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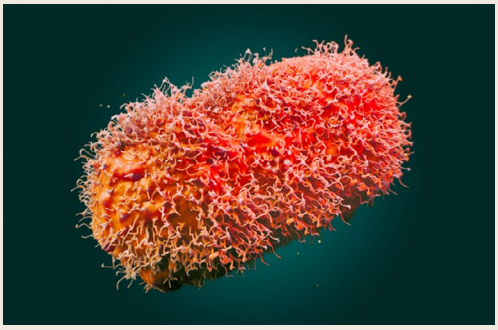

In this issue:

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Call for Papers

Empowering Military Women's Mission—Focusing on Military Women's Health and its Impact on Readiness

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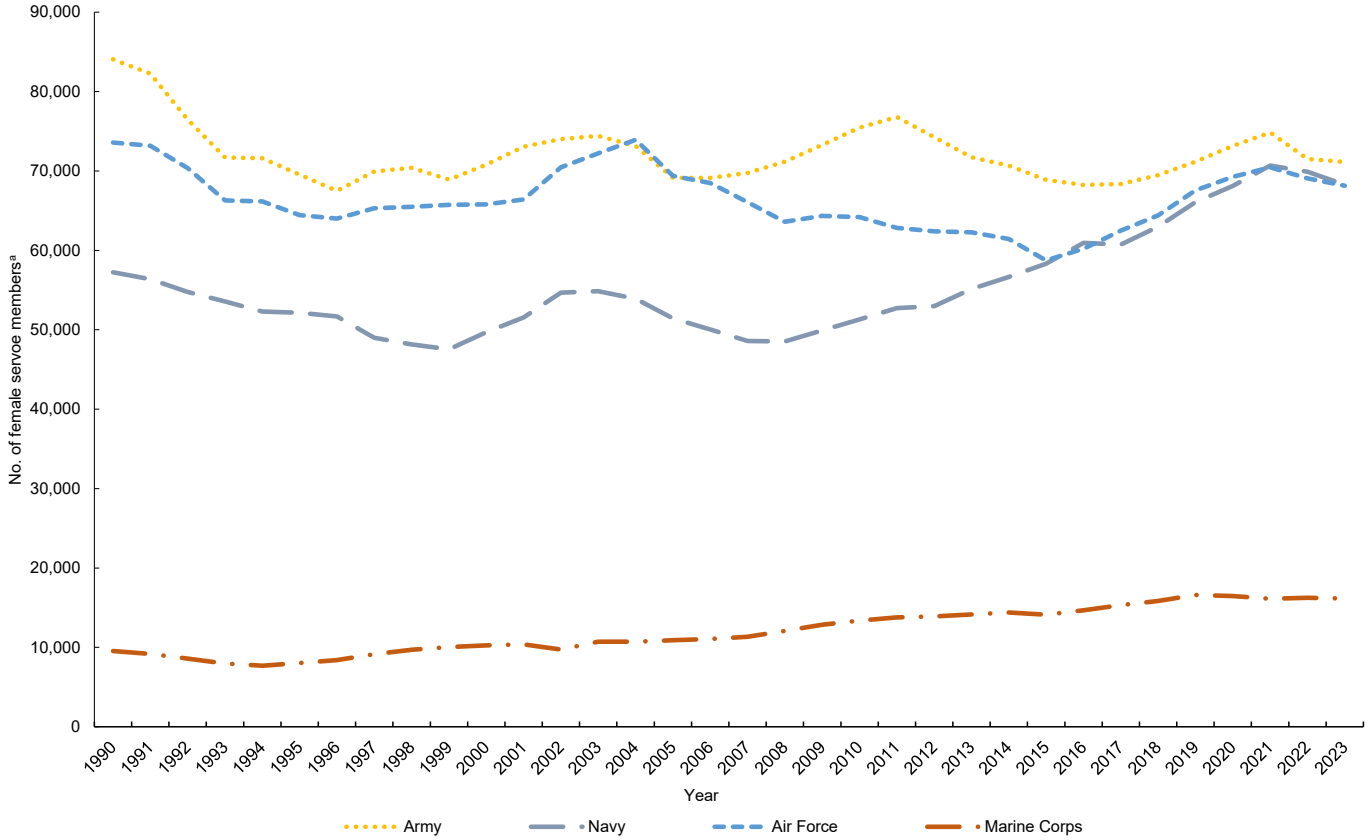
The editors of *MSMR* are announcing a call for papers to be published in the May 2025 issue of *MSMR* that will be dedicated to the health of women serving in the military, to coincide with Women's Health Awareness Month and Women's Health Week. The editors of *MSMR* are inviting researchers and investigators with an interest in women's health issues and their relationship to the U.S. military to submit manuscripts in the coming months to be considered for the *MSMR* 2025 women's health issue.

Women in Military Service

The U.S. Department of Defense (DOD) has recognized that increasing gender diversity in the military is contingent upon more female recruits, which requires emphasis on the importance of recruiting and retaining women, as part of maintaining diversity within the military.[1] In 2016 all gender restrictions on military service were lifted, allowing female service members to assume direct combat positions. The Defense Health Board (DHB) found that active duty women have been incorporated into all military occupational specialties and proven themselves critical to DOD mission success.[2] **Figure 1** shows the distribution of female service members by service type from 1990 to 2023.

Since the introduction of the all-volunteer force in 1973, the number of women entering the Army and Reserve components has increased significantly. As a result of targeted recruiting, revised training, and greater opportunities, the total number

FIGURE 1. Distribution of Female Service Members by Service Branch, 1990–2023



Abbreviation: No., number.

[a]Data extracted from Defense Medical Surveillance System (DMSS), 2023.

of women in the Army increased from 12,260 in 1972 to 52,900 in 1978,[3] and as of 2023 the number of active component female service members in the U.S. Armed Forces was 231,651, accounting for 17.6% of the active component force. A concurrent decline in the male service member population contributed to a relatively rapid increase in the proportion of the women serving in the U.S. military **(Figure 2)**. As the total population of the active component force decreased from 2,040,099 in 1990 to 1,317,194 in 2023, the number of male service members decreased from 1,815,683 in 1990 to 1,194,003 in 2001, and then stabilized, meanwhile the number of female service members remained substantially unchanged.

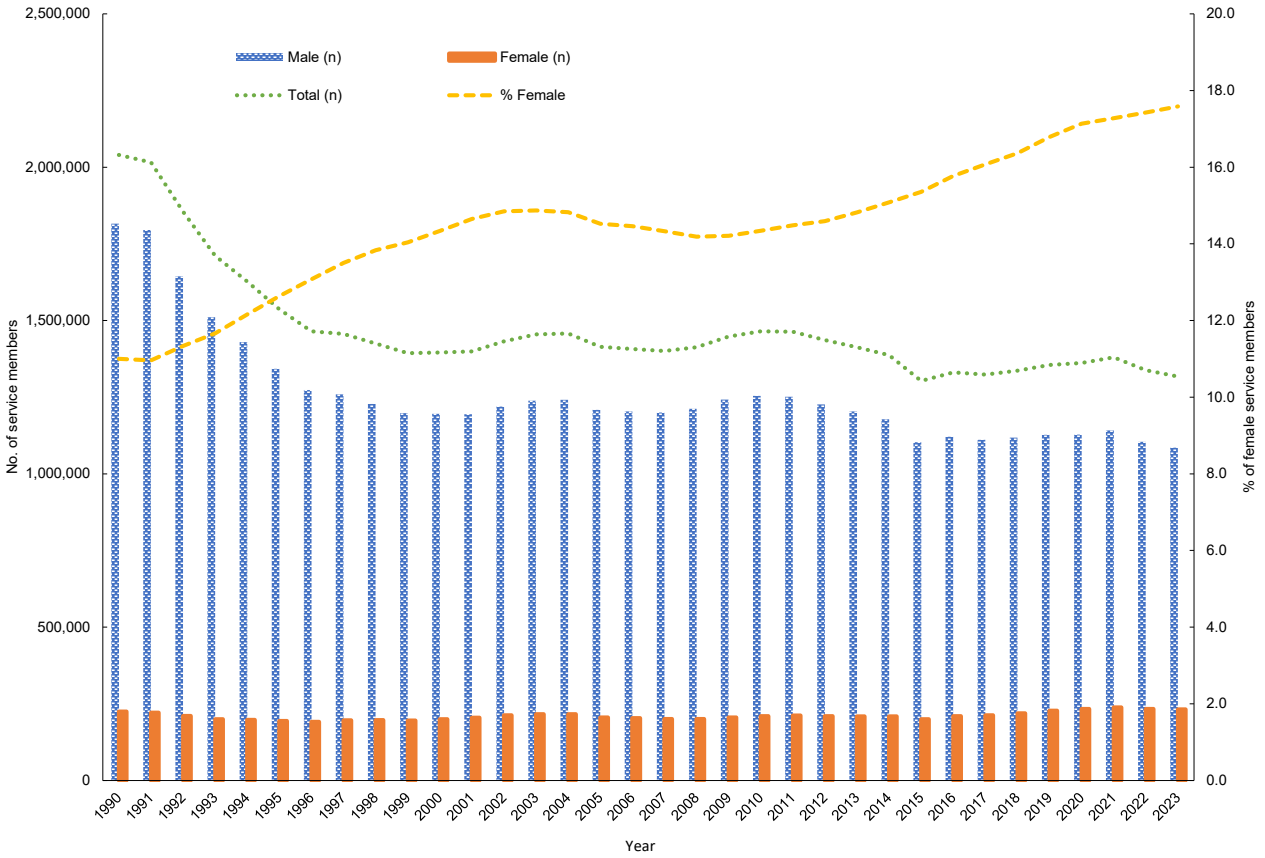
As military demographics continue to shape a proportionally larger female force in which the roles of women become increasingly important, there is a growing need to understand the unique challenges women face while serving, with a focus on their empowerment in addition to their retention. It is critical to evaluate whether the health needs of active component service women are appropriately managed within the military environment, taking into account their unique health concerns including occupational physical demands, gender-specific physical and mental stresses, and reproductive health issues.[4]

Women's Health and Its Challenges

"Women's health" is often too narrowly focused on sexual and reproductive health, which are generally considered synonymous with gender-specific conditions or reproductive health.[5,6] A focus on sexual and reproductive health is relevant but insufficient. Despite the strong need for evidence-based information to achieve better outcomes, a lack of research on women's health persists. Women's health burdens are under-represented in clinical research and treatment.[7] Historically, women's health needs have lagged in medical research, resulting in limited knowledge about women's health, which has restricted the health information available to women and the quality of their health care.[8] Fundamental and translational knowledge gaps specific to many women's health conditions and diseases have inhibited generation of robust scientific data needed to provide high quality, evidence-based care to women.[9]

To better understand and address the health of women, especially groups of women who bear a disproportionate burden of disease, it is crucial to acknowledge women's fundamental differences. It is also important to assess the health burdens associated with women's health inequities by measuring years of potential life expectancy, and to consider contributing factors including race and ethnicity, socioeconomic status, age, education, geographic location, gender identity, and disability

FIGURE 2. Distribution of Service Members by Sex, 1990–2023



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status.[6] In 2023 the National Institutes of Health reported numerous health disparities between women and men in the U.S.—in addition to disparities with women in other high-income countries. Women in the U.S. have shown a slower increase in life expectancy, far behind women in other high-income countries, along with higher rates of obesity, more experiences of pain and physical disability, and more concurrent chronic conditions than men, in addition to an increase in overall maternal mortality in the U.S.[5]

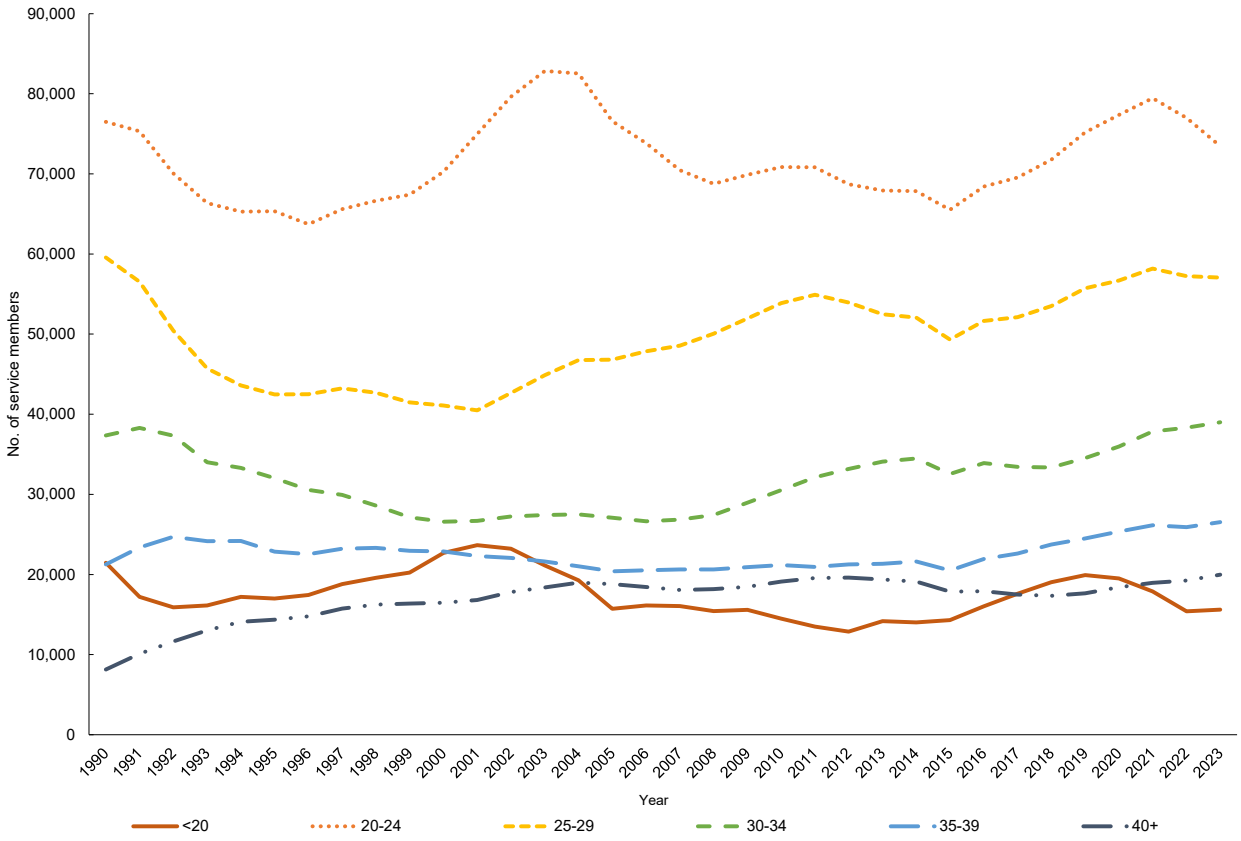
Women's complex health needs require health care that includes the whole woman, encompassing all the parts of the female body, all medical disciplines, and all life stages.[10] Women are more likely than men to need health care throughout their lifespans, but they are also more likely to be poor, which means health care costs can put both their health and economic security at risk. Consequently, women may delay diagnosis and treatment of serious health problems, leading to poorer health.[11] Women also experience different degrees or types of health problems that are dependent upon socioeconomic status. This year the World Economic Forum reported that women spend more of their lives in poor health and with greater degrees of disability, resulting in a women's health gap that equates to 75 million years of life lost annually due to poor health or early death, or the equivalent of 7 days per year for every woman.[6]

Women's health is tied to long-term economic productivity, with the development and economic performance of a country dependent upon how well it protects and promotes women's health. Societies are more likely to demonstrate better population health overall and remain more productive for generations to come when they prioritize women's health.[12] A McKinsey Health Institute report assessing the health burden associated with health disparities among women found 10 conditions that accounted for more than 50% of detrimental economic impacts: premenstrual syndrome (PMS), depressive symptoms, migraines, other gynecological diseases, anxiety disorders, ischemic heart disease, osteoarthritis, asthma, drug use disorders, and ovarian cancer.[6]

A 2021 RAND report argues that investing in women's health research produces significant societal benefits and returns over investing in general research, such as increased life-years, reduced years with disease, fewer years of functional dependence, and reductions in disruptions to work productivity.[13] The McKinsey report estimated that closing the gender health gap could reduce the time women spend in poor health by almost two-thirds and add up to $1 trillion to the global economy annually by 2040. McKinsey also estimated that for every $1 invested in women's health, approximately $3 can be projected in economic growth—creating the same impact as employing 137 million women in full-time jobs by 2040.[14]

Women already play a critical role in the U.S. economy, making up nearly 60% of U.S. workers and 65% of the unpaid

FIGURE 3. Distribution of Female U.S. Service Members by Age Group, 1990–2023



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workforce of caregivers.[10] One study estimating the economic burdens associated with the increases in U.S. maternal mortality rates over the past 2 decades, along with various maternal mortality disparities, found a substantial increase in potential years of lives lost and further calculated a statistical valuation, estimating a national economic burden of $27.4 billion due to maternal mortality from 2018 to 2020.[15]

Military Women's Health and Its Challenges

Women in the military experience health care and research inequities similar to their civilian counterparts. A recent scoping review of military women's health research found that a significant portion of published studies either did not include active duty women as research participants or failed to examine outcomes by gender or active duty status.[16] As a result, Trego and et al. conducted a military women's health Delphi study to determine priorities for military women's health research and reported 5 priority research topics: genitourinary health, sleep, physical assault, behavioral health, and menstrual cycle research.[17]

MSMR is dedicated to disseminating important information on women's health within the military and has published on women's health topics over the past decade that include vaginosis, chlamydia trachomatis, human papillomavirus (HPV), urinary tract infections (UTIs), pelvic inflammatory disease, menstrual suppression, menorrhagia, fibroids, ovarian and other gynecological disorders including birth and complications, infertility, contraceptive use, breast cancer, aggressive behaviors, and mental health among military women.

In 2023, female U.S. service members were hospitalized at more than 3 times the rate of male service members (116.5 per 1,000 and 34.3 per 1,000, respectively), which is consistent with the national hospitalization trend for women and men ages 18-44 (95 per 1,000 and 37 per 1,000, respectively) reported in 2022. Excluding pregnancy and delivery-related conditions, hospitalization rates for women in 2023 in the U.S. military were 33.0% higher (45.6 per 1,000) than for men (34.3 per 1,000), likely due to hospitalizations for mental health disorders.[18]

In 2023 female U.S. service members' annual outpatient visit rate was 87.5% higher than male service members' rate for all illness- and injury-related visits. Even when excluding pregnancy and delivery-related visits, female service members' outpatient visit rate in 2023 was still 70.5% higher than the male rate. In all major diagnostic categories except some specific diagnoses, women evinced illness- and injury-specific diagnoses rates 50% higher than men. The leading categories of female service members' outpatient visits in 2023 were musculoskeletal, "other," mental, "ill-defined," pregnancy, neurological, genitourinary, respiratory, injury, and dermatological diagnoses.[19]

Musculoskeletal disorders were the most common diagnosis at outpatient clinics for female service members in 2023.[19] According to a study examining intrinsic risk factors for exercise-related injuries among male and female army trainees, women are at higher risk for musculoskeletal injuries (MSIs) than men: at 30.1% incidence of time-loss injuries during army basic training compared to 20.2% for men.[20] Other studies have reported a higher risk of MSIs in women, with one reporting a total lifetime cost (sum of medical and work loss cost) among 302 Marines (84 women and 218 men) of approximately $1.4 million (in 2019 U.S. dollars), and another demonstrating increased health care utilization due to MSIs.[21,22] One study examining total costs of combat-related MSIs reported a cost per casualty of approximately $157,000, with medical costs associated with orthopedic care reaching $8.52 billion in the first year of treatment documented.[23]

Although these studies did not provide or investigate specific direct and indirect costs of health care utilization by female service members, service women's higher rates of outpatient and hospitalization, including increased use of health care resources, in addition to the expenditures associated with long-term consequences of MSIs, demonstrate the importance of prevention and effective management of health problems in female service members.

According to a U.S. Government Accountability Office report, the percentage of female active duty service members tends to decrease between 10 and 20 years of service. Women are 28% more likely than men to leave military service due to gender discrimination in health care, reproductive health needs, higher rates of MSIs and mental health issues, in addition to serious invisible injuries such as UTIs, with detrimental immediate impacts on military fitness and readiness.[1,24] In 2023, the largest proportion of female service members was in the 20-24-year age group (31.7%), followed by 25-29 years (24.6%), and then 30-34 years (16.8%), comprising a female majority in the U.S. military of childbearing age **(Figure 3)**. These demographics also highlight the importance of understanding and investigating general health issues women may face during their service, including contraceptive use as well as unintended pregnancy, and providing the support they need to meet their health needs.[25]

Advancing Research on Military Women's Health

President Biden's March 18, 2024 executive order advancing women's health research and innovation will require more research that prioritizes women's health within the federal research portfolio, to translate knowledge into impact to improve the health of all women.[26] Given their crucial role and the challenging environments in which female service members currently perform vital operations,[3] it is critical to identify the challenges they face in the military and recognize gaps in knowledge about their health needs, particularly in military settings.

Improving women's health requires an understanding of the determinants of disease, function, and well-being in women, in addition to the ability to intervene in relation and response to those determinants.[8] To provide effective care for women, gender-specific research, knowledge, and approaches to treatment are essential.[10] Quality research into women's health is critical for preventing and mitigating potential detrimental impacts on women's health. To estimate the economic impact of women's health, not only the medical

costs due to medical encounters and hospitalizations, but the long-term physical as well as mental burdens thereafter, need to be quantified.

The health of women serving in the military is affected by gender-specific health conditions as well as general environmental conditions that can affect each woman differently. Due to the growing role and importance of women in the military, continued and improved research is needed to support them, through a variety of studies.

Submissions for the May 2025 women's health issue of *MSMR* may consider any number of aspects, including preparedness, gender-specific risk assessment, prevention efforts, quality of care, health care expenditures and utilization, as well as health issues that may be differentiated from major health issues routinely studied. The editors of *MSMR* look forward to receiving submissions via email to the editor at dha.ncr.health-surv.mbx.msmr@health.mil. For detailed information on criteria for *MSMR* submissions, please visit Instructions for Authors | Health.mil. Manuscripts should be submitted no later than February 2, 2025 to be considered for publication in the issue.

References

1. U.S. Government Accountability Office.*Report to Congressional Committees: Female Active-Duty Personnel–Guidance and Plans Needed for Recruitment and Retention Efforts, GAO-20-61*. United States Government. 2020. Accessed Jul. 23, 2024. https://www.gao.gov/assets/gao-20-61.pdf
2. Defense Health Board. *Defense Health Board Report: Active Duty Women's Health Care Services*. U.S. Dept. of Defense. 2020. Updated Nov. 5, 2020. Accessed Jul. 11, 2024. https://www.health.mil/Reference-Center/Reports/2020/11/05/Active-Duty-Womens-Health-Care-Services
3. Department of the Army. Women in the Army. Army.mil. U.S. Dept. of Defense. Accessed Aug. 9, 2024. https://www.army.mil/women/history
4. Committee on Health Care for Underserved Women. *Committee Opinion 547: Health Care for Women in the Military and Women Veterans*. American College of Obstetricians and Gynecologists. 2022. Accessed Sep. 2, 2024. https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2012/12/health-care-for-women-in-the-military-and-women-veterans
5. National Institues of Health. *Advancing Science for the Health of Women: The 2019-2023 Trans-NIH Strategic Plan for Women's Health Research*. 2023. Accessed Jul. 19, 2024. https://orwh.od.nih.gov/sites/orwh/files/docs/ORWH_Strategic_Plan_2019_02_21_19_V2_508C.pdf
6. World Economic Forum, McKinsey Health Institute. *Closing the Women's Health Gap: A $1 Trillion Opportunity to Improve Lives and Economies–Insight Report, January 2024*. 2024. Accessed Jul. 22, 2024. https://www.weforum.org/publications/closing-the-women-s-health-gap-a-1-trillion-opportunity-to-improve-lives-and-economies
7. Tobb K, Kocher M, Bullock-Palmer RP. Underrepresentation of women in cardiovascular trials–it is time to shatter this glass ceiling. *Am Heart J Plus*. 2022;13:100109. doi:10.1016/j.ahjo.2022.100109
8. Institute of Medicine (US) Committee on Women's Health Research. Research on determinants of women's health. In: *Women's Health Research: Progress, Pitfalls, and Promise*. National Academies Press;2010. doi:10.17226/12908
9. Temkin SM, Noursi S, Regensteiner JG, Stratton P, Clayton JA. Perspectives from Advancing National Institutes of Health Research to Inform and Improve the Health of Women: a conference summary. *Obstet Gynecol*. 2022;140(1):10-19. doi:10.1097/AOG.0000000000004821
10. Deloitte. *The Future of Health Is Female: Understanding the Impact of Women+Health on Society*. 2021. Accessed Jul. 22, 2024. https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/impact-of-womens-health-on-society.html
11. Borchelt G. The impact poverty has on women's health. *Human Rights Magazine*. 2018;43(3). Accessed Jul. 22, 2024. https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/the-state-of-healthcare-in-the-united-states/poverty-on-womens-health
12. Onarheim KH, Iversen JH, Bloom DE. Economic benefits of investing in women's health: a systematic review. *PLoS One*. 2016;11(3):e0150120. doi:10.1371/journal.pone.0150120
13. Baird MD, Zaber MA, Chen A, et al. *Research Funding for Women's Health: Modeling Societal Impact*. RAND;2021. Accessed Jul. 30, 2024. https://www.rand.org/pubs/research_reports/RRA708-4.html
14. Ellingrud K, Pérez L, Petersen A, Sartori V, McKinsey Health Institute. *Closing the Women's Health Gap: A $1 Trillion Opportunity to Improve Lives and Economies*. McKinsey & Company;2024. Accessed Jul. 22, 2024. https://www.mckinsey.com/mhi/our-insights/closing-the-womens-health-gap-a-1-trillion-dollar-opportunity-to-improve-lives-and-economies
15. White RS, Lui B, Bryant-Huppert J, et al. Economic burden of maternal mortality in the USA, 2018-2020. *J Comp Eff Res*. 2022;11(13):927-933. doi:10.2217/cer-2022-0056
16. Iobst SE, Best N, Smith DC,et al. Promoting military women's health through research design. *Mil Med*. 2023;188(3-4):71-76. doi:10.1093/milmed/usac310
17. Trego LL, Deuster PA. Introduction to women in combat. *Mil Med*. 2023;188(Suppl 4):1-2. doi:10.1093/milmed/usac358
18. Armed Forces Health Surveillance Division. Hospitalizations among active component members of the U.S. Armed Forces, 2023. *MSMR*. 2024;31(6):11-18.
19. Armed Forces Health Surveillance Division. Ambulatory health care visits among active component members of the U.S. Armed Forces, 2023. *MSMR*. 2024;31(6):19-25.
20. Jones BH, Bovee MW, Harris JM, Cowan DN. Intrinsic risk factors for exercise-related injuries among male and female army trainees. *Am J Sports Med*. 1993;21(5):705-710. doi:10.1177/036354659302100512
21. Lovalekar M, Keenan KA, Beals K, et al. Incidence and pattern of musculoskeletal injuries among women and men during Marine Corps training in sex-integrated units. *J Sci Med Sport*. 2020;23(10):932-936. doi:10.1016/j.jsams.2020.03.016
22. Krauss MR, Garvin NU, Boivin MR, Cowan DN. Excess stress fractures, musculoskeletal injuries, and health care utilization among unfit and overweight female Army trainees. *Am J Sports Med*. 2017;45(2):311-316. doi:10.1177/0363546516675862
23. Hering K, Fisher MWA, Dalton MK, et al. Health-care utilization and expenditures associated with long-term treatment after combat and noncombat-related orthopaedic trauma. *J Bone Joint Surg Am*. 2022;104(10):864-871. doi:10.2106/JBJS.21.01124
24. Nolan M. Women's health can no longer be an afterthought in the military. *The Hill*. 2022. Accessed Jul. 25, 2024. https://thehill.com/opinion/national-security/3746537-womens-health-can-no-longer-be-an-afterthought-in-the-military
25. Witkop CT, Kostas-Polston EA, Degutis LC. Improving the health and readiness of military women. *Mil Med*. 2023;188:8-14. doi:10.1093/milmed/usac354
26. Office of Research on Women's Health, National Institutes of Health. President Biden Issues Executive Order on Advancing Women's Health Research and Innovation. U.S. Dept. of Health and Human Services. 2024. Accessed Jul. 25, 2024. https://orwh.od.nih.gov/in-the-spotlight/all-articles/president-biden-issues-executive-order-on-advancing-womens-health-research-and-innovation

Characteristics of Mpox Cases Diagnosed in Military Health System Beneficiaries, May 2022–April 2024

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In May 2022, cases of mpox emerged beyond its historically endemic parts of Central and West Africa, primarily affecting men who have sex with men (MSM), and spreading via sexual networks. During this global outbreak the novel clinical and epidemiological characteristics of mpox disease were thoroughly documented in civilian populations but comparable data have not been reported for Military Health System (MHS) populations including beneficiaries. MHS cases were identified through a variety of data sources, including the Disease Reporting System internet (DRSi) and a customized query of ICD-10-CM (International Classification of Diseases, 10th Revision, Clinical Modification) encounter codes. Contemporaneous chart reviews of patients' electronic health records in the Armed Forces Health Longitudinal Technology Application (AHLTA) and MHS GENESIS were performed to characterize cases. A total of 146 confirmed and probable MHS cases were identified from May 2022 through April 2024. Most cases occurred among MSM, with the majority developing classic prodromal symptoms and some experiencing anogenital and urinary symptoms.

What are the new findings?

From May 2022 to April 2024, total of 146 confirmed and probable mpox cases were identified among active duty service members and other MHS beneficiaries. With the majority of cases in MSM, most active duty service member cases were male (98.3%), 20-34 years old (81.4%), in the Army or Navy (39.8% each), and in the enlisted ranks (83.1%).

What is the impact on readiness and force health protection?

Although historically atypical, the clinical and epidemiological characteristics of MHS mpox cases reflect those documented in civilian populations during the 2022 global outbreak. Department of Defense clinicians and public health officials should optimize public health messaging and education focusing on patient risk modification that target MSM.

In May 2022, while in the wake of the COVID-19 pandemic, the Department of Defense (DOD) and U.S. Government faced a new public health crisis: locally acquired cases of mpox (formerly monkeypox), a historically rare zoonotic disease, were emerging in multiple non-endemic countries and spreading among men who have sex with men (MSM) populations via sexual networks.[1] While many of the initial cases and subsequent chains of transmission in Europe were linked to a LGBT+ Pride event on the Spanish island of Gran Canaria, by the end of May most cases were the result of local community transmission.[1] By July 2022, over 16,000 cases had been reported from 75 mostly non-endemic countries including the U.S., prompting the World Health Organization (WHO) to declare mpox a Public Health Emergency of International Concern.[2] Unusual characteristics of the virus during this outbreak—specifically, the extent of uninterrupted chains of human-to-human transmission, the form of spread, and population affected—reshaped a previously known disease into a new public health threat, with unclear impact to military readiness.

Mpox is a zoonotic disease caused by the monkeypox virus (MPXV), a double-stranded DNA virus of the *Orthopoxvirus* genus and *Poxviridae* family, which includes variola (smallpox), cowpox, and vaccinia viruses.[1] Mpox was first detected in laboratory monkeys in 1958, and the first human case was discovered by WHO in 1970 in the Democratic Republic of Congo.[1] WHO has declared mpox the most important *Orthopoxvirus* infection in humans since the eradication of smallpox.[3]

Two clades of MPXV exist: clade I (formerly the Congo Basin clade) causes more severe disease, with a potential case fatality rate of 10%; while clade II (formerly the West African clade), which includes subclades IIa and IIb, typically causes milder disease.[1] The global mpox outbreak that began in 2022 has been driven by subclade IIb.[4]

Historically, human mpox cases were reported primarily in endemic areas of West and Central Africa, acquired via zoonotic transmission associated with hunting and preparing or consuming animal meat, or bites or scratches from infected primates and rodents.[1] MPXV can also be transmitted among humans through direct contact with infectious sores or scabs, or through fomites contaminated with bodily fluids, as well as by respiratory secretion during prolonged close contact, and directly from an infected mother to her fetus.[1] In the outbreak that started in 2022, however, the majority of cases have been linked to close intimate contact, particularly sexual activity.

This outbreak has primarily affected MSM, who have presented with novel epidemiological and clinical characteristics.[4,5]

During MPXV's 3- to 17-day incubation period an individual is not contagious. The consequent illness typically lasts 14-28 days.[5] Prior to the 2022 outbreak, mpox illness usually began with prodromal symptoms including fever, malaise, headache, lymphadenopathy, and myalgias, followed by a rash that first appeared on the face and then spread over the body, to the palms of the hands and soles of the feet.[5] Cases during the 2022 outbreak, however, were reported with atypical clinical presentations such as lesions first appearing in the anogenital region or mouth that did not always progress elsewhere on the body, along with rectal symptoms (e.g., pain with defecation, purulent or bloody stools), and prodromal symptoms that occurred after development of a rash—or did not occur at all.[4] A person with mpox is contagious from the time of symptom onset until after all lesions have scabbed, sloughed from the body, with a fresh layer of renewed skin in place. Most infections with MPXV clade II, the lineage responsible for the outbreak of 2022, are mild to moderate in severity and self-limited, requiring only supportive care.[3,5]

Currently, 2 vaccines are licensed in the U.S. for the prevention of mpox, both of which are available through the Strategic National Stockpile: JYNNEOS™ (live, replication incompetent vaccinia virus) and ACAM2000® (live, replication competent vaccinia virus).[7] JYNNEOS can also be used as post-exposure prophylaxis.[7] The unique clinical and epidemiological picture of mpox patients in the 2022 outbreak have been well documented in civilian populations, both in the U.S and internationally.[8,9] This report describes the characteristics of mpox cases identified in U.S. military personnel and other MHS beneficiaries.

Methods

The surveillance period for this study was May 1, 2022 through April 30, 2024. The surveillance population included all active duty service members (including National Guard and Reserves) and other MHS beneficiaries seen at military hospitals and clinics during the surveillance period, including virtual consultations. Cases assessed in this report met the criteria for confirmed and probable mpox cases according to the U.S. Centers for Disease Control and Prevention (CDC)'s 2022 case definitions.[10] A probable case must meet specific criteria: 1) no suspicion of other recent *Orthopoxvirus* exposure (e.g., *vaccinia virus* in ACAM2000 vaccination) and 2) demonstration of either the presence of *Orthopoxvirus* DNA by PCR of a clinical specimen; *Orthopoxvirus* using immunohistochemical or electron microscopy testing methods; or detectable levels of anti-orthopoxvirus IgM antibody between 4 to 56 days after rash onset. A confirmed case must meet 1 of 2 criteria: demonstration of the presence of MPXV DNA by PCR testing or Next Generation sequencing of a clinical specimen; or isolation of MPXV in culture from a clinical specimen.

Epidemiologists at the Armed Forces Health Surveillance Division (AFHSD)'s Integrated Biosurveillance (IB) Branch began tracking confirmed, probable, and potential mpox cases among MHS beneficiaries at the start of the global outbreak in May 2022. Mpox diagnoses were ruled out due to inconclusive, equivocal, or negative laboratory results, or insufficient information. IB epidemiologists used the DOD Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) to construct an mpox query using chief complaint keywords and discharge diagnosis codes from the International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM).[11] The Electronic Data Interchange Personal Identifiers (EDI-PIs) associated with encounters flagged by this query were used to conduct chart reviews of potential cases' electronic health records in the Armed Forces Health Longitudinal Technology Application (AHLTA) and MHS GENESIS.

AFHSD-IB created a master case list for mpox from various sources including the ESSENCE mpox query, DOD Reportable Medical Events (RMEs) entered in the Disease Reporting System internet (DRSi), service-specific reporting to AFHSD, Commanders' and Directors' Critical Information Requirements (CCIRs and DCIRs, respectively), the National Guard Bureau, and direct communications with other DOD partners. Cases were validated and populated with demographic, epidemiologic, and clinical data by conducting chart reviews of patients' electronic health records, with key measures including sexual behavior, clinical signs and symptoms, duration of illness, and likely mode of transmission.

One reviewer with a background in epidemiology and health surveillance conducted chart reviews of all confirmed and probable MHS beneficiary cases that occurred from May 1, 2022 through April 30, 2024 for which electronic health records were available. Each patient's records were reviewed from the date of the initial mpox-related health encounter through documented physician-authorized release from isolation or new in-person encounters for unrelated medical services.

Case locations were defined by the country (and U.S. state, where applicable) of the hospital or clinic where the patient was initially diagnosed. Signs and symptoms that occurred at any point in the patient's course of illness were defined by the parameters established for chart review in the preceding paragraph. Patients were identified as MSM if their encounter notes explicitly established their MSM status, or alluded to a male spouse or partner or sexual encounter(s) with a male partner. The likely source or cause of mpox exposure was loosely grouped into the following categories: sexual/intimate, other person-to-person, animal, fomites, and unknown; with the determination made based on details shared in provider notes. Coinfections were defined by the presence of positive laboratory results for other communicable diseases—or provider documentation of such results—that were dated within a 1-week window of specimen collection or return of positive results for non-variola orthopoxvirus. Duration of illness was determined by calculating the number of days that elapsed from symptom onset to release from isolation.

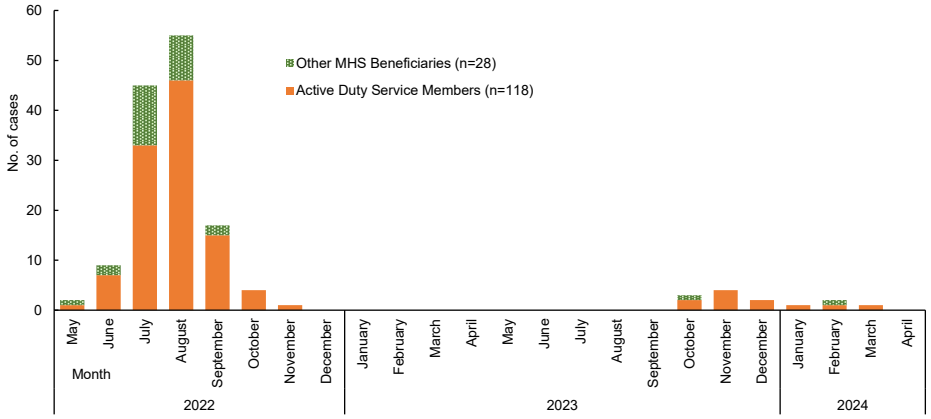
Results

A total of 146 confirmed and probable cases of mpox were identified among MHS beneficiaries during the study period. Symptom onset dates ranged from May 25, 2022 to March 9, 2024. After peaking in August 2022, with 55 cases, incidence among MHS beneficiaries declined sharply to 17 cases in September and then 4 cases in October, and has remained substantially lower since, with 2 or fewer cases per month from that time **(Figure 1)**. This trend reflects trends seen in the U.S. civilian population.[6] Clade-specific testing was conducted for at least 15 MHS beneficiary cases from Germany (n=2), Italy (n=2), Spain (n=2), the United Kingdom (n=1), and the U.S. (n=7), with all 15 identified as MPXV clade II (data not shown).

Active duty service members accounted for the majority (80.8%) of cases, with other MHS beneficiaries, including retirees, accounting for 19.2% **(Table 1)**. The majority (89.0%) of active duty service member cases were diagnosed in the U.S., with California, Virginia, and Maryland collectively accounting for more than half of these cases **(Table 1)**. Most active duty service member cases were male (98.3%), 20-34 years old (81.4%), in the enlisted ranks (83.1%), in the Army or Navy (39.8% each), and either non-Hispanic Black (33.9%) or non-Hispanic White (29.7%) race or ethnicity **(Table 1)**. Among cases with confirmed symptom onset dates and quarantine release dates (n=93, active duty service members; n=19, other MHS beneficiaries), the average time from onset to resolution and release from isolation was 29 days (data not shown). All MHS beneficiary patients experienced a rash, over half experienced a fever (55.7%), and nearly half (47.9%) had lymphadenopathy **(Figure 2)**.

Among patients with information about sexual behavior (n=109, active duty service members; n=27, other MHS beneficiaries), 88.8% and 100% of cases, respectively, occurred in MSM (data not shown). At least 30 (20.5%) of all MHS beneficiary cases were coinfected with 1 or more communicable diseases, including 24 patients (16.4%) who tested positive for a sexually transmitted infection (STI) (data not shown). Among MHS beneficiaries for whom a likely source or cause of disease exposure could be determined (n=37), the majority (81.2%) were attributable to sexual or intimate activity; other person-to-person contact accounted for 18.3% of cases, with transmission via fomites identified as a possible source of exposure for 4.6% of these cases (data not shown).

FIGURE 1. Confirmed and Probable Mpox Cases Among MHS Beneficiaries, by Month of Symptom Onset[a], May 2022–April 2024



Note: Active Duty includes National Guard and Reserves.
Abbreviation: No., number.
[a] Report date used as proxy for cases with unknown symptom onset (n=3).

Discussion

The characteristics of MHS mpox cases described in this report provide a foundation for additional studies to enable public health entities and military leadership alike to stratify at-risk population demographics, anticipate impacts on military readiness, and develop appropriate and effective mitigation strategies. These data also provide clinicians with an additional tool to assist diagnosis and treatment, most likely clinical presentation when mpox is a differential diagnosis, and populations at risk.

Active duty service members ages 25-29 years demonstrated the highest mpox occurrence of any single age group, and at least 83.1% of active duty cases were in the enlisted force. The overall incidence rate among active component personnel (approximately 1.6 million people) was 6.7 cases per 100,000 persons, which is lower than the rate of 9.9 cases per 100,000 in the U.S. civilian population (about 333 million people) during the same time period.[12,13] In relation to active component populations (which exclude activated National Guard and Reserves) during the study period, Defense Medical Surveillance System data show that the Navy (population 402,920) had the highest cumulative incidence percentages of mpox cases, at 1.2%, followed by the Army (pop. 568,520) at 0.7%, the Air Force (pop. 377,804) at 0.4%, and the Marine Corps (pop. 227,407), at 0.4%. Based on these data, the impact of this disease on military readiness appears to be minimal, at least in relation to the clade that drove global transmission during the surveillance period.

Clinical presentation of mpox in MHS beneficiaries mirrored what has been documented in affected civilian populations during the global outbreak.[4,8] Many cases developed classic prodromal symptoms including fever, lymphadenopathy, sore throat, fatigue, and malaise. Some cases, however, experienced anogenital and urinary symptoms that were atypical prior to 2022 but have been frequently documented in civilian populations since 2022, including rectal pain or pain with defecation, diarrhea, proctitis, anal discharge, rectal bleeding, and tenesmus. Average duration of illness and associated isolation among all MHS beneficiaries was 29 days. While a comparable metric could not be found for the U.S. civilian population, CDC guidance indicates that mpox illness typically lasts 2-4 weeks.[5]

TABLE. Demographic and Military Characteristics of Confirmed and Probable Mpox Cases Among MHS Beneficiaries, May 2022–April 2024

	Beneficiary Type					
	All MHS Beneficiaries		Active Duty Service Members[a]		Other MHS Beneficiaries[b]	
	No.	%	No.	%	No.	%
Total	146	--	118	--	28	--
Service branch (or sponsor)						
Army	61	41.8	47	39.8	14	50.0
Navy	54	37.0	47	39.8	7	25.0
Air Force	22	15.1	15	12.7	7	25.0
Marine Corps	8	5.5	8	6.8	--	--
U.S. Public Health Service	1	0.7	1	0.9	--	--
Sex						
Male	143	97.9	116	98.3	27	96.4
Female	3	2.1	2	1.7	1	3.6
Race and ethnicity						
Black, non-Hispanic	45	30.8	40	33.9	5	17.9
White, non-Hispanic	42	28.8	35	29.7	7	25.0
Hispanic[c]	21	14.4	17	14.4	4	14.3
Asian / Pacific Islander	7	4.8	7	5.9	--	--
Other / unknown[d]	31	21.2	19	16.1	12	42.9
Rank						
E1-E4 (Junior enlisted)	--	--	55	46.6	--	--
E5-E9 (Senior enlisted)	--	--	43	36.4	--	--
O1-O3; W1-W3 (Junior officer)	--	--	11	9.3	--	--
O4-O10; W4-W5 (Senior officer)	--	--	4	3.4	--	--
Other / unknown[e]	--	--	5	4.2	--	--
Age group, y						
<20	1	0.7	1	0.9	--	--
20-24	27	18.5	24	20.3	3	10.7
25-29	50	34.2	44	37.3	6	21.4
30-34	32	21.9	28	23.7	4	14.3
35-39	17	11.6	12	10.2	5	17.9
40-44	8	5.5	5	4.2	3	10.7
45-49	4	2.7	3	2.5	1	3.6
≥50	6	4.1	1	0.9	5	17.9
Unknown	1	0.7	--	--	1	3.6
Location of diagnosis[f]						
Germany	5	3.4	5	4.2	--	--
Italy	5	3.4	4	3.4	1	3.6
Japan	1	0.7	--	--	1	3.6
Spain	4	2.7	3	2.5	1	3.6
United Kingdom	1	0.7	1	0.8	--	--
United States	**130**	89.0	**105**	89.0	**25**	89.3
Virginia	24		19		5	
California	23		21		2	
Maryland	18		13		5	
Florida	10		9		1	
Texas	9		7		2	
Washington	8		6		2	
North Carolina	7		4		3	
South Carolina	5		4		1	
Georgia	4		4		--	
Colorado	4		3		1	
Hawaii	3		2		1	
New York	2		1		1	
Illinois	2		1		1	
Alabama	1		1		--	
Arizona	1		1		--	
Indiana	1		1		--	
Kentucky	1		1		--	
Louisiana	1		1		--	
Massachusetts	1		1		--	
Missouri	1		1		--	
Oklahoma	1		1		--	
Pennsylvania	1		1		--	
Unknown	1		1		--	

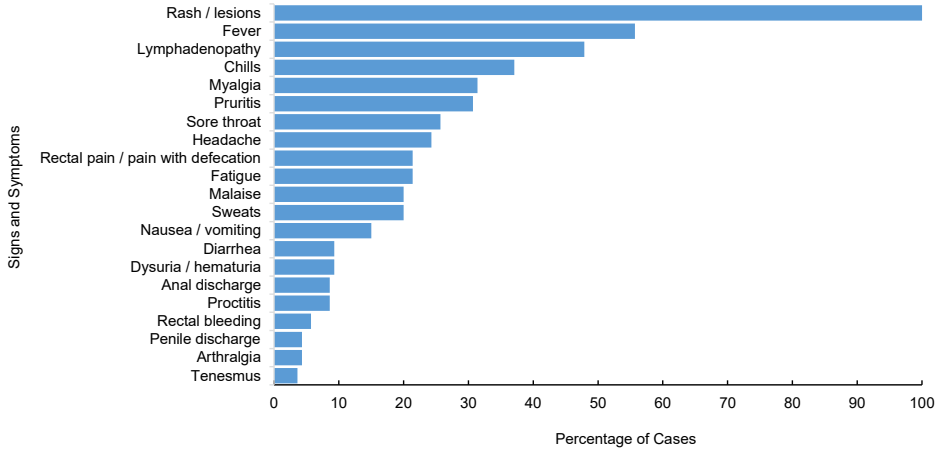
Approximately 88.8% of active duty service member cases occurred in MSM, which is slightly lower than in the overall U.S. population (90%).[6,12] At least 20.5% of all MHS beneficiary cases were coinfected with 1 or more communicable diseases, including 16.4% testing positive for an STI. The majority of MHS cases for which a likely source or cause of disease exposure could be determined were attributable to sexual or intimate activity. This finding suggests that DOD health care providers and public health entities should optimize public health messaging that targets these groups, and may usefully adapt some of the tools already developed in the U.S. civilian sector for this purpose.

A case series that specifically describes mpox disease progression among MHS beneficiary cases, including details on when, and if, classic prodromal symptoms appeared, and location and progression of bodily lesions, would be valuable source of additional information. Such clinical information, when integrated with data presented herein on case symptomatology as well as demographic and epidemiological case characteristics, could support MHS clinicians' identification of potential mpox cases in MHS patients, along with the incorporation of mpox into differential diagnoses where appropriate. DOD clinicians should also standardize consistent patient risk modifying education for this population, including vaccination recommendations, particularly in clinical settings where beneficiaries are seeking testing for STIs or other sexual health concerns.

Future discussion and study about the factors influencing the sharp decline in mpox incidence within the MHS beneficiary population is also warranted, to confirm, contradict, or modify assumptions

Abbreviations: MHS, Military Health System; No., number; y, years.
[a] Includes National Guard and Reserves.
[b] Includes retirees.
[c] Includes White (n=12), Black (n=3), Other race (n=5), and Unknown race (n=1).
[d] Includes Other race/non-Hispanic (n=9), White/unknown ethnicity (n=5), Unknown race/ethnicity (n=10), Black/unknown ethnicity (n=4), Asian or Pacific Islander/Hispanic (n=2), and Other race/unknown ethnicity (n=1).
[e] Includes 1 cadet.
[f] Refers to location of health care facility where case was diagnosed.

FIGURE 2. Sign and Symptom Frequency Among MHS Beneficiary Mpox Cases, May 2022–April 2024[a]



Abbreviation: MHS, Military Health System.
[a]Analysis excludes 6 cases without symptom information.

informed by emerging evidence. Global civilian studies have concluded that mpox cases in the ongoing outbreak have been predominately confined to a specific patient population, i.e., MSM with multiple sexual partners.[6,9] Consequently, it has been posited that effective targeting of pre- and post-exposure vaccine prophylaxis campaigns towards the MSM population along with decreased high-risk sexual activities due to awareness campaigns by DHA personnel may have contributed to the significant decline in MHS beneficiary cases.

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References

1. Mitjà O, Ogoina D, Titanji BK, et al. Monkeypox. *Lancet*. 2023;401(10370):60-74. doi:10.1016/S0140-6736(22)02075-X
2. World Health Organization. WHO Director-General's Statement at the Press Conference Following IHR Emergency Committee Regarding the Multi-Country Outbreak of Monkeypox: 23 July 2022. Jul. 23, 2022. Accessed Jul. 22, 2024. https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-the-press-conference-following-IHR-emergency-committee-regarding-the-multi--country-outbreak-of-monkeypox--23-july-2022
3. World Health Organization. *The Global Eradication of Smallpox: Final Report of the Global Commission for the Certification of Smallpox Eradication, Geneva, December 1979*. 1980. Accessed Apr. 10, 2024. https://iris.who.int/handle/10665/39253
4. Osborn LJ, Villarreal D, Wald-Dickler N, Bard JD. Monkeypox: clinical considerations, epidemiology, and laboratory diagnostics. *Clin Microbiol Newsl*. 2022;44(22):199-208. doi:10.1016/j.clinmicnews.2022.11.003
5. Centers for Disease Control and Prevention. Clinical Recognition: Key Characteristics for Identifying Mpox. U.S. Dept. of Health and Human Services. Aug. 30, 2023. Accessed Jul. 22, 2024. https://www.cdc.gov/poxvirus/mpox/clinicians/clinical-recognition.html
6. Tuttle A, Hughes CM, Dvorak M, et al. Notes from the field: clade II mpox surveillance update–United States, October 2023-April 2024. *MMWR Morb Mortal Wkly Rep*. 2024;73:474-476. doi:10.15585/mmwr.mm7320a4
7. Centers for Disease Control and Prevention. Interim Clinical Considerations for Use of JYNNEOS and ACAM2000 Vaccines During the 2022 U.S. Mpox Outbreak. U.S. Dept. of Health and Human Services. Oct. 2023. Accessed Feb. 13, 2024. https://www.cdc.gov/poxvirus/mpox/clinicians/vaccines/vaccine-considerations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fpoxvirus%2Fmpox%2Fclinicians%2Fsmallpox-vaccine.html
8. Laurenson-Schafer H, Sklenovska N, Hokha A, et al. Description of the first global outbreak of mpox: an analysis of global surveillance data. *Lancet Glob Health*. 2023;11(7):e1012-e1023. doi:10.1016/S2214-109X(23)00198-5
9. Philpott D, Hughes CM, Alroy KA, et al. Epidemiologic and clinical characteristics of monkeypox cases–United States, May 17-July 22, 2022. *MMWR Morb Mortal Wkly Rep*. 2022;71:1018-1022. doi:10.15585/mmwr.mm7132e3
10. Centers for Disease Control and Prevention. Case Definitions for Use in the 2022 Mpox Response. U.S. Dept. of Health and Human Services. Nov. 9, 2023. Accessed Mar. 8, 2024. https://www.cdc.gov/poxvirus/mpox/clinicians/case-definition.html
11. McGee SA, Russell JA, Metcalf-Kelly M. Enhanced mpox outbreak case detection among MHS beneficiaries through use of ESSENCE. *MSMR*. 2023;30(5):4-8.
12. Bureau of the Census. U.S. and World Population Clock. U.S. Dept. of Commerce. Accessed Jul. 30, 2024. https://www.census.gov/popclock
13. Centers for Disease Control and Prevention. Weekly Cases of Notifiable Diseases, United States, U.S. Territories, and Non-U.S. Residents Week Ending April 27, 2024 (Week 17). Accessed Jul. 30, 2024. https://wonder.cdc.gov/nndss/static/2024/17/2024-17-table968-H.pdf

Brief Report

Incidence of Alopecia and Hair Loss Among Female Active Component Service Members, 2010–2022

Alexis A. McQuistan, MPH; Mr. Thomas Wilkerson III, MPH; Dr. Sithembile L. Mabila, PhD, MSc

Alopecia, or hair loss, can have several different underlying causes and is typically classified as a scarring or non-scarring condition.[1] In non-scarring alopecia, there is potential for hair regrowth, while in scarring alopecia hair follicles are irreversibly destroyed, leading to permanent hair loss.[2,3] Cicatricial alopecia, or scarring hair loss, is the result of permanent damage to hair follicles. Androgenic alopecia is hair loss caused by the effects of androgens on hair follicles, and is the most common cause of non-scarring hair loss among both men and women. Alopecia areata is non-scarring hair loss caused by an autoimmune disorder, with a lifetime prevalence ranging from 1.7% to 2.1% based on the Rochester Epidemiology project, using data from 1990 to 2009.[4] Other non-scarring hair loss can be caused by disruptions to the hair cycle, as in the case of telogen effluvium, in which a physiological or emotional stressor causes sudden hair loss, as well as anagen effluvium, in which impairment of mitotic or metabolic activity of the hair follicle leads to abrupt hair loss.

Hair loss is also caused by repeated hair follicle damage by external causes. Traction alopecia is hair loss caused by repeated pulling of the hair, often caused by taut or tight hairstyles.[5] Traction alopecia can be non-scarring or scarring, depending on the extent of hair follicle damage caused by hair styling. Female active component service members (ACSMs) are at risk for hair loss due to traction alopecia, as military grooming standards often required hairstyles such as tight ponytails, buns, or braids over a prolonged period of time.[6] The U.S. military's recent efforts to change grooming standards have been driven by the desire to recognize diversity in the military and address grooming-related health concerns.[7]

Estimates of traction alopecia among service members have been difficult, as there are no specific diagnosis codes for traction alopecia in the International Classification of Diseases, 9th and 10th revisions (ICD-9/ICD-10). A prior study on the prevalence of alopecia among female ACSMs between 2010 and 2019 reported that 2.7% of female ACSMs had traction alopecia diagnoses.[8] This estimate may not be accurate, as the authors used the ICD-9 code 704.01 (alopecia areata) and ICD-10 code Q84.0 (congenital alopecia),[9] which are not fully representative of traction alopecia cases in administrative health records.

Despite the difficulty in conducting large studies on traction alopecia among service women, efforts should be made to quantify hair loss issues faced by female service members. The National Defense Authorization Act (NDAA) draft for fiscal year 2024 that passed the House Armed Services Committee includes an amendment to determine the cost of expanding treatments covered by TRICARE for traction alopecia, citing the disproportionate impact on Black female service members' likelihood to develop hair loss and traction alopecia due to adherence to strict standards of military dress.[10] The NDAA amendment called for the number of service women with traction alopecia to be determined for cost estimates. Although this cannot be directly measured with administrative health records, a broader look at alopecia and hair loss among female ACSMs can be made. This study aimed to determine the incidence of hair loss among active component service women, describe the types of hair loss, and summarize potential racial and ethnic disparities of hair loss among service women over the last 12 years.

Methods

The study population included female ACSMs in service in the U.S. Army, Navy, Air Force, and Marine Corps between January 1, 2010 and December 31, 2022. Data from the Defense Medical Surveillance System (DMSS), maintained by the Armed Forces Health Surveillance Division (AFHSD), were used to obtain demographics and medical encounter data for the study population. Inpatient and outpatient medical encounters at military hospitals and clinics as well as civilian facilities offering private sector care were included. Race and ethnicity were self-reported by service members.

ICD-9/ICD-10 diagnostic codes (ICD-9: 704.0*; ICD-10: L63*, L64*, L65*, L66*) were used to define cases of alopecia. The current study modeled alopecia case definition parameters based on a retrospective case series, in which investigators verified by chart review a high probability of alopecia areata for patients with at least 1 ICD-10 code (L63*).[11] An incident case of alopecia was defined as 1 medical encounter, either inpatient or outpatient, with a qualifying ICD-9/ICD-10 code in any diagnostic position. The first case-defining encounter was used as the incident date. A case could be counted once per lifetime. Incident cases from 2016 to 2022 were categorized into 4 different categories based on the qualifying ICD-10 code from the incident encounter. Incidence rates for alopecia areata, androgenic alopecia, other non-scarring hair loss, and cicatricial alopecia from 2016 to 2022 were calculated. Incidence rate calculations by alopecia category were limited to ICD-10-coded encounters because ICD-9 coding does not include these categories.

Person-time was calculated for each service member from January 1, 2010 through December 31, 2022. Service members whose case-defining incident encounter in DMSS preceded the start of the surveillance period were excluded. Incidence rates were calculated as incident alopecia diagnoses per 100,000 person-years (p-yrs).

Results

Between 2010 and 2022, a total of 21,329 active component U.S. service women were diagnosed with some type of alopecia **(Table)**. Among ICD-9-coded encounters, 79% of incident encounters were coded with unspecified alopecia (704.00) (data not shown). Twelve percent of ICD-9-coded cases were diagnosed with alopecia areata (704.01). Among ICD-10-coded encounters between 2016 and 2022, 80% of incident encounters were coded with other non-scarring hair loss (L65*) **(Table)**. Fourteen percent of ICD-10-coded cases were diagnosed with alopecia areata (L63*). Among ICD-10-coded cases,

TABLE. Incidence of Alopecia and Hair Loss by Demographic and Military Characteristics, Female Active Component Service Members, 2010–2022

	2010–2022			2016–2022[a] (n=13,496)							
	All Types, Alopecia or Hair Loss			Alopecia Areata		Androgenic Alopecia		Other Non-Scarring Hair Loss		Cicatrical Alopecia	
	No.	Person-years	Rate[b]	No.	Rate[b]	No.	Rate[b]	No.	Rate[b]	No.	Rate[b]
Total	21,329	2,651,417	804.4	1,906	129.5	338	23.0	10,804	734.2	448	30.4
Race and ethnicity											
White, non-Hispanic	6,283	1,174,195	535.1	392	62.4	122	19.4	3,447	548.8	83	13.2
Black, non-Hispanic	7,497	658,372	1,138.7	724	204.1	84	23.7	3,346	943.2	265	74.7
Hispanic	4,565	450,380	1,013.6	472	168.4	73	26.1	2,500	892.2	58	20.7
Other/unknown[c]	2,984	368,471	809.8	318	152.6	59	28.3	1,511	725.1	42	20.2
Age group, y											
<20	461	207,351	222.3	51	40.9	3	2.4	213	170.8	13	10.4
20-24	4,670	896,814	520.7	447	89.1	54	10.8	2,289	456.4	89	17.7
25-29	5,421	665,129	815.0	490	134.2	77	21.1	2,725	746.4	114	31.2
30-34	4,288	407,627	1,051.9	366	162.7	77	34.2	2,167	963.3	86	38.2
35-39	3,484	262,751	1,326.0	322	218.8	63	42.8	1,917	1,302.6	72	48.9
40-44	1,946	131,636	1,478.3	150	224.5	31	46.4	981	1,468.3	39	58.4
45+	1,059	80,109	1,321.9	80	194.2	33	80.1	512	1,242.7	35	85.0
Service											
Army	8,895	897,458	991.1	808	170.0	153	32.2	4,314	907.7	195	41.0
Navy	4,623	765,192	604.2	471	105.7	71	15.9	2,401	538.7	101	22.7
Air Force	6,634	798,226	831.1	502	113.6	105	23.8	3,480	787.6	117	26.5
Marine Corps	1,177	190,541	617.7	125	115.0	9	8.3	609	560.3	35	32.2
Rank, grade											
Junior Enlisted (E1-E4)	6,668	1,227,772	543.1	639	93.9	75	11.0	3,205	470.8	139	20.4
Senior Enlisted (E5-E9)	10,336	922,132	1,120.9	924	181.3	167	32.8	5,322	1,044.1	239	46.9
Officer (O1-O3, [W1-W3])	2,735	346,320	789.7	241	124.4	52	26.8	1,395	719.8	43	22.2
Senior Officer (O4-O10, [W4-W5])	1,590	155,194	1,024.5	102	117.1	44	50.5	882	1,012.2	27	31.0
Military occupation											
Combat-specific[d]	349	64,018	545.2	37	90.2	6	14.6	195	475.3	4	9.7
Motor transport	544	82,500	659.4	56	118.9	6	12.7	252	535.1	14	29.7
Pilot/air crew	196	39,624	494.6	18	78.2	4	17.4	110	477.9	1	4.3
Repair/engineering	3,192	525,339	607.6	333	111.6	47	15.8	1,615	541.4	71	23.8
Communications/ intelligence	8,271	861,248	960.4	741	160.8	119	25.8	4,073	883.9	196	42.5
Health care	4,938	499,009	989.6	377	139.8	99	36.7	2,548	944.5	82	30.4
Other	3,839	579,679	662.3	344	103.8	57	17.2	2,011	606.6	80	24.1

Abbreviations: n, number; No., number; y, years.

[a] 2016-2022 date range includes only ICD-10-coded encounters.

[b] Incidence rate per 100,000 person-years.

[c] Includes those of American Indian/Alaska Native, Asian/Pacific Islander, and unknown race or ethnicity.

[d] Infantry/artillery/combat engineering/armor.

non-Hispanic Black ACSMs accounted for the largest number of cases, with highest rates of alopecia areata (n=724; 38%), scarring alopecia (n=265; 59%), and the highest rate of other non-scarring hair loss **(Table)**. Hospitalizations were included in this analysis, but only 24 cases had an incident encounter in an inpatient setting, and alopecia was not the primary diagnoses for any of the inpatient encounters (data not shown).

The overall incidence rate of alopecia was 804.4 per 100,000 p-yrs **(Table)**. Non-Hispanic Black and Hispanic female ACSMs had the highest incidence rates among all races and ethnicities, at 1,138.7 per 100,000 p-yrs and 1,013.6 per 100,000 p-yrs, respectively **(Table)**. Non-Hispanic Black female ACSMs were more than twice as likely to be diagnosed with alopecia compared to non-Hispanic White female ACSMs.

Between 2016 and 2022, non-scarring hair loss had the highest rate (734.2 per 100,000 p-yrs) compared to the other 3 categories of alopecia and was a likely driver of the overall rates from 2010 to 2022. Non-Hispanic Black female ACSMs were more than 3 times as likely to be diagnosed with alopecia areata and more than 5 times as likely to be diagnosed with cicatricial alopecia **(Table)**. Incidence rates of alopecia increased with age **(Table)**, overall as well as by type. Among other demographic categories, women in the 40-44-year age group, in Army service, as well as senior enlisted and health care occupation categories had the highest rates **(Table)**.

The incidence rate for alopecia more than doubled from 2010 (564.3 per 100,000 p-yrs) to 2022 (1,228 per 100,000 p-yrs) **(Figure)**. Rates for alopecia steadily increased between 2010 (564.3 per 100,000 p-yrs) and 2020 (841.6 per 100,000 p-yrs) **(Figure)** before increasing by 38% between 2020 and 2021 (1166.5 per 100,000 p-yrs). The sharp increase in rates between 2020 and 2021 was seen within all racial and ethnicity groups, although rates for Hispanic women had been increasing since 2019. Non-Hispanic Black women had the highest rates throughout the surveillance period **(Figure)**. The incidence rate of alopecia among non-Hispanic Black women increased between 2010 and 2017 (938.6 per 100,000 p-yrs and 1199.3 p-yrs) before incidence rates began to decline until 2020 (1078.5 per 100,000 p-yrs).

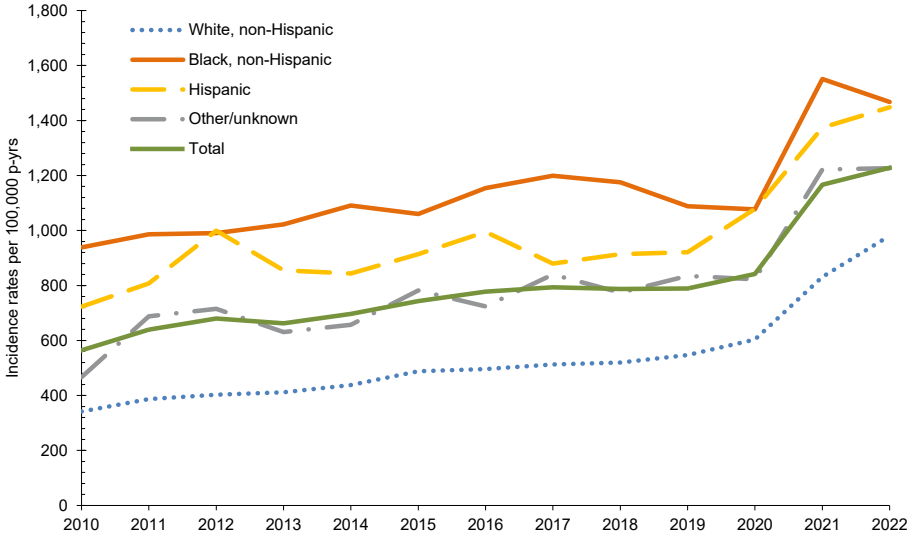
Discussion

This study found higher incidence rates of alopecia among non-Hispanic Black and Hispanic female ACSMs, consistent with other studies.[8,12] Non-Hispanic Black ACSMs represented the largest proportion of cases of alopecia and hair loss overall, and had the highest rates of alopecia areata, scarring alopecia, and other non-scarring hair loss. The frequency of diagnoses for unspecified non-scarring alopecia in female ACSMs may be an indication that cases of traction alopecia are captured with non-specific alopecia codes, but this cannot be confirmed utilizing administrative health records without a validated surveillance case definition.

The hair concerns of female service members have received more attention in recent years. Changes throughout the services have been made, authorizing a wider array of hairstyles and increasing hair bulk limits in an effort to be more inclusive of different hair types.[7] In 2020, the U.S. Air Force authorized an increase in hair bulk of up to 4 inches, and in 2021 both the Air Force and U.S. Army authorized ponytails and braids.[7] These changes were brought about by the efforts of service women, such as the Air Force Women's Initiative Team comprised of volunteer service women,[13] to implement changes in outdated hair policies. The increased attention to hair health could be driving female ACSMs to seek health care for any hair loss issues and may be the cause for the increase in incident cases seen starting in 2021. Increased awareness in the general public may also continue to drive these trends, driven by high profile celebrities and social media content.[14]

The timing of the observed increase in alopecia incidence in 2021 raises the question if that increase is associated with the COVID-19 pandemic. There is evidence to suggest COVID-19 is associated with telogen effluvium, which can be provoked by stressful events, trauma, illness, and more.[15,16] There was a 71% increase in this study population of the number of incident cases of telogen effluvium from 2020 to 2021, a difference of 72 cases, and a 41% increase in the other non-scarring alopecia category (L65*) overall (data not shown). Further study is required to determine whether SARS-CoV-2 or stressors during the pandemic were contributing factors to the increase documented.

FIGURE. Crude Annual Incidence Rates of Alopecia by Race and Ethnicity, Female Active Component Service Members, 2010–2022



Abbreviation: p-yrs, person-years.

Evaluating the impact of changes to grooming standards on traction alopecia could not be measured directly in this study, as traction alopecia cannot be identified through ICD-9/ICD-10 codes, a limitation of this study. Additionally, this study did not report the co-occurring or underlying health conditions that may have contributed to non-specific hair loss, such as autoimmune disorders, pregnancy and postpartum hair loss, or thyroid disorders. Further study would be required to better understand cases of unspecified hair loss.

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References

1. Lin J, Saknite I, Valdebran M, et al. Feature characterization of scarring and non-scarring types of alopecia by multiphoton microscopy. *Lasers Surg Med*. 2019;51(1):95-103. doi:10.1002/lsm.23017
2. Bernardez C, Molina-Ruiz AM, Requena L. Histologic features of alopecias–part I: nonscarring alopecias. *Actas Dermosifiliogr.* 2015;106(3):158-167. doi:10.1016/j.ad.2014.07.006
3. Filbrandt R, Rufaut N, Jones L, Sinclair R. Primary cicatricial alopecia: diagnosis and treatment. *CMAJ.* 2013;185(18):1579-1585. doi:10.1503/cmaj.111570
4. Mirzoyev SA, Schrum AG, Davis MDP, Torgerson RR. Lifetime incidence risk of alopecia areata estimated at 2.1% by Rochester Epidemiology Project, 1990-2009. *J Invest Dermatol*. 2014;134(4):1141-1142. doi:10.1038/jid.2013.464
5. Billero V, Miteva M. Traction alopecia: the root of the problem. *Clin Cosmet Investig Dermatol*. 2018;11:149-159. doi:10.2147/CCID.S137296
6. Thompson JM, Park MK, Qureshi AA, Cho E. Race and alopecia areata amongst US women. *J Investig Dermatol Symp Proc*. 2018;19(1):S47-S50. doi:10.1016/j.jisp.2017.10.007
7. Weiss AN, Arballo OM, Miletta NR, Wohltmann WE. Military grooming standards and their impact on skin diseases of the head and neck. *Cutis*. 2018;102(5):328,331-333.
8. Korona-Bailey J, Banaag A, Nguyen DR, Pasieka H, Koehlmoos TP. Free the burn: prevalence of alopecia among active duty service women, fiscal years 2010-2019. *Mil Med*. 2023;188(3-4):e492-e496. doi:10.1093/milmed/usab274
9. Korona-Bailey J, Banaag A, Nguyen DR, Pasieka H, Koehlmoos TP. Free the burn: prevalence of alopecia among active duty service women, fiscal years 2010-2019. Supplement 1. Alopecia ICD-9 and ICD-10 diagnostic codes. *Mil Med*. 2023;188(3-4):e492-e496. doi:10.1093/milmed/usab274
10. Library of Congress. *House of Representatives Report 118-125: National Defense Authorization Act for Fiscal Year 2024–Report of the Committee on Armed Services, House of Representatives on H.R. 2670 together with Additional Views [Including cost estimate of the Congressional Budget Office]*. U.S. Congress. Jun. 30, 2023. Accessed Jun. 4, 2024. https://www.congress.gov/congressional-report/118th-congress/house-report/125
11. Lavian J, Li SJ, Lee EY, et al. Validation of case identification for alopecia areata using International Classification of Diseases coding. *Int J Trichology*. 2020;12(5):234-237. doi:10.4103/ijt.ijt_67_20
12. May Franklin JM, Wohltmann WE, Wong EB. From buns to braids and ponytails: entering a new era of female military hair-grooming standards. *Cutis*. 2021;108(1):31-35. doi:10.12788/cutis.0296
13. Atkinson K, Nadeem A. Warrior braids and the Air Force Women's Initiative Team: the invisible labor behind diversity, inclusion, and institutional change. Official U.S. Air Force Website. May 17, 2021. Accessed Jun. 4, 2024. https://www.af.mil/News/Commentaries/Display/Article/2645866/warrior-braids-and-the-air-force-womens-initiative-team-the-invisible-labor-beh
14. Gupta AK, Polla Ravi S, Wang T. Alopecia areata and pattern hair loss (androgenetic alopecia) on social media: current public interest trends and cross-sectional analysis of YouTube and TikTok contents. *J Cosmet Dermatol*. 2023;22(2):586-592. doi:10.1111/jocd.15605
15. Seyfi S, Alijanpour R, Aryanian Z, Ezoji K, Mahmoudi M. Prevalence of telogen effluvium hair loss in COVID-19 patients and its relationship with disease severity. *J Med Life*. 2022;15(5):631-634. doi:10.25122/jml-2021-0380
16. Sharquie KE, Jabbar RI. COVID-19 infection is a major cause of acute telogen effluvium. *Ir J Med Sci*. 2022;191(4):1677-1681. doi:10.1007/s11845-021-02754-5

Reportable Medical Events at Military Health System Facilities Through Week 31, Ending August 3, 2024

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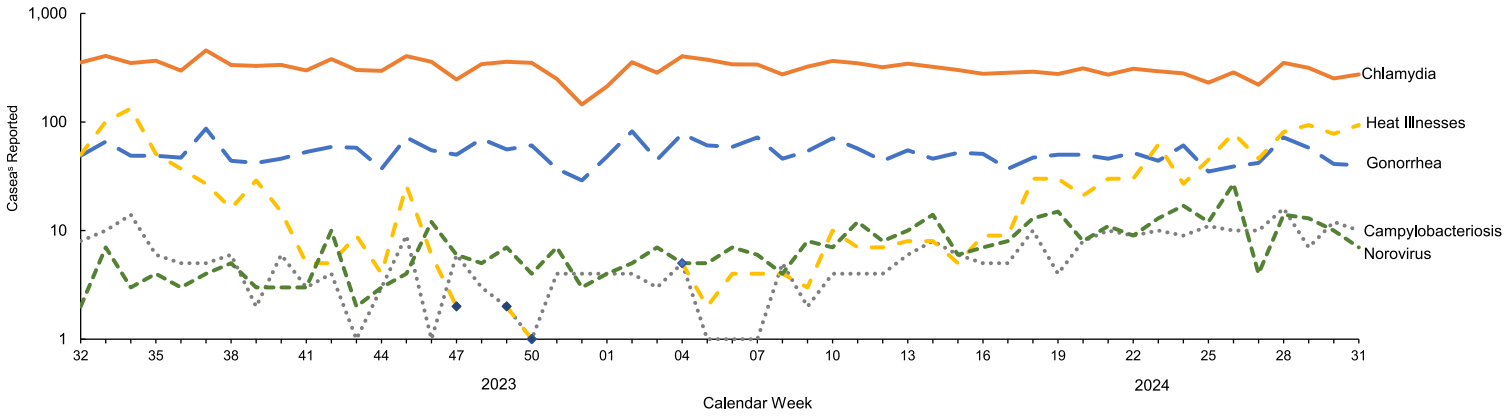
TOP 5 REPORTABLE MEDICAL EVENTS BY CALENDAR WEEK, ACTIVE COMPONENT (AUGUST 6, 2023 – AUGUST 3, 2024)



Abbreviation: RMEs, reportable medical events.

Note: Cases are shown on a logarithmic scale. There were 0 heat illness cases in the following weeks in 2023: 48, 51-52, and weeks 1 and 3 in 2024. Markers are added to represent instances of heat illnesses that were not visible on the logarithmic scale graph.

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 (July 2024) 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

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References

1. Armed Forces Health Surveillance Division. Armed Forces Reportable Medical Events. Accessed Feb. 28, 2024. https://health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events-Guidelines
2. Defense Manpower Data Center. Department of Defense Active Duty Military Personnel by Rank/Grade of Service. Accessed Feb. 28, 2024. https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports
3. Defense Manpower Data Center. Armed Forces Strength Figures for January 31, 2023. Accessed Feb. 28, 2024. https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports
4. Navy Medicine. Surveillance and Reporting Tools–DRSI: Disease Reporting System Internet. Accessed Feb. 28, 2024. https://www.med.navy.mil/Navy-Marine-Corps-Public-Health-Center/Preventive-Medicine/Program-and-Policy-Support/Disease-Surveillance/DRSI

TABLE. Reportable Medical Events, Military Health System Facilities, Week Ending August 3, 2024 (Week 31)[a]

Reportable Medical Event[b]	Active Component[c]					MHS Beneficiaries[d]
	June 2024	July 2024	YTD 2024	YTD 2023	Total, 2023	July 2024
	No.	No.	No.	No.	No.	No.
Amebiasis	1	0	7	11	15	0
Arboviral diseases, neuroinvasive and non-neuroinvasive	0	1	1	0	2	0
COVID-19-associated hospitalization and death[e]	3	3	25	72	113	60
Campylobacteriosis	41	51	200	164	270	26
Chikungunya virus disease	0	0	0	1	2	0
Chlamydia trachomatis	1,117	1,310	9,339	10,286	17,509	187
Cholera	0	1	2	4	4	1
Coccidioidomycosis	2	5	39	15	36	1
Cold weather injury[f]	1	0	133	99	152	N/A
Cryptosporidiosis	10	9	50	48	67	5
Cyclosporiasis	1	6	7	15	15	7
Dengue virus infection	0	4	9	2	7	2
E. coli, Shiga toxin-producing	11	11	49	40	69	28
Ehrlichiosis/Anaplasmosis	0	0	1	28	28	0
Giardiasis	9	12	60	45	78	3
Gonorrhea	181	241	1,624	1,597	2,763	33
Haemophilus influenzae, invasive	0	0	3	1	1	0
Hantavirus disease	0	0	0	1	2	0
Heat illness[f]	221	338	784	701	1,255	N/A
Hepatitis A	0	1	6	6	8	1
Hepatitis B, acute and chronic	5	9	64	92	155	12
Hepatitis C, acute and chronic	2	1	19	33	52	6
Influenza-associated hospitalization[g]	1	1	36	5	29	0
Lead poisoning, pediatric[h]	N/A	N/A	N/A	N/A	N/A	4
Legionellosis	0	0	3	3	5	3
Leishmaniasis	0	0	0	1	1	0
Leprosy	0	0	0	0	2	0
Leptospirosis	0	0	0	2	4	1
Listeriosis	0	0	0	0	0	2
Lyme disease	11	15	60	46	70	22
Malaria	0	3	7	13	28	0
Meningococcal disease	0	0	0	2	4	0
Mpox	4	1	9	0	5	1
Norovirus	69	45	293	315	420	45
Pertussis	2	4	15	4	15	6
Post-exposure prophylaxis against Rabies	58	61	358	361	598	53
Q fever	0	0	0	2	2	0
Rubella	0	0	0	2	2	0
Salmonellosis	17	12	73	54	129	21
Shigellosis	8	4	32	38	59	4
Spotted Fever Rickettsiosis	5	0	12	25	31	4
Syphilis (all)	31	36	369	544	944	13
Toxic shock syndrome	0	0	2	1	2	0
Trypanosomiasis	0	1	2	1	1	0
Tuberculosis	0	0	2	4	11	0
Tularemia	0	0	1	1	1	0
Typhoid fever	0	0	0	1	2	0
Typhus fever	0	0	1	3	3	3
Varicella	2	1	10	8	12	6
Zika virus infection	0	0	1	0	0	0
Total case counts	1,813	2,187	13,708	14,697	24,983	560

Abbreviations: MHS, Military Health System; YTD, year-to-date; no., number; *E., Escherichia*; N/A, not applicable.

[a] RMEs reported through the DRSi as of Aug. 31, 2024 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 Jun. 1, 2024–Jun. 30, 2024 and Jul. 1, 2024–Jul. 31, 2024. YTD comparison is displayed for the period of Jan. 1, 2024–Jul. 31, 2024 for MHS facilities. Previous year counts are provided as the following: previous YTD, Jan. 1, 2023-Jul. 31, 2023; total 2023, Jan. 1, 2023–Dec. 31, 2023.

[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 included 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] Beneficiaries included the following: 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 service members.

[g] Influenza-associated hospitalization is reportable only for individuals under 65 years of age.

[h] Pediatric lead poisoning is reportable only for children aged 6 years or younger.

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