. E-mail: msmr.afhsc@amedd.army.mil