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Contents

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Surveillance trends

Malaria among Active Duty US Soldiers, January - December 2000

As the most prevalent arthropod-transmitted disease in the world, malaria poses one of the most significant threats to the health and operational effectiveness of deployed military forces. Since the end of the cold war, deployments of US military forces have increased in numbers and expanded in geographic scope. As a result, US soldiers are now exposed to malaria risks more frequently and in more regions of the world than in the recent past.

For several decades prior to 1993, the Republic of Korea was considered to be free of malaria. In 1993, however, indigenous transmission of vivax malaria reemerged in Korea near the demilitarized zone (DMZ). Since then, malaria rates have increased among soldiers and civilians who reside or train near the DMZ.[1,2] For the past several years, the majority of malaria infections among US soldiers were acquired in Korea, and in 1999, 75% of malaria cases among US soldiers were considered Korea-acquired.[3] This report summarizes malaria incidence among US soldiers during calendar year 2000.

Methods. All data were derived from the Defense Medical Surveillance System (DMSS). Hospitalizations of US soldiers and reports to the Army's Reportable Medical Events System (RMES) were searched to identify all diagnoses of malaria (ICD-9-CM: 084.0-084.9). Only one episode of malaria per soldier was included in analysis. Locations of malaria acquisition were estimated using the following criteria: 1) all cases that presented in Korea between May and October (the malaria transmission season) were considered Korea-acquired cases with short incubation periods; 2) all cases reported through RMES that indicated a recent exposure to a malaria-endemic area were considered to have been acquired in that area; and, 3) all cases that were assigned to Korea during transmission seasons that preceded dates of malaria diagnoses were considered Korea-acquired with long incubation periods. All other cases were considered "unknown."

Malaria, overall. During calendar year 2000, 55 cases of malaria were reported among active duty soldiers. Most cases (n=44) were caused by *Plasmodium vivax*, and one case was caused by *P. falciparum*. For 10 cases, the malaria species was unspecified or unknown.

All cases were males, and most (n=38, 69%) were younger than 30 years old. In relation to the Army overall, white (n=38, 69%) and Hispanic (n=8, 15%) soldiers were overrepresented among cases; and black (n=2, 4%) soldiers were significantly underrepresented.

Of all malaria cases among soldiers in 2000, more than two-thirds (n=39, 71%) were considered

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Korea-acquired. Seven cases were attributed to exposures in Honduras and 3 to exposures in other tropical countries.

In contrast, only approximately one-fourth (n=12, 22%) of all cases were diagnosed in Korea. Cases presented at 14 other locations including Fort Campbell, Kentucky (n=9), Fort Lewis, Washington (n=7), Fort Bragg, North Carolina (n=6), and Fort Benning, Georgia (n=5) (figure 1).

Editorial comment. Most cases of malaria among US soldiers continue to be *P. vivax* cases acquired in Korea. Since Korea-acquired cases may have long incubation periods, their clinical manifestations may be delayed until affected soldiers have departed Korea. Primary care providers throughout the military health system should be vigilant for malaria that may present long after exposures to risk along the DMZ in Korea.

The identification, characterization, and tracking of malaria risks to deployed US forces require complete and accurate reporting of cases for medical surveillance purposes. In the Army, preventive medicine activities are required to report malaria cases to the Army Medical Surveillance Activity through the Army's Reportable Medical Events System. In turn, clinicians who diagnose malaria in beneficiaries of the US military health system should report them expeditiously to their local military preventive medicine and public health authorities.

References

1. Lee JS, Kso WG, Lee HW, Seo M, Lee WJ. Current status of vivax malaria among civilians in Korea. *Korean Journal of Parasitology*, 1998, 36:4(Dec), 241-248.
2. Feighner BH, Pak SI, Novakoski WL, Kelsey LL, Strickman D. Reemergence of *Plasmodium vivax* malaria in the republic of Korea. *Emerging Infectious Disease*, 1998, 4:2(Apr-Jun), 295-7.
3. Lesikar SJ. Malaria experience among active duty US soldiers. *MSMR*, 1999, 5:8(Dec), 2-3.

Figure 1. Malaria cases, by locations of acquisition and diagnosis, US Army, 2000

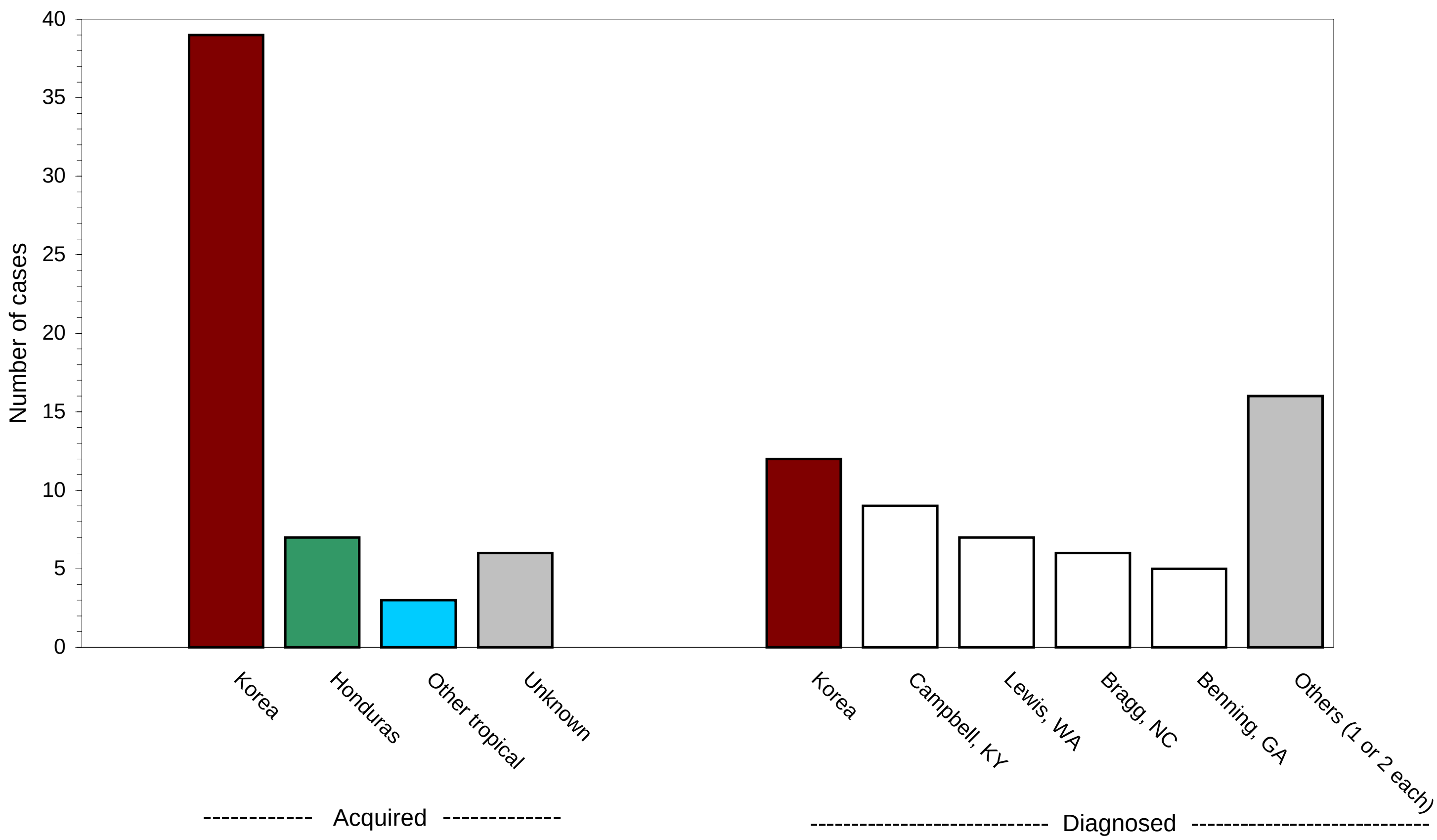


Table I. Sentinel reportable events, US Army medical treatment facilities[1]
Cumulative events for all beneficiaries, calendar year through December 31, 1999 and 2000[2]

Reporting Facility	Number of reported events[3]		Environmental				Food- and Water-borne							
			Cold		Heat		Campylobacter		Giardia		Salmonella		Shigella	
	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000
NORTH ATLANTIC RMC														
Walter Reed AMC, DC	179	196	-	-	-	-	5	5	6	6	3	9	-	5
Aberdeen Prov. Grd., MD	24	39	-	-	-	-	-	-	-	-	-	-	-	-
FT Belvoir, VA	214	236	-	-	2	8	9	14	12	5	12	9	3	2
FT Bragg, NC	1267	1485	9	5	109	164	8	2	2	-	33	17	-	1
FT Drum, NY	204	202	15	12	3	1	1	-	4	-	1	-	-	-
FT Eustis, VA	214	260	1	-	3	8	2	4	-	-	4	5	1	-
FT Knox, KY	303	251	2	-	15	10	3	1	3	2	1	1	3	-
FT Lee, VA	178	254	-	-	1	1	-	-	-	-	2	-	-	-
FT Meade, MD	66	92	-	-	-	-	-	-	1	-	-	2	-	-
West Point, NY	61	105	-	1	2	1	-	-	-	-	-	4	1	-
GREAT PLAINS RMC														
Brooke AMC, TX	395	298	-	-	9	4	-	4	-	5	7	4	4	7
Beaumont AMC, TX	307	313	-	-	5	6	-	-	-	2	4	8	2	7
FT Carson, CO	757	657	2	2	-	-	5	2	10	5	6	2	1	9
FT Hood, TX	1516	1912	-	1	8	32	2	4	1	1	10	12	8	4
FT Huachuca, AZ	69	55	-	-	2	1	1	-	-	-	1	-	1	-
FT Leavenworth, KS	20	32	-	-	-	2	2	1	1	2	-	1	-	-
FT Leonard Wood, MO	174	174	6	15	3	11	-	1	1	1	3	-	-	-
FT Polk, LA	206	249	-	-	1	4	-	-	-	-	-	-	-	-
FT Riley, KS	219	220	1	23	11	4	-	-	-	-	-	-	-	-
FT Sill, OK	281	288	-	-	9	8	-	-	-	-	-	-	2	-
SOUTHEAST RMC														
Eisenhower AMC, GA	203	304	1	-	4	1	-	-	-	-	2	2	-	1
FT Benning, GA	410	384	-	-	100	52	1	3	2	3	14	17	2	1
FT Campbell, KY	314	484	2	2	10	4	7	4	3	7	2	16	11	13
FT Jackson, SC	405	416	-	-	-	1	-	-	-	-	1	-	-	-
FT Rucker, AL	59	83	-	-	4	1	-	-	-	-	-	3	1	-
FT Stewart, GA	502	536	-	-	20	27	-	-	3	-	6	8	-	-
WESTERN RMC														
Madigan AMC, WA	453	719	-	-	-	-	-	5	1	6	-	6	1	2
FT Irwin, CA	41	59	-	-	-	-	-	-	-	-	-	-	-	-
FT Wainwright, AK	132	95	52	11	-	-	-	-	-	-	-	-	-	-
OTHER LOCATIONS														
Tripler, HI	584	807	-	-	3	3	25	47	14	10	13	12	1	2
Europe	695	1673	4	5	-	-	28	16	-	3	14	34	3	2
Korea	443	559	8	2	5	5	2	-	-	-	1	8	-	-
Total	**10,895**	**13,437**	**103**	**79**	**329**	**359**	**101**	**113**	**64**	**58**	**140**	**180**	**45**	**56**

1. Main and satellite clinics.

2. Events reported by January 7, 2000 and 2001.

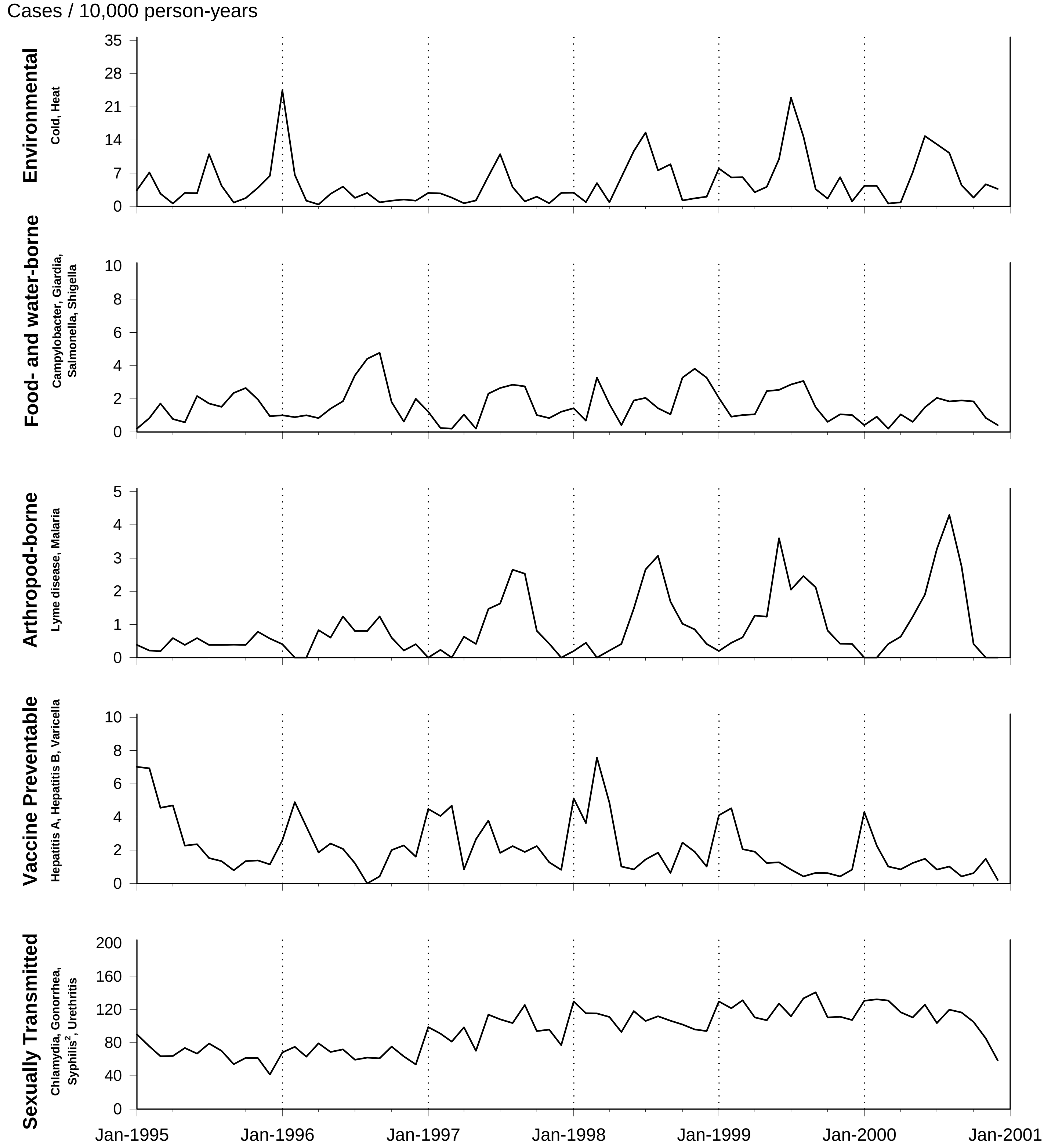
3. Tri-Service Reportable Events, Version 1.0, July 2000. Not all reportable events are displayed in Table I.
Number of events in a row may not equal the total number of reported events for the reporting facility.

Table I. (Cont'd) Sentinel reportable events, US Army medical treatment facilities[1]
Cumulative events for all beneficiaries, calendar year through December 31, 1999 and 2000[2]

Arthropod-borne				Vaccine Preventable						Sexually Transmitted							
Lyme Disease		Malaria		Hepatitis A		Hepatitis B		Varicella		Chlamydia		Gonorrhea		Syphilis[4]		Urethritis[5]	
Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000	Cum. 1999	Cum. 2000
2	3	4	-	1	1	-	1	3	3	86	76	21	28	3	2	1	-
-	3	-	-	-	-	-	3	1	1	8	18	13	5	-	2	2	2
-	-	-	-	1	-	-	6	-	1	135	143	35	32	-	3	-	-
4	2	3	6	-	-	-	-	1	6	556	609	264	284	5	3	268	380
-	-	3	1	-	-	-	-	6	5	111	130	54	50	-	-	3	2
-	1	2	-	-	-	1	1	2	2	144	189	51	46	-	-	-	-
-	-	-	-	-	-	-	1	1	7	213	181	59	45	1	1	-	-
-	-	-	-	-	1	1	-	-	-	141	193	30	59	3	-	-	-
3	-	-	-	-	-	-	-	1	-	52	68	6	11	-	1	-	2
17	38	-	1	-	-	2	1	1	2	33	42	3	12	-	1	-	-
2	-	2	2	3	-	4	-	2	2	181	160	55	58	-	2	1	-
-	-	1	-	1	3	-	-	2	2	250	232	21	38	-	-	13	6
-	-	-	1	-	-	1	1	2	-	550	495	98	73	-	-	72	49
1	-	4	1	1	1	1	2	3	2	888	1017	257	376	5	1	299	435
-	-	-	-	1	-	-	-	-	-	49	43	12	11	-	-	-	-
-	1	-	-	-	-	-	-	-	-	14	20	3	3	-	-	-	-
-	1	1	-	-	-	1	-	12	13	99	86	30	31	1	-	8	10
-	-	1	-	-	-	-	-	-	-	160	214	40	30	2	-	-	-
-	-	-	-	-	-	-	-	-	-	152	127	55	62	-	1	-	-
-	2	1	-	-	-	6	-	6	4	159	164	60	59	2	-	33	45
-	2	-	3	1	-	3	4	2	2	164	225	14	26	1	1	-	-
-	-	1	8	1	-	-	1	2	8	154	175	88	101	15	4	-	-
-	1	5	9	-	-	-	1	-	2	172	276	100	140	-	1	-	-
-	-	-	-	-	-	-	-	6	3	333	358	51	45	6	4	-	-
-	-	-	1	-	-	-	-	-	-	41	57	13	15	-	-	-	-
-	-	4	2	-	-	1	-	4	-	161	179	97	121	-	-	204	196
-	3	6	7	-	1	-	3	-	-	268	488	53	67	-	-	114	108
-	-	-	1	-	-	5	-	-	5	32	42	4	8	-	2	-	-
-	-	1	-	-	-	1	-	2	-	64	80	10	3	-	-	-	-
-	-	4	3	1	1	1	2	-	1	367	560	91	98	-	-	-	1
10	17	2	1	2	1	7	7	4	9	479	1295	125	257	2	4	1	-
-	-	21	14	-	-	15	1	3	3	332	434	16	47	15	16	-	11
39	**74**	**66**	**61**	**13**	**9**	**50**	**35**	**66**	**83**	**6,548**	**8,376**	**1,829**	**2,241**	**61**	**49**	**1,019**	**1,247**

4. Primary and Secondary.
5. Urethritis, non-gonoccal (NGU).
Note: Completeness and timeliness of reporting varies by facility.
Source: Army Reportable Medical Events System.

Figure I. Sentinel reportable events (grouped), active duty soldiers, January 1995 - December 2000[1]



1. Events reported by January 7, 2001
2. Primary and Secondary

Source: Army Reportable Medical Events System

Surveillance trends

P. Vivax Malaria Acquired by US soldiers in Korea: Acquisition Trends and Incubation Period Characteristics, 1994-2000

In 1993, after several decades of being considered free of malaria, the disease reemerged in the Republic of Korea.[1-3] Since then, rates of malaria have increased, but risks of acquisition have remained localized to areas that border the Demilitarized Zone that partitions the Korean peninsula.[2-4]

The *Plasmodium vivax* strains that are endemic in Korea are characteristic of those of temperate regions in general. A hallmark of temperate zone malaria is the generally bimodal distribution of incubation periods[5-7] (i.e., times from acquisition of sporozoites to clinical manifestations of acute illness). Short incubation periods are typically 13-16 days, while long incubation periods have much wider distributions, ranging from several months to years.[5] Reports among Korean citizens who acquired malaria since the recent resurgence suggest that a majority of cases have long incubation periods.[3]

US soldiers are at risk of exposure to malaria in Korea when they are stationed or train in endemic areas near the DMZ during summer-fall transmission seasons (when mosquitoes that transmit the parasite are abundant and active).[2,4,8] Since typical assignments in Korea are 13 months in duration, most soldiers are potentially exposed to malaria risk for at least one full transmission season (possibly split over two calendar years). Since long incubation periods are likely to extend beyond the tours of duty in Korea of affected soldiers, many Korea-acquired cases become clinically overt during subsequent assignments at locations outside of Korea.[9]

This report summarizes results of analyses to estimate frequencies and trends of malaria acquired in Korea by US soldiers, correlates of risk of acquiring malaria in Korea, and characteristics of incubation times of Korea-acquired malaria.

Methods. All data were derived from the Defense Medical Surveillance System (DMSS). The study period was January 1994 to December 2000. All hospitalizations of US Army soldiers and all reports to the Army's Reportable Medical Events System (RMES) during the study period were searched to identify all diagnoses of malaria (ICD-9-CM: 084.0-084.9). One episode (the earliest) of malaria per soldier was included in analyses.

Locations of malaria acquisitions were estimated by the following hierarchical method: first, all cases that were hospitalized in or reported from Korea during a malaria transmission season (May through October) were considered Korea-acquired cases with short incubation periods; second, all cases reported through RMES that indicated recent exposures to malarious areas (e.g., near the DMZ in Korea) were considered acquired in those areas; and lastly, all cases that were assigned to Korea during transmission seasons that preceded dates of malaria diagnoses were considered Korea-acquired with long incubation periods. All other cases were considered to have unknown origins. Only cases that were considered Korea-acquired were included in analyses. Proportions of cases considered "long incubation" were estimated by dividing the number of long incubation cases by the total number of cases in a subgroup or time interval of interest. Confidence intervals around observed proportions were estimated using the binomial distribution.

Results. During the 7-year period, 168 cases of malaria were considered Korea-acquired. More than 70% of all Korea-acquired cases (n=120) were in soldiers between 20 and 29 years old, and all but one of the cases were among males.

Acquisition trends. Acquisitions of malaria in Korea increased sharply beween 1995 (n=2) and 1998 (n=48) (figure 1). However, there were similar numbers of acquisitions in 1998 (n=48) and 1999 (n=46), and there were similar numbers of short incubation cases in 1998 (n=20), 1999 (n=24), and 2000 (n=21) (figure 1). These recent trends suggest a plateauing of malaria acquisitions since 1998.

Incubation periods. Nearly half of all Korea-acquired cases (n=75, 45% [95%CI 37.3-52.1]) had long incubation periods. The proportions of cases with long incubation periods were remarkably similar across age groups from 20 to 39 years old (figure 2). However, there were relatively fewer (27%) and relatively more (80%) long incubation cases in the youngest (<20 years old) and oldest (40+ years) age groups, respectively (figure 2).

Editorial comment. These analyses suggest that acquisitions of malaria by US soldiers in Korea have remained relatively stable since 1998. The results also suggest that nearly half of malaria cases acquired in Korea have long incubation periods and, thus, are likely to become clinically overt at locations outside of Korea. Of note, there was relatively little variability in the proportion of cases with long incubation periods over time or related to age. This finding may be useful for medical surveillance purposes since it may allow estimates of the total number of infections acquired during a transmission season and the number of cases likely to present after a transmission season based on the number of short incubation cases diagnosed during a transmission season. Throughout the military health system, clinical vigilance and compliance with case reporting are necessary to track the reemerging malaria threat in Korea and to validate the findings of this report.

References

1. Cho SY, Kong Y, Park SM, Lee JS, Lim YA, Chae SL, Kho WG, Lee JS, Shim JC, Shin HK. Two vivax malaria cases detected in Korea. *Korean J Parasitol* 1994 Dec;32(4):281-4.

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

3. Chai JY. Re-emerging *Plasmodium vivax* malaria in the Republic of Korea. *Korean J Parasitol* 1999 Sep;37(3):129-43.

4. Strickman D, Miller ME, Kim HC, Lee KW. Mosquito surveillance in the Demilitarized Zone, Republic of Korea, during an outbreak of *Plasmodium vivax* malaria in 1996 and 1997. *J Am Mosq Control Assoc* 2000 Jun;16(2):100-13.

5. Shute PG, Lupascu G, Branzei P, Maryon M, Constantinescu P, Bruce-Chwatt LJ, Draper CC, Killick-Kendrick R, Garnham PC. A strain of *Plasmodium vivax* characterized by prolonged incubation: the effect of numbers of sporozoites on the length of the prepatent period. *Trans R Soc Trop Med Hyg.* 1977;70(5-6):474-81.

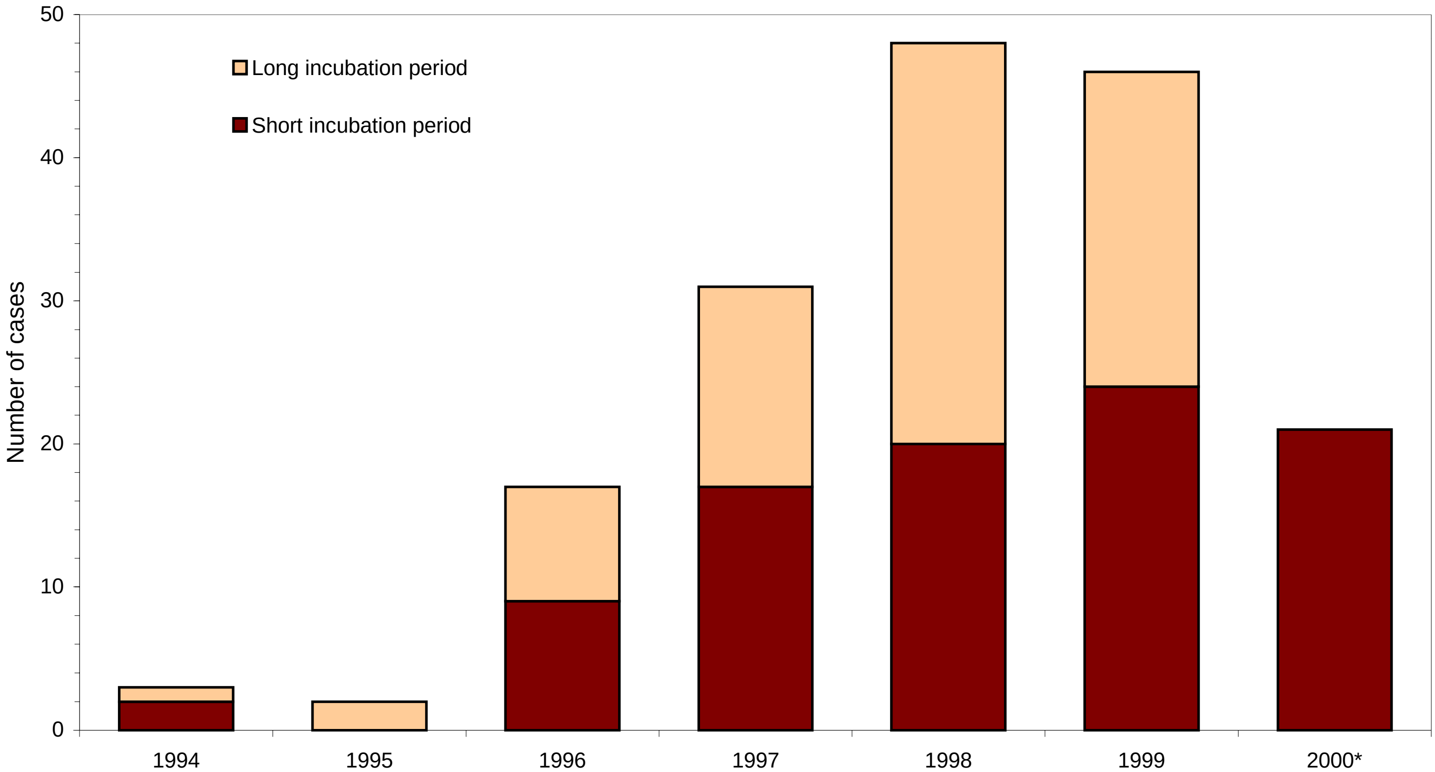
6. Adak T, Sharma VP, Orlov VS. Studies on the *Plasmodium vivax* relapse pattern in Delhi, India. *Am J Trop Med Hyg* 1998 Jul;59(1):175-9.

7. Yang B. Experimental and field studies on some biological characteristics of *Plasmodium vivax* isolated from tropical and temperate zones of China. *Chin Med J (Engl).* 1996 Apr;109(4):266-71.

8. 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 Sep;164(9):626-9.

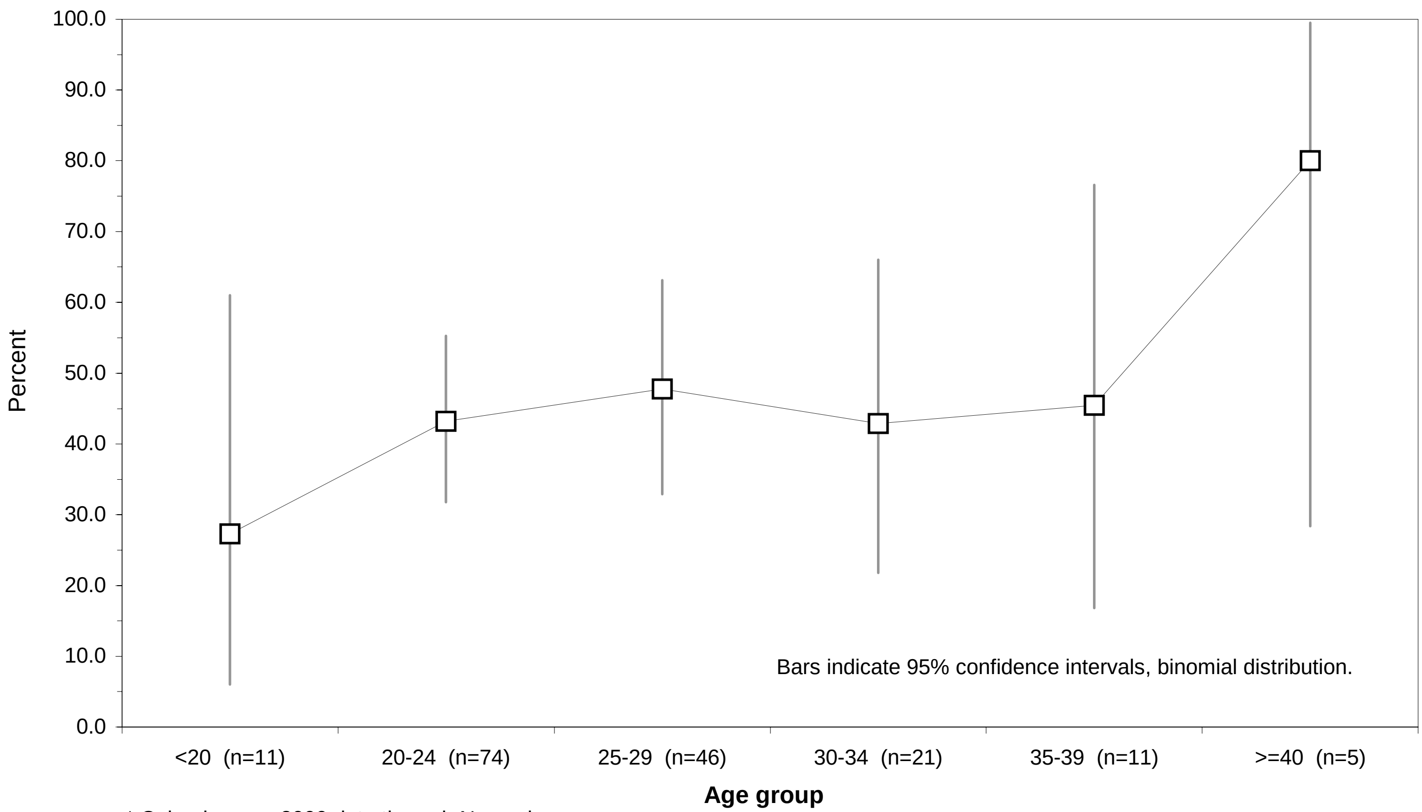
9. Petruccelli BP, Feighner BH, Craig SC, Kortepeter MG, Livingston R. Late presentations of vivax malaria of Korean origin, multiple geographic sites. *MSMR.* 1998 Jul/Aug;4(5), 2-10.

Figure 1. Cases of Korea-acquired malaria among US Army soldiers, by estimated year of acquisition and length of incubation period, 1994-2000*



* Calendar year 2000 data through November.

Figure 2. Percent of Korea-acquired malaria cases with long incubation periods, by age, active duty soldiers, 1994-2000*



* Calendar year 2000 data through November.

Case Report

P. falciparum Malaria in the Sons of a Soldier in Hanau, Germany

On 4 December 2000, the 7-year old son of a soldier assigned to Hanau, Germany, developed a fever while at school. The child was evaluated at the US Army Health Clinic in Hanau. On presentation, the child complained of fever, a right-sided headache, stomach pain, and diarrhea for 1 day. Physical examination was remarkable for a temperature of 103°F. and diffuse lower abdominal pain. Acetominophen was given for fever, and a urinalysis and complete blood count were ordered. The child was released to his home with a temperature of 100.1°F. The parents were instructed to return the next day if the child's symptoms persisted.

The complete blood count revealed an increased red cell distribution width and decreased platelets (75,000/ml). To further assess the abnormalities, the sergeant in charge of the laboratory examined a smear of the child's blood which revealed inclusions within red blood cells. Although the sergeant had not seen malaria parasites since his laboratory technician training approximately 6 years earlier, he suspected that the inclusions were plasmodia ring forms. He notified the child's attending physician of his findings and suspicions.

On 5 December, the slide was reviewed by a pathologist at the US Army hospital in Heidelberg. The pathologist confirmed the diagnosis of malaria but could not confirm the species. The attending physician consulted the Hanau Clinic commander, a Preventive Medicine physician, who advised the presumption of *P. falciparum* in the absence of a definitive diagnosis.

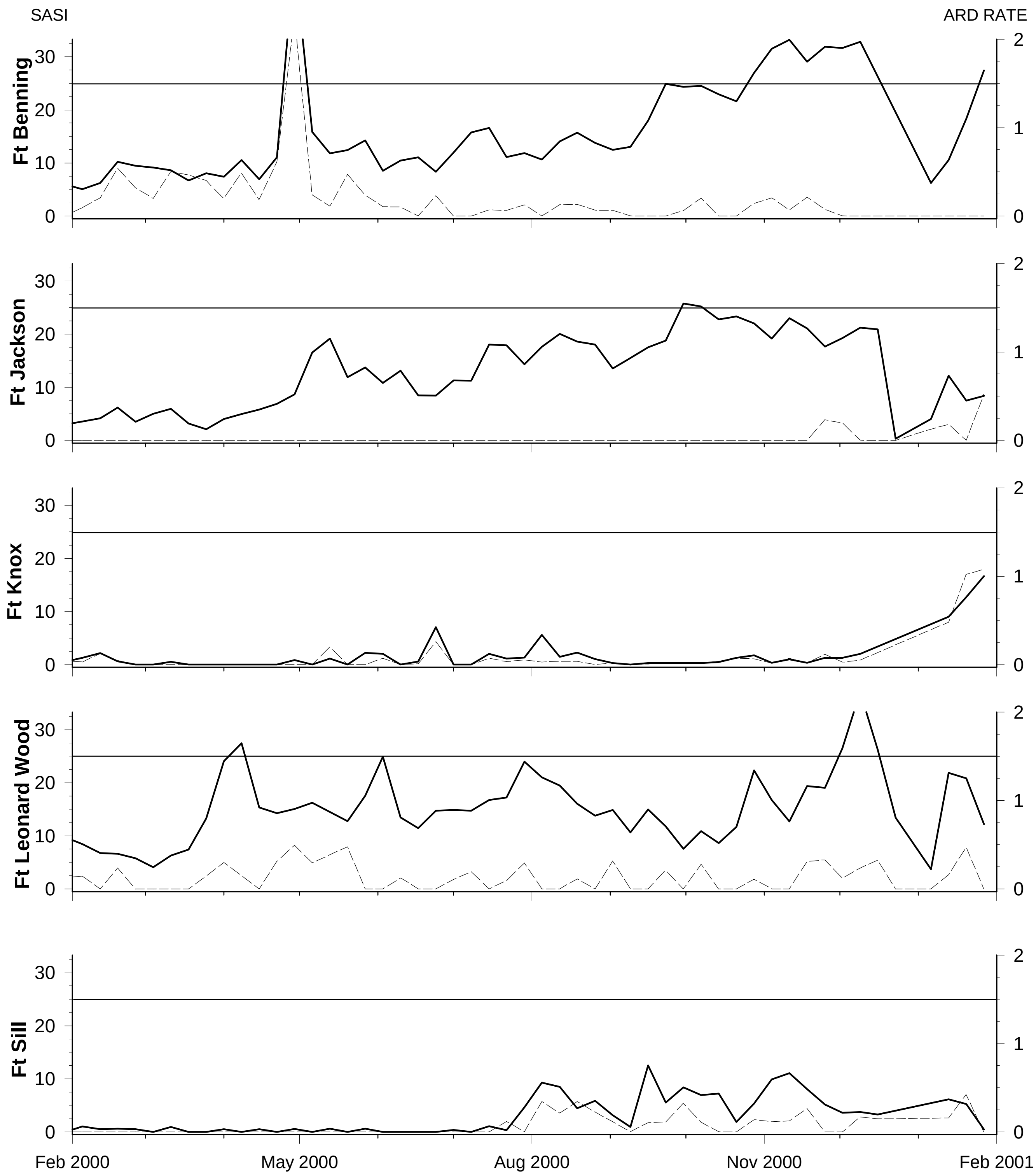
The child was referred to the Center for Tropical Diseases at the Frankfurt University Medical Center. During initial history taking, the child's 14-year-old brother, who was at home, developed signs and symptoms similar to his brother's. *P. falciparum* malaria was confirmed in both children. The children were admitted to the Frankfurt University Hospital, treated with intravenous quinine, and released after 3 days without complications.

The Hanau Clinic's Community Health Nurse interviewed the father to determine the nature, duration, and location of the children's malaria exposures. Both children were born and lived in Cameroon, West Africa until approximately 6 weeks prior to their illnesses when they joined their parents in Germany. Neither child had received malaria chemoprophylaxis. No other family members had signs or symptoms of malaria.

Editorial comment. Malaria may be the most significant public health problem in the world. Annually, there are an estimated 300-500 million clinical cases of malaria, most in Africa; and malaria accounts for an estimated 2 million deaths each year, more than half of them in children and pregnant women.[1,2] The case report above emphasizes several points regarding the prevention, detection, and management of malaria in US military-associated populations. First, even in locations where there is no indigenous transmission of malaria (e.g., Germany), during periods of increased febrile illnesses in general (e.g., winter), and in settings where other causes of febrile illnesses are much more likely (e.g., elementary school), malaria should be considered in the differential diagnoses of febrile patients with compatible clinical syndromes and histories of potential exposures. Second, care providers should solicit histories of potential malaria exposures with cognizance of the geographic distribution and expanding ranges of malaria, the increasing frequencies of international travel, and the potentially long lead times from infection with the parasite to expression of disease. Third, since the diagnosis of malaria depends on the detection of parasites in peripheral blood, the diligence and competence—and in turn, the supervision and training—of laboratory personnel are critical. In this case, the chief laboratory technician prepared and examined a smear of the patient's blood after abnormalities were detected on a routine CBC; he recognized inclusions in RBCs that were suggestive of malaria; he promptly notified the attending physician of the finding; and he referred the smear for further examination by a pathologist. All steps

Figure II. Acute respiratory disease (ARD) surveillance update US Army initial entry training centers

——— ARD rate = (ARD hospitalizations / # trainees) x 100 ------- SASI* = (ARD rate x strep rate**)	SASI ≥ 25 or ARD rate ≥ 1.5% for 2 weeks defines an ARD epidemic



* SASI (Strep ARD Surveillance Index) is a reliable predictor of serious strep-related morbidity

** Strep rate = (Group A beta-hemolytic strep(+) / # cultures) x 100 were critical to the timely diagnosis and management of the case. Fourth, in the absence of a definitive diagnosis, the patient was presumed to have *P. falciparum* malaria since it is the most dangerous malaria species. Fifth, physicians and others who care for military and military-associated populations, especially overseas, should be competent to provide state-of-the-art diagnostic and therapeutic services for tropical infectious and other travel-related diseases. These competencies should be emphasized in military graduate, postgraduate, and continuing medical education programs. Finally, long-term residents of endemic areas may have clinically inapparent malaria infections. Thus, "terminal prophylaxis" is required to eradicate malaria infections that may have been acquired while living in endemic regions.

Reported by SGT Jorge Rubio, Ms. Kathleen Ackermann, CHN, Dr. Edeltraud Fairy and LTC William Novakoski, Hanau Health Clinic; and CPT Daniel Costigan, Preventive Medicine Service, Heidelberg MEDDAC.

References

1. Martens P, Hall L. Perspectives: malaria on the move: human population movement and malaria transmission. *Emerging Inf Dis*, 2000, 6:2,

2. Phillips RS. Current status of malaria and potential control. *Clin Microbiol Rev*, 2001, 14:1, 208-26.

Table SI. Reportable events, US Army medical treatment facilities[1] Cumulative events for all beneficiaries, January - December 2000[2]

Diagnosis[3]	Jan-Mar 2000	Apr-Jun 2000	Jul-Sep 2000	Oct-Dec 2000	Diagnosis[3]	Jan-Mar 2000	Apr-Jun 2000	Jul-Sep 2000	Oct-Dec 2000
All reportable events	**3621**	**3623**	**3655**	**2480**	Listeriosis	-	-	-	-
Amebiasis	1	1	-	1	Lyme disease	4	19	40	6
Anthrax	-	-	-	-	Malaria, falciparum	1	2	3	2
Biological warfare agent exposure	-	-	-	-	Malaria, malariae	-	-	-	-
Botulism	-	-	-	1	Malaria, ovale	-	-	-	-
Brucellosis	-	-	-	-	Malaria, unspecified	-	8	2	1
Campylobacter	14	34	39	26	Malaria, vivax	2	9	38	1
Carbon monoxide poisoning	1	2	1	12	Measles	1	-	-	4
Chemical agent exposure	-	-	-	-	Meningococcal meningitis	2	1	1	2
Chlamydia	2310	2259	2149	1638	Meningococcal septicemia	-	-	-	-
Cholera	-	-	-	-	Mumps	3	1	-	1
Coccidioidomycosis	1	1	-	1	Pertussis	1	8	4	-
Cold weather, frostbite	16	1	-	18	Plague	-	-	-	-
Cold weather, hypothermia	2	-	-	1	Pneumococcal pneumonia	1	2	1	1
Cold weather, immersion type	8	1	-	4	Poliomyelitis	-	-	-	-
Cold weather, unspecified	21	-	-	7	Q fever	-	-	1	-
Cryptosporidiosis	-	-	2	2	Rabies, human	-	-	-	-
Cyclospora	-	1	-	-	Relapsing fever	-	-	-	-
Dengue fever	-	1	1	-	Rheumatic fever, acute	-	-	-	-
Diphtheria	-	-	-	-	Rift valley fever	-	-	-	-
E. Coli O157:H7	2	4	10	2	Rocky mountain spotted fever	-	5	11	-
Ehrlichiosis	-	2	1	1	Rubella	-	-	-	-
Encephalitis	-	1	-	-	Salmonellosis	22	47	80	30
Filariasis	-	-	-	1	Schistosomiasis	-	1	-	-
Giardiasis	15	6	26	9	Shigellosis	12	16	13	13
Gonorrhea	591	614	618	415	Smallpox	-	-	-	-
H. influenzae, invasive	2	1	3	-	Streptococcus, group A, invasive	-	3	1	-
Hantavirus infection	-	-	-	-	Syphilis, congenital	1	1	-	-
Heat exhaustion	3	123	158	13	Syphilis, latent	7	19	4	8
Heat stroke	1	23	30	8	Syphilis, primary/secondary	19	8	15	7
Hemorrhagic fever	-	-	-	2	Syphilis, tertiary	2	2	6	2
Hepatitis A	3	2	3	-	Tetanus	-	-	-	-
Hepatitis B	11	10	8	6	Toxic shock syndrome	1	-	-	-
Hepatitis C	13	7	7	4	Trichinosis	-	-	-	-
Influenza	107	-	-	11	Trypanosomiasis	-	-	-	-
Lead poisoning	3	-	1	-	Tuberculosis, pulmonary	7	2	5	1
Legionellosis	1	-	-	-	Tularemia	-	1	1	-
Leishmaniasis, cutaneous	-	-	-	-	Typhoid fever	-	-	-	-
Leishmaniasis, mucocutaneous	-	-	-	-	Typhus fever	-	-	-	-
Leishmaniasis, unspecified	-	-	-	-	Urethritis, non-gonococcal	348	340	354	203
Leishmaniasis, visceral	-	-	-	-	Vaccine, adverse event	21	9	5	5
Leprosy	-	-	-	-	Varicella, active duty only	40	24	10	10
Leptospirosis	-	1	3	-	Yellow fever	-	-	-	-

1. Main and satellite clinics.
2. Events reported by January 7, 2001.
3. Tri-Service Reportable Events, Version 1.0, July 1998.

Note: Completeness and timeliness of reporting varies by facility.
Source: Army Reportable Medical Events System.

Table S2. Reportable events, US Army medical treatment facilities[1] Cumulative events for all beneficiaries, calendar years 1999 and 2000[2]

Diagnosis[3]	1999		2000		Diagnosis[3]	1999		2000	
	AD[4]	Other	AD[4]	Other		AD[4]	Other	AD[4]	Other
All reportable events	**7483**	**3415**	**7929**	**5450**	Listeriosis	-	2	-	-
Amebiasis	1	1	1	2	Lyme disease	12	27	21	48
Anthrax	-	-	-	-	Malaria, falciparum	4	3	-	8
Biological warfare agent exposure	-	-	-	-	Malaria, malariae	-	-	-	-
Botulism	-	-	-	1	Malaria, ovale	-	1	-	-
Brucellosis	-	-	-	-	Malaria, unspecified	3	1	7	4
Campylobacter	49	52	24	89	Malaria, vivax	55	3	45	5
Carbon monoxide poisoning	2	2	-	16	Measles	-	3	3	2
Chemical agent exposure	-	-	-	-	Meningococcal meningitis	2	2	5	1
Chlamydia	4292	2257	4927	3429	Meningococcal septicemia	5	13	-	-
Cholera	-	-	-	-	Mumps	1	1	2	3
Coccidioidomycosis	1	1	1	2	Pertussis	-	4	1	12
Cold weather, frostbite	80	3	34	1	Plague	-	1	-	-
Cold weather, hypothermia	12	-	3	-	Pneumococcal pneumonia	18	1	2	3
Cold weather, immersion type	6	-	12	1	Poliomyelitis	-	-	-	-
Cold weather, unspecified	2	-	28	-	Q fever	-	-	1	-
Cryptosporidiosis	-	1	2	2	Rabies, human	-	-	-	-
Cyclospora	-	-	-	1	Relapsing fever	-	-	-	-
Dengue fever	3	-	1	1	Rheumatic fever, acute	-	-	-	-
Diphtheria	-	-	-	-	Rift valley fever	-	-	-	-
E. Coli O157:H7	2	10	9	9	Rocky mountain spotted fever	-	3	13	3
Ehrlichiosis	1	1	2	2	Rubella	1	2	-	-
Encephalitis	-	-	1	-	Salmonellosis	25	115	33	146
Filariasis	-	1	1	-	Schistosomiasis	-	-	1	-
Giardiasis	16	48	14	42	Shigellosis	17	28	6	48
Gonorrhea	1348	481	1405	833	Smallpox	-	-	-	-
H. influenzae, invasive	4	1	1	5	Streptococcus, group A, invasive	1	-	-	4
Hantavirus infection	-	1	-	-	Syphilis, congenital	1	1	1	1
Heat exhaustion	217	37	226	71	Syphilis, latent	14	12	12	26
Heat stroke	71	4	43	19	Syphilis, primary/secondary	35	26	35	14
Hemorrhagic fever	-	-	2	-	Syphilis, tertiary	6	8	1	11
Hepatitis A	3	10	1	7	Tetanus	-	-	-	-
Hepatitis B	32	18	16	19	Toxic shock syndrome	-	-	-	1
Hepatitis C	11	15	9	22	Trichinosis	3	-	-	-
Influenza	71	140	9	109	Trypanosomiasis	-	-	-	-
Lead poisoning	-	1	-	4	Tuberculosis, pulmonary	6	10	4	11
Legionellosis	1	4	-	1	Tularemia	-	-	1	1
Leishmaniasis, cutaneous	3	-	-	-	Typhoid fever	-	-	-	-
Leishmaniasis, mucocutaneous	-	-	-	-	Typhus fever	-	1	-	-
Leishmaniasis, unspecified	-	-	-	-	Urethritis, non-gonococcal	977	42	863	382
Leishmaniasis, visceral	-	-	-	-	Vaccine, adverse event	16	3	30	10
Leprosy	-	-	-	-	Varicella, active duty only	53	13	70	14
Leptospirosis	-	-	-	4	Yellow fever	-	-	-	-

1. Main and satellite clinics.
2. Events reported by January 7, 2001.
3. Tri-Service Reportable Events, Version 1.0, July 1998.
4. Active duty personnel.

Note: Completeness and timeliness of reporting varies by facility.
Source: Army Reportable Medical Events System.

Table S3. Active duty force strength by medical treatment facility/post, United States Army, September, 2000[1]

MTF/Post[2]	Males							Females							All
	< 20	20-24	25-29	30-34	35-39	>= 40	Total M	< 20	20-24	25-29	30-34	35-39	>= 40	Total F	
NORTH ATLANTIC RMC															
Walter Reed AMC, DC	132	3140	2200	1755	2005	3213	12445	63	830	741	553	524	671	3382	15827
Aberdeen Prov. Ground, MD	291	589	301	326	361	331	2199	37	101	75	53	45	45	356	2555
FT Belvoir, VA	17	183	247	247	319	404	1417	6	73	102	79	67	82	409	1826
FT Bragg, NC	2044	11887	7807	5681	4352	2390	34161	297	1681	1156	637	462	255	4488	38649
FT Drum, NY	646	3945	2320	1348	1055	520	9834	154	470	228	144	92	55	1143	10977
FT Eustis, VA	507	1872	1253	966	944	800	6342	135	543	328	208	165	130	1509	7851
FT Knox, KY	2077	3323	1803	1363	1352	781	10699	46	296	213	156	110	77	898	11597
FT Lee, VA	372	957	676	515	491	391	3402	257	487	273	161	127	97	1402	4804
FT Meade, MD	75	716	814	779	660	786	3830	38	266	252	204	160	133	1053	4883
West Point, NY	37	249	222	617	499	550	2174	12	60	66	121	73	76	408	2582
GREAT PLAINS RMC															
Brooke AMC, TX	154	725	889	909	819	927	4423	143	412	389	355	289	305	1893	6316
Beaumont AMC, TX	422	2326	1750	1281	1088	974	7841	124	585	392	208	180	132	1621	9462
FT Carson, CO	695	4692	3279	2120	1609	878	13273	142	722	422	221	172	92	1771	15044
FT Hood, TX	2259	12846	8073	5111	3839	2200	34328	542	2351	1468	808	599	370	6138	40466
FT Huachuca, AZ	408	1277	925	627	528	434	4199	138	378	210	124	87	82	1019	5218
FT Leavenworth, KS	29	260	226	456	733	513	2217	18	70	49	66	82	53	338	2555
FT Leonard Wood, MO	1950	1919	1171	1158	1045	612	7855	644	611	325	218	151	93	2042	9897
FT Polk, LA	455	2640	1604	1321	859	397	7276	98	449	260	148	90	74	1119	8395
FT Riley, KS	637	3726	2070	1267	925	488	9113	103	387	245	137	114	60	1046	10159
FT Sill, OK	1996	3649	2189	1520	1246	761	11361	325	498	298	204	120	66	1511	12872
SOUTHEAST RMC															
Eisenhower AMC, GA	901	2156	1472	1145	1116	1213	8003	186	629	441	344	304	257	2161	10164
FT Benning, GA	4562	5470	3142	2168	1504	765	17611	83	539	348	234	152	86	1442	19053
FT Campbell, KY	1098	7391	5248	3541	2539	1196	21013	228	1045	689	375	230	111	2678	23691
FT Jackson, SC	2559	1841	920	883	762	474	7439	1986	1102	480	344	194	91	4197	11636
FT McClellan, AL	165	203	130	130	223	234	1085	25	33	33	27	32	29	179	1264
FT Rucker, AL	88	739	1051	612	526	434	3450	41	206	160	76	50	36	569	4019
FT Stewart, GA	1214	6319	3895	2437	1884	952	16701	192	1095	687	404	276	150	2804	19505
WESTERN RMC															
Madigan AMC, WA	1144	5642	3700	2586	1963	1366	16401	263	1026	636	366	249	208	2748	19149
FT Irwin, CA	154	1507	988	698	561	310	4218	31	193	125	82	55	28	514	4732
FT Wainwright, AK	383	1962	1520	838	533	313	5549	64	335	219	128	114	49	909	6458
OTHER LOCATIONS															
Tripler, HI	790	4396	3345	2039	1558	976	13104	192	862	691	380	266	218	2609	15713
Europe	2567	14457	13000	8298	6497	4033	48852	650	3139	2263	1347	1017	620	9036	57888
Korea	1893	8252	5743	4222	3672	2388	26170	512	1571	1009	674	577	375	4718	30888
Other/Unknown	993	3216	4089	6221	6375	4463	25357	234	591	687	728	666	499	3405	28783
Total	33714	124472	88062	65185	54442	37467	403342	8009	23636	15960	10314	7891	5705	71515[§]	474878[§]

1. Based on duty zip code. Does not account for TDY.

2. Includes any subordinate catchment areas not listed separately.

§ Includes unknown age groups and unknown gender.

Source: Defense Manpower Data Center.

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