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Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries, Active Component, U.S. Armed Forces, 2021

Perceptions of the relative importance of various health conditions in military populations often determine the natures, extents, and priorities for resources applied to primary, secondary, and tertiary prevention activities. However, these perceptions are inherently subjective and may not reflect objective measures of the relationship between the conditions and their impact on health, fitness, military operational effectiveness, health care costs, and so on.

Several classification systems and morbidity measures have been developed to quantify the "public health burdens" that are attributable to various illnesses and injuries in defined populations and settings.[1] Not surprisingly, different classification systems and morbidity measures lead to different rankings of illness- and injury-specific public health burdens.[2]

For example, in a given population and setting, the illnesses and injuries that account for the most hospitalizations are likely different from those that account for the most outpatient medical encounters. The illnesses and injuries that account for the most medical encounters overall may differ from those that affect the most individuals, have the most debilitating or long-lasting effects, and so on.[2] Thus, in a given population and setting, the classification system or measure used to quantify condition-specific morbidity burdens shapes to a large extent the conclusions that may be drawn regarding the relative importance of various conditions and, in turn, the resources that may be indicated to prevent or minimize their impacts.

This annual summary uses a standard disease classification system (modified for use among U.S. military members) and several health care burden measures to quantify the impacts of various illnesses and injuries among members of the active component of the U.S. Armed Forces in 2021.

METHODS

The surveillance period was 1 January through 31 December 2021. The surveillance population included all individuals who served in the active component of the U.S. Army, Navy, Air Force, or Marine Corps at any time during the surveillance period. All data used in this analysis were derived from records routinely maintained in the Defense Medical Surveillance System (DMSS). These records document both ambulatory encounters and hospitalizations of active component members of the U.S. Armed Forces in fixed military and civilian (if reimbursed through the Military Health System [MHS]) treatment facilities worldwide.

For this analysis, DMSS data for all inpatient and outpatient medical encounters of all active component members during 2021 were summarized according to the primary (first-listed) diagnosis (if reported with an International Classification of Diseases, 10th Revision [ICD-10] code between A00 and T88; U07.0, U07.1 or U09.9; an ICD-10 code beginning with Z37; or Department of Defense [DoD] unique personal history codes DOD0101–DOD0105). 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 "categories" based on a modified version of the classification system developed for the Global Burden of Disease (GBD) Study.[1] The most recently added conditions include COVID-19 and polycystic ovarian syndrome, both of which were added in the 2020 burden analysis. The 2019 *MSMR* analyses grouped illness- and injury-specific diagnoses into 151 conditions, which was an increase over the prior 142 conditions used in previous *MSMR* analyses. The increase to 151 conditions in the 2019 analysis was informed by the review of preliminary results of the 2019 burden analysis which revealed that within 8 of the 22 "all other" conditions, large numbers of medical encounters were attributable to 9 diagnosis codes or groups of codes (cervicalgia, chronic pain, vaginitis and vulvitis, urinary tract infection and cystitis, deviated nasal septum, tinea skin infections, constipation, testicular hypofunction, and gout). Based on this finding, these diagnosis codes or groups of codes were broken out and treated as separate burden of disease-related conditions in the analysis.

In general, the GBD system groups diagnoses with common pathophysiologic or etiologic bases and/or significant international health policymaking importance. In this analysis, some diagnoses that are grouped into single categories in the GBD system (e.g., mental health disorders) were disaggregated to increase the military relevance of the results. Also, injuries were classified by affected anatomic site rather than by cause because external causes of injuries are incompletely reported in military outpatient records.

WHAT ARE THE NEW FINDINGS?

In 2021, as in prior years, the medical conditions associated with the most medical encounters, the largest number of affected service members, and the greatest number of hospital days were in the major categories of injuries, musculoskeletal disorders, and mental health disorders. Despite the pandemic, COVID-19 accounted for less than 2% of total medical encounters and bed days in active component service members.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Injuries, musculoskeletal disorders, and mental health disorders detract from service members' individual readiness and deployability and hinder the ability to execute the missions of the Armed Forces. Continued focus on enhanced measures to prevent and treat such disorders is warranted.

The "morbidity burdens" attributable to various "conditions" were estimated based on the total number of medical encounters attributable to each condition (i.e., total hospitalizations and ambulatory visits for the condition with a limit of 1 encounter per individual per condition per day), numbers of service members affected by each condition (i.e., individuals with at least 1 medical encounter for the condition during the year), and total bed days during hospitalizations for each condition.

RESULTS

Morbidity burden, by category

In 2021, more active component service members (individuals affected) (n=517,491) had medical encounters for injury/poisoning than any other morbidity-related category **(Figure 1a)**. In addition, injury/poisoning accounted for more medical encounters (n=2,657,136) than any other morbidity category and over one-fifth (22.3%) of all medical encounters overall.

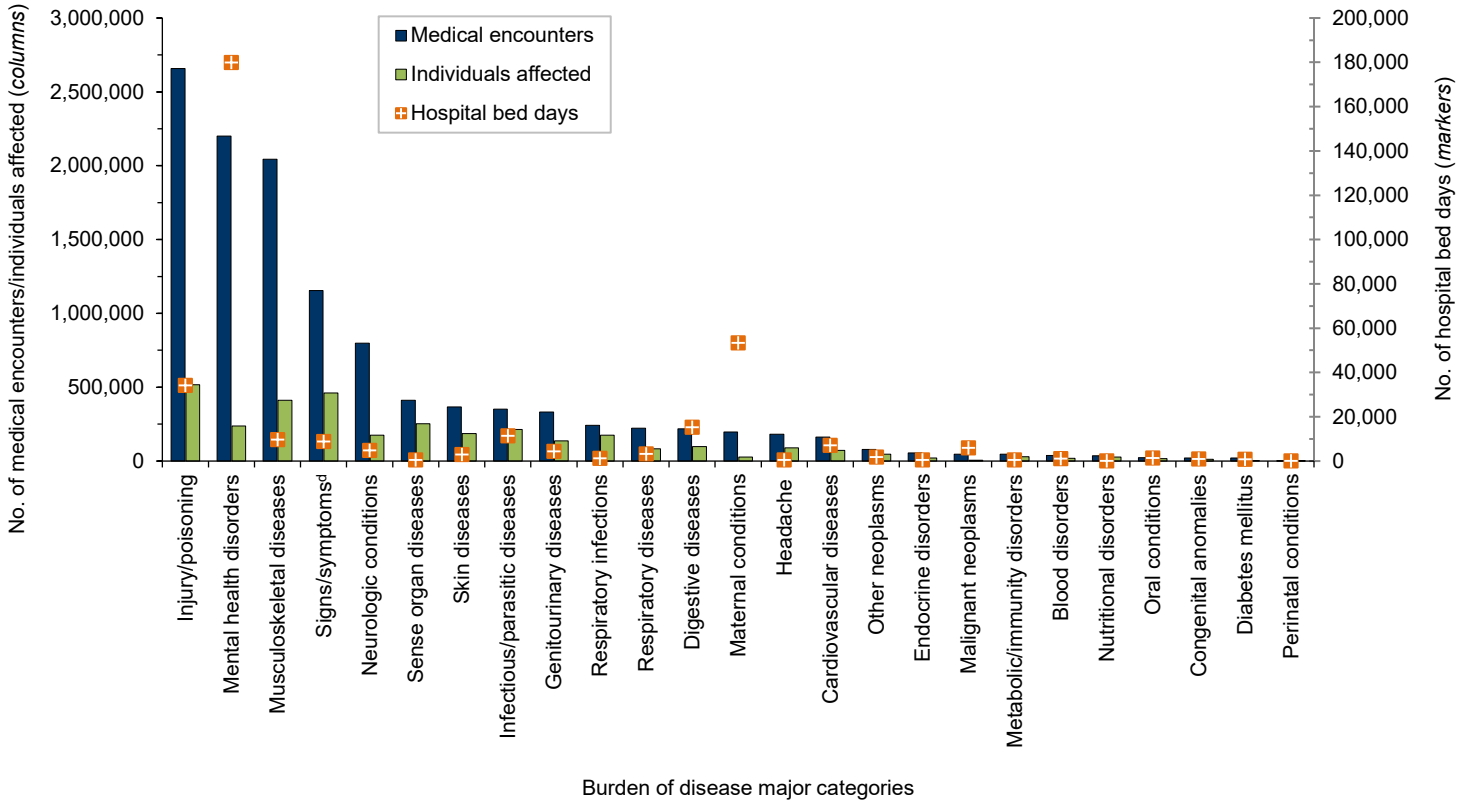
Mental health disorders accounted for more hospital bed days (n=179,986) than any other morbidity category and over half (51.3%) of all hospital bed days overall **(Figures 1a, 1b)**. Together, injury/poisoning and mental health disorders accounted for over three-fifths (61.1%) of all hospital bed days and about two-fifths (40.8%) of all medical encounters.

Of note, maternal conditions (e.g., pregnancy complications and delivery) accounted for a relatively large proportion of all hospital bed days (n=53,295; 15.2%) but a much smaller proportion of medical encounters overall (n=197,106; 1.7%) **(Figures 1a, 1b)**. Routine prenatal visits are not included in this summary.

Medical encounters, by condition

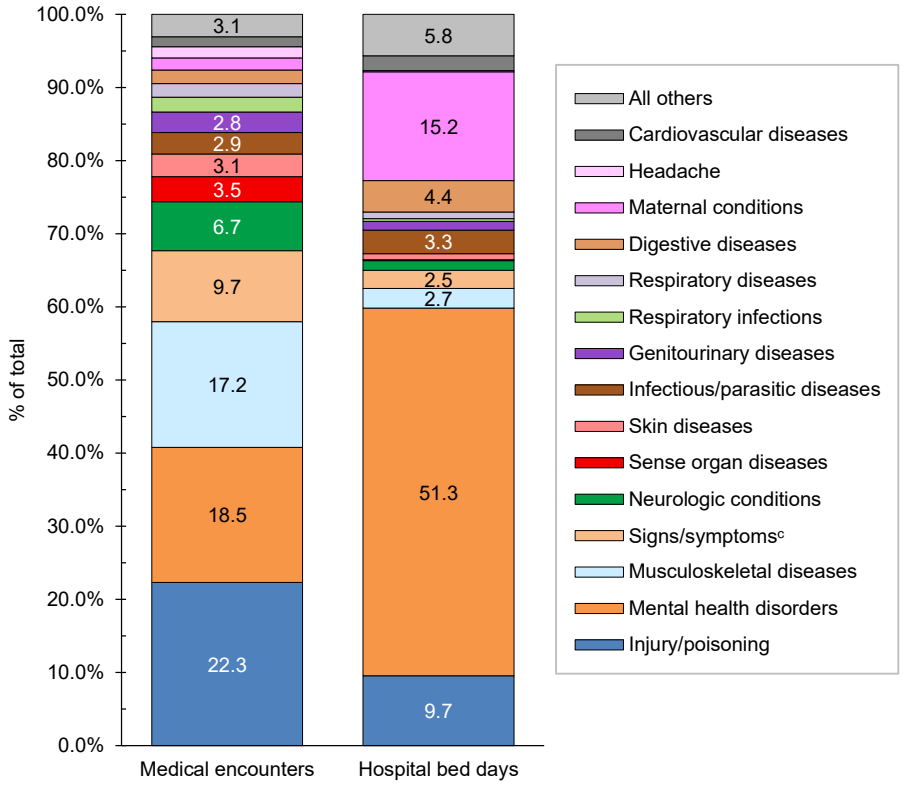
In 2021, the 3 burden of disease-related conditions that accounted for the most medical encounters were other back problems, all other signs and symptoms, and knee injuries. These conditions accounted for slightly more than one-fifth (21.1%) of all illness- and injury-related medical encounters overall **(Figure 2)**. Moreover, the top 9 conditions associated with the most medical encounters accounted for more than half (51.2%) of all illness- and injury-related medical encounters overall. In general, the conditions that accounted for the most medical encounters among active component service members in 2021 were predominantly musculoskeletal diseases (e.g., back problems), injuries (e.g., knee, arm/shoulder, foot/ankle, or leg), mental health disorders (e.g., adjustment disorders, anxiety disorders, mood disorders, or

FIGURE 1a. Numbers of medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] active component, U.S. Armed Forces, 2021



[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.[1]
[d]Includes ill-defined conditions.
No., number.

FIGURE 1b. Percentage of medical encounters[a] and hospital bed days, attributable to burden of disease major categories,[b] active component, U.S. Armed Forces, 2021



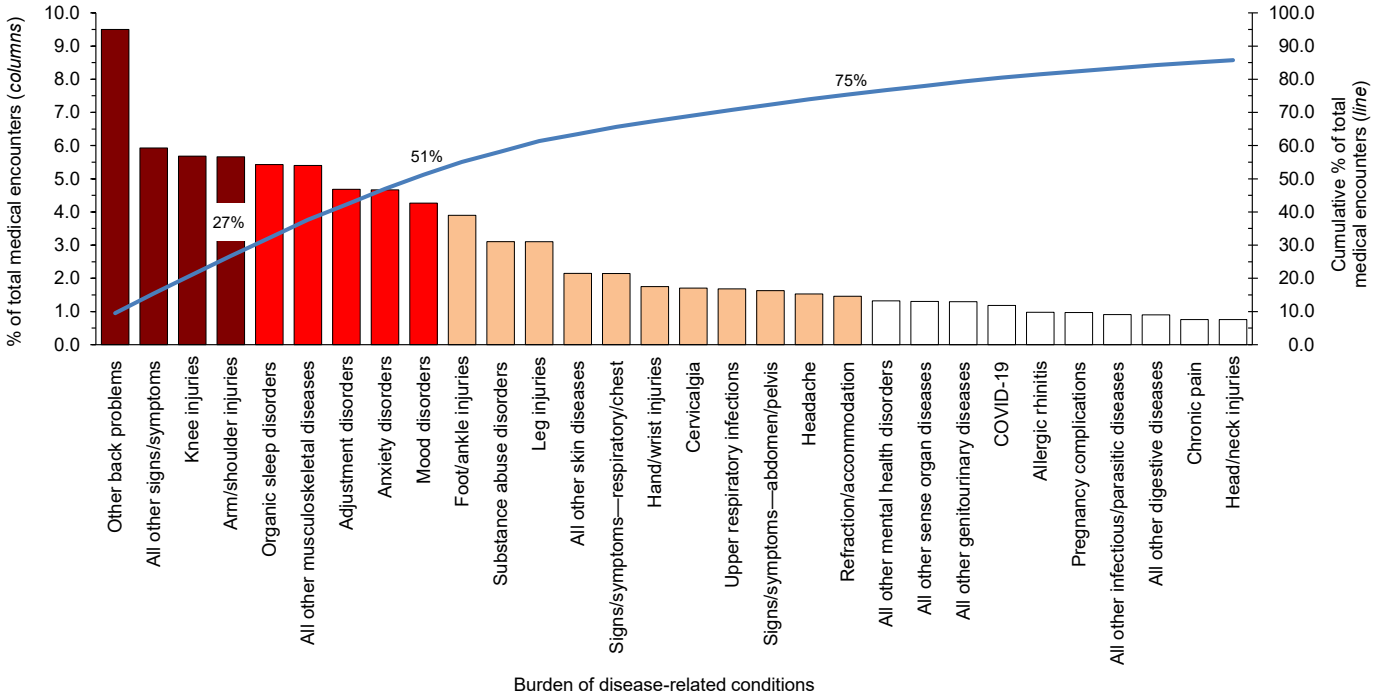
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease Study.[1]
[c]Includes ill-defined conditions.

substance abuse disorders), other signs and symptoms (e.g., dizziness and giddiness, palpitations), and organic sleep disorders (e.g., insomnia, organic sleep apnea) **(Table, Figure 2)**. COVID-19 accounted for 1.2 percent of medical encounters and ranked 24th in total medical encounters during 2021 **(Figure 2, Table)**.

Individuals affected, by condition

In 2021, more active component service members received medical care for all other signs and symptoms than for any other specific condition **(Table)**. Of the top 10 conditions that affected the most service members, 2 were musculoskeletal diseases (other back problems and all other musculoskeletal diseases); 2 were injuries (knee and foot/ankle); 2 were signs and symptoms (all other signs and symptoms and respiratory and chest); 1 was respiratory infections (upper respiratory infections); 1 was a neurological condition (organic sleep disorders); 1 was a sense organ disease (refraction/accommodation); and 1 was skin diseases (all other skin diseases). A total of 92,061 active component service members received care for COVID-19,

FIGURE 2. Percentage and cumulative percentage distribution, burden of disease-related conditions[a] that accounted for the most medical encounters, active component, U.S. Armed Forces, 2021



[a]Burden of disease-related conditions based on a modified version of those defined in the Global Burden of Disease Study.[1]

TABLE. Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2021

Major category condition[a]	Medical encounters[b]		Individuals affected[c]		Bed days	
	No.	Rank[d]	No.	Rank[d]	No.	Rank[d]
Injury and poisoning						
Knee injuries	676,518	(3)	146,252	(6)	900	(42)
Arm and shoulder injuries	674,129	(4)	134,978	(11)	2,569	(26)
Foot and ankle injuries	464,212	(10)	135,475	(10)	2,035	(29)
Leg injuries	369,528	(12)	93,667	(15)	4,866	(14)
Hand and wrist injuries	208,437	(15)	77,537	(19)	1,000	(39)
Head and neck injuries	90,120	(30)	47,603	(26)	6,494	(9)
Back and abdomen injuries	48,113	(36)	28,177	(36)	4,140	(17)
Other complications NOS	34,962	(44)	20,691	(41)	6,186	(12)
Other injury from external causes	31,414	(45)	16,736	(50)	477	(60)
Environmental	23,134	(53)	17,036	(49)	618	(53)
Unspecified injury	21,892	(56)	15,280	(56)	1,211	(37)
Poisoning, nondrug	5,241	(102)	3,546	(94)	353	(67)
Poisoning, drugs	3,773	(111)	1,999	(105)	3,121	(22)
All other injury	3,002	(118)	2,533	(100)	60	(99)
Other burns	1,505	(125)	770	(115)	127	(87)
Other superficial injury	1,142	(127)	676	(116)	2	(142)
Underdosing	14	(153)	13	(152)	0	(146)
Mental health disorders						
Adjustment disorders	557,522	(7)	110,693	(13)	38,269	(3)
Anxiety disorders	555,551	(8)	88,177	(18)	20,567	(5)
Mood disorders	507,969	(9)	60,752	(22)	61,413	(1)
Substance abuse disorders	369,664	(11)	30,230	(33)	48,106	(2)
All other mental health disorders	157,283	(21)	52,605	(25)	2,374	(27)
Personality disorders	20,108	(62)	3,623	(93)	2,570	(25)
Psychotic disorders	18,373	(65)	1,861	(107)	6,337	(10)
Somatoform disorders	7,735	(94)	2,575	(98)	338	(70)
Tobacco dependence	5,650	(101)	3,860	(91)	12	(129)
Musculoskeletal diseases						
Other back problems	1,131,009	(1)	235,666	(2)	4,173	(16)
All other musculoskeletal diseases	643,073	(6)	220,122	(3)	4,220	(15)
Cervicalgia	203,082	(16)	56,037	(23)	23	(120)
Osteoarthritis	39,694	(42)	18,695	(45)	757	(45)
Other knee disorders	12,156	(79)	5,461	(77)	358	(66)
Other shoulder disorders	10,002	(84)	4,560	(82)	82	(95)
Rheumatoid arthritis	4,070	(109)	1,247	(110)	6	(133)
Signs/symptoms						
All other signs and symptoms	705,815	(2)	319,927	(1)	7,234	(8)
Respiratory and chest	255,371	(14)	151,154	(5)	736	(48)
Abdomen and pelvis	193,902	(18)	115,485	(12)	924	(40)
Neurologic conditions						
Organic sleep disorders	646,223	(5)	144,280	(7)	342	(69)
Chronic pain	90,129	(29)	28,646	(35)	173	(82)
All other neurologic conditions	39,312	(43)	14,320	(58)	3,324	(21)
Other mononeuritis - upper and lower limbs	12,955	(76)	6,509	(74)	35	(113)
Epilepsy	6,010	(99)	1,809	(108)	741	(46)
Multiple sclerosis	3,143	(116)	505	(124)	132	(85)
Parkinson disease	240	(146)	50	(145)	4	(137)
Sense organ diseases						
Refraction/accommodation	173,793	(20)	143,876	(8)	4	(137)
All other sense organ diseases	155,204	(22)	94,045	(14)	448	(62)
Hearing disorders	69,554	(32)	41,737	(27)	1	(144)
Glaucoma	10,639	(82)	6,643	(73)	3	(139)
Cataracts	1,530	(123)	814	(114)	0	(146)
Skin diseases						
All other skin diseases	255,855	(13)	139,943	(9)	2,869	(24)
Sebaceous gland diseases	66,661	(33)	35,563	(30)	59	(100)
Contact dermatitis	43,757	(40)	30,773	(32)	31	(116)
Infectious and parasitic diseases						
COVID-19	140,828	(24)	92,061	(16)	6,291	(11)
All other infectious and parasitic diseases	108,049	(27)	72,678	(21)	4,125	(18)
Unspecified viral infection	29,180	(48)	26,152	(38)	59	(100)
Tinea skin infections	23,303	(52)	18,525	(46)	3	(139)

TABLE (cont). Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2021

Major category condition[a]	Medical encounters[b]		Individuals affected[c]		Bed days	
	No.	Rank[d]	No.	Rank[d]	No.	Rank[d]
Infectious and parasitic diseases (cont.)						
Chlamydia	16,012	(70)	12,862	(60)	19	(124)
STDs (excluding chlamydia)	15,280	(71)	10,946	(65)	125	(89)
Diarrheal diseases	15,237	(72)	13,176	(59)	629	(52)
Hepatitis B and C	1,528	(124)	620	(118)	0	(146)
Tuberculosis	615	(133)	273	(132)	69	(97)
Intestinal nematode infection	308	(141)	269	(133)	0	(146)
Malaria	256	(144)	168	(136)	54	(104)
Bacterial meningitis	91	(150)	28	(150)	49	(108)
Tropical cluster	50	(152)	30	(149)	1	(144)
Genitourinary diseases						
All other genitourinary diseases	154,270	(23)	75,927	(20)	1,537	(32)
Female genital pain	45,882	(37)	19,810	(42)	51	(106)
Menstrual disorders	29,754	(47)	18,182	(47)	409	(63)
UTI and cystitis	26,355	(50)	19,586	(43)	240	(76)
Other breast disorders	22,840	(55)	11,765	(63)	244	(73)
Vaginitis and vulvitis	21,562	(58)	15,553	(54)	12	(129)
Kidney stones	16,275	(69)	6,722	(72)	479	(59)
Nephritis and nephrosis	12,088	(80)	4,711	(81)	1,316	(34)
Benign prostatic hypertrophy	3,811	(110)	2,323	(102)	67	(98)
Respiratory infections						
Upper respiratory infections	200,309	(17)	152,579	(4)	384	(64)
Lower respiratory infections	23,057	(54)	16,516	(51)	901	(41)
Otitis media	18,971	(64)	14,802	(57)	5	(136)
Respiratory diseases						
Allergic rhinitis	116,283	(25)	41,352	(28)	15	(126)
All other respiratory diseases	49,393	(35)	27,762	(37)	2,881	(23)
Asthma	27,424	(49)	11,995	(62)	202	(79)
Deviated nasal septum	13,429	(75)	7,082	(71)	145	(84)
Chronic sinusitis	12,781	(78)	7,136	(70)	53	(105)
Chronic obstructive pulmonary disease	3,267	(113)	2,682	(97)	22	(122)
Digestive diseases						
All other digestive diseases	107,028	(28)	54,820	(24)	8,669	(7)
Esophagus disease	43,940	(39)	25,441	(39)	569	(55)
Other gastroenteritis and colitis	30,650	(46)	15,448	(55)	1,830	(30)
Constipation	17,557	(66)	12,621	(61)	72	(96)
Inguinal hernia	10,452	(83)	4,297	(85)	202	(79)
Appendicitis	6,270	(98)	2,911	(96)	3,638	(19)
Peptic ulcer disease	1,302	(126)	816	(113)	243	(75)
Cirrhosis of the liver	490	(138)	139	(139)	94	(93)
Maternal conditions						
Pregnancy complications	115,408	(26)	23,673	(40)	30,149	(4)
All other maternal disorders	43,179	(41)	11,278	(64)	5,753	(13)
Delivery	20,837	(60)	10,942	(66)	15,794	(6)
Ectopic/miscarriage/abortion	9,459	(86)	4,030	(89)	366	(65)
Puerperium complications	8,223	(91)	4,006	(90)	1,233	(36)
Headache						
Headache	182,044	(19)	88,938	(17)	589	(54)
Cardiovascular diseases						
All other cardiovascular diseases	76,864	(31)	36,630	(29)	3,429	(20)
Essential hypertension	65,752	(34)	33,999	(31)	477	(60)
Cerebrovascular disease	9,328	(87)	1,995	(106)	2,166	(28)
Ischemic heart disease	7,545	(96)	2,978	(95)	737	(47)
Inflammatory	3,147	(115)	1,481	(109)	348	(68)
Rheumatic heart disease	697	(131)	606	(120)	15	(126)
Other neoplasms						
All other neoplasms	44,701	(38)	29,139	(34)	1,308	(35)
Benign skin neoplasm	19,916	(63)	15,751	(52)	2	(142)
Lipoma	9,595	(85)	5,642	(76)	23	(120)
Uterine leiomyoma	5,095	(103)	2,361	(101)	552	(56)
Endocrine disorders						
Hypothyroidism	16,287	(68)	7,579	(69)	44	(109)
Testicular hypofunction	14,434	(74)	5,340	(78)	0	(146)
Other thyroid disorders	12,869	(77)	4,755	(80)	250	(72)

TABLE (cont). Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2021

Major category condition[a]	Medical encounters[b]		Individuals affected[c]		Bed days	
	No.	Rank[d]	No.	Rank[d]	No.	Rank[d]
Endocrine disorders (cont.)						
All other endocrine disorders	8,017	(93)	4,043	(88)	186	(81)
Polycystic ovarian syndrome	3,625	(112)	2,094	(104)	3	(139)
Malignant neoplasms						
All other malignant neoplasms	7,108	(97)	1,102	(112)	1,636	(31)
Lymphoma and multiple myeloma	6,009	(100)	633	(117)	510	(57)
Melanoma and other skin cancers	4,929	(104)	2,148	(103)	57	(102)
Breast cancer	4,878	(105)	432	(128)	100	(92)
Leukemia	4,866	(106)	326	(130)	1,022	(38)
Testicular cancer	4,217	(108)	608	(119)	283	(71)
Colon and rectum cancers	3,188	(114)	286	(131)	663	(49)
Brain cancer	3,113	(117)	218	(135)	787	(43)
Thyroid cancer	1,898	(120)	448	(127)	132	(85)
Mouth and oropharynx cancers	1,584	(121)	158	(138)	208	(78)
Prostate cancer	1,116	(128)	222	(134)	35	(113)
Cervix uteri cancer	1,061	(129)	452	(126)	28	(117)
Trachea, bronchus, and lung cancers	638	(132)	70	(141)	119	(90)
Stomach cancer	433	(139)	43	(146)	114	(91)
Bladder cancer	352	(140)	63	(142)	36	(112)
Esophagus cancer	285	(142)	13	(152)	22	(122)
Liver cancer	254	(145)	36	(147)	10	(131)
Ovary cancer	233	(147)	52	(144)	15	(126)
Pancreas cancer	229	(148)	32	(148)	127	(87)
Corpus uteri cancer	55	(151)	20	(151)	0	(146)
Metabolic and immunity disorders						
Lipoid metabolism disorders	24,959	(51)	18,824	(44)	44	(109)
Other metabolic disorders	8,289	(90)	4,507	(84)	496	(58)
Gout	7,649	(95)	3,687	(92)	32	(115)
Immunity disorders	4,742	(107)	2,555	(99)	9	(132)
Blood disorders						
All other blood disorders	10,744	(81)	4,980	(79)	662	(50)
Iron-deficiency anemia	9,012	(88)	4,131	(87)	84	(94)
Hereditary anemias	8,728	(89)	6,342	(75)	50	(107)
Other non-deficiency anemias	8,097	(92)	4,271	(86)	244	(73)
Other deficiency anemias	790	(130)	464	(125)	6	(133)
Nutritional disorders						
All other nutritional disorders	21,803	(57)	18,115	(48)	28	(117)
Overweight, obesity	14,491	(73)	10,648	(67)	27	(119)
Protein-energy malnutrition	257	(143)	105	(140)	44	(109)
Oral conditions						
All other oral conditions	21,147	(59)	15,637	(53)	1,341	(33)
Dental caries	602	(134)	544	(121)	0	(146)
Periodontal disease	542	(135)	509	(123)	6	(133)
Congenital anomalies						
All other congenital anomalies	16,971	(67)	10,044	(68)	634	(51)
Congenital heart disease	2,616	(119)	1,165	(111)	149	(83)
Other circulatory anomalies	1,544	(122)	525	(122)	210	(77)
Diabetes mellitus						
Diabetes mellitus	20,630	(61)	4,524	(83)	765	(44)
Conditions arising during the perinatal period[e]						
All other perinatal anomalies	510	(136)	327	(129)	57	(102)
Low birth weight	508	(137)	162	(137)	0	(146)
Birth asphyxia and birth trauma	97	(149)	62	(143)	19	(124)

[a]Burden of disease major categories and burden of disease-related conditions based on a modified version of those defined in the Global Burden of Disease Study.[1]
[b]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[c]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[d]Rank is based on the number of encounters, individuals affected, or hospital bed days in the respective columns within the listing of 153 burden-related disease conditions. For individuals affected, 1 pair of tied values (n=13) were given the same ranking (152). For hospital bed days, there were 8 conditions whose value was 0, so they were tied for the same (and lowest) ranking in the listing of 153 conditions. Accordingly, these 8 conditions share the ranking of 146 and there are no conditions ranked 147–153 for the column of hospital bed days.
[e]Conditions affecting newborns erroneously coded on service member medical records.
No., number; NOS, not otherwise specified; UTI, urinary tract infection; STDs, sexually transmitted diseases.

which ranked 16th in the number of service members affected as compared to all other conditions.

Hospital bed days, by condition

In 2021, mood and substance abuse disorders accounted for nearly one-third (31.2%) of all hospital bed days **(Figure 3)**. Together, 4 mental health disorders (mood, substance abuse, adjustment, and anxiety) and 2 maternal conditions (pregnancy complications and delivery) accounted for more than three-fifths (61.1%) of all hospital bed days **(Table, Figure 3)**. About 10 percent (9.7%) of all hospital bed days were attributable to injuries and poisonings. A total of 6,291 bed days were attributable to COVID-19 which was ranked 11th among all conditions for bed days **(Table)**.

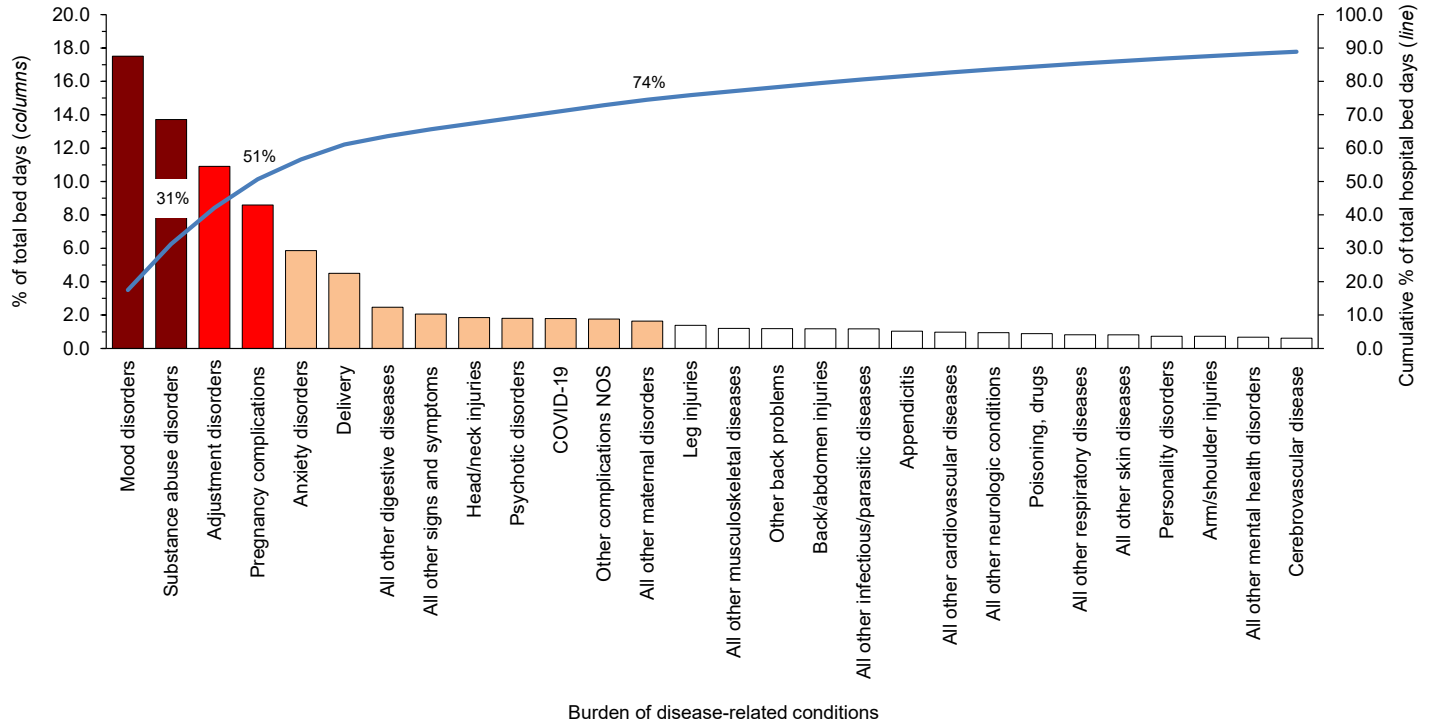
Relationships between health care burden indicators

There was a strong positive correlation between the number of medical encounters attributable to various conditions and the number of individuals affected by the conditions (r=0.87) **(data not shown)**. For example, the 3 leading causes of medical encounters were among the 6 conditions that affected the most individuals **(Table)**. In contrast, there were weak to moderate positive relationships between the hospital bed days attributable to conditions and either the numbers of individuals affected by (r=0.20) or medical encounters attributable to (r=0.41) the same conditions. For example, substance abuse disorders and labor and delivery were among the top-ranking conditions in terms of proportion of total hospital bed days; however, these conditions affected relatively few active component service members.

EDITORIAL COMMENT

This report reiterates the major findings of prior annual reports on morbidity and health care burdens among U.S. military members. In 2021, as in prior years, the burden of disease categories of musculoskeletal diseases, injury and poisoning, mental health disorders, and maternal conditions accounted for relatively large proportions of the morbidity and health care burdens that affected active component service members. Of the 153 burden of disease-related conditions, just 9 (6.0%) accounted for slightly more than half of all illness- and injury-related medical encounters of active component members. These conditions included 2 musculoskeletal conditions (other back problems and all other musculoskeletal diseases), 2 anatomic site-defined injuries (knee and arm/shoulder), organic sleep disorders, all other signs and symptoms, and 3 mental health disorders (adjustment, anxiety, and mood disorders). It is important to note that this pattern of illness and injury among U.S. active component members is distinctive from other population groups characterized by different demographic distributions and occupational hazards. Examples of such different populations include not only the general

FIGURE 3. Percentage and cumulative percentage distribution, burden of disease-related conditions[a] that accounted for the most hospital bed days, active component, U.S. Armed Forces, 2021



[a]Burden of disease-related conditions based on a modified version of those defined in the Global Burden of Disease Study.[1]
NOS, not otherwise specified.

U.S. population but also other MHS beneficiaries such as family members and retirees. The differing burdens of disease and injury for the other MHS beneficiaries are described in another article in this issue of the *MSMR*.[3]

Although 2021 was impacted by the COVID-19 pandemic, COVID-19 accounted for relatively modest numbers of medical encounters, bed days, and service members affected as compared to other conditions included in this analysis. This is likely due to several factors including the robust mitigation measures employed by the DoD to prevent COVID-19 infections and the fact that active component service members represent a relatively young and healthy population.

Mental health disorders (including substance abuse disorders), injuries, and musculoskeletal disorders of the back have been leading causes of morbidity and disability among service members throughout military history.[4–10] It is well recognized that the prevention, treatment, and rehabilitation of back problems and joint injuries, and the detection, characterization, and management of mental health disorders—including substance abuse and deployment stress-related disorders (e.g., post-traumatic stress disorder)—should be the highest priorities for military medical research, public health, and force health protection programs.

In summary, this analysis, similar to prior years, documents that relatively few illnesses and injuries account for a substantial proportion of morbidity and health care burdens that affect U.S. military members. Illnesses and injuries that disproportionately contribute to morbidity and health care burdens should be high-priority targets for preventive action, research, and resources.

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Hospitalizations, Active Component, U.S. Armed Forces, 2021

This report documents the frequencies, rates, trends, and distributions of hospitalizations of active component members of the U.S. Army, Navy, Air Force, and Marine Corps during calendar year 2021. Summaries are based on standardized records of hospitalizations at U.S. military and non-military (reimbursed care) medical facilities worldwide. For this report, primary (first-listed) discharge diagnoses are considered indicative of the primary reasons for hospitalizations; summaries are based on the first 3 digits of the International Classification of Diseases, 10th Revision (ICD-10), used to report primary discharge diagnoses. Hospitalizations not routinely documented with standardized, automated records (e.g., during field training exercises or while shipboard) are not centrally available for health surveillance purposes and thus are not included in this report.

Frequencies, rates, and trends

In 2021, there were 64,062 records of hospitalizations of active component members of the U.S. Army, Navy, Air Force, and Marine Corps **(Table 1)**; 36.6% of the hospitalizations were in non-military facilities **(data not shown)**. The annual hospitalization rate (all causes) for 2021 was 48.0 per 1,000 service member person-years (p-yrs) **(Table 1)**. This rate was the second lowest of the years covered in this report (2012–2021), during which rates fell steadily each year until 2019 when the rate (52.3 per 1,000 p-yrs) exceeded that of 2018 (51.0 per 1,000 p-yrs) (**Figure 1**). The lowest rate of the surveillance period (47.8 per 1,000 p-yrs) was in 2020.

WHAT ARE THE NEW FINDINGS?

The hospitalization rate in 2021 was 48.0 per 1,000 person-years (p-yrs), the second lowest rate of the most recent 10 years. For hospitalizations limited to military facilities, the rate in 2021 was the lowest for the entire period. As in prior years, the majority (71.2%) of hospitalizations were associated with diagnoses in the categories of mental health disorders, pregnancy-related conditions, injury/poisoning, and digestive system disorders.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Not only are mental health disorders the most common diagnoses associated with hospitalizations, they are associated with the longest median hospital stay (6 days). Moreover, 5% of hospitalizations for mental health disorders had durations of stay greater than 30 days. Prolonged hospitalizations, subsequent aftercare, and early attrition because of such common disorders can have a negative impact on individual and unit operational readiness.

TABLE 1. Numbers, rates,[a] and ranks[b] of hospitalizations, by ICD-10 major diagnostic category, active component, U.S. Armed Forces, 2021

	2021		
Major diagnostic category (ICD-10)	No.	Rate[a]	Rank[b]
Mental disorders (F01-F99)	20,053	15.0	(1)
Pregnancy and delivery (O00-O9A, relevant Z codes)[c]	14,989	64.9	(2)
Injury and poisoning (S00-T88, DOD0101-DOD0105)	5,573	4.2	(3)
Digestive system (K00-K95)	4,992	3.7	(4)
Musculoskeletal system (M00-M99)	3,769	2.8	(5)
Signs, symptoms, and ill-defined conditions (R00-R99)	2,597	1.9	(6)
Other (Z00–Z99, except pregnancy-related)[d]	1,654	1.2	(7)
Genitourinary system (N00-N99)	1,605	1.2	(8)
Circulatory system (I00-I99)	1,585	1.2	(9)
Nervous system and sense organs (G00-G99, H00-H95)	1,229	0.9	(10)
Neoplasms (C00-D49)	1,212	0.9	(11)
Respiratory system (J00-J99, U07.0)	1,188	0.9	(12)
COVID-19 (U07.1, U09.9)	990	0.7	(13)
Infectious and parasitic diseases (A00-B99)	911	0.7	(14)
Skin and subcutaneous tissue (L00-L99)	676	0.5	(15)
Endocrine, nutrition, immunity (E00-E89)	527	0.4	(16)
Hematologic and immune disorders (D50-D89)	283	0.2	(17)
Congenital anomalies (Q00-Q99)	229	0.2	(18)
Total	64,062	48.0	

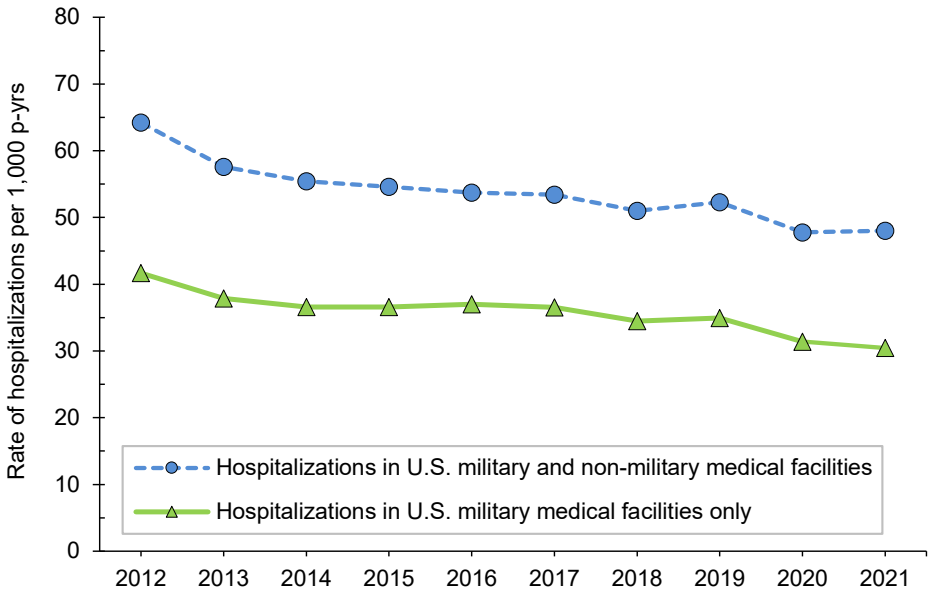
[a]Rate per 1,000 person-years.
[b]Rank of major diagnostic category based on number of hospitalizations.
[c]Rate of pregnancy and delivery-related hospitalizations among females only.
[d]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number.

Hospitalizations, by illness and injury categories

In 2021, 4 diagnostic categories accounted for 71.2% of all hospitalizations of active component members: mental health disorders (31.3%), pregnancy- and delivery-related conditions (23.4%), injury/poisoning (8.7%), and digestive system disorders (7.8%) **(Table 1)**. Similar to 2017 and 2019, in 2021 there were more hospitalizations for mental health disorders than for any other major diagnostic category (per ICD-10); 2009 was the last year in which the number of hospitalizations for pregnancy- and delivery-related conditions exceeded the number for mental health disorders **(data not shown)**.

Comparing 2021 to 2017, numbers of hospitalizations decreased in all major categories of illnesses and injuries except for mental health disorders, which increased 10.3% **(data not shown)**. The largest drop in the number of hospitalizations during 2017–2021 was seen in the ICD diagnostic category musculoskeletal system and

FIGURE 1. Rates of hospitalization, by year, active component, U.S. Armed Forces, 2012–2021



P-yrs, person-years.

connective tissue (hospitalization difference, 2017–2021: -1,544; 29.1% decrease) **(data not shown)**.

Hospitalizations, by sex

In 2021, the hospitalization rate (all causes) among female service members was more than 3 times that of male service members (113.0 per 1,000 p-yrs and 33.5 per 1,000 p-yrs, respectively). Excluding pregnancy and delivery, the rate of hospitalizations among female service members (48.1 per 1,000 p-yrs) was 43.6% higher than among male service members **(data not shown)**.

Overall hospitalization rates were higher (i.e., the rate difference [RD] was greater than 1.0 per 1,000 p-yrs) among female than male service members for mental health disorders (female:male, RD: 8.3 per 1,000 p-yrs); genitourinary disorders (RD: 2.6 per 1,000 p-yrs); and neoplasms (RD: 1.3 per 1,000 p-yrs) **(data not shown)**. With the exception of pregnancy- and delivery-related conditions, hospitalization rates were relatively similar among male and female service members for the remaining 14 major disease-specific categories **(data not shown)**.

Relationships between age and hospitalization rates varied considerably across illness- and injury-specific categories. For example, among both male and female service members, hospitalization rates generally increased with age for neoplasms, musculoskeletal system/connective tissue disorders, COVID-19, and genitourinary, circulatory, digestive, nervous, and endocrine/nutrition/immunity disorders **(Figure 2)**. Among service members aged 30 or older, there were pronounced differences by sex in the slopes of the rates of neoplasms, and genitourinary, hematologic/immune, and endocrine/nutrition/immunity disorders; the slopes and rates among female service members were notably higher than among male service members in the same age groups. Rates decreased with increasing age for mental health disorders, but were relatively stable across age groups for injury/poisoning, signs/symptoms/ill-defined conditions, respiratory system disorders, and infectious/parasitic diseases.

Most frequent diagnoses

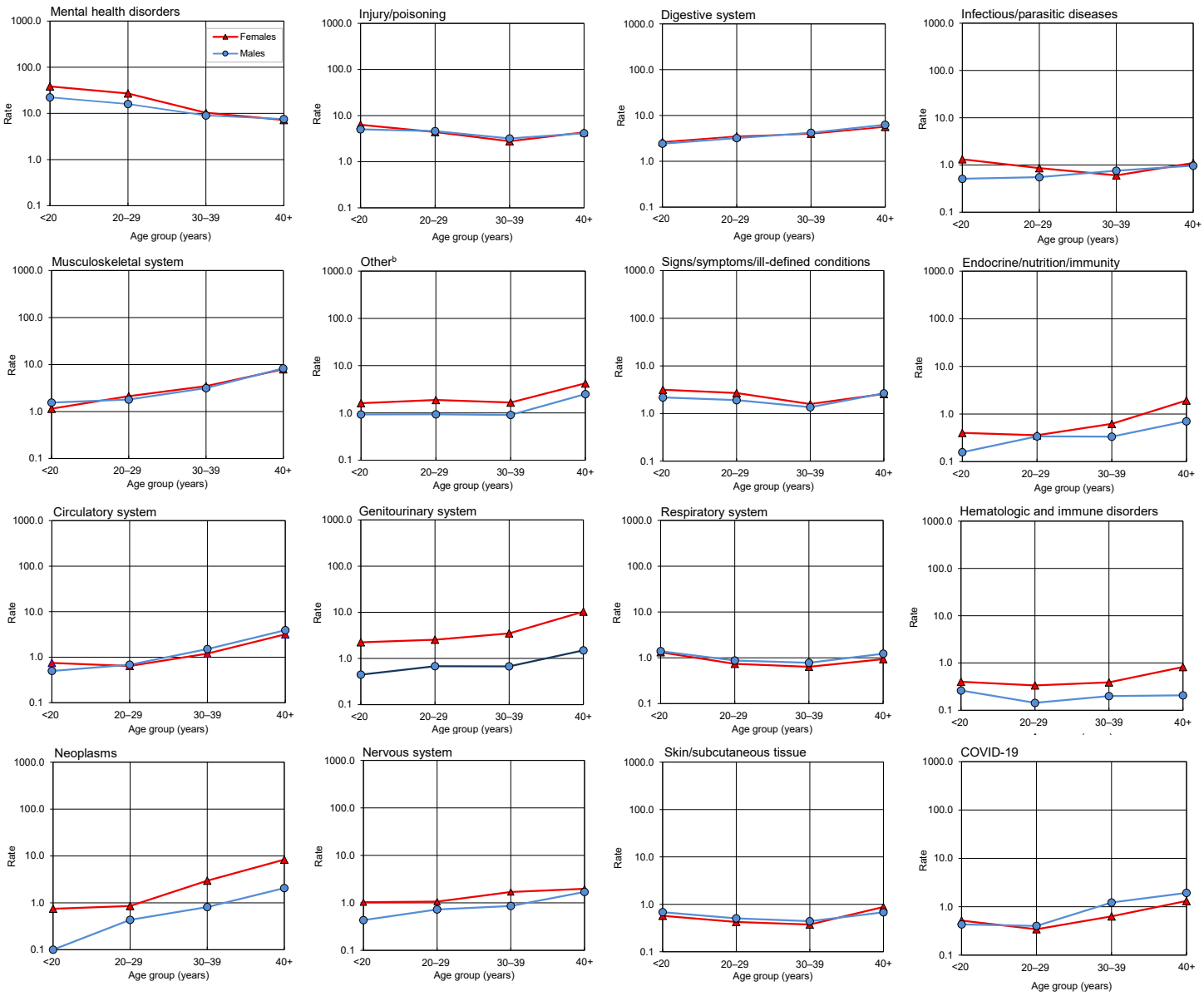
In 2021, adjustment disorder was the most frequent discharge diagnosis among male service members (n=4,960) **(Table 2)**. Alcohol dependence (n=2,354), recurrent major depressive disorder [severe without psychotic features] (n=1,343), single episode major depressive disorder [unspecified] (n=1,226), acute appendicitis (n=1,022), other symptoms and signs involving emotional state (n=633), and post-traumatic stress disorder (PTSD) (n=597) were the next 6 most frequent diagnoses in male service members **(Table 2)**.

The most frequent discharge diagnosis among female service members in 2021 was adjustment disorder (n=1,544). Pregnancy- and delivery-related conditions represented the next 5 leading causes of hospitalizations among female service members, and this category alone accounted for more than one-half (57.4%) of all hospitalizations of females **(Table 3)**. The top 5 discharge diagnoses in this condition category included post-term (late) pregnancy (n=1,121), abnormality in fetal heart rate and rhythm (n=963), maternal care due to uterine scar from previous surgery (n=833), premature rupture of membranes [onset of labor within 24 hours of rupture] (n=721), and gestational hypertension complicating delivery (n=705). After the top 6 discharge diagnoses described above for female service members, the other leading causes of hospitalizations were recurrent major depressive disorder [severe without psychotic features] (n=563), PTSD (n=501), single episode major depressive disorder [unspecified] (n=459), and alcohol dependence (n=303). Combined, mental health disorder diagnoses accounted for nearly one-fifth (19.4%) of all hospitalizations of female service members.

Injury/poisoning

As in the past, in 2021, injury/poisoning was the third leading cause of hospitalizations of U.S. military members **(Table 1)**. Among male service members, injury/poisoning-related hospitalizations were most often related to unspecified injury, infection following a procedure, other fractures of the lower leg, concussion, or heatstroke/sunstroke **(Table 2)**. Among female service members, injury/poisoning-related hospitalizations were most often related to unspecified injury, poisoning by/adverse effect of/underdosing of other and unspecified antidepressants, infection following a procedure, poisoning by/adverse effect of/underdosing of 4-aminophenol derivatives (e.g., acetaminophen), or other fractures of the lower leg **(Table 3)**.

FIGURE 2. Rates[a] of hospitalization, by ICD-10 major diagnostic category, age group, and sex, active component, U.S. Armed Forces, 2021



[a]Rate per 1,000 person-years; rates are shown on semi-log plots.
[b]Other factors influencing health status and contact with health services (Z00–Z99, excluding pregnancy-related).
ICD, International Classification of Diseases; COVID-19, coronavirus disease 2019.

Durations of hospitalizations

During 2012–2021, the median duration of hospital stays (all causes) remained stable at 3 days **(Figure 3)**. As in previous years, medians and ranges of durations of hospitalizations varied considerably across major diagnostic categories. For example, median lengths of hospitalizations varied from 2 days (e.g., musculoskeletal system disorders; genitourinary system disorders; signs, symptoms, and ill-defined conditions) to 6 days (mental health disorders). For more than one-half of the ICD diagnostic categories, less than 5% of hospitalizations exceeded 10 days, but for 8 categories, 5% of hospitalizations had longer durations: circulatory system disorders (13 days), infectious/parasitic diseases (14 days), COVID-19 (18 days), nervous system/sense organ disorders (19 days), injury/poisoning (19 days), neoplasms (25 days), mental health disorders (30 days), and other non-pregnancy-related factors influencing health status and contact with health services (primarily orthopedic aftercare and rehabilitation following a previous illness or injury) (31 days) **(Figure 4)**.

Hospitalizations, by service

Among active component members of the Air Force, pregnancy- and delivery-related conditions accounted for more hospitalizations than any other category of illnesses or injuries; however, among

TABLE 2. Numbers and percentages of the most frequent diagnoses during hospitalization, by ICD-10 major diagnostic category, males, active component, U.S. Armed Forces, 2021

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Mental health disorders (F01-F99)	**14,985**	
Adjustment disorders	4,960	33.1
Alcohol dependence	2,354	15.7
Major depressive disorder, recurrent severe without psychotic features	1,343	9.0
Major depressive disorder, single episode, unspecified	1,226	8.2
Post-traumatic stress disorder (PTSD)	597	4.0
Injury and poisoning (S00–T88, DOD0101–DOD0105)	**4,623**	
Unspecified injury	192	4.2
Infection following a procedure	184	4.0
Other fractures of lower leg	115	2.5
Concussion	105	2.3
Heatstroke and sunstroke	105	2.3
Digestive system (K00–K95)	**4,129**	
Other and unspecified acute appendicitis	1,022	24.8
Acute appendicitis with localized peritonitis	240	5.8
Acute pancreatitis, unspecified	191	4.6
Other and unspecified intestinal obstruction	143	3.5
Alcohol induced acute pancreatitis	133	3.2
Musculoskeletal system (M00–M99)	**3,109**	
Other specified disorders of muscle	499	16.1
Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders with radiculopathy	263	8.5
Spinal stenosis	183	5.9
Major anomalies of jaw size	172	5.5
Other spondylosis with radiculopathy	157	5.0
Other (Z00–Z99, except pregnancy-related)[b]	**1,195**	
Encounter for examination and observation for unspecified reason	350	29.3
Encounter for antineoplastic chemotherapy and immunotherapy	183	15.3
Encounter for other orthopedic aftercare	105	8.8
Encounter for other specified postprocedural aftercare	86	7.2
Aftercare following joint replacement surgery	77	6.4
Signs, symptoms, and ill-defined conditions (R00–R99)	**2,037**	
Other symptoms and signs involving emotional state	633	31.1
Syncope and collapse	185	9.1
Other chest pain	139	6.8
Chest pain, unspecified	123	6.0
Unspecified abdominal pain	84	4.1
Circulatory system (I00–I99)	**1,354**	
Pulmonary embolism without acute cor pulmonale	172	12.7
Non-ST elevation (NSTEMI) myocardial infarction	76	5.6
Paroxysmal atrial fibrillation	62	4.6
Unspecified atrial fibrillation and atrial flutter	56	4.1
Atherosclerotic heart disease of native coronary artery	50	3.7
Genitourinary system (N00–N99)	**822**	
Acute kidney failure, unspecified	199	24.2
Hydronephrosis with renal and ureteral calculous obstruction	71	8.6
Calculus of kidney	42	5.1
Calculus of ureter	37	4.5
Hypertrophy of breast	32	3.9

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Respiratory system (J00-J99, U07.0)	**1,010**	
Peritonsillar abscess	106	10.5
Pneumonia, unspecified organism	89	8.8
Deviated nasal septum	72	7.1
Acute tonsillitis, unspecified	58	5.7
Acute respiratory failure	56	5.5
Neoplasms (C00–D49)	**750**	
Malignant neoplasm of thyroid gland	31	4.1
Acute lymphoblastic leukemia [ALL]	30	4.0
Malignant neoplasm of testis, unspecified whether descended or undescended	22	2.9
Malignant neoplasm of rectum	21	2.8
Malignant neoplasm of brain, unspecified	20	2.7
Nervous system and sense organs (G00–G99, H00–H95)	**929**	
Epilepsy, unspecified	69	7.4
Sleep apnea	66	7.1
Migraine, unspecified	37	4.0
Brachial plexus disorders	35	3.8
Other generalized epilepsy and epileptic syndromes	32	3.4
Skin and subcutaneous tissue (L00–L99)	**570**	
Cellulitis and acute lymphangitis of other parts of limb	215	37.7
Cutaneous abscess, furuncle and carbuncle of limb	34	6.0
Pilonidal cyst and sinus with abscess	33	5.8
Cutaneous abscess, furuncle and carbuncle of trunk	29	5.1
Cellulitis and acute lymphangitis of finger and toe	26	4.6
Infectious and parasitic diseases (A00–B99)	**716**	
Sepsis, unspecified organism	224	31.3
Other specified sepsis	105	14.7
Infectious gastroenteritis and colitis, unspecified	32	4.5
Enterocolitis due to *Clostridium difficile*	27	3.8
Viral intestinal infection, unspecified	27	3.8
Endocrine, nutrition, immunity (E00–E89)	**399**	
Type 2 diabetes mellitus with ketoacidosis	55	13.8
Type 1 diabetes mellitus with ketoacidosis	51	12.8
Type 2 diabetes mellitus with other specified complications	31	7.8
Thyrotoxicosis with diffuse goiter	26	6.5
Hypo-osmolality and hyponatremia	26	6.5
Congenital anomalies (Q00–Q99)	**146**	
Other congenital deformities of hip	20	13.7
Atrial septal defect	13	8.9
Pectus excavatum	13	8.9
Congenital insufficiency of aortic valve	12	8.2
Arteriovenous malformation of cerebral vessels	11	7.5
Hematologic and immune disorders (D50–D89)	**192**	
Neutropenia, unspecified	35	18.2
Other specified aplastic anemias and other bone marrow failure syndromes	27	14.1
Immune thrombocytopenic purpura	13	6.8
Other specified disorders of white blood cells	12	6.3
Agranulocytosis secondary to cancer chemotherapy	10	5.2

[a]Percentage of the total number of hospitalizations within the diagnostic category.
[b]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number; NSTEMI, non-ST segment elevation myocardial infarction; NEC, not elsewhere classified.

TABLE 3. Numbers and percentages of the most frequent diagnoses during hospitalization, by ICD-10 major diagnostic category, females, active component, U.S. Armed Forces, 2021

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Mental health disorders (F01-F99)	**5,068**	
Adjustment disorders	1,544	30.5
Major depressive disorder, recurrent severe without psychotic features	563	11.1
Post-traumatic stress disorder (PTSD)	501	9.9
Major depressive disorder, single episode, unspecified	459	9.1
Alcohol dependence	303	6.0
Pregnancy and delivery (O00-O9A, relevant Z codes)	**14,989**	
Post-term pregnancy	1,121	7.5
Abnormality in fetal heart rate and rhythm complicating labor and delivery	963	6.4
Maternal care due to uterine scar from previous surgery	833	5.6
Premature rupture of membranes, onset of labor within 24 hours of rupture	721	4.8
Gestational [pregnancy-induced] hypertension without significant proteinuria, complicating childbirth	705	4.7
Injury and poisoning (S00–T88, DOD0101–DOD0105)	**950**	
Unspecified injury	55	5.8
Poisoning by, adverse effect of and underdosing of other and unspecified antidepressants	53	5.6
Infection following a procedure	51	5.4
Poisoning by, adverse effect of and underdosing of 4-Aminophenol derivatives	50	5.3
Other fractures of lower leg	34	3.6
Digestive system (K00–K95)	**863**	
Other and unspecified acute appendicitis	177	20.5
Acute appendicitis with localized peritonitis	50	5.8
Calculus of gallbladder with acute cholecystitis	43	5.0
Acute cholecystitis	36	4.2
Other and unspecified intestinal obstruction	30	3.5
Musculoskeletal system (M00–M99)	**660**	
Other specified disorders of muscle	77	11.7
Major anomalies of jaw size	61	9.2
Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders with radiculopathy	38	5.8
Other spondylosis with radiculopathy	26	3.9
Pain in joint	24	3.6
Other (Z00–Z99, except pregnancy-related)[b]	**459**	
Encounter for examination and observation for unspecified reason	111	24.2
Encounter for other orthopedic aftercare	38	8.3
Encounter for antineoplastic chemotherapy and immunotherapy	33	7.2
Encounter for other specified postprocedural aftercare	32	7.0
Weeks of gestation of pregnancy, weeks 30-39	30	6.5
Signs, symptoms, and ill-defined conditions (R00–R99)	**560**	
Other symptoms and signs involving emotional state	157	28.0
Syncope and collapse	44	7.9
Unspecified abdominal pain	43	7.7
Pain localized to other parts of lower abdomen	29	5.2
Pain localized to upper abdomen	24	4.3
Circulatory system (I00–I99)	**231**	
Pulmonary embolism without acute cor pulmonale	37	16.0
Acute embolism and thrombosis of deep veins of lower extremity	15	6.5
Essential (primary) hypertension	10	4.3
Cerebral aneurysm, nonruptured	8	3.5
Orthostatic hypotension	6	2.6

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Genitourinary system (N00-N99)	**783**	
Abnormal uterine and vaginal bleeding, unspecified	98	12.5
Other and unspecified ovarian cysts	62	7.9
Excessive and frequent menstruation with regular cycle	44	5.6
Hypertrophy of breast	38	4.9
Tubulo-interstitial nephritis, not specified as acute or chronic	37	4.7
Respiratory system (J00–J99, U07.0)	**178**	
Peritonsillar abscess	27	15.2
Pneumonia, unspecified organism	14	7.9
Other intraoperative and postprocedural complications and disorders of respiratory system, not elsewhere classified	14	7.9
Acute tonsillitis, unspecified	11	6.2
Other and unspecified asthma	11	6.2
Neoplasms (C00–D49)	**462**	
Leiomyoma of uterus, unspecified	144	31.2
Intramural leiomyoma of uterus	40	8.7
Subserosal leiomyoma of uterus	33	7.1
Malignant neoplasm of thyroid gland	21	4.5
Benign neoplasm of right ovary	12	2.6
Nervous system and sense organs (G00–G99, H00–H95)	**300**	
Acute pain, not elsewhere classified	26	8.7
Migraine, unspecified	24	8.0
Epilepsy, unspecified	19	6.3
Brachial plexus disorders	19	6.3
Benign intracranial hypertension	16	5.3
Skin and subcutaneous tissue (L00–L99)	**106**	
Cellulitis and acute lymphangitis of other parts of limb	28	26.4
Cutaneous abscess, furuncle and carbuncle of limb	8	7.5
Cellulitis and acute lymphangitis of face and neck	7	6.6
Cellulitis and acute lymphangitis of trunk	5	4.7
Local infection of the skin and subcutaneous tissue, unspecified	5	4.7
Infectious and parasitic diseases (A00–B99)	**195**	
Sepsis, unspecified organism	56	28.7
Sepsis due to other Gram-negative organisms	17	8.7
Other specified sepsis	17	8.7
Infectious gastroenteritis and colitis, unspecified	14	7.2
Enterocolitis due to *Clostridium difficile*	12	6.2
Endocrine, nutrition, immunity (E00–E89)	**128**	
Thyrotoxicosis with diffuse goiter	25	19.5
Nontoxic multinodular goiter	11	8.6
Dehydration	10	7.8
Hypokalemia	9	7.0
Nontoxic single thyroid nodule	6	4.7
Hematologic and immune disorders (D50-D89)	**91**	
Iron deficiency anemia, unspecified	11	12.1
Anemia, unspecified	10	11.0
Iron deficiency anemia secondary to blood loss (chronic)	8	8.8
Acute posthemorrhagic anemia	8	8.8
Immune thrombocytopenic purpura	7	7.7

[a]Percentage of the total number of hospitalizations within the diagnostic category.
[b]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number; NSTEMI, non-ST segment elevation myocardial infarction; NEC, not elsewhere classified.

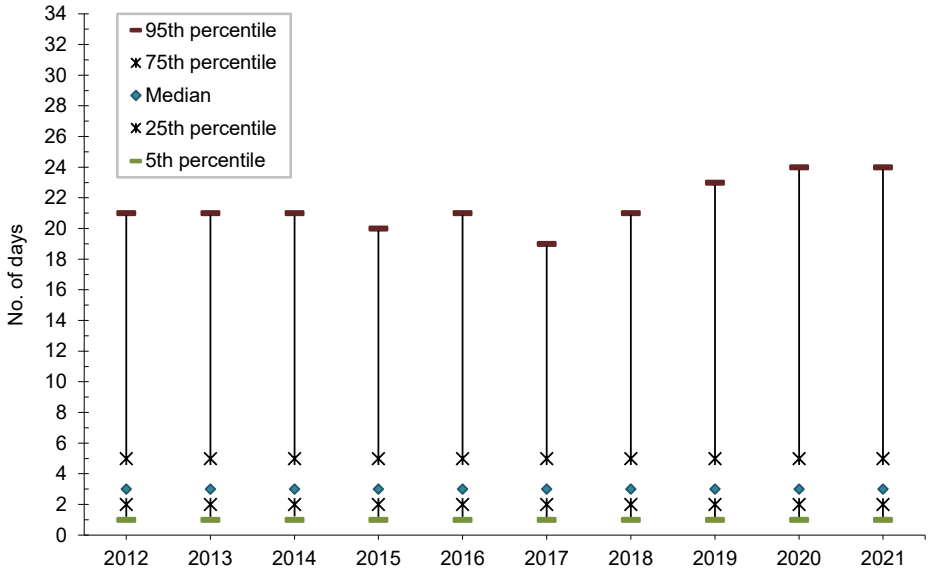
active component members of the Army, Navy, and Marine Corps, mental health disorders were the leading cause of hospitalizations **(Table 4)**. The crude hospitalization rate for mental health disorders among active component Army members (17.5 per 1,000 p-yrs) was higher than among members of all other services. Injury/poisoning was the third leading cause of hospitalizations in the Army and the Marine Corps, and fourth in the Navy and Air Force **(Table 4)**. The hospitalization rate for injury/poisoning was highest among Army (5.4 per 1,000 p-yrs) and Marines Corps members (5.3 per 1,000 p-yrs) and lowest among Air Force members (2.4 per 1,000 p-yrs).

EDITORIAL COMMENT

The total hospitalization rate for all causes in military and non-military medical facilities among active component members in 2021 was the second lowest rate of the past 10 years. For hospitalizations limited to military facilities, the rate in 2021 was the lowest for the entire period. As in past years, in 2021, mental health disorders, pregnancy- and delivery-related conditions, and injury/poisoning accounted for more than half of all hospitalizations of active component members. Adjustment and mood disorders were among the leading causes of hospitalizations among both male and female service members. In recent years, attention at the highest levels of the U.S. military and significant resources have focused on detecting, diagnosing, and treating mental health disorders—especially those related to long and repeated deployments and combat stress. Despite these efforts, crude annual rates of hospitalizations for mental health disorders increased slightly between 2017 and 2021.

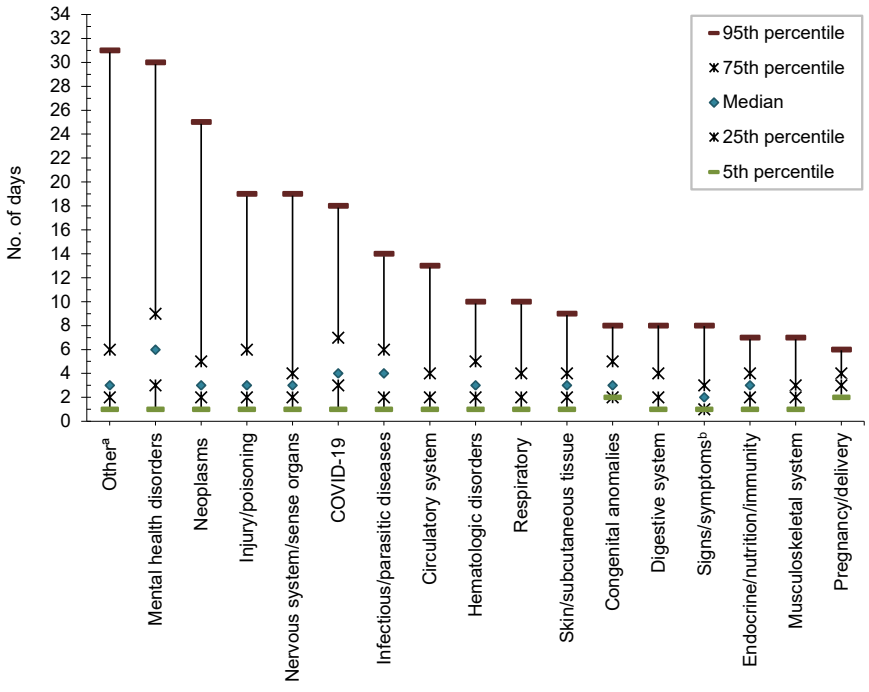
The reasons for the recent downturn in the trends for annual numbers of hospitalizations overall and for the slight increase in mental health disorder–related hospitalizations in particular are not clear. It is conceivable that there has been a decline in the impact of combat and peacekeeping operations on overall morbidity among service members since the withdrawal

FIGURE 3. Length of hospital stay, active component, U.S. Armed Forces, 2012–2021



No., number.

FIGURE 4. Length of hospital stay, by ICD-10 major diagnostic category, active component, U.S. Armed Forces, 2012–2021



[a]Other factors influencing health status and contact with health services (excluding pregnancy-related).
[b]Includes ill-defined conditions.
ICD, International Classification of Diseases; No., number.

TABLE 4. Numbers and rates of hospitalizations, by service and ICD-10 diagnostic category, active component, U.S. Armed Forces, 2021

	Army		Navy		Air Force		Marine Corps	
Major diagnostic category (ICD-10 codes)	No.	Rate[a]	No.	Rate[a]	No.	Rate[a]	No.	Rate[a]
Mental health disorders (F01-F99)	8,404	17.5	5,241	15.3	3,825	11.6	2,583	14.3
Pregnancy and delivery (O00-O9A, relevant Z codes)[b]	5,200	69.8	4,256	60.6	4,353	62.1	1,180	72.5
Injury and poisoning (S00-T88, DOD0101-DOD0105)	2,601	5.4	1,216	3.5	802	2.4	954	5.3
Digestive system (K00-K95)	2,090	4.3	1,354	3.9	955	2.9	593	3.3
Musculoskeletal system (M00-M99)	1,752	3.6	796	2.3	771	2.3	450	2.5
Signs, symptoms, and ill-defined conditions (R00-R99)	1,398	2.9	496	1.4	478	1.4	225	1.2
Genitourinary system (N00-N99)	717	1.5	385	1.1	322	1.0	181	1.0
Circulatory system (I00-I99)	689	1.4	392	1.1	378	1.1	126	0.7
Other (Z00–Z99, except pregnancy-related)[c]	644	1.3	368	1.1	433	1.3	209	1.2
Respiratory system (J00-J99, U07.0)	576	1.2	214	0.6	227	0.7	171	0.9
Nervous system and sense organs (G00-G99, H00-H95)	573	1.2	275	0.8	244	0.7	137	0.8
Neoplasms (C00-D49)	516	1.1	324	0.9	270	0.8	102	0.6
COVID-19 (U07.1, U09.9)	377	0.8	254	0.7	236	0.7	123	0.7
Infectious and parasitic diseases (A00-B99)	328	0.7	242	0.7	246	0.7	95	0.5
Skin and subcutaneous tissue (L00-L99)	286	0.6	154	0.4	103	0.3	133	0.7
Endocrine, nutrition, immunity (E00-E89)	225	0.5	129	0.4	107	0.3	66	0.4
Hematologic and immune disorders (D50-D89)	137	0.3	45	0.1	67	0.2	34	0.2
Congenital anomalies (Q00-Q99)	90	0.2	47	0.1	58	0.2	34	0.2
Total	26,603	55.4	16,188	47.1	13,875	42.0	7,396	41.0

[a]Rates are based on 1,000 person-years.
[b]Rates for pregnancy and delivery-related hospitalizations among females only (in parentheses)
[c]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number.

of U.S. forces from Iraq and the official end to combat operations in Afghanistan. The decrease in hospitalizations in 2021 may also have been a consequence of the COVID-19 pandemic, during which elective admissions to hospitals were discouraged and the public health measures of social distancing and use of personal protective equipment may have reduced the incidence of not only infectious diseases but also of injuries. Continued monitoring of hospitalizations and all other health care encounters over time may permit elucidation of the possible reasons for these recent trends.

This summary has certain limitations that should be considered when interpreting the results. For example, the scope of this report is limited to members of the active components of the U.S. Armed Forces. Many reserve component members were hospitalized for illnesses and injuries while serving on active duty in 2021; however, these hospitalizations are not accounted for in this report. Please refer to the snapshot pertaining to the reserve component elsewhere in this issue of the *MSMR*. In addition, many injury/poisoning-related hospitalizations occur in nonmilitary hospitals. Also, this summary is based on primary (first-listed) discharge diagnoses only; however, in many hospitalized cases, there are multiple underlying conditions. For example, military members who are wounded in combat or injured in motor vehicle accidents may have multiple injuries and complex medical and psychological complications. In such cases, only the first-listed discharge diagnosis would be accounted for in this report. Finally, it should be noted that medical data from sites that were using the new electronic health record for the Military Health System, MHS GENESIS, between July 2017 and October 2019 are not available in the DMSS. These sites include Naval Hospital Oak Harbor, Naval Hospital Bremerton, Air Force Medical Services Fairchild, and Madigan Army Medical Center. Therefore, medical encounter data for individuals seeking care at any of these facilities from July 2017 through October 2019 were not included in the current analysis. Even with these limitations, this report provides useful and informative insights regarding the natures, rates, and distributions of the most serious illnesses and injuries that affect active component military members.

Ambulatory Visits, Active Component, U.S. Armed Forces, 2021

This report documents the frequencies, rates, trends, and characteristics of ambulatory healthcare visits of active component members of the U.S. Army, Navy, Air Force, and Marine Corps during 2021. Ambulatory visits of U.S. service members in fixed military and non-military (reimbursed through the Military Health System [MHS]) medical treatment facilities are documented with standardized records that are routinely archived for health surveillance purposes in the Defense Medical Surveillance System (DMSS). Ambulatory visits that are not routinely and completely documented within fixed military and non-military medical treatment facilities (e.g., during deployments, field training exercises, or at sea) are not included in this analysis.

As in previous *MSMR* reports, all records of ambulatory visits of active component service members were categorized according to the International Classification of Diseases, 10th Revision (ICD-10) codes entered in the primary (first-listed) diagnostic position of the visit records.[1] In this analysis, a special query of the DMSS records was performed to distinguish ambulatory visits that were accomplished via "telehealth" encounters (e.g., via telephone or video teleconference) rather than in-person encounters. Both types of encounters were included and not distinguished in most of the data summaries, but trends in the proportions of encounters that were accomplished via telehealth were examined because of the increased use of telehealth encounters during the COVID-19 pandemic.

TABLE 1. Numbers, rates,[a] and ranks[b] of ambulatory visits, by ICD-10 major diagnostic category, active component, U.S. Armed Forces, 2021

	2021		
Major diagnostic category (ICD-10)	No.	Rate[a]	Rank[b]
Other (Z00–Z99, except pregnancy-related)[c]	8,770,528	6,572.9	(1)
Musculoskeletal system (M00-M99)	4,144,538	3,106.0	(2)
Mental disorders (F01-F99)	2,235,738	1,675.5	(3)
Nervous system and sense organs (G00-G99, H00-H95)	1,418,260	1,062.9	(4)
Signs, symptoms, and ill-defined conditions (R00-R99)	1,349,863	1,011.6	(5)
Injury and poisoning (S00-T88, DOD0101-DOD0105)	716,194	536.7	(6)
Respiratory system (J00-J99, U07.0)	454,544	340.6	(7)
Skin and subcutaneous tissue (L00-L99)	384,306	288.0	(8)
Pregnancy and childbirth (O00-O9A, relevant Z codes)[d]	360,037	1,557.8	(9)
Genitourinary system (N00-N99)	303,078	227.1	(10)
Digestive system (K00-K95)	252,512	189.2	(11)
Infectious and parasitic diseases (A00-B99)	200,585	150.3	(12)
Endocrine, nutrition, immunity (E00-E89)	150,682	112.9	(13)
Circulatory system (I00-I99)	148,838	111.5	(14)
COVID-19 (U07.1, U09.9)	140,685	105.4	(15)
Neoplasms (C00-D49)	128,774	96.5	(16)
Hematologic and immune disorders (D50-D89)	43,003	32.2	(17)
Congenital anomalies (Q00-Q99)	21,356	16.0	(18)
Total	21,223,521	15,905.5	

[a]Rates are based on 1,000 person-years.
[b]Rank of major diagnostic category based on number of hospitalizations.
[c]Other factors influencing health status and contact with health services (excluding pregnancy-related).
[d]Rate of pregnancy and delivery-related hospitalizations among females only.
ICD, International Classification of Diseases; No., number.

WHAT ARE THE NEW FINDINGS?

In 2021, the overall numbers and rates of active component service member ambulatory care visits were the highest of any of the last 10 years. Most categories of illness and injury showed modest increases in numbers and rates. The proportions of ambulatory care visits that were accomplished via telehealth encounters fell to under 15% in 2021, compared to 19% in 2020.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Although the response to the COVID-19 pandemic in 2020 may have been associated with decreases in the incidence of disease and injury diagnoses in the service member population receiving ambulatory care, the data for 2021 show a return to pre-pandemic levels. Moreover, the proportions of health care encounters delivered through telehealth have similarly reverted to the lower levels seen in the pre-pandemic period. Lessons learned may guide future steps in reducing disease and injury incidence in the post-pandemic era.

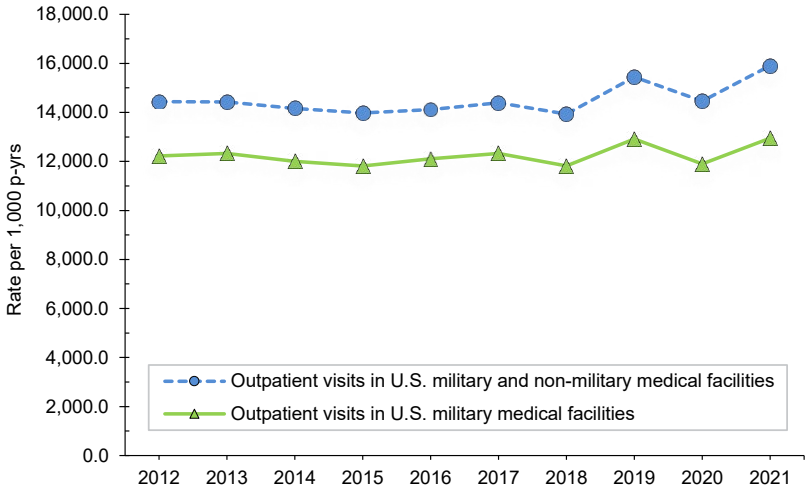
Frequencies, rates, and trends

During 2021, there were 21,223,521 ambulatory visits of active component service members. "Visits" refers to encounters accomplished via in-person clinical meetings as well as "telehealth" encounters. The crude annual rate (all causes) was 15,905.5 visits per 1,000 person-years (p-yrs) or 15.9 visits per p-yr; thus, the average number of ambulatory encounters during the year was nearly 16 encounters per service member **(Table 1)**. The crude annual rate for 2021 was the highest of the period 2012–2021 **(Figure 1)**. The rate of documented ambulatory visits in U.S. military and non-military medical facilities in 2021 was 13.8% higher than the lowest rate in the interval 2012–2020

(13,978.5 per 1,000 p-yrs in 2015) and 1.2% higher than the previous peak in 2019 (15,718.5 visits per 1,000 p-yrs) **(Figure 1, data not shown)**. In 2021, 41.3% of ambulatory visits were classified into the "other" category (i.e., other factors influencing health status and contact with health services, excluding pregnancy-related), which includes health care not related to a current illness or injury **(Table 1)**. Such care includes routine and special medical examinations (e.g., periodic, occupational, or retirement), therapeutic and rehabilitative treatments for previously diagnosed illnesses or injuries (e.g., physical therapy), immunizations, counseling, deployment-related health assessments, and screening.

In 2021, there were 12,452,993 documented ambulatory visits for illnesses and injuries (ICD-10: A00–T88, including relevant pregnancy Z-codes; U07.0, U70.1, and U09.9), not including diagnoses classified as "other," for a crude annual rate of illness- and injury-related visits of approximately 9.3 visits per p-yr **(data not shown)**. During the prior 9 years, the crude annual rate of ambulatory visits for illnesses and injuries in 2021 was exceeded only by the rate in 2016 (9.6 visits per year).

FIGURE 1. Rates of ambulatory visits by year, active component, U.S. Armed Forces, 2012–2021



P-yrs, person-years.

Ambulatory visits, by diagnostic categories

In 2021, 4 major diagnostic categories accounted for almost three-quarters (73.5%) of all illness- and injury-related ambulatory visits among active component service members (not including diagnoses classified as "other"): musculoskeletal system/connective tissue disorders (33.3%); mental health disorders (18.0%); disorders of the nervous system and sense organs (11.4%); and signs, symptoms, and ill-defined conditions (10.8%) **(Table 1)**. COVID-19 accounted for 0.66% of the total ambulatory visits in 2021, an increase from 2020 when COVID-19 was associated with just 0.44% of all visits. Among visits for illness and injury, COVID-19 encounters represented 1.1% of visits in 2021 and 0.74% of visits in 2020.

During 2021, the annual rates of visits in 5 major diagnostic categories of illness and injury were the highest for any year in the 10-year period of 2012–2021 **(Table 1; data not shown)**. These peak rates were recorded for the categories of mental health disorders; nervous system and sense organs; signs, symptoms, and ill-defined conditions; genitourinary system; and hematologic disorders. The category for COVID-19 was added to the categories of illness and injury for last year's report.[2] The number of visits and rates for COVID-19 increased from 83,405 and 62.9 per 1,000 p-yrs in 2020 to 140,685 and 105.43 per 1,000 p-yrs in 2021. Of the remaining 11 major diagnostic categories of disease and injury, 7 categories had higher rates in 2021 than were recorded in the years 2019 and 2020. There were 4 diagnostic categories of illness and injury for which the 2021 rates were notably lower than the annual rates for most of the 10-year period. Specifically, the 2021 rate for musculoskeletal disorders (3,106.0 per 1,000 p-yrs) was only the fifth highest of the period. More distinctively, the 2021 rates for infectious and parasitic diseases (150.3 per 1,000 p-yrs), injury and poisoning (536.7 per 1,000 p-yrs), and respiratory system disorders (340.6 per 1,000 p-yrs) ranked 8th, 9th, and 10th among rates observed for those categories during the 10-year period.

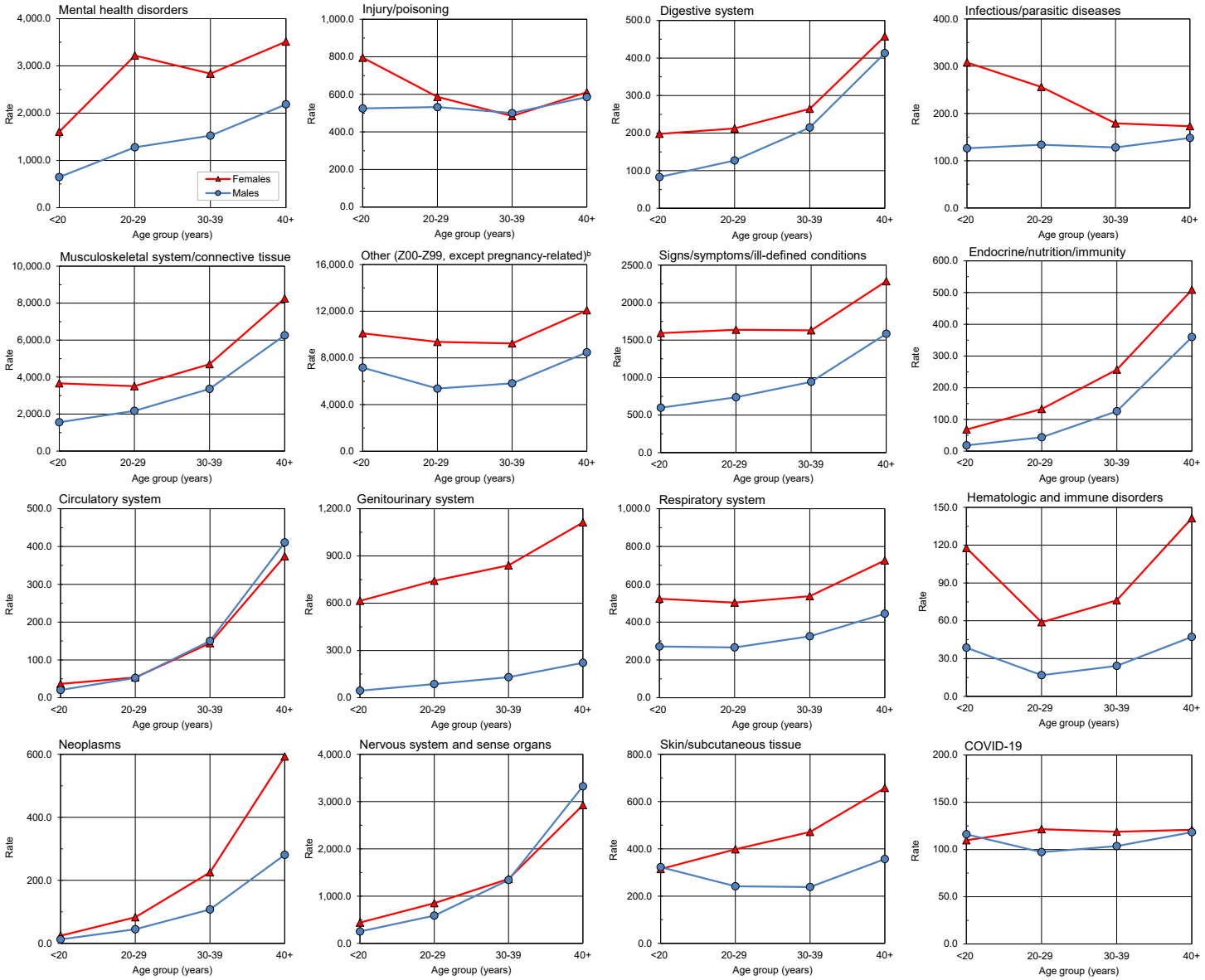
In general, the relative distributions of ambulatory visits by ICD-10 diagnostic categories remained stable over the surveillance period **(Table 1)**. In a comparison of the numbers and rates of visits attributable to each of the 17 major diagnostic categories (excluding COVID-19) in the years of interest 2015–2021, the rank orders of the most numerous categories remained relatively stable. The rank orders of the 5 least numerous of the diagnostic categories tended to vary from year to year. COVID-19 ranked 16th and 15th in total visits during 2020 and 2021, respectively.

Ambulatory visits, by sex

In 2021, male service members accounted for nearly three-fourths (72.0%) of all illness- and injury-related visits; however, the annual crude rate among female service members (15.1 visits per p-yr) was 85.2% higher than that among males (8.1 visits per p-yr) **(data not shown)**. Excluding pregnancy- and delivery-related visits (which accounted for 10.3% of all non-Z-coded ambulatory visits among female service members), the illness and injury ambulatory visit rate among female service members was 13.5 visits per p-yr. As in the past, rates for illness- and injury-related categories were generally higher among female than male service members **(Figure 2)**.

Among all illness- and injury-specific diagnoses, 4 of the 5 diagnoses with the largest numbers of ambulatory visits were the same for male and female service members **(Tables 2, 3)**. However, the crude rate (per 1,000 p-yrs) was at least 35% higher

FIGURE 2. Rates[a] of ambulatory visits, by ICD-10 major diagnostic category, age group, and sex, active component, U.S. Armed Forces, 2021



[a]Rate per 1,000 person-years.
[b]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases.

among female than male service members for each of these 4 common diagnoses: pain in joint (female: 1,647.1; male: 1,131.5; female:male rate ratio [RR]: 1.46); low back pain (female: 604.3; male: 448.0; RR: 1.35); adjustment disorders (female: 727.13; male: 329.2; RR: 2.44); and pain in the limb, hand, foot, fingers, and toes (female: 326.8; male: 221.8; RR: 1.47) **(data not shown)**. Four other diagnoses were among the 10 most common diagnoses for both male and female service members: post-traumatic stress disorder (PTSD); cervicalgia; dorsalgia; and anxiety disorder, unspecified. Of note, among male service members, sleep apnea was the 3rd most frequent illness- or injury-specific primary diagnosis during ambulatory visits and alcohol dependence was ranked 6th, but neither of these diagnostic categories ranked among the 10 most common diagnoses among female service members. Among female service members, the 9th and 10th most common diagnoses were major depressive disorder, recurrent, severe without psychotic features, and generalized anxiety disorder, but neither was among the 10 most common diagnoses among male service members **(Tables 2, 3)**.

Across diagnostic categories, relationships between age group and ambulatory visit rates were broadly similar among male and female service members **(Figure 2)**. For example, among both sexes, ambulatory visit rates for neoplasms and circulatory disorders among those aged 40 years or older were 10 or more times the rates

TABLE 2. Numbers and percentages of the most frequent diagnoses during ambulatory visits, by ICD-10 major diagnostic category, males, active component, U.S. Armed Forces, 2021

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Infectious and parasitic diseases (A00–B99)	**146,752**	
Viral infection, unspecified	21,767	14.8
Coronavirus infection, unspecified	8,980	6.1
Coronavirus as the cause of diseases classified elsewhere	7,285	5.0
Plantar wart	6,783	4.6
Tinea unguium	6,755	4.6
Neoplasms (C00–D49)	**92,645**	
Neoplasm of uncertain behavior of skin	11,019	11.9
Melanocytic nevi, unspecified	4,795	5.2
Neoplasm of unspecified behavior of bone, soft tissue, and skin	3,827	4.1
Melanocytic nevi of trunk	3,407	3.7
Benign lipomatous neoplasm of skin and subcutaneous tissue of trunk	2,751	3.0
Endocrine, nutrition, immunity (E00-E89)	**106,664**	
Hyperlipidemia, unspecified	15,001	14.1
Testicular hypofunction	14,429	13.5
Vitamin D deficiency, unspecified	11,101	10.4
Type 2 diabetes mellitus without complications	7,736	7.3
Hypothyroidism, unspecified	6,546	6.1
Hematologic and immune disorders (D50-D89)	**25,819**	
Sickle-cell trait	3,438	13.3
Anemia, unspecified	3,114	12.1
Other specified disorders of white blood cells	2,412	9.3
Iron deficiency anemia, unspecified	1,756	6.8
Immunodeficiency, unspecified	1,401	5.4
Mental health disorders (F01-F99)	**1,537,772**	
Adjustment disorders	329,198	21.4
Alcohol dependence	231,382	15.0
Post-traumatic stress disorder (PTSD)	183,663	11.9
Anxiety disorder, unspecified	92,319	6.0
Major depressive disorder, recurrent severe without psychotic features	69,408	4.5
Nervous system and sense organs (G00-G99, H00-H95)	**1,159,794**	
Sleep apnea	473,199	40.8
Myopia	80,280	6.9
Chronic pain, not elsewhere classified	52,839	4.6
Insomnia	48,859	4.2
Astigmatism	29,965	2.6
Circulatory system (I00-I99)	**125,377**	
Essential (primary) hypertension	57,619	46.0
Scrotal varices	4,870	3.9
Pulmonary embolism without acute cor pulmonale	3,047	2.4
Atherosclerotic heart disease of native coronary artery	2,945	2.3
Paroxysmal atrial fibrillation	2,485	2.0
Respiratory system (J00-J99)	**331,797**	
Acute upper respiratory infection, unspecified	66,420	20.0
Acute pharyngitis, unspecified	36,453	11.0
Allergic rhinitis due to pollen	33,989	10.2
Allergic rhinitis, unspecified	23,449	7.1
Other allergic rhinitis	17,092	5.2

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Digestive system (K00–K95)	**195,944**	
Gastro-esophageal reflux disease without esophagitis	22,765	11.6
Noninfective gastroenteritis and colitis, unspecified	10,571	5.4
Hemorrhage of anus and rectum	9,164	4.7
Constipation	8,439	4.3
Unilateral inguinal hernia, without obstruction or gangrene	8,333	4.3
Genitourinary system (N00-N99)	**120,893**	
Other specified disorders of male genital organs	25,747	21.3
Calculus of kidney	8,058	6.7
Male erectile dysfunction, unspecified	7,216	6.0
Hypertrophy of breast	7,018	5.8
Male infertility, unspecified	5,426	4.5
Skin and subcutaneous tissue (L00-L99)	**284,482**	
Pseudofolliculitis barbae	42,243	14.8
Acne vulgaris	17,573	6.2
Ingrowing nail	17,280	6.1
Dermatitis, unspecified	15,564	5.5
Cellulitis and acute lymphangitis of other parts of limb	9,475	3.3
Musculoskeletal system and connective tissue (M00-M99)	**3,171,393**	
Pain in joint	1,248,319	39.4
Low back pain	494,278	15.6
Pain in limb, hand, foot, fingers and toes	244,683	7.7
Cervicalgia	146,894	4.6
Dorsalgia, unspecified	113,830	3.6
Congenital anomalies (Q00-Q99)	**15,777**	
Congenital pes planus	2,536	16.1
Congenital pes cavus	1,325	8.4
Atrial septal defect	823	5.2
Congenital insufficiency of aortic valve	720	4.6
Other congenital deformities of feet	591	3.7
Signs, symptoms, and ill-defined conditions (R00-R99)	**960,778**	
Other symptoms and signs involving emotional state	58,102	6.0
Headache, unspecified	50,776	5.3
Chest pain, unspecified	50,527	5.3
Dyspnea	37,838	3.9
Other abnormalities of breathing	36,952	3.8
Injury/poisoning (S00-T88, DOD0101-DOD0105)	**582,785**	
Sprain of ankle	32,317	5.5
Concussion	21,800	3.7
Sprain of shoulder joint	21,591	3.7
Sprain of cruciate ligament of knee	19,304	3.3
Tear of meniscus, current injury	15,490	2.7
Other (Z00–Z99, except pregnancy-related)[b]	**6,549,438**	
Encounter for immunization	1,422,866	21.7
Encounter for other administrative examinations	1,148,768	17.5
Encounter for administrative examinations, unspecified	398,125	6.1
Encounter for screening for other viral diseases	339,229	5.2
Other specified counseling	309,887	4.7

[a]Percentage of the total number of hospitalizations within the diagnostic category.
[b]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number.

TABLE 3. Numbers and percentages of the most frequent diagnoses during ambulatory visits, by ICD-10 major diagnostic category, females, active component, U.S. Armed Forces, 2021

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Infectious and parasitic diseases (A00–B99)	**53,833**	
Viral infection, unspecified	7,406	13.8
Candidiasis of vulva and vagina	6,586	12.2
Chlamydial infection of genitourinary tract, unspecified	2,486	4.6
Coronavirus infection, unspecified	2,373	4.4
Chlamydial infection, unspecified	2,340	4.3
Neoplasms (C00–D49)	**36,129**	
Leiomyoma of uterus, unspecified	4,022	11.1
Neoplasm of uncertain behavior of skin	3,197	8.8
Malignant neoplasm of breast of unspecified site	2,467	6.8
Melanocytic nevi, unspecified	1,683	4.7
Malignant neoplasm of upper-outer quadrant of breast	1,170	3.2
Endocrine, nutrition, immunity (E00-E89)	**44,018**	
Vitamin D deficiency, unspecified	6,877	15.6
Hypothyroidism, unspecified	6,024	13.7
Polycystic ovarian syndrome	3,621	8.2
Obesity, unspecified	2,715	6.2
Iron deficiency	1,655	3.8
Hematologic and immune disorders (D50-D89)	**17,184**	
Iron deficiency anemia, unspecified	5,009	29.1
Anemia, unspecified	3,127	18.2
Sickle-cell trait	1,472	8.6
Iron deficiency anemia secondary to blood loss (chronic)	1,129	6.6
Other specified disorders of white blood cells	797	4.6
Mental health disorders (F01-F99)	**697,966**	
Adjustment disorders	168,054	24.1
Post-traumatic stress disorder (ptsd)	101,651	14.6
Anxiety disorder, unspecified	49,613	7.1
Major depressive disorder, recurrent severe without psychotic features	38,247	5.5
Generalized anxiety disorder	38,183	5.5
Nervous system and sense organs (G00-G99, H00-H95)	**258,466**	
Sleep apnea	36,667	14.2
Myopia	25,689	9.9
Chronic pain, not elsewhere classified	18,602	7.2
Insomnia	14,807	5.7
Migraine with aura	9,024	3.5
Circulatory system (I00-I99)	**23,461**	
Essential (primary) hypertension	7,787	33.2
Varicose veins of lower extremities with other complications	1,109	4.7
Venous insufficiency (chronic) (peripheral)	822	3.5
Pulmonary embolism without acute cor pulmonale	731	3.1
Raynaud's syndrome	709	3.0
Respiratory system (J00-J99)	**122,747**	
Acute upper respiratory infection, unspecified	22,500	18.3
Acute pharyngitis, unspecified	16,460	13.4
Allergic rhinitis due to pollen	13,263	10.8
Allergic rhinitis, unspecified	8,878	7.2
Other allergic rhinitis	6,949	5.7

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Digestive system (K00–K95)	**56,568**	
Constipation	9,266	16.4
Gastro-esophageal reflux disease without esophagitis	5,602	9.9
Noninfective gastroenteritis and colitis, unspecified	3,701	6.5
Hemorrhage of anus and rectum	2,019	3.6
Unspecified hemorrhoids	1,709	3.0
Genitourinary system (N00-N99)	**182,185**	
Acute vaginitis	19,561	10.7
Urinary tract infection, site not specified	14,393	7.9
Other specified noninflammatory disorders of vagina	9,703	5.3
Abnormal uterine and vaginal bleeding, unspecified	9,466	5.2
Female infertility, unspecified	8,502	4.7
Pregnancy and delivery (O00-O9A, relevant Z codes)	**360,037**	
Encounter for care and examination of lactating mother	33,504	9.3
Encounter for supervision of normal first pregnancy	26,965	7.5
Encounter for supervision of other normal pregnancy	22,176	6.2
Encounter for routine postpartum follow-up	17,132	4.8
Pregnant state, incidental	15,358	4.3
Skin and subcutaneous tissue (L00-L99)	**99,824**	
Acne vulgaris	15,849	15.9
Dermatitis, unspecified	6,603	6.6
Acne, unspecified	4,530	4.5
Ingrowing nail	2,935	2.9
Urticaria, unspecified	2,811	2.8
Musculoskeletal system and connective tissue (M00-M99)	**973,145**	
Pain in joint	380,693	39.1
Low back pain	139,660	14.4
Pain in limb, hand, foot, fingers and toes	75,527	7.8
Cervicalgia	56,185	5.8
Dorsalgia, unspecified	39,064	4.0
Signs, symptoms, and ill-defined conditions (R00-R99)	**389,085**	
Pelvic and perineal pain	27,286	7.0
Headache, unspecified	25,440	6.5
Other symptoms and signs involving emotional state	21,449	5.5
Unspecified abdominal pain	19,522	5.0
Dyspnea	13,284	3.4
Injury/poisoning (S00-T98, DOD0101-DOD0105)	**133,409**	
Sprain of ankle	9,448	7.1
Concussion	5,477	4.1
Sprain of cruciate ligament of knee	4,207	3.2
Injury of muscle, fascia and tendon of abdomen, lower back and pelvis	2,858	2.1
Sprain of hip	2,387	1.8
Other (Z00–Z99, except pregnancy-related)[b]	**2,221,090**	
Encounter for other administrative examinations	441,611	19.9
Encounter for immunization	295,770	13.3
Encounter for administrative examinations, unspecified	168,569	7.6
Other specified counseling	142,909	6.4
Encounter for screening for other viral diseases	78,054	3.5

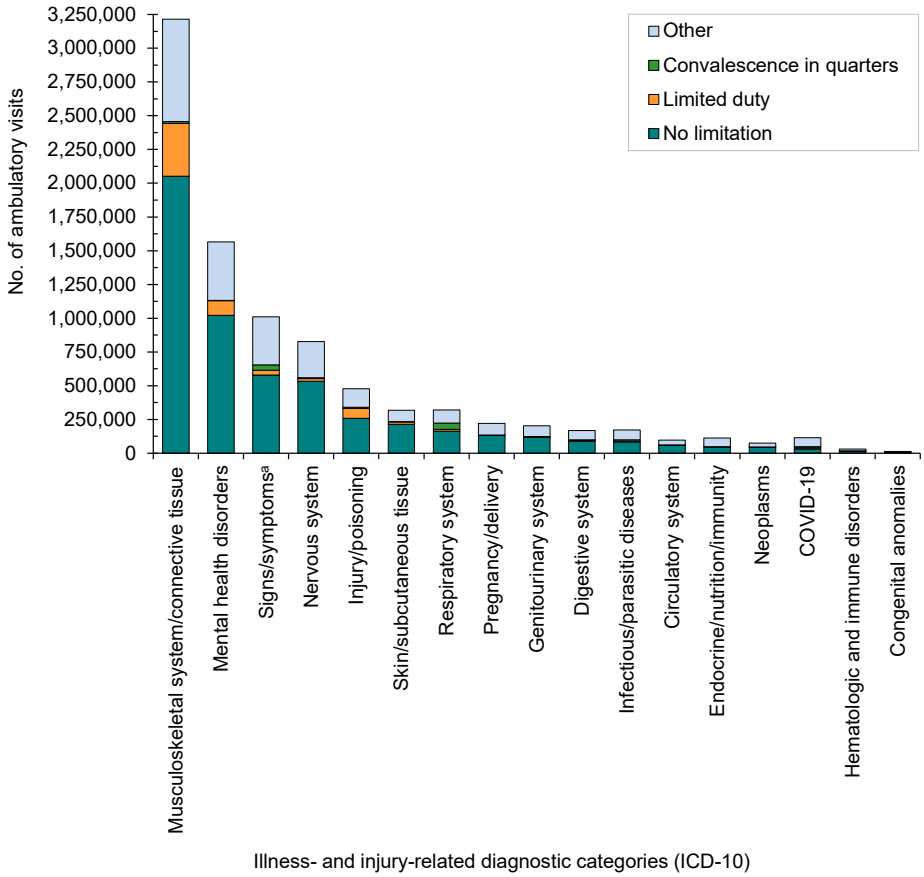
[a]Percentage of the total number of hospitalizations within the diagnostic category.
[b]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number.

among those younger than 20 years old; in contrast, clinic visit rates for infectious and parasitic diseases were lower among the oldest compared to the youngest service members. As in the past, ambulatory visit rates for disorders of the nervous system; digestive system; endocrine system, nutrition, and immunity; and musculoskeletal system/connective tissue rose more steeply with advancing age than most other categories of illness or injury (for which rates were relatively stable or only modestly increased) **(Figure 2)**. Ambulatory visit rates for diagnoses of COVID-19 infections were relatively stable with advancing age.

Dispositions after ambulatory visits

Because disposition codes are assigned to ambulatory medical encounters that occur only at military treatment facilities (MTFs), the following metrics do not include outsourced care. Approximately 60.9% of all illness- and injury-related visits resulted in "no limitation" (i.e., duty without limitations) dispositions **(data not shown)**. Of illness- and injury-related visits, 1.6% resulted in "convalescence in quarters" dispositions **(data not shown)**. The illness- and injury-related diagnostic categories with the highest proportions of "limited duty" dispositions were injuries and poisonings (15.5%) and musculoskeletal system/connective tissue disorders (12.3%) **(Figure 3)**. The illness- and injury-related diagnostic categories with the highest proportions of "convalescence in quarters" were infectious and parasitic diseases (6.2%) and diseases of the respiratory system (14.2%). Musculoskeletal system/connective tissue disorders (56.1%) accounted for more than one-half of all "limited duty" dispositions, and mental health disorders (15.7%) and injury/poisoning (10.7%) together accounted for more than one-quarter (26.4%) **(Figure 4)**. Diseases of the respiratory system accounted for nearly one-third (31.1%) of all "convalescence in quarters" dispositions—more than twice as many (n=45,347) as any other diagnostic category, except signs and symptoms (26.5%).

FIGURE 3. Ambulatory visits in relation to reported dispositions, by illness- and injury-related diagnostic category, active component, U.S. Armed Forces, 2021



[a]Includes ill-defined conditions.
No., number; ICD, International Classification of Diseases.

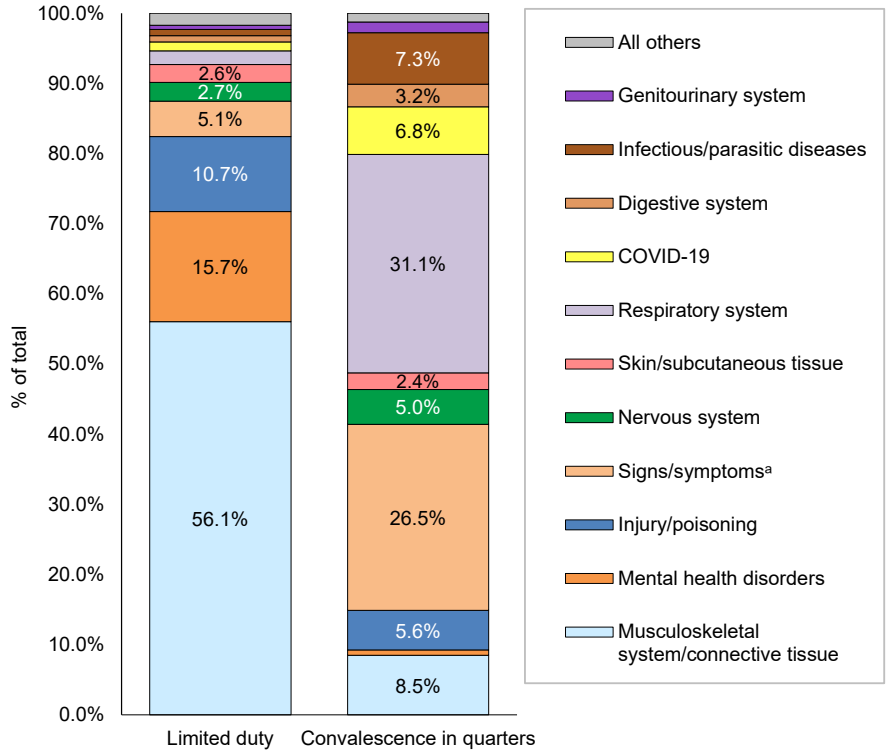
Ambulatory visits accomplished via telehealth

In the years 2016 and 2018 the percentages of ambulatory encounters that were associated with telehealth encounters approximated 14% **(data not shown)**. In 2020, the first year of the COVID-19 pandemic, the percentage of encounters that were attributed to telehealth was 19.2% **(data not shown)**. The number of telehealth encounters had increased by 942,859 encounters between 2018 and 2020, but the number of non-telehealth encounters fell by 964,119 during that interval **(data not shown)**. In the second year (2021) of the pandemic, the total number of outpatient encounters was 21,223,521, a much larger total than was recorded in 2020 (19,070,128). In 2021, 14.8% of outpatient encounters were accomplished via telehealth, a noteworthy decrease from 2020 **(data not shown)**. Of the 18 different major diagnostic categories (including the new category for COVID-19), only 9 of the categories had 10% or more of their encounters via telehealth. The leading percentages of telehealth visits were for COVID-19 (40%); endocrine/nutrition/immunity (30%); "other" (27%); infectious and parasitic diseases (23%); hematologic and immune disorders (21%); neoplasms and genitourinary system disorders (both 12%); and disorders of the circulatory system and signs, symptoms, and ill-defined conditions (both 10%) **(data not shown)**. These 9 categories accounted for 85.5% of all ambulatory encounters accomplished via telehealth.

EDITORIAL COMMENT

During 2019–2021, the numbers of illness- and injury-related ambulatory visits in relation to their reported primary causes decreased in 2020 and then increased significantly in 2021. In 2021, musculoskeletal system/connective tissue and mental health

FIGURE 4. Percentages of ambulatory visit-related limited duty and convalescence in quarters dispositions attributable to illness- and injury-related diagnostic categories, active component, U.S. Armed Forces, 2021



[a]Includes ill-defined conditions.

disorders accounted for more than one-half (51.3%) of all illness- and injury-related diagnoses documented on standardized records of ambulatory encounters. Over the course of the 3-year period that included 1 year before, and 2 years after, the onset of the COVID-19 pandemic (2019–2021), the incidence rates of 5 major illness- and injury-related categories (mental disorders; nervous system and sense organs; signs/symptoms and ill-defined conditions; disorders of the genitourinary system; and hematologic and immune disorders) increased to peak numbers of ambulatory visits and rates in 2021; 3 illness- and injury-related categories showed consistent decreases.

One factor that partially explained the observed decreases in ambulatory encounters in 2020 is the COVID-19 pandemic which directly affected the health of many service members whether or not they acquired a coronavirus infection. During 2020, indirect effects of the pandemic could be attributed to the implementation of preventive measures taken to lessen transmission of the virus. Such measures included restrictions on housing, training, and social gatherings, all of which may have reduced the incidence of injuries and illnesses in the service member population. The reduced incidence would be reflected in the counts of ambulatory visits in the MHS. In addition, during 2020, medical facilities were encouraged to increase the use of telehealth procedures in order to reduce the risks of virus transmission in the health care settings. These telehealth initiatives may have succeeded in reducing the incidence of not only SARS-CoV-2 infections but also other infectious diseases.

The second year of the pandemic, 2021, was marked by the introduction of efficacious COVID-19 vaccines. Although the vaccines over time undoubtedly reduced the incidence of COVID-19 disease below its potential peak levels, the emergence of variant strains of the virus and the careful surveillance for SARS-CoV-2 infections resulted in an increase in cases detected despite the extensive control measures. The fact that incidence rates of the more common categories of illness and injury rose in 2021 to exceed pre-pandemic levels may reflect several factors, including the postponement of care for some common conditions during 2020, the increased ability of health care facilities and staff to accommodate patients with precautionary measures during 2021, and the increased incidence of some diagnoses (e.g., mental health disorders) as a result of the social impact of pandemic measures. The fact that the 2021 rates of visits for infectious and parasitic diseases, injury and poisoning, and respiratory system disorders declined while the rates for most other disease and injury categories increased suggests that steps taken to reduce spread of SARS-CoV-2 had a positive effect on those disorders.

Several limitations should be considered when interpreting the findings of this report. For example, ambulatory care that is delivered by unit medics and at deployed medical treatment facilities (such as in Afghanistan or Iraq or at sea) have not been included. In turn, this summary does not reflect the experience of active component military members overall to the extent that the natures and rates of illnesses and injuries may vary between those who are deployed and those who are not deployed.

In addition, this summary is based on primary (first-listed) diagnosis codes reported on ambulatory visit records. As a result, the current summary discounts morbidity related to comorbid and complicating conditions that may have been documented in secondary diagnostic positions of the healthcare records. Furthermore, the accuracy of reported diagnoses likely varies across conditions, care providers, treatment facilities, and clinical settings. Although some specific diagnoses made during individual encounters may not be definitive, final, or even correct, summaries of the frequencies, natures, and trends of ambulatory encounters among active component members are informative and potentially useful. For example, the relatively large numbers of ambulatory visits for mental health disorders in general and the large numbers of visits for organic sleep disorders among males, reflect patterns of responses by the MHS to the effects of

combat- and deployment-related stresses on active component service members.

Also, this report documents all ambulatory healthcare visits but does not provide estimates of the incidence rates of the diagnoses described. In contrast to common, self-limited, and minor illnesses and injuries that require very little, if any, follow-up or continuing care, illnesses and injuries that necessitate multiple ambulatory visits for evaluation, treatment, and rehabilitation are overrepresented in this summary of the ambulatory burden of health care. Finally, medical data from sites that were using the new electronic health record for the Military Health System, MHS GENESIS, between July 2017 and October 2019 were not available in the DMSS at the time of the analysis. These sites include Naval Hospital Oak Harbor, Naval Hospital Bremerton, Air Force Medical Services Fairchild, and Madigan Army Medical Center. Therefore, medical encounter data for individuals seeking care at any of these facilities from July 2017 through October 2019 were not included in the current analysis.

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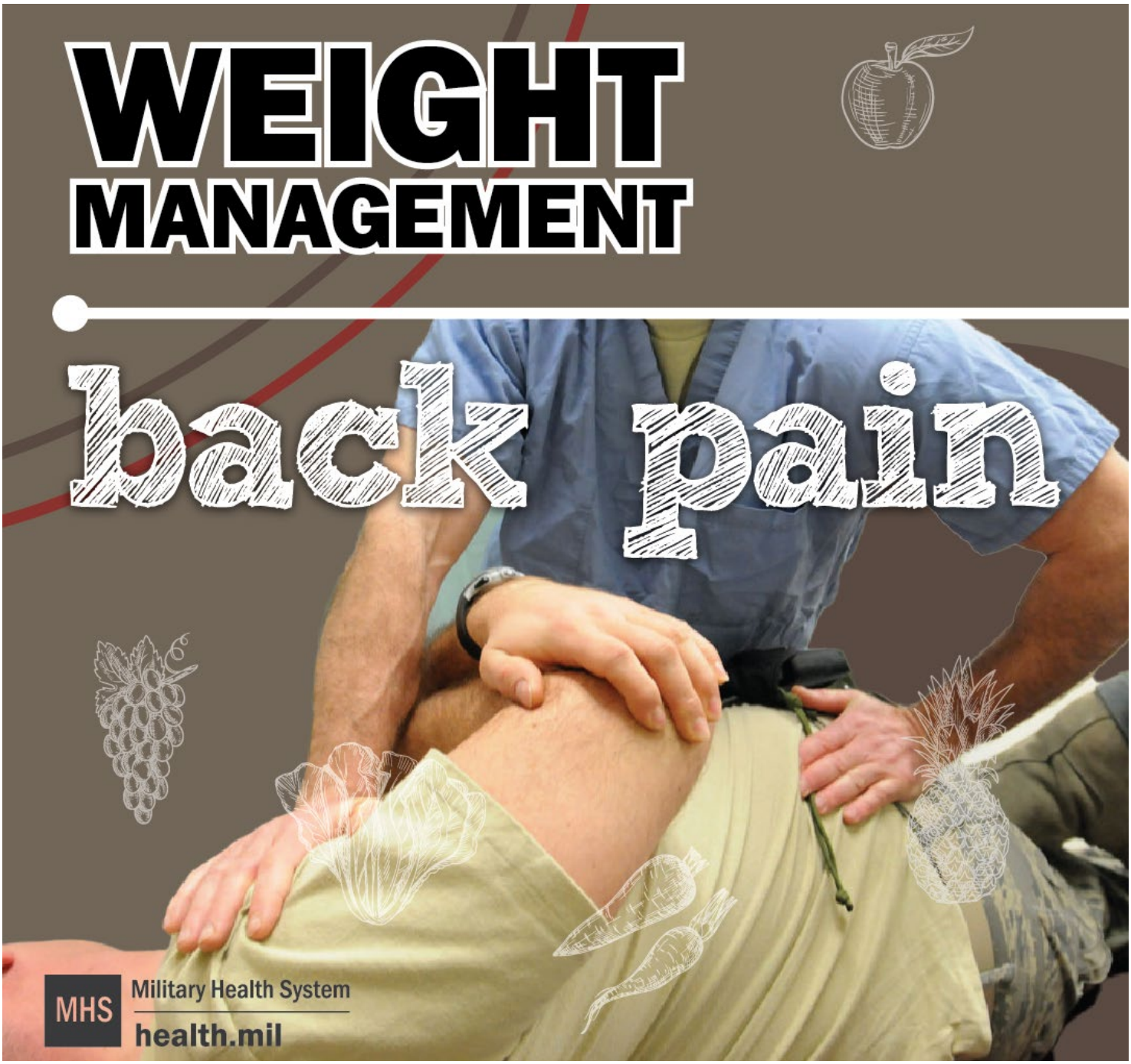


Surveillance Snapshot: Illness and Injury Burdens, Reserve Component, U.S. Armed Forces, 2021

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, 2021

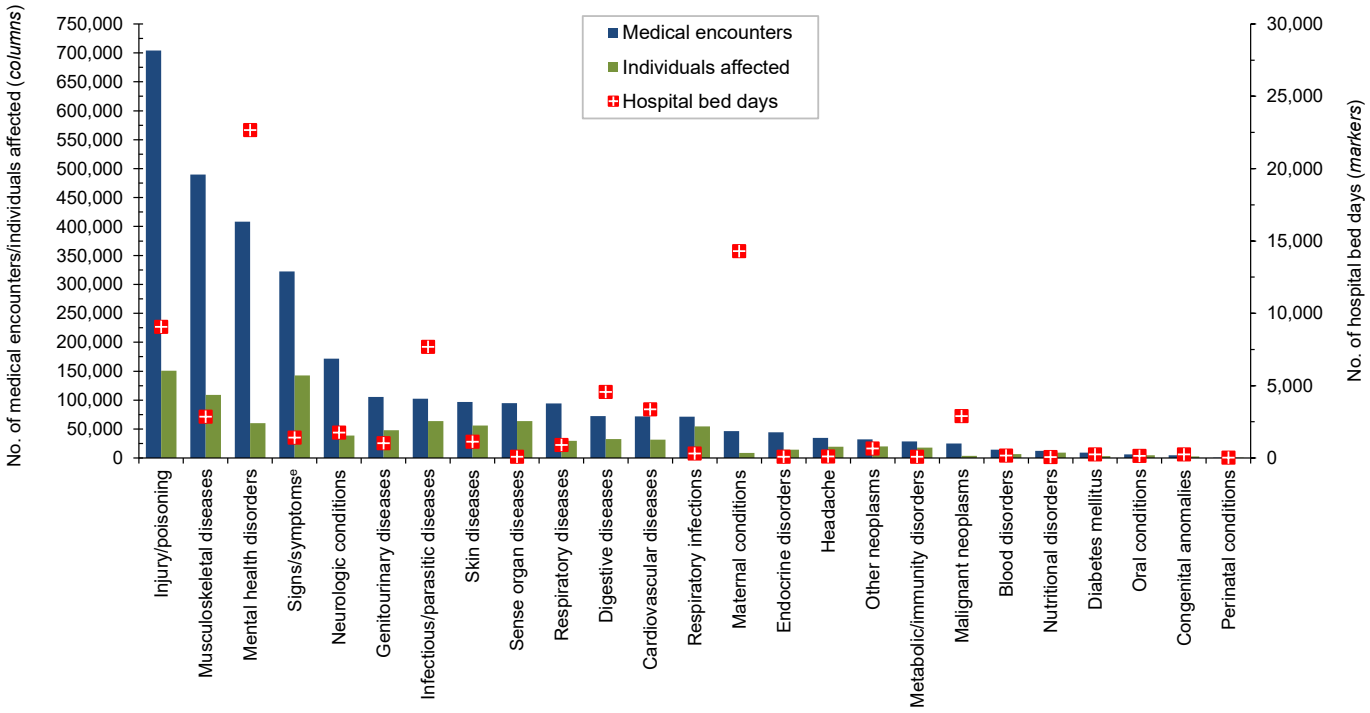
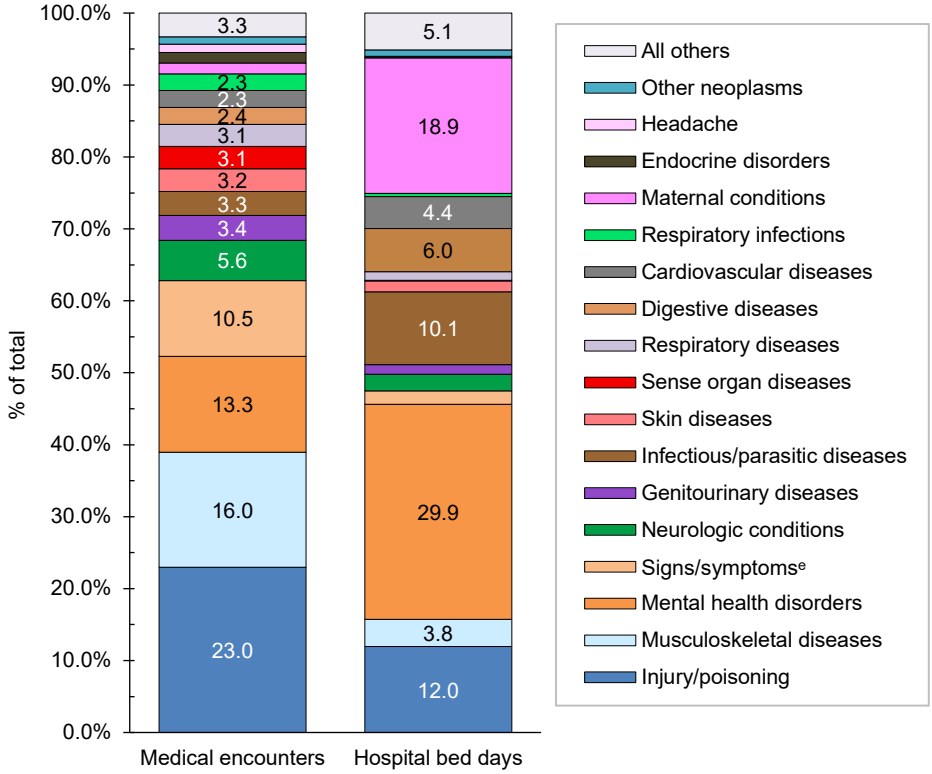


FIGURE 2. Percentages of medical encounters[a] and hospital bed days, by burden of disease category,[c] reserve component,[d] U.S. Armed Forces, 2021



[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 made up of Reserve and Guard members of each service.

[e]Includes ill-defined conditions.

No. number.

Surveillance Snapshot: Illness and Injury Burdens, Recruit Trainees, U.S. Armed Forces, 2021

FIGURE 1. Numbers of medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] recruit trainees,[d] active component, U.S. Armed Forces, 2021

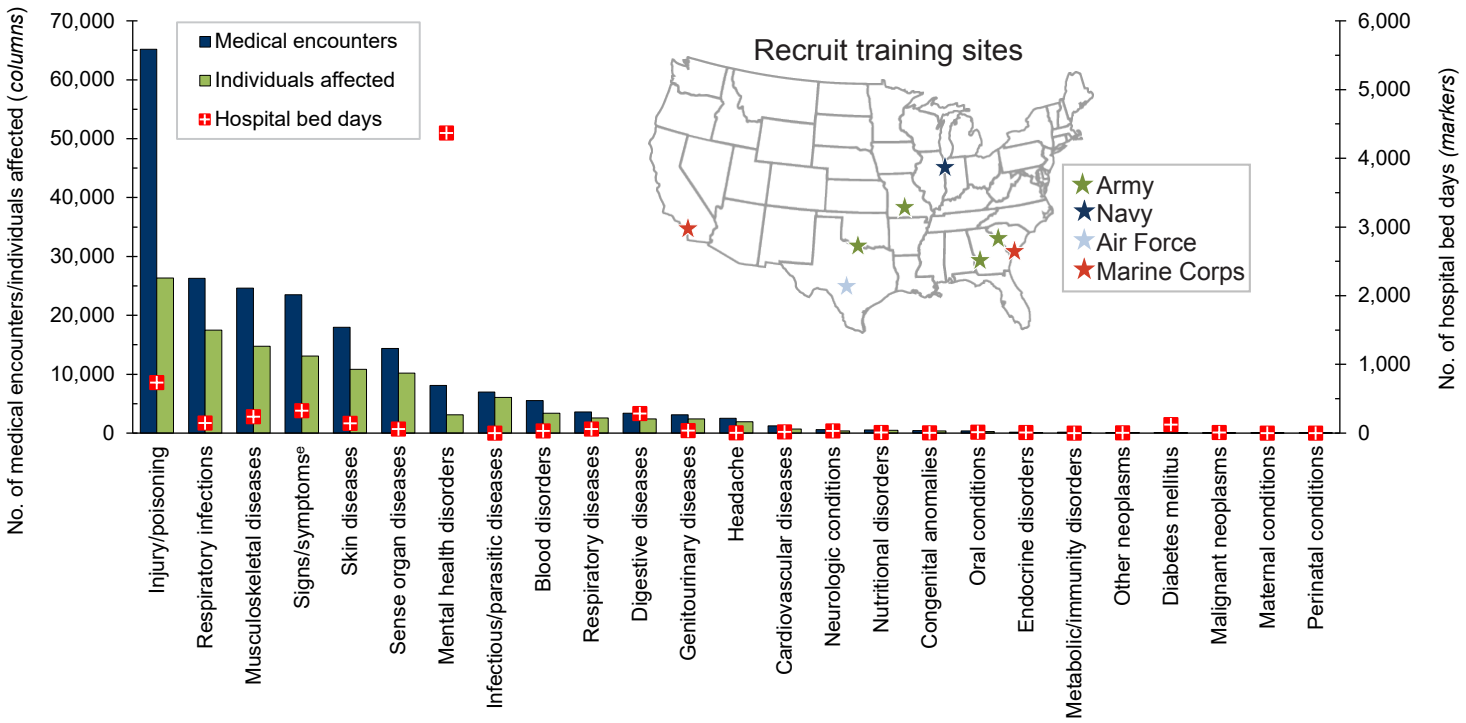
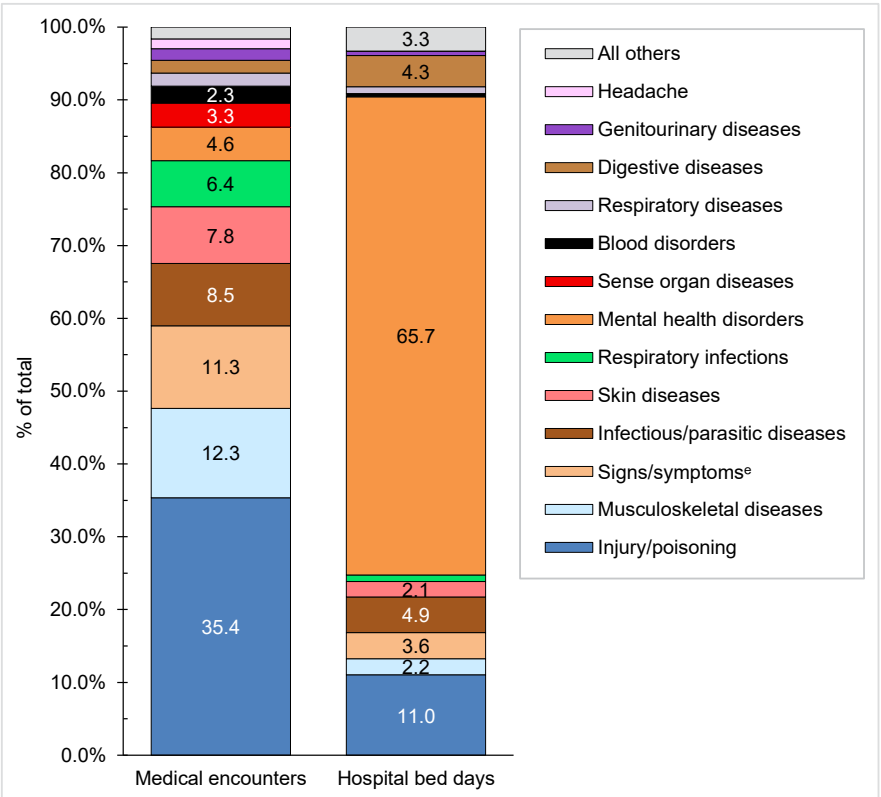


FIGURE 2. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[c] recruit trainees,[d] active component, U.S. Armed Forces, 2021



[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 mobidity burdens in the active component overall (see pp. 2–9).

[d]Recruit trainees are defined as active component members of the Army, Navy, Air Force, or Marine Corps with a rank of E1–E4 who served at 1 of the 8 basic training locations (Figure 1, map inset) during a service-specific training period following a first-ever personnel record. The data shown here are a subset of the active component data found on pp. 2–9.

[e]Includes ill-defined conditions.

No., number.

Medical Evacuations out of the U.S. Central and U.S. Africa Commands, Active and Reserve Components, U.S. Armed Forces, 2021

In recent years, there have been substantial reductions in U.S. Central Command (USCENTCOM) area of responsibility (AOR) combat operations in Southwest Asia, with the U.S. completing withdrawal from Afghanistan on 31 August 2021 and ending its combat mission in Iraq on 9 December 2021.[1,2] However, the number of service members deployed to the USCENTCOM AOR remains significant, with an estimated 40,000–60,000 troops deployed to 21 different countries.[3] In contrast, approximately 6,000 troops including civilians and contractors are deployed to the U.S. Africa Command (USAFRICOM), which includes all countries on the African continent except for Egypt (which is part of USCENTCOM).[4] Despite this relatively small number of deployed troops, the U.S. has increased operations in some African countries as the combat missions in Iraq and Afghanistan have come to a close, and both USAFRICOM and USCENTCOM remain important AORs for counterterrorism efforts.[4,5]

In theaters of operation, most medical care is provided by deployed military medical personnel; however, some injuries and illnesses require medical management outside the operational theater. In these cases, the affected individuals are usually transported by air to a fixed military medical facility in Europe or the U.S. where the service members receive the specialized, technically advanced, and/or prolonged diagnostic, therapeutic, and rehabilitative care required. Medical air transports, or medical evacuations, are costly and generally indicative of serious medical conditions. Some serious conditions are directly related to participation in or support of combat operations (e.g., battle wounds); however, many other conditions are unrelated to combat and may be preventable. This report summarizes the natures, numbers, and trends of conditions for which male and female military members were medically evacuated out of USCENTCOM or USAFRICOM AOR operations during 2021 and provides historical comparisons to the previous 4 years.

METHODS

The surveillance period was 1 January 2017 through 31 December 2021. The surveillance population included all members of the active and reserve components of the U.S. Army, Navy, Air Force, and Marine Corps who were deployed to the USCENTCOM or USAFRICOM AOR during the period. Medical evacuations conducted by the U.S. Transportation Command (TRANSCOM) from the USCENTCOM or USAFRICOM AOR 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 stipulated that the medical evacuee have at least 1 inpatient or outpatient medical encounter in a permanent military medical facility in the U.S. or Europe during a time interval extending from 5 days before to 10 days after the reported evacuation date. Data for evacuations out of USCENTCOM and USAFRICOM are presented separately.

Medical evacuations included in the analyses were classified by the causes and natures of the precipitating medical conditions (based on information reported in relevant evacuation and medical encounter records). First, all medical conditions that resulted in evacuations were classified as either "battle injuries" or "non-battle injuries and illnesses" (based on entries in an indicator field of the TRAC2ES evacuation record). Evacuations due to non-battle injuries and illnesses were subclassified into 18 illness/injury categories based on International Classification of Diseases, 9th and 10th Revisions (ICD-9 and ICD-10, respectively) diagnostic codes reported on the records of medical encounters after evacuation, including 1 category specific to diagnosis of COVID-19 or a post-COVID-19 condition (ICD-10: U07.1 or U09.9).

For the purposes of this report, all records of hospitalizations and ambulatory visits from 5 days before to 10 days after the reported date of each medical evacuation were identified. In most cases, the primary (first-listed) diagnosis for either a hospitalization (if any occurred) or the earliest ambulatory visit after evacuation was considered indicative of the condition responsible for the evacuation. However, if the first-listed diagnostic code specified the external cause (rather than the nature) of an injury (ICD-9 E-code/ICD-10 V-, W-, X-, or Y-code) or an encounter for something

WHAT ARE THE NEW FINDINGS?

The proportions of evacuations out of USCENTCOM that were due to battle injuries declined substantially in 2021. For USCENTCOM, evacuations for mental health disorders were the most common, followed by non-battle injury and poisoning, and signs, symptoms, and ill-defined conditions. For USAFRICOM, evacuations for non-battle injury and poisoning were most common, followed by disorders of the digestive system and mental health disorders.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Only 965 service members were evacuated out of USCENTCOM and 43 out of USAFRICOM during 2021, but the process of medical evacuation of service members to Europe and CONUS is logistically demanding. The effort expended to evacuate service members to sources of definitive, modern health care is a reassuring investment in the health, welfare, and importance of the men and women serving overseas.

other than a current illness or injury (e.g., observation, medical examination, or vaccination [ICD-9 V-codes/ICD-10 Z-codes other than those related to pregnancy]), then secondary diagnoses that specified illnesses and injuries (ICD-9: 001–999/ICD-10: A00–T88, U07.0, U07.1, or U09.9) were considered the likely reasons for the subject evacuations. If there was no secondary diagnosis 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 medical encounter were classified to document 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 2021, a total of 965 medical evacuations of service members from the USCENTCOM AOR and 43 from the USAFRICOM AOR were followed by at least 1 medical encounter in a fixed medical facility outside the operational theater **(Table 1)**. For USCENTCOM, there were more medical evacuations for mental health disorders (n=323; 33.5%) than for any other single category of illnesses or injuries. In order of decreasing frequency, the categories with the next most common medical evacuations were non-battle injuries and poisonings (n=235; 24.4%); signs, symptoms, and ill-defined conditions (n=88; 9.1%); musculoskeletal system/connective tissue disorders (n=77; 7.4%); and disorders of the digestive system (n=68; 7.0%). In USAFRICOM, medical evacuations for non-battle injuries and poisonings (n=12; 27.9%) were most common, followed by disorders of the digestive system (n=11; 25.6%) and mental health disorders (n=5; 11.6%). There were only 8 (0.8%) medical evacuations for battle injuries from USCENTCOM and there were 0 evacuations for battle injuries from USAFRICOM. The top 3 categories for USCENTCOM—mental health disorders (most frequently adjustment and depressive disorders); non-battle injuries (primarily fractures of extremities, dislocations, strains, and sprains); and signs, symptoms, and ill-defined conditions (such as syncope and collapse, abnormalities of heartbeat, localized swelling, etc.)—accounted for two-thirds (66.9%) of all evacuations **(Table 1)**.

TABLE 1. Numbers and percentages of medical encounters following medical evacuation from theater, by major ICD-10 diagnostic category, U.S. Armed Forces, 2021

	USCENTCOM						USAFRICOM					
	Total		Males		Females		Total		Males		Females	
Major diagnostic category (ICD-10 codes)	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mental disorders (F01 - F99)	323	33.5	231	30.0	92	46.9	5	11.6	5	13.2	0	0.0
Non-battle injury and poisoning (S00 - T88, DOD0101 - DOD0105)	235	24.4	200	26.0	35	17.9	12	27.9	11	28.9	1	20.0
Signs, symptoms and ill-defined conditions (R00 - R99)	88	9.1	67	8.7	21	10.7	3	7.0	2	5.3	1	20.0
Musculoskeletal system (M00 - M99)	71	7.4	64	8.3	7	3.6	4	9.3	4	10.5	0	0.0
Digestive system (K00 - K95)	68	7.0	57	7.4	11	5.6	11	25.6	9	23.7	2	40.0
Circulatory system (I00 - I99)	38	3.9	32	4.2	6	3.1	2	4.7	2	5.3	0	0.0
Nervous system and sense organs (G00 - G99, H00 - H95)	33	3.4	28	3.6	5	2.6	3	7.0	2	5.3	1	20.0
COVID-19 (U07.1, U09.9)	27	2.8	22	2.9	5	2.6	0	0.0	0	0.0	0	0.0
Genitourinary system (N00 - N99)	17	1.8	11	1.4	6	3.1	1	2.3	1	2.6	0	0.0
Neoplasms (C00 - D49)	13	1.3	13	1.7	0	0.0	0	0.0	0	0.0	0	0.0
Endocrine, nutrition, immunity (E00 - E89)	12	1.2	10	1.3	2	1.0	0	0.0	0	0.0	0	0.0
Other (Z00 - Z99, except pregnancy related)	9	0.9	7	0.9	2	1.0	2	4.7	2	5.3	0	0.0
Respiratory system (J00 - J99, U07.0)	9	0.9	8	1.0	1	0.5	0	0.0	0	0.0	0	0.0
Battle injury (from TRAC2ES records)	8	0.8	7	0.9	1	0.5	0	0.0	0	0.0	0	0.0
Skin and subcutaneous tissue (L00 - L99)	5	0.5	5	0.7	0	0.0	0	0.0	0	0.0	0	0.0
Infectious and parasitic diseases (A00 - B99)	3	0.3	3	0.4	0	0.0	0	0.0	0	0.0	0	0.0
Congenital anomalies (Q00 - Q99)	2	0.2	2	0.3	0	0.0	0	0.0	0	0.0	0	0.0
Hematologic disorders (D50 - D89)	2	0.2	2	0.3	0	0.0	0	0.0	0	0.0	0	0.0
Pregnancy and childbirth (O00 - O9A, relevant Z codes)	2	0.2	0	0.0	2	1.0	0	0.0	0	0.0	0	0.0
Total	965	100.0	769	100.0	196	100.0	43	100.0	38	100.0	5	100.0

USCENTCOM, U.S. Central Command; USAFRICOM, U.S. Africa Command; ICD, International Classification of Diseases; No., number; TRAC2ES, U.S. Transportation Command (TRANSCOM) Regulating and Command & Control Evacuation System; COVID-19, coronavirus-2019.

Similarly in USAFRICOM, the top 3 categories— non-battle injuries (most frequently shoulder and upper arm injuries); disorders of the digestive system (e.g., inguinal hernias, appendicitis, and other diseases); and mental health disorders—accounted for almost two-thirds (65.1%) of all evacuations.

During 2017–2021, the annual number of medical evacuations out of USCENTCOM attributable to battle injuries was highest in 2017 (n=72), decreased in 2018 (n=57), remained relatively stable through 2020 (n=59), and then decreased substantially in 2021 (n=8) **(Figure 1)**. There was a peak in the monthly number of medical evacuations out of USCENTCOM attributable to battle injuries in January 2020 (n=32) **(Figure 1)**. The annual number of medical evacuations out of USCENTCOM attributable to non-battle injuries and diseases fluctuated between 957 and 1,209 during the 2017–2021 surveillance period. For USAFRICOM, the annual number of medical evacuations attributable to battle injuries ranged from 3 to 6 during the first 4 years of the surveillance period but then decreased to 0 in 2021 **(Figure 2)**. The annual number of medical evacuations out of USAFRICOM attributable to non-battle injuries and diseases peaked in 2019 (n=218) and decreased through 2021 (n=43).

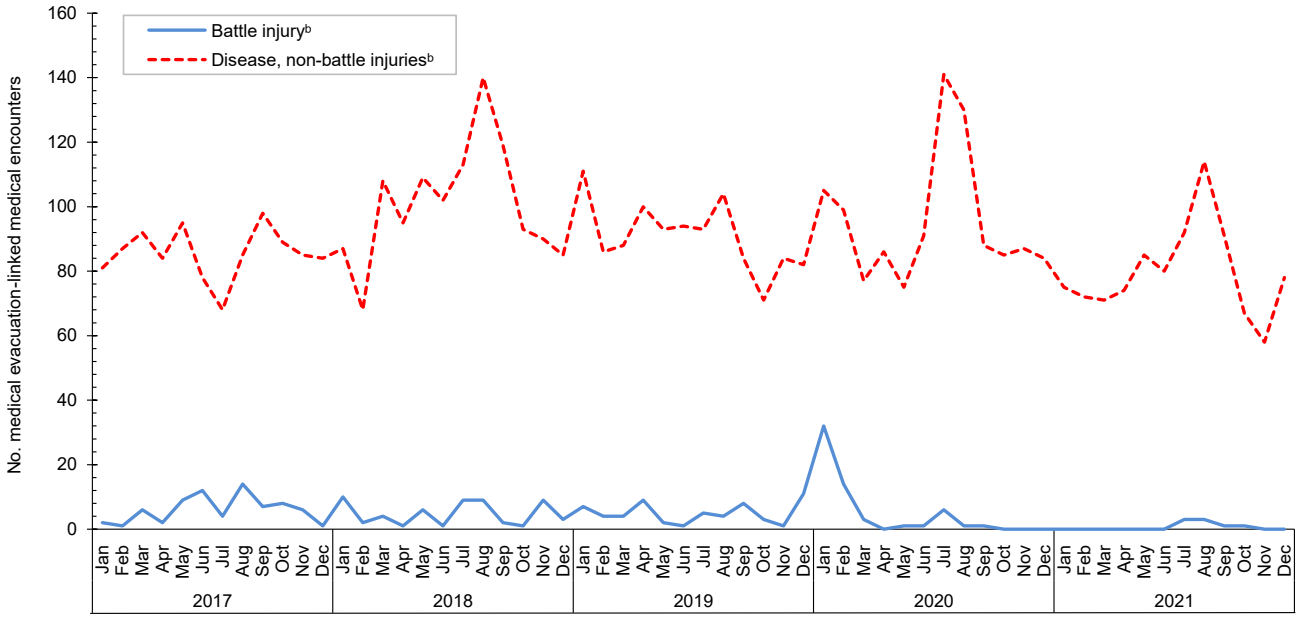
Demographic and military characteristics

The percentage of medical evacuations in 2021 was higher among male than female service members for both USAFRICOM (88.4% vs. 11.6%) and USCENTCOM (79.8% vs. 20.3%) **(Table 1, 2)**. The most frequent causes of medical evacuations out of USCENTCOM among male service members were mental health disorders (n=231; 30.0%); non-battle injury and poisoning (n=200; 26.0%); and signs, symptoms, and ill-defined conditions (n=67; 8.7%) **(Table 1)**. Similarly, among female service members, the most frequent causes of medical evacuations were mental health disorders (n=92; 46.9%); non-battle injury and poisoning (n=35; 17.9%); and signs, symptoms, and ill-defined conditions (n=21; 10.7%). The most frequent causes of medical evacuations out of USAFRICOM among male service members were non-battle injury and poisoning (n=11; 28.9%); digestive system disorders (n=9; 23.7%); and mental health disorders (n=5; 13.2%). There were only 5 medical evacuations out of USAFRICOM among female service members in 2021.

Compared to males, female service members had notably higher percentages of medical evacuations out of USCENTCOM for mental health disorders and genitourinary system disorders **(Table 1)**. In contrast, male service members had higher percentages of evacuation out of USCENTCOM for non-battle related injuries, musculoskeletal system disorders, and digestive system conditions.

Within the various demographic and military characteristics of those service members who were evacuated, the largest numbers and proportions of evacuees out of USCENTCOM were among non-Hispanic White service members, those aged 20–24 years, members of the Army, junior and senior enlisted personnel, and those in repair/engineering occupations **(Table 2)**. The largest numbers and proportions

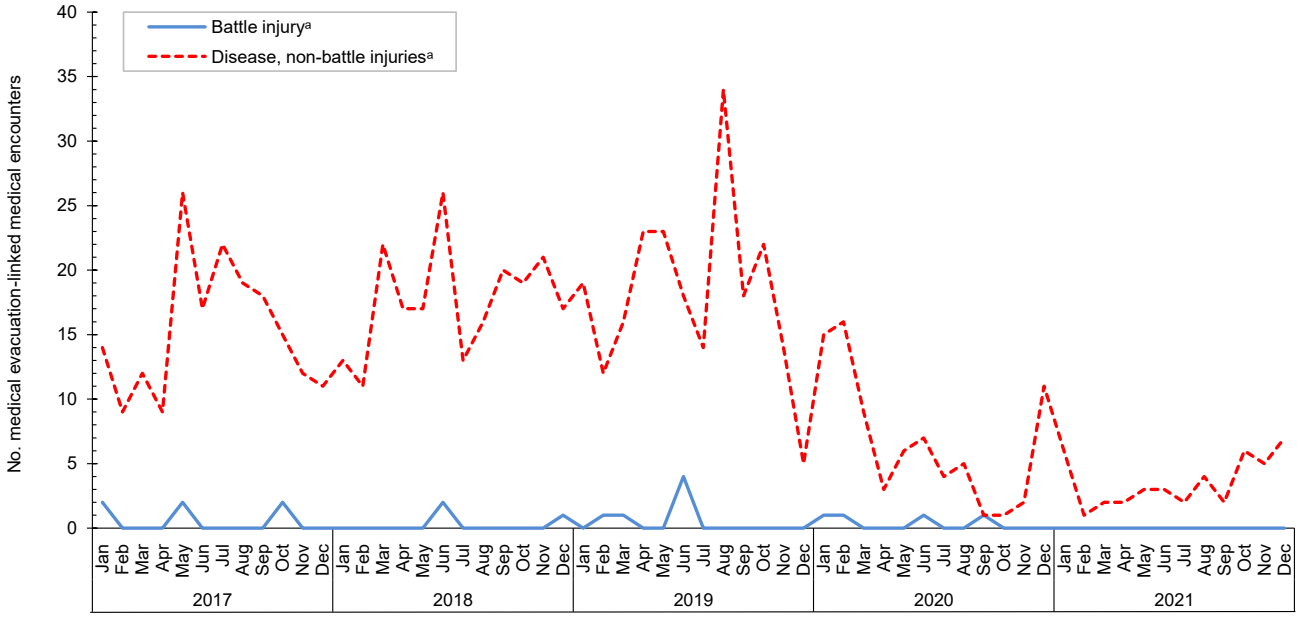
FIGURE 1. Numbers of medical evacuations of U.S. service members for battle injuries and for disease and non-battle injuries, USCENTCOM, by month, 2017–2021[a]



	2017	2018	2019	2020	2021
Battle injuries	72	57	59	59	8
Disease, non-battle injuries	1,026	1,209	1,090	1,148	957

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

FIGURE 2. Numbers of medical evacuations of U.S. service members for battle injuries and for disease and non-battle injuries, USAFRICOM, by month, 2017–2021[a]



	2017	2018	2019	2020	2021
Battle injuries	6	3	6	4	0
Disease, non-battle injuries	184	212	218	80	43

[a]These classifications are based on the causal event of medical evacuation medical encounters..
USAFRICOM, U.S. Africa Command; No., number..

of evacuees out of USAFRICOM were among non-Hispanic White service members, those aged 30–34 years, members of the Air Force, senior enlisted personnel, and those in communications/intelligence or other or unknown occupations. In 2021, most medical evacuations out of USCENTCOM (85.8%) and USAFRICOM (69.8%) were characterized as having routine precedence. The remainder of evacuations had priority (11.2% USCENTCOM; 16.3% USAFRICOM) or urgent (3.0% USCENTCOM; 14.0% USAFRICOM) precedence. Most medical evacuations were accomplished through military transport (83.5% USCENTCOM; 69.8% USAFRICOM) **(Table 2)**.

Most frequent specific diagnoses

Among both male and female service members medically evacuated out of USCENTCOM in 2021, a mental health disorder ("reaction to severe stress, and adjustment disorders") was the most frequent specific diagnosis (3-digit ICD-10 diagnosis code: F43) during initial medical encounters after evacuations **(Table 3)**. The next most common 3-digit diagnoses for male service members were fractures at the hand and wrist level (ICD-10: S62), and COVID-19 (ICD-10: U07.1). For female service members, the second and third most common 3-digit diagnoses were for depressive episodes (ICD-10: F32) and recurrent major depressive disorder (ICD-10: F33). Among male service members medically evacuated out of USAFRICOM in 2021, "Injury of muscle, fascia and tendon at shoulder and upper arm level" was the most frequent specific diagnosis (3-digit ICD-10 diagnosis code: S46) during initial medical encounters after evacuations.

Disposition

Of the 965 USCENTCOM medical evacuations and 43 USAFRICOM evacuations in 2021, a total of 430 (44.6%) out of USCENTCOM and 18 (41.9%) out of USAFRICOM resulted in inpatient encounters. About four-fifths (82.8%) of all service members who were hospitalized after medical evacuations out of USCENTCOM were discharged back to duty. All service members who were hospitalized after medical evacuations out of USAFRICOM were discharged back to duty. Less than one-tenth (8.8%) of service members who were hospitalized after medical evacuations out of USCENTCOM were transferred or discharged to other facilities **(Table 4)**.

Among medical evacuations out of USCENTCOM, return to duty dispositions were much more likely after hospitalizations for non-battle injuries (n=64, 71.9%) than for battle injuries (n=1, 33.3%). The majority (n=2, 66.7%) of battle injury-related hospitalizations and a little more than one-fifth (n=17, 19.1%) of non-battle injury-related hospitalizations resulted in transfers/discharges to other facilities **(Table 4)**.

Slightly more than one-half of all medical evacuations out of USCENTCOM (n=535; 55.4%) and USAFRICOM (n=25; 58.1%) resulted in outpatient encounters only. Of the service members who were treated exclusively in outpatient settings after evacuations, the majority (64.7% USCENTCOM; 72.0% USAFRICOM) were discharged back to duty without work/duty limitations or released with work/duty limitations (22.8% USCENTCOM; 8.0% USAFRICOM). Service members treated as outpatients after battle injury-related evacuations out of USCENTCOM were more

TABLE 2. Demographic and military characteristics of service members medically evacuated from the U.S. Central and Africa Command area of responsiblity, U.S. Armed Forces, 2021

	CENTCOM		AFRICOM	
	No.	% total	No.	% total
Total	965	100.0	43	100.0
Sex				
Male	769	79.7	38	88.4
Female	196	20.3	5	11.6
Age group (years)				
<20	15	1.6	0	0.0
20–24	305	31.6	10	23.3
25–29	212	22.0	10	23.3
30–34	165	17.1	14	32.6
35–39	115	11.9	6	14.0
40–44	63	6.5	2	4.7
45+	90	9.3	1	2.3
Race/ethnicity group				
Non-Hispanic White	504	52.2	21	48.8
Non-Hispanic Black	197	20.4	10	23.3
Hispanic	154	16.0	5	11.6
Other/unknown	110	11.4	7	16.3
Service				
Army	581	60.2	15	34.9
Navy	155	16.1	5	11.6
Air Force	205	21.2	18	41.9
Marine Corps	24	2.5	5	11.6
Component				
Active	557	57.7	30	69.8
Reserve/Guard	408	42.3	13	30.2
Rank/grade				
Junior enlisted (E1–E4)	402	41.7	13	30.2
Senior enlisted (E5–E9)	416	43.1	23	53.5
Junior officer (O1–O3; W1–W3)	91	9.4	2	4.7
Senior officer (O4–O10; W4–W5)	56	5.8	5	11.6
Military occupation				
Combat-specific[a]	162	16.8	6	14.0
Motor transport	44	4.6	3	7.0
Repair/engineering	266	27.6	6	14.0
Communications/intelligence	218	22.6	13	30.2
Health care	81	8.4	2	4.7
Other/unknown	194	20.1	13	30.2
Marital status				
Married	514	53.3	22	51.2
Single, never married	387	40.1	19	44.2
Other/unknown	64	6.6	2	4.7
Education level				
High school or less	592	61.3	27	62.8
Some college	156	16.2	7	16.3
College	199	20.6	8	18.6
Other/unknown	18	1.9	1	2.3
Precedence[b]				
Routine	828	85.8	30	69.8
Priority	108	11.2	7	16.3
Urgent	29	3.0	6	14.0
Transport_mode_num[b]				
Military	806	83.5	30	69.8
Commercial	10	1.0	2	4.7
Other/unknown	149	15.4	11	25.6

[a]Infantry/artillery/combat engineering/armor.
[b]Data field within U.S. Transportation Command (TRANSCOM) Regulating and Command & Control Evacuation System (TRAC2ES).
CENTCOM, Central Command; AFRICOM, Africa Command; No., number.

likely to be released without limitations (n=5; 100%) than USCENTCOM medical evacuees treated as outpatients for non-battle injuries (n=104; 71.2%) **(Table 4)**.

EDITORIAL COMMENT

This report documented that in 2021, only 8 (0.8%) of all medical evacuations out of USCENTCOM, and 0 medical evacuations out of USAFRICOM, were associated with battle injuries. Counts of evacuations for battle injuries out of USCENTCOM decreased substantially in 2021, likely reflecting the significantly reduced amount of combat operations in the USCENTCOM AOR as compared to the prior years of Operation Iraqi Freedom and Operation Enduring Freedom. However, there was a small spike in the number of medical evacuations for battle injuries in USCENTCOM in January 2020, coinciding with the Iranian ballistic missile attack on the U.S. al-Asad Air Base in Iraq.

Most evacuations out of USCENTCOM in 2021 were attributed to mental health disorders, followed by non-battle injuries and poisonings; signs, symptoms, and ill-defined conditions; and musculoskeletal disorders. Evacuations during the entire 5-year surveillance period followed a similar pattern. In USCENTCOM, during each year of the entire 5-year surveillance period, mental health disorders were the most frequent diagnosis followed by non-battle injuries; signs, symptoms and ill-defined conditions; musculoskeletal disorders; and digestive system disorders. In USAFRICOM, non-battle injuries was the most frequent diagnosis each year of the surveillance period. Between 2017 and 2020, in terms of frequency of occurrence, non-battle injuries was followed by signs, symptoms and ill-defined conditions, and mental health disorders. However, in 2021, non-battle injuries was followed by digestive system disorders and mental health disorders. In 2021, male service members had higher percentages of evacuations out of USCENTCOM for non-battle related injuries, musculoskeletal system disorders, and digestive system conditions compared to female service members. The majority of service members

TABLE 3. Most frequent 3-digit ICD-10 diagnoses from medical evacuations, by sex, U.S. Armed Forces, 2021

USCENTCOM					
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	159	F43	Reaction to severe stress, and adjustment disorders	67
S62	Fracture at wrist and hand level	30	F32	Depressive episode	9
U07	Emergency use of U07	22	F33	Major depressive disorder, recurrent	6
M54	Dorsalgia	21	S83	Dislocation and sprain of joints and ligaments of knee	6
S83	Dislocation and sprain of joints and ligaments of knee	21	S06	Intracranial injury	5
USAFRICOM					
Males			Females		
3-digit ICD-10	ICD-10 code description	No.	3-digit ICD-10	ICD-10 code description	No.
S46	Injury of muscle, fascia and tendon at shoulder and upper arm level	5	H05	Disorders of orbit	1
K40	Inguinal hernia	3	K29	Gastritis and duodenitis	1
F10	Alcohol related disorders	2	K80	Cholelithiasis	1
F43	Reaction to severe stress, and adjustment disorders	2	R22	Localized swelling, mass and lump of skin and subcutaneous tissue	1
K92	Other diseases of digestive system	2	S16	Injury of muscle, fascia and tendon at neck level	1

ICD, International Classification of Diseases; USCENTCOM, U.S. Central Command; USAFRICOM, U.S Africa Command; No., number.

TABLE 4. Dispositions after inpatient or outpatient encounters following medical evacuation, U.S. Armed Forces, 2021

	USCENTCOM						USAFRICOM					
Disposition	Total		Battle injury		Non-battle injury and poisoning		Total		Battle injury		Non-battle injury and poisoning	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total	965	100.0	8	0.8	235	24.4	43	100.0	0	0.0	12	27.9
Inpatient	430	44.6	3	37.5	89	37.9	18	41.9	0	0.0	4	33.3
Returned to duty	356	82.8	1	33.3	64	71.9	18	100.0	0	0.0	4	100.0
Transferred/discharged to other facility	38	8.8	2	66.7	17	19.1	0	0.0	0	0.0	0	0.0
Discharged home	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Separated	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Died	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other/unknown	36	8.4	0	0.0	8	9.0	0	0.0	0	0.0	0	0.0
Outpatient	535	55.4	5	62.5	146	62.1	25	58.1	0	0.0	8	66.7
Released without limitation	346	64.7	5	100.0	104	71.2	18	72.0	0	0.0	6	75.0
Released with work/duty limitation	122	22.8	0	0.0	27	18.5	2	8.0	0	0.0	2	25.0
Sick at home/quarters	2	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Immediate referral	5	0.9	0	0.0	2	1.4	0	0.0	0	0.0	0	0.0
Admitted/transferred to civilian hospital	4	0.7	0	0.0	1	0.7	0	0.0	0	0.0	0	0.0
Died	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Discharged home	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other/unknown	56	10.5	0	0.0	12	8.2	5	20.0	0	0.0	0	0.0

USCENTCOM, U.S. Central Command; USAFRICOM, U.S Africa Command; No., number.

who were evacuated out of USCENTCOM or USAFRICOM were returned to normal duty status following their post-evacuation hospitalizations or outpatient encounters.

Overall, the changes in numbers of medical evacuations over the course of the surveillance period reflect the drawdown of combat operations in USCENTCOM and the small but increasing expansion of operations in USAFRICOM. The relatively low percentage of medical evacuations in 2021 suggests that most deployers were sufficiently healthy and ready for their deployments and received the medical care in theater necessary to complete their assignments without having to be evacuated. Moreover, the fact that very few medical evacuations were conducted for chronic conditions such as hematologic disorders and congenital anomalies also supports the idea that most deployers were sufficiently healthy for deployment. However, it is not surprising that such conditions were occasionally diagnosed among deployed service members. For example, there were 2 medical evacuations out of USCENTCOM for congenital anomalies in 2021; one for congenital diaphragmatic hernia and 1 for sinus, fistula and cyst of branchial cleft **(data not shown)**. Because congenital anomalies may not be identified and diagnosed until later in life, [6] and may also cause health issues later in life, the infrequent detection of such diagnoses during deployment is not unexpected.

The proportion of 2021 medical evacuations out of USCENTCOM attributed to mental health disorders (33.5%) represents a slight increase over the proportion reported in recent *MSMR* analyses of medical evacuations reported in 2020 (27.2%) and 2019 (27.1%), and considerably higher than the proportion (11.6%) reported in an earlier *MSMR* report examining evacuations from Iraq during a 9-year period between 2003 and 2011.[7-9] However, the latter article also reported that during the last 4 years of the surveillance period (2008–2011), as the proportion of evacuations for battle injuries fell sharply, the proportions of evacuations for mental health disorders increased dramatically for both male (peak of 20.9% in 2010) and female service members (peak of 26.6% in 2010). Although some studies have indicated improved access to mental health care in deployed settings, the results from the current analysis indicate that mental health diagnoses still represent the single most common basis for medical evacuations out of the USCENTCOM AOR.[10] This could be due, at least in part, to variations in the availability of mental health care in deployed settings. In these settings, the distribution of providers and clinics that deliver such services is uneven and varies according to factors such as the number of deployed personnel and the assessed needs of the particular unit.[10] In addition, although the number of mental health care providers in Afghanistan increased from 2005 through 2010, this number decreased after 2013 as part of the overall drawdown of U.S. troops from the region.[10]

Several important limitations should be considered when interpreting the results of this analysis. Direct comparisons of numbers and percentages of medical evacuations by cause, as between male and female service members, can be misleading; for example, such comparisons do not account for differences between the groups in other characteristics (e.g., age, grade, military occupation, location, and activities while deployed) that are significant determinants of medical evacuation risk. Moreover, because data about the characteristics of the entire deployed population of service members were not available, it was not possible to determine if the members of demographic and military groups listed above were over- or underrepresented among the evacuees. Also, for this report, most causes of medical evacuations were estimated from primary diagnoses that were recorded during hospitalizations or initial outpatient encounters after evacuation. In some cases, clinical evaluations in fixed medical treatment facilities after medical evacuations may have ruled out serious conditions that were clinically suspected in theater. For this analysis, the causes of such evacuations reflect diagnoses that were determined after evaluations outside of the theater rather than diagnoses—perhaps of severe disease—that were clinically suspected in theater. To the extent that this occurred, the causes of some medical evacuations may seem surprisingly minor.

Overall, the results of the current analysis highlight the continued need to tailor force health protection policies, training, supplies, equipment, and practices based on characteristics of the deployed force (e.g., combat vs. support; male vs. female) and the nature of the military operations (e.g., combat vs. humanitarian assistance).

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Morbidity Burdens Attributable to Various Illnesses and Injuries, Deployed Active and Reserve Component Service Members, U.S. Armed Forces, 2021

Every 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) using electronic records of medical encounters from the Defense Medical Surveillance System (DMSS). These records document health care delivered in the fixed medical facilities of the MHS and in civilian medical facilities when care is paid for by the MHS. Health care encounters of deployed service members are documented in records that are maintained in the Theater Medical Data Store (TMDS), which is incorporated into the DMSS. This report updates previous analyses examining the distributions of illnesses and injuries that accounted for medical encounters ("morbidity burdens") of active component members in deployed settings in the U.S. Central Command (USCENTCOM) and the U.S. Africa Command (USAFRICOM) areas of operations during the 2021 calendar year.[1]

METHODS

The surveillance population included all individuals who served in the active or reserve components of the U.S. Army, Navy, Air Force, or Marine Corps and who had records of health care encounters captured in the TMDS during the surveillance period. The analysis was restricted to encounters where the theater of care specified was USCENTCOM or USAFRICOM 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 (e.g., SAMS, SAMS8, SAMS9) or where the military treatment facility descriptor indicated that care was provided aboard a ship (e.g., *USS George H.W. Bush* or *USS Dwight D. Eisenhower*) were excluded from this analysis. Encounters from aeromedical staging facilities outside of USCENTCOM or USAFRICOM (e.g., the 779th Medical Group Aeromedical Staging Facility or the 86th Contingency Aeromedical Staging Facility) 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 or beginning with Z37). Primary diagnoses that did not correspond to an ICD-9 or ICD-10 code (e.g., 1XXXX, 4XXXX) were not reported in this burden analysis.

In tandem with the methodology described on pages 2–3 of this issue of the *MSMR*, all illness- and injury-specific diagnoses were grouped into 153 burden of disease-related conditions and 25 major categories based on a modified version of the classification system developed for the Global Burden of Disease (GBD) study.[2] The morbidity burdens attributable to various conditions were estimated on the basis of the total number of medical encounters attributable to each condition (i.e., total hospitalizations and ambulatory visits for the condition with a limit of 1 encounter per individual per condition per day) and the numbers of service members affected by the conditions. In general, the GBD system groups diagnoses with common pathophysiologic or etiologic bases and/or significant international health policy-making importance. For this analysis, some diagnoses that are grouped into single categories in the GBD system (e.g., mental health disorders) were disaggregated. Also, injuries were categorized by the affected anatomic sites rather than by causes because external causes of injuries are not completely reported in TMDS records. It is important to note that because the TMDS has not fully transitioned to ICD-10 codes, some ICD-9 codes appear in this analysis. In addition to the examination of the distribution of diagnoses by the 153 conditions and the 25 major categories of disease burden, a third analysis depicts the distribution of diagnoses according to the 17 traditional categories of the ICD system, plus an 18th category dedicated to COVID-19.

WHAT ARE THE NEW FINDINGS?

As in previous years, among service members deployed during 2021, injury/poisoning, musculoskeletal diseases and signs/symptoms accounted for more than half of the total health care burden during deployment. Compared to garrison disease burden, deployed service members had relatively higher proportions of encounters for respiratory infections, skin diseases, and infectious and parasitic diseases. The recent marked increase in the percentage of total medical encounters attributable to the ICD diagnostic category "other" (23.0% in 2017 to 44.4% in 2021) is likely due to increases in diagnostic testing and immunization associated with the response to the COVID-19 pandemic.

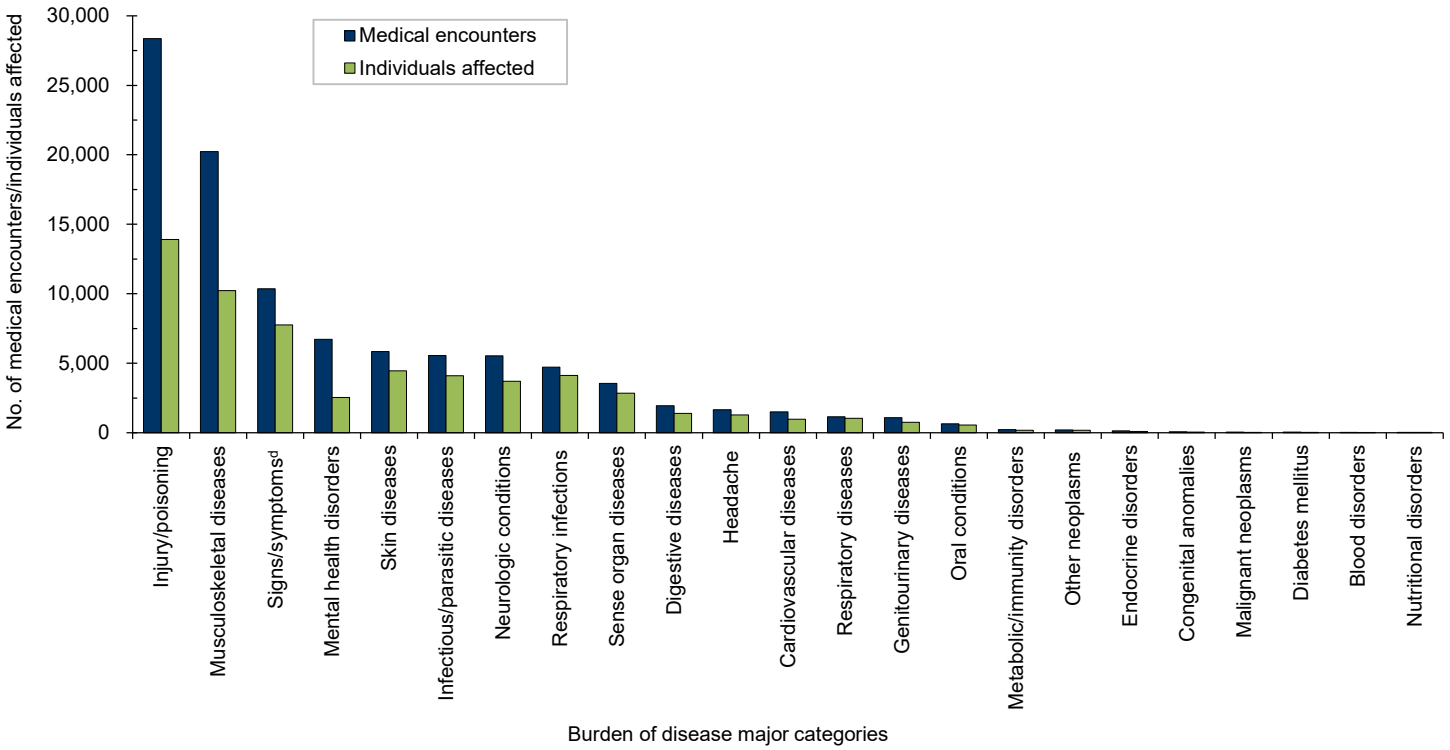
WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Injuries and musculoskeletal diseases account for the greatest burden of deployed medical care and continued focus on surveillance and preventive measures for these health threats is warranted. While deployed, readiness may be impacted by conditions associated with austere environmental and sanitary conditions.

RESULTS

In 2021, a total of 131,694 medical encounters occurred among 48,457

FIGURE 1a. Medical encounters[a] and individuals affected,[b] by burden of disease major category,[c] deployed male service members, U.S. Armed Forces, 2021



[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.[2]
[d]Includes ill-defined conditions.
No., number.

individuals while deployed to Southwest Asia/Middle East and Africa. Of the total medical encounters, 141 (0.11%) were indicated to be hospitalizations **(data not shown)**. A majority of the medical encounters (75.7%), individuals affected (79.9%), and hospitalizations (79.4%) occurred among male service members **(Figures 1a, 1b)**.

Medical encounters/individuals affected by burden of disease categories

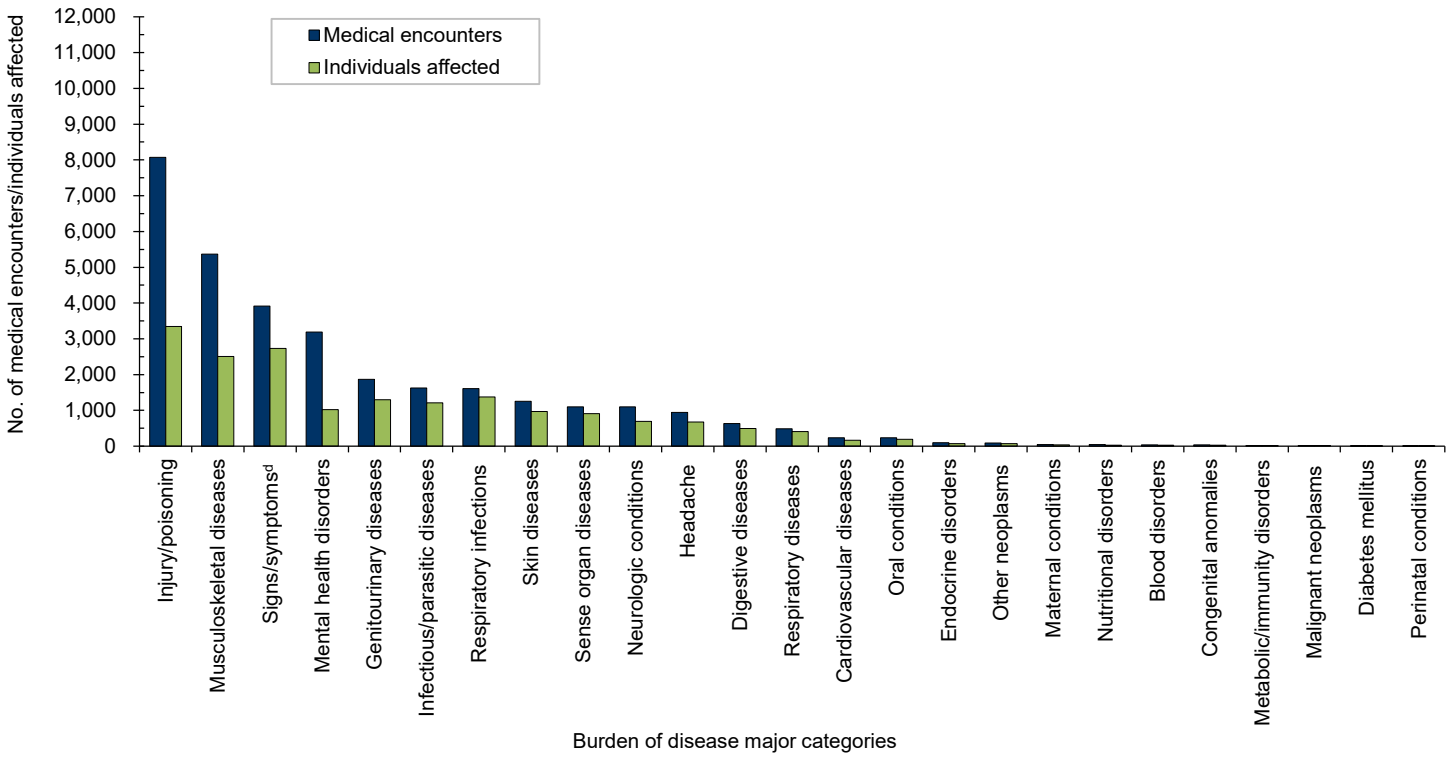
During 2021, the percentages of total medical encounters by burden of disease categories in both deployed male and female service members were generally similar; in both sexes, more encounters were attributable to injury/poisoning, musculoskeletal diseases, and signs/symptoms (including ill-defined conditions) than any other categories **(Figures 1a, 1b, 2a, 2b)**. The substantial burden of these disease categories on total medical encounters was also reflected as the top-3 categories for which individuals received medical care while deployed. Of note, female service members had a greater proportion of medical encounters for genitourinary diseases (5.8%) compared to male service members (1.1%).

Among both male and female service members, 4 burden conditions (other back problems, arm/shoulder injuries, knee injuries, and all other signs and symptoms) were among the top 5 burden conditions that accounted for the most medical encounters in 2021 **(Figures 3a, 3b)**. The remaining burden conditions among the top 5 were organic sleep disorders (specifically, circadian rhythm disorders) among male service members and foot and ankle injuries among female service members.

The 4-digit ICD-10 code with the most medical encounters in the other back problems category during 2021 was for low back pain **(data not shown)**. For all other musculoskeletal diseases, the most common 4-digit ICD code for both male and female service members was for cervicalgia. The most common 4-digit ICD-10 codes for arm/shoulder injuries and knee injuries were for pain in the specified body part (e.g., pain in right or left shoulder or pain in right or left knee) **(data not shown)**. The 4-digit ICD-10 code with the third most medical encounters was for acute upper respiratory infection, unspecified **(data not shown)**.

Of note, among male service members, less than 0.3% of all medical encounters during deployment were associated with any of the following major morbidity categories: metabolic/immunity disorders, other neoplasms, endocrine disorders, congenital anomalies, malignant neoplasms, diabetes mellitus, blood disorders, and

FIGURE 1b. Medical encounters[a] and individuals affected,[b] by burden of disease major category,[c] deployed female service members, U.S. Armed Forces, 2021



[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.[2]
[d]Includes ill-defined conditions.
No., number.

nutritional disorders **(Figure 1a)**. Among female service members, less than 0.3% of all medical encounters during deployment were associated with maternal conditions, nutritional disorders, blood disorders, congenital anomalies, metabolic/immunity disorders, malignant neoplasms, diabetes mellitus, and perinatal conditions **(Figure 1b)**.

Medical encounters by major ICD-10 diagnostic category

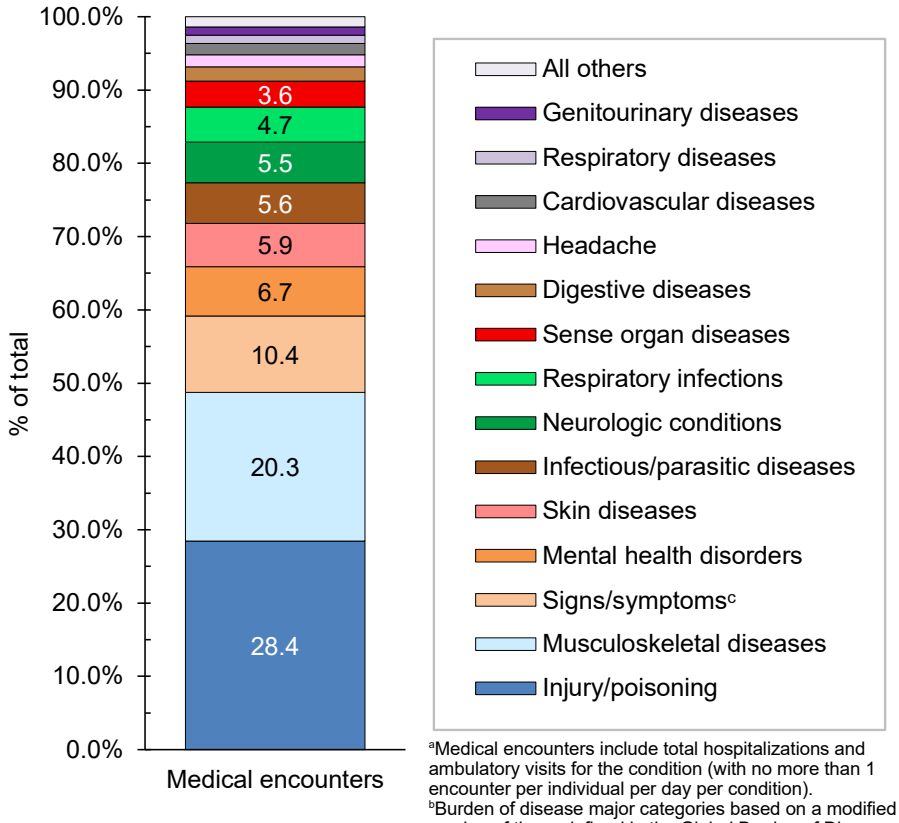
In 2021, among the 18 major ICD-10 diagnostic categories, the largest percentages of medical encounters were attributable to "other" (includes factors influencing health status and contact with health services as well as external causes of morbidity), followed by musculoskeletal system/connective tissue **(Figure 4)**. The percentage of total medical encounters attributable to "other" increased from 23% in 2017 to 44% in 2021. The top 3 most common ICD-10 diagnoses in the "other" category in 2021 included Z11.59 (28%, Encounter for screening for other viral diseases), Z02.89 (19%, Encounter for other administrative examinations), and Z23 (16%, Inoculations and vaccinations). Encounters for COVID-19 accounted for 0.4% of the total medical encounters in 2021 **(data not shown)**. The percentage of medical encounters attributable to injury and poisoning decreased from 9.8% in 2017 to 5.0% in 2021 **(Figure 4)**. The percentages of medical encounters attributable to the remaining major ICD diagnostic categories were relatively similar during the years 2017, 2019, and 2021.

EDITORIAL COMMENT

This report documents the morbidity and health care burden among U.S. military members while deployed to Southwest Asia/Middle East and Africa during 2021. Similar to results from earlier surveillance periods,[1,3,4] 3 burden categories—injury/poisoning, musculoskeletal diseases, and signs/symptoms—together accounted for more than one-half of the total health care burden in theater among both male and female deployers. The 2021 percentages of encounters due to "other" health encounters may have been driven by increased screening and vaccination for COVID-19, although this was not investigated in detail in this report.

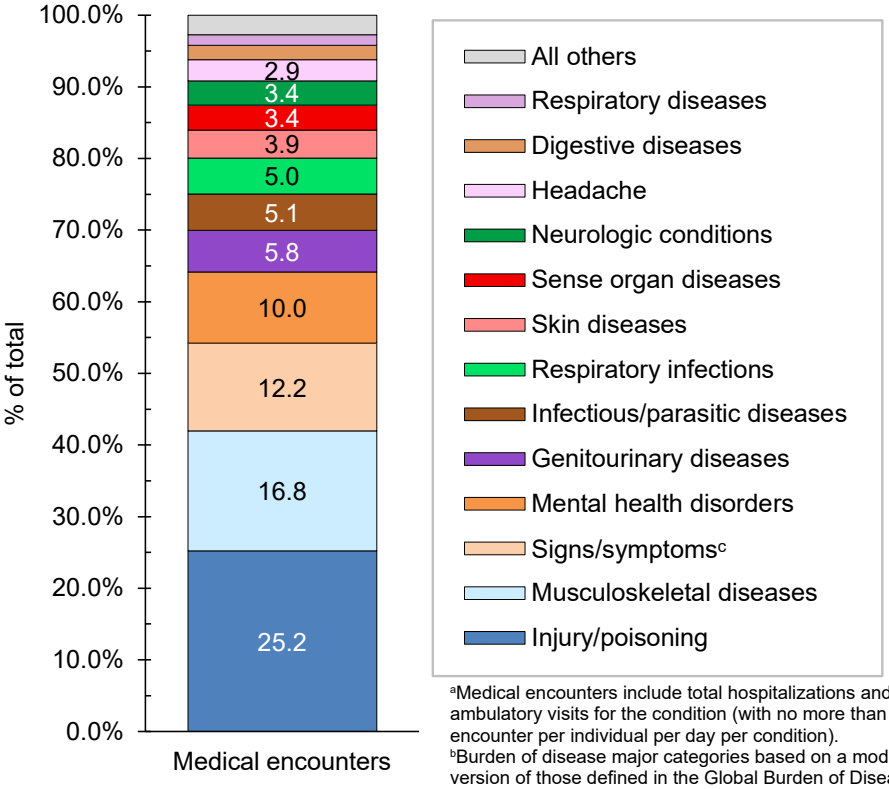
Compared to the distribution of major burden of disease categories documented in garrison, this report also demonstrates relatively greater proportions of in-theater medical encounters due to respiratory infections, skin diseases, and infectious and parasitic diseases. The lack of certain amenities and greater exposure to austere environmental conditions may have compromised

FIGURE 2a. Percentage of medical encounters,[a] by burden of disease major category,[b] deployed male service members, U.S. Armed Forces, 2021



[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.[2]
[c]Includes ill-defined conditions.

FIGURE 2b. Percentage of medical encounters,[a] by burden of disease major category,[b] deployed female service members, U.S. Armed Forces, 2021



[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.[2]
[c]Includes ill-defined conditions.

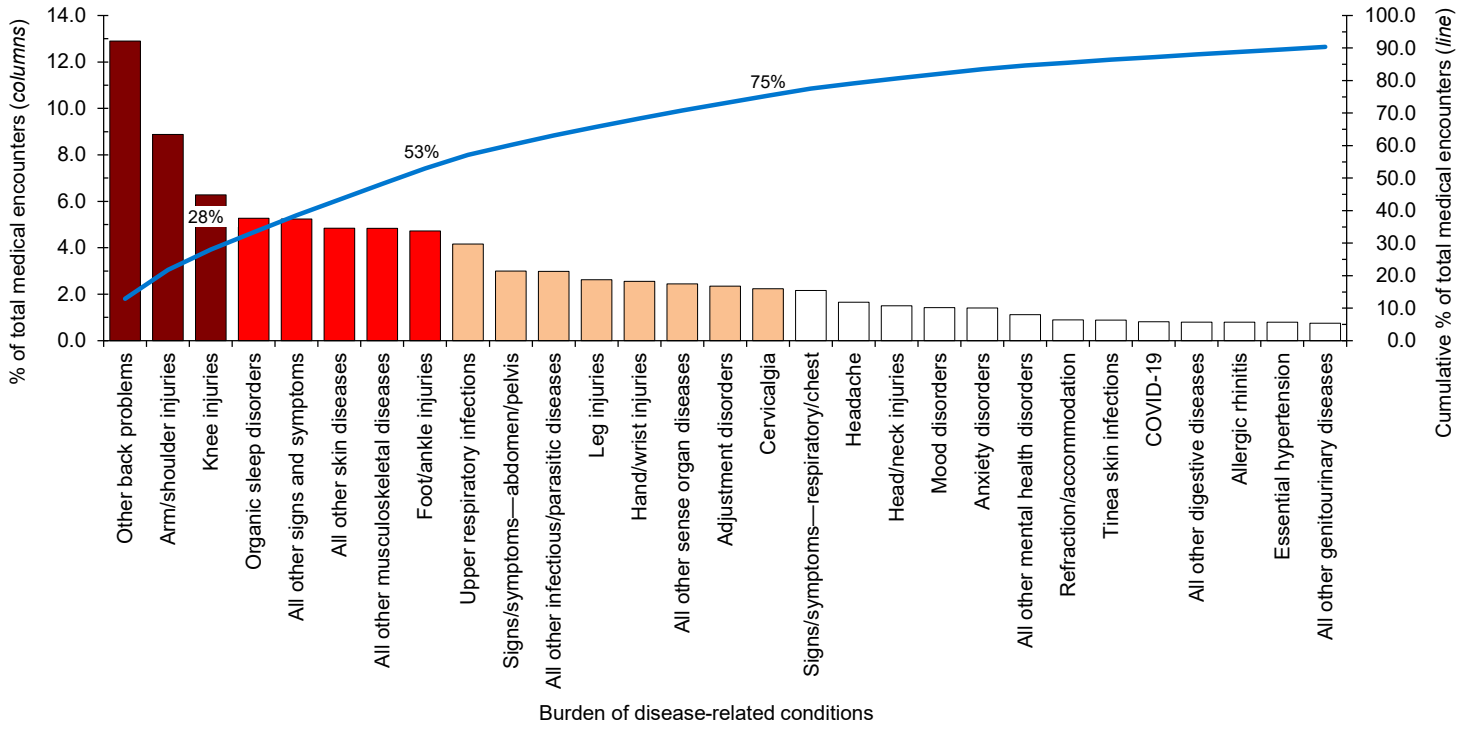
hygienic practices and contributed to this finding. In contrast, compared to the distribution of burden of disease in garrison, a relatively lower proportion of in-theater medical encounters due to mental health disorders was observed.[5] This finding may be due to a number of factors including pre-deployment screening and the continued emphasis on promoting psychological health and resilience in deployed service members.

However, 4 of the top 5 major burden of disease categories in-theater—injury/poisoning, musculoskeletal diseases, signs/symptoms, and mental health disorders—were the same as those reported in non-deployed settings.[5] Injury/poisoning ranked first in both settings and musculoskeletal diseases ranked second in-theater and third in non-deployed settings.[5] The similarity in these top conditions is likely attributable to the fact that both deployed and non-deployed populations generally comprise young and healthy individuals undergoing strenuous physical and mental tasks.

Encounters for certain conditions are not expected to occur often in deployment settings. For example, the presence of some conditions (e.g., diabetes, pregnancy, or congenital anomalies) makes the affected service members ineligible for deployment. As a result of this selection process, deployed service members are generally healthier than their non-deployed counterparts and, specifically, less likely to require medical care for conditions that preclude deployment. The overall result of such pre-deployment medical screening is diminished health care burdens (as documented in the TMDS) related to certain disease categories.

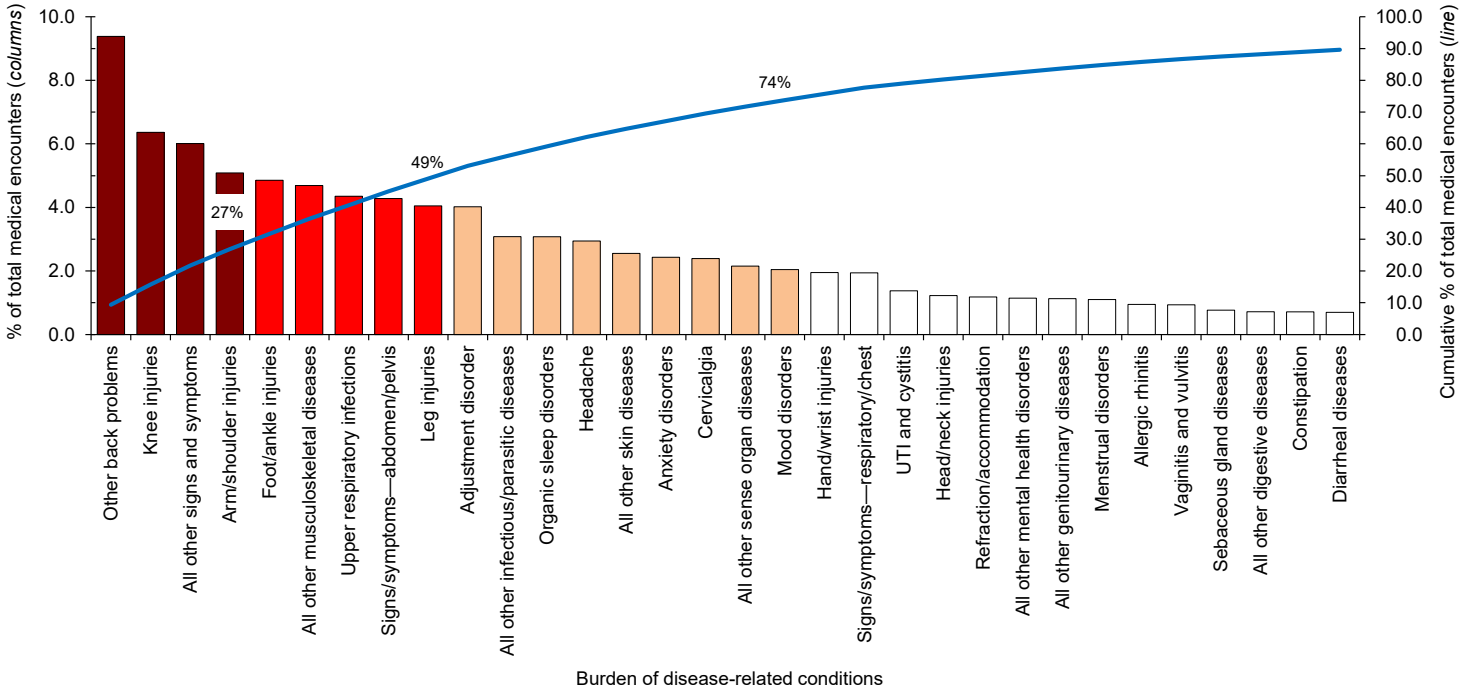
Interpretation of the data in this report should be done with consideration of some limitations. Not all medical encounters in theaters of operation are captured in the TMDS. Some care is rendered by medical personnel at small, remote, or austere forward locations where electronic documentation of diagnoses and treatment is not feasible. As a result, the data described in this report likely underestimate the total burden of health care actually provided in the areas of operation examined. In particular, some emergency medical care provided

FIGURE 3a. Percentage and cumulative percentage distribution, burden of disease-related conditions[a] that accounted for the most medical encounters, deployed male service members, U.S. Armed Forces, 2021



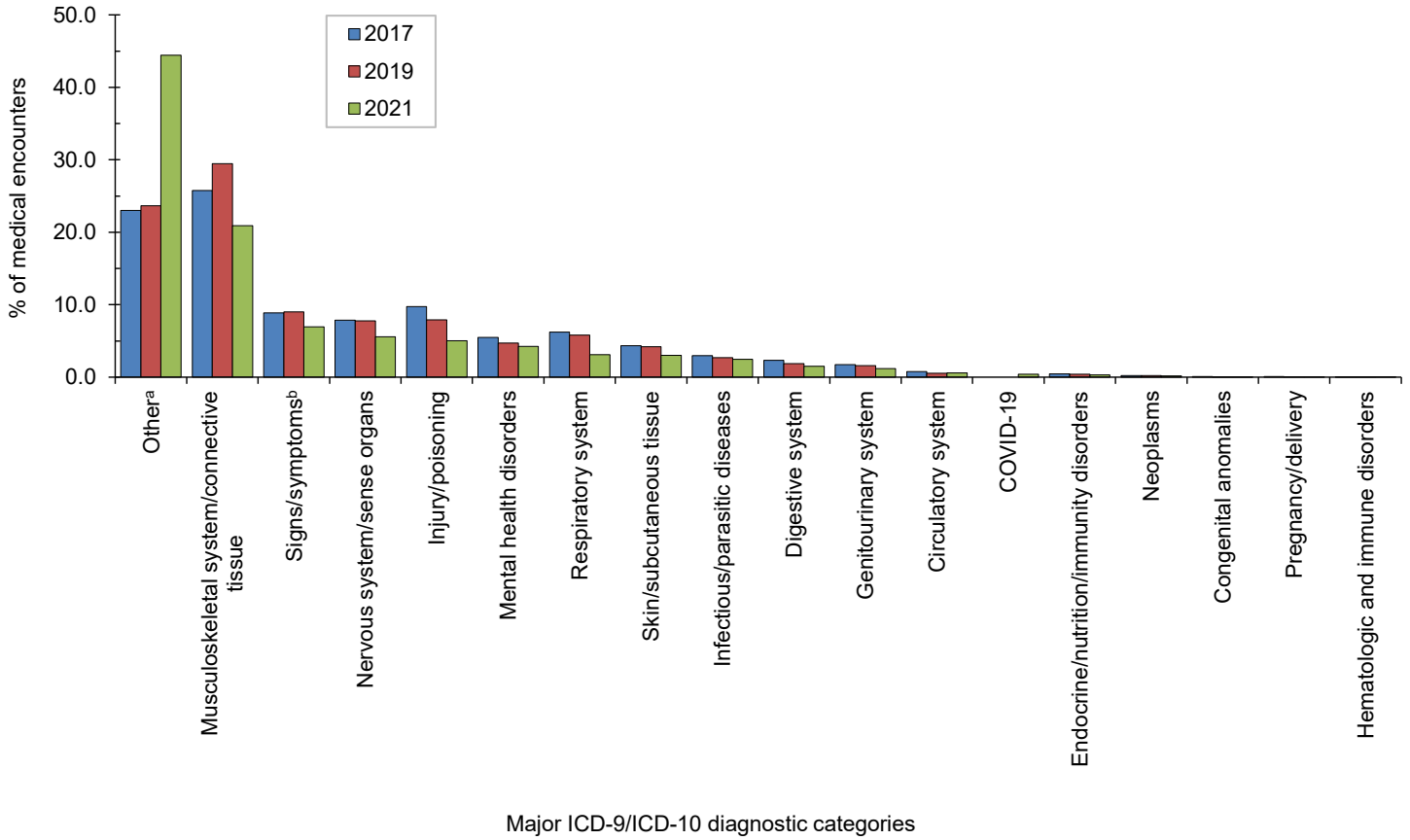
[a]Burden of disease-related conditions based on a modified version of those defined in the Global Burden of Disease study.[2]

FIGURE 3b. Percentage and cumulative percentage distribution, burden of disease-related conditions[a] that accounted for the most medical encounters, deployed female service members, U.S. Armed Forces, 2021



[a]Burden of disease-related conditions based on a modified version of those defined in the Global Burden of Disease study.[2]
UTI, urinary tract infection.

FIGURE 4. ICD-9/ICD-10 diagnostic categories of in-theater medical encounters, active component, U.S. Armed Forces, 2017, 2019, and 2021



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

to stabilize combat-injured service members before evacuation may not be routinely captured in the TMDS. Another limitation derives from the potential for misclassification of diagnoses due to errors in the coding of diagnoses entered into the electronic health record. Although the aggregated distributions of illnesses and injuries found in this study are compatible with expectations derived from other examinations of morbidity in military populations (both deployed and non-deployed), instances of incorrect diagnostic codes (e.g., coding a spinal cord injury using a code that denotes the injury was suffered as a birth trauma rather than using a code indicating injury in an adult) warrant caution in the interpretation of some findings. Although such coding errors are not common, their presence serves as a reminder of the extent to which this study depends on the capture of accurate information in the sometimes austere deployment environment in which health care encounters occur.

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Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries, Non-service Member Beneficiaries of the Military Health System, 2021

Individuals who are eligible for care through the Military Health System (MHS) ("beneficiaries") include active component service members and their eligible family members, activated National Guard and Reserve service members and their eligible family members, and retirees and their eligible family members. In fiscal year 2020, there were approximately 9.62 million beneficiaries eligible for health care in the MHS: 1.41 million active duty and activated reserve component service members, 1.64 million active duty family members, 230,000 Guard/Reserve members, 830,000 Guard/Reserve family members, and 5.51 million retirees and their family members.[1] Some beneficiaries of MHS care do not enroll in the health care plans provided by the MHS (e.g., they use insurance through their own employment), and some of those who are enrolled do not seek care through the MHS.

MHS beneficiaries may receive care from resources provided directly by fixed military medical treatment facilities (MTFs) or from civilian health care resources (i.e., outsourced [purchased] care) that supplement direct military medical care.[1] In 2021, approximately 6.36 million non-service member beneficiaries utilized inpatient or outpatient services provided by the MHS (data source: the Defense Medical Surveillance System [DMSS]).

Since 1998, the *MSMR* has published annual summaries of the numbers and rates of hospitalizations and outpatient medical encounters to assess the health care burdens among active component military members. Beginning in 2001, the *MSMR* complemented those summaries with annual reports on the combined health care burden of both inpatient and outpatient care for 25 categories of health care. Since then, the *MSMR*'s annual burden issue has contained a report on hospital care, ambulatory care, and the overall burden of care each for active component service members. In 2014, for the first time and using similar methodology, the *MSMR* published a report that quantified the health care burden for illnesses and injuries among non-service members in calendar year 2013.[2] The current report represents an updated summary of care provided to non-service members in the MHS during calendar year 2021. Health care burden estimates are stratified by direct versus outsourced care and across 4 age groups of health care recipients.

METHODS

The surveillance period was 1 January through 31 December 2021. The surveillance population included all non-service member beneficiaries of the MHS who had at least 1 hospitalization or outpatient medical encounter during 2021 either through

WHAT ARE THE NEW FINDINGS?

In 2021, 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. As in previous years, this report documents a substantial majority of non-service member beneficiaries received care for current illness and injury from the Military Health System as outsourced services at non-military medical facilities.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

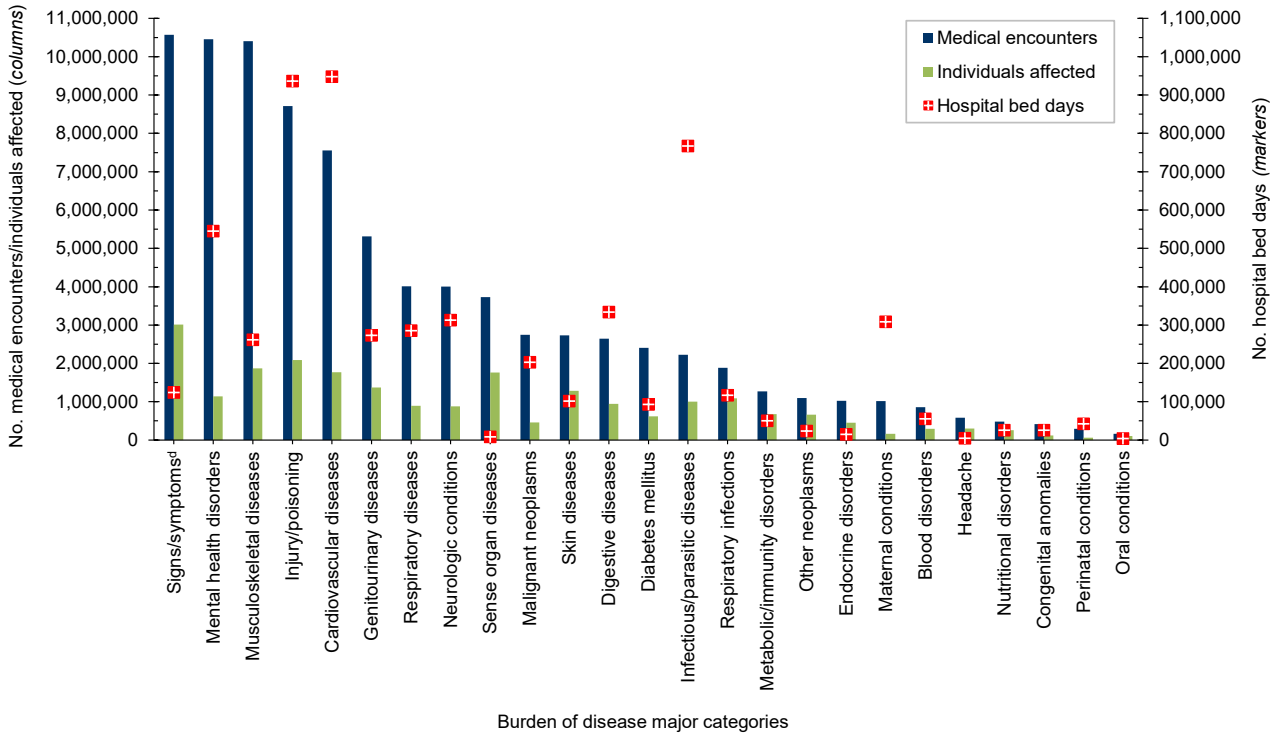
Illness and injury among military family member dependents may negatively impact service members' readiness and their focus on the mission by contributing to stress or by affecting the mental health status of the service member. The provision of health care services to non-service member beneficiaries is an important benefit that can improve military family readiness and, in turn, improve the overall readiness of the force.

TABLE. Medical encounters,[a] individuals affected,[b] and hospital bed days, by source and age group, non-service member beneficiaries, 2021

	Medical encounters		Individuals affected		Hospital bed days		Medical encounters per individual affected
	No.	% total	No.	% total	No.	% total	
All non-service member beneficiaries	86,581,149	---	6,364,951	---	5,867,422	---	14
Source							
Direct care only	8,231,982	9.5	667,265	10.5	412,092	7.0	n/a
Outsourced care only	78,349,167	90.5	4,712,772	74.0	5,455,330	93.0	n/a
Direct and outsourced care	n/a	n/a	984,914	15.5	n/a	n/a	n/a
Age group[c]							
0–17 years	12,324,939	14.2	1,396,821	21.9	464,050	7.9	9
18–44 years	13,346,181	15.4	1,478,939	23.2	681,681	11.6	9
45–64 years	17,664,174	20.4	1,426,669	22.4	906,623	15.5	12
65 years or older	43,245,855	49.9	2,062,522	32.4	3,815,068	65.0	21

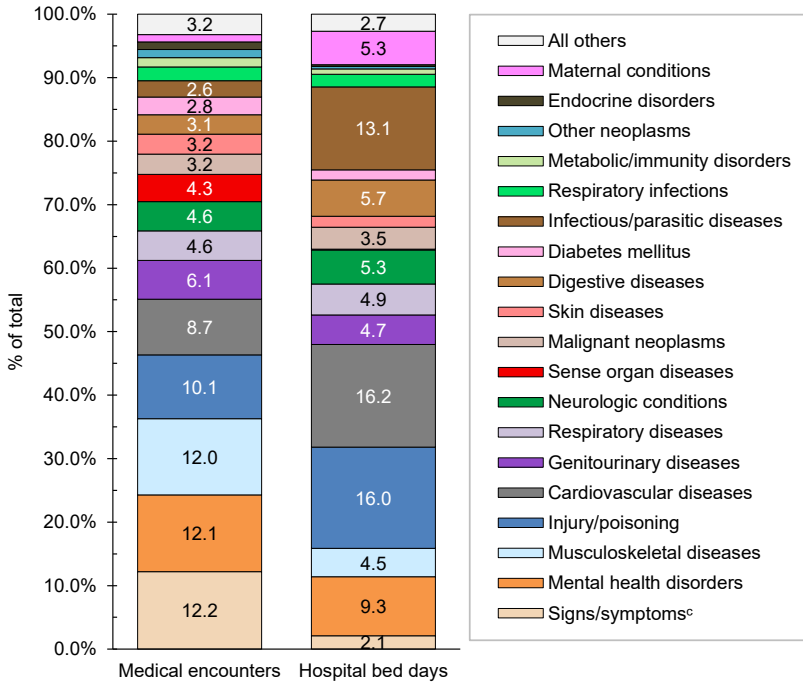
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.

FIGURE 1a. Numbers of medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, direct and outsourced care, 2021



[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.
No., number.

FIGURE 1b. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, direct and outsourced care, 2021

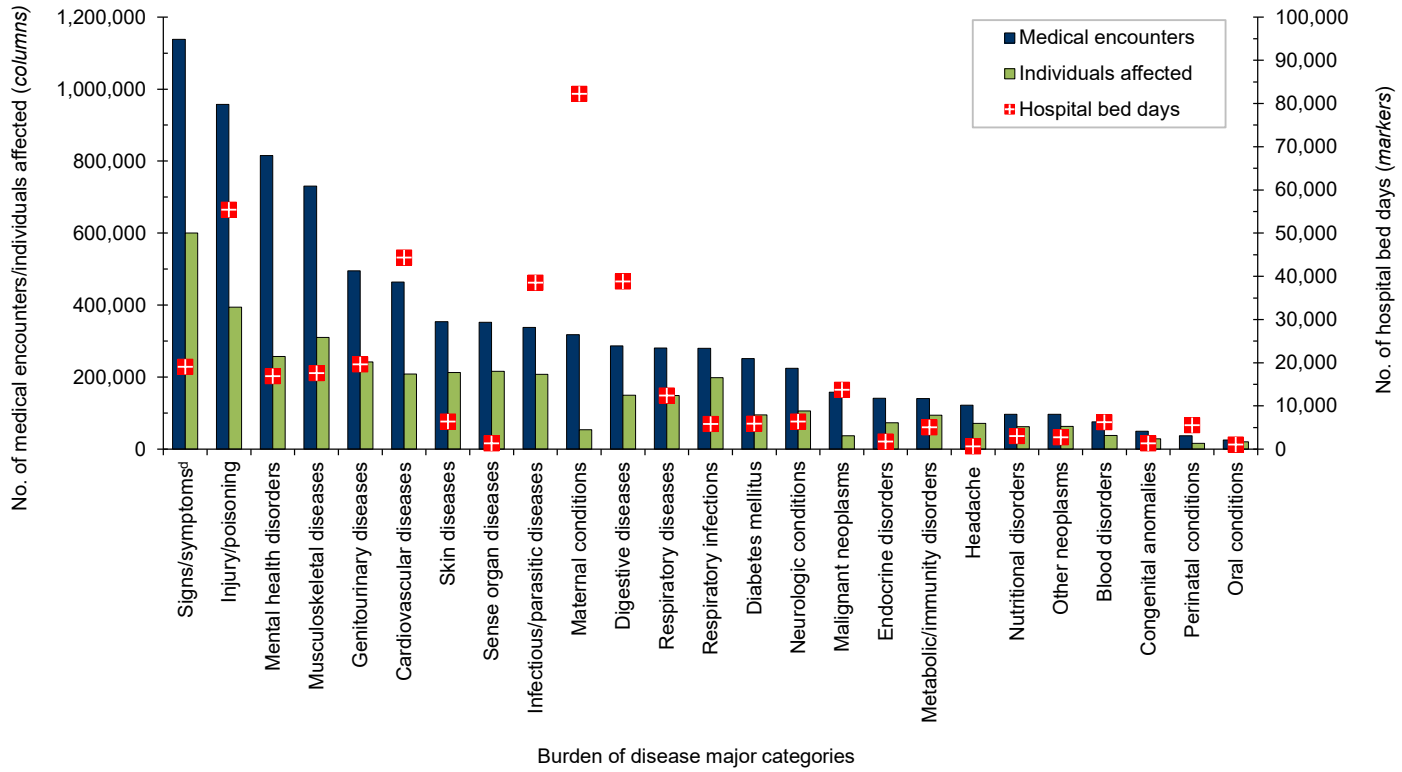


[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Includes ill-defined conditions.

a military medical facility/provider or a civilian facility/provider (if reimbursed through the MHS). 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, U07.0, U07.1, and U09.9). 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; however, encounters with primary diagnoses of Z37 ("outcome of delivery, single liveborn") were retained.

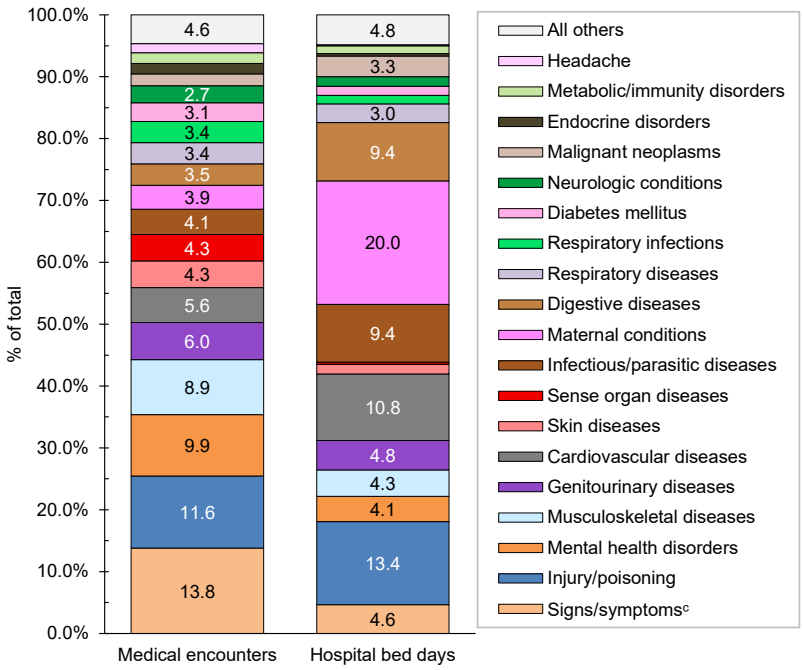
For summary purposes, all illness- and injury-specific diagnoses (as defined by the ICD-10) were grouped into 153 burden of disease-related conditions and 25 major morbidity categories based on a modified

FIGURE 2a. Numbers of medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, direct care only, 2021



[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.
No., number.

FIGURE 2b. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, direct care only, 2021



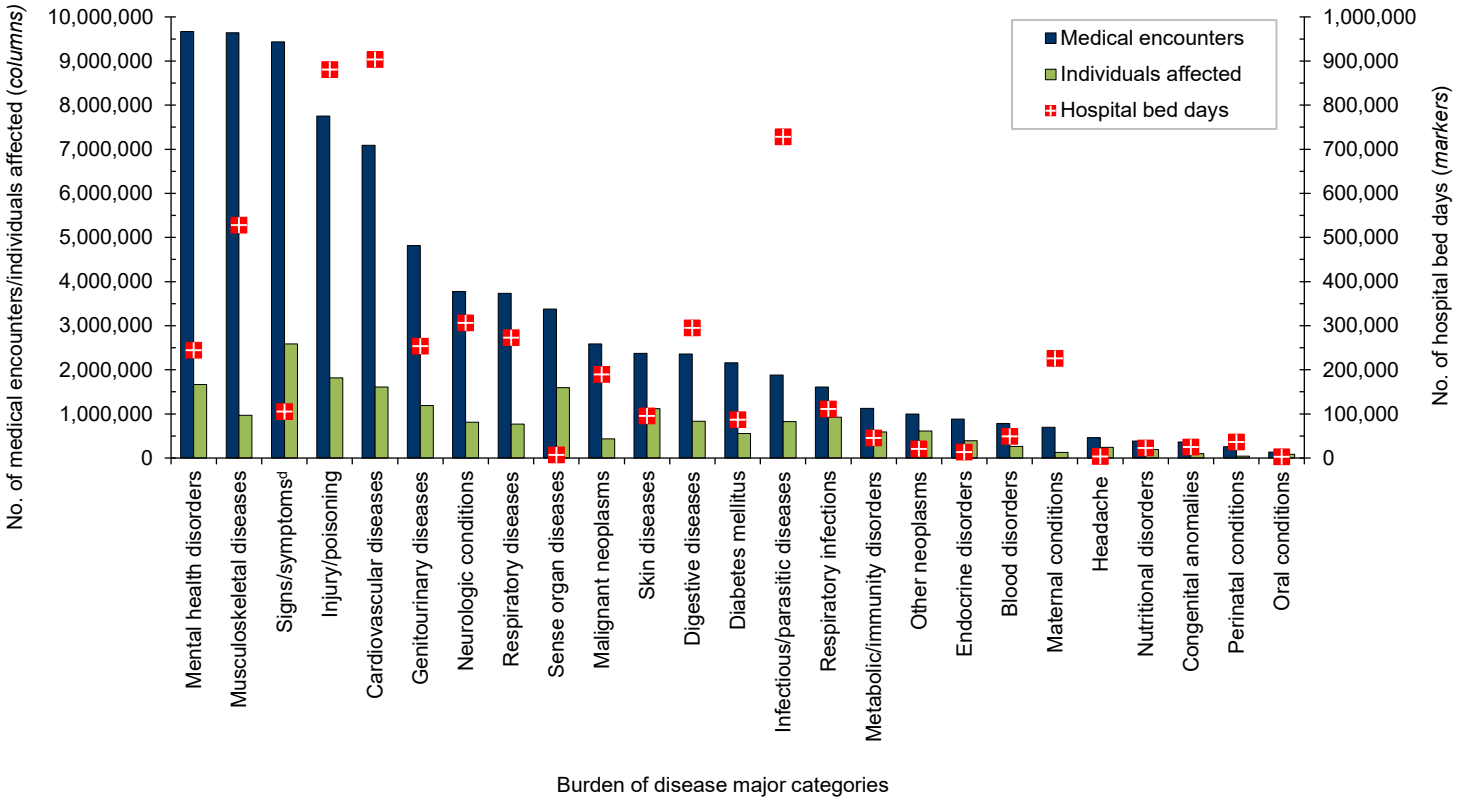
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Includes ill-defined conditions.

version of the classification system developed for the Global Burden of Disease Study.[3] The methodology for summarizing absolute and relative morbidity burdens is described on page 2 of this issue of the *MSMR*. Results were stratified by source of health care (direct [military treatment facilities] vs outsourced [non-military medical facilities]) and by age group (0–17 years, 18–44 years, 45–64 years, and 65 years old or older). For the purposes of the analysis of morbidity burdens within the youngest age group, developmental disorders were classified as "mental health" disorders.

RESULTS

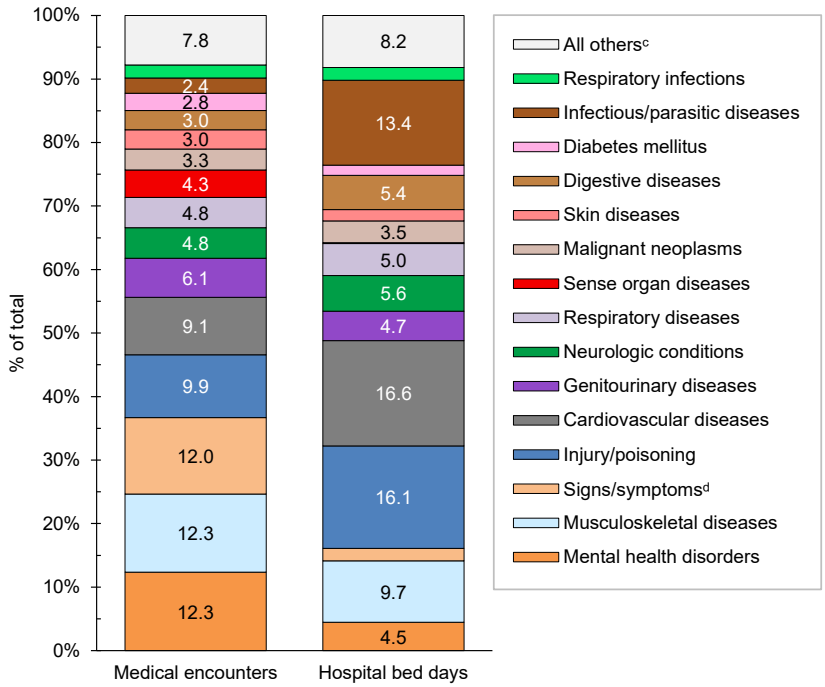
In the population of non-service member MHS care recipients in 2021, there were more female (57.1%) than male beneficiaries (42.9%); more infants, children, and adolescents (those younger than 20 years old: n=1.55 million; 24.3%) and more seniors

FIGURE 3a. Numbers of medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, outsourced care only, 2021



[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.
No., number.

FIGURE 3b. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, outsourced care only, 2021



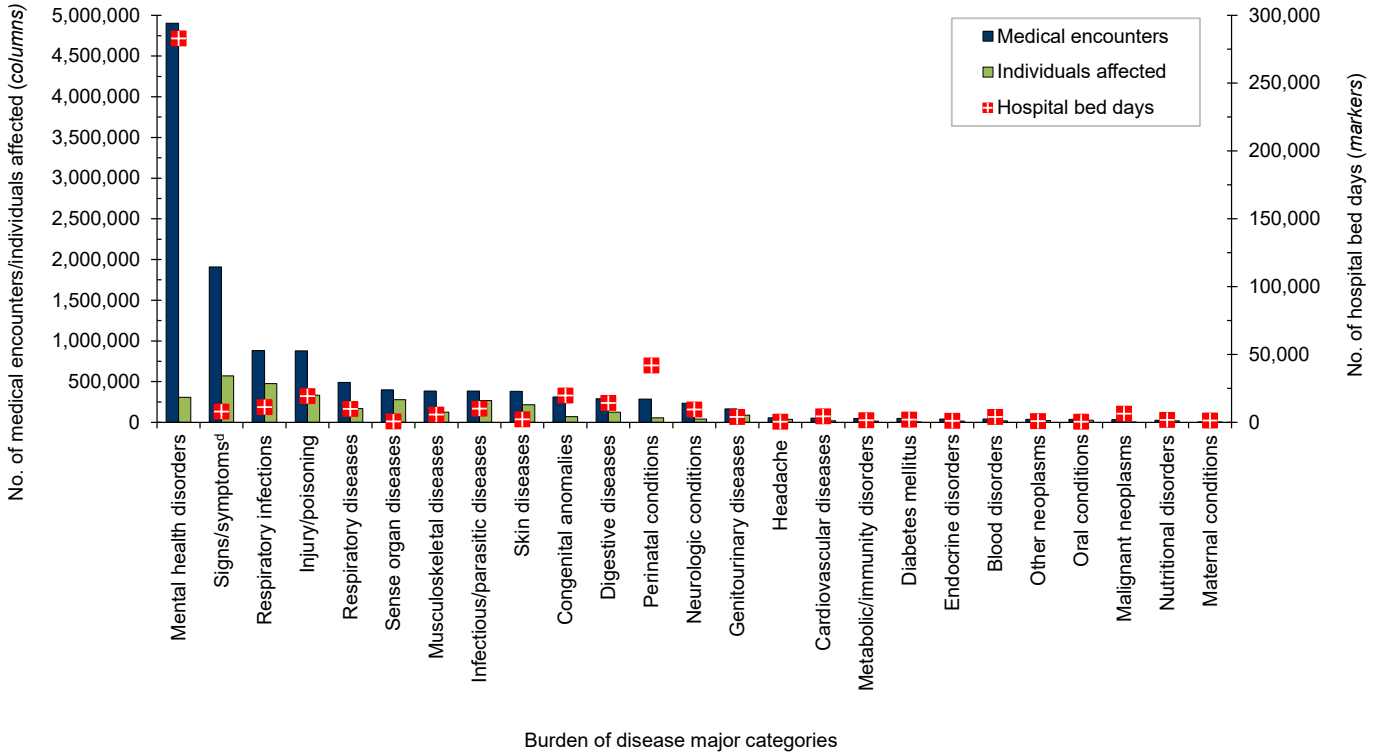
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, outsourced care only, 2021
[d]Includes ill-defined conditions.

(those aged 65 or older: n=2.06 million; 32.4%) than younger (aged 20–44: n=1.33 million; 20.8%) or older (aged 45–64: n=1.43 million; 22.4%) adults **(data not shown)**.

In 2021, a total of 6,364,951 non-service member beneficiaries of the MHS had 86,581,149 medical encounters **(Table)**. Thus, on average, each individual who accessed care from the MHS had 14 medical encounters over the course of the year. The top 3 morbidity-related categories, which accounted for more than one-third (36.3%) of all medical encounters, were signs/symptoms and ill-defined conditions (12.2%), mental health disorders (12.1%), and musculoskeletal diseases (12.0%) **(Figures 1a, 1b)**. The morbidity-specific categories that affected the most beneficiaries (individuals affected) who received any care were signs/symptoms and ill-defined conditions (47.3%), injury/poisoning (32.8%), and musculoskeletal diseases (29.4%) **(data not shown)**.

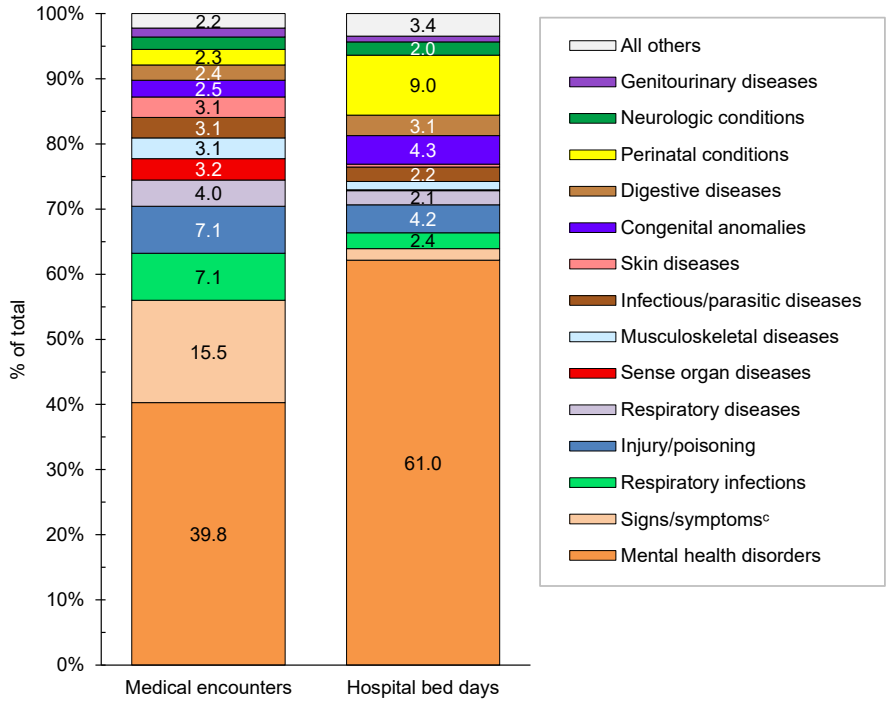
Cardiovascular diseases accounted for more hospital bed days (n=948,005) than

FIGURE 4a. Medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, pediatric non-service member beneficiaries, aged 0–17, direct and outsourced care, 2021



[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.
No., number.

FIGURE 4b. Percentages of medical encounters[a] and hospital bed days, by burden of disease category,[b] pediatric non-service member beneficiaries, aged 0–17, direct and outsourced care, 2021



[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]Includes ill-defined conditions.

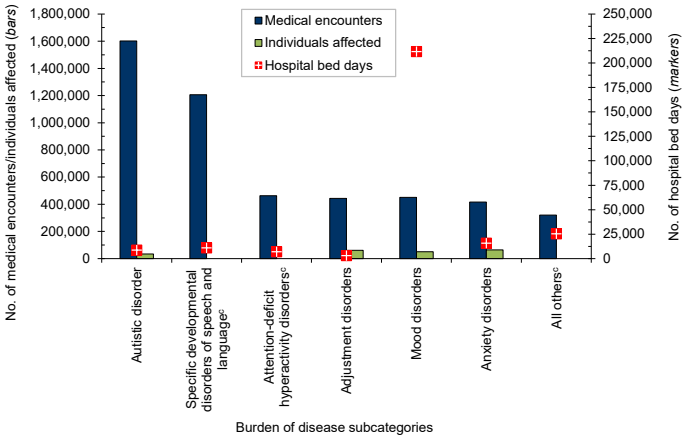
any other illness/injury category and 16.2% of total hospital bed days **(Figures 1a, 1b)**. An additional 44.0% of all bed days were attributable to injury/poisoning (16.0%), infectious/parasitic diseases (13.1%), mental health disorders (9.3%), and digestive diseases (5.7%).

Of note, among all beneficiaries, maternal conditions (including pregnancy complications and delivery) accounted for relatively more hospital bed days (n=308,245; 5.3%) than individuals affected (n=161,174; 2.5%) **(Figure 1a)**.

Direct care vs. outsourced care

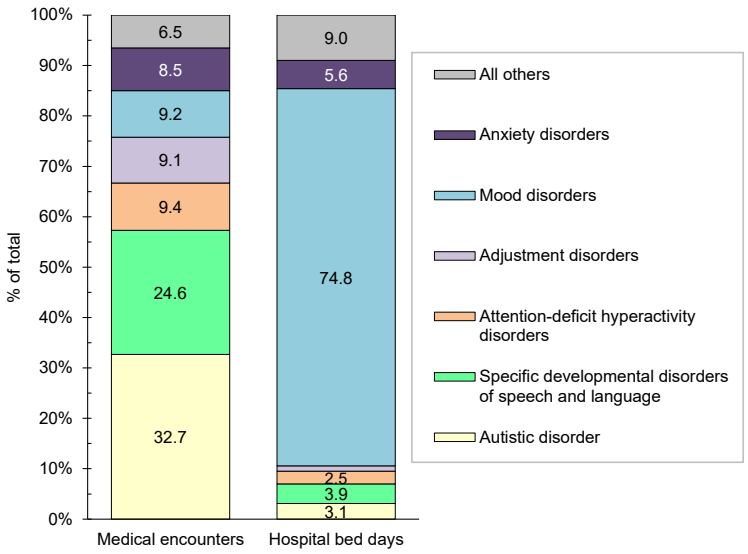
In 2021, among non-service member beneficiaries, most medical encounters (90.5%) were in non-military medical facilities (outsourced care) **(Table)**. Of all non-service member beneficiaries (individuals affected) with any illness or injury-related encounters during the year, many more exclusively received outsourced care (n=4,712,772; 74.0%) than either military medical (direct) care only (n=667,265;

FIGURE 4c. Medical encounters,[a] individuals affected,[b] and hospital bed days, by the mental health disorders accounting for the most morbidity burden, pediatric non-service member beneficiaries, aged 0–17, 2021



[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]The numbers of individuals affected were not computed for these burden of disease subcategories.
No., number.

FIGURE 4d. Percentages of medical encounters[a] and hospital bed days for mental health disorders by the conditons accounting for the most morbidity burden, pediatric non-service member beneficiaries, aged 0–17, 2021



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

10.5%) or both outsourced and direct care (n=984,914; 15.5%). By far, most inpatient care (93.0% of all bed days) was received in non-military facilities.

The proportions of medical encounters by morbidity-related categories were broadly similar for direct and outsourced care **(Figures 2a, 2b, 3a, 3b)**. However, encounters for cardiovascular diseases and musculoskeletal diseases were relatively more common in outsourced (9.1% and 12.3%, respectively) compared to direct (5.6% and 8.9%, respectively) care.

Maternal conditions accounted for 20.0% of all direct care bed days but only 4.1% of all outsourced care bed days **(Figures 2b, 3b)**. However, cardiovascular diseases, musculoskeletal diseases, infectious/parasitic diseases, and neurologic conditions accounted for relatively more of all outsourced than direct care bed days (% of outsourced vs. % of direct care bed days: cardiovascular, 16.6% vs. 10.8%; musculoskeletal, 9.7% vs 4.3%; infectious/parasitic, 13.4% vs. 9.4%; neurologic, 5.6% vs. 1.6%).

Pediatric beneficiaries (aged 0–17)

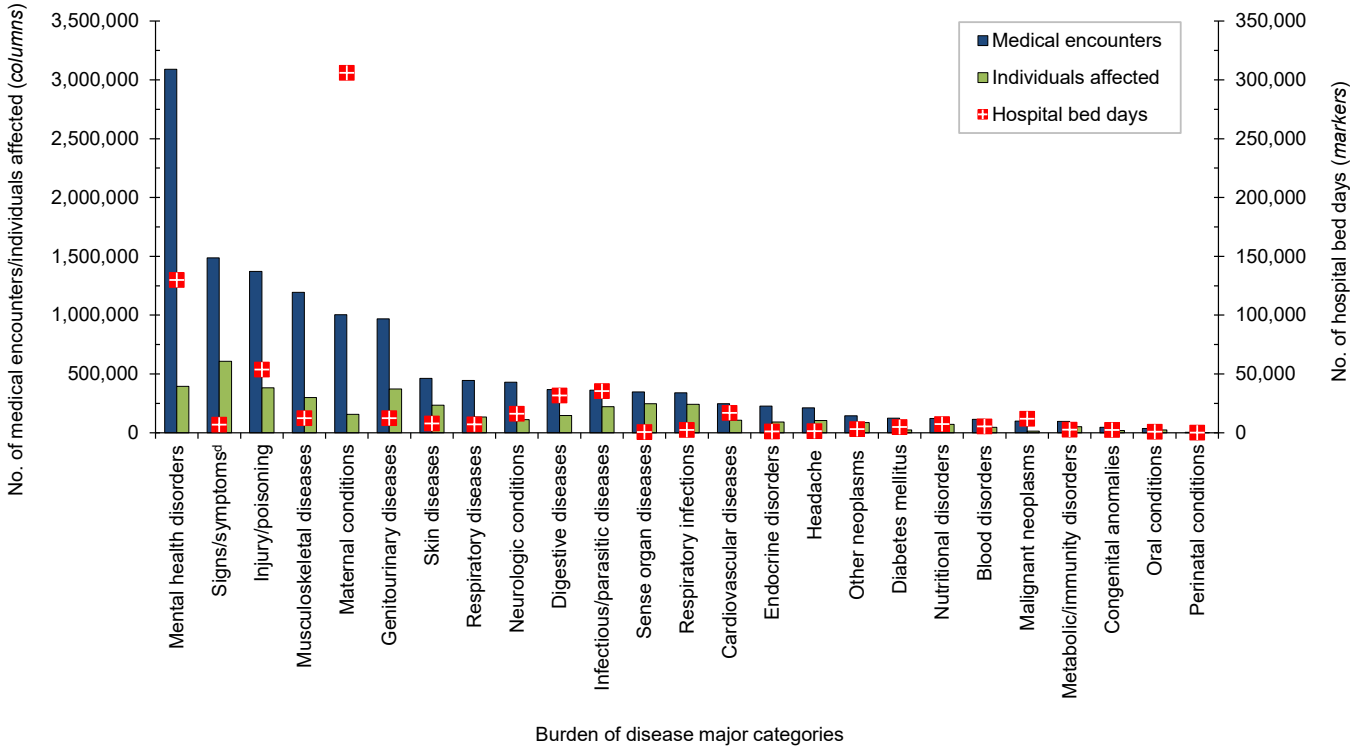
In 2021, pediatric beneficiaries accounted for 14.2% of all medical encounters, 21.9% of all individuals affected, and 7.9% of all hospital bed days **(Table)**. On average, each affected individual had 9 medical encounters during the year.

Mental health disorders accounted for almost two-fifths (39.8%; n=4,902,671) of all medical encounters and more than three-fifths (61.0%; n=464,040) of all hospital bed days among pediatric beneficiaries **(Figures 4a, 4b)**. On average, pediatric beneficiaries affected by a mental health disorder had 16 encounters related to this morbidity category during the year. More than two-thirds (66.7%) of all medical encounters for mental health disorders among pediatric beneficiaries were attributed to 3 groups of disorders, including autistic disorders (32.7%), followed by developmental disorders of speech and language (24.6%), and attention-deficit hyperactivity disorders (9.4%) **(Figures 4c, 4d)**. On average, there were 47 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 (74.8%) of mental health disorder-related hospital bed days were attributable to mood disorders, and 30.1% of mood disorder-related bed days were attributable to "major depressive disorder, recurrent, severe without psychotic features" **(data not shown)**.

Among pediatric beneficiaries overall, perinatal conditions (i.e., conditions arising during the perinatal period) accounted for the second highest number of hospital bed days (n=41,857; 9.0%) **(Figures 4a, 4b)**. Of note, among pediatric beneficiaries with at least 1 illness or injury-related diagnosis, those with malignant neoplasms had the second highest number of related encounters per affected individual (13). The highest numbers of malignant neoplasm-related encounters and hospital bed days were attributable to leukemias, all other malignant neoplasms, and malignant neoplasms of the brain **(data not shown)**.

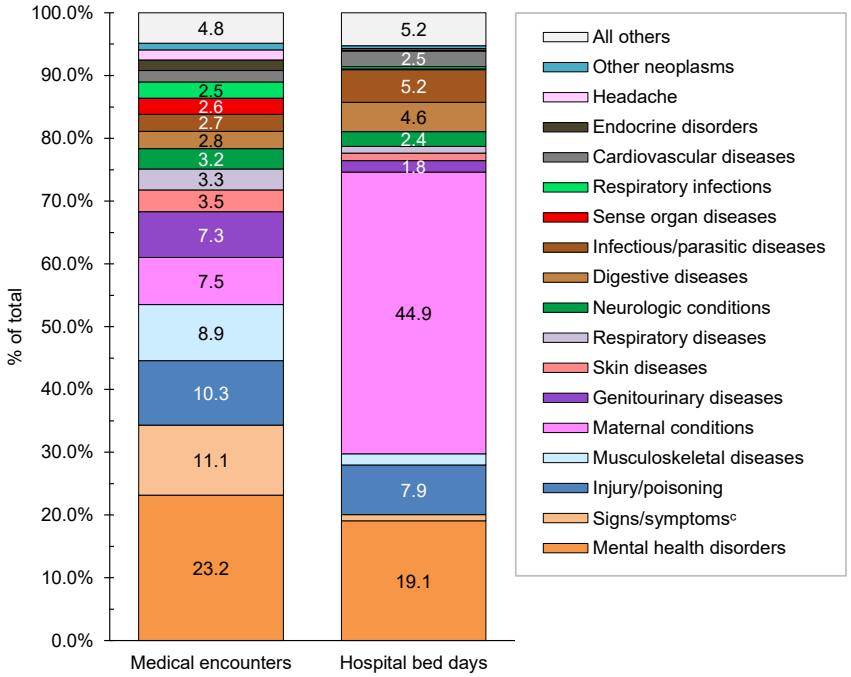
Finally, respiratory infections (including upper and lower respiratory infections and otitis media) accounted for relatively more medical encounters among pediatric beneficiaries (7.1%) when compared to any older age group of beneficiaries **(Figures 4b, 5b, 6b, and 7b)**. Respiratory infections accounted for relatively more hospital bed days among pediatric beneficiaries (2.4%) than among beneficiaries aged 18–64 (18–44, 0.4%; 45–64, 1.1%;); however, among those aged 65 or older, respiratory infections accounted for approximately the same proportion (2.4%) of total hospital bed days.

FIGURE 5a. Medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, aged 18–44, direct and outsourced care, 2021



[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.
No., number.

FIGURE 5b. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, aged 18–44, direct and outsourced care, 2021



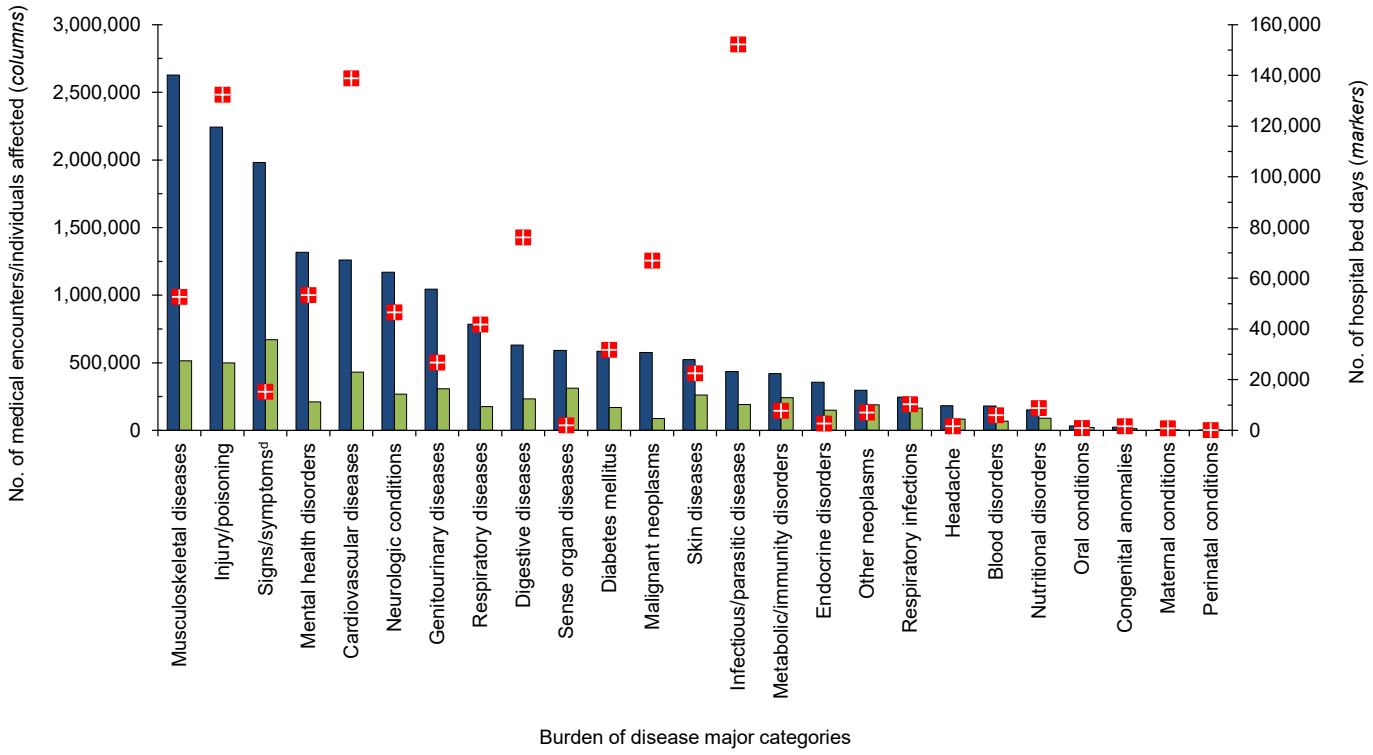
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease Study.[3]
[c]Includes ill-defined conditions.

Beneficiaries aged 18–44

In 2021, non-service member beneficiaries aged 18–44 accounted for 15.4% of all medical encounters, 23.2% of all individuals affected, and 11.6% of hospital bed days **(Table)**. On average, each individual affected with an illness or injury (any cause) had 9 medical encounters during the year.

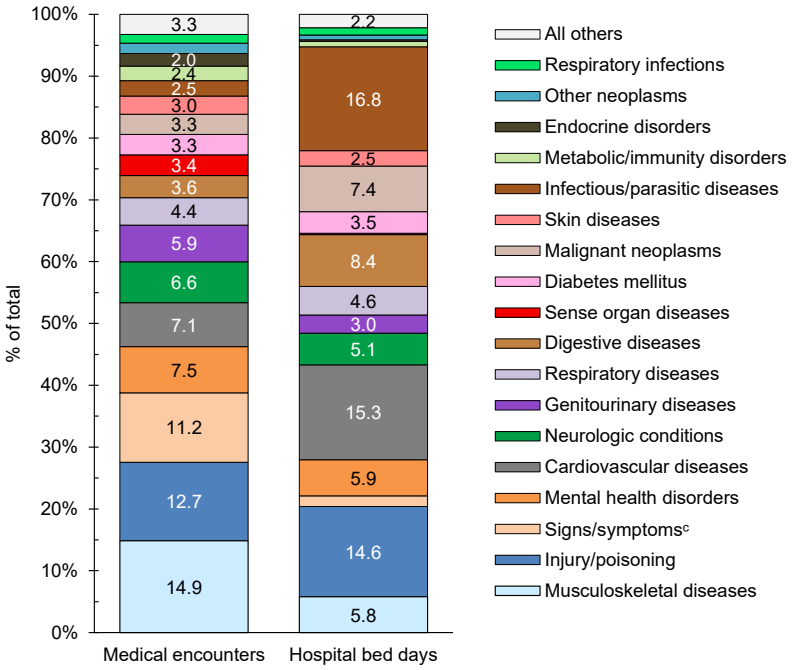
Among beneficiaries aged 18–44, the morbidity-related category that accounted for the most medical encounters was mental health disorders (n=3,091,190; 23.2% of all encounters) **(Figures 5a, 5b)**. Among these adult beneficiaries, mental health disorders accounted for almost one-fifth (19.1%) of all 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 (32.7%), mood disorders (30.5%), and adjustment disorders (17.3%) accounted for approximately four-fifths (80.6%) of all mental health disorder-related medical encounters among beneficiaries aged 18–44 **(data not shown)**. Among adult beneficiaries

FIGURE 6a. Medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, aged 45–64, direct and outsourced care, 2021



[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.
No., number.

FIGURE 6b. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, aged 45–64, direct and outsourced care, 2021

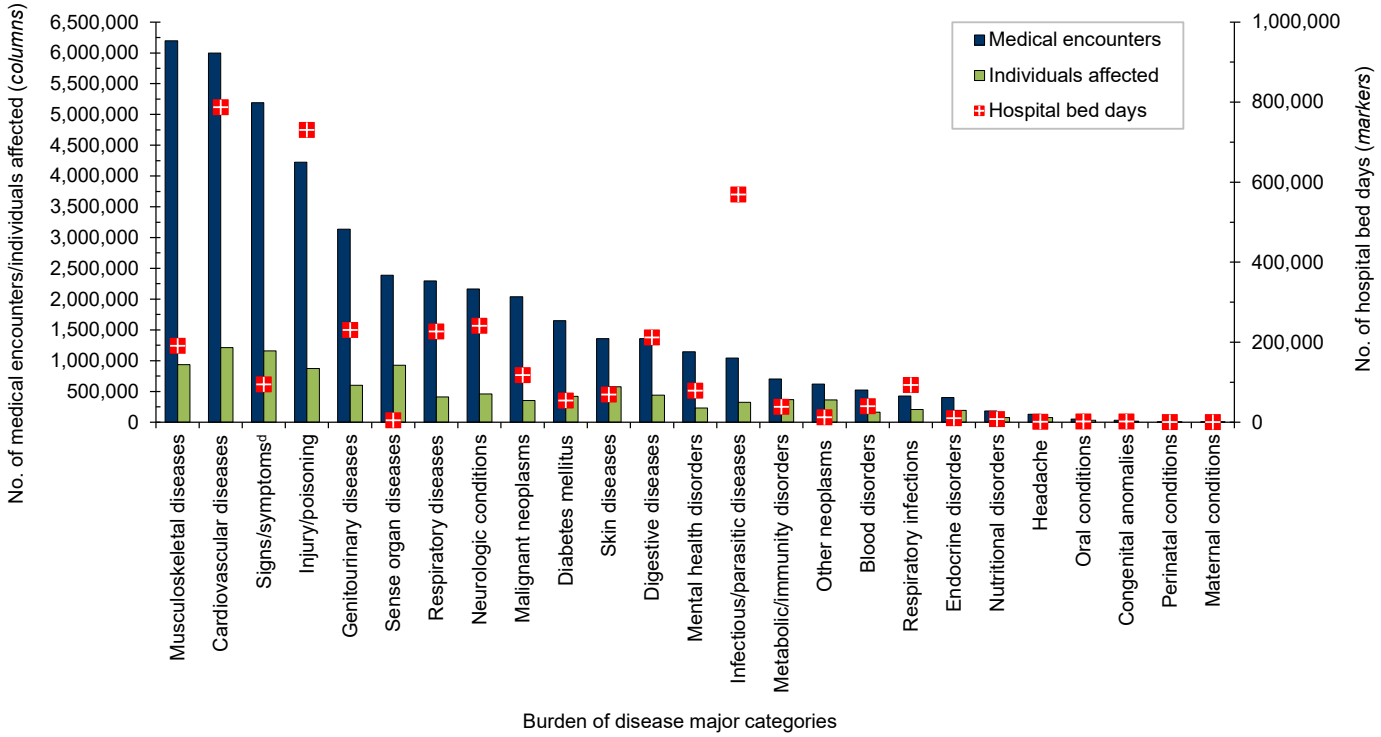


[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease Study.[3]
[c]Includes ill-defined conditions.

in this age group, mood and substance abuse disorders accounted for over three-quarters (54.0% and 21.7%, respectively) of total mental health disorder-related hospital bed days.

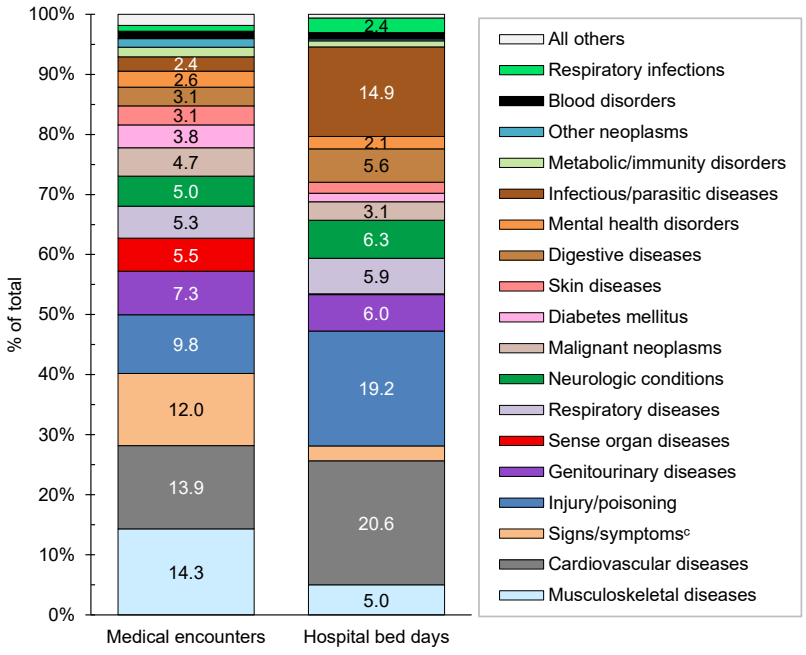
Among adults aged 18–44, maternal conditions accounted for more than two-fifths (44.9%) of all bed days and, on average, 6 medical encounters per affected individual **(Figures 5a, 5b)**. Deliveries accounted for 10.1% of maternal condition-related medical encounters **(data not shown)**. Adults aged 18–44 accounted for nearly all (99.2%) maternal condition-related bed days among non-service member beneficiaries of any age. Although adults aged 18–44 had the second lowest percentage of total medical encounters (15.4%), if morbidity burdens associated with maternal conditions were excluded from the overall analysis, this age group would account for even lower percentages of total medical encounters (14.3%) and the lowest percentage of total hospital bed days (6.4%) when compared to any other age group **(data not shown)**.

FIGURE 7a. Medical encounters,[a] individuals affected,[b] and hospital bed days, by burden of disease major category,[c] non-service member beneficiaries, aged 65 or older, direct and outsourced care, 2021



[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.
No., number.

FIGURE 7b. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[b] non-service member beneficiaries, aged 65 or older, direct and outsourced care, 2021



[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]Includes ill-defined conditions.

Among beneficiaries aged 18–44 with at least 1 illness or injury-related diagnosis, those with malignant neoplasms had the second most category-specific encounters per affected individual (7). Malignant neoplasm of the breast accounted for the most malignant neoplasm-related encounters for this age group (29.2% of the total) **(data not shown)**.

Beneficiaries aged 45–64

In 2021, non-service member beneficiaries aged 45–64 accounted for approximately one-fifth (20.4%) of all medical encounters, 22.4% of all individuals affected, and 15.5% of hospital bed days **(Table)**. On average, each affected individual had 12 medical encounters during the year.

Of all morbidity-related categories, musculoskeletal diseases accounted for the most medical encounters (n=2,627,272; 14.9%) among older adult beneficiaries aged 45-64 **(Figures 6a, 6b)**. In addition, in this age group, back problems accounted for 43.2% of all musculoskeletal disease-related

encounters **(data not shown)**. Infectious/parasitic diseases accounted for more hospital bed days (16.8% of the total) than any other category of illnesses or injuries. COVID-19 accounted for more than half (54.3%) of the total infectious/parasitic disease-related hospital bed days. Within the injury/poisoning morbidity-related category, the majority of bed days were attributed to complications not otherwise specified (43.9%) and leg injuries (19.5%) **(data not shown)**. Digestive diseases accounted for a larger percentage (8.4%) of total hospital bed days among beneficiaries in this age group compared to those in the other age groups.

The most medical encounters per affected individual were associated with malignant neoplasms (7), mental health disorders (6), and musculoskeletal diseases (5) **(data not shown)**. Malignant neoplasms (7.4%) accounted for a larger proportion of total bed days among beneficiaries aged 45–64 than among the other age groups of beneficiaries. Malignant neoplasm of the breast accounted for more than one-quarter (25.6 %) of all malignant neoplasm-related encounters among older adult beneficiaries **(data not shown)**.

Beneficiaries aged 65 or older

In 2021, non-service member beneficiaries aged 65 or older accounted for approximately half (49.9%) of all medical encounters, nearly one-third (32.4%) of all individuals affected, and almost two-thirds (65.0%) of hospital bed days **(Table 1)**. On average, each affected individual had 21 medical encounters during the year.

Of all morbidity-related categories, musculoskeletal diseases (n=6,195,523; 14.3%) and cardiovascular diseases (n=6,000,188; 13.5%) accounted for the most medical encounters, but cardiovascular diseases accounted for the most bed days (787,739 days; 20.6%) **(Figures 7a, 7b)**. Back problems accounted for a little more than one-third (36.3%) of all musculoskeletal disease-related medical encounters and 41.0% of hospital bed days **(data not shown)**. Taken together, essential hypertension (26.9%), ischemic heart disease (13.3%), and cerebrovascular disease (9.8%) accounted for approximately half (50.1%) of all cardiovascular disease-related medical encounters, and cerebrovascular disease accounted for almost one-third (31.9%) of all cardiovascular disease-related bed days **(data not shown)**.

Among the oldest age group of beneficiaries, the most medical encounters per affected individual were associated with musculoskeletal diseases (7), malignant neoplasms (6), respiratory diseases (6), diseases of the genitourinary system (5), mental health disorders (5), and cardiovascular diseases (5) **(data not shown)**. In this age group, melanomas and other malignant neoplasms of the skin (20.4%) and malignant neoplasms of the prostate (14.4%), breast (12.6%), trachea, bronchus, and lung (9.5%) accounted for more than half (56.9%) of all malignant neoplasm-related encounters **(data not shown)**. Chronic obstructive pulmonary disease accounted for nearly one-third of all medical encounters (38.2%) and 28.8% of all bed days attributable to respiratory diseases **(data not shown)**.

Infectious and parasitic diseases (14.9%) accounted for a larger proportion of total bed days among the oldest age group compared to the other age groups of beneficiaries **(Figures 7a, 7b)**. COVID-19 accounted for more than one-third (36.3%) of infectious/parasitic-related medical encounters and 42.0% of hospital bed days **(data not shown)**. In contrast to infectious/parasitic diseases, mental health disorders accounted for smaller percentages of medical encounters (2.6%) and bed days (2.1%) among the oldest age group compared to the younger age groups.

EDITORIAL COMMENT

This report documents a large majority of non-service member beneficiaries receive MHS care for current illness and injury (excluding encounters with diagnoses identified by Z-codes) in non-military medical facilities (i.e., outsourced [purchased] care). The report also documents pronounced differences in the types of morbidity-related diagnoses and disease-specific conditions across age groups of beneficiaries. Of particular note, individuals aged 65 or older —32.4% of all non-service member beneficiaries receiving an illness or injury specific diagnosis in 2021—accounted for approximately half (49.9%) of all medical encounters and nearly two-thirds (65.0%) of all hospital bed days delivered to all such beneficiaries.

In 2021, as in previous years, mental health disorders accounted for the largest proportions of the morbidity and health care burdens that affected the pediatric (aged 0–17) and younger adult (aged 18–44) beneficiary age groups. Developmental disorders were a significant driver of health care utilization among pediatric beneficiaries with 66.7% of medical encounters for mental health disorders attributable to autistic disorder, specific developmental disorders of speech and language, or attention-deficit hyperactivity disorders. Of particular note, children affected by autistic disorder had, on average, 47 autism-related encounters each during the 1-year surveillance period.

Although mental health disorders also accounted for more medical encounters among young adult (aged 18–44) beneficiaries than any other major category of illnesses or injuries, the proportion of all encounters attributable to mental health disorders was markedly lower among young adult (23.2%) than pediatric (39.8%) beneficiaries. Also, as expected, the mental health disorders that accounted for the largest health care burdens among younger adults (18–44 years)—anxiety, mood, and adjustment disorders—differed from those that most affected the pediatric age group.

It is not surprising that the highest numbers and proportions of hospital bed days among adults aged 18–44 were for maternal conditions because this age group encompasses nearly all women of childbearing age. In 2021, among adults aged 45–64 and those aged 65 or older, musculoskeletal diseases were the greatest contributors to morbidity and health care burdens. Cardiovascular diseases accounted for the second highest number of medical encounters among adults in the oldest age group.

Of musculoskeletal diseases, back problems were a major source of health care burden; of cardiovascular diseases, essential hypertension, ischemic heart disease, and cerebrovascular disease accounted for the largest health care burdens. These findings are not unexpected and reflect the inevitable effects of aging on the health and health care needs of the older segment of the MHS

beneficiary population. However, many of the health conditions associated with the largest morbidity and health care burdens among beneficiaries in older age groups are also associated with unhealthy lifestyles (e.g., unhealthy diet, inadequate exercise, or tobacco use). As such, to varying extents, the most costly health conditions may be preventable and their disabling or life-threatening long-term consequences may be avoidable. It is important to note, however, that among the oldest group of beneficiaries, COVID-19 accounted for more than two-fifths (42.0%) of hospital bed days attributed to infectious/parasitic diseases. Illnesses and injuries that disproportionately contribute to morbidity and health care burdens in various age groups of MHS beneficiaries should be targeted for early detection and treatment by comprehensive prevention and research programs.

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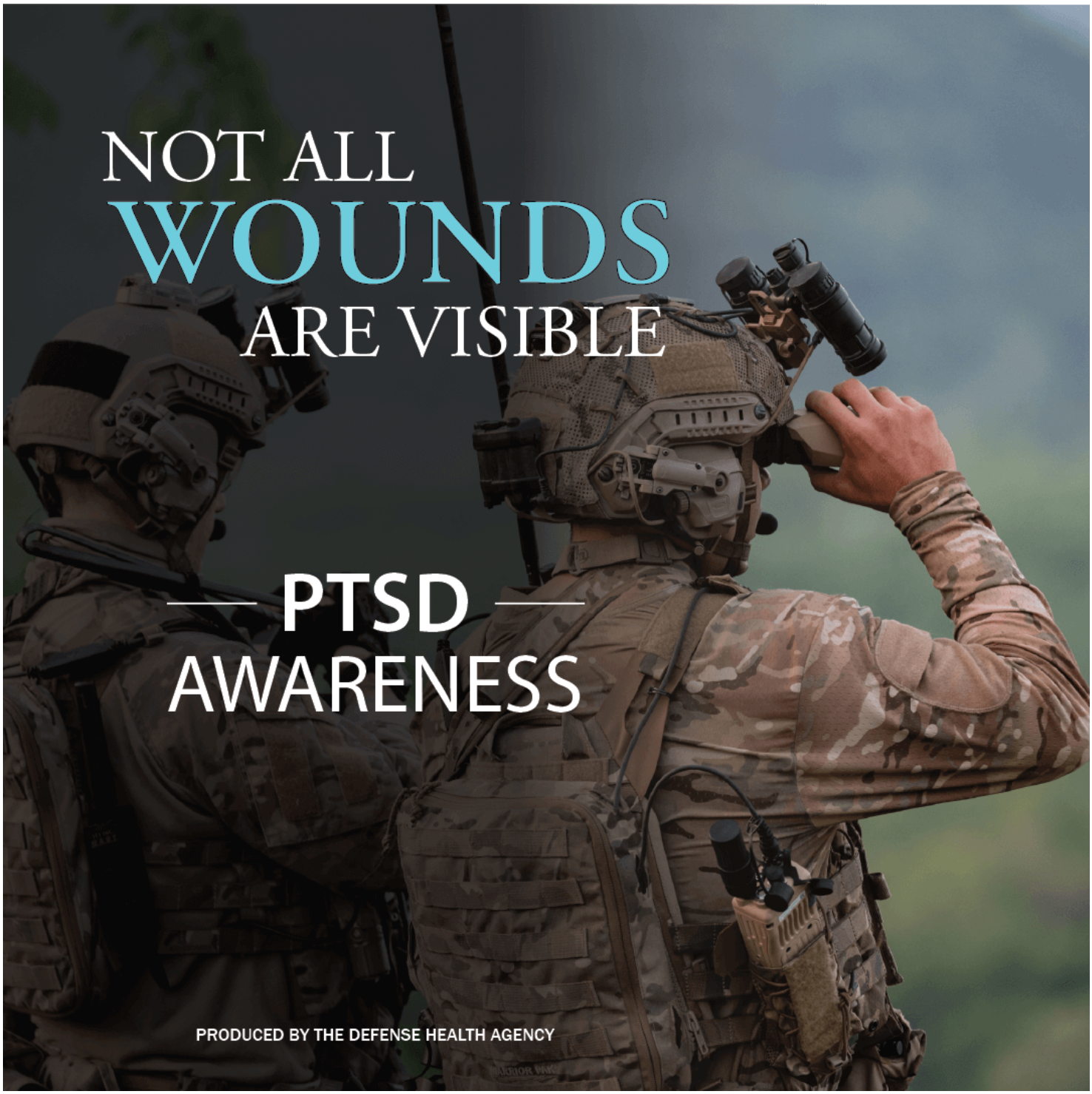
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