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In this issue:

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Trends and Disparities in Systemic Lupus Erythematosus Incidence Among U.S. Active Component Service Members, 2000–2022

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Inpatient and outpatient encounter data retrieved from the Defense Medical Surveillance System (DMSS) were used to establish that there were 1,127 diagnoses of systemic lupus erythematosus (SLE) among active component U.S. service members (ACSM) from 2000 to 2022, with an overall incidence rate of 3.5 cases per 100,000 person-years. Annual incidence remained relatively constant over the 23-year surveillance period, peaking in 2009. Female ACSM accounted for 69.5% of incident cases, with a rate of incidence 12.3 times greater than males, while non-Hispanic Black ACSM accounted for 50.0% of incident cases, with a rate 6.7 times greater than among non-Hispanic Whites. This study further demonstrates greatest SLE incidence among non-Hispanic Black women, in all age groups.

What are the new findings?

SLE incidence among ACSM remained relatively stable from 2000 to 2022. Incidence was notably highest among non-Hispanic Black women in all age groups.

What is the impact on readiness and force health protection?

SLE imposes a substantial burden upon afflicted individuals. Diagnosed ACSM may experience declines in mental and physical acuity that are required for mission execution. Evaluating SLE incidence helps identify factors that contribute to its trends, for early diagnosis and management.

The most common type of lupus is systemic lupus erythematosus (SLE), a chronic autoimmune disease that is often difficult to diagnose due to its complex clinical presentations.[1,2] This disease imposes a substantial burden for those who develop a myriad of symptoms ranging from fatigue to organ damage.[2] The literature on representative, population-based, national U.S. studies of SLE incidence is limited, but existing research demonstrates an upward trend in incidence within the U.S. and reveals disparities between sexes as well as racial and ethnic groups.[1,3,4,5]

The U.S. Lupus Midwest Network (LUMEN) has demonstrated several patterns in SLE, including increased prevalence, from 30.6 cases per 100,000 persons in 1985 to 97.4 in 2015, and a 2% increase in incidence each year, starting at 3.32 cases per 100,000 persons from 1976 to 1988 and ending at 6.44 from 2009 to 2018.[1] The nation's increasing racial and ethnic diversity, along with improved early detection of the disease, may contribute to this trend.[1,6] LUMEN and other population-based studies have shown incidence rates 3 to 7 times higher among women than men.[3,4,7] Incidence rates were higher among non-Hispanic Black individuals of both sexes than among other groups.[3,5]

Compared to civilians, active component service members (ACSM) may have an increased risk of SLE due to greater exposure to environmental risk factors, such as silica dust and ultraviolet (UV) radiation, and higher rates of post-traumatic stress disorder (PTSD), which have been linked to SLE.[7,8,9,10] This study reports on annual incidence and sociodemographic disparities from 2000 to 2022 for ACSM in the U.S. Armed Forces diagnosed with SLE.

Methods

This study includes ACSM from January 1, 2000 through December 31, 2022, using data from the Defense Medical Surveillance System (DMSS). Demographic variables of interest were sex, age, race and ethnicity, service, and rank. Diagnoses were ascertained from inpatient as well as outpatient encounter data of individuals who received medical care in the Military Health System (MHS) or civilian facilities in the purchased care system.

SLE diagnosis was identified by International Classification of Diseases, 9th Revision (ICD-9) code 710.0, or International Classification of Diseases, 10th Revision (ICD-10) codes with all extenders under M32.[11] An incident case was defined as 1 inpatient encounter with a qualifying code in the first or second diagnostic position, or the first of 2 outpatient encounters within 365 days at a rheumatology clinic (defined by Medical Expense and Performance Reporting [MEPRS] code equal to "BAO") with a qualifying code in any diagnostic position.[11] The first encounter meeting the case definition with a qualifying code was considered the incident encounter. ACSM were counted only once during the surveillance period.

Incidence rates were calculated as SLE diagnoses per 100,000 person-years (p-years) using the mid-year population for each year of the surveillance period. Rates were stratified by age, sex, and race and ethnicity. Incidence rate ratios comparing non-Hispanic Blacks to non-Hispanic Whites, Hispanics, and other/unknown races and ethnicities were determined for each age group, stratified by sex.

Results

From 2000 to 2022, 1,127 ACSM were diagnosed with SLE. The number of incident cases was highest among ACSM aged 40 years or older, women, and non-Hispanic Black individuals **(Table 1)**.

There were 545 (48.4%) ACSM incident SLE hospitalizations, with an average hospitalization of 4.7 days (standard deviation: 6.7, range: 0-60) **(data not shown)**. Annual incidence for ACSM remained stable, ranging from 50 incident cases in 2000 to 44 in 2022 **(data not shown)**. There was a slight increase in 2009, to 66 cases **(data not shown)**.

The overall incidence rate of SLE among ACSM from 2000 to 2022 was 3.5 per 100,000 p-years **(Table 1)**. Service members aged 40 years and older had the highest rate of SLE compared to other age categories, with 6.0 cases per 100,000 p-years **(Table 1)**. Non-Hispanic Black and female ACSM also had the highest incidence rates for their respective demographics, at 10.7 and 16.0 per 100,000 p-years, respectively **(Table 1)**. Crude annual incidence rates among both sexes remained relatively constant throughout the surveillance period **(Figure)**. Women started at 19.0 cases per 100,000 p-years in 2000 and ended at 12.9 in 2022, while men started at 1.0 case per 100,000 p-years in 2000 and ended at 1.3 in 2022 **(Figure)**. Incidence rates for both sexes spiked during 2009, with women experiencing 20.9 cases per 100,000 p-years, while men experienced 1.9 cases per 100,000 p-years **(Figure)**. Incidence rates overall were highest among non-Hispanic Black ACSM and those of other/unknown race and ethnicity **(Table 1)**. Non-Hispanic Black service members started at 10.1 cases per 100,000 p-years in 2000 and ended at 6.7 in 2022 **(data not shown)**. Service members of other/unknown race and ethnicity started at 12.2 cases per 100,000 p-years in 2000, dropping to a low of 4.4 cases per 100,000 p-years in 2018, before increasing to 10.5 cases per 100,000 p-years in 2022 **(data not shown)**. Meanwhile, non-Hispanic White service members began at 1.8 cases per 100,000 p-years in 2000 and ended at 2.4 in 2022, and Hispanic service members started at 2.5 cases per 100,000 p-years in 2000 and ended at 2.5 in 2022 **(data not shown)**.

TABLE 1. Incidence of SLE by Demographic and Military Characteristics, Active Component Service Members, 2000–2022

	No.	Person-years	Rate[a]
Total	1,127	32,105,296	3.5
Race and ethnicity			
Non-Hispanic Black	565	5,295,620	10.7
Non-Hispanic White	300	19,265,114	1.6
Hispanic	131	4,094,378	3.2
Other/unknown[b]	131	3,450,184	3.8
Sex			
Female	783	4,884,574	16.0
Male	344	27,220,722	1.3
Age group (years)			
<20	41	2,111,028	1.9
20-24	287	10,462,742	2.7
25-29	255	7,280,808	3.5
30-34	178	4,931,138	3.6
35-39	164	3,939,286	4.2
40+	202	3,380,294	6.0
Service			
Army	465	11,455,955	4.1
Navy	276	7,803,947	3.5
Marine Corps	72	4,251,806	1.7
Air & Space Forces	299	7,714,715	3.9
Coast Guard	15	878,873	1.7
Rank			
Junior Enlisted (E0-E4)	443	13,808,326	3.2
Senior Enlisted (E5-E9)	506	12,786,957	4.0
Officer (O0-O3 [W1-W3])	92	3,404,369	2.7
Officer (O4-O10 [W4-W5])	86	2,105,644	4.1

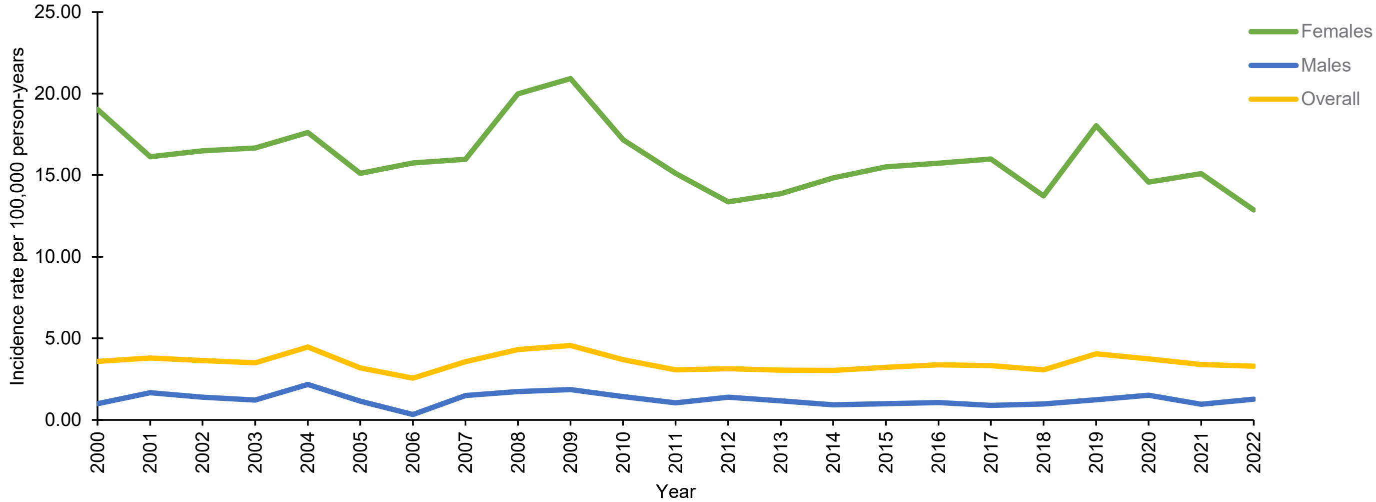
Abbreviations: SLE, systemic lupus erythematosus; No., number of cases.
[a] Incidence rate per 100,000 person-years.
[b] Includes those of American Indian/Alaska Native, Asian/Pacific Islander, and unknown race and ethnicity.

SLE incidence rates increased from 19.9 to 54.1 cases per 100,000 p-years for non-Hispanic Black women, compared to 2.9 to 16.8 for non-Hispanic White women with increasing age group **(Table 2)**. Among all age groups and sexes, non-Hispanic Black ACSM had higher incidence rates of SLE compared to both their non-Hispanic White and Hispanic counterparts **(Table 2)**. Incidence rate ratios comparing non-Hispanic Black to non-Hispanic White ACSM ranged from 2.8 to 7.9, while ratios comparing non-Hispanic Black to Hispanic ACSM ranged from 1.6 to 3.7, and ratios comparing non-Hispanic Black to the other/unknown racial and ethnic group ranged from 1.0 to 6.3 **(Table 2)**.

Discussion

Overall, this study shows consistent SLE incidence rates among ACSM between 2000 and 2022, with the highest incidence among non-Hispanic Blacks and women. Existing research agrees with this disparity; other studies have shown significantly

FIGURE. Crude Annual Incidence Rates of SLE by Sex, Active Component Service Members, 2000–2022



Abbreviation: SLE, systemic lupus erythematosus.

TABLE 2. Incidence of SLE by Sex, Age, Race and Ethnicity, Active Component Service Members, 2000–2022

		Race and Ethnicity								Non-Hispanic Black Compared to Other Races and Ethnicities		
		Non-Hispanic Black		Non-Hispanic White		Hispanic		Other/unknown[a]		Non-Hispanic Black: Non-Hispanic White	Non-Hispanic Black: Hispanic	Non-Hispanic Black: Other/ unknown[a]
Sex	Age group (years)	No.	Rate[b]	No.	Rate[b]	No.	Rate[b]	No.	Rate[b]	IRR	IRR	IRR
Female	<20	17	19.9	5	2.9	4	5.6	3	7.2	6.9	3.5	2.8
	20-24	96	24.1	55	7.0	30	10.5	22	10.5	3.5	2.3	2.3
	25-29	92	30.9	37	6.8	22	13.1	23	14.2	4.5	2.4	2.2
	30-34	66	32.0	28	8.6	18	19.7	12	12.1	3.7	1.6	2.6
	35-39	70	42.5	28	12.1	11	20.4	10	16.0	3.5	2.1	2.6
	40+	71	54.1	36	16.8	9	26.6	18	37.6	3.2	2.0	1.4
Male	<20	3	1.3	5	0.5	2	0.7	2	1.3	2.8	1.8	1.0
	20-24	34	2.9	27	0.5	11	0.9	12	1.4	5.8	3.3	2.1
	25-29	32	3.7	32	0.9	9	1.1	8	1.2	4.3	3.2	3.1
	30-34	27	4.1	18	0.7	6	1.2	3	0.6	5.8	3.3	6.3
	35-39	21	3.5	10	0.5	4	1.2	10	2.9	7.6	3.0	1.2
	40+	36	7.7	19	1.0	5	2.1	8	2.7	7.9	3.7	2.9

Abbreviations: SLE, systemic lupus erythematosus; No., number of cases; IRR, incidence rate ratio.
[a] Includes those of American Indian/Alaska Native, Asian/Pacific Islander, and unknown race or ethnicity.
[b] Incidence rate per 100,000 person-years.

higher SLE incidence among non-Hispanic Black women.[1,2,4,12,13] There is evidence suggesting those of African lineage are more likely than other races and ethnicities to possess a gene variant that increases SLE risk.[14,15] There were more than twice as many incident cases among women (n=783) than men (n=344), and the overall incidence rate was 12.3 times higher among women. This trend was seen in rates for all ages as well as races and ethnicities, consistent with published statistics demonstrating that women are significantly more likely than men to develop SLE, perhaps due to differences in androgen levels and metabolism.[4,12,13,16]

Evidence shows that SLE is most common in women of child-bearing age (15 to 44 years). Women diagnosed with SLE aged 40 year or older may have developed the disease earlier in life but were not diagnosed until later.[2,3,17] This is consistent with the findings of this study.

Unlike previous research of primarily civilian populations, this study found consistent incidence rates rather than increasing rates.[1,3,4] This contrast may be due to better access to care for ACSM within the MHS, compared to other health systems that monitor civilians, allowing greater and earlier detection of SLE.

To our knowledge, this is the first study to show trends of SLE incidence in ACSM, yet there are limitations. This study relies on encounter data and does not use laboratory test data to confirm SLE diagnosis, which may have led to misclassification. For instance, patients may have been assigned SLE diagnostic codes based on physical examination and symptoms without laboratory tests confirming the diagnosis. Previous studies using similar case definitions displayed high sensitivity and specificity,[11] but adding laboratory criteria to the case definition may be limiting, since the blood tests used to detect SLE are often positive in healthy individuals, leading to misdiagnosis.[2] Likewise, this study did not use pharmacy data, such as the inclusion of selected medications including hydroxychloroquine, to confirm diagnosis.[18] Future analyses may use pharmacy data to increase study specificity. Furthermore, race and ethnicity are self-reported; misclassification may occur due to limitations in how race and ethnicity are captured in DMSS. Despite these limitations, this study provides strong evidence that non-Hispanic Black women are disproportionately affected by SLE.

Although this disease is uncommon, its effects can be debilitating. ACSM who develop SLE may suffer from arthritis, pleuritis, and nephritis leading to kidney failure.[19] These physical symptoms hinder ACSM abilities to execute military duties; 1 study demonstrated increased risk of discharge from the U.S. Army for service members with SLE.[20] Analyzing trends in SLE incidence is valuable, to assess the burden and potential impact of SLE on mission readiness, for improved understanding and management of the disease among ACSM.

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Weighing the Risks to Force and Mission in a Public Health Crisis: The Plight of the U.S. Army in Four Pandemics

Sanders Marble, PhD

History provides no one solution for how the Army should respond to pandemics. Each pandemic presents different risks. During the 20th and 21st centuries, the U.S. Army has continued operations throughout different pandemics, and its response to each pandemic was calibrated. There has been no definitive approach—nor is one likely.

Army leaders must consider current missions against the specific medical risks at a particular time due to the pandemic agent, offset by available mitigation methods. Command decisions for balancing risks—from a pandemic against operational risks—differ in every instance because these decisions occur within a broader cultural context of acceptable health risks determined largely by available technology and scientific knowledge. Commanders can use preventive medicine techniques to protect the force, but with varying costs in reduced readiness and operational tempo. Various measures such as stopping recruiting, quarantining (or reducing access to) posts, pausing troop movements, suspending training, and dispersing troops all reduce disease spread—but also reduce readiness or combat power.

1918: Accepting deaths by disease to win a world war

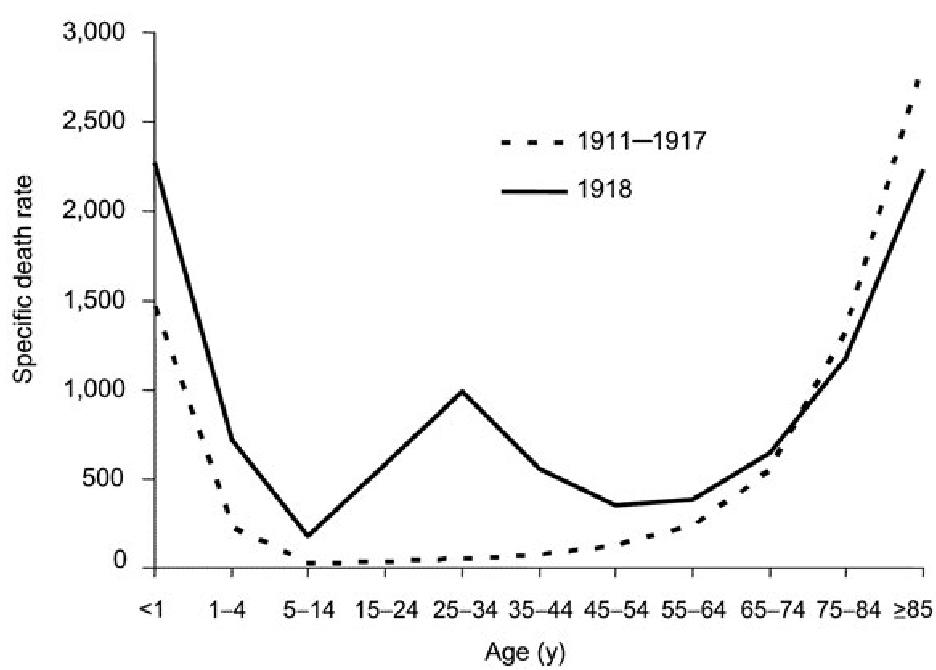
On October 7, 1918, President Woodrow Wilson walked over to the War Department from the White House. In 1918 the world faced a fast-spreading influenza pandemic, which was deadliest among the military-age population **(Figure 1)**. Wilson was upset, after a briefing by doctors about the medical situation that troops were facing on transport ships to France. The risk of disease due to the influenza pandemic was extreme, and Wilson wanted to talk with War Department leadership.

With the Secretary of War visiting forces in France, the Acting Secretary called in General Peyton March, the Chief of Staff of the Army **(Figure 2)**. March knew that soldiers were going to die, whatever choice he made.[1] He squared his shoulders and briefed the president on his decision: He was ordering packed troopships to continue sailing for France. It was not a risk but a certainty that soldiers on those ships would catch influenza, and some would die from it, some even before the voyage was over—but the mission was to beat the Germans, and these reinforcements would speed that outcome.

March laid it out for the Commander-in-Chief, including the medical advice he had decided to countermand. March was thorough in his briefing to Wilson; it was clear he understood the medical countermeasures, and their limitations. Puny mitigations were all he could offer. President Wilson accepted the Chief of Staff's decision. Winning the war for everyone was more important than reducing the risk to individual doughboys.

In August and September 1918, while in the U.S. the lethal mutation of the virus was spreading, in Europe the Allies had engaged in massive military offensives. The major American efforts at St. Mihiel (September 12-16) and Meuse-Argonne (September 26–November 11) resulted in over 100,000 battle casualties. The American Expeditionary forces needed replacements as well as reinforcements, and reducing the flow of troops—pulling America's punches—would undermine those offensives, reduce American influence during inter-Allied negotiations, and lower American prestige at the imminent peace negotiations.

FIGURE 1. W-shaped Mortality Curve of the 1918 Influenza Pandemic in Comparison with the U-shaped Curve of Preceding Influenza Outbreaks



Credit: Taubenberger and Morens. 1918 influenza: the mother of all pandemics. *Emerg Infect Dis*. 2006;12(1):15-22.

The U.S. Army knew about avoiding communicable diseases; in a time before antibiotics, an ounce of prevention was worth a pound of cure. Army doctors had immense credibility with line officers when they recommended any of a range of disease countermeasures, especially spacing between soldiers to prevent airborne spread of disease.[2] World War I was an existential threat, however, and the line accepted more crowding to train more men within limited facilities. Disease outbreaks during the winter of 1917-1918, especially measles, had sickened approximately 95,000 soldiers, but those outbreaks were nothing like what would happen in late 1918.

At the end of August 1918, upon receiving news of the lethal flu variant at an Army base, Surgeon General William Gorgas had taken immediate action. Gorgas sent warnings to Army hospitals and recommended stop-move orders to Chief of Staff March.[3] March considered Gorgas's advice, but ultimately rejected most of it. When the disease had been containable, March had canceled troop moves from camps with outbreaks, but once influenza began spreading rapidly, he apparently thought troop movements would make little difference.[2] At the time scientists could not yet identify viruses, only bacteria, and were unable to determine just what was spreading or how. March understood that Army actions would further spread the pandemic, killing more soldiers and civilians, and he had accepted that outcome. Victor Vaughan, former president of the American Medical Association who served as a colonel during WWI, recalled being told by his command that "The purpose of mobilization is to convert civilians into trained soldiers as quickly as possible and not to make a demonstration in preventive medicine."[3]

Influenza quickly swept across the U.S. throughout September 1918. The flu arrived in Kansas City on September 23, and within a week Fort Leavenworth placed restrictions on leave and passes, and delayed draftee arrivals. Fort Leavenworth did not have a large troop population, housing its troops in a range of forms: in pre-war barracks along with wartime constructions, in addition to the prison, while some troops attended civilian schools in Kansas City. By September 29, on post 18 influenza cases had been identified—and then 100 the next day. That surge in case numbers presumably drove the order on September 30 to refrain from entering crowded buildings such as theaters and restaurants, and to abstain from spitting, with instruction to use handkerchiefs when sneezing or coughing.

In late September and early October 1918, in the midst of the Meuse-Argonne campaign in France, which was generating cables emphasizing the need for more troops, the Army experienced its fastest influenza spread: about 80,000 influenza infections during the week of September 28 through October 4, compounded by another 89,000 the following week. Gorgas recommended halving the loading of troop ships for the 2-week voyage to Europe, after week-long quarantines at embarkation camps before boarding. General March overruled the Surgeon General's recommendations, which led to his meeting with President Wilson on October 7. Following the meeting between Wilson and March, troop ships would be just as packed as before, but troops' temperatures would be checked before embarkation, and they would be asked about symptoms. It is hard to credit that March or Wilson believed these measures would have meaningful impacts **(Figure 3)**.

Not understanding exactly how the disease spread, in the U.S. there was an effort to certify buildings (e.g., restaurants, cinemas, or ice cream parlors) as sanitary and permissible. Differing city and state responses to the growing pandemic included closures of schools, theaters, and churches, as well as limiting group sizes. The Army adopted various techniques that today would be termed "social distancing," for both off- and on-duty service members: reducing training, keeping troops on post, closing posts to visitors (although not fully quarantined), suspending church services, and other measures to avoid crowding.[2,4] On October 8 tenant units of Fort Leavenworth were instructed to read aloud the September 30 orders, with commanders to report compliance. By October 26, more than a month into the local Kansas City epidemic, church services on post were suspended—and there were to be no gatherings of any kind, including troop training.

FIGURE 2. General Peyton March

Library of Congress

FIGURE 3. Inspection of Soldiers' Throats

Library of Congress

Meanwhile, in Europe the operational situation was rapidly shifting: Multiple Allied attacks had reinforced the others and forced Germany to request an armistice on October 5. Quickly, the Army's response to the pandemic changed. Draft call-ups were both delayed and reduced—but not stopped—to reduce both crowding in training camps and patients in Army hospitals.[3]

By November 2, Fort Leavenworth was able to lift its restrictions, with mixed results. Contemporary data are scarce, but in 1917 Fort Leavenworth's disciplinary barracks registered 41 cases of pneumonia or influenza, with 4 deaths, but in 1918 the disciplinary barracks reported 293 cases and 86 deaths, among only 2,026 prisoners.[5,6]

The U.S. Army ultimately suffered an estimated 50,000 fatalities from influenza in WWI, a number almost certainly increased due to General March's decisions. As the pandemic escalated in late summer 1918, March could not have known how soon the fighting in Europe would be over; if battles had continued through the fall and into 1919, American battle casualties would likely have exceeded the added deaths due to influenza. The cessation of fighting within the first weeks of autumn 1918 was the determining factor of whether disease or battle deaths were to be greater that year.

In hindsight, March's deliberate, even calculated, inaction in all likelihood caused more deaths among U.S. troops, along with the civilian population, but at the time March judged it the better choice. Once operational pressures at the front eased, he chose to increase disease-mitigation protocols. General March adhered to his commander's intent by prioritizing measures for winning a world war, and not the battle against an influenza pandemic.

1968: Calculating risk against progress

In the 1930s new technologies had allowed viruses to be identified, including various strains of influenza virus. An influenza vaccine developed in the 1940s was compulsorily administered to service members during World War II. At the same time, the Army epidemiology board evaluated masks as a preventive measure, but found they had insignificant protective value.[7] There was no pandemic during WWII; penicillin would have helped with combatting secondary infections, but the Army was watchful. Later, in the 1950s and early 1960s a number of new vaccines were developed, notably the polio and measles vaccines, in addition to the research and development of mumps and rubella vaccines.

In July 1968 another influenza pandemic started in China, reaching the wider world through Hong Kong, then a British colony. The U.S. Army promptly learned of the "Hong Kong flu" outbreak, and a team from the 406th Medical General Laboratory (the forward-deployed diagnostic laboratory for Pacific Command, based in Tokyo) went to Hong Kong. From the data collected during that visit, the Armed Forces Epidemiology Board considered possible actions.[8]

The new flu of 1968 was H3N2, somewhat similar to 1957's mild pandemic of H2N2 influenza, and their N2 similarity could offer limited protection. Moreover, 6 U.S. vaccine manufacturers could attempt different approaches, increasing odds of achieving an effective vaccine quickly.[9] The Board decided to recommend no immediate action, but instead to wait and rely upon an efficacious vaccine.

If expectations in 1968 were to prove erroneous—that the newest pandemic would affect not just the old and the young (i.e., a U-shaped curve) but include young adults (i.e., a W-shaped curve)—the military had a large hospital system for further risk mitigation. With epidemiologists recommending no immediate action, the Army, unsurprisingly, took none. Soldiers are generally a young and healthy population. Recruitment and draft call-ups continued unabated, with training, worldwide movements, and operations uninterrupted. Fighting in Vietnam increased.

The following year, 1969, would be America's bloodiest in Vietnam, but not from the pandemic **(Figure 4)**. The pandemic was essentially ignored in Vietnam; rest-and-relaxation leave to Hong Kong was not stopped, although it was a known factor in the disease's spatial spread. Troop rotation from Vietnam back to the U.S. likely helped spread the virus domestically.[8,10] Routine troop moves to U.S. Army Europe (USAREUR) may have expedited H3N2's arrival to Germany.[11] Neither the 44th Medical Brigade (the medical headquarters in Vietnam) nor USAREUR even mentioned the pandemic in their annual reports.[12]

Bases in the U.S. took little notice of the pandemic, indeed even less than some civilian institutions. Some colleges closed, sending students home, while some hospitals limited visitors.[11] The entire military district that covered central Louisiana to Fort Bliss, Texas, and as far north as central Oklahoma, had no confirmed H3N2 cases through December. Fort Sam Houston in San Antonio enacted no restrictions. Trainees visited San Antonio, and local residents came on post. Recreation and meetings were unaffected. There was no mention at all of influenza in the post newspaper, with little mention in the civilian press.[19-25] Contrasted with the restrictions a half century earlier at Fort Leavenworth, the U.S. response to the 1968 H3N2 pandemic was extremely limited.

Confidence in vaccines was high in 1968, and mitigation measures were available, doubtless making risk-taking easier. The media campaign for the 1968-1969

FIGURE 4. U.S. Military Maneuvers in Vietnam

influenza vaccine seemingly increased, and the vaccine was mandated for active duty troops. (Influenza vaccine strains developed before the H3N2 version also proved to provide some protection.[14]) By November 1968, a mere 4 months after the pandemic was identified, 1,000,000 H3N2 vaccine doses were available, and in early 1969 doses arrived in Vietnam. The history of medical support in Vietnam notes “only a few cases appeared in military units in Vietnam,” then simply asserts that the vaccine became available in January 1969.[18]

These calculated risks created negligible adverse consequences. The Army’s rate of influenza cases in the 1968-1969 season was only slightly higher than in previous years, and affected neither combat operations in Vietnam nor deterrence in Europe.[15-17] The 1968 pandemic seems to have sickened 1-2% of troops at worst, who were off-duty for only a few days.[13] In 1968, the acceptable answer was to do almost nothing.

2009: Advocating for better practice

An H1N1 swine influenza was first detected in the U.S. in 2009, and by June the outbreak had been declared a pandemic. The U.S. reported the most swine flu pandemic cases in the world, with cases recorded in every state.[26] Few individuals in the military-age population had antibodies, while around one-third of persons over 60 years of age were found to have antibodies.

The H1N1 variant was neither more contagious nor more virulent than seasonal influenza. The U.S. Centers for Disease Control and Prevention (CDC) guidance cautioned institutions, as well as officials and individuals, not to react strongly. The influenza virus and countermeasures were well understood, and officials were confident that a vaccine could be produced in time to reduce widespread public health effects.

The Department of Defense (DOD) followed the guidance provided by the CDC. DOD’s response focused on hygiene—coughing into the elbow was stressed—and use of antivirals when appropriate, in addition to vaccination. The annual influenza vaccination program was advocated more aggressively, including vaccination for family members.

Amid operations in Iraq and Afghanistan, DOD response to a pandemic that was mild in nature could be limited. This proved reasonable. Even though the military population had little previous exposure, the virus was neither more contagious nor more virulent than seasonal influenza. The Military Health System had approximately 1,000 hospitalizations for influenza, averaging 3.63 days in hospital.[27] The greatest cost incurred by the DOD for the 2009 H1N1 pandemic was for the more robust annual vaccination campaign.

2020: Protecting service members against unknown effects

In the half century that followed 1968, public safety had become more prevalent within civilian society as well as the Army. 1968 was the first year new cars were required to have seatbelts—while wearing them was still optional—and the Occupational Safety and Health Act was passed 3 years later, in 1971. In 1968 the Army safety program addressed only aviation accidents; the Army Safety Center was created 10 years later, in 1978. If the phrase “protecting the force” was used in the mid-20th century, it was understood differently.

U.S. life expectancy increased from 70 in 1968 to 79 by 2020, with many older individuals survivors of cancer or on dialysis, neither of which was common in 1968. Medicine had also changed, emphasizing outpatient care, with a far smaller military hospital system as a result.

In 2020 the world situation was comparatively benign. Few troops were deployed, and even fewer were in combat. The Army had been an all-volunteer force for almost 50 years. The military could focus on protecting the force, including military families and the military’s civilian workforce **(Figure 5)**. Accidents often damaged commanders’ careers. Army commanders recognized the individual soldier as the Army’s most important weapon, with families viewed as important keys to soldier retention. The importance of an effective civilian workforce was similarly emphasized.

Early in 2020 the Army faced, in both viral virulence and unknown effects, an unprecedented situation—for both the short- and long-terms. The COVID-19 virus was most lethal among the elderly, not the military-age population, but large numbers of people were immuno-compromised or had other identified COVID risk factors. Protecting a far more varied population added complexities to anticipated responses by the public. The U.S. Armed Forces lost only 14 personnel, of a total force of around 2.2 million, from COVID-19 in 2020.[28] By contrast, 1 county in Texas, Bexar County, which includes San Antonio, suffered around 5,000 deaths from a population of 2 million.[29]

FIGURE 5. Masked Personnel Conducting Field Exercises During the COVID-19 Pandemic

The military restricted recruiting, training, and travel in different ways at different times; in addition, service members were issued personal protective equipment; and DOD modified facilities to reduce spread of the virus. With few operational requirements, risk was comparatively limited and command focus could be placed on protecting the force. U.S. Forces Korea (USFK) had the opportunity to institute the dramatically-named Operation Kill The Virus because USFK had only routine operational requirements.[30] Notably, 1 aircraft carrier group had to dock in response to an outbreak aboard ship.[31]

No uniform answers

Throughout the past century, the U.S. Army faced wartime pandemics that presented both known and unknown threats. The pandemics of 1918 and 1968 had similarities, most significantly large forces at war overseas, as well as differences, most notably that, by 1968, the influenza virus had been identified and a reliable vaccine developed. The 2009 pandemic occurred during substantial overseas military operations but involved a well-understood virus for which there were effective anti-virals. The latest pandemic was markedly different, and the next pandemic will be different yet again.

Medical advice has always played a role in the Army's pandemic responses, but there was a time when the Army, as well as national, leadership felt it appropriate to accept the certainty of more sickness and death to reduce risk of battlefield defeat. At various times doctors have advised no immediate action against disease outbreaks. The COVID pandemic occurred in a new operational, as well as societal, paradigm focused on protecting the force, along with military families and the civilian workforce.

History does not provide a ready solution to successfully combat threats posed by pandemics, instead demonstrating military *ad hoc* pragmatism. None of these examples may be appropriate in the future. One thing is certain: There will be future pandemics, and public health leaders will again have to communicate threats and risks to Army leaders who will, in turn, have to weigh their missions with medical risks and practicable mitigation methods. At some point in the future, the Army may have to explain to its officers, soldiers, and the American public why it is unable to prioritize force health protection, instead putting "mission first" before "people always."

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Disclaimer

The views expressed in this article are those of the author and do not necessarily reflect the official policy of the Department of Defense nor the U.S. Government.

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Surveillance Snapshot

Chikungunya in Service Members of the U.S. Armed Forces, 2016–2022

Shauna L. Stahlman, PhD, MPH; Richard S. Langton, MD, MPH

TABLE. Chikungunya Cases Among U.S. Military Service Members, 2016–2022

Service	Rank	Duty Status	Year of Onset	Travel Locations	Deployment-related	Hospitalized	Long-term Symptoms[a]	Short-term Symptoms
Army	Officer	Active Duty	2016	Colombia	No	No	Yes	Joint pain, fever, rash
Navy	Officer	Active Duty	2016	Cancun, Mexico	No	No	No	Fever, lower back pain, erythema
Army	Enlisted	Active Duty	2017	South Korea, Puerto Rico	No	No	N/A	Vomit, fever, diarrhea, joint pain
Army	Officer	Active Duty	2017	Bangladesh	No	No	No	Fever, myalgia, arthralgia, maculopapular rash
Navy	Enlisted	Active Duty	2019	Philippines	No	No	No	Fever, myalgia, fatigue, weakness, nausea, rash
Army	Enlisted	Active Duty	2019	Djibouti	Yes	No	N/A	N/A
Navy	Enlisted	Active Duty	2022	Brazil	No	Yes	No	Fever, fatigue, malaise, whole body rash
Army	Officer	National Guard	2022	Mexico	No	No	No	N/A

N/A=Data were not available.
[a]Long-term symptoms were defined as symptoms lasting longer than 12 weeks.

Chikungunya is a viral disease spread by the bite of an infected mosquito,[1] characterized by severe joint pain and myalgia that can last for weeks or months.[2] Prior to 2013, cases and outbreaks of Chikungunya were identified in Africa, Asia, and Europe; in late 2013, however, the first local transmission in the Americas was identified in the Caribbean.[1] Chikungunya became a nationally-notifiable disease in the United States in 2015 following a substantial increase in locally-acquired infections reported in U.S. territories.[3]

The U.S. Food and Drug Administration (FDA) announced its approval of a live attenuated virus vaccine on November 9, 2023, which may eventually be recommended to U.S. travelers.[4] This could become relevant for U.S. military service members at potential risk for Chikungunya virus infection during deployments to endemic locations, particularly during outbreaks among local populations.

Prior *MSMR* reports describe cases of Chikungunya occurring among U.S. military service members and other beneficiaries between 2010 and 2020.[5,6] This Surveillance Snapshot updates these results through the end of 2022, using confirmed and probable medical event reports of Chikungunya cases from the U.S. military's Disease Reporting System internet (DRSi), which were confirmed via medical chart review.

Eight cases of Chikungunya virus disease among service members were documented between 2016 and 2022 **(Table)**. Five cases were recorded in the Army, and 3 in the Navy. One case was acquired while on deployment to Djibouti; no other cases were deployment-related. Two cases were acquired via unofficial travel to Mexico. One case each was attributed to unofficial travel to Colombia, Brazil, Bangladesh, and the Philippines. Another case was diagnosed during deployment to South Korea, but the DRSi record indicated that the patient had previously lived in Puerto Rico, with no other pertinent travel history.

Only 1 case was hospitalized; this case was acquired in Brazil by a 35-year-old male with a medical history of Bell's palsy. Five cases reported fever and myalgia, which were the most commonly documented symptoms. Other reported symptoms included nausea, vomiting, fatigue, and rash. One case involving a 30-year-old male who acquired the infection in Colombia evidenced long-term symptoms (i.e., lasting longer than 12 weeks) manifesting as bilateral wrist and ankle pain worsened by movement.

The small number of cases, hospitalizations, and evidence of long-term symptoms reported in the past 7 years suggest that risk of Chikungunya virus disease to U.S. service member readiness is small. Prior reports have, however, indicated that cases among U.S. service members increase during periods of outbreak among local populations.[6] Therefore, service members deployed to endemic locations are encouraged to use standard preventive measures including use of personal protective equipment. Policy development may also benefit from this information as the FDA-approved vaccine becomes more widely available.

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Surveillance Snapshot

Mid-Year Populations by Sex, Age, and Race and Ethnicity of Active Component Service Members of the U.S. Armed Forces, 2018–2022

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This Surveillance Snapshot describes the mid-year population for active component service members (ACSM) of the Army, Navy, Air Force, Marine Corps, and Coast Guard between 2018 and 2022, stratified by age, sex, and race and ethnicity. Population counts were obtained from June of each calendar year using personnel data from the Defense Manpower Data Center (DMDC) maintained within the Defense Medical Surveillance System (DMSS). Counts and percentages were stratified by sex, age group, and race and ethnicity. Both sex and race/ethnicity are self-reported by the service member. Race and ethnicity were categorized into non-Hispanic White, non-Hispanic Black, Hispanic, and Other/unknown. As some services do not provide separate race and ethnicity categories for Asian/Pacific Islanders and American Indian/Alaskan Natives, these groups are included in the Other/unknown category.

Among ACSM, the minimum and maximum mid-year populations ranged from 1,104,484 to 1,141,780 men and 218,748 to 238,448 women during the surveillance period, with the highest population documented in 2021 for both men and women. The overall proportion of women and Hispanic service members increased between 2018 and 2022, while the proportion of non-Hispanic Whites and service members under 20 years of age decreased. When stratified by sex, age, and race and ethnicity, the racial/ethnic differences between ACSM men and women are apparent **(Table)**. In 2022, non-Hispanic White males represented 56.5% of male ACSM, whereas less than half (41.5%) of female ACSM identified as non-Hispanic White. The proportion of non-Hispanic White male and female ACSM decreased throughout the surveillance period. Among men, the proportion of Hispanics increased throughout the surveillance period; however, they represented a smaller proportion of the older age groups, particularly over 50 years of age. Among women, the proportion of Hispanic service members also increased throughout the surveillance period, and they were typically younger.

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TABLE. Number of Active Component Service Members[a] in June, 2018–2022, Stratified by Sex, Race and Ethnicity, and Age Group

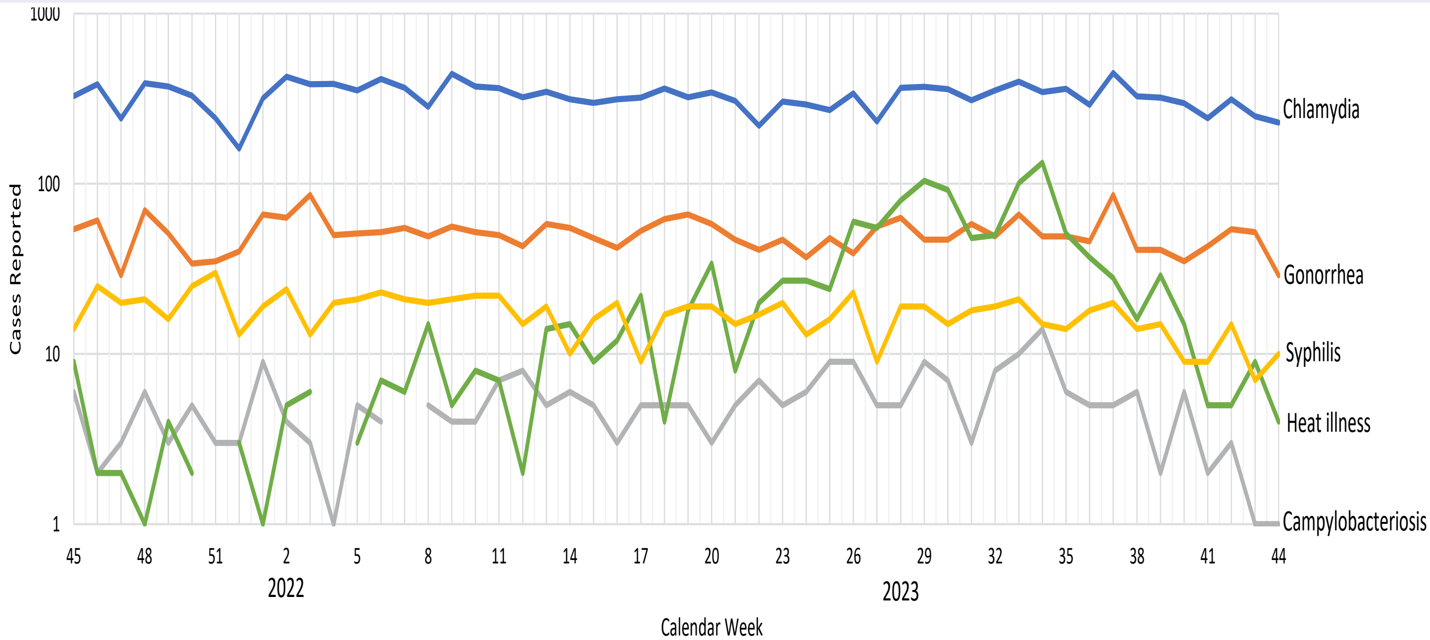
		2018				2019				2020				2021				2022			
		Men		Women		Men		Women		Men		Women		Men		Women		Men		Women	
Age	Race and Ethnicity	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<20	White, non-Hispanic	35,136	58.5	5,954	43.4	33,241	56.1	5,978	41.6	31,317	56.5	5,545	40.7	31,513	56.8	5,455	44.0	25,348	54.9	4,314	41.7
	Black, non-Hispanic	7,810	13.0	2,912	21.2	7,831	13.2	2,984	20.8	7,495	13.5	3,103	22.8	7,207	13.0	2,599	20.9	6,098	13.2	2,164	20.9
	Hispanic	11,996	20.0	3,444	25.1	12,692	21.4	3,791	26.4	12,142	21.9	3,657	26.8	12,449	22.4	3,299	26.6	10,945	23.7	2,856	27.6
	Other	5,141	8.6	1,418	10.3	5,464	9.2	1,613	11.2	4,464	8.1	1,329	9.7	4,315	7.8	1,058	8.5	3,813	8.3	1,008	9.7
20-24	White, non-Hispanic	194,783	58.1	29,138	42.8	194,456	57.4	30,080	42.3	189,938	56.6	30,366	41.4	190,419	56.1	30,713	40.9	181,253	55.2	29,485	40.6
	Black, non-Hispanic	46,804	14.0	15,654	23.0	46,775	13.8	16,129	22.7	46,458	13.9	16,565	22.6	46,817	13.8	16,894	22.5	45,033	13.7	16,039	22.1
	Hispanic	60,923	18.2	14,877	21.8	63,775	18.8	16,180	22.7	66,304	19.8	17,585	24.0	69,708	20.5	18,646	24.8	70,380	21.5	18,819	25.9
	Other	32,900	9.8	8,462	12.4	33,567	9.9	8,744	12.3	32,668	9.7	8,839	12.0	32,436	9.6	8,900	11.8	31,437	9.6	8,358	11.5
25-29	White, non-Hispanic	150,118	57.7	24,003	43.3	149,682	56.8	24,560	42.6	149,567	56.3	24,838	42.2	151,207	55.9	25,403	42.0	146,251	55.4	24,873	41.5
	Black, non-Hispanic	36,982	14.2	13,033	23.5	38,387	14.6	13,540	23.5	39,142	14.7	13,710	23.3	39,973	14.8	14,020	23.2	38,926	14.7	13,699	22.8
	Hispanic	40,699	15.6	9,879	17.8	42,697	16.2	10,747	18.6	44,291	16.7	11,422	19.4	46,444	17.2	12,152	20.1	46,979	17.8	12,491	20.8
	Other	32,546	12.5	8,579	15.5	32,949	12.5	8,817	15.3	32,589	12.3	8,820	15.0	32,726	12.1	8,964	14.8	31,947	12.1	8,907	14.9
30-34	White, non-Hispanic	111,502	60.0	15,472	43.9	109,678	58.9	16,036	43.5	108,699	57.9	16,516	42.9	107,906	56.9	16,926	42.0	104,352	55.9	16,744	41.5
	Black, non-Hispanic	24,514	13.2	8,517	24.1	25,080	13.5	8,820	23.9	25,817	13.8	9,223	23.9	26,870	14.2	9,720	24.1	27,019	14.5	9,651	23.9
	Hispanic	25,843	13.9	5,533	15.7	26,785	14.4	5,923	16.1	28,013	14.9	6,384	16.6	29,381	15.5	6,960	17.3	29,890	16.0	7,245	17.9
	Other	24,062	12.9	5,748	16.3	24,664	13.2	6,098	16.5	25,101	13.4	6,406	16.6	25,622	13.5	6,679	16.6	25,344	13.6	6,730	16.7
35-39	White, non-Hispanic	85,265	60.0	10,813	42.5	86,717	60.0	11,012	42.0	87,870	59.8	11,218	41.8	88,588	59.5	11,519	42.0	86,685	59.0	11,475	41.9
	Black, non-Hispanic	20,347	14.3	7,027	27.6	20,317	14.1	7,060	27.0	20,411	13.9	7,046	26.3	20,521	13.8	6,953	25.4	20,253	13.8	6,885	25.1
	Hispanic	18,844	13.3	3,776	14.8	19,481	13.5	4,009	15.3	20,146	13.7	4,224	15.8	20,699	13.9	4,386	16.0	20,784	14.1	4,415	16.1
	Other	17,569	12.4	3,850	15.1	17,977	12.4	4,110	15.7	18,482	12.6	4,320	16.1	19,006	12.8	4,548	16.6	19,202	13.1	4,629	16.9
40-44	White, non-Hispanic	48,939	60.7	5,397	43.1	49,994	60.4	5,699	43.3	50,849	60.0	6,018	43.4	51,668	60.0	6,261	43.2	50,104	59.6	6,184	42.6
	Black, non-Hispanic	11,664	14.5	3,615	28.9	11,703	14.1	3,682	28.0	11,858	14.0	3,772	27.2	11,889	13.8	3,860	26.6	11,460	13.6	3,800	26.2
	Hispanic	10,168	12.6	1,602	12.8	10,699	12.9	1,731	13.2	11,151	13.2	1,882	13.6	11,433	13.3	2,028	14.0	11,353	13.5	2,127	14.6
	Other	9,875	12.2	1,898	15.2	10,393	12.6	2,047	15.6	10,821	12.8	2,197	15.8	11,144	12.9	2,345	16.2	11,117	13.2	2,417	16.6
45-49	White, non-Hispanic	23,763	63.7	2,454	46.4	22,740	62.8	2,424	46.1	21,833	61.7	2,425	45.3	21,155	61.1	2,362	44.9	19,773	60.7	2,305	45.3
	Black, non-Hispanic	5,453	14.6	1,574	29.7	5,105	14.1	1,478	28.1	5,010	14.2	1,449	27.1	4,788	13.8	1,395	26.5	4,460	13.7	1,276	25.1
	Hispanic	3,880	10.4	536	10.1	4,014	11.1	571	10.9	4,162	11.8	642	12.0	4,275	12.3	649	12.3	4,136	12.7	644	12.7
	Other	4,195	11.2	730	13.8	4,337	12.0	781	14.9	4,387	12.4	833	15.6	4,433	12.8	858	16.3	4,190	12.9	858	16.9
50-54	White, non-Hispanic	8,584	67.8	1,064	49.8	8,767	67.3	1,057	49.6	9,085	67.1	1,048	49.0	8,914	66.1	1,024	47.8	8,105	65.2	930	46.7
	Black, non-Hispanic	1,640	13.0	614	28.7	1,656	12.7	579	27.1	1,653	12.2	577	27.0	1,663	12.3	589	27.5	1,565	12.6	546	27.4
	Hispanic	1,048	8.3	187	8.8	1,149	8.8	213	10.0	1,254	9.3	218	10.2	1,309	9.7	212	9.9	1,227	9.9	205	10.3
	Other	1,389	11.0	271	12.7	1,457	11.2	284	13.3	1,550	11.4	295	13.8	1,600	11.9	319	14.9	1,538	12.4	312	15.7
55+	White, non-Hispanic	2,464	72.8	432	60.3	2,489	72.3	425	57.7	2,623	71.5	417	54.2	2,592	70.0	396	52.7	2,392	68.0	368	51.1
	Black, non-Hispanic	337	10.0	156	21.8	358	10.4	177	24.0	395	10.8	192	25.0	429	11.6	193	25.7	428	12.2	193	26.8
	Hispanic	239	7.1	38	5.3	236	6.9	40	5.4	254	6.9	53	6.9	259	7.0	61	8.1	258	7.3	53	7.4
	Other	343	10.1	91	12.7	358	10.4	94	12.8	394	10.7	107	13.9	422	11.4	102	13.6	439	12.5	106	14.7
Total	White, non-Hispanic	660,554	59.1	94,727	43.3	657,764	58.3	97,271	42.8	651,781	57.8	98,391	42.2	653,962	57.3	100,059	42.0	624,263	56.5	96,678	41.5
	Black, non-Hispanic	155,551	13.9	53,102	24.3	157,212	13.9	54,449	23.9	158,239	14.0	55,637	23.9	160,157	14.0	56,223	23.6	155,242	14.1	54,253	23.3
	Hispanic	173,640	15.5	39,872	18.2	181,528	16.1	43,205	19.0	187,717	16.6	46,067	19.8	195,957	17.2	48,393	20.3	195,952	17.7	48,855	21.0
	Other	128,020	11.5	31,047	14.2	131,166	11.6	32,588	14.3	130,456	11.6	33,146	14.2	131,704	11.5	33,773	14.2	129,027	11.7	33,325	14.3

[a]Army, Navy, Air Force, Marine Corps, and Coast Guard.

Reportable Medical Events at Military Health System Facilities Through Week 44, Ending November 4, 2023

Matthew W. R. Allman, MPH; Anthony R. Marquez, MPH; Katherine S. Kotas, MPH

TOP 5 REPORTABLE MEDICAL EVENTS BY CALENDAR WEEK, ACTIVE COMPONENT (NOVEMBER 6, 2022 - NOVEMBER 4, 2023)



Note: There were 0 heat illness cases in week 51 of 2022 and week 4 of 2023. 0 cases of campylobacteriosis were reported in week 7 of 2023.
Abbreviation: No., number.
[a]Cases are shown on a log scale.

Reportable Medical Events (RMEs) are documented in the Disease Reporting System internet (DRSi) by health care providers and public health officials throughout the Military Health System (MHS) for monitoring, controlling, and preventing the occurrence and spread of diseases of public health interest or readiness importance. These reports are reviewed by each service's public health surveillance hub. The DRSi collects reports on over 70 different RMEs, including infectious and non-infectious conditions, outbreak reports, STI risk surveys, and tuberculosis contact investigation reports. A complete list of RMEs is available in the *2022 Armed Forces Reportable Medical Events Guidelines and Case Definitions*.[1] Data reported in these tables are considered provisional and do not represent conclusive evidence until case reports are fully validated.

Total active component cases reported per week are displayed for the top 5 RMEs for the previous year. Each month, the graph is updated with the top 5 RMEs, and is presented with the current month's (October 2023) top 5 RMEs, which may differ from previous months. COVID-19 is excluded from these graphs due to changes in reporting and case definition updates in 2023.

For questions about this report, please contact the Disease Epidemiology Branch at the Defense Centers for Public Health–Aberdeen. Email: dha.apg.pub-health-a.mbx.disease-epidemiologyprogram13@health.mil

Authors' Affiliation: Defense Health Agency, Disease Epidemiology Branch, Defense Centers for Public Health–Aberdeen

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TABLE. Reportable Medical Events, Military Health System Facilities, Week Ending November 4, 2023 (Week 44)[a]

Reportable Medical Event[b]	Active Component[c]					MHS Beneficiaries[d]
	Sept. 2023	Oct. 2023	YTD 2023	YTD 2022	Total, 2022	Oct. 2023
	no.	no.	no.	no.	no.	no.
Amebiasis	0	0	12	7	13	0
Arboviral diseases, neuroinvasive and non-neuroinvasive	0	0	2	1	1	0
Brucellosis	0	0	0	2	2	0
COVID-19-associated hospitalization and death[e]	9	9	92	0	7	59
Campylobacteriosis	18	13	230	198	230	8
Chikungunya virus disease	0	0	2	1	1	0
Chlamydia trachomatis	1437	1190	14462	16715	19432	177
Cholera	0	0	4	2	2	0
Coccidioidomycosis	2	1	21	13	15	1
Cold weather injury[f]	1	3	105	117	151	0
Cryptosporidiosis	6	1	60	41	46	3
Cyclosporiasis	0	0	15	10	10	0
Dengue virus infection	2	1	7	1	1	0
E. coli, Shiga toxin-producing	13	2	62	66	67	3
Ehrlichiosis/Anaplasmosis	0	0	29	3	3	0
Giardiasis	7	2	63	61	71	2
Gonorrhea	225	192	2264	2886	3305	21
Haemophilus influenzae, invasive	0	0	1	1	1	0
Hantavirus disease	0	0	1	0	1	0
Heat illness[f]	114	36	1219	1180	1213	0
Hepatitis A	1	0	7	11	16	0
Hepatitis B	14	7	125	107	119	1
Hepatitis C	3	2	43	50	57	8
Influenza-associated hospitalization[g]	1	9	16	127	148	3
Lead poisoning, pediatric[h]	0	0	0	0	0	7
Legionellosis	0	1	4	3	4	2
Leishmaniasis	0	0	1	1	1	0
Leprosy	0	0	2	1	1	0
Leptospirosis	0	1	4	1	1	0
Lyme disease	6	6	62	57	65	5
Malaria	4	2	21	25	26	1
Meningococcal disease	0	0	2	1	2	0
Mpox	0	2	2	92	93	1
Norovirus	16	14	362	190	221	8
Pertussis	1	5	10	8	10	4
Post-exposure prophylaxis against Rabies	51	38	489	454	514	25
Q fever	0	0	2	3	3	0
Rubella	0	0	2	3	3	0
Salmonellosis	17	23	104	114	122	16
Schistosomiasis	0	0	0	1	1	0
Severe Acute Respiratory Syndrome (SARS)	0	0	0	1	1	0
Shigellosis	8	0	56	28	33	3
Spotted Fever Rickettsiosis	1	0	30	65	70	2
Syphilis (all)	72	45	735	870	1048	10
Toxic Shock Syndrome	0	0	1	0	0	0
Trypanosomiasis	0	0	1	1	1	0
Tuberculosis	1	2	10	10	11	1
Tularemia	0	0	1	0	0	0
Typhoid fever	1	0	2	0	0	0
Typhus fever	0	0	2	1	1	0
Varicella	1	0	9	14	16	2
Total case counts	2,032	1,607	20,756	23,544	27,160	373

Abbreviations: RME, reportable medical event; MHS, Military Health System; YTD, year-to-date; no., number.

[a] RMEs reported through the Disease Reporting System internet (DRSi) as of Nov. 30, 2023 are included in this report. RMEs were classified by date of diagnosis, or where unavailable, date of onset. Monthly comparisons are displayed for the period of Sept. 1, 2023 to Sept. 30, 2023 and Oct. 1, 2023 to Oct. 31, 2023. YTD comparison is displayed for the period of Jan. 1, 2023 to Oct. 31, 2023 for MHS facilities. Previous year counts are provided as the following: prior year YTD–Jan. 1, 2022 to Oct. 31, 2022; total 2022–Jan. 1, 2022 to Dec. 31, 2022.

[b] RME categories with 0 reported cases among active component service members and MHS beneficiaries for the time periods covered were not included in this report.

[c] Services in this report include the Army, Navy, Air Force, Marine Corps, Coast Guard, and Space Force, including personnel classified as FMP 20 with duty status of Active Duty, Recruit, or Cadet in DRSi.

[d] MHS beneficiaries included individuals classified as FMP 20 with duty status of Retired and individuals with all other FMPs except 98 and 99. Civilians, contractors, and foreign nationals were excluded from these counts.

[e] Only cases reported after case definition update on May 4, 2023. Includes only cases resulting in hospitalization or death. Does not include cases of hospitalization or death reported under the previous COVID-19 case definition.

[f] Only reportable for active component service members.

[g] Influenza-associated hospitalization is reportable only for individuals aged 65 years or younger.

[h] Pediatric Lead Poisoning is reportable only for children aged 6 years or younger.

Thank You to MSMR External Reviewers

The Editor-in-Chief of *MSMR*, its contributing editors, and production staff would each like to extend their appreciation and gratitude to the subject matter experts who served as peer reviewers of manuscripts published in *MSMR* during 2023. Our external reviewers commit valuable time and effort sincerely appreciated by the *MSMR* team. Their informed insight, careful analysis, and thoughtful critique supported the continuance of the *MSMR* mission: to provide monthly, evidence-based estimates of the incidence, distribution, impact, and trends of health-related conditions among service members.

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Valerie Williams

It is with great sadness that the *Medical Surveillance Monthly Report (MSMR)* shares the news of the recent death of our colleague, Valerie Williams. Ms. Williams, a senior scientist employed by General Dynamics Information Technology, had served as a writer and editor for the *MSMR* since February 2016. Valerie Williams was an exemplary scientist and committed editor who made important contributions to the journal during her tenure.

Ms. Williams had an astoundingly broad skill set that made her critical to the *MSMR*'s production over the last seven years. She co-authored over 40 original *MSMR* manuscripts encompassing a broad range of surveillance topics related to the health of military service members. She was also expert in patiently and diligently shepherding external *MSMR* submissions through the publication process. She invariably strengthened these external manuscripts through her exceptional editorial acumen and commitment to scientific excellence. She took as much care with the minutiae of table footnote punctuation during final copy edits as she did in rigorously scrutinizing the methods and analysis of initial manuscript submissions.

She was always willing to step in where needed. She served "double duty" as production editor when the position was vacant, and this remarkable commitment to ensuring continuous production, no matter what it required of her, meant that she was an indispensable resource for every member of the editorial staff. Despite the incumbent challenges in producing a monthly peer-reviewed journal, she faced these challenges with humor and positivity while demonstrating an unwavering focus and commitment to ensuring the scientific accuracy and editorial excellence of the *MSMR*.

Ms. Williams's dedication to the *MSMR* and her colleagues never flagged. Her final project for the *MSMR*, in addition to her normal editorial duties, was to lead the preparation of *MSMR*'s technical application to the NIH's National Library of Medicine for full indexing of this journal on PubMed Central (PMC). This process involved the creation of numerous sample files according to extremely precise criteria, requiring meticulousness, diligence, and patience.

Prior to joining the *MSMR* staff, Ms. Williams had a productive research career at the Truth Initiative in Washington, DC; the University of Massachusetts Medical School; and the Battelle Centers for Public Health Research and Evaluation, among others. Her work and publication record at these institutions focused primarily on tobacco control, mental health, and juvenile justice. She held master's degrees in epidemiology and biological anthropology from the University of Illinois, Urbana-Champaign and a bachelor's degree in anthropology and environmental science from the University of Virginia.

In addition to being an exemplary scientist, committed editor, and dependable colleague, Valerie Williams was highly esteemed as an individual. Perhaps her most outstanding quality was her compassion and concern for others, which manifested in her unwavering willingness to aid her colleagues in whatever way she could. Her conscientiousness was unequaled. She was also a person of great wit, insight, and humor who will be greatly missed by her AFHSD colleagues. We were enriched by her presence. Our deepest sympathies go to her family.

Medical Surveillance Monthly Report (MSMR), in continuous publication since 1995, is produced by the Armed Forces Health Surveillance Division (AFHSD) of the Defense Health Agency (DHA) Public Health Directorate. AFHSD is a designated public health authority within the Defense Health Agency. The *MSMR* provides evidence-based estimates of the incidence, distribution, impact, and trends of illness and injuries among U.S. military members and associated populations. Most reports in the *MSMR* are based on summaries of medical administrative data that are routinely provided to the AFHSD and integrated into the Defense Medical Surveillance System for health surveillance purposes.

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