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Update

Morbidity Burdens Attributable to Various Illnesses and Injuries Among Deployed Active and Reserve Component Service Members, U.S. Armed Forces, 2022

Each year, the *MSMR* estimates illness- and injury-related morbidity and health care burdens on the U.S. Armed Forces and the Military Health System (MHS), and this report updates previous analyses of these burden distributions among active and reserve component service members in deployed settings. While deployed service members are primarily selected from a subset of the active component, the reserve component also contributes a substantial portion of U.S. deployed forces. This report focuses on the health encounters of service members during deployment to 2 specific theaters of operation: US Central Command (CENTCOM) and US Africa Command (AFRICOM). While U.S. service members are deployed to all geographic combatant commands, the largest concentrations without access to fixed medical facilities are in the CENTCOM and AFRICOM areas of operation.[1]

This report utilizes data from the Theater Medical Data Store (TMDS), which documents service members' inpatient and outpatient encounters while treated in an operational environment; MHS GENESIS captures health care data at permanent military facilities. TMDS receives medical data from Theater Medical Information Program-Joint (TMIP-J) applications, including AHLTA-Theater, TMIP-Composite Health Care System Cache, Mobile Computing Capability, Maritime Medical Modules, and the U.S. Transportation Command Regulating and Command and control Evacuation System (TRAC2ES).[2]

While this report focuses on medical encounters of service members treated in CENTCOM and AFRICOM operational environments during the 2022 calendar year, future reports may incorporate other combatant commands as circumstances dictate and data become available.

Methods

The surveillance population includes all individuals who served in the active or reserve components of the U.S. Army, Navy, Air Force, or Marine Corps with health care encounters captured in the TMDS during the surveillance period. This analysis was restricted to encounters where the theater of care specified was CENTCOM or AFRICOM, or where the name of the theater of operation was missing or null; by default, this excluded encounters in the U.S. Northern Command, U.S. European Command, U.S. Indo-Pacific Command, or U.S. Southern Command theaters of operations. In addition, TMDS-recorded medical encounters where the data source was identified as Shipboard Automated Medical System, or where the military treatment facility descriptor indicated that care was provided aboard a ship, were excluded from this analysis. Encounters from aeromedical staging facilities outside of CENTCOM or AFRICOM were also excluded.

Inpatient and outpatient medical encounters were summarized according to the primary (first-listed) diagnoses (if reported with an International Classification of Diseases, 10th Revision [ICD-10] code between A00 and U09 and Z codes, excluding Z37). TMDS has not fully transitioned to ICD-10 codes, so some ICD-9 codes were included. Primary diagnoses that did not correspond to an ICD-9 or ICD-10 code are not reported in this burden analysis. Medical encounters were summarized by ICD code chapters, plus an additional category for separate classification of COVID-19 diagnoses.

Morbidity burdens attributable to various conditions were estimated by the distribution of diagnoses corresponding to the 17 traditional categories of the ICD system, with an 18th category for COVID-19. Extended ICD-10 code groupings were also reviewed for the most common diagnoses.

What are the new findings?

Administrative and other health services (ICD-10 "Z" codes) together with musculoskeletal disorders accounted for more than half of total medical encounters in 2022 among service members deployed to the U.S. Central Command (CENTCOM) or the U.S. Africa Command (AFRICOM). Three common injury conditions—other back problems, arm/shoulder injuries, and knee injuries—were shared by male and female service members deployed to CENTCOM and AFRICOM.

What is the impact on readiness and force health protection?

Understanding the most common causes of injury and illness during deployment will help senior leaders develop and implement strategies to reduce preventable medical issues, preserving the fighting strength and enhancing readiness.

Results

In 2022, 48,446 individuals initiated a total of 136,009 medical encounters while deployed to Africa and Southwest Asia/Middle East. Of the 136,009 total medical encounters, 231 (0.17%) were recorded as hospitalizations. Most medical encounters (75.8%), individuals affected (80.0%), and hospitalizations (74.5%) occurred among male service members **(data not shown).**

In 2022, the largest percentages of medical encounters attributable to a major ICD-10 diagnostic category were coded as administrative and other health services (Z codes; includes factors influencing health status and health service contact), followed by musculoskeletal system/connective

tissue disorders **(Figure)**. The percentage of total medical encounters attributed to other health services increased from 26.2% in 2018 to 30.6% in 2022, when the most common ICD-10 diagnoses in this category included Z1152 (COVID-19 screening, 4.6%), Z0289 (other administrative examinations, 4.3%), and Z5682 (military deployment status, 2.6%). COVID-19 accounted for 1.2% of all medical encounters in 2022 **(Table)**.

From 2018 to 2022, the percentage of in-theater medical encounters due to musculoskeletal disorders (28.2% to 25.1%) and injury (8.2% to 5.9%) decreased **(Figure)**. Lower back pain (M545) was the most frequent diagnostic code for musculoskeletal encounters in both men and women, followed by pain in the right shoulder (M25511), pain in the left shoulder (M25512), pain in the right knee (M25561), and pain in the left knee (M25562) **(Table)**.

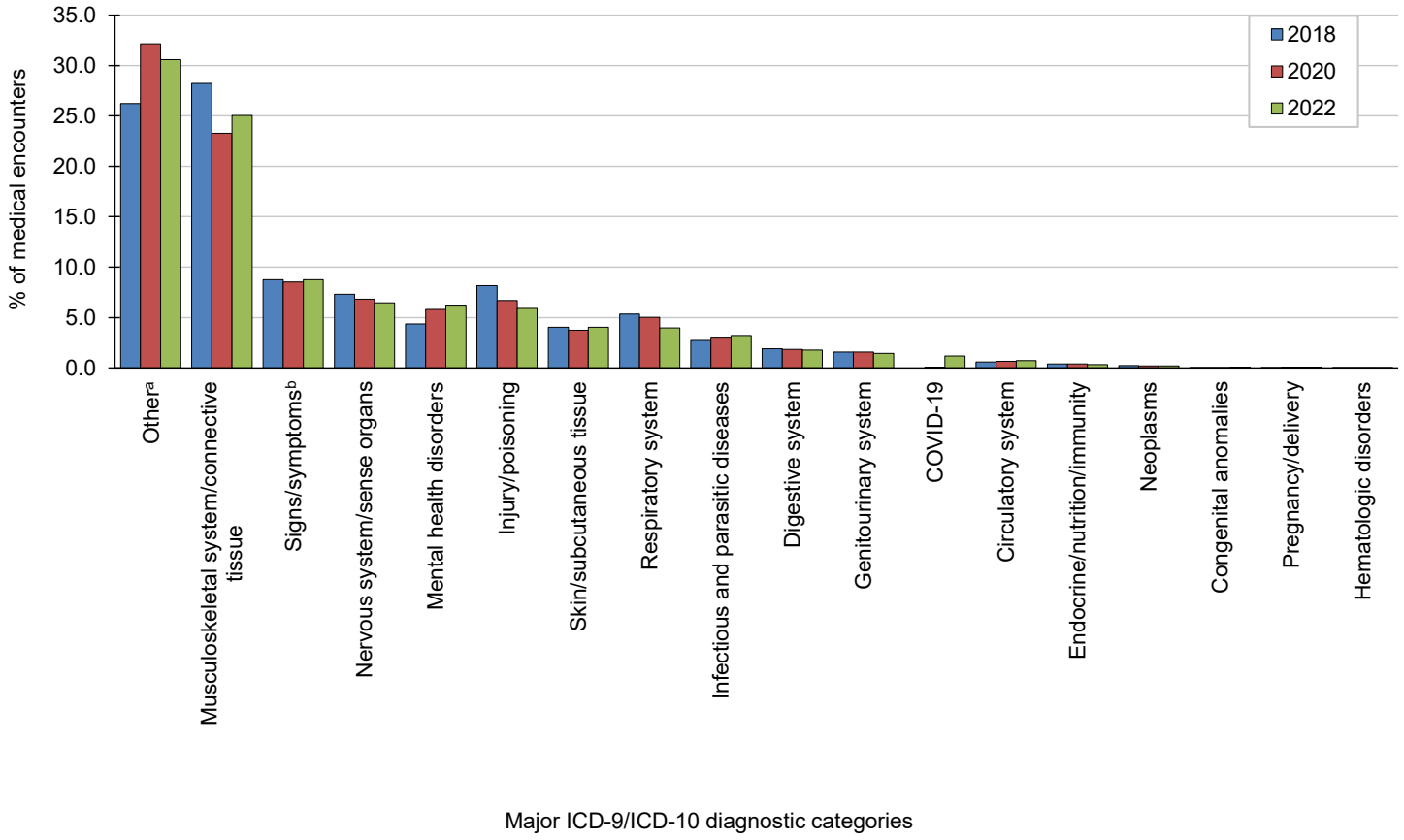
The percentage of in-theater medical encounters attributed to mental health disorders increased from 4.4% to 6.2% during the surveillance period **(Figure)**. Adjustment disorder with mixed anxiety and depressed mood (F4323) was the most frequent mental health disorder diagnosis, with a higher percentage of in-theater encounters for this disorder among women (1.5%) than men (0.9%) **(Table)**.

Discussion

As in prior annual reports of illness- and injury-related morbidity and health care burdens in deployed settings, administrative and other health services together with musculoskeletal disorders accounted for more than half of total medical encounters in theater. COVID-19 screening may have partially contributed to the increase in encounters for administrative and other health services during the surveillance period, as this specific Z-code (Z1152) accounted for almost 5% of all in-theater medical encounters in 2022.

This report documents an increased percentage of mental health disorder medical encounters in theater, which is consistent with the 2018-2022 increased rate of ambulatory encounters for mental health disorders in garrison. The distribution of ambulatory encounters for mental health disorders in garrison (13.0%), however, was substantially higher than the percentage observed in theater (1.0%).[3] No absolute rate comparisons can be made due to the lack of denominator (person-time) data in theater.

FIGURE. Major ICD-9/ICD-10 Diagnostic Categories of In-Theater Medical Encounters, U.S. Armed Forces Active Component, 2018, 2020, and 2022



Abbreviation: ICD, International Classification of Diseases.
[a]Other factors influencing health status and contact with health services (excluding pregnancy-related).
[b]Includes ill-defined conditions.

TABLE. Most Frequent ICD-10 Diagnostic Codes for In-Theater Medical Encounters by Sex, U.S. Armed Forces Active Component, 2022

ICD-10 code[a]	ICD-10 code description	Total		Male		Female	
		No.	%	No.	%	No.	%
M545	Low back pain	11,021	5.5	8,823	5.8	2,198	4.6
Z1152	Encounter for screening for COVID-19	9,131	4.6	7,483	4.9	1,648	3.4
Z0289	Encounter for other administrative examinations	8,695	4.3	6,980	4.6	1,715	3.6
Z5682	Military deployment status	5,280	2.6	3,934	2.6	1,346	2.8
Z029	Encounter for administrative examinations, unspecified	5,000	2.5	3,912	2.6	1,088	2.3
Z1159	Encounter for screening for other viral diseases	4,157	2.1	3,166	2.1	991	2.1
M25511	Pain in right shoulder	3,659	1.8	3,013	2.0	646	1.3
M25512	Pain in left shoulder	3,150	1.6	2,652	1.7	498	1.0
M25561	Pain in right knee	2,972	1.5	2,310	1.5	662	1.4
Z9182	Personal history of military deployment	2,914	1.5	2,388	1.6	526	1.1
Z0489	Encounter for examination and observation for other specified reasons	2,879	1.4	2,256	1.5	623	1.3
M542	Cervicalgia	2,877	1.4	2,153	1.4	724	1.5
J069	Acute upper respiratory infection, unspecified	2,833	1.4	2,092	1.4	741	1.5
Z23	Encounter for immunization	2,709	1.4	2,233	1.5	476	1.0
M25562	Pain in left knee	2,682	1.3	2,001	1.3	681	1.4
U071	COVID-19	2,304	1.2	1,887	1.2	417	0.9
Z713	Dietary counseling and surveillance	2,298	1.1	1,536	1.0	762	1.6
L731	Pseudofolliculitis barbae	2,189	1.1	2,185	1.4	4	0.0
F4323	Adjustment disorder with mixed anxiety and depressed mood	2,003	1.0	1,294	0.9	709	1.5
M549	Dorsalgia, unspecified	1,935	1.0	1,514	1.0	421	0.9
Z760	Encounter for issue of repeat prescription	1,918	1.0	1,310	0.9	608	1.3
R197	Diarrhea, unspecified	1,843	0.9	1,432	0.9	411	0.9
B342	Coronavirus infection, unspecified	1,773	0.9	1,410	0.9	363	0.8
G4726	Circadian rhythm sleep disorder, shift work type	1,666	0.8	1,492	1.0	174	0.4
Z7189	Other specified counseling	1,572	0.8	1,124	0.7	448	0.9
F4320	Adjustment disorder, unspecified	1,524	0.8	1,047	0.7	477	1.0
M25571	Pain in right ankle and joints of right foot	1,477	0.7	1,060	0.7	417	0.9
Z0279	Encounter for issue of other medical certificate	1,411	0.7	1,164	0.8	247	0.5
J00	Acute nasopharyngitis	1,395	0.7	1,034	0.7	361	0.7
G4700	Insomnia, unspecified	1,341	0.7	1,008	0.7	333	0.7
M25551	Pain in right hip	1,285	0.6	754	0.5	531	1.1
R51	Headache, unspecified	1,212	0.6	811	0.5	401	0.8
M25572	Pain in left ankle and joints of left foot	1,167	0.6	881	0.6	286	0.6
G4720	Circadian rhythm sleep disorder, unspecified type	1,133	0.6	987	0.6	146	0.3
R109	Unspecified abdominal pain	1,130	0.6	746	0.5	384	0.8
F419	Anxiety disorder, unspecified	1,058	0.5	647	0.4	411	0.9
R21	Rash and other nonspecific skin eruption	957	0.5	727	0.5	230	0.5
Z658	Other specified problems related to psychosocial circumstances	796	0.4	555	0.4	241	0.5
Z0189	Encounter for other specified special examinations	731	0.4	597	0.4	134	0.3
Z733	Stress, not elsewhere classified	661	0.3	421	0.3	240	0.5
Z11	Encounter for screening for infectious and parasitic diseases	596	0.3	467	0.3	129	0.3
Z630	Problems in relationship with spouse or partner	585	0.3	459	0.3	126	0.3

Abbreviation: ICD, International Classification of Diseases.

[a]Some ICD-9 codes still appear in TMDS. While medical encounters documented with ICD-9 codes were included in the overall analysis for major diagnostic cateogry analysis, the summary of these codes are excluded from this table.

Encounters for certain conditions are generally rare in deployment settings. Some conditions, including diabetes, pregnancy, or congenital anomalies, often preclude deployment for service members. As a result of pre-screening, deployed service members demonstrate a lower rate of medical conditions that may interfere with deployment operations than their non-deployed counterparts. Deployed service members are also less likely to require medical care for pre-screened conditions.

Several limitations of the data presented in this report should be considered when interpreting these results and analyses. Not all medical encounters in theaters of operation are recorded in the TMDS. Some care by in-theater medical personnel occurs at small, remote, or austere forward locations where electronic documentation of diagnoses and treatment is infeasible, and some emergency medical care to stabilize combat-injured service members before evacuation may not be routinely captured in the TMDS. Due to the exigencies of deployment settings that complicate accurate data reporting or transmission, this report may underestimate the true burden of health care in the areas of operation examined.

In any review relying on ICD coding, some misclassification of diagnoses should be expected due to coding errors in the electronic health record. Although the aggregated distributions of illnesses and injuries presented in this report are compatible with expectations derived from other examinations of morbidity in military populations (both deployed and non-deployed), instances of highly unlikely diagnostic codes based on the deployed population have been observed. This misclassification bias is likely minor and non-differential.

The DOD does not maintain complete data to monitor personnel tempo data, which limits assessment of the amount of time service members are deployed or assigned to serve away from home for other events.[4] This lack of denominator data for person-time makes direct comparison of numbers and percentages of medical evacuations by cause difficult.

This report only includes CENTCOM and AFRICOM medical encounters, and thus does not describe any medical encounters from the recent deployment of troops to the U.S. European Command (EUCOM), the U.S. Indo-Pacific Command (INDOPACOM), and the U.S. Southern Command (SOUTHCOM). Each area of operation is unique, with vastly different medical assets and numbers of deployed service members. The results from CENTCOM or AFRICOM may not be generalizable to other combatant commands.

References

1. White House Briefing Room. Letter to the Speaker of the House and President Pro Tempore of the Senate Regarding the War Powers Report. December 8, 2022. Accessed July 18, 2023. https://www.whitehouse.gov/briefing-room/statements-releases/2022/12/08/letter-to-the-speaker-of-the-house-and-president-pro-tempore-of-the-senate-regarding-the-war-powers-report-4

2. Joint Operational Medicine Information Systems Program Management Office. TMDS Fact Sheet. Accessed July 18, 2023. https://www.health.mil/Reference-Center/Fact-Sheets/2019/07/30/TMDS-Fact-Sheet

3. Armed Forces Health Surveillance Division. Ambulatory visits among active component members, U.S. Armed Forces, 2022. *MSMR*. 2023;30(6):19-25.

4. United States Government Accountability Office. Report to Congressional Committees. GAO-18-253, MILITARY READINESS: Clear Policy and Reliable Data Would Help DOD Better Manage Service Members' Time Away from Home. April 2018. Accessed July 5, 2023. https://www.gao.gov/assets/gao-18-253.pdf

Update

Medical Evacuations out of U.S. Central and U.S. Africa Command Among Active and Reserve Components, U.S. Armed Forces, 2022

During deployed military operations, initial medical care is provided by military medical personnel stationed within the operational theater, but some injuries and illnesses require medical care outside the theater of operation. In such cases, affected individuals are usually transported to a permanent military medical facility, usually in Europe or the U.S., for definitive diagnosis or care. Because medical evacuations are resource-intensive, they are employed for serious medical conditions, some of which are directly related to participation in, or support of, military operations. Other medical conditions that are unrelated to operational activities but necessitate medical evacuation may be preventable. This report summarizes the nature, numbers, and trends of conditions for which military members were medically evacuated from the U.S. Central Command (CENTCOM) or Africa Central Command (AFRICOM) operations during 2022, with historical comparisons to the previous 4 years.

With completion of the withdrawal of all U.S. military forces from Afghanistan on August 31, 2021, followed by the conclusion of the U.S. combat mission in Iraq on December 9, 2021,[1,2] U.S. military operations have been substantially reduced in the CENTCOM area of responsibility (AOR). To sustain counterterrorism operation successes, deployment of forces continues in all AORs, in addition to assistance, advice, and accompaniment of security forces for selected partners, particularly in the CENTCOM and AFRICOM AORs.[3] This report only includes medical evacuations from CENTCOM and AFRICOM, without describing any medical evacuations from recent troop deployment to the U.S. European Command (EUCOM), U.S. Indo-Pacific Command (INDOPACOM), or U.S. Southern Command (SOUTHCOM). *MSMR* has historically reported medical evacuations from CENTCOM due to large numbers of service members deployed for named operations such as Operation Iraqi Freedom, Operation Enduring Freedom, and Operation New Dawn. The AFRICOM AOR was added to this annual report in 2021, due counterterrorism force deployment.[3] Future reports may review medical evacuations from other AORs, as required by leadership interest or changing operational tempos.

What are the new findings?

Mental health disorders and injuries constituted the most frequent diagnostic categories for service members medically evacuated in 2022 from U.S. Central Command (CENTCOM) and U.S. Africa Command (AFRICOM). Of the 691 CENTCOM service members and 229 from AFRICOM who were evacuated, hospitalization was required for 245 (35.5%) and 59 (25.8%), respectively. Most service members evacuated from CENTCOM or AFRICOM were returned to full duty status after their post-evacuation hospitalizations or outpatient evaluation.

What is the impact on readiness and force health protection?

While the number of medical evacuations from CENTCOM declined to the lowest point observed over the last 5 years, during the same period AFRICOM medical evacuations increased to their highest level. These trends correspond with the changes in deployed troop strength within these 2 geographic combatant commands.

Methods

The surveillance population for this analysis includes all members of the active and reserve components of the U.S. Army, Navy, Air Force, and Marine Corps deployed to the CENTCOM or AFRICOM AORs for any length of time from January 1, 2018 through December 31, 2022. Medical evacuations by the U.S. Transportation Command (TRANSCOM) from the CENTCOM or AFRICOM AORs to a medical treatment facility outside the operational theater were assessed from records maintained in the TRANSCOM Regulating and Command & Control Evacuation System (TRAC2ES). Inclusion criteria for this analysis required that any medical evacuee have at least 1 inpatient or outpatient medical encounter at a permanent military medical facility in the U.S. or Europe within an interval of 5 days before to 10 days after the reported evacuation date. CENTCOM and AFRICOM evacuation data are presented separately.

Medical evacuations were classified by the cause and nature of the precipitating medical condition, based on information in relevant evacuation and medical encounter records. All medical evacuations were classified as "battle injuries" or "non-battle injuries and illnesses," based on entries in the TRAC2ES evacuation record.

Evacuations due to non-battle injuries and illnesses were further classified into 18 illness/injury categories based on International Classification of Diseases, 9th and 10th Revisions (ICD-9 and ICD-10, respectively) diagnostic codes reported in medical encounter records following evacuation. All records of hospitalizations and ambulatory visits from 5 days before until 10 days after the reported date of each medical evacuation were identified from Defense Medical Surveillance System (DMSS) data. The primary (first-listed) diagnosis for either hospitalization or earliest ambulatory visit after evacuation was used to classify the condition that necessitated the evacuation. If the first-listed

diagnostic code specified an external cause of injury (ICD-9 E-code/ICD-10 V-, W-, X-, or Y-code) or an encounter for a condition other than a current illness or injury, the secondary diagnosis specifying illness or injury (ICD-9: 001–999/ICD-10: A00–T88, U07.1, or U09.9) was used. If no secondary diagnosis was provided, or if the secondary diagnosis also was an external cause code, the first-listed diagnostic code of a subsequent encounter was used.

The disposition codes associated with the DMSS medical encounter were used to create a disposition category for each medical evacuation. Inpatient disposition categories include: Returned to duty (code 01), Transferred/discharged to other facility (codes 02–04, 09, 21–28, 43, or 61–66), Died (codes 20, 30, 40–42, 50, or 51), Separated from service (codes 10–15), and Other/unknown. Outpatient disposition categories include: Released without limitation (code 1), Released with work/duty limitation (code 2), Immediate referral (code 4), Sick at home/quarters (codes 3 or S), Admitted/transferred to civilian hospital (codes 7, 9, A–D, or U), Died (codes 8 or G), Discharged home (code F), and Other/unknown.

Results

In 2022, 691 service members were medically evacuated from the CENTCOM AOR, while 229 were evacuated from the AFRICOM AOR, with each experiencing at least 1 subsequent medical encounter at a fixed medical facility outside the operational theater, within the requisite inclusion time frame **(Table 1)**. Mental health disorders accounted for the most medical encounters after a CENTCOM evacuation (n=268; 38.8%), while injury represented the most common diagnostic category after evacuation from AFRICOM (n=69; 30.1%) **(Table 1)**.

Annual CENTCOM medical evacuations attributable to battle injuries remained relatively stable in 2018 (n=57), 2019 (n=59), and 2020 (n=59), subsequently decreasing to near 0 (n=8 in 2021; n=3 in 2022) with the conclusion of major combat operations **(data not shown)**. Annual CENTCOM medical evacuations attributable to non-battle injuries also declined,

TABLE 1. Numbers and Percentages of Medical Encounters Following Medical Evacuation for Disease and Non-Battle Injuries[a] from Theater by Area of Responsibility and Major ICD-10 Diagnostic Category, U.S. Armed Forces, 2022

	CENTCOM						AFRICOM					
	Total		Men		Women		Total		Men		Women	
Major diagnostic category (ICD-10 codes)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mental disorders (F01 - F99)	268	38.8	193	36.1	75	47.8	34	14.8	27	14.4	7	16.7
Non-battle injury and poisoning (S00 - T88, DOD0101 - DOD0105)	139	20.1	117	21.9	22	14.0	69	30.1	58	31.0	11	26.2
Signs, symptoms and ill-defined conditions (R00 - R99)	79	11.4	61	11.4	18	11.5	25	10.9	18	9.6	7	16.7
Musculoskeletal system (M00 - M99)	55	8.0	51	9.6	4	2.5	28	12.2	24	12.8	4	9.5
Digestive system (K00 - K95)	34	4.9	30	5.6	4	2.5	21	9.2	19	10.2	2	4.8
Genitourinary system (N00 - N99)	22	3.2	11	2.1	11	7.0	7	3.1	3	1.6	4	9.5
Circulatory system (I00 - I99)	20	2.9	18	3.4	2	1.3	3	1.3	3	1.6	0	0.0
Nervous system and sense organs (G00 - G99, H00 - H95)	20	2.9	19	3.6	1	0.6	11	4.8	8	4.3	3	7.1
Neoplasms (C00 - D49)	16	2.3	13	2.4	3	1.9	1	0.4	1	0.5	0	0.0
Other (Z00 - Z99, except pregnancy related)	14	2.0	9	1.7	5	3.2	10	4.4	7	3.7	3	7.1
Endocrine, nutrition, immunity (E00 - E89)	6	0.9	3	0.6	3	1.9	3	1.3	3	1.6	0	0.0
Pregnancy and childbirth (O00 - O9A, relevant Z codes)	5	0.7	--	--	5	3.2	0	0.0	--	--	0	0.0
Skin and subcutaneous tissue (L00 - L99)	4	0.6	2	0.4	2	1.3	5	2.2	5	2.7	0	0.0
Infectious and parasitic diseases (A00 - B99)	4	0.6	3	0.6	1	0.6	9	3.9	8	4.3	1	2.4
Battle injury (from TRAC2ES records)	3	0.4	3	0.6	0	0.0	2	0.9	2	1.1	0	0.0
Respiratory system (J00 - J99, U07.0)	2	0.3	1	0.2	1	0.6	0	0.0	0	0.0	0	0.0
COVID-19 (U07.1, U09.9)	0	0.0	0	0.0	0	0.0	1	0.4	1	0.5	0	0.0
Congenital anomalies (Q00 - Q99)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hematologic disorders (D50 - D89)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	691	100.0	534	100.0	157	100.0	229	100.0	187	100.0	42	100.0

Abbreviations: ICD, International Classification of Diseases, 10th Revision; No., number; TRAC2ES, U.S. Transportation Command (TRANSCOM) Regulating and Command & Control Evacuation System.

[a]Classified as Disease and non-Battle Injuries from injury_type field in TRAC2ES

from 1,266 to 691, during the 2018-2022 surveillance period **(Figure)**. Annual medical evacuations from AFRICOM attributed to battle injuries peaked at 6 in 2019, then declining to 4 in 2020 and 0 in 2021, with 2 in 2022 **(data not shown)**. Notably, in 2022 AFRICOM medical evacuations attributable to non-battle injuries and diseases (n=229) exceeded the numbers attributed in the prior 4 years but remained much lower than CENTCOM **(Figure)**.

Demographic and military characteristics

The leading major diagnostic categories following medical evacuations from CENTCOM and AFRICOM were the same for men and women: mental disorders (from CENTCOM) and non-battle injury (from AFRICOM) **(Table 1)**. Compared to men, female CENTCOM and AFRICOM service members had a higher proportion of medical evacuations for mental health disorders and genitourinary system disorders **(Table 1)**. In contrast, male service members from both AORs had higher proportions of evacuation for injuries, musculoskeletal system disorders, and digestive system conditions.

The largest numbers and proportions of CENTCOM and AFRICOM evacuees were non-Hispanic White service members, those aged 20-24 years, members of the Army, and junior and senior enlisted personnel. **(Table 2)**. Most CENTCOM (84.5%) and AFRICOM (80.8%) medical evacuations were assigned routine precedence.

Most frequent specific diagnoses

Among men and women in both AORs, the leading 3-digit ICD-10 code for mental health disorders indicated reaction to severe stress and adjustment disorders (F43) **(Table 3)**. This ICD-10 code represented over 75% of mental disorder diagnoses among men and women in both AORs **(data not shown)**.

The proportion of medical encounters for signs, symptoms and ill-defined conditions (R00-R99) accounted for over 10% of all medical evacuations in both AORs **(Table 1)**. The primary diagnoses for the R00-R99 major diagnostic category were not clustered to 1 diagnosis but were diffused throughout this ICD-10 code chapter **(data not shown)**.

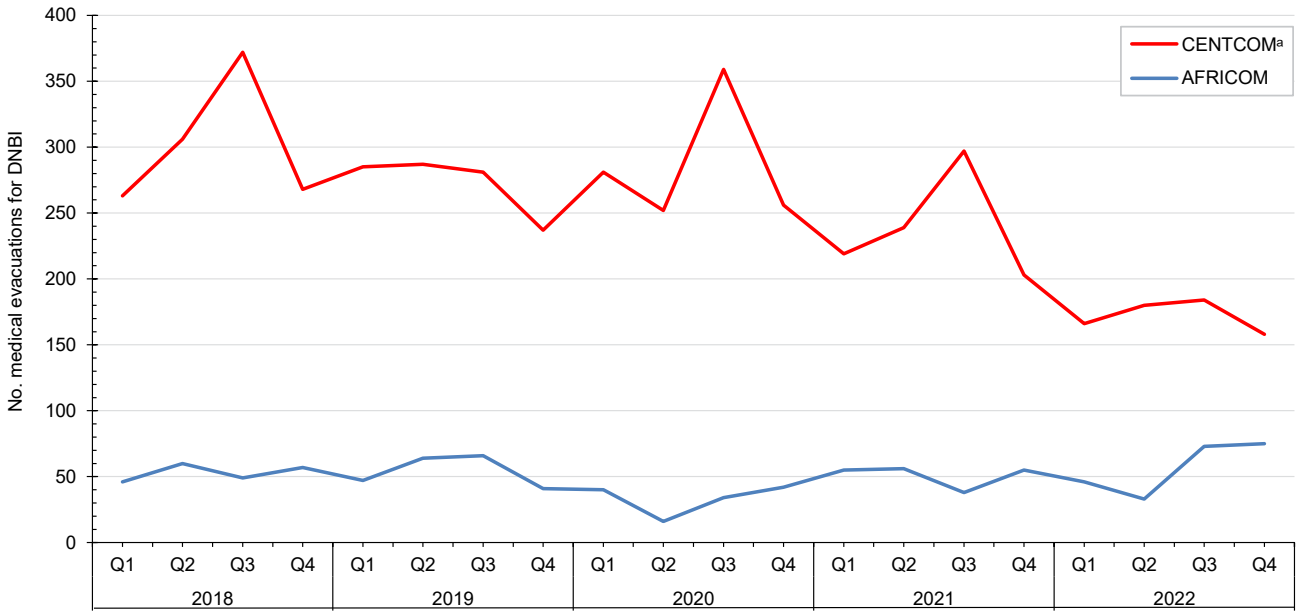
Disposition

Hospitalization was required for 245 (35.5%) of CENTCOM (n=691) and 59 (25.8%) of AFRICOM (n=229) medical evacuees in 2022. About four-fifths (82.9% in CENTCOM and 83.1% in AFRICOM) of all service members hospitalized after medical evacuation were returned to duty. A smaller proportion of CENTCOM medical evacuees with subsequent outpatient encounters were released without limitation (69.5%) compared to AFRICOM evacuees (84.1%) **(data not shown)**.

Discussion

Only 5 (0.3%) medical evacuations from CENTCOM (n=3) and AFRICOM (n=2) in 2022 were associated with battle

FIGURE. Medical Evacuations of U.S. Service Members for Disease and Non-Battle Injuries, by Area of Responsibility and Yearly Quarter, 2018–2022[a]



Abbreviations: CENTCOM, Central Command; AFRICOM, Africa Command; No., number; DNBI, Disease non-Battle Injury
[a]These classifications are based on the causal event of medical evacuation-linked medical encounters.
[b]Note: Operation Resolute Support (ORS) began on January 1, 2015 and ended August 31, 2021. The Iranian airstrike on the U.S. al-Asad Air Base, Iraq occurred January 8, 2020.

injuries in the TRAC2ES records. While CENTCOM medical evacuations attributable to non-battle injuries declined to the lowest number observed in the last 5 years, during the same period AFRICOM non-battle injury medical evacuations increased to their highest level. These trends coincide with the drawdown in forces from CENTCOM and reestablishment of persistent military forces throughout East Africa.[3]

The leading diagnoses of AFRICOM non-battle injuries were not clustered around any specific ICD-10 code but distributed among diagnoses such as dislocation and sprain of joints and knee ligaments, intracranial injuries, and wrist or hand fractures. This heterogeneity of injury type may be due to the large proportion resulting from occupational hazards in the deployed environment. Classification by cause of injury rather than affected body system may be more appropriate for this population.

The proportion of CENTCOM medical evacuations in 2022 attributed to mental health disorders (38.8%; n=268) represents a continued increase from the proportions reported in 2021 (33.5%; n=323), 2020 (27.2%; n=327), and 2019 (27.1%; n=308). These rates of medical evacuation due mental health disorders are also considerably higher than the proportion (11.6%; n=5,892) described by a *MSMR* report examining evacuations from Iraq during a 9-year period between 2003 and 2011.[4-7]

Several important limitations should be considered when interpreting these results. Demographic data for the deployed population, i.e. person-time for individuals eligible for medical evacuation, are not readily available. A Government Accountability Office finding that the DOD does not maintain complete data to allow monitoring of personnel tempo limits assessment of the amount of time service members are deployed or assigned for service away from home for other events.[8] The lack of deployed individual person-time precludes calculation of stratified and overall rates for medical evacuations.

Most causes of medical evacuations were estimated for this report from primary (first-listed) diagnoses in DMSS recorded during hospitalizations or initial outpatient encounters following evacuation.

TABLE 2. Demographic and Military Characteristics of Service Members Medically Evacuated from the U.S. Central and Africa Command Areas of Responsiblity, U.S. Armed Forces, 2022

	CENTCOM		AFRICOM	
	No.	% total	No.	% total
Total	691	100.0	229	100.0
Sex				
Male	534	77.3	187	81.7
Female	157	22.7	42	18.3
Age group, y				
<20	16	2.3	5	2.2
20–24	225	32.6	64	27.9
25–29	159	23.0	48	21.0
30–34	113	16.4	41	17.9
35–39	88	12.7	33	14.4
40–44	45	6.5	13	5.7
45+	45	6.5	25	10.9
Racial/ethnic group				
Non-Hispanic White	391	56.6	132	57.6
Non-Hispanic Black	134	19.4	41	17.9
Hispanic	120	17.4	42	18.3
Other/unknown	46	6.7	14	6.1
Service				
Army	437	63.2	116	50.7
Navy	65	9.4	43	18.8
Air Force	184	26.6	51	22.3
Marine Corps	5	0.7	19	8.3
Component				
Active	372	53.8	98	42.8
Reserve/Guard	319	46.2	131	57.2
Rank/grade				
Junior enlisted (E1–E4)	320	46.3	87	38.0
Senior enlisted (E5–E9)	278	40.2	110	48.0
Junior officer (O1–O3; W1–W3)	60	8.7	18	7.9
Senior officer (O4–O10; W4–W5)	33	4.8	14	6.1
Military occupation				
Combat-specific[a]	111	16.1	48	21.0
Motor transport	24	3.5	4	1.7
Repair/engineering	180	26.0	51	22.3
Communications/intelligence	149	21.6	55	24.0
Health care	47	6.8	18	7.9
Other/unknown	180	26.0	53	23.1
Marital status				
Married	331	47.9	120	52.4
Single, never married	310	44.9	94	41.0
Other/unknown	50	7.2	15	6.6
Education level				
High school or less	426	61.6	132	57.6
Some college	120	17.4	36	15.7
College	131	19.0	56	24.5
Other/unknown	14	2.0	5	2.2
Precedence[b]				
Routine	584	84.5	185	80.8
Priority	94	13.6	29	12.7
Urgent	13	1.9	15	6.6
Transport mode				
Military	429	62.1	58	25.3
Commercial	15	2.2	6	2.6
Other/unknown	247	35.7	165	72.1

Abbreviations: CENTCOM, Central Command; AFRICOM, Africa Command; No., number.

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

[b]Data field within U.S. Transportation Command (TRANSCOM) Regulating and Command & Control Evacuation System (TRAC2ES).

TABLE 3. Most Frequent 3-digit ICD-10 Diagnoses Associated with Medical Evacuations, by Area of Responsibility and Sex, U.S. Armed Forces, 2022

CENTCOM					
Males			Females		
3-digit ICD-10	ICD-10 code description	No.	3-digit ICD-10	ICD-10 code description	No.
F43	Reaction to severe stress, and adjustment disorders	150	F43	Reaction to severe stress, and adjustment disorders	58
S46	Injury of muscle, fascia and tendon at shoulder and upper arm level	23	F33	Major depressive disorder, recurrent	5
M54	Dorsalgia	17	F41	Other anxiety disorders	5
F32	Depressive episode	15	N63	Unspecified lump in breast	5
K40	Inguinal hernia	9	R10	Abdominal and pelvic pain	3
AFRICOM					
Males			Females		
3-digit ICD-10	ICD-10 code description	No.	3-digit ICD-10	ICD-10 code description	No.
F43	Reaction to severe stress, and adjustment disorders	23	F43	Reaction to severe stress, and adjustment disorders	6
M25	Other joint disorder, not elsewhere classified	12	M25	Other joint disorder, not elsewhere classified	2
S83	Dislocation and sprain of joints and ligaments of knee	8	N20	Calculus of kidney and ureter	2
S06	Intracranial injury	6	R10	Abdominal and pelvic pain	2
S62	Fracture at wrist and hand level	6	Z02	Encounter for administrative examination	2

Abbreviations: ICD, International Classification of Diseases, 10th Revision; CENTCOM, Central Command; AFRICOM, Africa Command; No., number.

Diagnoses recorded in theater through the Theater Medical Data Store (TMDS) are not reflected in this analysis. In some cases, clinical evaluations at fixed medical treatment facilities following medical evacuation may have ruled out serious conditions clinically suspected while in theater, resulting in possible misclassification errors.

Battle injuries rely on proper classification in the TRAC2ES system. Misclassification errors may occur, and given the small number of battle injuries, any misclassification will have an outsized effect.

As troop drawdown continues in CENTCOM, increasing non-battle injuries among AFRICOM medical evacuees may pose challenges due to AFRICOM's particular logistical conditions, including extreme force dispersion, long distances for medical evacuation, and relatively few medical assets. While the substantial number of mental disorders following evacuation may indicate ongoing need for mental health services or reexamination of the predeployment screening process, the large proportion of service members evacuated with injury and musculoskeletal disorders from the AFRICOM AOR constitutes a major potentially preventable risk that degrades the readiness of the deployed force.

References

1. White House Briefing Room. Remarks by President Biden on the End of the War in Afghanistan. August 31, 2021. Accessed March 24, 2022. https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/08/31/remarks-by-president-biden-on-the-end-of-the-war-in-afghanistan
2. Kullab, Samya. US Formally Ends Combat Mission in Iraq. *Military Times.* December 9, 2021. Accessed March 24, 2022. https://www.militarytimes.com/news/your-military/2021/12/09/us-formally-ends-combat-mission-in-iraq
3. White House Briefing Room. Letter to the Speaker of the House and President Pro Tempore of the Senate Regarding the War Powers Report. December 8, 2022. Accessed July 5, 2023. https://www.whitehouse.gov/briefing-room/statements-releases/2022/12/08/letter-to-the-speaker-of-the-house-and-president-pro-tempore-of-the-senate-regarding-the-war-powers-report-4
4. Armed Forces Health Surveillance Division. Medical evacuations out of the U.S. Central Command, active and reserve components, U.S. Armed Forces, 2019. *MSMR*. 2020;27(5):27-32.
5. Armed Forces Health Surveillance Division. Medical evacuations out of the U.S. Central Command, active and reserve components, U.S. Armed Forces, 2020. *MSMR*. 2021;28(5):28-33.
6. Armed Forces Health Surveillance Division. Medical evacuations out of the U.S. Central and U.S. Africa Commands, active and reserve components, U.S. Armed Forces, 2021. *MSMR*. 2022; 29(6):27-33.
7. Armed Forces Health Surveillance Center. Medical evacuations from Operation Iraqi Freedom/Operation New Dawn, active and reserve components, U.S. Armed Forces, 2003–2011. *MSMR*. 2012;19(2):18-21.
8. United States Government Accountability Office. Report to Congressional Committees. GAO-18-253, Military Readiness: Clear Policy and Reliable Data Would Help DOD Better Manage Service Members' Time Away from Home. April 2018. Accessed July 5, 2023. https://www.gao.gov/assets/gao-18-253.pdf

Update

Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries Among Non-Service Member Beneficiaries of the Military Health System, 2022

Military Health System (MHS) beneficiaries are a diverse and heterogeneous population: Individuals who are eligible for care through the MHS include active component service members, activated National Guard and Reserve service members, family members of active component members, retirees, and family members of retirees. Each of these beneficiary categories has different demographics, enrollment, and utilization patterns.

An important distinction of beneficiary care is the transition from TRICARE to Medicare. Once an individual reaches age 65, TRICARE eligibility ends, as beneficiaries become eligible for Medicare. If they enroll in Medicare, those individuals receive a Medicare gap insurance, known as TRICARE for Life (TFL). TFL is funded through mechanisms outside of the Defense Health Program. While TFL patients are eligible for direct care at military hospitals and clinics , most care is provided at civilian institutions, paid through the Medicare benefit. While Medicare-eligible individuals remain eligible for direct care at a military medical facilities, such care is on a space-available basis.

Beneficiaries enrolled in TRICARE Prime and TRICARE Select, which includes many family members of active duty service members and a portion of non-Medicare eligible retirees and their family members (primarily those aged 64 and younger), may receive care at fixed military hospitals and clinics or from civilian health care resources (purchased care) that supplement direct military medical care.[1] In 2022, approximately 6.66 million non-service member beneficiaries utilized health care services through the MHS.[1]

This report provides an updated summary of care provided to non-service members in the MHS during calendar year 2022. Health care burden estimates are stratified for 4 age groups of health care recipients. Medicare-eligible beneficiaries (over age 65) are considered separately, as most of their care is provided and paid for by non-MHS resources.

Methods

The surveillance population included all non-service member beneficiaries of the MHS who had at least 1 hospitalization or outpatient medical encounter from January 1 through December 31, 2022, either through a military medical facility or provider or a civilian facility or provider (if reimbursed through TRICARE or through Medicare with a copay by TFL). For this analysis, all inpatient and outpatient medical encounters were summarized according to the primary (first-listed) International Classification of Diseases, 10th Revision (ICD-10) codes that indicate the natures of illnesses or injuries (i.e., ICD-10 codes A00–T88). Nearly all records of encounters with first-listed diagnoses that were Z-codes (care other than for a current illness or injury—e.g., general medical examinations, after care, vaccinations) or V/W/X/Y-codes (indicators of the external causes but not the natures of injuries)—were excluded from the analysis; encounters with a code of Z37 ("outcome of delivery, single liveborn") in the primary position were retained.

For summary purposes, all illness- and injury-specific diagnoses (as defined by the ICD-10) were grouped into 153 burden of disease-related conditions and 25 major morbidity categories based on a modified version of the classification system developed for the Global Burden of Disease Study.[2] The methodology for summarizing absolute and relative morbidity has been used annually since 2014 and described elsewhere.[3] Results were stratified by source of health care (direct care [military treatment facilities] vs. non-direct care [non-military medical facilities]) and by age group (0-17 years, 18-44 years, 45-64 years, and 65 years old or older). For analysis of morbidity burdens within the youngest age group, developmental disorders were included in the general category of mental health disorders.

What are the new findings?

In 2022, mental health disorders accounted for the largest proportions of the morbidity and health care burdens that affected the pediatric and younger adult beneficiary age groups. Among adults aged 45-64 and those aged 65 or older, musculoskeletal diseases accounted for the most morbidity and health care burdens. Nearly all care for Medicare-eligible beneficiaries (those over age 65 along with select other groups) was at non-military medical facilities, which resulted in over 90% of total non-service member beneficiaries encounters (Medicare-eligible and TRICARE-eligible) at non-military medical facilities.

What is the impact on readiness and force health protection?

Service member focus and morale are improved by the assurance of medical care to family members, especially during deployment or other periods of separation. The promise of lifetime medical benefits upon retirement for a service member and immediate family has been a powerful recruiting and retention tool over the past several decades. Non-member beneficiaries provide important opportunities for active duty health care providers to maintain medical skills, knowledge, and abilities, improving the readiness of the medical force. Trends in utilization and diagnostic patterns can help senior leaders allocate health care resources within the Military Health System to maximize efficiency, medical readiness, and the readiness of the medical force.

Results

In 2022, the population of non-service member MHS care recipients included more female beneficiaries (56.8%) than male beneficiaries (43.2%). Adults aged 65 years and older accounted for the highest number of individuals receiving health care (n=2.07 million; 31.6%), followed by adults 18-44 years old (n=1.58 million; 24.1%), pediatric beneficiaries under 17 years of age (n=1.47 million; 22.5%), and older adults 45-64 years of age (n=1.43 million; 21.8%) **(Table 1)**.

In 2022, a total of 6,544,033 non-service member beneficiaries of the MHS experienced 88,440,430 medical encounters. The 2,068,635 beneficiaries over age 65 accounted for over half (50.2%) of these encounters **(Table 1)**. Among TRICARE-eligible beneficiaries (under age 65), the 3 most frequent morbidity-related categories accounting for the most medical encounters were mental health disorders, signs/symptoms and ill-defined conditions, and injury/poisoning. While mental health disorders and injury also accounted for 1 of the 3 highest morbidity-related groupings for hospital bed days, maternal conditions accounted for the second-most bed days among beneficiaries under 65 years of age **(Figures 1a, 1b)**.

Direct care versus care at non-military medical facilities

Most medical encounters (90.7%) among non-service member beneficiaries in 2022 were at non-military medical facilities (purchased care or care received under the Medicare benefit) **(Table 1)**. Of all non-service member beneficiaries (individuals affected) with any illness or injury-related encounters during the year, many more exclusively received their care in non-military medical facilities (n=4,841,140; 74.0%) than either exclusively by military medical (direct) care (n=750,969; 11.5%) or a combination of both (n=951,924; 14.5%).

The highest proportion of care among beneficiaries of all age groups was exclusively from non-military hospitals or clinics. While individuals under 64 years of age utilized both direct and non-direct care within a range of 16.7% to 19.6%, combined care among beneficiaries ages 65 and older was lower (6.6%). Medicare-eligible beneficiaries (over age 65) accounted for the largest age-specific proportion of care exclusively outside military hospitals and clinics (91.0%); accordingly, just 2.5% received care exclusively in military hospitals or clinics **(Table 2)**.

Pediatric beneficiaries (aged 0 to 17)

In 2022, pediatric beneficiaries accounted for 14.7% of all medical encounters, 22.5% of all individuals affected, and 6.7% of all hospital bed days **(Table 1)**. On average, each pediatric beneficiary experienced 9 medical encounters during the year. Among TRICARE-eligible beneficiaries (excluding Medicare-eligible beneficiaries 65 and older), this group accounted for 29.5% of medical encounters, 32.8% of individuals affected, and 24.8% of all bed days.

Mental health disorders represented the largest burden of disease among pediatric beneficiaries when examining all medical encounters (37.1%; n=4,811,215) and hospital bed stays (59.2%; n=282,905) **(Figures 2a, 2b)**. On average, pediatric beneficiaries affected by a mental health disorder had 15 medical encounters related to this morbidity category during the year **(data not shown)**. More than two-thirds (67.0%) of all medical encounters for mental health disorders among pediatric beneficiaries were attributed to 3 groups of disorders: autism-related disorders (31.1%), followed by developmental disorders of speech and language (25.7%), and attention-deficit hyperactivity disorders (10.2%) **(Figure 2c)**. On average, there were 41 autism-related encounters per individual affected by an autistic disorder **(data not shown)**. Despite the high numbers of encounters associated with these 3 categories of mental health disorders, approximately three-quarters (73.7%) of mental health disorder-related hospital bed days were attributable to mood disorders, and 29.8% of mood disorder-related bed days were attributable to "major depressive disorder, recurrent, severe without psychotic features (ICD10: F332)" **(data not shown)**.

Among pediatric beneficiaries overall, perinatal conditions (i.e., medical issues occurring within 1 year of birth) accounted for the second highest number of hospital bed days (n=41,114; 8.6%) after mental health disorders **(Figures 2a, 2b)**. Among pediatric beneficiaries with at least 1 illness or injury-related diagnosis, those with malignant neoplasms had the second highest number (14) of related encounters per affected individual. The highest numbers of malignant neoplasm-related encounters and hospital bed days were attributable to leukemias **(data not shown)**.

Respiratory infections (including upper and lower respiratory infections and otitis media) accounted for relatively more medical encounters among pediatric beneficiaries (9.8%) when compared to any older age group of beneficiaries **(Figures 2b, 3b, 4b, and 5b)**. Respiratory infections were attributed to a larger proportion of hospital bed days for adults 65 and older (6.5%) than pediatric beneficiaries (3.2%).

Beneficiaries aged 18 to 44

In 2022, non-service member beneficiaries aged 18-44 accounted for 15.6% of all medical encounters, 24.1% of all individuals affected, and 8.9% of hospital bed days **(Table 1)**. On average, each individual affected with an illness or injury (any cause) had 9 medical encounters during the year. Excluding those eligible for Medicare according to age, non-service member beneficiaries aged 18-44 accounted for 31.3% of all medical encounters, 35.3% of individuals affected, and 32.9% of all bed days in 2022.

The morbidity-related category that accounted for the most medical encounters among beneficiaries aged 18-44 was mental health disorders (n=3,309,402; 24.0% of all encounters) **(Figures 3a, 3b)**. Among these adult beneficiaries, mental health disorders accounted for over one-fifth (21.3%) of all bed days, and on average, each adult affected by a mental health disorder had 8 mental health disorder-related encounters during the year. Anxiety disorders (33.9%), mood disorders (29.9%), and adjustment disorders (16.5%) accounted for approximately four-fifths (80.3%) of all mental health disorder-related medical encounters among beneficiaries aged 18-44 **(data**

TABLE 1. Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days, by Source and Age Group, MHS Non-Service Member Beneficiaries, 2022

	Medical encounters		Individuals affected		Hospital bed days		Medical encounters per individual affected
	No.	% total	No.	% total	No.	% total	
All non-service member beneficiaries	88,440,430	---	6,544,033	---	7,108,109	---	13.5
Source							
Military hospitals/clinics, exclusively	8,253,373	9.3	750,969	11.5	281,467	4.0	n/a
Non-military medical facilities,[c] exclusively	80,191,057	90.7	4,841,140	74.0	6,826,642	96.0	n/a
Military and non-military medical facilities[d]	n/a	n/a	951,924	14.5	n/a	n/a	n/a
Age group							
0–17 years	12,976,284	14.7	1,469,827	22.5	477,608	6.7	8.8
18–44 years	13,804,177	15.6	1,579,365	24.1	633,339	8.9	8.7
45–64 years	17,261,186	19.5	1,426,206	21.8	812,039	11.4	12.1
65 years or older	44,402,783	50.2	2,068,635	31.6	5,185,123	72.9	21.5

[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).

[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.

[c]Represents encounters or hospital bed days received under purchased care or care received under the Medicare benefit.

[d]Represents a combination of care received directly at military hospitals/clinics and non-military medical facilities.

TABLE 2. Individuals Affected,[a] by Age Group and Source, MHS Non-Service Member Beneficiaries, 2022

	Military hospitals/clinics, exclusively		Non-military medical facilities,[b] exclusively		Military and non-military medical facilities[c]		Total
	No.	%	No.	%	No.	%	
0-17 years	189,457	12.9%	991,716	67.5%	288,654	19.6%	1,469,827
18-44 years	353,430	22.4%	961,920	60.9%	264,015	16.7%	1,579,365
45-64 years	156,713	11.0%	1,005,900	70.5%	263,593	18.5%	1,426,206
65+ years	51,369	2.5%	1,881,604	91.0%	135,662	6.6%	2,068,635

[a]Individuals with at least 1 hospitalization or ambulatory visit for the condition.

[b]Represents encounters or hospital bed days received under purchased care or care received under the Medicare benefit.

[c]Represents a combination of care received directly at military hospitals/clinics and non-military medical facilities.

not shown). Among adult beneficiaries in this age group, mood and substance abuse disorders accounted for over three-quarters (50.3% and 24.1%, respectively) of total mental health disorder-related hospital bed days.

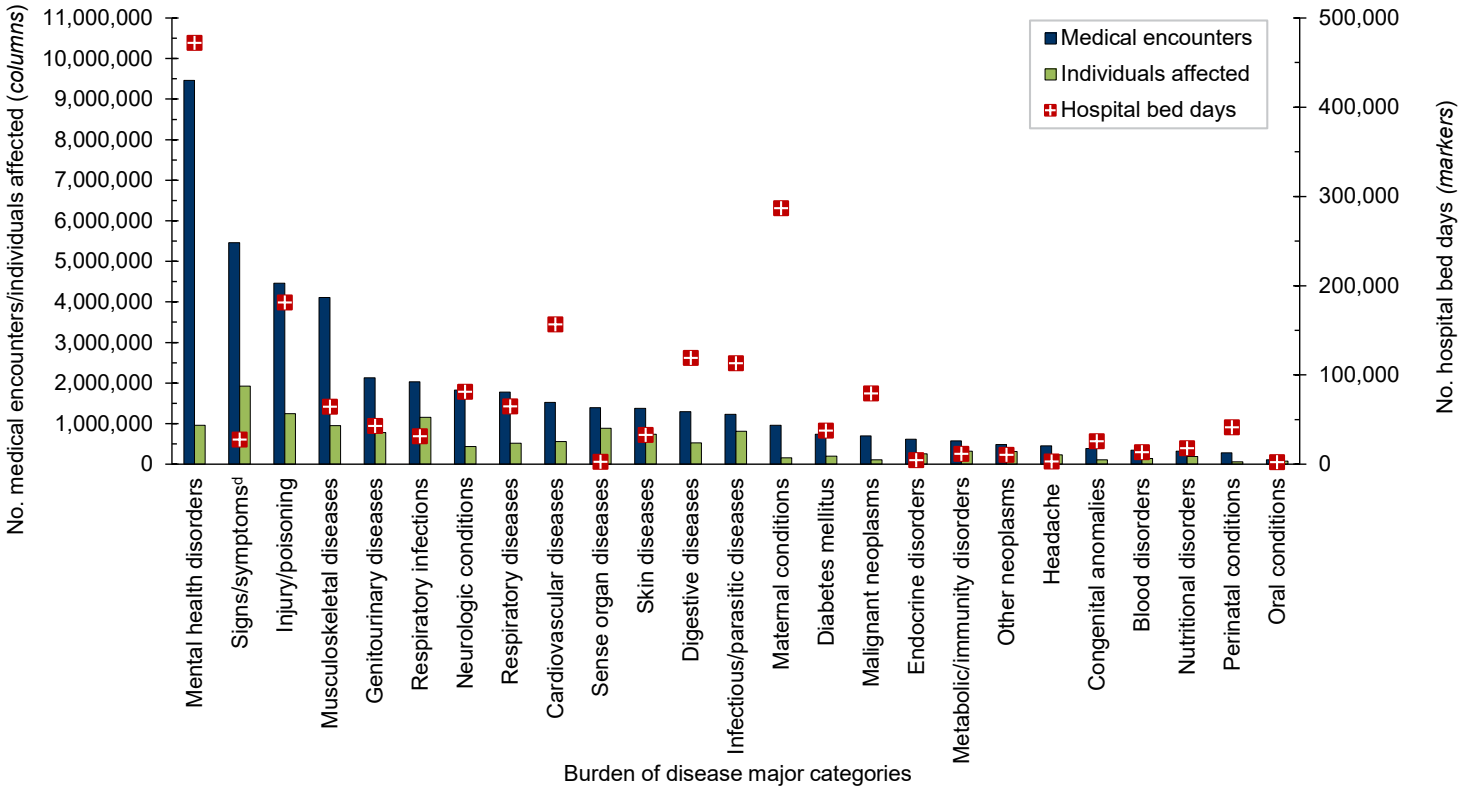
Maternal conditions accounted for more than two-fifths (45.0%) of all bed days among adults aged 18-44, and on average, 6 medical encounters per affected individual **(Figures 3a, 3b)**. Deliveries accounted for 9.8% of maternal condition-related medical encounters **(data not shown)**.

Examination of an average number of medical encounters per person within a respective morbidity category identified malignant neoplasms as a diagnostic group accounting for individual health care use (6.4 encounters per individual) relatively comparable to mental health disorders (7.8 encounters per individual) and maternal conditions (6.1 encounters per individual). Of the 101,006 medical encounters for malignant neoplasms among adults aged 18-44, 29.5% were attributed to malignant neoplasm of the breast **(data not shown)**.

Beneficiaries aged 45 to 64

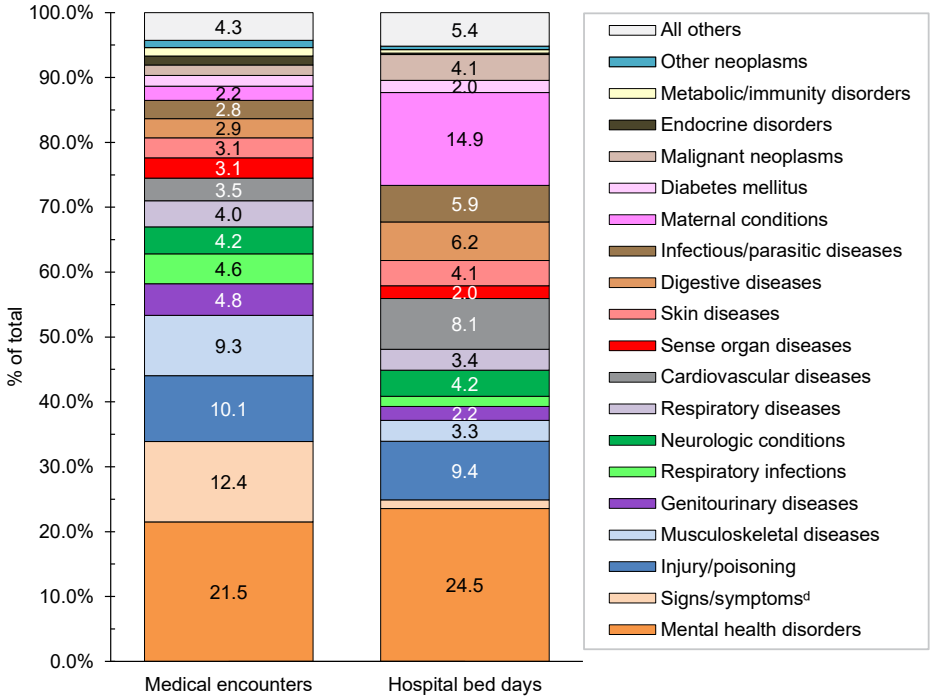
In 2022, non-service member beneficiaries aged 45-64 accounted for approximately one-fifth (19.5%) of all medical encounters, 21.8% of all individuals affected, and 11.4% of hospital bed days **(Table 1)**. On average, each affected individual had 12 medical encounters during the year. Excluding Medicare-eligible beneficiaries, this group accounted for 39.2% of medical encounters, 31.9% of individuals affected, and 42.2% of all bed days.

FIGURE 1a. Numbers of Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days, by Burden of Disease Major Category,[c] MHS Non-Service Member Beneficiaries Under 65 Years of Age,[e] 2022



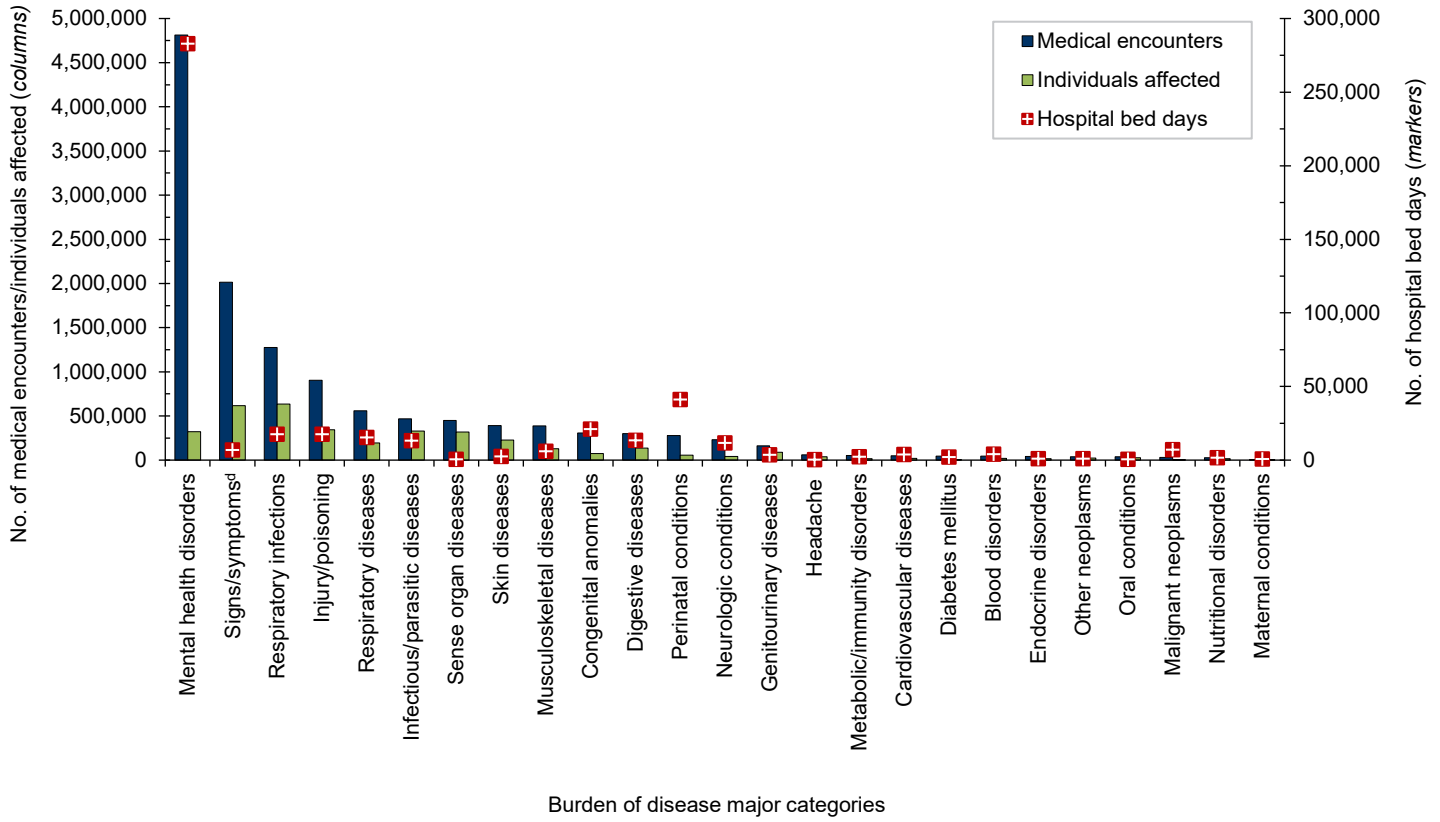
Abbreviation: No., number.
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[c]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.
[d]Includes ill-defined conditions.
[e]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.

FIGURE 1b. Percentages of Medical Encounters[a] and Hospital Bed Days, by Burden of Disease Major Category,[b] MHS Non-service Member Beneficiaries Under 65 Years of Age,[c] 2022



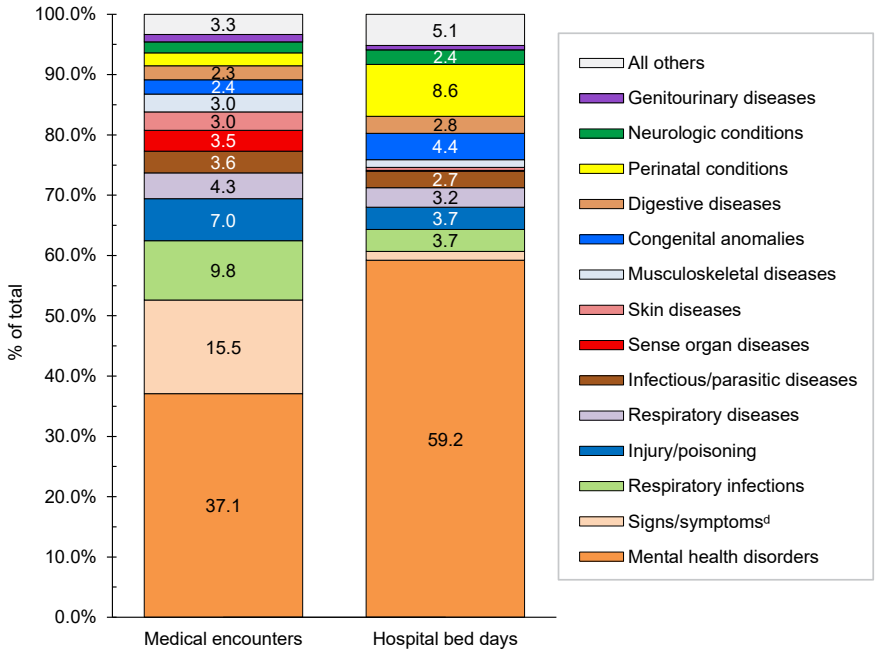
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.
[d]Includes ill-defined conditions.

FIGURE 2a. Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days, by Burden of Disease Major Category,[c] MHS Non-Service Member Beneficiaries, Pediatric Non-Service Member Beneficiaries,[e] Aged 0–17, 2022



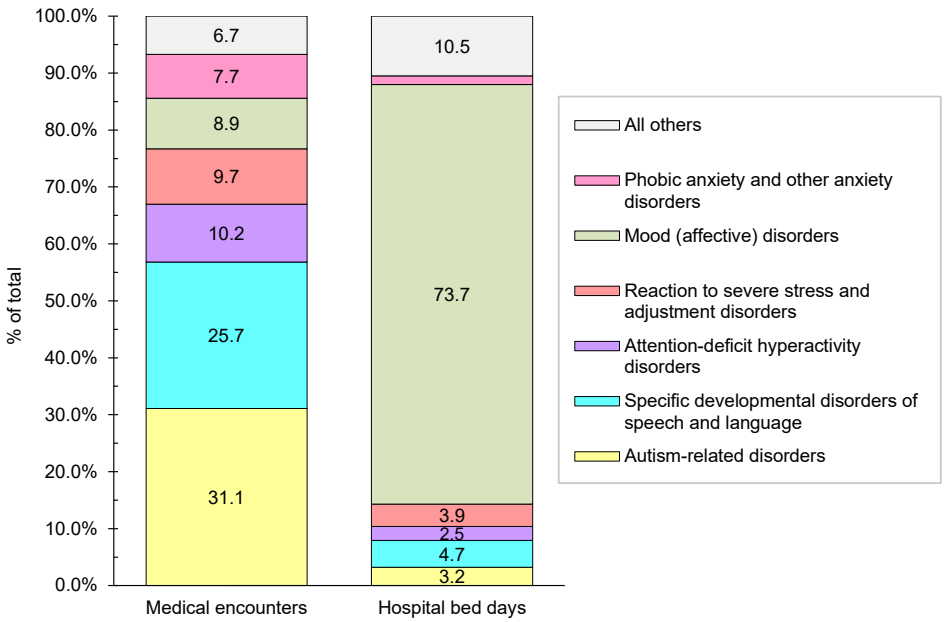
Abbreviation: No., number.
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[c]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[d]Includes ill-defined conditions.
[e]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.

FIGURE 2b. Percentages of Medical Encounters[a] and Hospital Bed Days, by Burden of Disease Category,[b] Pediatric MHS Non-Service Member Beneficiaries,[c] Aged 0–17, 2022



[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.
[d]Includes ill-defined conditions.

FIGURE 2c. Percentages of Medical Encountersa and Hospital Bed Days for Mental Health Disorders by the Conditions Accounting for the Most Morbidity Burden, Pediatric MHS Non-Service Member Beneficiaries, Aged 0–17, 2022



[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).

Of all morbidity-related categories, musculoskeletal diseases accounted for the most medical encounters (n=2,509,110; 14.5%) among older adult beneficiaries aged 45-64 **(Figures 4a, 4b)**; back problems accounted for 42.5% of these musculoskeletal disease-related encounters **(data not shown)**. Cardiovascular diseases represented the highest proportion of hospital bed days (17.0%), second to injury/poisoning (15.1%) **(data not shown)**. Digestive diseases (9.3%) and malignant neoplasms (7.6%) accounted for a larger percentage of total hospital bed days among beneficiaries compared to other age groups.

Malignant neoplasm of the breast represented the leading cause of neoplasm-related encounters (25.7%) in adult beneficiaries ages 45-64 **(data not shown)**.

Beneficiaries aged 65 or older (Medicare-eligible or TFL)

In 2022, non-service member beneficiaries aged 65 or older accounted for more medical encounters and more than 2.5 times the number of hospital bed days than all other age groups combined. On average, each affected individual had 21 medical encounters during the year. In addition, the number of individuals affected was greater than any other age group **(Table 1)**.

Musculoskeletal diseases (n=6,443,154; 14.5%) and cardiovascular diseases (n=6,082,418; 13.7%) together represented the leading causes for medical encounters among beneficiaries aged 65 or older, while cardiovascular diseases as a discrete cause accounted for the most bed days (1,201,613 days; 23.2%) **(Figures 5a, 5b)**. Back problems accounted for a little more than one-third (35.8%) of all musculoskeletal disease-related medical encounters **(data not shown)**.

Discussion

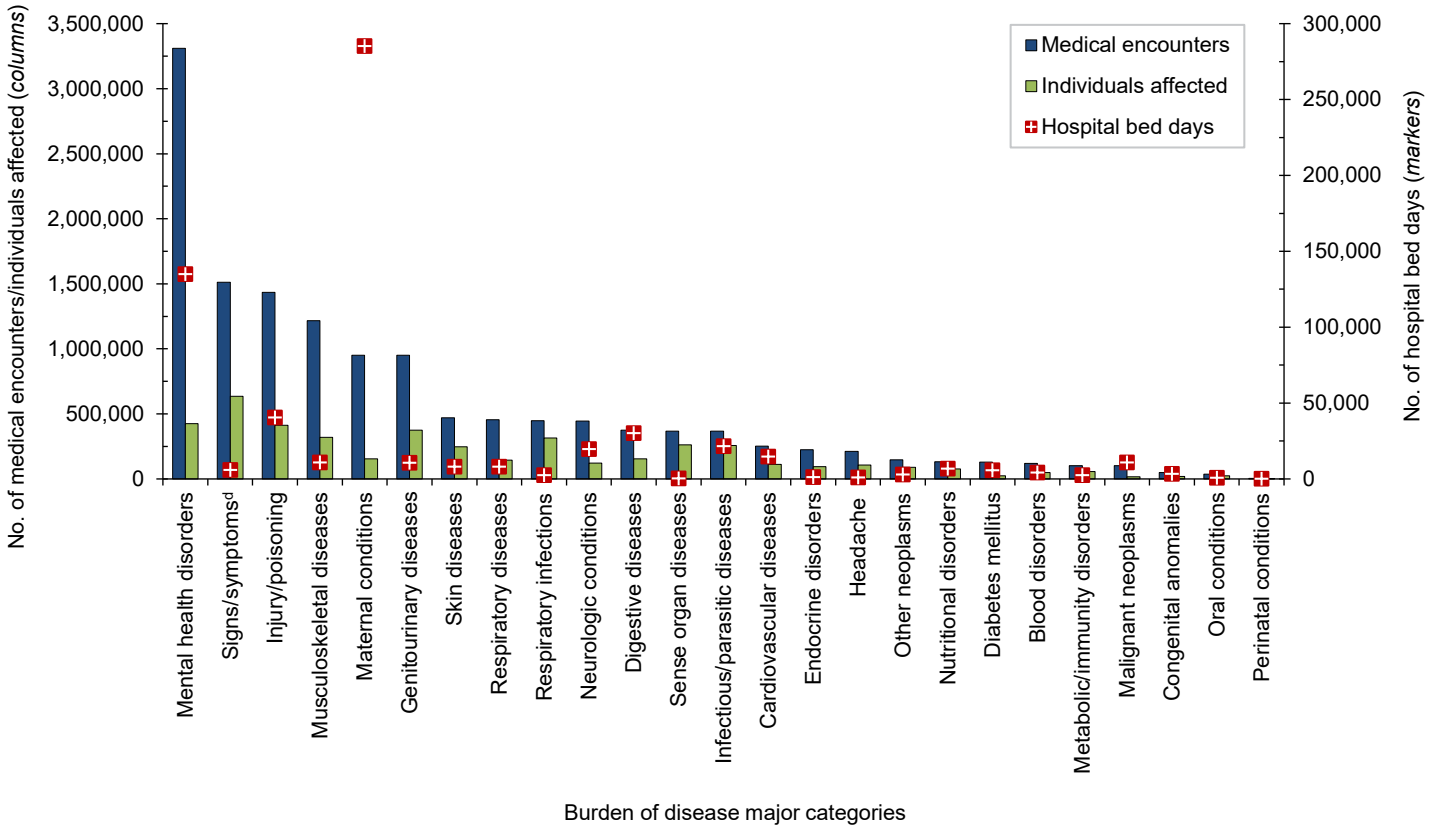
This report documents health care among non-service member beneficiaries through direct care at military hospitals and clinics, non-military medical facility purchased care reimbursements, and Medicare services external to the MHS. A substantial majority of individuals received care exclusively from non-military medical clinics and hospitals, reflecting the fact that just under 10% of all ambulatory encounters documented in DMSS were provided from a direct care military medical facility in 2022. This low figure is somewhat misleading, however, as most encounters and bed days among non-service member beneficiaries are attributable to Medicare-eligible (65 or older) beneficiaries who are often distant from military hospitals and clinics and can generally only receive direct care if space is available.

The National Ambulatory Medical Care Survey of 2019 documents a substantially lower rate of ambulatory visits (3.2 visits per p-yr) among the general U.S. population than among non-service member MHS beneficiaries (13.5 visits per p-yr) reported here.[4] This increased rate of ambulatory visits among non-service member beneficiaries compared to national civilian data was observed for all age groups. Future analyses comparing the major diagnostic category rates to civilian counterparts, by age and sex, may be useful to identify longitudinal morbidity outcomes unique to military service. Since the National Ambulatory Medical Care survey includes uninsured individuals, the financial barrier to care may explain a portion of the lower overall utilization rate.

Pronounced differences between beneficiary age groups are evident for types of morbidity-related diagnoses and disease-specific conditions. Individuals aged 65 or older—31.6% of all non-service member beneficiaries receiving an illness- or injury-specific diagnosis in 2022—accounted for approximately half (50.2%) of all medical encounters and nearly two-thirds (72.9%) of all hospital bed days among all beneficiaries. As those individuals receive care primarily through a Medicare benefit at non-MHS facilities, the impact on the MHS is minimal.

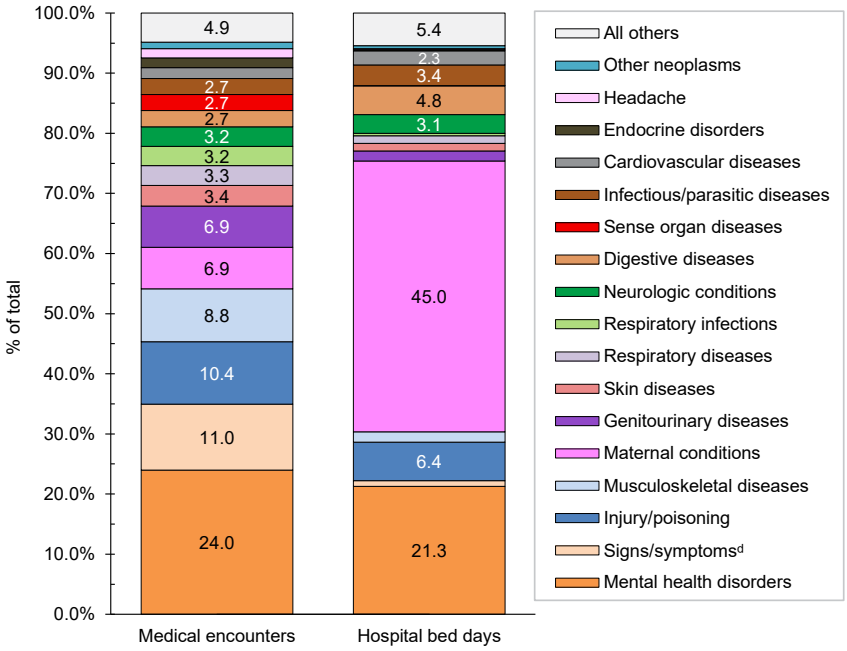
While ambulatory encounters among non-service member beneficiaries in 2022 remained relatively stable (2.1% increase) compared to the previous year, the crude annual difference in hospital bed days increased by over 20%. This trend was influenced by hospital bed days for beneficiaries ages 65 and older, among whom hospital bed days for cardiovascular disease

FIGURE 3a. Medical Encounters,[a] Individuals Affected[b] and Hospital Bed Days, by Burden of Disease Major Category,[c] MHS Non-Service Member Beneficiaries,[e] Aged 18–44, 2022



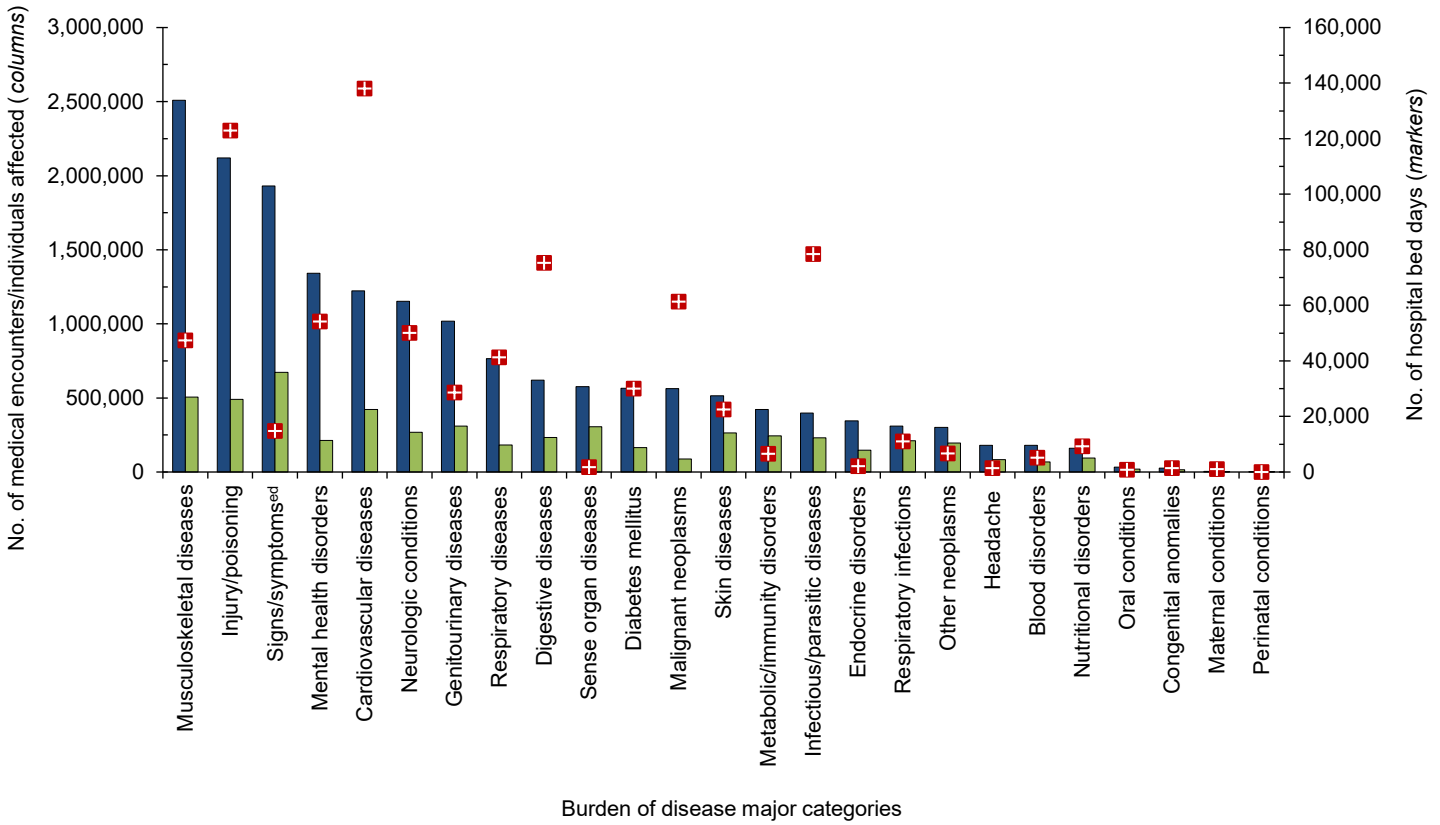
Abbreviation: No., number.
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[c]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[d]Includes ill-defined conditions.
[e]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.

FIGURE 3b. Percentages of Medical Encounters[a] and Hospital Bed Days, by Burden of Disease Major Category,[b] MHS Non-Service Member Beneficiaries,[c] Aged 18–44, 2022



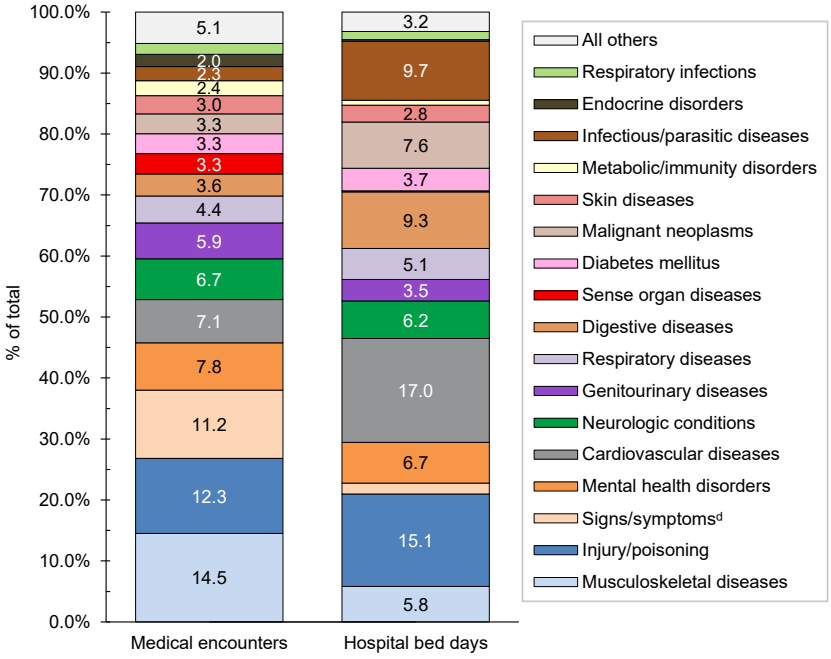
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.
[d]Includes ill-defined conditions.

FIGURE 4a. Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days, by Burden of Disease Major Category,[c] MHS Non-Service Member Beneficiaries,[d] Aged 45–64, 2022



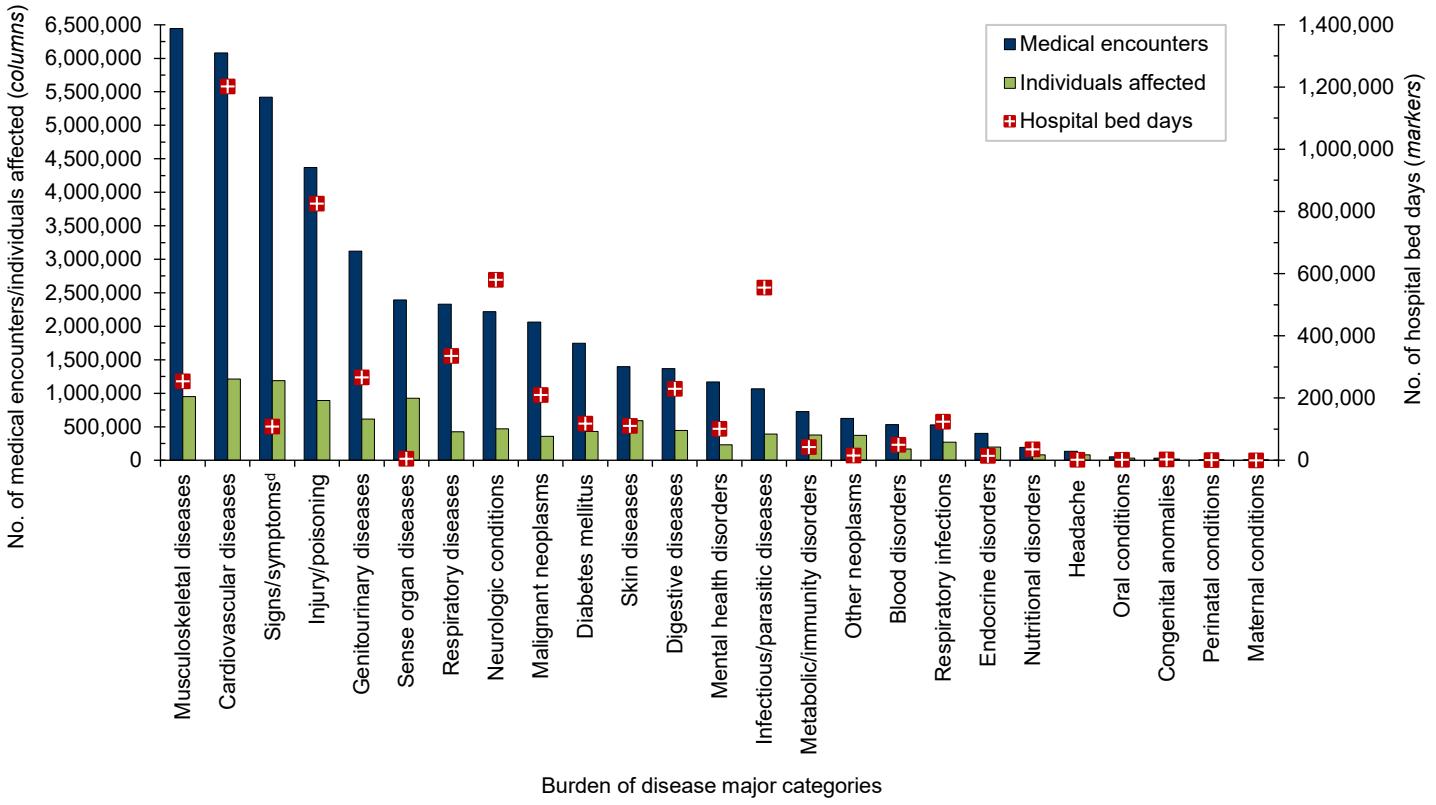
Abbreviation: No., number.
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[c]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[d]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.

FIGURE 4b. Percentages of Medical Encounters[a] and Hospital Bed Days, by Burden of Disease Major Category,[b] MHS Non-Service Member Beneficiaries,[c] Aged 45–64, 2022



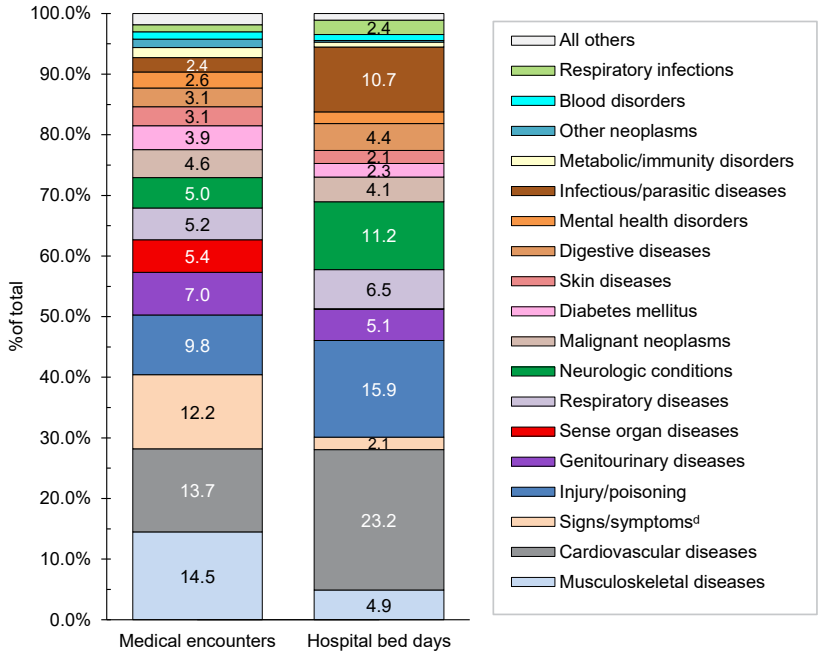
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.
[d]Includes ill-defined conditions.

FIGURE 5a. Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days, by Burden of Disease Major Category,[c] MHS Non-Service Member Beneficiaries,[e] Aged 65 or Older, 2022



Abbreviation: No., number.
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[c]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[d]Includes ill-defined conditions.
[e]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.

FIGURE 5b. Percentages of Medical Encounters[a] and Hospital Bed Days, by Burden of Disease Major Category,[b] MHS Non-Service Member Beneficiaries,[c] Aged 65 or Older, 2022



[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Source of care includes medical encounters or hospitalizations at military hospitals/clinics and non-military medical facilities.
[d]Includes ill-defined conditions.

increased from 787,739 bed days in 2021 to 1,201,613 bed days in 2022. The number of individuals 65 years and older affected by cardiovascular disease remained stable (from 1,211,692 individuals in 2021 to 1,213,404 individuals in 2022). Since this report does not include person-time nor approximate rates, annual comparisons are not proportionate to changes in the number of beneficiaries utilizing care. Further investigation of this finding may be of interest to MHS researchers.

In 2022, as in previous years, mental health disorders were the leading cause for medical encounters among pediatric (aged 0-17) and young adult (aged 18-44) beneficiary age groups, although the proportion of medical encounters attributed to mental health disorders was markedly lower among young adult (24.0%) than pediatric (37.1%) beneficiaries. Developmental disorders were a significant factor for pediatric beneficiary health care, with 67% of medical encounters for mental health disorders attributable to autism-related disorders, specific developmental disorders of speech and language, or attention-deficit hyperactivity disorders. Children affected by autistic disorder had an average of 41 autism-related encounters in 2022. Among young adult beneficiaries, the mental health disorders accounting for the largest health care burdens included anxiety, mood, and adjustment disorders.

As the MHS completes its transition to the new MHS GENESIS electronic health record (EHR), AFHSD is also in the process of completely transferring or mapping EHR data to the Defense Medical Surveillance System (DMSS). During the transition to the new MHS Information Platform (MIP), the number of records transmitted from MHS GENESIS and the Tricare Encounter Detail (TED) to DMSS are being continually reviewed for completeness of data capture. The annual burden summary for active component service members indicated a substantial drop in the number of ambulatory encounters as well as incomplete data elements.[5] This limitation was not seen among non-service member beneficiaries, however, as the number of ambulatory encounters remained relatively stable and hospital bed days increased substantially. This limitation appears to be primarily related to administrative ("Z") codes, which were excluded from this analysis.

While this report aims to describe morbidity-related diagnoses for all MHS beneficiaries, the data are limited to beneficiaries who received care at military hospitals and clinics or at a non-military medical facilities that was reimbursed through TRICARE (as primary or secondary insurance) or through Medicare, if TFL was also billed. Certain care, e.g. paid with other health insurance and not billed to TRICARE, or paid directly by the patient (or family member), is not captured in this report.

References

1. Department of Defense. Evaluation of the TRICARE Program: Fiscal Year 2022 Report to Congress: Access, Cost, and Quality Data Through Fiscal Year 2022. Accessed 18 May 2023. https://www.health.mil/Reference-Center/Reports/2022/10/07/Evaluation-of-the-TRICARE-Program-FY-2022-Report-to-Congress
2. Armed Forces Health Surveillance Center. Absolute and relative morbidity burdens attributable to various illnesses and injuries, non-service member beneficiaries of the Military Health System, 2013. *MSMR*. 2014;21(4):23-30.
3. Murray CJ and Lopez AD, eds. In: *Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, MA: Harvard University Press; 1996:120-122.
4. National Ambulatory Health Care Survey: 2019 National Summary. Accessed July 19, 2023. National Ambulatory Medical Care Survey: 2019 National Summary (cdc.gov).
5. Armed Forces Health Surveillance Center. Ambulatory visits among active component members, U.S. Armed Forces, 2022**.** *MSMR*. 2023;30(6): 19-25.

Illness and Injury Burdens Among Reserve Component Members, U.S. Armed Forces, 2022

FIGURE 1. Numbers of Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days by Burden of Disease Major Category,[c] Reserve Component,[d] U.S. Armed Forces, 2022[e]

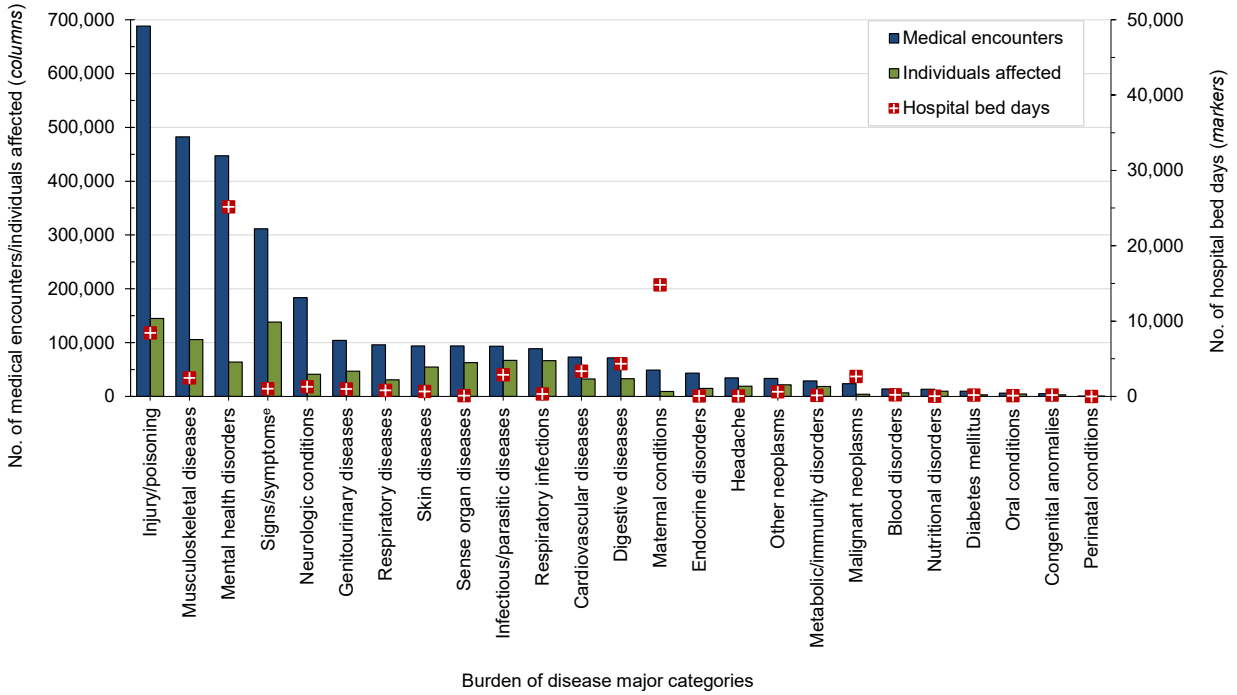
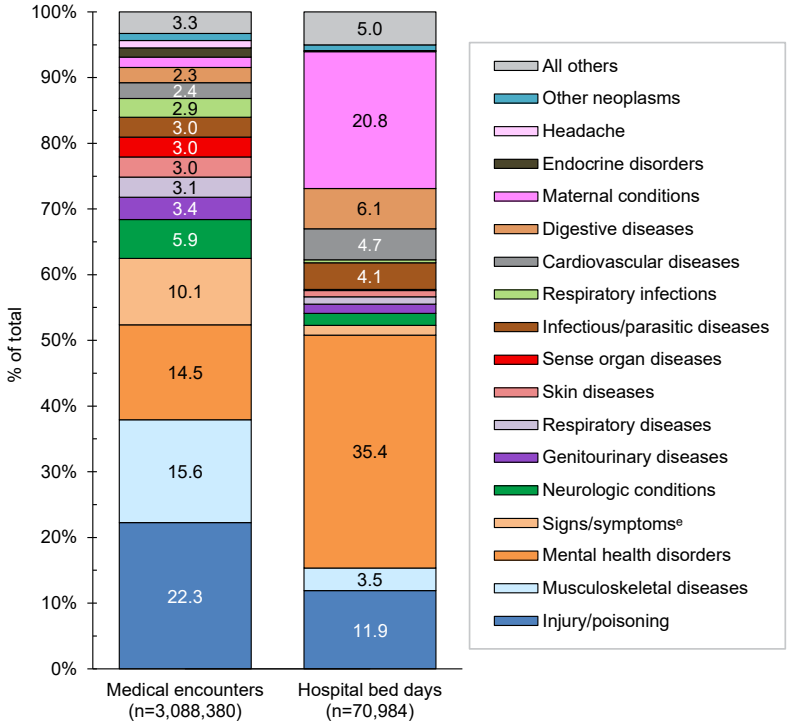


FIGURE 2. Percentages of Medical Encounters[a] and Hospital Bed Days by Burden of Disease Category,[c] Reserve Component,[d] U.S. Armed Forces, 2022[e]



Abbreviation: No. number.

[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition) occurring in U.S. military and non-military medical facilities.

[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.

[c]Burden of disease categories are the same as those used for analyses of morbidity burdens in the active component overall (see pp. 2–9).

[d]The reserve component is comprised of Reserve and Guard members of each service.

[e]2022 is the first year for which data from the DMSS were housed and analyzed from the Military Health System (MHS) Information Platform (MIP). As part of this transition, data quality assessments for completeness and timeliness are underway. Therefore, 2022 data presented in this Surveillance Snapshot are considered provisional but current as of March 23, 2023.

Illness and Injury Burdens Among Reserve Component Members, U.S. Coast Guard, 2022

FIGURE 1. Numbers of Medical Encounters,[a] Individuals Affected,[b] and Hospital Bed Days, by Burden of Disease Major Category,[c] U.S. Coast Guard Reserve Component, 2022[d]

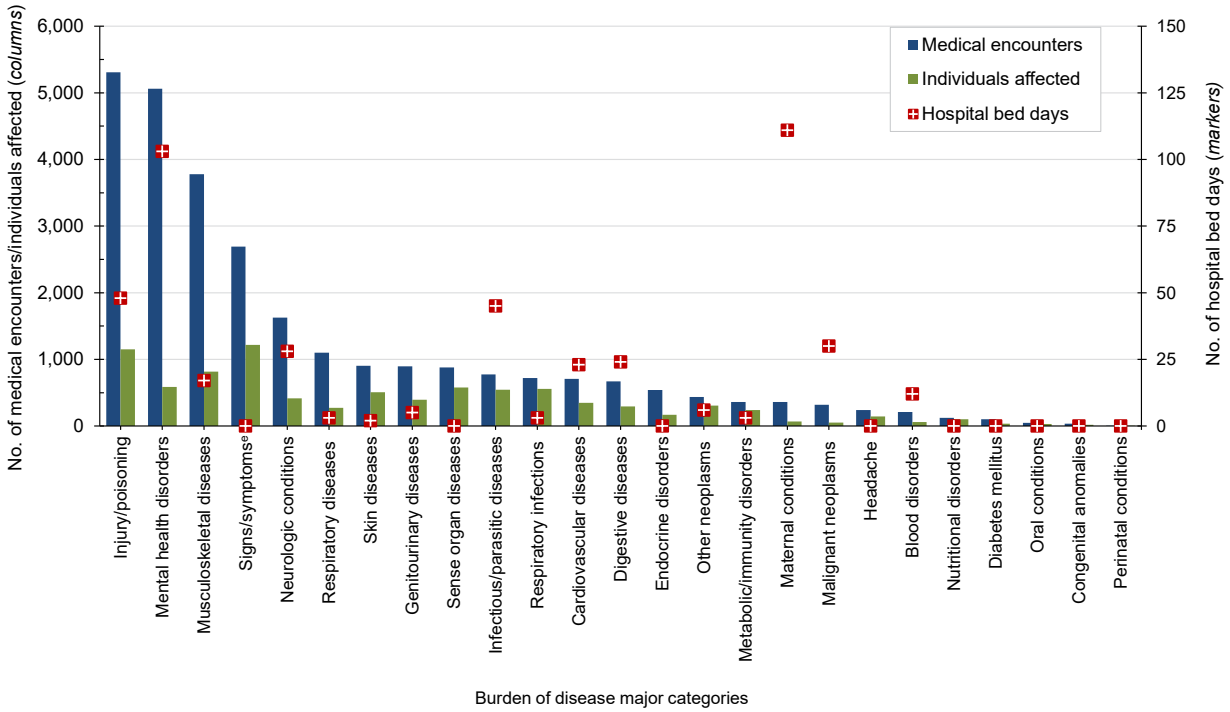
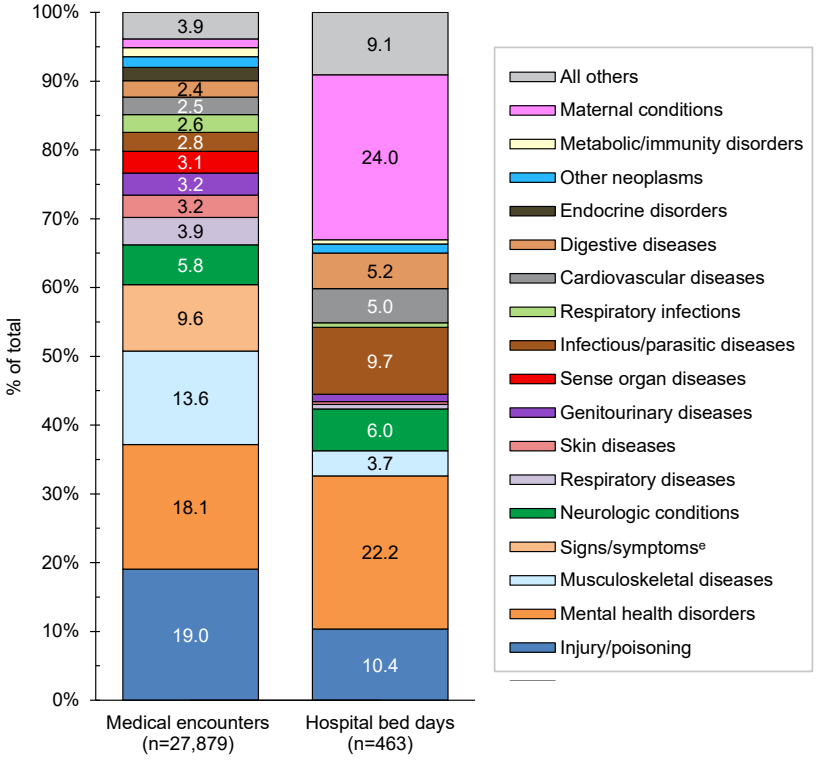


FIGURE 2. Percentages of Medical Encounters[a] and Hospital Bed Days by Burden of Disease Category,[c] U.S. Coast Guard Reserve Component, 2022[d]



Abbreviation: No. number.

[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition) occurring in U.S. military and non-military medical facilities.

[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.

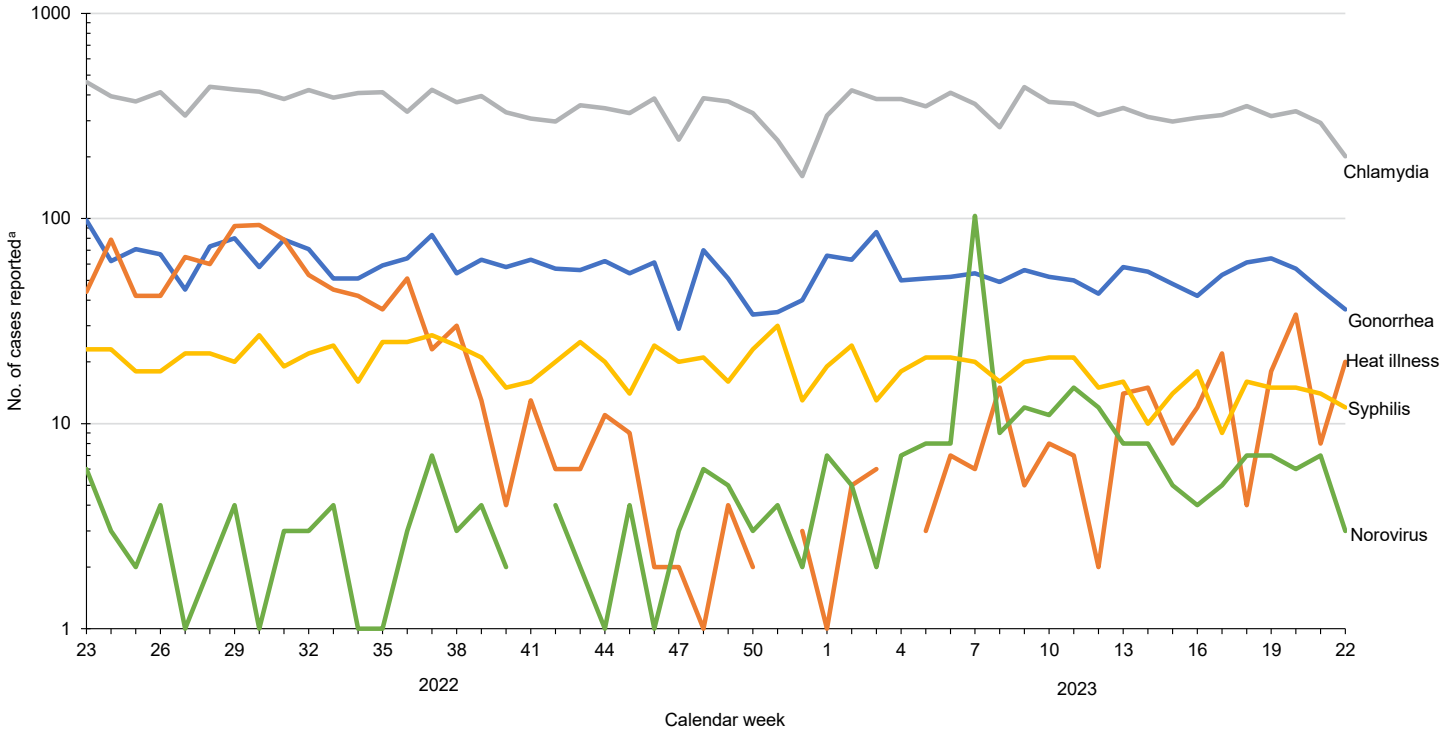
[c]Burden of disease categories are the same as those used for analyses of morbidity burdens in the active component overall (see pp. 2–9).

[d]T2022 is the first year for which data from the DMSS were housed and analyzed from the Military Health System (MHS) Information Platform (MIP). As part of this transition, data quality assessments for completeness and timeliness are underway. Therefore, 2022 data presented in this Surveillance Snapshot are considered provisional but current as of March 23, 2023.

Reportable Medical Events, Military Health System Facilities, Week 22, Ending June 3, 2023

TOP 5 REPORTABLE MEDICAL EVENTS BY CALENDAR WEEK, ACTIVE COMPONENT

(MAY 28, 2022 - JUNE 3, 2023)



Abbreviation: No., number.
[a]Cases are shown on a log scale.
Note: There were 0 heat illness cases in week 51 of 2022 and week 4 of 2023. There were 0 norovirus cases in week 41 of 2022.

Reportable Medical Events (RMEs) are documented in the Disease Reporting System internet (DRSi) by health care providers and public health officials across the Military Health System (MHS) for the purpose of 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 (May 2023) top 5 RMEs, which may differ from previous months. COVID-19 is excluded from these graphs due to changes in reporting/case definition updates in 2023.

References

1. Armed Forces Health Surveillance Division. Armed Forces Reportable Medical Events. Accessed April 6, 2023. https://www.health.mil/Military-Health-Topics/Health-Readiness/AFHSD/Reports-and-Publications/Armed-Forces-Reportable-Medical-Events
2. Defense Manpower Data Center. Department of Defense Active Duty Military Personnel by Rank/Grade of Service, October 31, 2022. 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. https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports
4. Navy Medicine. Surveillance and Reporting Tools–DRSI: Disease Reporting System Internet. 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 June 3, 2023 (Week 22)[a]

Reportable Medical Event[b]	Active component[c]			MHS beneficiaries[d]		
	Apr	May	YTD 2023	YTD 2022	Total, 2022	May
	no.	no.	no.	no.	no.	no.
Amebiasis	2	2	7	5	13	1
Arboviral Diseases, Neuroinvasive and Non-neuroinvasive	0	0	0	1	1	0
Brucellosis	0	0	0	0	2	0
COVID-19 Associated Hospitalization and Death[f]	4	0	60	-	7	3
COVID-19[g]	1,919	551	16,935	138,989	209,958	202
Campylobacteriosis	19	20	98	94	229	12
Chikungunya Virus Disease	0	0	0	1	1	0
Chlamydia trachomatis	1,269	1,370	7,373	8,313	19,400	223
Cholera	0	0	1	0	2	0
Coccidioidomycosis	1	1	10	5	15	2
Cold Weather Injuries[e]	4	2	93	109	151	-
Cryptosporidiosis	4	10	32	18	46	3
Cyclosporiasis	0	1	1	0	10	0
Dengue Virus Infection	0	1	2	0	1	0
Diphtheria	0	0	0	0	0	1
E. coli, Shiga Toxin-Producing	3	11	18	16	67	3
Ehrlichiosis/Anaplasmosis	0	0	0	0	3	1
Giardiasis	6	10	31	32	71	2
Gonorrhea	203	246	1,174	1,457	3,302	28
Haemophilus influenzae, invasive	0	0	0	1	1	0
Hantavirus Disease	0	0	0	0	1	0
Heat Illness[e]	57	75	211	230	1,213	-
Hepatitis A	2	0	4	6	16	2
Hepatitis B	6	12	63	54	118	9
Hepatitis C	3	0	24	18	57	4
Influenza-Associated Hospitalization[h]	0	0	5	13	148	3
Lead Poisoning, Pediatric[i]	-	-	-	-	-	5
Legionellosis	1	0	2	2	4	2
Leishmaniasis	0	0	1	1	1	0
Leptospirosis	0	0	2	0	1	0
Lyme Disease	5	7	27	23	65	9
Malaria	0	2	8	5	26	0
Measles	0	0	0	0	0	1
Meningococcal Disease	1	0	2	0	2	0
Mpox	0	0	0	0	93	0
Norovirus	22	28	257	109	219	37
Pertussis	1	1	3	4	10	8
Post-Exposure Prophylaxis against Rabies	39	50	218	188	509	31
Q Fever	0	0	1	2	3	0
Rubella	0	0	2	2	3	0
Salmonellosis	7	13	34	39	122	5
Schistosomiasis	0	0	0	0	1	0
Severe Acute Respiratory Syndrome (SARS)	0	0	0	1	1	0
Shigellosis	5	8	26	11	33	0
Spotted Fever Rickettsiosis	2	4	18	19	70	2
Syphilis (All)	53	63	360	396	1,042	15
Toxic Shock Syndrome	0	0	1	0	0	0
Trypanosomiasis	0	0	1	1	1	0
Tuberculosis	0	0	2	3	10	1
Tularemia	1	0	1	0	0	0
Typhus Fever	0	0	1	1	1	1
Varicella	2	1	4	3	16	6
Total case counts	3,641	2,489	27,113	150,172	237,066	622

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

[a] RMEs reported through the DRSi as of June 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 April 1, 2023-April 30, 2023 and May 1, 2023-May 31, 2023. Year-to-date comparison is displayed for the period of January 1, 2023-May 31, 2023 for Military Health System facilities. Previous year counts are provided as the following: previous year YTD - 1 January 2022-31 May 2022; total 2022-January 1, 2022-December 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 included in this report include Air Force, Army, Coast Guard, Navy, Marine Corps, and Space Force, including personnel classified as FMP 20 with Duty Status of AD, 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 reportable for active component service members.

[f] Only cases reported after case definition update on May 4, 2023. Includes only cases resulting in hospitalization or death.

[g] Includes all cases of COVID-19 reported through DRSi prior to May 4, 2023.

[h] Influenza-Associated Hospitalization is reportable only for individuals aged 65 years or younger.

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

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