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Leishmaniasis, US Armed Forces, 2003

Leishmaniasis is an arthropod-transmitted zoonotic disease that is caused by protozoa of the genus *Leishmania*.[1,2,3] Leishmania parasites are transmitted through bites of infective female sand flies (*Lutzomyia* species in the Americas and *Phlebotomus* species elsewhere).[4] The disease is endemic in many areas of Asia, Africa, the Middle East, South and Central America, and southern Europe.[1-6]

The clinical expressions of leishmaniasis are highly variable and primarily dependent on the infecting leishmania species and host immune responses.[1,3] Cutaneous, mucosal, and visceral leishmaniasis, the three major clinical forms, are manifestations of skin, naso-oropharyngeal mucous membrane, and systemic infections, respectively.[1,3] The courses of cutaneous and mucosal leishmaniasis are characterized by papules that progress to nodules and eventually to ulcers (which are often multiple and can be disfiguring). The manifestations of visceral leishmaniasis (which can be life threatening) include fever, weakness, hepatosplenomegaly, pancytopenia, hyperglobulinemia, and emaciation.[1-3,7,8] Not all infected persons develop signs or symptoms of leishmaniasis; but among those who do, times from infection to first clinical manifestations generally range from a week to many months, with much longer periods (e.g., up to 10 years) for visceral infections.[1-3,9]

U.S. military personnel are exposed to risks of leishmamiasis during training and operations in endemic areas.[2,4-6] Of recent and ongoing concern, leishmaniasis is endemic in many areas of Iraq, Afghanistan, and Kuwait. During the past year, surveillance of female phlebotomine sand flies in areas of Iraq where the U.S. military operated revealed an overall infection rate (among nearly 24,000 female sand flies) of 1.4%.[2]

This report summarizes frequencies, rates, and demographic and military characteristics of U.S. servicemembers who were diagnosed/reported with leishmaniasis during calendar year 2003. The leishmaniasis experience in 2003 is compared to experiences of past years.

Methods. We defined three surveillance periods: (1) January-December 2003; (2) January 1999–December 2002; and (3) January 1990–December 1991. We searched records in the Defense Medical Surveillance System (DMSS) to identify all reportable medical events, hospitalizations, and ambulatory visits during the surveillance periods with diagnoses of leishmaniasis (ICD-9-CM: 085.0-085.9). (Hospitalization records were the only records available for the 1990-1991 period.) Only one episode of leishmaniasis per person per year was included. Demographic and military characteristics were ascertained for all affected members of the active and Reserve components of all Services, but incidence rates were calculated for the active components only. Histories of international travel were self-reported. Only one follow-up visit (defined as a hospitalization or ambulatory visit at least one day after a diagnosis) per person per day was included.

Results. In 2003, there were 400 incident diagnoses/reports of leishmaniasis among members of the U.S. Armed Forces. All but one of the cases were reported as "cutaneous leishmaniasis." Approximately one-fourth (n=105, 26%) of all cases were Reserve component members (table 1).

The median age of cases was 27 years (range: 18-57 years). Most cases reported service in Iraq and/or Kuwait.

In the active components of the Services, the overall incidence rate of leishmaniasis in 2003 was 20.9 per 100,000 person-years (p-yrs). The rate was higher by far in the Army (55.2 per 100,000 p-yrs) than the other Services (table 1). The incidence rate was nearly four times higher among men than women; and the rate was higher among servicemembers who were non-Hispanic White than non-Hispanic Black, Hispanic, or "all other" race-ethnicities (table1, figure 1). During 2003, the rate of diagnosis of leishmaniasis was highest in the autumn and peaked in September (53.2 new diagnoses per 100,000 p-yrs) (figure 2). Among cases (n=235) who had documented medical encounters following their initial diagnoses, the median number of follow-up visits was 10 (range: 2-26 visits). Only one percent of all cases were hospitalized (data not shown).

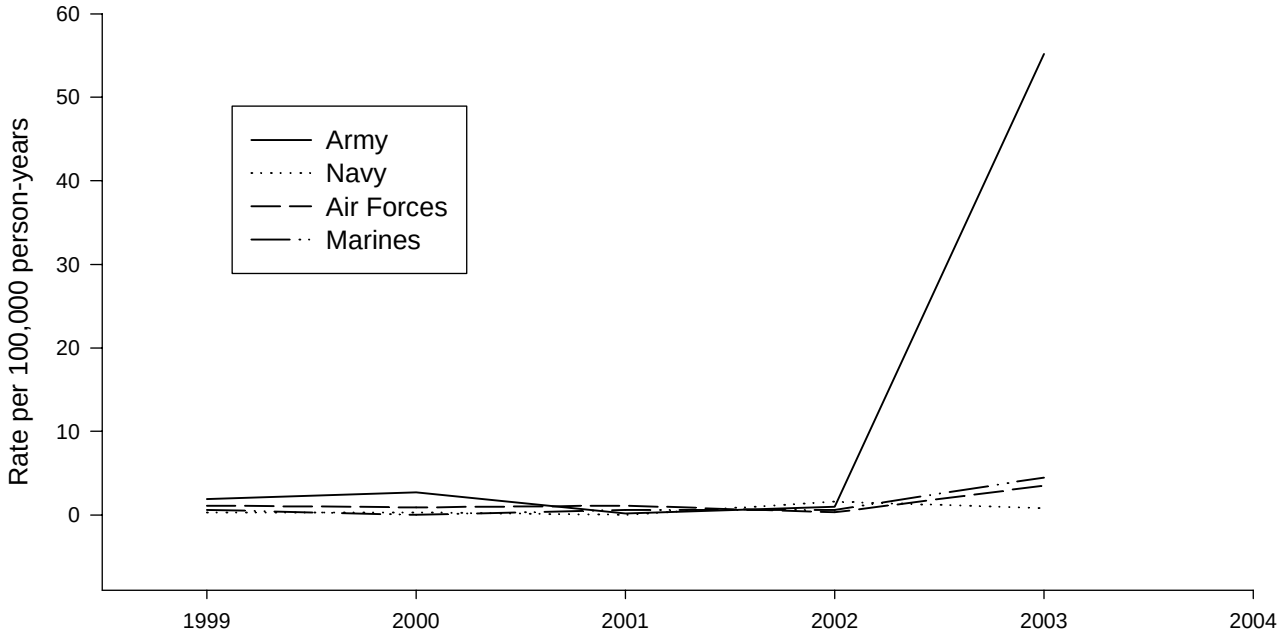
Table 1. Frequencies and rates of diagnoses of leishmaniasis, by demographic and military characteristics, US Armed Forces, 2003 and 1999-2002

	2003		1999-2002	
	Cases*	Rate**	Cases*	Rate**
Overall	400	20.9	58	0.9
Gender				
Female	21	6.1	6	0.8
Male	379	23.5	52	1.0
Age group				
<20	15	14.1	4	0.8
21-24	144	24.7	15	0.9
25-29	79	23.4	9	0.8
30-34	64	22.3	12	1.2
35-39	55	17.5	5	0.6
>=40	43	10.8	13	1.5
Race/ethnic				
Black non-Hispanic	70	19.7	10	0.9
White non-Hispanic	283	26.3	40	0.9
Hispanic	30	18.4	2	0.4
All others	17	6.1	6	1.6
Service				
Army	363	55.2	30	1.5
Navy	3	0.8	9	0.5
Air Force	20	3.5	16	0.8
Marines	14	4.5	3	0.4
Component				
Active	295	23.9	51	0.9
Reserve (incl National Guard)	105	na	7	na

* includes cases among members of active and reserve components

** incident cases per 100,000 person-years (active components only)

Figure 1. Rate of leishmaniasis by service, US Armed Forces, 1999-2003.



Comparisons with prior experience. Overall, the incidence rate of leishmaniasis in 2003 was more than 20-times higher than during the prior 4 years (figure 1). In the Army, the incidence rate in 2003 was nearly 40-times higher than in 1999-2002 (figure 1).

Servicemembers diagnosed with leishmaniasis in 2003 tended to be younger than those in the recent past (median ages, 2003: 27 years: 1999-2002: 30 years). Also, the sharp peak in diagnoses in the fall of 2003 contrasted with the bi-modal distribution (with shallow peaks in March-April and August) of diagnoses in 1999-2002 (figure 3).

Finally, during 1990-1991 (the period of the first Gulf War), there were 41 diagnoses of leishmaniasis among hospitalized US servicemembers. (The number of leishmaniasis cases that were diagnosed and treated as outpatients during that period is unknown).

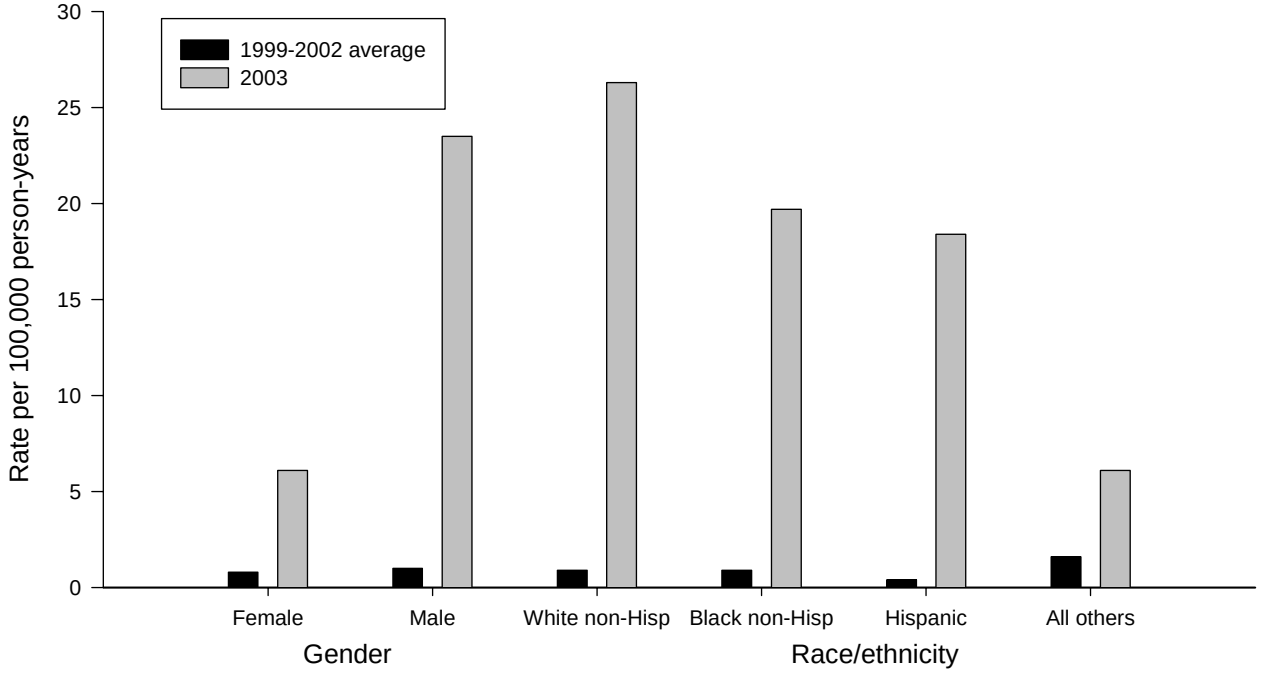
Editorial comment. The sharp increase in incidence of leishmaniasis in 2003 was attributable to prolonged exposures of large numbers of U.S. military members (particularly Army soldiers) to high endemicity areas in the Persian Gulf/Middle East region (e.g., Iraq, Afghanistan, Kuwait).

It is difficult to directly compare the leishmaniasis experiences of participants in Operations Enduring Freedom/Iraqi Freedom (OEF/OIF) with those of veterans of the first Gulf War. For example, since the end of the first Gulf War, there have been significant changes in indications for (and resulting declines in rates of) hospitalizations of servicemembers. In addition, in the past decade, automated systems of reporting notifiable medical conditions (such as leishmaniasis) and of documenting diagnoses and treatments in outpatient settings have been implemented. Thus, for surveillance purposes, the ascertainment of recent cases compared to those from 13 years ago is likely more complete.

Still, it is noteworthy that many more cases of cutaneous leishmaniasis, but fewer cases of visceral leishmaniasis, have been diagnosed/reported among participants in OEF/OIF than the first Gulf War.[6,8] Of course, cases of visceral leishmaniasis can be clinically inapparent for long periods, and their first clinical manifestations can be non-specific (and thus difficult to diagnose). Physicians and other primary care providers should include leishmaniasis among possible diagnoses among veterans of military service in Iraq, Afghanistan, or Kuwait who have exposure histories and clinical presentations compatable with cutaneous or visceral leishmaniasis.

For decades, cases of leishmaniasis in U.S. military members have been referred to the Walter

Figure 2. Rate of leishmaniasis by gender and race/ethnicity, US Armed Forces.



Reed Army Medical Center (WRAMC) for evaluation and treatment with the pentavalent antimonial compound, sodium stibogluconate (Penostam®).[2,5] Currently, in the United States, sodium stibogluconate is used to treat leishmaniasis under Investigational New Drug (IND) protocols that are held by the Surgeon General of the U.S. Army and the Centers for Disease Control and Prevention with the Food and Drug Administration.[2,3]

In 2003, diagnoses of leishmaniasis peaked in September, late in the summer season in the Persian Gulf/Middle East. However, because of significant variations, for example, in incubation times, rates of clinical progression, and health care-seeking behaviors of affected individuals, it is difficult to estimate high risk seasons of transmission from dates of diagnosis.

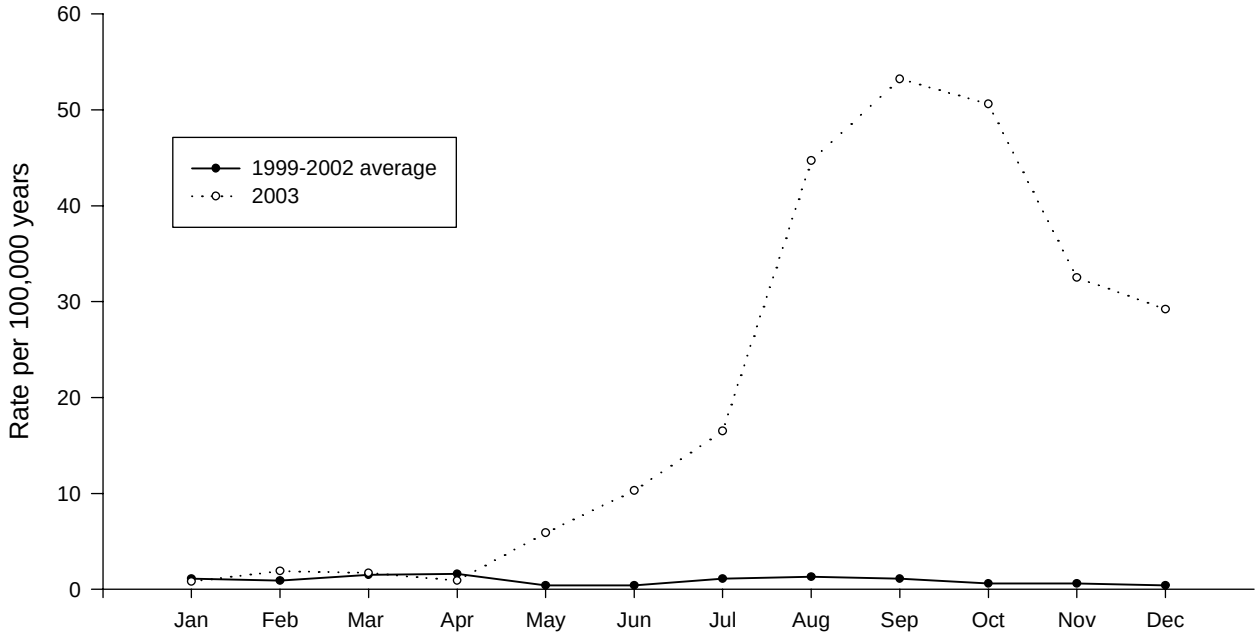
There are no vaccines or prophylactic medications that prevent leishmaniasis. Thus, all military personnel who serve in leishmaniasis endemic areas should be informed of the nature of the risks and measures to counter them. Specifically, all servicemembers at risk of leishmaniasis should be trained, equipped, supplied, and supervised to ensure compliance (especially from dusk to dawn) with indicated personal protective measures to include the consistent and proper wear of permethrin-treated uniforms; the consistent use of military issued, DEET-containing insect repellent on exposed skin; and the consistent and proper use of permethrin-treated bednets to prevent sand fly bites.[2,4,5]

Analysis and report by Jenny C. Lay, MPH, Analysis Group, Army Medical Surveillance Activity.

References

1. Leishmaniasis. In Control of Communicable Diseases Manual. 17th edition. Chin J, ed. Washington, DC: American Public Health Association, 2000: 284-9.
2. Aronson N, Coleman R, Coyne P, Rowton E, Hack D, Polhemus M, Wortmann G, Cox K, Weina P, Herwaldt BL. Cutaneous leishmaniasis in U.S. military personnel — Southwwest/Central Asia, 2002-2003. *MMWR* 2003:52(42):1009-1012.
3. Herwaldt BL. Leishmaniasis. Lancet 1999:354:1191-9.
4. Army Medical Surveillance Activity. New world cutaneous leishmaniasis patients at WRAMC. *MSMR* 1996:2(3):2-3.
5. Martin S, Gambel J, Jackson J, Aronson N, Gupta R, Rowton E, Perich M, McEvoy P, Berman J, Magill A, Hoke C. Leishmaniasis in the United States military. *Mil Med* 1998:163:801-7.
6. Hyams KC, Hanson K, Wignall FS, Escamilla J, Oldfield EC 3rd. The impact of infectious diseases on the health of U.S. troops deployed to the Persian Gulf during Operations Desert Shield and Desert Storm. *Clin Infect Dis* 1995:20:1497-1504.
7. Magill AJ, Grogl M, Sun W. Viscerotropic leishmaniasis in persons returning from Operation Desert Storm – 1990-1991. *MMWR* 1992:41(08):131-4.
8. Magill AJ, Grogl M, Gasser RA, Sun W, Oster CN. Visceral infection caused by Leishmania tropica in veterans of Operation Desert Storm. *N Eng J Med* 1993:328(19):1383-7.
9. Wright MI. Kala-azar of unusual duration, associated with agammaglobulinaemia. *BrMed J* 1959:1:1218-1221.

Figure 3. Rates of diagnosis of leishmaniasis, by month, US Armed Forces, 1999-2002 and 2003.



Malaria, US Army, 2003

Malaria is a common, potentially life-threatening, mosquito-transmitted parasitic disease that is endemic throughout the tropics and in some temperate regions.[1] It is estimated that malaria accounts for as many as 300 million acute illnesses and more than 1 million deaths each year worldwide[1]. Four *Plasmodium* species are capable of infecting humans and causing malaria: *Plasmodium falciparum* (the most deadly), *Plasmodium vivax* (the most common), *Plasmodium ovale*, and *Plasmodium malariae*.[1]

For centuries, malaria has been recognized as a disease of military operational significance.[2,3] Currently, U.S. servicemembers are at risk of malaria when they are permanently assigned to endemic areas (such as near the Demilitarized Zone [DMZ] in Korea[4-6]); when they participate in operations in endemic areas (e.g., Central/South America, Africa, Afghanistan,[7] Iraq[8]); and when they visit malarious areas during personal travels. Over the past decade, there has been a general increase in malaria incidence among U.S. soldiers, primarily due to *P. vivax* infections acquired near the DMZ in Korea.[4-6, 9-13] Of note, malaria (particularly *P. vivax*) also is endemic in areas of Afghanistan[7] and Iraq;[8] thus, in the past few years, many U.S. soldiers have been exposed to risk while participating in operations in Central Asia and the Middle East. This report summarizes the malaria experience of U.S. soldiers during calendar year 2003.

Methods. The Defense Medical Surveillance System was searched to identify all hospitalizations and reports to the Army's Reportable Medical Events System (RMES) during calendar year 2003 that included a primary diagnosis of malaria (ICD-9-CM: 084.0-084.9) among U.S. soldiers. For this summary, only one episode of malaria per soldier was included. When multiple records were available for a soldier, the date of the earliest was considered the date of onset and the most specific diagnosis (typically from an inpatient record) was used to classify the type of malaria. Locations of malaria acquisition were estimated using the following algorithm: (1) cases diagnosed in Korea were considered Korea-acquired; (2) cases that were documented through RMES that listed exposures to malaria endemic locations were considered acquired in those locations; (3) cases among soldiers who had been assigned to Korea within 2 years of diagnosis were considered acquired in Korea; (4) all remaining cases were considered acquired in "other/unknown" areas.

Results. In 2003, 84 cases of malaria were diagnosed among soldiers in the U.S. Army; there were 25% more cases in 2003 than 2002 (figure 1). In 2003, as in the recent past, most soldiers diagnosed with malaria were younger than 30 (77.4%), male (98.8%), white (82.1%), and in the active component (90.5%) (table 1).

In contrast to recent years, in 2003 more cases (n=38, 45.2%) were considered acquired in Central Asia/Middle East (principally Afghanistan) than in any other region Of note, of all cases considered acquired in Central Asia/Middle East, more than three-fourths were diagnosed at Fort Benning, Georgia (n=25) or Fort Bragg, North Carolina (n=5) (table 2).

Finally, in 2003, 23 (27.4%) cases of malaria were considered acquired in Korea. The number of Korea-acquired cases diagnosed in 2003 was 51% fewer than in 2002. Of all Korea-acquired cases diagnosed in 2003, approximately two-thirds (n=15) were diagnosed in Korea; the others were diagnosed at various Army and Air Force facilities in the United States and Germany.

Editorial comment. In 2003, there were 25% more cases of malaria among U.S. soldiers than in 2002. The increase was due primarily to *P. vivax* infections acquired in Afghanistan. Of note, in 2003 compared to recent prior years, there was a sharp decrease in cases that were considered acquired in Korea.

As in previous years, the majority of malaria cases among U.S. soldiers were diagnosed at medical facilities that are remote from malaria endemic areas.[10] For example, because many *P. vivax* infections acquired in Korea have long latency periods[11], many infections acquired during summer—fall seasons in Korea clinically emerge and present months later at

military or civilian facilties outside of Korea. Primary care providers should be alert for clinical presentations that are consistent with malaria when treating U.S. servicemembers who have traveled to or been assigned/deployed to malaria-endemic areas (e.g., Korea, Afghanistan, Iraq, Central/South America, Africa) even months earlier.

Finally, all soldiers at risk of malaria (and other arthropod-transmitted infections) should be informed of the nature of the risk; trained, equipped, and supplied to conduct indicated countermeasures; and monitored to ensure compliance. Personal protective measures against malaria include the proper wear of permethrin-impregnated uniforms; the use of bed nets and military-issued DEET-containing insect repellent; and compliance with prescribed chemoprophylactic drugs before, during, and after times of exposure in malarious areas.

Analysis and report by Karen E. Johnson, MS, Analysis Group, Army Medical Surveillance Activity.

References

1. What is malaria? Roll Back Malaria, World Health Organization. (cited February 27, 2004). http://www.rbm.who.int/cmc_upload/0/000/015/372/RBMInfosheet_1.htm).

2. Ognibene, AJ, Barrett, O. Malaria: Introduction and background, In: Internal medicine in Vietnam (vol II): General medicine and infectious diseases. Ed: Ognibene, AJ, Barrett, O. Office of the Surgeon General and Center of Military History, US Army, Washington, DC, 1982, 271-8.

3. Shanks GD, Karwacki JJ. Malaria as a military factor in Southeast Asia. *Mil Med* 1991;156(12):684-6.

4. Feighner BH, Pak SI, Novakoski, WL, Kelsey LL, Strickman D. Reemergence of Plasmodium vivax malaria in the Republic of Korea. *Emerg Infect Dis* 1998; 4(2):295-7.

5. Strickman D, Miller ME, Kelsey LL, Lee WJ, Lee HW, Lee KW, Kim HC, Feighner BH. Evaluation of the malaria threat at the multipurpose range complex, Yongp'yong, Republic of Korea. *Mil Med* 1999; 164(9):626-9.

6. Lee JS, Lee WJ, Cho SH, Ree H. Outbreak of vivax malaria in areas adjacent to the demilitarized zone, South Korea, 1998. *Am J Trop Med Hyg* 2002; 66(1):13-7.

7. Wallace MR, Hale BR, Utz GC, Olson PE, Earhart KC, Thornton SA, Hyams KC. Endemic infectious diseases of Afghanistan. *Clin Infect Dis* 2002 Jun 15;34(Suppl 5):S171-207.

Table 1. Malaria cases by species type and selected demographic characteristics, US Army, 2003

	P. vivax	*P. falciparum*	Other/unknown	Total	
Total	55	8	21	84	100.0%
Gender					
Male	54	8	21	83	98.8%
Female	1	0	0	1	1.2%
Age group					
<20	3	0	1	4	4.8%
20-24	30	1	10	41	48.8%
25-29	13	1	6	20	23.8%
30-34	6	4	0	10	11.9%
35-39	1	2	3	6	7.1%
40+	2	0	1	3	3.6%
Race					
White	47	5	17	69	82.1%
Black	1	3	2	6	7.1%
Other	7	0	2	9	10.7%
Component					
Active	52	5	19	76	90.5%
Guard	2	3	0	5	6.0%
Reserve	1	0	2	3	3.6%

8. Malaria in Iraq. Roll Back Malaria, World Health Organization (cited February 27, 2004. http://www.emro.who.int/rbm/malariasituation1999.pdf)
9. Army Medical Surveillance Activity. Plasmodium vivax malaria of Korean origin, 1997. *MSMR* 1997;3(5), 2-3.
10. Petruccelli BP, Feighner BH, Craig SC, Kortepeter MG, Livingston R. Late presentations of vivax malaria of Korean origin, multiple geographic sites. *MSMR* 1998;4(5)2-3,8-10.
11. Army Medical Surveillance Activity. P. vivax malaria acquired by US soldiers in Korea: acquisition trends and incubation period characteristics, 1994-2000. *MSMR* 2001;7(1):7-8.
12. Lum GR. Malaria among active duty soldiers, US Army, 2001. *MSMR* 2002; 8(3):2-4.
13. Lum GR. Malaria among active duty soldiers, US Army, 2002. *MSMR* 2003; 9(1):2-5.

Figure 1. Malaria cases by plasmodium species and year, US Army, 1995-2003.

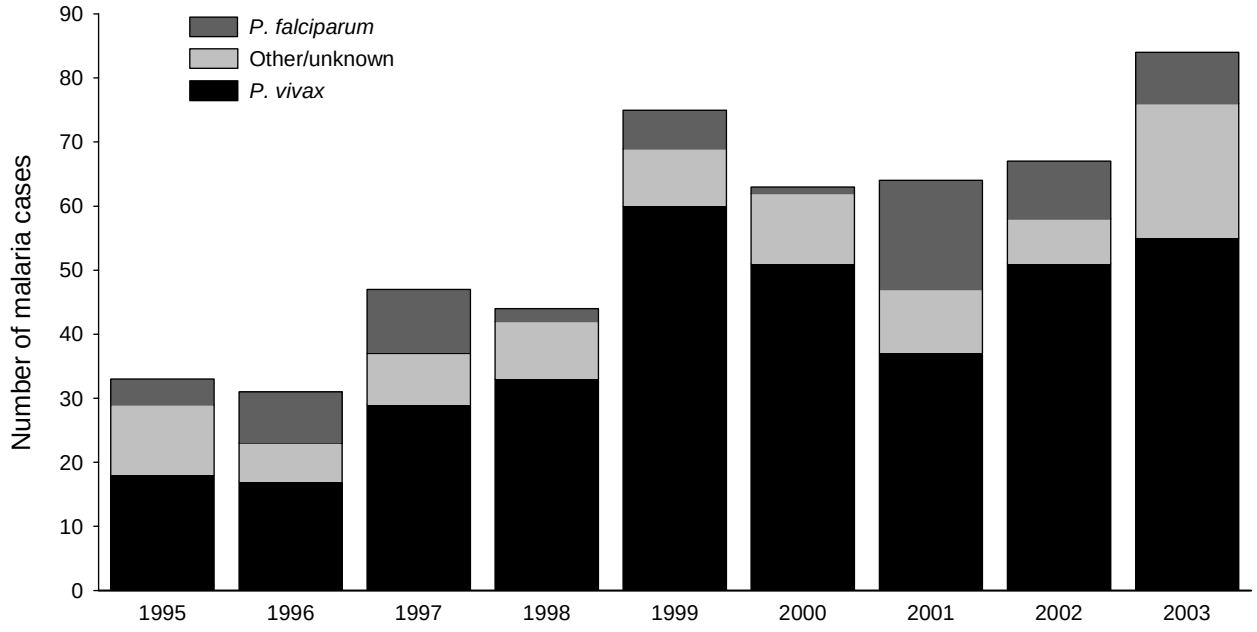


Table 2. Number of malaria cases by geographical locations of acquisition and diagnosis, US Army, 2003

Location/site of diagnosis	Location of infection acquisition: Central Asia/ Middle East	Korea	Central/South America	Africa	SE Asia/ Pacific Islands	Unknown	Total
Fort Benning, GA	25	1	0	0	0	5	31
Fort Bragg, NC	5	0	2	0	0	0	7
Korea	0	15	0	0	0	0	15
Germany	1	2	0	1	0	4	8
Other Army	5	4	2	1	1	1	14
Air Force	2	1	0	0	0	1	4
Non-military	0	0	0	0	0	5	5

Update: Pre- and Post-deployment Health Assessments, US Armed Forces, September 2002-December 2003

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

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

The overall success of deployment force health protection efforts depends in part on the completeness and quality of pre- and post-deployment health assessments. This report summarizes characteristics of servicemembers who completed pre- (since 1 September 2002) and post- (since 1 January 2003) deployment forms, responses to selected questions on pre- and post-deployment forms, and changes in responses of individuals from pre- to post-deployment.

Methods. For this update, the DMSS was searched to identify all pre- and post-deployment forms that were completed after 1 September 2002 (in order that assessments of servicemembers who deployed in October 2002 were included in analyses). For summary purposes, pre-deployment responses included all assessments (DD Form 2795) completed after 1 September 2002, and post-deployment responses included all assessments (DD Form 2796) completed after 1 January 2003.

Results. From 1 September 2002 to 31 December 2003, 483,021 pre-deployment health assessment forms were completed at field sites, shipped to AMSA, and entered into the DMSS database—approximately 50% were completed in January, February, or March (table 1).

From 1 January to 31 December 2003, 350,187 post-deployment health assessments were completed at field sites, shipped to AMSA, and entered into the DMSS database—more than half (56%) were completed in May, June, or July (table 1).

In general, the distributions of self-assessments of "overall health status" were similar among pre- and post-deployment form respondents (figure 1). More pre-deployment (32.0%) than post-deployment (22.8%) respondents assessed their "overall health" as "excellent"; and slightly more pre- (42.5%) than post- (38.7%) deployment respondents assessed their overall health as "very good." Higher proportions of respondents chose "good", "fair", or "poor" to describe their health status after deployment compared to pre-deployment (figure 1).

On post-deployment forms, approximately 20% of active and 33% of Reserve component respondents reported "medical/dental problems"; and approximately 5% of respondents overall reported "mental health concerns"(table 2). Twenty-one percent of post-deployment forms overall documented that "referrals" were indicated (table 2).

Among servicemembers (n=167,390) who completed both forms, approximately half (48.7%) chose the same descriptor of their "overall health status" before and after deploying (figures 2, 3). Of those (n=85,943) who changed their health status assessments from pre- to post-deployment, 40% (n=66,999) changed by a single category (on a five category scale) (figure 2,3); and of those who changed by more than one category, approximately 7-times more indicated a decrement (n=16,525) than an improvement (n=2,419) in their assessments of their overall health (figure 3).

Overall, 13.4% of all servicemembers who completed post-deployment forms reported deployment-related "exposure concerns." The

Figure 1. Percent distributions of self-assessed overall health status, pre- and post-deployment, US Armed Forces, September 2002-December 2003.

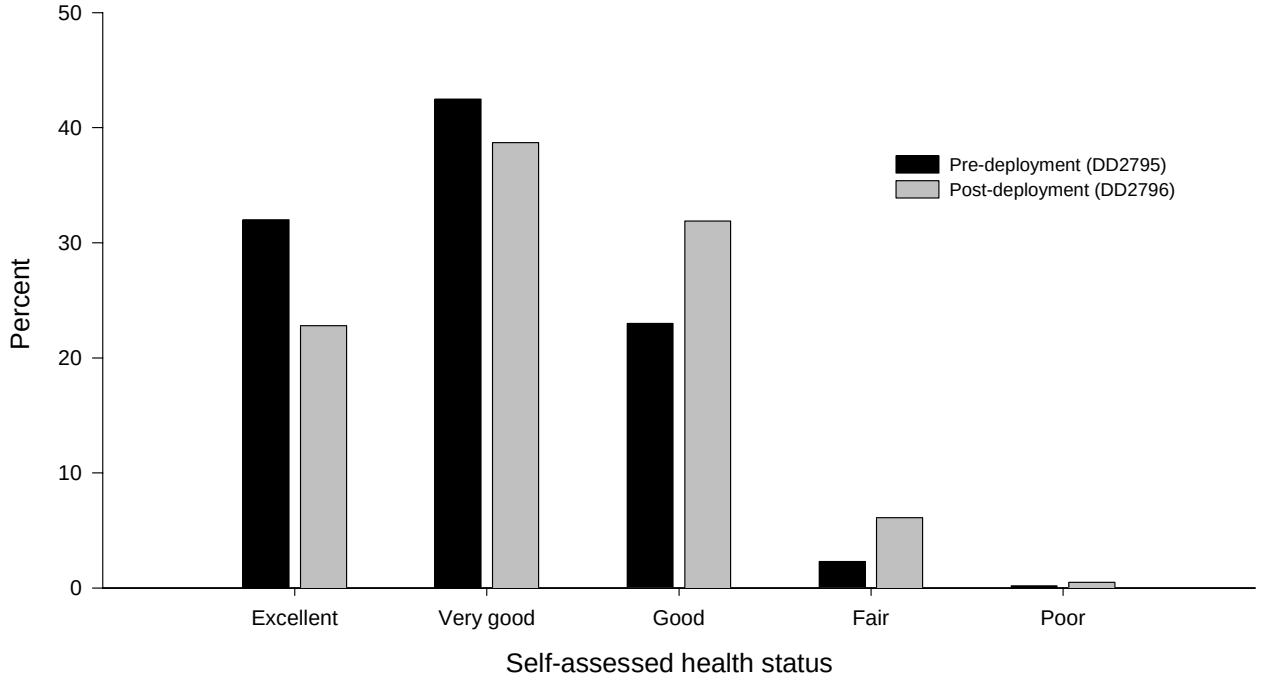


Table 1. Total pre-deployment and post-deployment health assessments, by month and year, US Armed Forces

	Pre-deployment *		Post-deployment **	
	No.	%	No.	%
Total	483,021	100.0	350,187	100.0
2002				
September	10,941	2.3	-	-
October	16,351	3.4	-	-
November	18,884	3.9	-	-
December	16,840	3.5	-	-
2003				
January	68,172	14.1	5,368	1.5
February	107,861	22.3	4,519	1.3
March	68,731	14.2	6,044	1.7
April	35,724	7.4	16,655	4.8
May	11,634	2.4	83,912	24.0
June	14,093	2.9	63,516	18.1
July	16,842	3.5	49,541	14.1
August	15,278	3.2	33,352	9.5
September	11,637	2.4	26,889	7.7
October	22,479	4.7	24,573	7.0
November	17,163	3.6	17,974	5.1
December	30,391	6.3	17,844	5.1

* Total pre-deployment assessments (DD form 2795), 1 September 2002-31 December 2003.

** Total post-deployment assessments (DD form 2796), 1 January 2003-31 December 2003.

likelihood of reporting an "exposure concern" increased monotonically with age (table 3). In general, reservists, members of the Marine Corps and Army, and officers were more likely to report "exposure concerns" than their respective counterparts (table 3).

Editorial comment. In general, servicemembers who have been mobilized/deployed since September 2002 have assessed their overall health as "good" to "excellent." The distributions of self-assessed health statuses are generally similar prior to and after returning from deploying; however, more servicemembers reported declines than improvements in their overall health from pre- to post-deployment. This is not surprising considering the extreme physical and psychological stresses associated with mobilization, overseas deployment, and harsh and dangerous living and working conditions.[14] The deployment health assessment process is specifically designed to identify, assess, and follow-up as necessary all servicemembers with concerns regarding health and/or deployment-related exposures.

Overall, nearly one of every 7 servicemembers who completed post-deployment health assessments reported an "exposure concern." Of demographic factors, the strongest correlate of reporting an exposure concern was older age. The higher crude prevalences of exposure concerns among reservists (versus active component) and officers (versus enlisted), for example, may be related at least in part to differences in the age distributions of the respective groups. Trends in the numbers and natures of deployment-related "exposure concerns" will be

Table 2. Responses to selected questions from post-deployment forms (DD2796) submitted since 1 January 2003, by service and component, US Armed Forces*

Active component	Army	Navy	Air Force	Marines	Total
SMs with DD 2796 at AMSA	103,307	40,036	37,740	42,305	223,388
General health("fair" or "poor")	9%	5%	2%	6%	7%
Medical/dental problems	26%	12%	11%	18%	20%
Currently on profile	11%	1%	2%	3%	6%
Mental health concerns	5%	2%	1%	2%	3%
Exposure concerns	16%	6%	6%	12%	12%
Health concerns	15%	6%	5%	8%	10%
Referral indicated	25%	7%	10%	10%	16%
Med. visit following referral**	83%	68%	87%	61%	80%
Post deployment serum***	82%	65%	92%	79%	80%
Reserve component					
SMs with DD 2796 at AMSA	85,121	9,446	16,989	11,426	122,982
General health("fair" or "poor")	10%	5%	3%	10%	8%
Medical/dental problems	36%	34%	18%	36%	33%
Currently on profile	15%	4%	2%	4%	11%
Mental health concerns	5%	2%	1%	3%	4%
Exposure concerns	18%	13%	11%	30%	18%
Health concerns	20%	18%	9%	24%	18%
Referral indicated	23%	15%	13%	25%	21%
Med. visit following referral**	60%	84%	58%	52%	60%
Post deployment serum***	85%	86%	72%	78%	83%

* As of 08 March 2004.

** Inpatient or outpatient visit within 6 months after referral.

*** Only calculated for DD form 2796 completed since 1 June 2003.

Note: Subgroup totals may not equal the overall total due to missing/unknown data

monitored as more servicemembers return from overseas assignments and/or demobilize.

References

1. Medical readiness division, J-4, JCS. Capstone document: force health protection. Washington, DC. Available at: < http://www.dtic.mil/jcs/j4/organization/hssd/fhpcapstone.pdf >.
2. Brundage JF. Military preventive medicine and medical surveillance in the post-cold war era. *Mil Med* 1998 May;163(5):272-7.
3. Trump DH, Mazzuchi JF, Riddle J, Hyams KC, Balough B. Force health protection: 10 years of lessons learned by the Department of Defense. *Mil Med* 2002 Mar;167(3):179-85.
4. Hyams KC, Riddle J, Trump DH, Wallace MR. Protecting the health of United States military forces in Afghanistan: applying lessons learned since the Gulf War. *Clin Infect Dis* 2002 Jun 15;34(Suppl 5):S208-14.
5. DoD instruction 6490.3, subject: Implementation and application of joint medical surveillance for deployments. 7 Aug 1997.
6. 10 USC 1074f, subject: Medical tracking system for members deployed overseas. 18 Nov 1997.
7. ASD (Health Affairs) memorandum, subject: Policy for pre- and post-deployment health assessments and blood samples (HA policy: 99-002). 6 Oct 1998.
8. ASD (Health Affairs) memorandum, subject: Updated policy for pre- and post-deployment health assessments and blood samples (HA policy: 01-017). 25 Oct 2001.
9. JCS memorandum, subject: Updated procedures for deployment health surveillance and readiness (MCM-0006-02). 1 Feb 2002.
10. USD (Personnel and Readiness) memorandum, subject: Enhanced post-deployment health assessments. 22 Apr 2003.
11. Rubertone MV, Brundage JF. The Defense Medical Surveillance System and the Department of Defense Serum Repository: glimpses of the future of comprehensive public health surveillance. *Am J Pub Hlth* 2002 Dec;92(12):1900-4.
12. Brundage JF, Kohlhase KF, Gambel JM. Hospitalization experiences of U.S. servicemembers before, during, and after participation in peacekeeping operations in Bosnia-Herzegovina. *Am J Ind Med* 2002 Apr;41(4):279-84.
13. Brundage JF, Kohlhase KF, Rubertone MV. Hospitalizations for all causes of U.S. military service members in relation to participation in Operations Joint Endeavor and Joint Guard, Bosnia-Herzegovina, January 1995 to December 1997. *Mil Med* 2000 Jul;165(7):505-11.
14. Hyams KC, Wignall FS, Roswell R. War syndromes and their evaluation: from the U.S. Civil War to the Persian Gulf War. *Ann Intern Med* 1996 Sep 1;125(5):398-405.

Figure 2. Self-assessed health status on post-deployment form, in relation to self-assessed health status pre-deployment, US Armed Forces, September 2002-December 2003.

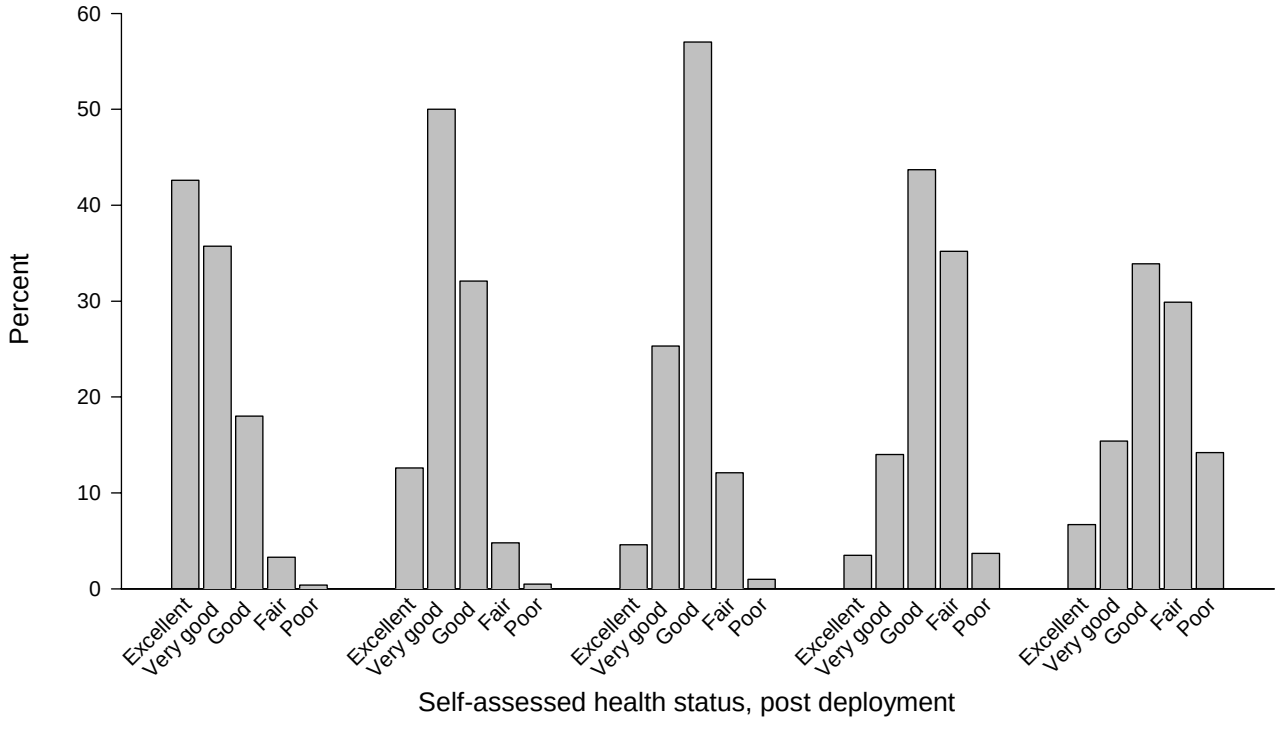
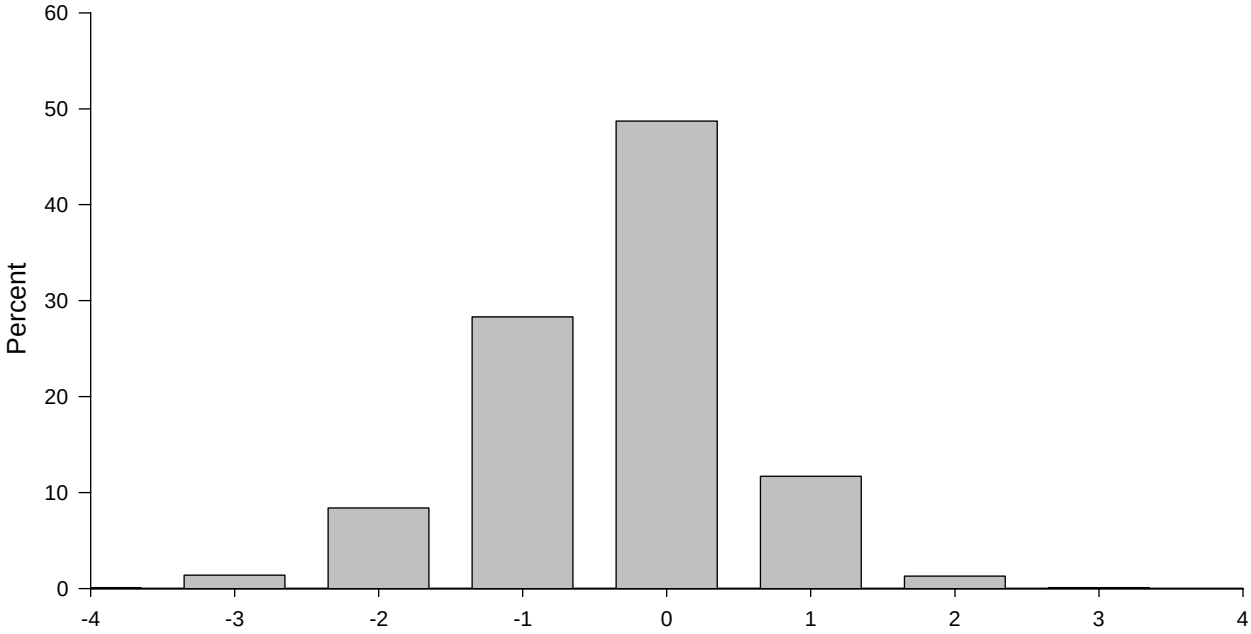


Figure 3. Distribution of self-assessed health status changes from pre- to post-deployment, US Armed Forces, September 2002-December 2003.



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

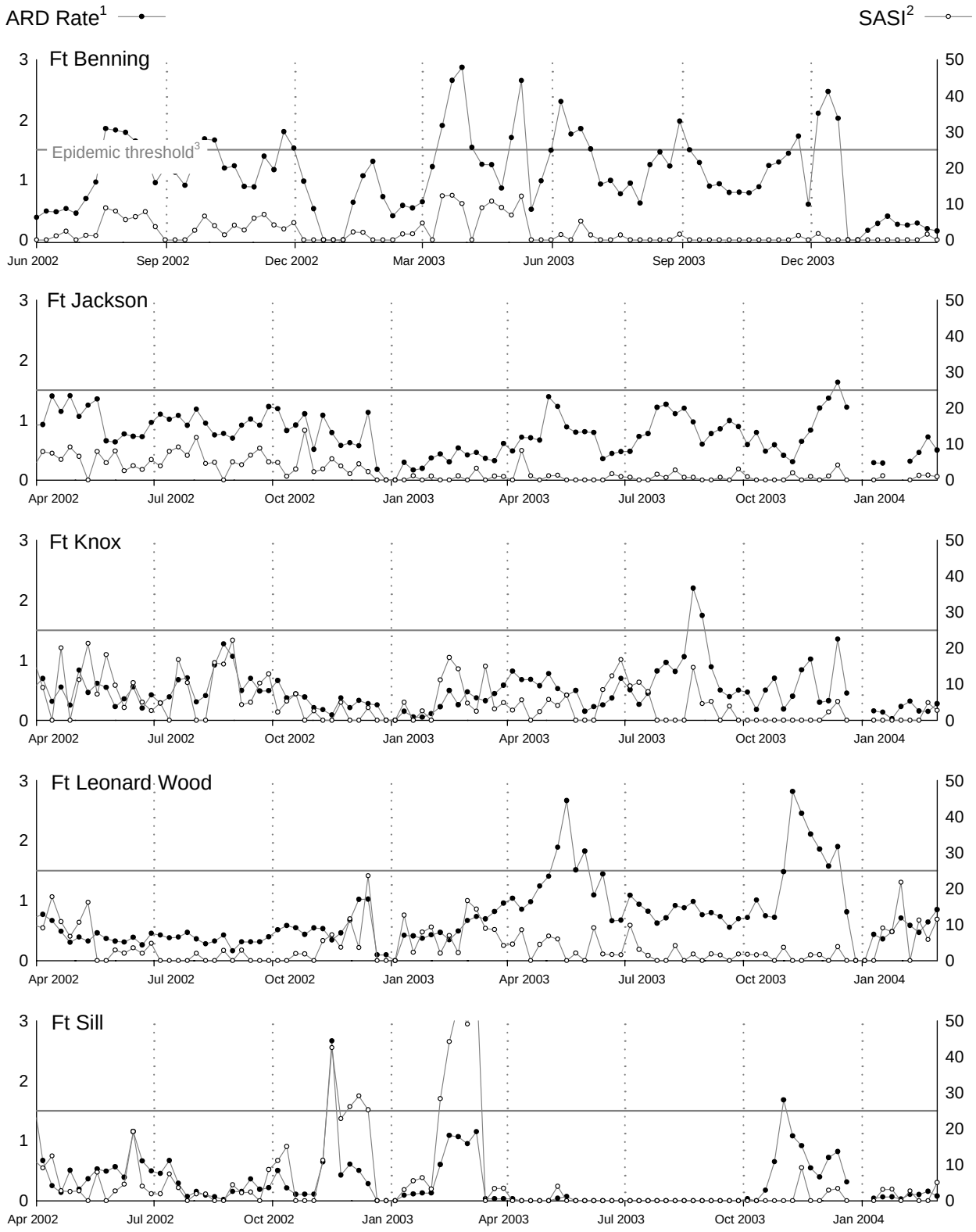
Table 3. Deployment-related "exposure concerns" reported on post-deployment health assessments*, US Armed Forces, January-December 2003

	Total respondents	Exposure concerns no.	Exposure concerns %
Total	296,355	39,751	13.4
Component			
Active	193,652	21,920	11.3
Reserve	102,682	17,822	17.4
Service			
Army	146,590	23,564	16.1
Navy	44,449	3,305	7.4
Air Force	52,797	4,154	7.9
Marines	52,519	8,728	16.6
Age (years)			
<20	11,023	797	7.2
20-29	156,338	18,312	11.7
30-39	82,235	12,407	15.1
>39	46,757	8,233	17.6
Gender			
Men	263,018	34,910	13.3
Women	33,277	4,836	14.5
Race/ethnicity			
Black	53,295	7,549	14.2
Hispanic	30,357	4,440	14.6
Other	3,461	616	17.8
White nonhispanic	194,050	25,306	13.0
Grade			
Enlisted	257,571	33,695	13.1
Officer	38,763	6,048	15.6

* Post-deployment health assessments (DD Form 2796) with completion dates: 1 January - 31 October 2003.

Note: Total does not include missing responses to "exposure concerns" or missing characteristics.

Acute respiratory disease (ARD) and streptococcal pharyngitis (SASI), Army Basic Training Centers, by week through February 28, 2004



[1]ARD rate = cases per 100 trainees per week

[2]SASI (Strep ARD surveillance index) = (ARD rate)x(rate of Group A beta-hemolytic strep)

[3]ARD rate >=1.5 or SASI >=25.0 for 2 consecutive weeks indicates an "epidemic"

Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through Feb 28/29, 2003 and 2004

Reporting location	Number of reports all events[3]		Food-borne								Vaccine Preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
NORTH ATLANTIC																
Washington, DC Area	38	14	.	.	2	.	.	.	1	.	.	.	.	.	.	3
Aberdeen, MD	4	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	18	13	1	.	.	.	3	.	.	.	.	.	.	.	.	.
FT Bragg, NC	162	135	.	.	.	.	1	.	1	.	.	.	.	.	2	.
FT Drum, NY	21	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Eustis, VA	27	17	.	.	.	.	.	.	.	.	.	.	.	.	1	.
FT Knox, KY	13	12	.	.	.	2	1	1	.	.	.	.	.	.	.	.
FT Lee, VA	17	18	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Meade, MD	13	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
West Point, NY	3	3	.	.	.	.	.	.	.	.	1	.	1	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	23	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Bliss, TX	29	15	.	.	.	.	.	.	1	.	.	.	.	.	.	.
FT Carson, CO	51	42	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Hood, TX	162	24	1	1	.	.	2	.	1	3	.	.	.	.	.	.
FT Huachuca, AZ	9	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Leavenworth, KS	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	20	9	.	.	.	.	.	.	.	.	.	.	.	.	2	.
FT Polk, LA	23	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Riley, KS	23	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Sill, OK	34	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SOUTHEAST																
FT Gordon, GA	17	5	.	.	.	.	1	.	.	.	.	.	.	.	.	.
FT Benning, GA	26	36	.	.	.	1	.	.	.	.	.	.	.	.	.	.
FT Campbell, KY	58	37	.	.	.	.	1	.	.	.	.	.	.	.	.	.
FT Jackson, SC	3	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Rucker, AL	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Stewart, GA	16	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.
WESTERN																
FT Lewis, WA	46	43	.	.	1	.	1	.	.	.	.	.	.	.	.	.
FT Irwin, CA	2	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FT Wainwright, AK	14	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
OTHER LOCATIONS																
Hawaii	91	68	1	.	1	1	2	3	1	.	.	.	.	1	.	.
Europe	158	55	2	.	.	.	1	1	.	.	1	.	.	.	.	.
Korea	77	14	.	1	.	.	.	.	.	.	.	.	.	.	.	1
Total	**1,202**	**712**	**5**	**2**	**4**	**4**	**13**	**5**	**5**	**3**	**2**	**0**	**1**	**1**	**5**	**4**

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

2. Events reported by March 7, 2003 and 2004.

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

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

(Cont'd) Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through Feb 28/29, 2003 and 2004

Reporting location	Arthropod-borne				Sexually Transmitted								Environmental			
	Lyme Disease		Malaria		Chlamydia		Gonorrhea		Syphilis[3]		Urethritis[4]		Cold		Heat	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
NORTH ATLANTIC																
Washington, DC Area	.	.	.	.	23	7	1	2	1	.	.	.	.	.	.	.
Aberdeen, MD	.	.	.	.	2	4	2	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	.	.	.	.	12	11	2	2	.	.	.	.	.	.	.	.
FT Bragg, NC	.	.	1	2	123	98	25	24	.	.	8	10	1	.	.	.
FT Drum, NY	.	.	.	1	16	.	2	.	.	.	.	.	.	.	.	.
FT Eustis, VA	.	.	.	.	19	16	6	1	.	.	.	.	.	.	.	.
FT Knox, KY	.	.	.	.	12	9	.	.	.	.	.	.	.	.	.	.
FT Lee, VA	.	.	.	.	13	16	4	2	.	.	.	.	.	.	.	.
FT Meade, MD	.	.	.	.	11	10	2	3	.	.	.	.	.	.	.	.
West Point, NY	.	.	.	.	1	3	.	.	.	.	.	.	.	.	.	.
GREAT PLAINS																
FT Sam Houston, TX	.	.	.	.	15	5	7	.	1	.	.	.	.	.	.	.
FT Bliss, TX	.	.	.	.	23	13	2	2	.	.	.	.	.	.	.	.
FT Carson, CO	.	.	.	.	39	40	3	.	.	.	7	2	2	.	.	.
FT Hood, TX	.	.	.	.	83	11	24	4	.	.	18	5	2	.	.	.
FT Huachuca, AZ	.	.	.	.	9	12	.	1	.	.	.	.	.	.	.	.
FT Leavenworth, KS	.	.	.	.	1	3	.	1	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	.	.	.	.	17	8	.	.	.	.	.	.	.	.	.	.
FT Polk, LA	.	.	.	.	16	9	7	1	.	1	.	.	.	.	.	.
FT Riley, KS	.	.	.	.	22	10	.	.	.	.	.	.	.	3	.	.
FT Sill, OK	.	.	.	.	19	10	6	.	.	.	7	.	.	1	.	.
SOUTHEAST																
FT Gordon, GA	.	.	.	.	13	5	3	.	.	.	.	.	.	.	.	.
FT Benning, GA	.	.	.	.	14	25	12	10	.	.	.	.	.	.	.	.
FT Campbell, KY	.	.	.	.	42	34	13	3	.	.	.	.	1	.	.	.
FT Jackson, SC	.	.	.	.	.	18	.	2	.	.	.	.	1	.	.	.
FT Rucker, AL	.	.	.	.	2	3	1	.	.	.	.	.	.	.	.	.
FT Stewart, GA	.	.	.	.	5	23	8	9	.	.	2	1	.	.	.	.
WESTERN																
FT Lewis, WA	.	.	.	.	19	25	10	4	.	.	12	12	.	.	.	.
FT Irwin, CA	.	.	.	.	2	5	.	.	.	.	.	.	.	.	.	.
FT Wainwright, AK	.	.	.	.	11	6	1	2	.	.	.	.	2	5	.	.
OTHER LOCATIONS																
Hawaii	.	.	.	.	52	48	5	12	.	.	.	.	.	.	.	2
Europe	.	.	.	.	118	41	26	9	.	.	.	.	1	1	.	.
Korea	.	.	.	.	59	7	14	3	.	.	.	.	1	2	.	.
Total	**0**	**0**	**1**	**3**	**813**	**535**	**186**	**97**	**2**	**1**	**54**	**30**	**11**	**12**	**0**	**2**

3. Primary and secondary.

4. Urethritis, non-gonococcal (NGU).

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through December 31, 2002 and 2003

Reporting location	Number of reports all events[3]		Food-borne								Vaccine Preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
NORTH ATLANTIC																
Washington, DC Area	234	412	6	.	6	5	7	3	7	3	2	.	.	.	1	2
Aberdeen, MD	52	102	1	.	1	.	.	.	1	.	.	.	1	.	.	.
FT Belvoir, VA	224	279	9	10	4	4	8	11	3	4	.	.	.	.	.	.
FT Bragg, NC	2,228	1,916	11	8	.	.	45	30	62	20	.	.	1	.	.	2
FT Drum, NY	165	204	1	.	.	1	.	.	.	.	.	.	.	.	.	2
FT Eustis, VA	287	471	3	.	.	.	3	1	9	.	.	.	1	.	2	2
FT Knox, KY	232	254	5	3	4	.	4	5	.	.	.	.	.	.	.	1
FT Lee, VA	233	218	.	.	.	.	1	2	.	.	.	.	.	.	.	.
FT Meade, MD	121	117	.	.	1	1	1	.	.	1	.	.	.	.	1	.
West Point, NY	114	85	.	2	.	.	3	2	.	.	2	1	1	1	2	.
GREAT PLAINS																
FT Sam Houston, TX	322	219	.	.	.	.	2	6	.	.	.	.	.	.	.	.
FT Bliss, TX	251	445	.	2	5	4	5	3	2	1	.	.	2	2	.	1
FT Carson, CO	643	685	8	13	8	7	4	3	4	2	.	4	3	.	.	1
FT Hood, TX	2,290	1,839	4	9	.	.	17	28	12	107	.	1	.	1	.	.
FT Huachuca, AZ	68	77	.	.	.	.	1	.	.	.	.	.	.	.	.	.
FT Leavenworth, KS	54	47	.	2	3	.	.	1	1	1	1	.	.	.	.	.
FT Leonard Wood, MO	237	210	.	6	.	.	3	1	.	.	.	.	.	1	4	4
FT Polk, LA	232	223	.	1	.	.	6	3	1	1	.	.	.	2	.	.
FT Riley, KS	291	253	.	4	.	6	1	1	.	.	.	1	.	2	1	.
FT Sill, OK	337	258	1	.	.	.	.	.	5	1	.	.	.	.	.	.
SOUTHEAST																
FT Gordon, GA	245	326	.	.	.	1	.	3	3	.	1	.	1	2	.	.
FT Benning, GA	562	462	.	1	3	6	31	9	2	8	.	.	.	.	3	.
FT Campbell, KY	740	491	4	4	1	8	4	4	2	1	.	.	.	.	3	.
FT Jackson, SC	264	247	.	.	.	.	.	1	.	.	.	1	1	.	1	.
FT Rucker, AL	80	74	1	.	.	.	3	6	2	7	.	2	.	1	.	.
FT Stewart, GA	590	356	1	.	3	.	12	16	3	14	.	.	.	.	1	1
WESTERN																
FT Lewis, WA	761	737	3	3	1	7	6	7	1	3	.	1	.	.	.	.
FT Irwin, CA	68	61	.	.	.	.	.	.	.	.	.	.	1	.	.	.
FT Wainwright, AK	142	199	1	2	1	.	1	1	.	.	.	.	.	.	.	.
OTHER LOCATIONS																
Hawaii	898	1,085	42	24	12	9	14	11	1	4	.	.	2	2	.	1
Europe	2,154	1,469	34	19	.	.	44	19	3	1	1	9	6	1	5	3
Korea	596	581	3	.	.	.	8	2	.	.	1	1	1	1	1	6
Total	**15,715**	**14,402**	**138**	**113**	**53**	**59**	**234**	**179**	**124**	**179**	**8**	**21**	**21**	**16**	**25**	**26**

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

2. Events reported by January 7, 2003 and 2004.

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

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

(Cont'd) Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through December 31, 2003 and 2004

Reporting location	Arthropod-borne				Sexually Transmitted								Environmental			
	Lyme Disease		Malaria		Chlamydia		Gonorrhea		Syphilis[3]		Urethritis[4]		Cold		Heat	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
NORTH ATLANTIC																
Washington, DC Area	5	2	2	2	97	161	23	24	6	3	.	.	.	1	2	.
Aberdeen, MD	2	2	.	.	43	39	3	12	.	.	.	.	.	9	.	.
FT Belvoir, VA	3	2	.	1	154	196	34	40	1	.	.	.	.	.	2	1
FT Bragg, NC	.	1	4	8	1,558	1,308	297	264	1	6	125	111	1	5	110	79
FT Drum, NY	.	.	2	.	109	133	29	25	.	1	.	.	10	4	14	.
FT Eustis, VA	1	.	.	.	212	188	51	44	1	1	.	.	.	.	3	.
FT Knox, KY	.	.	.	.	166	209	48	30	.	.	.	.	.	.	3	1
FT Lee, VA	2	.	.	.	192	142	36	27	.	.	.	.	.	.	2	.
FT Meade, MD	5	.	.	.	95	95	15	20	.	.	2	.	.	.	.	.
West Point, NY	40	36	.	.	18	25	9	3	1	.	.	.	.	1	37	8
GREAT PLAINS																
FT Sam Houston, TX	.	.	.	.	246	169	48	33	.	1	.	.	.	.	2	.
FT Bliss, TX	.	.	.	.	153	283	27	60	1	2	.	.	.	.	1	1
FT Carson, CO	.	.	3	.	446	380	53	39	1	1	64	41	1	2	.	1
FT Hood, TX	.	.	5	3	1,251	889	440	275	4	5	406	202	1	5	40	11
FT Huachuca, AZ	.	.	.	1	55	71	10	5	.	.	.	.	.	.	2	.
FT Leavenworth, KS	.	.	1	1	35	37	11	3	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	.	.	1	.	167	169	38	20	.	1	2	.	3	2	12	3
FT Polk, LA	.	.	1	1	153	162	62	45	3	.	.	.	.	.	1	8
FT Riley, KS	.	.	2	.	219	197	51	10	.	.	.	.	12	.	3	4
FT Sill, OK	.	.	2	.	193	148	59	21	.	1	55	32	1	.	19	4
SOUTHEAST																
FT Gordon, GA	2	.	1	2	195	277	30	24	1	5	.	.	.	.	1	2
FT Benning, GA	.	.	1	25	286	265	135	117	1	.	.	.	.	.	94	29
FT Campbell, KY	1	1	2	2	528	355	161	92	1	1	.	.	1	2	24	9
FT Jackson, SC	.	.	.	.	215	180	42	33	1	.	.	.	2	5	2	22
FT Rucker, AL	.	.	1	.	50	39	18	12	.	.	.	1	.	.	5	4
FT Stewart, GA	3	.	1	2	358	173	150	85	2	.	11	35	.	.	42	14
WESTERN																
FT Lewis, WA	.	.	3	2	534	383	85	75	2	.	112	89	.	1	.	2
FT Irwin, CA	.	.	.	.	53	47	12	13	.	.	.	.	.	.	1	.
FT Wainwright, AK	1	.	.	1	111	116	8	25	.	.	.	.	14	34	.	.
OTHER LOCATIONS																
Hawaii	.	.	2	2	647	745	100	133	1	1	.	.	.	.	12	21
Europe	9	5	10	8	1,571	1,059	431	246	6	2	3	1	13	4	8	33
Korea	.	.	20	19	415	442	116	68	1	3	1	8	8	5	14	12
Total	**74**	**49**	**64**	**80**	**10,525**	**9,082**	**2,632**	**1,923**	**35**	**34**	**781**	**520**	**67**	**80**	**456**	**269**

3. Primary and secondary.

4. Urethritis, non-gonococcal (NGU).

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

Commander
U.S. Army Center for Health Promotion
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