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Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries, Active Component, U.S. Armed Forces, 2020

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 impacts 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 2020.

METHODS

The surveillance period was 1 January through 31 December 2020. 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 2020 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, 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] This represents the addition of 2 new conditions for the 2020 burden analysis: coronavirus 2019 (COVID-19) and polycystic ovarian syndrome. 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 current 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.

The "morbidity burdens" attributable to various "conditions" were estimated

WHAT ARE THE NEW FINDINGS?

In 2020, 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 musculoskeletal disorders, injuries, and mental health disorders. Despite the pandemic, COVID-19 accounted for less than 1% of total medical encounters and bed days in active component service members.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Musculoskeletal disorders, injuries, 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.

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 2020, more active component service members (n=469,503) received medical care for injury/poisoning than any other morbidity-related category **(Figure 1a)**. In addition, injury/poisoning accounted for more medical encounters (n=2,329,222) than any other morbidity category and over one-fifth (21.6%) of all medical encounters overall.

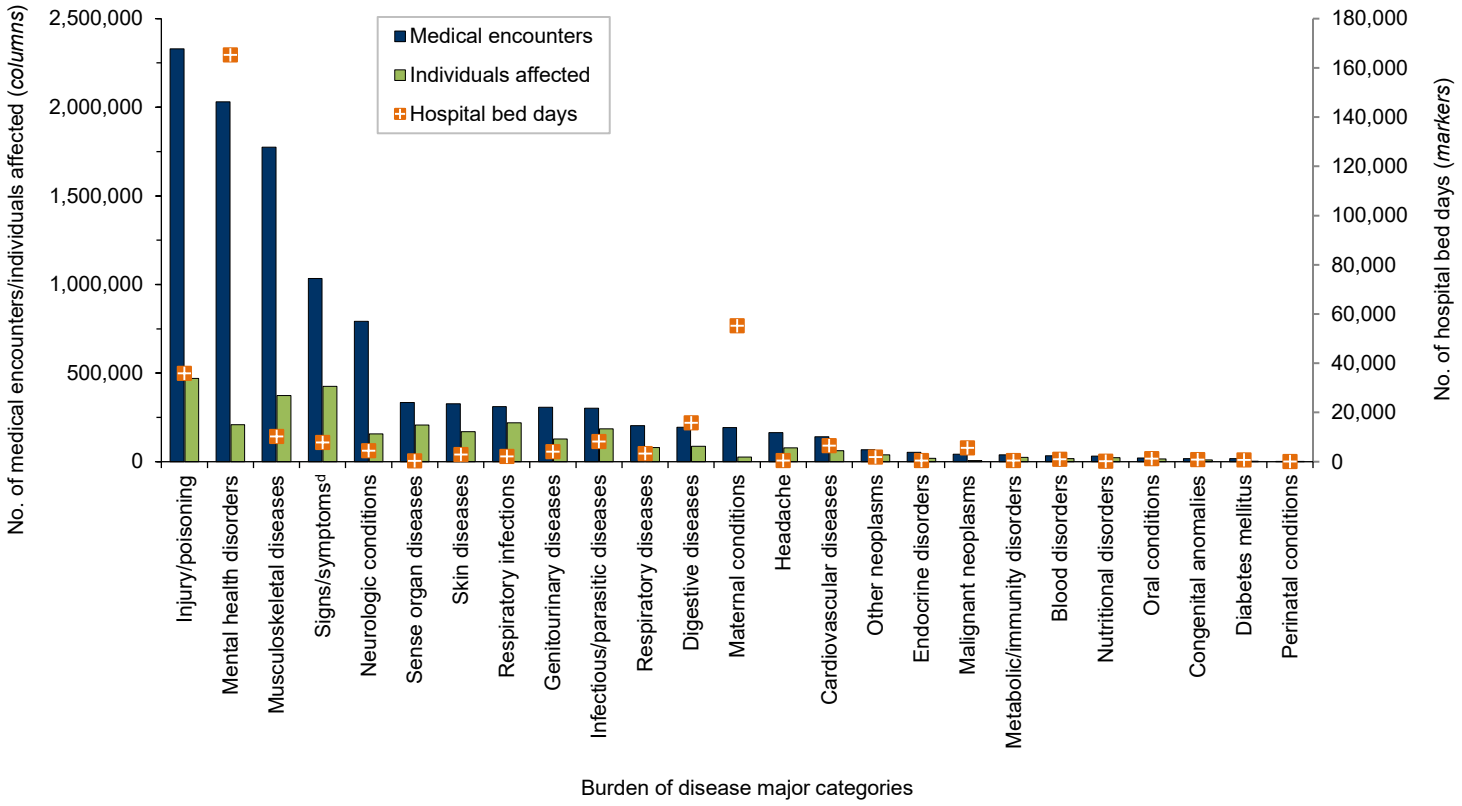
Mental health disorders accounted for more hospital bed days (n=165,296) than any other morbidity category and nearly half (49.3%) of all hospital bed days overall **(Figures 1a, 1b)**. Together, injury/poisoning and mental health disorders accounted for about three-fifths (60.0%) of all hospital bed days and about two-fifths (40.5%) of all medical encounters.

Of note, maternal conditions (including pregnancy complications and delivery) accounted for a relatively large proportion of all hospital bed days (n=55,177; 16.4%) but a much smaller proportion of medical encounters overall (n=192,278; 1.8%) **(Figures 1a, 1b)**. Routine prenatal visits are not included in this summary.

Medical encounters, by condition

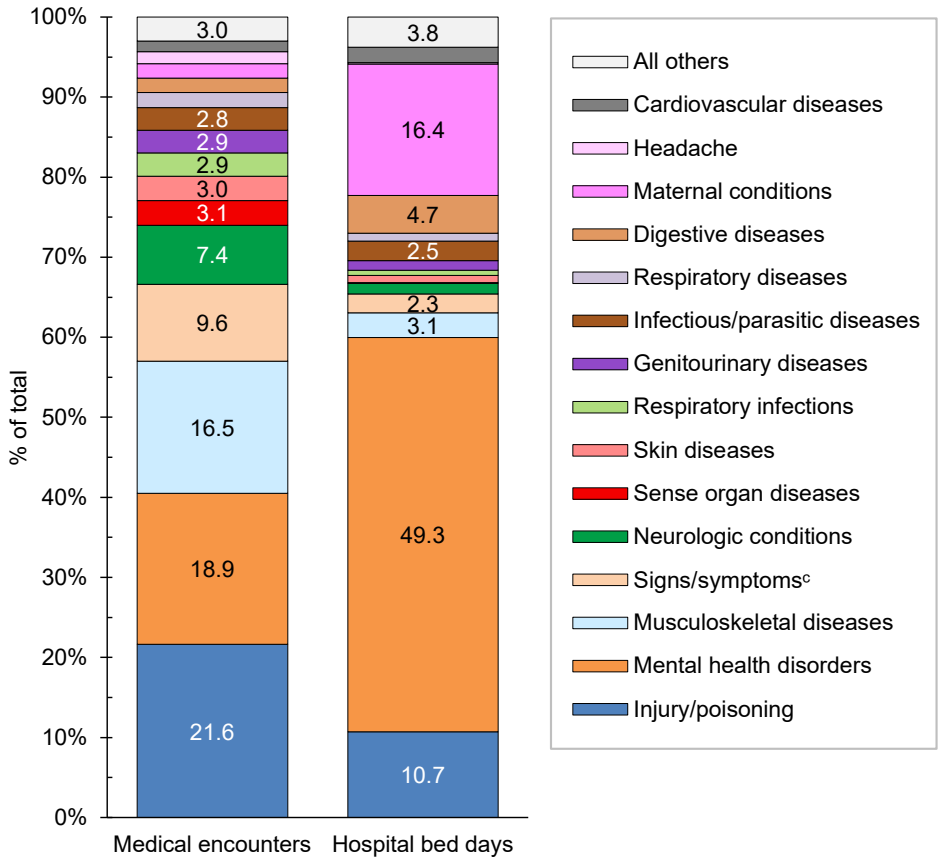
In 2020, the 3 burden of disease-related conditions that accounted for the most medical encounters (i.e., other back problems, organic sleep disorders, and all other signs and symptoms) accounted for slightly over one-fifth (21.2%) of all illness- and injury-related medical encounters overall **(Figure 2)**. Moreover, the 9 conditions that accounted for the most medical encounters accounted for more than half (50.7%) 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 2020 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

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, 2020



[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, 2020



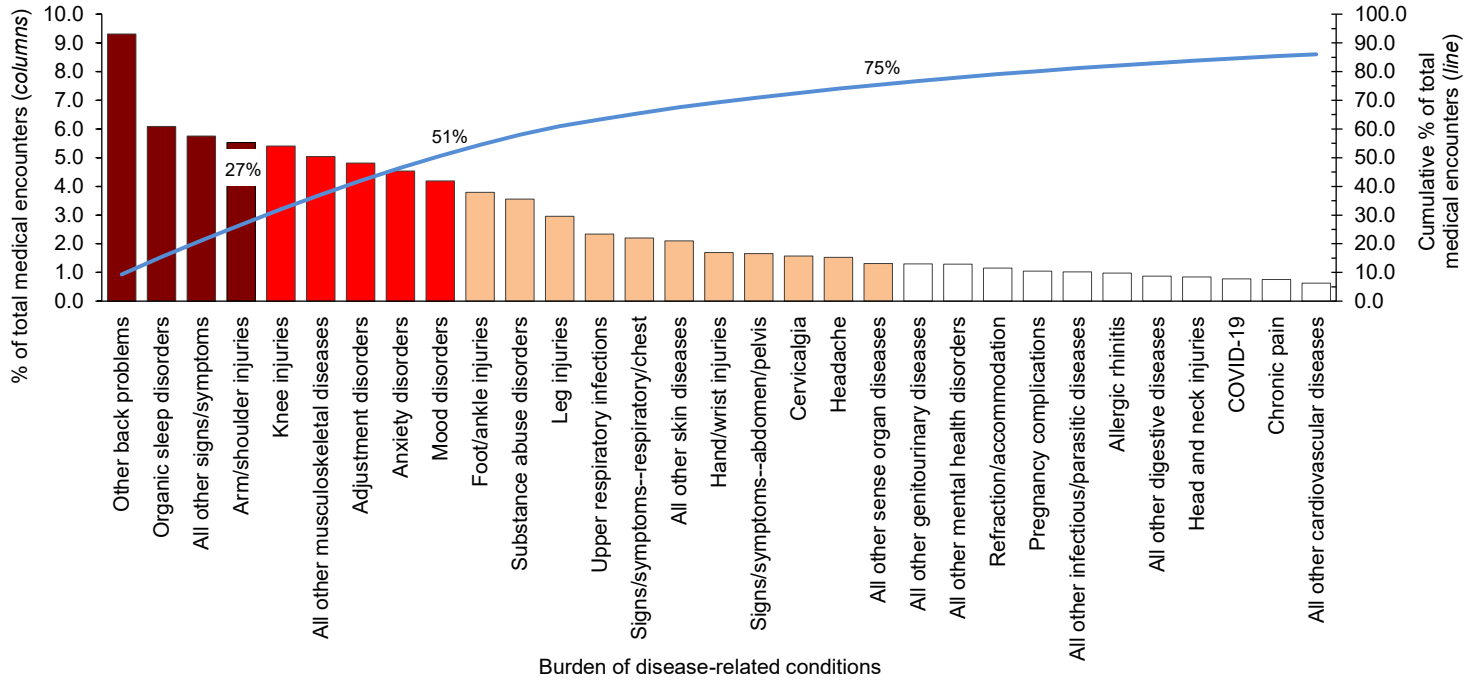
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease Study.[1]
[c]Includes ill-defined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

disorders, or substance abuse disorders), organic sleep disorders (e.g., insomnia, organic sleep apnea), and other signs and symptoms (e.g. fever, malaise). **(Table, Figure 2)**. COVID-19 accounted for 0.78% of medical encounters and ranked 29th in total medical encounters during 2020 **(Table)**.

Individuals affected, by condition

In 2020, more active component service members received medical care for all other signs and symptoms than for any other specific condition **(Table)**. Of the 10 conditions that affected the most service members, 3 were injuries (knee, arm/shoulder, foot/ankle); 2 were musculoskeletal diseases (other back problems and all other musculoskeletal diseases); 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); and 1 was skin diseases (all other skin diseases). COVID-19 affected 52,872 service members and ranked 21st in the number of service members affected as compared to all other conditions.

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, 2020



[a]Burden of disease-related conditions based on a modified version of those defined in the Global Burden of Disease Study.[1]
COVID-19, corononavirus disease 2019.

TABLE. Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2020

Major category condition[a]	Medical encounters[b]		Individuals affected[c]		Bed days	
	No.	Rank[d]	No.	Rank[d]	No.	Rank[d]
Injury and poisoning						
Arm and shoulder injuries	594,748	(4)	120,094	(10)	2,786	(24)
Knee injuries	581,700	(5)	128,830	(6)	1,163	(39)
Foot and ankle injuries	408,082	(10)	121,344	(9)	1,930	(29)
Leg injuries	318,248	(12)	81,774	(15)	5,726	(12)
Hand and wrist injuries	182,336	(16)	69,486	(19)	1,425	(34)
Head and neck injuries	90,768	(28)	44,828	(26)	7,358	(8)
Back and abdomen injuries	40,056	(39)	24,181	(39)	3,839	(18)
Other injury from external causes	34,361	(45)	15,362	(52)	372	(64)
Other complications NOS	28,482	(48)	16,025	(50)	6,618	(9)
Environmental	20,668	(56)	15,111	(53)	659	(49)
Unspecified injury	17,070	(67)	12,004	(61)	786	(43)
Poisoning, nondrug	4,675	(103)	3,224	(94)	368	(65)
Poisoning, drugs	3,349	(110)	1,789	(104)	2,603	(27)
All other injury	2,615	(115)	2,165	(98)	93	(94)
Other burns	1,405	(122)	682	(114)	177	(81)
Other superficial injury	643	(132)	446	(123)	0	(146)
Underdosing	16	(153)	15	(153)	0	(146)
Mental health disorders						
Adjustment disorders	517,863	(7)	96,499	(13)	35,784	(3)
Anxiety disorders	488,030	(8)	72,533	(18)	17,943	(5)
Mood disorders	450,897	(9)	52,067	(22)	54,048	(1)
Substance abuse disorders	382,709	(11)	29,023	(34)	45,506	(2)
All other mental disorders	138,746	(22)	46,268	(25)	2,695	(25)
Personality disorders	19,945	(59)	3,264	(93)	2,614	(26)
Psychotic disorders	19,228	(60)	1,984	(102)	6,257	(11)
Somatoform disorders	6,980	(94)	2,111	(99)	436	(60)
Tobacco dependence	6,775	(96)	4,627	(79)	13	(128)
Musculoskeletal diseases						
Other back problems	1,001,883	(1)	213,331	(2)	4,622	(14)
All other musculoskeletal diseases	542,057	(6)	193,780	(3)	4,227	(15)
Cervicalgia	169,234	(18)	48,432	(23)	61	(103)
Osteoarthritis	35,765	(43)	16,768	(47)	872	(41)
Other knee disorders	11,955	(76)	4,854	(76)	342	(67)
Other shoulder disorders	9,554	(83)	4,031	(85)	141	(88)
Rheumatoid arthritis	4,058	(107)	1,193	(109)	61	(103)
Signs/symptoms						
All other signs and symptoms	619,142	(3)	284,255	(1)	6,274	(10)
Respiratory and chest	236,854	(14)	145,740	(5)	773	(45)
Abdomen and pelvis	178,331	(17)	107,641	(11)	784	(44)
Neurologic conditions						
Organic sleep disorders	655,183	(2)	126,733	(7)	264	(71)
Chronic pain	81,173	(30)	28,226	(35)	52	(109)
All other neurologic conditions	34,957	(44)	12,447	(58)	3,058	(21)
Other mononeuritis - upper and lower limbs	12,007	(75)	6,049	(72)	18	(125)
Epilepsy	5,937	(101)	1,673	(106)	829	(42)
Multiple sclerosis	2,888	(113)	477	(121)	230	(75)
Parkinson disease	214	(144)	49	(142)	0	(146)
Sense organ diseases						
All other sense organ diseases	141,134	(20)	86,312	(14)	346	(66)
Refraction/accommodation	123,968	(23)	104,336	(12)	2	(142)
Hearing disorders	59,204	(33)	35,545	(28)	26	(121)
Glaucoma	9,094	(85)	5,646	(75)	13	(128)
Cataracts	1,310	(124)	658	(115)	1	(144)
Skin diseases						
All other skin diseases	226,063	(15)	126,066	(8)	2,910	(22)
Sebaceous gland diseases	60,018	(32)	31,691	(30)	21	(122)
Contact dermatitis	40,437	(37)	29,174	(32)	47	(113)
Respiratory infections						
Upper respiratory infections	251,517	(13)	189,353	(4)	479	(58)
Lower respiratory infections	40,429	(38)	29,046	(33)	1,672	(31)
Otitis media	19,225	(61)	15,060	(54)	11	(130)

TABLE. (cont.) Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2020

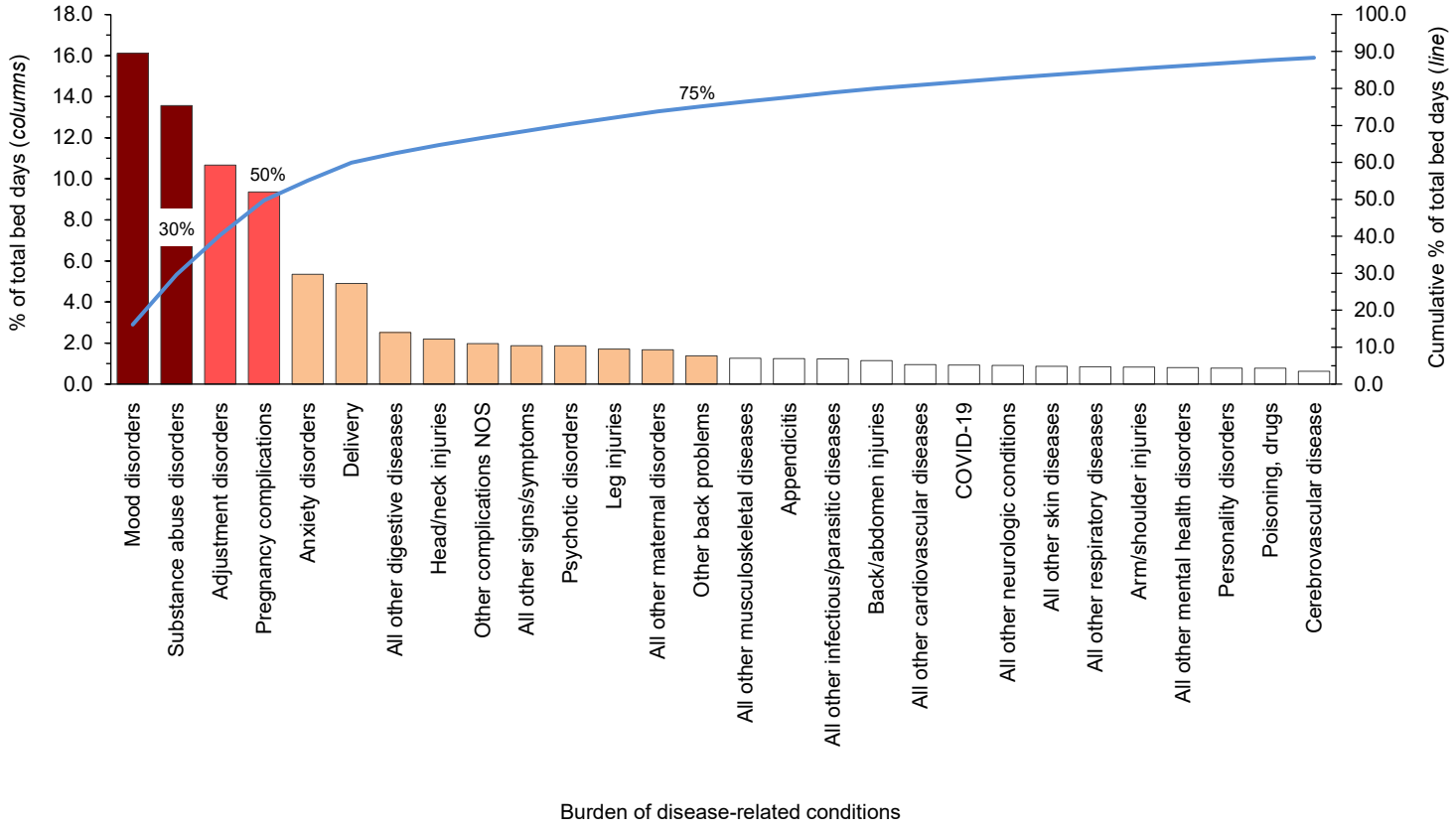
Major category condition[a]	Medical encounters[b]		Individuals affected[c]		Bed days	
	No.	Rank[d]	No.	Rank[d]	No.	Rank[d]
Genitourinary diseases						
All other genito-urinary diseases	139,726	(21)	69,297	(20)	1,561	(32)
Female genital pain	39,827	(40)	17,588	(44)	65	(102)
Menstrual disorders	27,155	(50)	16,661	(48)	393	(62)
UTI and cystitis	26,964	(51)	20,004	(42)	185	(80)
Vaginitis and vulvitis	23,068	(52)	16,253	(49)	17	(126)
Other breast disorders	20,523	(57)	10,670	(65)	291	(69)
Kidney stones	16,352	(68)	6,525	(70)	405	(61)
Nephritis and nephrosis	11,135	(79)	4,149	(82)	1,070	(40)
Benign prostatic hypertrophy	3,186	(111)	2,019	(101)	40	(117)
Infectious and parasitic diseases						
All other infectious and parasitic diseases	109,733	(25)	72,821	(17)	4,119	(17)
COVID-19	83,498	(29)	52,872	(21)	3,115	(20)
Unspecified viral infection	29,179	(46)	26,124	(36)	69	(100)
Diarrheal diseases	22,093	(54)	18,875	(43)	621	(50)
Tinea skin infections	21,369	(55)	16,894	(46)	4	(137)
Chlamydia	19,142	(62)	15,032	(55)	31	(118)
STDs	13,727	(73)	9,848	(66)	109	(92)
Hepatitis B and C	1,490	(121)	617	(116)	4	(137)
Tuberculosis	1,007	(127)	262	(132)	70	(99)
Intestinal nematode infection	367	(139)	316	(128)	2	(142)
Malaria	120	(147)	43	(145)	54	(108)
Tropical cluster	92	(149)	43	(145)	8	(132)
Bacterial meningitis	67	(151)	26	(149)	29	(120)
Respiratory disease						
Allergic rhinitis	105,249	(26)	41,710	(27)	6	(133)
All other respiratory diseases	43,545	(35)	25,303	(37)	2,831	(23)
Asthma	28,693	(47)	12,061	(60)	122	(91)
Chronic sinusitis	11,308	(78)	6,043	(73)	82	(97)
Deviated nasal septum	10,560	(80)	5,771	(74)	145	(87)
Chronic obstructive pulmonary disease	3,702	(109)	2,954	(95)	73	(98)
Digestive diseases						
All other digestive diseases	93,760	(27)	48,100	(24)	8,435	(7)
Esophagus disease	39,222	(42)	22,759	(41)	578	(52)
Other gastroenteritis and colitis	27,441	(49)	13,172	(57)	1,859	(30)
Constipation	15,710	(69)	11,483	(62)	98	(93)
Inguinal hernia	10,100	(81)	4,051	(84)	208	(78)
Appendicitis	6,273	(100)	2,935	(96)	4,163	(16)
Peptic ulcer disease	1,202	(125)	737	(113)	287	(70)
Cirrhosis of the liver	445	(137)	113	(138)	157	(84)
Maternal conditions						
Pregnancy complications	112,550	(24)	23,225	(40)	31,394	(4)
All other maternal disorders	42,622	(36)	10,696	(64)	5,609	(13)
Delivery	20,218	(58)	11,291	(63)	16,445	(6)
Ectopic/miscarriage/abortion	9,665	(82)	3,926	(87)	496	(56)
Puerperium complications	7,223	(91)	3,997	(86)	1,233	(37)
Headache						
Headache	164,252	(19)	78,971	(16)	503	(55)
Cardiovascular diseases						
All other cardiovascular diseases	67,502	(31)	32,144	(29)	3,185	(19)
Essential hypertension	55,949	(34)	29,300	(31)	222	(76)
Cerebrovascular disease	7,433	(90)	1,622	(107)	2,097	(28)
Ischemic heart disease	6,729	(98)	2,649	(97)	714	(46)
Inflammatory	2,344	(118)	1,204	(108)	264	(71)
Rheumatic heart disease	384	(138)	284	(130)	11	(130)
Other neoplasms						
All other neoplasms	39,467	(41)	24,768	(38)	1,276	(36)
Benign skin neoplasm	15,606	(70)	12,381	(59)	0	(146)
Lipoma	7,567	(89)	4,637	(78)	91	(95)
Uterine leiomyoma	4,412	(105)	2,054	(100)	558	(53)

TABLE. (cont.) Health care burdens attributable to various diseases and injuries, U.S. Armed Forces, 2020

Major category condition[a]	Medical encounters[b]		Individuals affected[c]		Bed days	
	No.	Rank[d]	No.	Rank[d]	No.	Rank[d]
Endocrine disorders						
Hypothyroidism	17,099	(66)	7,690	(69)	42	(115)
Testicular hypofunction	13,861	(72)	4,813	(77)	0	(146)
Other thyroid disorders	12,050	(74)	4,400	(80)	252	(73)
All other endocrine disorders	7,118	(92)	3,346	(91)	234	(74)
Polycystic ovarian syndrome	2,815	(114)	1,680	(105)	0	(146)
Malignant neoplasms						
All other malignant neoplasms	6,936	(95)	1,035	(110)	1,388	(35)
Lymphoma and multiple myeloma	6,311	(99)	598	(117)	611	(51)
Leukemia	4,908	(102)	303	(129)	1,465	(33)
Melanoma and other skin cancers	4,520	(104)	1,901	(103)	42	(115)
Breast cancer	4,115	(106)	401	(126)	149	(86)
Testicular cancer	3,841	(108)	573	(118)	124	(90)
Colon and rectum cancers	3,175	(112)	256	(134)	674	(48)
Brain	2,375	(117)	187	(135)	546	(54)
Thyroid	1,995	(120)	427	(124)	202	(79)
Mouth and oropharynx cancers	1,118	(126)	121	(137)	68	(101)
Prostate cancer	998	(128)	159	(136)	56	(106)
Cervix uteri cancer	856	(129)	406	(125)	17	(126)
Trachea, bronchus, and lung cancers	614	(134)	74	(139)	61	(103)
Stomach cancer	544	(135)	37	(147)	175	(82)
Liver cancer	241	(141)	25	(150)	56	(106)
Bladder cancer	217	(143)	60	(141)	6	(133)
Ovary cancer	190	(145)	46	(143)	20	(123)
Pancreas cancer	159	(146)	28	(148)	4	(137)
Esophagus cancer	120	(147)	16	(152)	0	(146)
Corpus uteri cancer	37	(152)	19	(151)	3	(140)
Metabolic and immunity disorders						
Lipoid metabolism disorders	22,525	(53)	17,006	(45)	49	(111)
Other metabolic disorders	7,727	(88)	4,091	(83)	381	(63)
Gout	6,768	(97)	3,308	(92)	19	(124)
Immunity disorders	2,441	(116)	751	(112)	84	(96)
Blood disorders						
All other blood disorders	9,193	(84)	4,322	(81)	466	(59)
Hereditary anemias	8,942	(86)	6,273	(71)	51	(110)
Iron-deficiency anemia	8,096	(87)	3,854	(88)	174	(83)
Other non-deficiency anemias	6,982	(93)	3,670	(90)	305	(68)
Other deficiency anemias	664	(131)	391	(127)	3	(140)
Nutritional disorders						
All other nutritional disorders	18,829	(64)	15,679	(51)	43	(114)
Overweight, obesity	11,765	(77)	8,219	(67)	49	(111)
Protein-energy malnutrition	218	(142)	44	(144)	151	(85)
Oral conditions						
All other oral conditions	19,069	(63)	13,932	(56)	1,179	(38)
Dental caries	632	(133)	554	(119)	0	(146)
Periodontal disease	543	(136)	479	(120)	5	(135)
Congenital disorders						
All other congenital anomalies	14,117	(71)	8,205	(68)	486	(57)
Congenital heart disease	2,263	(119)	1,004	(111)	127	(89)
Other circulatory anomalies	1,316	(123)	462	(122)	209	(77)
Diabetes						
Diabetes mellitus	17,539	(65)	3,752	(89)	686	(47)
Conditions arising during the perinatal period[e]						
Low birth weight	741	(130)	259	(133)	31	(118)
All other perinatal anomalies	349	(140)	271	(131)	1	(144)
Birth asphyxia and birth trauma	82	(150)	66	(140)	5	(135)

[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 based on number of encounters, individuals affected, or bed days within 153 burden-related disease conditions; for medical encounters, 1 pair of tied values (147) were given the same ranking, which resulted in a highest rank of 153; for individuals affected, 1 pair of tied values (145) were given the same ranking, which resulted in a highest rank of 153; for hospital bed days, 16 sets of tied values were given the same ranking, which resulted in a highest rank of 146.
[e]Conditions affecting newborns erroneously coded on service member medical records.
No., number; NOS, not otherwise specified; UTI, urinary tract infection; COVID-19, corononavirus disease 2019; STDs, sexually transmitted diseases.

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, 2020



[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; COVID-19, corononavirus disease 2019.

Hospital bed days, by condition

In 2020, mood and substance abuse disorders accounted for more than one-quarter (29.7%) of all hospital bed days. Together, 4 mental health disorders (mood, substance abuse, adjustment, and anxiety) and 2 maternal conditions (pregnancy complications and delivery) accounted for three-fifths (60.0%) of all hospital bed days **(Table, Figure 3)**. Slightly more than 10 percent (10.6%) of all hospital bed days were attributable to injuries and poisonings. A total of 3,115 bed days were attributable to COVID-19 which was ranked 20th among all conditions for bed days.

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=0.86) **(data not shown)**. For example, the 3 leading causes of medical encounters were among the 9 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=0.19) or medical encounters attributable to (r=0.43) the same conditions. For example, labor and delivery and substance abuse disorders 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 2020, as in prior years, the burden of disease categories of musculoskeletal disorders, injuries, mental health disorders, and pregnancy- and delivery-related 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 anatomic site-defined injuries (knee and arm/shoulder), 2 musculoskeletal conditions (other

back problems and all other musculoskeletal diseases), 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 that of other population groups that are different in terms of demographic distribution and occupational hazards. Examples of such different populations include not only the general 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 the majority of 2020 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.[4–9] 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, like those of prior years, documents that relatively few illnesses and injuries account for most of the 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.

REFERENCES

1. Murray CJL, Lopez AD, eds. *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, MA: Harvard University Press, 1996:120–122.
2. Brundage JF, Johnson KE, Lange JL, Rubertone MV. Comparing the population health impacts of medical conditions using routinely collected health care utilization data: nature and sources of variability. *Mil Med*. 2006;171(10):937–942.
3. Armed Forces Health Surveillance Branch. Absolute and relative morbidity burdens attributable to various illnesses and injuries, non-service member beneficiaries of the Military Health System, 2020. *MSMR*. 2021;28(5):40–50.
4. Cozza KL, Hales RE. Psychiatry in the Army: a brief historical perspective and current developments. *Hosp Community Psychiatry*.1991;42(4):413–418.
5. Watanabe HK, Harig PT, Rock NL, Koshes RJ. Alcohol and drug abuse and dependence. In: Jones FD, Sparcino, LR, Wilcox VL, Rotherberg JM, eds. *Textbook of Military Medicine. Military Psychiatry: Preparing in Peace for War.* Falls Church, VA: Office of the Surgeon General; 1994.
6. Jones BH, Perrotta DM, Canham-Chervak ML, Nee MA, Brundage JF. Injuries in the military: a review and commentary focused on prevention. *Am J Prev Med*. 2000;18(3 suppl):71–84.
7. Hoge CW, Auchterlonie JL, Milliken CS. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA*. 2006;295(9):1023–1032.
8. Packnett ER, Elmasry H, Toolin CF, Cowan DB, Boivin MR. Epidemiology of major depressive disorder disability in the US military: FY 2007–2012. *J Nerv Ment Dis*. 2017;205(9):672–678.
9. Stahlman S, Oetting AA. Mental health disorders and mental health problems, active component, U.S. Armed Forces, 2007–2016. *MSMR*. 2018;25(3):2–11.

MSMR's Invitation to Readers

Medical Surveillance Monthly Report (MSMR) invites readers to submit topics for consideration as the basis for future *MSMR* reports. The *MSMR* editorial staff will review suggested topics for feasibility and compatibility with the journal's health surveillance goals. As is the case with most of the analyses and reports produced by Armed Forces Health Surveillance Branch staff, studies that would take advantage of the health care and personnel data contained in the Defense Medical Surveillance System (DMSS) would be the most plausible types. For each promising topic, Armed Forces Health Surveillance Branch staff members will design and carry out the data analysis, interpret the results, and write a manuscript to report on the study. This invitation represents a willingness to consider good ideas from anyone who shares the *MSMR*'s objective to publish evidence-based reports on subjects relevant to the health, safety, and well-being of military service members and other beneficiaries of the Military Health System (MHS).

In addition, the *MSMR* encourages the submission for publication of reports on evidence-based estimates of the incidence, distribution, impact, or trends of illness and injuries among members of the U.S. Armed Forces and other beneficiaries of the MHS. Information about manuscript submissions is available at www.health.mil/MSMRInstructions.

Please email your article ideas and suggestions to the *MSMR* Editor at dha.ncr.health-surv.mbx.msmr@mail.mil.

Hospitalizations, Active Component, U.S. Armed Forces, 2020

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 2020. 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, 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 2020, there were 62,459 records of hospitalizations of active component members of the U.S. Army, Navy, Air Force, and Marine Corps **(Table 1)**; 33.7% of the hospitalizations were in non-military facilities **(data not shown)**. The annual hospitalization rate (all causes) for 2020 was 47.1 per 1,000 service member person-years (p-yrs). This rate was the lowest of the years covered in this report (2011–2020), during which rates fell steadily each year until 2019 when the rate (52.2 per 1,000 p-yrs) exceeded that of 2018 (51.0 per 1,000 p-yrs) (**Figure 1**).

Hospitalizations, by illness and injury categories

In 2020, 4 diagnostic categories accounted for 70.9% of all hospitalizations

WHAT ARE THE NEW FINDINGS?

The hospitalization rate in 2020 was 47.1 per 1,000 person-years, the lowest rate of the most recent 10 years, during which period annual rates steadily declined. As in prior years, the majority (70.9%) 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?

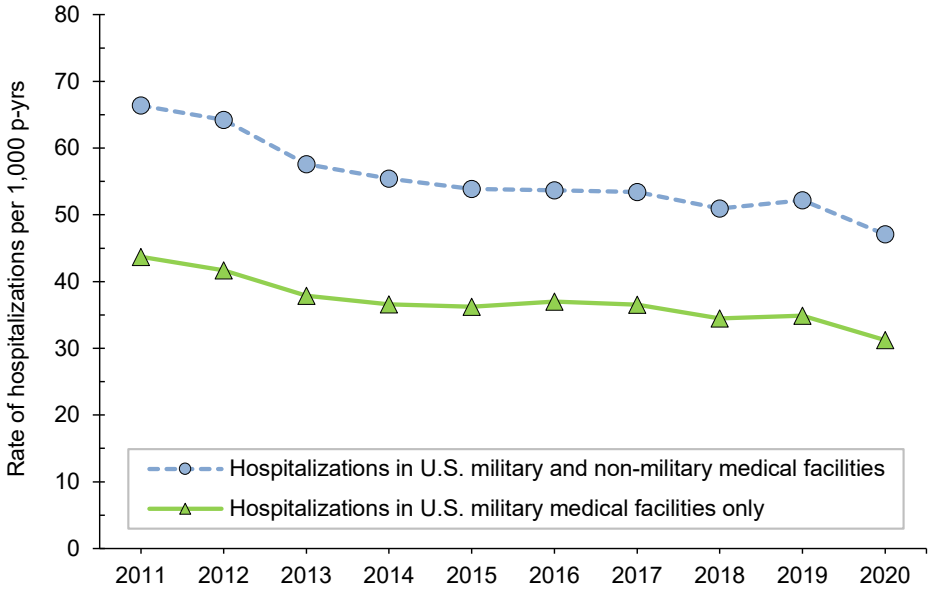
Not only are mental health disorders the most common diagnoses associated with hospitalizations, they are associated with the longest median hospital stay (6 days). Moreover, 5% of hospitalizations for mental health disorders had durations of stay greater than 30 days. Prolonged hospitalizations, subsequent 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-9/ICD-10 major diagnostic category, active component, U.S. Armed Forces, 2016, 2018, and 2020

	2016[c]			2018			2020		
Major diagnostic category (ICD-9-CM; ICD-10-CM)	No.	Rate[a]	Rank[b]	No.	Rate[a]	Rank[b]	No.	Rate[a]	Rank[b]
Mental health disorders (290–319; F01–F99)	16,749	13.0	(1)	18,003	13.9	(1)	17,949	13.5	(1)
Pregnancy and delivery (630–679, relevant V-codes; O00–O99, relevant Z codes)[d]	15,474	76.1	(2)	14,907	70.0	(2)	15,647	68.7	(2)
Injury and poisoning (800–999; S00–T98, DOD0101–DOD0105)	6,895	5.3	(3)	6,506	5.0	(3)	5,498	4.1	(3)
Digestive system (520–579; K00–K95)	5,768	4.5	(5)	5,326	4.1	(4)	5,161	3.9	(4)
Musculoskeletal system and connective tissue (710–739; M00–M99)	6,002	4.7	(4)	4,858	3.7	(5)	3,921	3.0	(5)
Signs, symptoms, and ill-defined conditions (780–799; R00–R99)	3,288	2.6	(6)	3,055	2.4	(6)	2,387	1.8	(6)
Other (V01–V99, except pregnancy-related; Z00–Z99, except pregnancy-related)[e]	2,161	1.7	(7)	2,054	1.6	(7)	1,777	1.3	(7)
Genitourinary system (580–629; N00–N99)	2,082	1.6	(8)	2,008	1.5	(8)	1,551	1.2	(8)
Circulatory system (390–459; I00–I99)	1,884	1.5	(10)	1,650	1.3	(10)	1,495	1.1	(9)
Respiratory system (460–519; J00–J99)	2,027	1.6	(9)	1,805	1.4	(9)	1,471	1.1	(10)
Nervous system and sense organs (320–389; G00–G99, H00–H95)	1,757	1.4	(11)	1,463	1.1	(11)	1,256	0.9	(11)
Neoplasms (140–239; C00–D49)	1,677	1.3	(12)	1,358	1.0	(12)	1,194	0.9	(12)
Infectious and parasitic diseases (001–139; A00–B99)	1,071	0.8	(14)	1,001	0.8	(14)	867	0.7	(13)
Skin and subcutaneous tissue (680–709; L00–L99)	1,201	0.9	(13)	1,059	0.8	(13)	736	0.6	(14)
Endocrine, nutrition, immunity (240–278; E00–E89)	627	0.5	(15)	523	0.4	(15)	552	0.4	(15)
COVID-19 (ICD-10: U07.1)	--	--	--	--	--	--	509	0.4	(16)
Hematologic and immune disorders (279–289; D50–D89)	262	0.2	(17)	276	0.2	(16)	286	0.2	(17)
Congenital anomalies (740–759; Q00–Q99)	283	0.2	(16)	217	0.2	(17)	202	0.2	(18)
Total	69,208	53.7		66,069	51.0		62,459	47.1	

[a]Rate per 1,000 person-years.
[b]Rank of major diagnostic category based on number of hospitalizations.
[c]2015 hospitalization data included ICD-9 diagnostic codes.
[d]Rate of pregnancy and delivery-related hospitalizations among females only.
[e]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number; COVID-19, coronavirus disease 2019.

FIGURE 1. Rates of hospitalization, by year, active component, U.S. Armed Forces, 2011–2020



P-yrs, person-years.

of active component members: mental health disorders (28.7%), pregnancy- and delivery-related conditions (25.1%), injury/poisoning (8.8%), and digestive system disorders (8.3%) **(Table 1)**. Similar to 2016 and 2018, in 2020 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 2020 to 2016, numbers of hospitalizations decreased in all major categories of illnesses and injuries except for mental health disorders, pregnancy and delivery, and hematologic and immune disorders, which increased 7.2%, 1.1%, and 9.2%, respectively **(Table 1)**. The largest drop in the number of hospitalizations during 2016–2020 was seen in the category of "musculoskeletal system and connective system disorders" (hospitalization difference, 2016–2020: -2,081; 34.7% decrease).

Hospitalizations, by sex

In 2020, the hospitalization rate (all causes) among females was more than 3 times that of males (114.8 per 1,000 p-yrs vs. 32.6 per 1,000 p-yrs, respectively). Excluding pregnancy and delivery, the rate of hospitalizations among females (46.1 per 1,000 p-yrs) was 41.6% higher than among males **(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 females than males for mental health disorders (female:male, RD: 7.4 per 1,000 p-yrs); genitourinary disorders (RD: 2.9 per 1,000 p-yrs); and neoplasms (RD: 1.4 per 1,000 p-yrs) **(data not shown)**. With the exception of pregnancy- and delivery-related conditions, hospitalization rates were similar among males and females for the remaining 13 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 males and females, hospitalization rates generally increased with age for musculoskeletal system/connective tissue disorders, neoplasms, and circulatory, genitourinary, digestive, nervous, and endocrine/nutrition/immunity disorders **(Figure 2)**. Among service members aged 30 years or older, there was a pronounced difference by sex in the slopes of the rates of neoplasms, with the rates among females notably higher than among males in the same age groups. Rates decreased with age for mental health disorders but were relatively stable across age groups for injury/poisoning, signs/symptoms/ill-defined conditions, and infectious/parasitic diseases.

Most frequent diagnoses

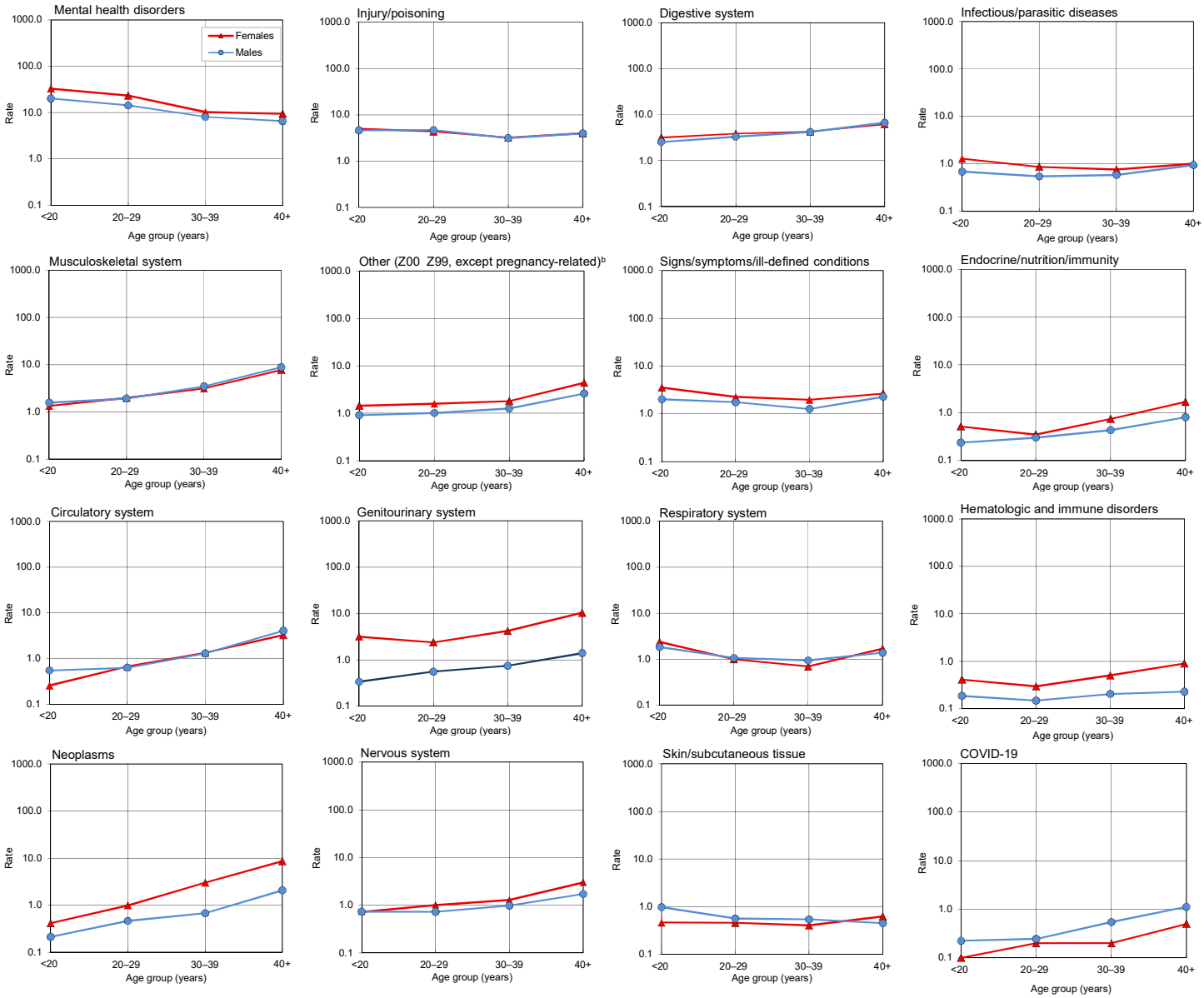
In 2020, adjustment disorder was the most frequent discharge diagnosis among males (n=4,433) **(Table 2)**. Alcohol dependence (n=2,303), acute appendicitis (n=1,197), major depressive disorder [recurrent, severe without psychotic features] (n=1,104), major depressive disorder [single episode, unspecified] (n=1,087), other symptoms and signs involving emotional state (n=542), and post-traumatic stress disorder (PTSD) (n=523) were the next 6 most frequent diagnoses in males **(Table 2)**.

In 2020, the most frequent discharge diagnosis among females was adjustment disorder (n=1,352). Pregnancy- and delivery-related conditions represented the next 5 leading causes of hospitalizations among females, and this category alone accounted for 59.7% of all hospitalizations of females **(Table 3)**. The top 5 discharge diagnoses in this condition category included post-term (late) pregnancy (n=1,332), abnormality in fetal heart rate and rhythm (n=922), maternal care due to uterine scar from previous surgery (n=856), premature rupture of membranes [onset of labor within 24 hours of rupture] (n=847), and first degree perineal laceration during delivery (n=793). After the top 6 discharge diagnoses described above for females, the other leading causes of hospitalizations among females were recurrent major depressive disorder without psychotic features (n=454), PTSD (n=448), major depressive disorder [single episode, unspecified] (n=380), and alcohol dependence (n=304). Combined, mental health disorder diagnoses accounted for one-sixth (17.1%) of all hospitalizations of females.

Injury/poisoning

As in the past, in 2020, injury/poisoning was the third leading cause of

FIGURE 2. Rates[a] of hospitalization, by ICD-10 major diagnostic category, age group, and sex, active component, U.S. Armed Forces, 2020



[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 (excluding pregnancy-related).
ICD, International Classification of Diseases; COVID-19, coronavirus disease 2019.

hospitalizations of U.S. military members **(Table 1)**. Of all injury/poisoning-related hospitalizations in U.S. military medical facilities (n=3,326), more than half (63.4%) had a missing or invalid NATO Standardization Agreement (STANAG) code **(Table 4)**. More than one-third (35.6%) of all "unintentional" injury/poisoning-related hospitalizations in U.S. military facilities (n=1,068) were considered caused by falls and miscellaneous (n=380), while land transport (n=236) accounted for 22.1% of "unintentional" injury/poisoning-related hospitalizations **(Table 4)**.

Among males, injury/poisoning-related hospitalizations were most often related to infection following a procedure, concussion, fracture of the tibial shaft, or fracture of the mandible **(Table 2)**. Among females, injury/poisoning-related hospitalizations were most often related to poisoning by/adverse effect of acetaminophen derivatives, unspecified injury, infection following a procedure, concussion, or poisoning by/adverse effect of/underdosing of other and unspecified antidepressants **(Table 3)**.

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, 2020

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Mental health disorders (F01-F99)	**13,467**	
Adjustment disorders	4,433	32.9
Alcohol dependence	2,303	17.1
Major depressive disorder, recurrent severe without psychotic features	1,104	8.2
Major depressive disorder, single episode, unspecified	1,087	8.1
Post-traumatic stress disorder (PTSD)	523	3.9
Injury and poisoning (S00–T98, DOD0101–DOD0105)	**4,598**	
Infection following a procedure	201	4.4
Concussion	124	2.7
Fracture of shaft of tibia	116	2.5
Fracture of mandible	113	2.5
Heatstroke and sunstroke	113	2.5
Digestive system (K00–K95)	**4,223**	
Other and unspecified acute appendicitis	1,197	28.3
Acute appendicitis with localized peritonitis	258	6.1
Acute pancreatitis, unspecified	172	4.1
Alcohol induced acute pancreatitis	125	3.0
Other and unspecified intestinal obstruction	109	2.6
Musculoskeletal system (M00–M99)	**3,310**	
Other specified disorders of muscle	474	14.3
Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders with radiculopathy	275	8.3
Spinal stenosis	222	6.7
Other spondylosis with radiculopathy	165	5.0
Major anomalies of jaw size	152	4.6
Other (Z00–Z99, except pregnancy-related)	**1,355**	
Encounter for examination and observation for unspecified reason	363	26.8
Encounter for antineoplastic chemotherapy and immunotherapy	189	13.9
Encounter for other specified postprocedural aftercare	173	12.8
Encounter for other orthopedic aftercare	134	9.9
Aftercare following joint replacement surgery	93	6.9
Signs, symptoms, and ill-defined conditions (R00–R99)	**1,854**	
Other symptoms and signs involving emotional state	542	29.2
Syncope and collapse	174	9.4
Other chest pain	121	6.5
Chest pain, unspecified	116	6.3
Unspecified convulsions	93	5.0
Circulatory system (I00–I99)	**1,264**	
Pulmonary embolism without acute cor pulmonale	152	12.0
Non-ST elevation (NSTEMI) myocardial infarction	69	5.5
Unspecified atrial fibrillation and atrial flutter	55	4.4
Paroxysmal atrial fibrillation	53	4.2
Atherosclerotic heart disease of native coronary artery	38	3.0
Genitourinary system (N00–N99)	**744**	
Acute kidney failure, unspecified	167	22.4
Hydronephrosis with renal and ureteral calculous obstruction	58	7.8
Calculus of ureter	53	7.1
Calculus of kidney	49	6.6
Torsion of testis	39	5.2

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Respiratory system (460–519; J00–J99)	**1,224**	
Pneumonia, unspecified organism	152	12.4
Peritonsillar abscess	98	8.0
Deviated nasal septum	63	5.1
Other pneumothorax and air leak	53	4.3
Acute respiratory failure	51	4.2
Neoplasms (C00–D49)	**727**	
Malignant neoplasm of thyroid gland	40	5.5
Acute lymphoblastic leukemia [ALL]	26	3.6
Malignant neoplasm of prostate	23	3.2
Acute myeloblastic leukemia	23	3.2
Malignant neoplasm of rectum	17	2.3
Nervous system and sense organs (G00–G99, H00–H95)	**981**	
Sleep apnea	73	7.4
Epilepsy, unspecified	64	6.5
Other epilepsy and recurrent seizures	47	4.8
Brachial plexus disorders	47	4.8
Acute pain, NEC	32	3.3
Skin and subcutaneous tissue (L00–L99)	**632**	
Cellulitis and acute lymphangitis of other parts of limb	257	40.7
Cutaneous abscess, furuncle and carbuncle of limb	43	6.8
Cellulitis and acute lymphangitis of face and neck	32	5.1
Pilonidal cyst and sinus with abscess	31	4.9
Cellulitis and acute lymphangitis of finger and toe	28	4.4
Infectious and parasitic diseases (A00–B99)	**666**	
Sepsis, unspecified organism	196	29.4
Other specified sepsis	56	8.4
Infectious gastroenteritis and colitis, unspecified	53	8.0
Infectious mononucleosis, unspecified	36	5.4
Enterocolitis due to *Clostridium difficile*	28	4.2
Endocrine, nutrition, immunity (E00–E89)	**422**	
Type 2 diabetes mellitus with ketoacidosis	68	16.1
Type 1 diabetes mellitus with ketoacidosis	66	15.6
Dehydration	27	6.4
Hypo-osmolality and hyponatremia	27	6.4
Type 2 diabetes mellitus with other specified complications	26	6.2
Congenital anomalies (Q00–Q99)	**141**	
Meckel's diverticulum (displaced) (hypertrophic)	12	8.5
Other congenital deformities of hip	12	8.5
Atrial septal defect	11	7.8
Arteriovenous malformation of cerebral vessels	10	7.1
Pectus excavatum	9	6.4
Hematologic and immune disorders (D50–D89)	**193**	
Neutropenia, unspecified	27	14.0
Other specified aplastic anemias and other bone marrow failure syndromes	17	8.8
Immune thrombocytopenic purpura	16	8.3
Iron deficiency anemia, unspecified	14	7.3
Acute posthemorrhagic anemia	12	6.2

[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, 2020

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Mental health disorders (F01-F99)	**4,482**	
Adjustment disorders	1,352	30.2
Major depressive disorder, recurrent severe without psychotic features	454	10.1
Post-traumatic stress disorder (PTSD)	448	10.0
Major depressive disorder, single episode, unspecified	380	8.5
Alcohol dependence	304	6.8
Pregnancy and childbirth (O00-O99, relevant Z codes)	**15,647**	
Post-term pregnancy	1,332	8.5
Abnormality in fetal heart rate and rhythm complicating labor and delivery	922	5.9
Maternal care due to uterine scar from previous surgery	856	5.5
Premature rupture of membranes, onset of labor within 24 hours of rupture	847	5.4
First degree perineal laceration during delivery	793	5.1
Injury and poisoning (S00–T98, DOD0101–DOD0105)	**900**	
Poisoning by, adverse effect of and underdosing of 4-Aminophenol derivatives	47	5.2
Unspecified injury	44	4.9
Infection following a procedure	40	4.4
Concussion	34	3.8
Poisoning by, adverse effect of and underdosing of other and unspecified antidepressants	31	3.4
Digestive system (K00–K95)	**938**	
Other and unspecified acute appendicitis	229	24.4
Calculus of gallbladder with acute cholecystitis	48	5.1
Acute cholecystitis	43	4.6
Acute appendicitis with localized peritonitis	35	3.7
Other and unspecified intestinal obstruction	29	3.1
Musculoskeletal system (M00–M99)	**611**	
Other specified disorders of muscle	55	9.0
Major anomalies of jaw size	39	6.4
Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders with radiculopathy	35	5.7
Other spondylosis with radiculopathy	25	4.1
Stress fracture	25	4.1
Other (Z00–Z99, except pregnancy-related)	**422**	
Encounter for examination and observation for unspecified reason	132	31.3
Encounter for other specified postprocedural aftercare	63	14.9
Encounter for antineoplastic chemotherapy and immunotherapy	38	9.0
Encounter for other administrative examinations	26	6.2
Encounter for other orthopedic aftercare	21	5.0
Signs, symptoms, and ill-defined conditions (R00–R99)	**533**	
Other symptoms and signs involving emotional state	164	30.8
Unspecified abdominal pain	34	6.4
Syncope and collapse	33	6.2
Pain localized to upper abdomen	26	4.9
Unspecified convulsions	25	4.7
Circulatory system (I00–I99)	**231**	
Pulmonary embolism without acute cor pulmonale	41	17.7
Acute embolism and thrombosis of deep veins of lower extremity	9	3.9
Cerebral infarction, unspecified	7	3.0
Cerebral aneurysm, nonruptured	7	3.0
Non-ST elevation (NSTEMI) myocardial infarction	6	2.6

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Genitourinary system (N00-N99)	**807**	
Abnormal uterine and vaginal bleeding, unspecified	115	14.3
Other and unspecified ovarian cysts	76	9.4
Acute tubulo-interstitial nephritis	52	6.4
Hypertrophy of breast	40	5.0
Other specified abnormal uterine and vaginal bleeding	30	3.7
Respiratory system (J00–J99, U07.0)	**247**	
Peritonsillar abscess	34	13.8
Acute tonsillitis, unspecified	21	8.5
Pneumonia, unspecified organism	20	8.1
Other and unspecified asthma	10	4.0
Other intraoperative and postprocedural complications and disorders of respiratory system, NEC	10	4.0
Neoplasms (C00–D49)	**467**	
Leiomyoma of uterus, unspecified	131	28.1
Intramural leiomyoma of uterus	50	10.7
Malignant neoplasm of thyroid gland	23	4.9
Subserosal leiomyoma of uterus	23	4.9
Malignant neoplasm of breast of unspecified site	17	3.6
Nervous system and sense organs (G00–G99, H00–H95)	**275**	
Migraine with aura	22	8.0
Migraine, unspecified	21	7.6
Acute pain, NEC	18	6.5
Brachial plexus disorders	12	4.4
Multiple sclerosis	10	3.6
Skin and subcutaneous tissue (L00–L99)	**104**	
Cellulitis and acute lymphangitis of other parts of limb	18	17.3
Cellulitis and acute lymphangitis of finger and toe	10	9.6
Cellulitis and acute lymphangitis of face and neck	7	6.7
Pilonidal cyst and sinus with abscess	7	6.7
Postprocedural hematoma and seroma of skin and subcutaneous tissue following a procedure	7	6.7
Infectious and parasitic diseases (A00–B99)	**201**	
Sepsis, unspecified organism	68	33.8
Sepsis due to other Gram-negative organisms	17	8.5
Enterocolitis due to *Clostridium difficile*	15	7.5
Infectious gastroenteritis and colitis, unspecified	14	7.0
Infectious mononucleosis, unspecified	7	3.5
Endocrine, nutrition, immunity (E00–E89)	**130**	
Thyrotoxicosis with diffuse goiter	18	13.8
Nontoxic multinodular goiter	12	9.2
Dehydration	12	9.2
Type 2 diabetes mellitus with ketoacidosis	8	6.2
Localized adiposity	8	6.2
Hematologic and immune disorders (D50-D89)	**93**	
Iron deficiency anemia, unspecified	19	20.4
Anemia, unspecified	14	15.1
Other iron deficiency anemias	7	7.5
Iron deficiency anemia secondary to blood loss (chronic)	6	6.5
Acute posthemorrhagic anemia	5	5.4

[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 4. Numbers and percentages of injury-related hospitalizations,[a] by causal agent,[b] active component, U.S. Armed Forces, 2020

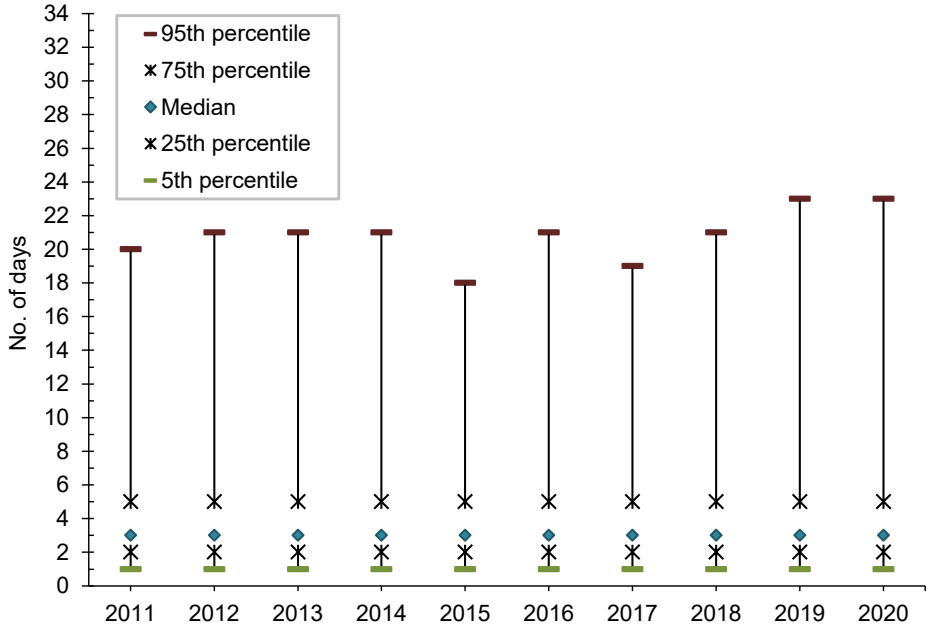
Cause	No.	% total
Unintentional	1,068	32.1
Fall and miscellaneous	380	11.4
Land transport	236	7.1
Poisons and fire	94	2.8
Athletics	92	2.8
Complications of medical/surgical	89	2.7
Machinery, tools	72	2.2
Environmental	44	1.3
Guns, explosives (includes accidents during war)	32	1.0
Air transport	24	0.7
Water transport	5	0.2
Intentional	150	4.5
Self-inflicted	117	3.5
Battle casualty	21	0.6
Non-battle, inflicted by other (e.g., assault)	12	0.4
Missing/invalid code	2,108	63.4
Total	3,326	100.0

[a]Hospitalizations in U.S. military medical facilities only
[b]Causal agents were determined by codes per NATO Standardization Agreement (STANAG) 2050
No., number.

Durations of hospitalizations

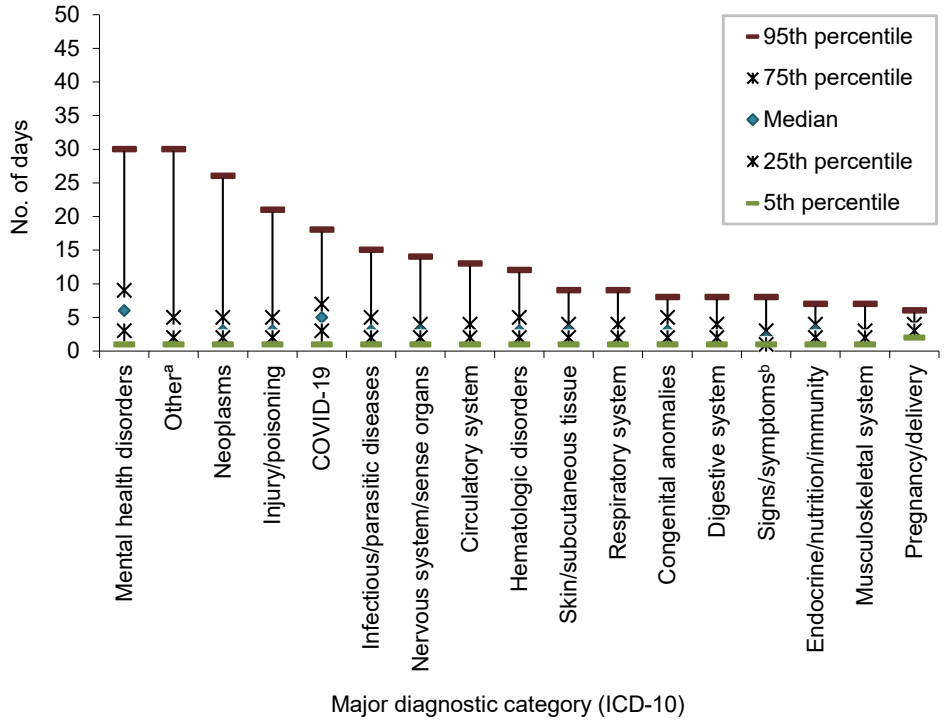
During 2011–2020, the median duration of hospital stays (all causes) remained stable at 3 days **(Figure 3)**. As in previous years, medians and ranges of durations of hospitalizations varied considerably across major diagnostic categories. For example, median lengths of hospitalizations varied from 2 days (e.g., musculoskeletal system disorders; genitourinary system disorders; signs, symptoms, and ill-defined conditions) to 6 days (mental health disorders). For most diagnostic categories, less than 5% of hospitalizations exceeded 12 days, but for 7 categories, 5% of hospitalizations had longer durations: circulatory system disorders (13 days), nervous system/sense organ disorders (14 days), infectious/parasitic diseases (15 days), injury/poisoning (21 days), neoplasms (26 days), other non-pregnancy-related factors influencing

FIGURE 3. Length of hospital stay, active component, U.S. Armed Forces, 2011–2020



No., number.

FIGURE 4. Length of hospital stay, by ICD-10 major diagnostic category, active component, U.S. Armed Forces, 2011–2020



[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; COVID-19, coronavirus disease 2019.

TABLE 5. Numbers and rates of hospitalizations, by service and ICD-10 diagnostic category, active component, U.S. Armed Forces, 2020

	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)	7,234	15.2	4,585	13.6	3,558	10.8	2,572	14.1
Pregnancy and childbirth (O00-O99, relevant Z codes)	5,472	11.5	4,497	13.3	4,474	13.6	1,204	6.6
Injury and poisoning (S00-T98, DOD0101-DOD0105)	2,662	5.6	1,106	3.3	853	2.6	877	4.8
Digestive system (K00-K95)	2,139	4.5	1,352	4.0	1,029	3.1	641	3.5
Musculoskeletal system (M00-M99)	1,858	3.9	797	2.4	754	2.3	512	2.8
Signs, symptoms, and ill-defined conditions (R00-R99)	1,423	3.0	406	1.2	388	1.2	170	0.9
Respiratory system (J00-J99, U07.0)	705	1.5	257	0.8	280	0.8	229	1.3
Other (Z00–Z99, except pregnancy-related)[c]	698	1.5	400	1.2	453	1.4	226	1.2
Genitourinary system (N00-N99)	690	1.4	388	1.1	323	1.0	150	0.8
Circulatory system (I00-I99)	650	1.4	374	1.1	330	1.0	141	0.8
Nervous system and sense organs (G00-G99, H00-H95)	554	1.2	295	0.9	288	0.9	119	0.7
Neoplasms (C00-D49)	479	1.0	317	0.9	256	0.8	142	0.8
Skin and subcutaneous tissue (L00-L99)	322	0.7	146	0.4	101	0.3	167	0.9
Infectious and parasitic diseases (A00-B99)	320	0.7	218	0.6	218	0.7	111	0.6
Endocrine, nutrition, immunity (E00-E89)	233	0.5	145	0.4	114	0.3	60	0.3
COVID-19 (U07.1)	186	0.4	180	0.5	108	0.3	35	0.2
Hematologic and immune disorders (D50-D89)	111	0.2	74	0.2	64	0.2	37	0.2
Congenital anomalies (Q00-Q99)	79	0.2	38	0.1	57	0.2	28	0.2
Total	25,815	54.1	15,575	46.1	13,648	41.4	7,421	40.6

[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.

health status and contact with health services (primarily orthopedic aftercare and rehabilitation following a previous illness or injury) (30 days), and mental health disorders (30 days) **(Figure 4)**. It is noteworthy that, for one specific infectious disease, COVID-19, although the median length of hospital stay was 5 days, 5% of patients had hospital stays of 18 days or longer.

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 active component members of the Army, Navy, and Marine Corps, mental health disorders were the leading cause of hospitalizations **(Table 5)**. For the Navy, this was a change from the results for 2019, when pregnancy and delivery-related conditions were most numerous. The crude hospitalization rate for mental health disorders among active component Army members (15.2 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 5)**. The hospitalization rate for injury/poisoning was highest among Army (5.6 per 1,000 p-yrs) and Marines Corps members (4.8 per 1,000 p-yrs) and lowest among Air Force members (2.6 per 1,000 p-yrs).

EDITORIAL COMMENT

The hospitalization rate for all causes among active component members in 2020 was the lowest rate of the past 10 years. As in past years, in 2020, 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. Annual crude rates of hospitalizations for mental health disorders increased between 2015 and 2017 and have remained relatively stable between 2017 and 2020. The annual number of mental health disorder-related hospitalizations has been approximately 18,000 since 2017.

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 of U.S. forces from Iraq and the official end to combat operations in Afghanistan. The decrease in hospitalizations in 2020 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 the recent trends in hospitalization.

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 2020; 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 non-military hospitals. If there are significant differences between the causes of injuries and poisonings that resulted in hospitalizations in U.S. military and non-military hospitals, the summary of external causes of injuries requiring hospital treatment reported here **(Table 4)** could be misleading. 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, 2020

This report documents the frequencies, rates, trends, and characteristics of ambulatory health care visits of active component members of the U.S. Army, Navy, Air Force, and Marine Corps during 2020. Ambulatory visits of U.S. service members in fixed military and nonmilitary (reimbursed through the Military Health System [MHS]) medical treatment facilities are documented with standardized, automated records. These records are routinely archived for health surveillance purposes in the Defense Medical Surveillance System (DMSS), which is the source of data for this report. Ambulatory visits that are not routinely and completely documented with standardized electronic records (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 first 4 characters of 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 coronavirus 2019 (COVID-19) pandemic.

WHAT ARE THE NEW FINDINGS?

In 2020, the overall numbers and rates of active component service member ambulatory care visits decreased slightly compared to previous years. Most categories of illness and injury showed modest declines in numbers and rates. The proportions of ambulatory care visits that were accomplished via telehealth encounters increased to 19% in 2020, compared to 14% in 2016 and 2018.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

The response to the coronavirus pandemic may have been associated with not only a decrease in the incidence of disease and injury diagnoses in the service member population but also an increase in the proportions of health care encounters delivered through telehealth. Lessons learned may guide future steps in reducing disease and injury incidence in the post-pandemic era.

TABLE 1. Numbers, rates,[a] and ranks[b] of ambulatory visits, by ICD-9/ICD-10 major diagnostic category, active component, U.S. Armed Forces, 2016, 2018, and 2020

	2016[c]			2018			2020		
Major diagnostic category (ICD-9; ICD-10)	No.	Rate[a]	Rank[b]	No.	Rate[a]	Rank[b]	No.	Rate[a]	Rank[b]
Other (V01–V99, except pregnancy-related; Z00–Z99, except pregnancy-related)[d]	7,568,681	5872.4	(1)	7,155,040	5519.7	(1)	7,831,384	5901.5	(1)
Musculoskeletal system and connective tissue (710–739; M00–M99)	4,399,712	3413.7	(2)	4,240,142	3271.0	(2)	3,575,703	2694.6	(2)
Mental health disorders (290–319; F01–F99)	2,070,773	1606.7	(3)	1,913,176	1475.9	(3)	2,068,706	1558.9	(3)
Nervous system and sense organs (320–389; G00–G99, H00–H95)	1,327,664	1030.1	(4)	1,329,520	1025.7	(4)	1,313,805	990.1	(4)
Signs, symptoms, and ill-defined conditions (780–799; R00–R99)	1,143,051	886.9	(5)	1,166,310	899.7	(5)	1,213,450	914.4	(5)
Injury and poisoning (800–999; S00–T98, DOD0101–DOD0105)	859,750	667.1	(6)	771,839	595.4	(6)	645,599	486.5	(6)
Respiratory system (460–519; J00–J99)	638,271	495.2	(7)	629,983	486.0	(7)	504,666	380.3	(7)
Pregnancy and delivery (630–679, relevant V-codes; O00–O99, relevant Z codes)[e]	325,185	1,599.4	(9)	333,532	1,565.1	(9)	343,640	1,508.9	(8)
Skin and subcutaneous tissue (680–709; L00–L99)	393,370	305.2	(8)	380,308	293.4	(8)	343,259	258.7	(9)
Genitourinary system (580–629; N00–N99)	281,184	218.2	(10)	275,770	212.7	(10)	281,369	212.0	(10)
Digestive system (520–579; K00–K95)	248,088	192.5	(11)	232,925	179.7	(11)	224,811	169.4	(11)
Infectious and parasitic diseases (001–139; A00–B99)	247,988	192.4	(12)	225,660	174.1	(12)	208,984	157.5	(12)
Endocrine, nutrition, immunity (240–278; E00–E89)	157,572	122.3	(13)	136,619	105.4	(13)	135,893	102.4	(13)
Circulatory system (390–459; I00–I99)	139,928	108.6	(14)	129,022	99.5	(14)	126,954	95.7	(14)
Neoplasms (140–239; C00–D49)	131,882	102.3	(15)	119,622	92.3	(15)	113,569	85.6	(15)
COVID-19 (ICD-10: U07.1)	--	--	--	--	--	--	83,405	62.9	(16)
Hematologic and immune disorders (279–289; D50–D89)	32,663	25.3	(16)	31,949	24.6	(16)	37,041	27.9	(17)
Congenital anomalies (740–759; Q00–Q99)	22,400	17.4	(17)	19,971	15.4	(17)	17,890	13.5	(18)
Total	19,988,162	15,508.5		19,091,388	14,728.0		19,070,128	14,370.8	

[a]Rates are based on 1,000 person-years.
[b]Rank of major diagnostic category based on number of hospitalizations.
[c]2016 ambulatory visit data included ICD-9 diagnostic codes.
[d]Other factors influencing health status and contact with health services (excluding pregnancy-related).
[e]Rate of pregnancy and delivery-related hospitalizations among females only.
ICD, International Classification of Diseases; No., number.

Frequencies, rates, and trends

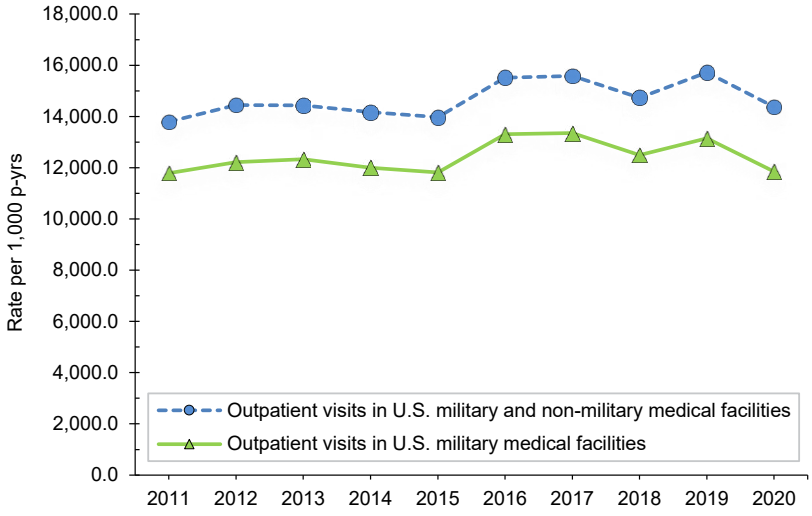
During 2020, there were 19,070,128 reported ambulatory visits of active component service members. "Visits" refers to encounters accomplished via in-person clinical meetings as well as "telehealth" encounters. The crude annual rate (all causes) was 14,370.8 visits per 1,000 person-years (p-yrs) or 14.4 visits per p-yr; thus, on average, each service member had approximately 14 ambulatory encounters during the year **(Table 1)**. The rate of documented ambulatory visits in 2020 was 4.2% higher than the lowest point in 2011 (13,792.8 per 1,000 p-yrs) and 8.6% lower than the peak in 2019 (15,718.5 visits per 1,000 p-yrs) **(Figure 1)**. In 2020, 41.1% 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 2020, there were 11,238,744 documented ambulatory visits for illnesses and injuries (ICD-10: A00–T88, including relevant pregnancy Z-codes), not including diagnoses classified as "other," for a crude annual rate of illness- and injury-related visits of approximately 8.5 visits per p-yr **(Table 1)**. The crude annual rate of ambulatory visits for illnesses and injuries in 2020 was slightly lower than the rates in 2018 (9.2 visits per p-yr) and 2016 (9.6 visits per p-yr).

Ambulatory visits, by diagnostic categories

In 2020, 4 major diagnostic categories accounted for almost three-quarters (72.7%) of all illness- and injury-related ambulatory visits among active component service members: musculoskeletal system/connective tissue disorders (31.8%); mental health disorders (18.4%); disorders of the nervous system and sense organs (11.7%); and signs, symptoms, and ill-defined conditions (10.8%) **(Table 1)**. COVID-19 accounted for 0.44% of the total ambulatory visits in 2020.

FIGURE 1. Rates of ambulatory visits by year, active component, U.S. Armed Forces, 2011–2020



P-yrs, person-years.

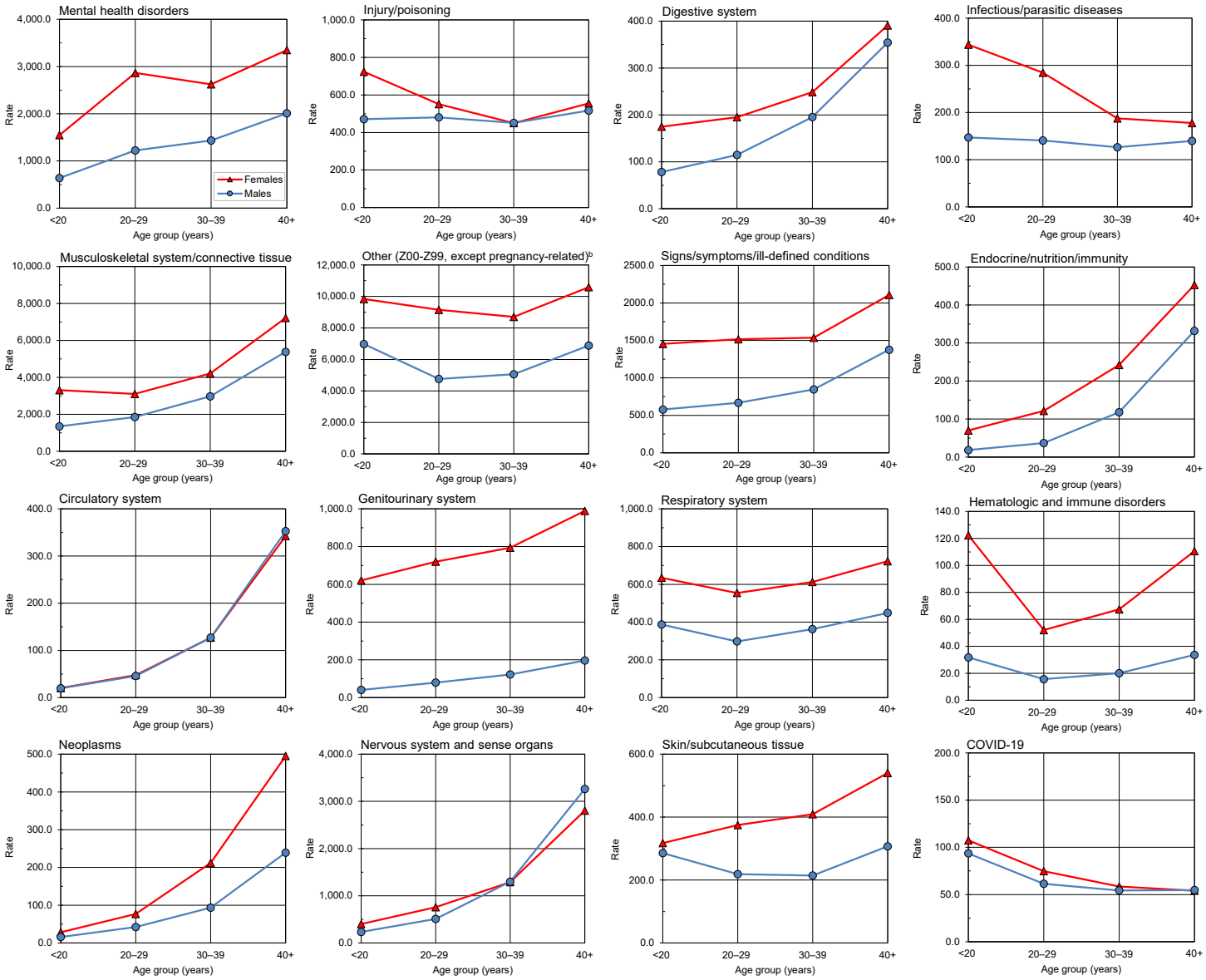
Between 2016 and 2020, there were increases in the numbers of visits in 4 major diagnostic categories of illness and injury and decreases in 12 categories **(Table 1)**. In terms of both the numbers of ambulatory visits and the percentage change in the numbers of visits for illnesses and injuries, the largest increases during 2016–2020 were for signs, symptoms, and ill-defined conditions (change: +70,399 visits; +6.2%) and pregnancy and delivery (change: +18,455; +5.7%). The largest decrease in numbers of visits between 2016 and 2020 was for musculoskeletal system/connective tissue disorders (change: -824,009; -18.7%) **(Table 1)**. The largest percentage decreases in ambulatory visits during 2016–2020 were for injury and poisoning (change: -214,151; -24.9%); respiratory system disorders (change: -133,605; -20.9%); congenital anomalies (change: -4,510; -20.1%); infectious and parasitic diseases (change: -39,004; -15.7%); neoplasms (change: -18,313; -13.9%); endocrine, nutrition, and immunity disorders (change: -21,679; -13.8%); ; and disorders of skin and subcutaneous tissue (change: -50,011; -12.7%); moreover, the rates of ambulatory visits for illnesses and injuries in all of these categories showed consistent decreases during the 5-year period (2016–2018 and 2018–2020).

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 in the 3 years of interest, the rank orders of 1 pair of categories were exchanged in 2016 and 2018 relative to 2020: pregnancy and delivery (9th to 8th) and disorders of skin and subcutaneous tissue (8th to 9th). COVID-19 was included as a separate diagnostic category in 2020 and ranked 16th in total visits.

Ambulatory visits, by sex

In 2020, males accounted for nearly three-fourths (71.9%) of all illness- and injury-related visits; however, the annual crude rate among females (13.9 visits per p-yr) was 88.6% higher than that among males (7.4 visits per p-yr) **(data not shown)**. Excluding pregnancy- and delivery-related visits (which accounted for 10.9% of all non-Z-coded ambulatory visits among females), the illness and injury ambulatory visit rate among females was 12.4 visits per p-yr. As in the past, rates for illness- and

FIGURE 2. Rates[a] of ambulatory visits, by ICD-10 major diagnostic category, age group, and sex, active component, U.S. Armed Forces, 2020



[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 (excluding pregnancy-related).
ICD, International Classification of Diseases; COVID-19, coronavirus disease 2019.

injury-related categories were generally higher among females than males **(Figure 2)**.

Among all illness- and injury-specific diagnoses, 3 of the 5 diagnoses with the largest numbers of ambulatory visits were the same for males and females. However, the crude rate (per 1,000 p-yrs) was at least 37% higher among females than males for these 3 common diagnoses: pain in joint (female: 1,445.2; male: 955.4; female:male rate ratio [RR]: 1.51); low back pain (female: 618.9; male: 451.6; RR: 1.37); and adjustment disorders (female: 688.8; male: 282.6; RR: 2.44) **(data not shown)**. Five other diagnoses were among the 10 most common diagnoses for both males and females: pain in limb, hand, foot, fingers, and toes; post-traumatic stress disorder (PTSD); sleep apnea; alcohol dependence; and cervicalgia. Of note, sleep apnea was the 2nd most frequent illness- or injury-specific primary diagnosis during ambulatory visits of males, but it ranked as the 8th most common diagnosis among females. Among females, the 7th most common diagnosis was anxiety disorder, unspecified, which was the 10th most common diagnosis among males **(Tables 2, 3)**.

Across diagnostic categories, relationships between age group and ambulatory visit rates were broadly similar among males and females **(Figure 2)**. For example, among both males and females, ambulatory visit rates for neoplasms and circulatory disorders among those aged 40 years or older were 15 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, 2020

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Infectious and parasitic diseases (A00–B99)	150,710	
Viral infection, unspecified	21,527	14.3
Coronavirus infection, unspecified	10,906	7.2
Viral intestinal infection, unspecified	8,589	5.7
Coronavirus as the cause of diseases classified elsewhere	7,324	4.9
Plantar wart	6,071	4.0
Neoplasms (C00–D49)	81,567	
Neoplasm of uncertain behavior of skin	10,197	12.5
Melanocytic nevi, unspecified	2,955	3.6
Melanocytic nevi of trunk	2,882	3.5
Neoplasm of unspecified behavior of bone, soft tissue, and skin	2,710	3.3
Other benign neoplasm of skin, unspecified	2,444	3.0
Endocrine, nutrition, immunity (E00-E89)	96,156	
Testicular hypofunction	13,858	14.4
Hyperlipidemia, unspecified	13,761	14.3
Vitamin D deficiency, unspecified	9,548	9.9
Hypothyroidism, unspecified	6,817	7.1
Type 2 diabetes mellitus without complications	6,319	6.6
Hematologic and immune disorders (D50-D89)	21,871	
Sickle-cell trait	3,734	17.1
Anemia, unspecified	2,662	12.2
Other specified disorders of white blood cells	1,843	8.4
Iron deficiency anemia, unspecified	1,579	7.2
Anemia due to G6PD deficiency	1,110	5.1
Mental health disorders (F01-F99)	1,447,614	
Adjustment disorders	310,651	21.5
Alcohol dependence	240,985	16.6
Post-traumatic stress disorder (ptsd)	169,626	11.7
Anxiety disorder, unspecified	82,797	5.7
Alcohol abuse	59,944	4.1
Nervous system and sense organs (G00-G99, H00-H95)	1,080,326	
Sleep apnea	500,279	46.3
Myopia	58,460	5.4
Chronic pain, not elsewhere classified	46,731	4.3
Insomnia	43,087	4.0
Sleep disorder, unspecified	20,520	1.9
Circulatory system (I00-I99)	106,720	
Essential (primary) hypertension	49,054	46.0
Scrotal varices	4,382	4.1
Atherosclerotic heart disease of native coronary artery	2,788	2.6
Paroxysmal atrial fibrillation	2,321	2.2
Varicose veins of lower extremities with other complications	2,163	2.0
Respiratory system (J00-J99)	370,499	
Acute upper respiratory infection, unspecified	83,066	22.4
Acute pharyngitis, unspecified	40,630	11.0
Acute nasopharyngitis (common cold)	28,942	7.8
Allergic rhinitis due to pollen	28,507	7.7
Allergic rhinitis, unspecified	22,898	6.2

Diagnostic category (ICD-10 codes) ♂	No.	%[a]
Digestive system (K00–K95)	174,136	
Gastro-esophageal reflux disease without esophagitis	20,488	11.8
Noninfective gastroenteritis and colitis, unspecified	8,705	5.0
Unilateral inguinal hernia, without obstruction or gangrene	8,015	4.6
Hemorrhage of anus and rectum	7,798	4.5
Constipation	7,733	4.4
Genitourinary system (N00-N99)	110,219	
Other specified disorders of male genital organs	23,033	20.9
Calculus of kidney	7,935	7.2
Male erectile dysfunction, unspecified	5,822	5.3
Hypertrophy of breast	5,465	5.0
Male infertility, unspecified	4,858	4.4
Skin and subcutaneous tissue (L00-L99)	254,050	
Pseudofolliculitis barbae	35,346	13.9
Acne vulgaris	15,183	6.0
Ingrowing nail	14,832	5.8
Dermatitis, unspecified	13,015	5.1
Cellulitis and acute lymphangitis of other parts of limb	9,681	3.8
Musculoskeletal system and connective tissue (M00-M99)	2,726,159	
Pain in joint	1,050,267	38.5
Low back pain	496,387	18.2
Pain in limb, hand, foot, fingers and toes	201,037	7.4
Cervicalgia	122,403	4.5
Radiculopathy	54,073	2.0
Congenital anomalies (Q00-Q99)	13,143	
Congenital pes planus	2,078	15.8
Congenital pes cavus	875	6.7
Atrial septal defect	685	5.2
Other congenital deformities of feet	656	5.0
Congenital insufficiency of aortic valve	605	4.6
Signs, symptoms, and ill-defined conditions (R00-R99)	857,761	
Cough	53,096	6.2
Other symptoms and signs involving emotional state	49,053	5.7
Chest pain, unspecified	41,403	4.8
Headache	41,323	4.8
Dyspnea	32,063	3.7
Injury/poisoning (S00-T98, DOD0101-DOD0105)	522,648	
Sprain of ankle	29,124	5.6
Sprain of shoulder joint	21,152	4.0
Sprain of cruciate ligament of knee	19,183	3.7
Tear of meniscus, current injury	13,856	2.7
Fracture of other and unspecified metacarpal bone	13,591	2.6
Other (Z00–Z99, except pregnancy-related)[b]	5,734,445	
Encounter for other administrative examinations	1,278,811	22.3
Encounter for immunization	612,541	10.7
Encounter for administrative examinations, unspecified	400,207	7.0
Other specified counseling	279,513	4.9
Encounter for examination of ears and hearing	272,568	4.8

[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; G6PD, glucose-6-phosphate dehydrogenase.

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, 2020

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Infectious and parasitic diseases (A00–B99)	58,274	
Viral infection, unspecified	7,632	13.1
Candidiasis of vulva and vagina	7,398	12.7
Chlamydial infection of genitourinary tract, unspecified	3,103	5.3
Viral intestinal infection, unspecified	2,983	5.1
Coronavirus infection, unspecified	2,960	5.1
Neoplasms (C00–D49)	32,002	
Leiomyoma of uterus, unspecified	3,510	11.0
Neoplasm of uncertain behavior of skin	2,980	9.3
Malignant neoplasm of breast of unspecified site	2,180	6.8
Melanocytic nevi, unspecified	1,044	3.3
Malignant neoplasm of upper-outer quadrant of breast	982	3.1
Endocrine, nutrition, immunity (E00-E89)	39,737	
Hypothyroidism, unspecified	6,294	15.8
Vitamin D deficiency, unspecified	6,192	15.6
Polycystic ovarian syndrome	2,813	7.1
Obesity, unspecified	2,120	5.3
Overweight	1,347	3.4
Hematologic and immune disorders (D50-D89)	15,170	
Iron deficiency anemia, unspecified	4,574	30.2
Anemia, unspecified	2,787	18.4
Sickle-cell trait	1,784	11.8
Iron deficiency anemia secondary to blood loss (chronic)	973	6.4
Other specified disorders of white blood cells	703	4.6
Mental health disorders (F01-F99)	621,092	
Adjustment disorders	156,859	25.3
Post-traumatic stress disorder (ptsd)	86,217	13.9
Anxiety disorder, unspecified	42,961	6.9
Alcohol dependence	35,678	5.7
Major depressive disorder, recurrent, moderate	31,676	5.1
Nervous system and sense organs (G00-G99, H00-H95)	233,479	
Sleep apnea	37,412	16.0
Myopia	20,043	8.6
Chronic pain, not elsewhere classified	17,400	7.5
Insomnia	13,383	5.7
Migraine with aura	9,011	3.9
Circulatory system (I00-I99)	20,234	
Essential (primary) hypertension	6,638	32.8
Varicose veins of lower extremities with other complications	880	4.3
Pulmonary embolism without acute cor pulmonale	705	3.5
Venous insufficiency (chronic) (peripheral)	613	3.0
Supraventricular tachycardia	604	3.0
Respiratory system (J00-J99)	134,167	
Acute upper respiratory infection, unspecified	28,276	21.1
Acute pharyngitis, unspecified	18,108	13.5
Allergic rhinitis due to pollen	11,338	8.5
Acute nasopharyngitis [common cold]	11,076	8.3
Allergic rhinitis, unspecified	8,678	6.5

Diagnostic category (ICD-10 codes) ♀	No.	%[a]
Digestive system (K00–K95)	50,675	
Constipation	8,135	16.1
Gastro-esophageal reflux disease without esophagitis	4,936	9.7
Noninfective gastroenteritis and colitis, unspecified	3,079	6.1
Hemorrhage of anus and rectum	1,859	3.7
Unspecified hemorrhoids	1,607	3.2
Genitourinary system (N00-N99)	171,150	
Acute vaginitis	20,775	12.1
Urinary tract infection, site not specified	14,268	8.3
Other specified noninflammatory disorders of vagina	9,016	5.3
Abnormal uterine and vaginal bleeding, unspecified	8,693	5.1
Female infertility, unspecified	7,612	4.4
Pregnancy and delivery (O00-O99, relevant Z codes)	343,640	
Encounter for care and examination of lactating mother	33,816	9.8
Encounter for supervision of normal first pregnancy	31,534	9.2
Encounter for supervision of other normal pregnancy	24,411	7.1
Encounter for routine postpartum follow-up	19,275	5.6
Other specified diseases and conditions complicating pregnancy, childbirth and the puerperium	14,682	4.3
Skin and subcutaneous tissue (L00-L99)	89,209	
Acne vulgaris	13,626	15.3
Dermatitis, unspecified	5,734	6.4
Acne, unspecified	5,292	5.9
Ingrowing nail	2,650	3.0
Urticaria, unspecified	2,347	2.6
Musculoskeletal system and connective tissue (M00-M99)	849,544	
Pain in joint	329,116	38.7
Low back pain	140,947	16.6
Pain in limb, hand, foot, fingers and toes	64,181	7.6
Cervicalgia	46,825	5.5
Stress fracture	20,984	2.5
Signs, symptoms, and ill-defined conditions (R00-R99)	355,689	
Pelvic and perineal pain	24,130	6.8
Headache	21,174	6.0
Other symptoms and signs involving emotional state	18,491	5.2
Unspecified abdominal pain	17,383	4.9
Cough	16,398	4.6
Injury/poisoning (DOD0101-DOD0105)	122,951	
Sprain of ankle	9,557	7.8
Sprain of cruciate ligament of knee	3,736	3.0
Concussion	3,495	2.8
Sprain of hip	2,457	2.0
Physical abuse, confirmed	2,438	2.0
Other (Z00–Z99, except pregnancy-related)[b]	2,096,939	
Encounter for other administrative examinations	487,008	23.2
Encounter for administrative examinations, unspecified	170,854	8.1
Encounter for immunization	138,471	6.6
Other specified counseling	135,860	6.5
Persons encountering health services in other specified circumstances	67,908	3.2

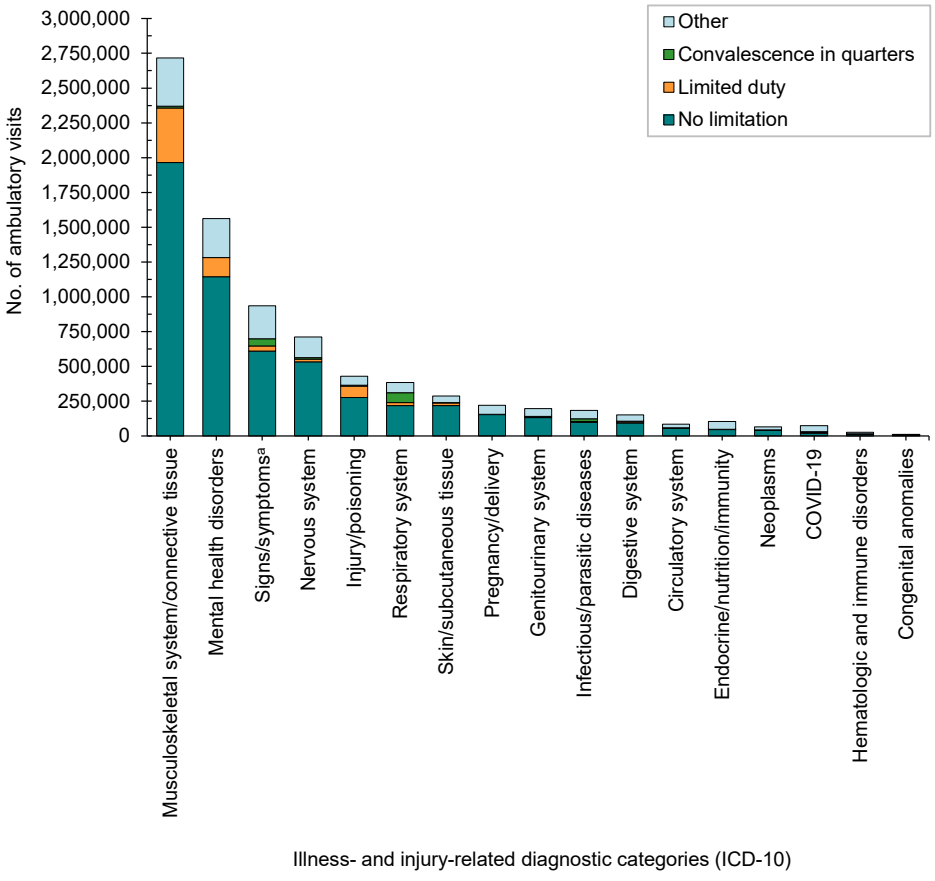
[a]Percentage of the total number of hospitalizations within the diagnostic category.
[b]Other factors influencing health status and contact with health services (excluding pregnancy-related).
ICD, International Classification of Diseases; No., number.

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)**.

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 69.1% 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, 2.3% 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 (18.9%) and musculoskeletal system/connective tissue disorders (14.4%) **(Figure 3)**. The illness- and injury-related diagnostic categories with the highest proportions of "convalescence in quarters" were infectious and parasitic diseases (9.9%) and diseases of the respiratory system (18.3%). Musculoskeletal system/connective tissue disorders (52.7%) accounted for more than one-half of all "limited duty" dispositions, and mental health disorders (18.5%) and injury/poisoning (10.9%) together accounted for more than one-quarter (29.4%) **(Figure 4)**. Diseases of the respiratory system accounted for nearly three-eighths (36.8%) of all "convalescence in quarters" dispositions—more than twice as many (n=70,184) as any other disease 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, 2020



[a]Includes ill-defined conditions.
No., number; ICD, International Classification of Diseases; COVID-19, coronavirus disease 2019.

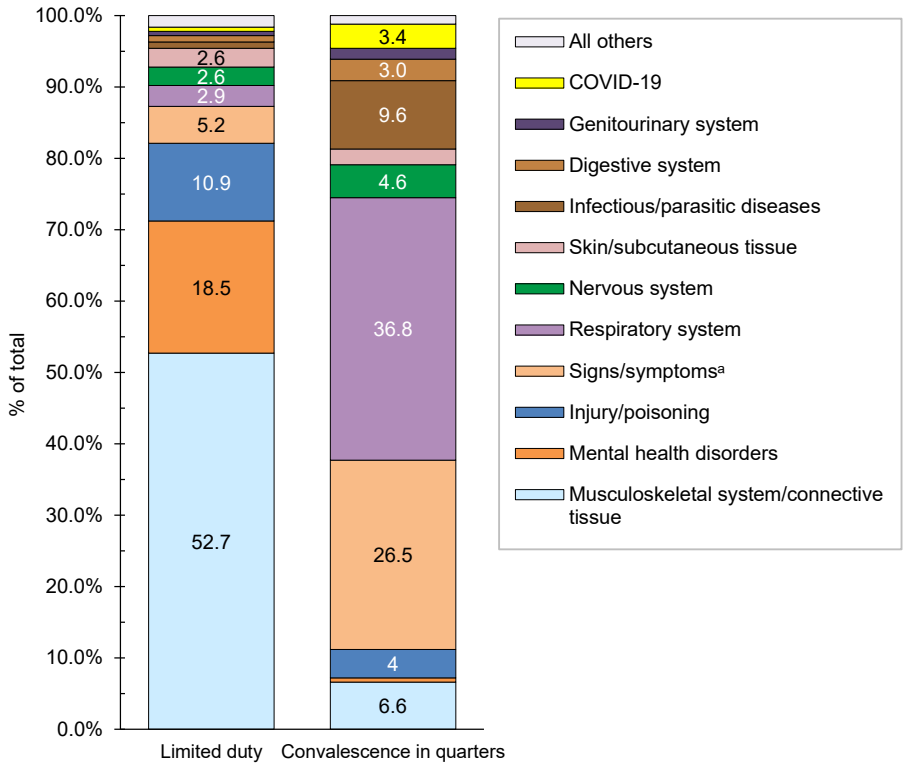
Ambulatory visits accomplished via telehealth

During the years 2016, 2018, and 2020, the total numbers of ambulatory encounters (telehealth and in-person) were 19,988,162; 19,091,388; and 19,070,128, respectively **(Table 4)**. The percentages of encounters that were telehealth approximated 14% in the first 2 of those years, but rose to 19.2% in 2020. While the number of telehealth encounters increased by 942,859 encounters from 2018 to 2020, the number of non-telehealth encounters fell by 964,119 during that interval. Among the 17 different major diagnostic categories, the number of telehealth encounters in 2020 surpassed the numbers for both 2018 and 2016 for 15 of the categories. The only exceptions were for the 2 categories endocrine, nutrition, and immunity and injury and poisoning **(data not shown)**.

EDITORIAL COMMENT

During the 5-year period covered by the years 2016, 2018, and 2020, the distribution of illness- and injury-related ambulatory visits in relation to their reported primary causes remained fairly stable. In 2020, musculoskeletal system/connective tissue and mental health disorders accounted for more than one-half (50.2%) of all illness- and injury-related diagnoses documented on standardized records of ambulatory encounters. Over the course of the surveillance period (2016–2018 and 2018–2020), 4 major illness- and injury-related categories (signs/symptoms and ill-defined conditions; pregnancy-related diagnoses; disorders of the genitourinary system; and hematologic and immune

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, 2020



[a]Includes ill-defined conditions.
COVID-19, coronavirus disease 2019.

TABLE 4. Ambulatory health care encounters, telehealth and non-telehealth (in-person), active component service members, U.S. Armed Forces, 2016, 2018, and 2020

	2016		2018		2020	
	No.	%	No.	%	No.	%
Total	19,988,162		19,091,388		19,070,128	
Telehealth encounters	2,700,737	13.5	2,725,734	14.3	3,668,593	19.2
Non-telehealth encounters	17,287,425	86.5	16,365,654	85.7	15,401,535	80.8

No., number.

disorders) showed modest increases in numbers of ambulatory visits and rates; all other major illness- and injury-related categories showed consistent decreases.

One factor that may partially explain the observed decreases in ambulatory encounters in 2020 is the COVID-19 pandemic which directly affected the health of many service members who acquired coronavirus infections. 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 coronavirus infections but also other infectious diseases.

During 2016–2020, the relative ranking of injuries and poisonings (rank: 6) as a primary cause of ambulatory visits remained stable. However, the numbers and rates of visits were 16.4% and 18.3% lower, respectively, in 2020 compared to 2018. Nevertheless, the potential military operational impacts of various conditions cannot be assessed by numbers of attributable ambulatory visits alone. For example, in 2020, injuries and poisonings accounted for approximately 1 of every 28 ambulatory visits overall; however, of ambulatory visits occurring at MTFs, 20.7% (slightly more than 1 in 5) had limited duty or "convalescence in quarters" dispositions. Of particular note, in relation to injuries and musculoskeletal conditions, in 2020 as in the past, joint and back injuries and other disorders accounted for large numbers of ambulatory visits; resources should continue to be focused on preventing, treating, and rehabilitating back pain and injuries among active component members.

It should be noted that the summary data using the major diagnostic categories of the ICD-10 system presented in **Table 1** deserve as detailed an examination as those presented in **Tables 2** and **3**. For example, the general category identified as "nervous system" encompasses diseases of the nervous system and the sense organs (eyes and ears). Results presented in **Tables 2** and **3** indicate that the more common diagnoses in this category refer to sleep disorders, disorders of refraction and accommodation, and pain disorders. Closer scrutiny reveals that even though the annual counts of visits for this category decreased slightly from 2016 (n=1,327,664) to 2020 (n=1,313,805), the counts of diagnoses of the 2 most common sleep disorders (sleep apnea and insomnia) rose from 466,577 in 2016 to 594,161 in 2020.

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) may not be documented on standardized, automated records and thus not archived in the DMSS. 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 health care 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 health care 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.

REFERENCES

1. Armed Forces Health Surveillance Branch. Ambulatory visits, active component, U.S. Armed Forces, 2016. *MSMR*. 2017;24(4):16–22.

Surveillance Snapshot: Illness and Injury Burdens, Reserve Component, U.S. Armed Forces, 2020

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, 2020

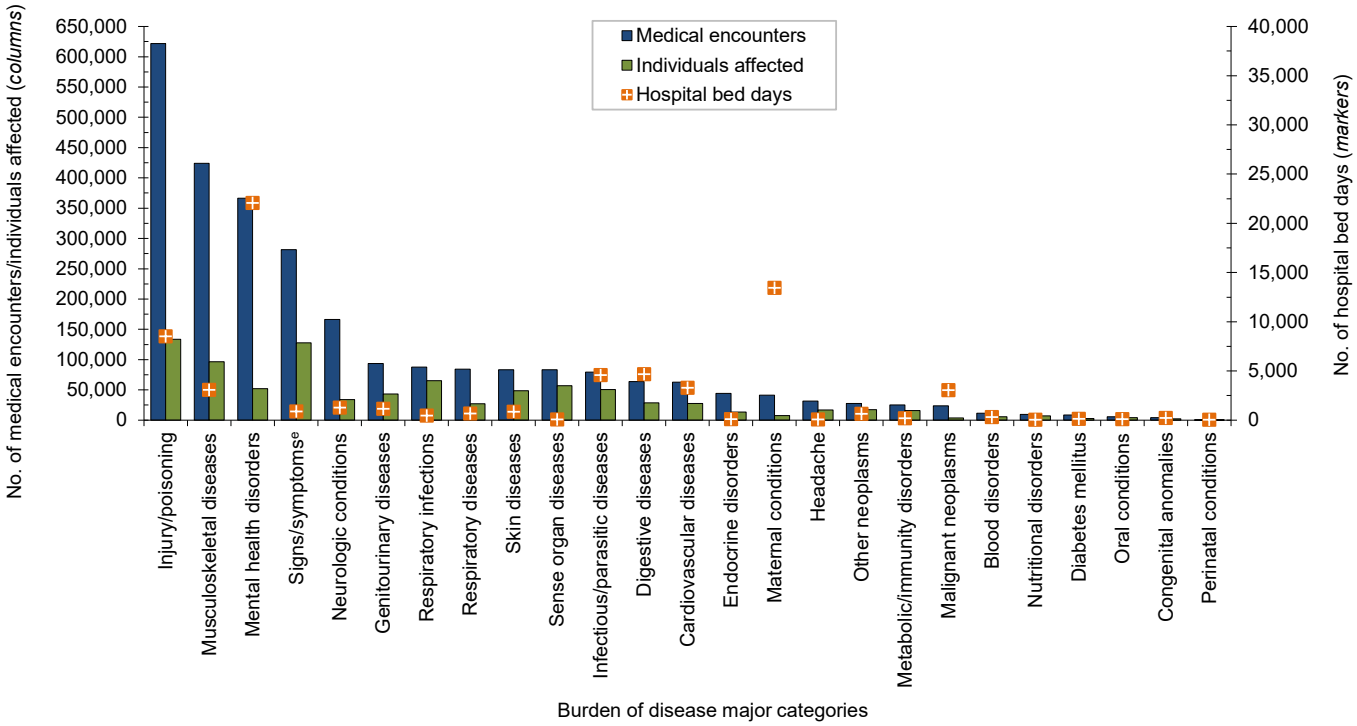
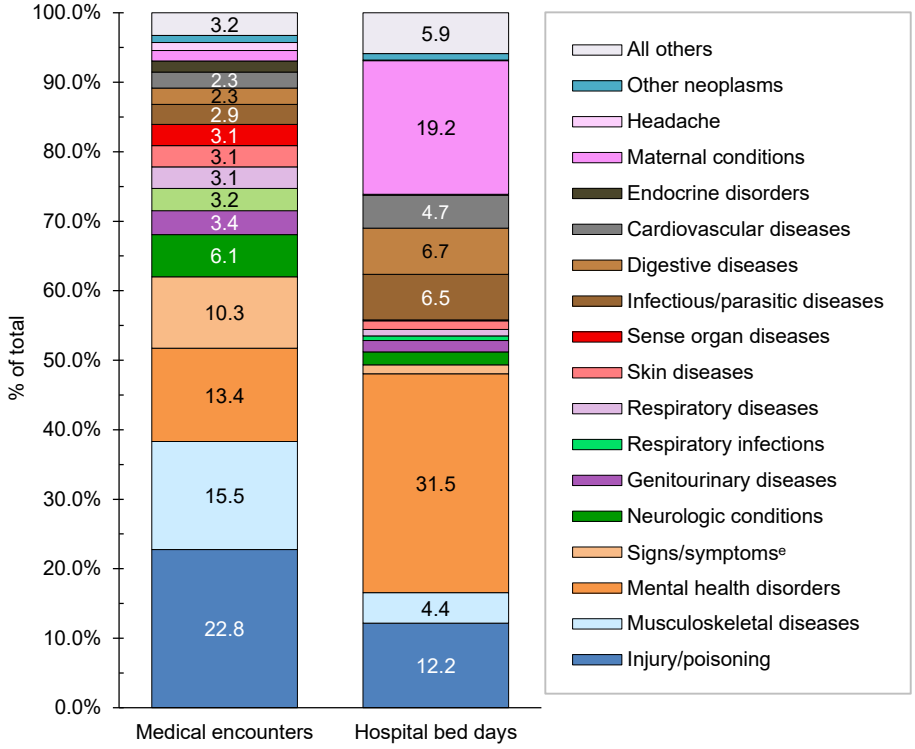


FIGURE 2. Percentages of medical encounters[a] and hospital bed days, by burden of disease category,[c] reserve component,[d] U.S. Armed Forces, 2020



[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 categories are the same as those used for analyses of mobidity 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, Active Component, U.S. Armed Forces, 2020

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, 2020

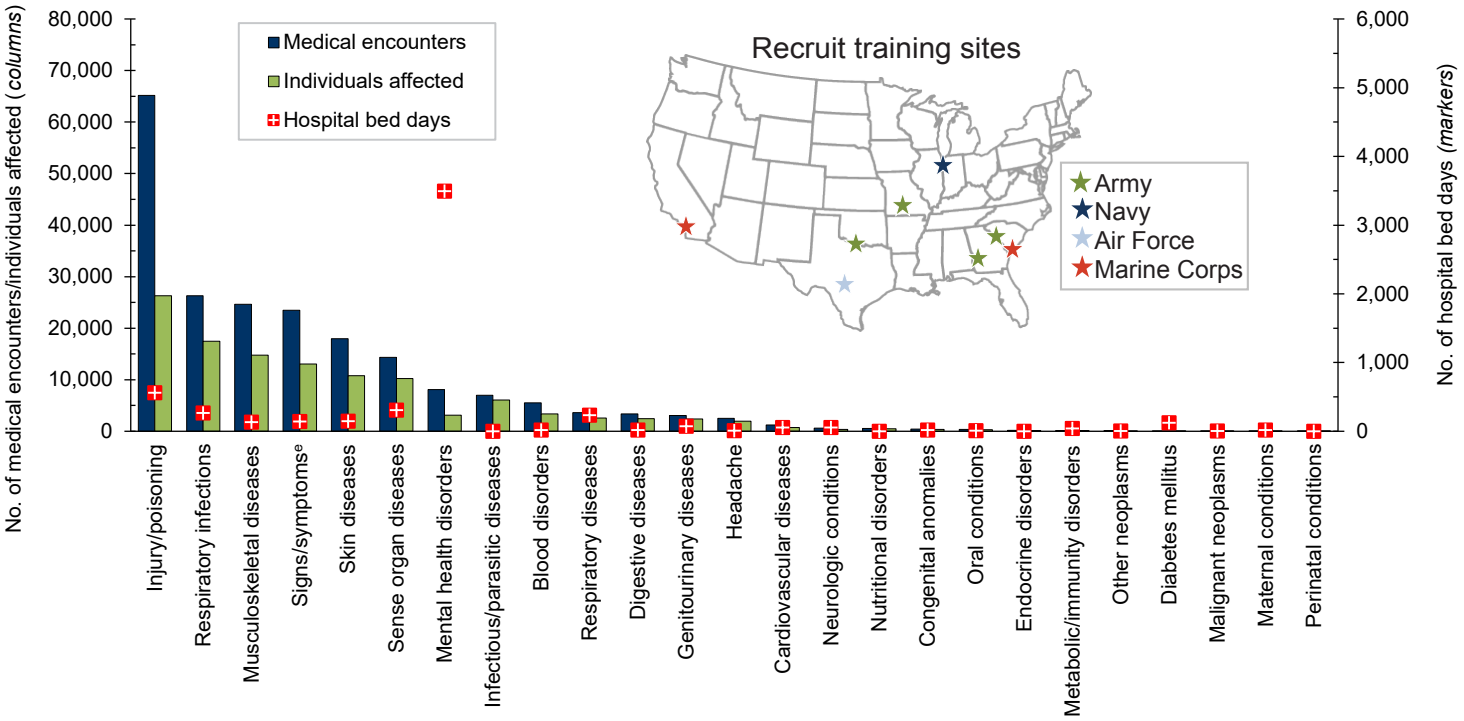
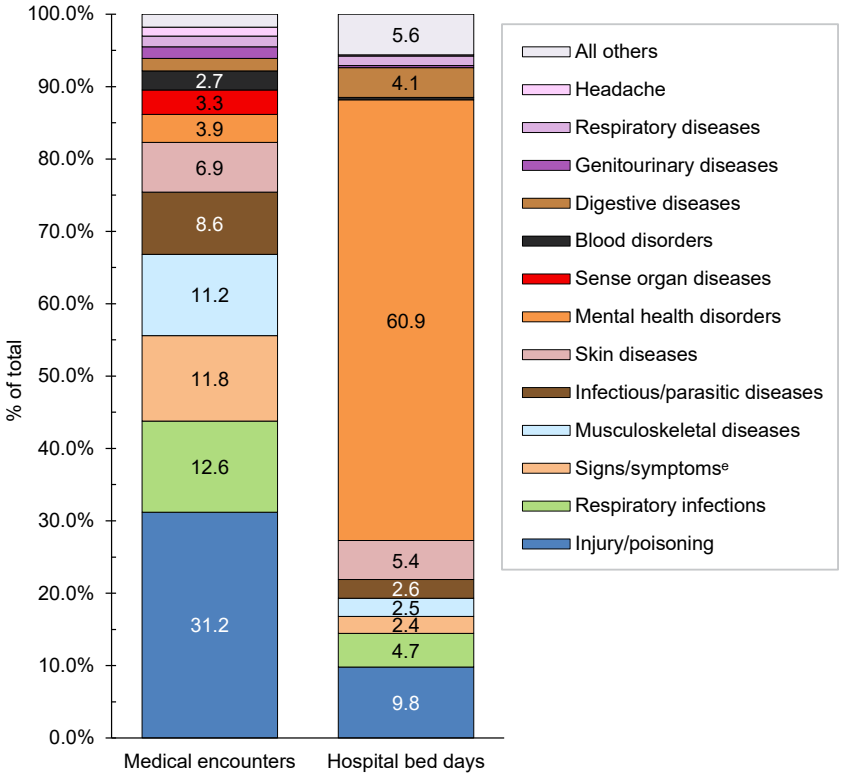


FIGURE 2. Percentages of medical encounters[a] and hospital bed days, by burden of disease major category,[c] recruit trainees,[d] active component, U.S. Armed Forces, 2020



[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 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 Command, Active and Reserve Components, U.S. Armed Forces, 2020

Although there have been substantial reductions in combat operations taking place in the U.S. Central Command (CENTCOM) area of responsibility (AOR) in Southwest Asia,[1] the number of service members deployed to the CENTCOM AOR is still significant. Recent reports indicate that there are about 60–80,000 U.S. troops in the CENTCOM AOR.[2,3] In theaters of operations such as Afghanistan, 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.

The ongoing pandemic of coronavirus disease 2019 (COVID-19) has presented additional challenges to readiness for service members stationed in CENTCOM. According to the May 2020 U.S. CENTCOM COVID-19 Pandemic Playbook for Operational Environments, all persons who test positive for COVID-19 are recommended to be moved into isolation and prepared for evacuation out of theater.[4] A prior *MSMR* report identified 186 air evacuations for COVID-19 originating from CENTCOM through the end of September 2020, which included positive cases and close contacts.[5]

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 from CENTCOM AOR operations during 2020 and compares them to the previous 4 years.

METHODS

The surveillance period was 1 January 2016 through 31 December 2020. 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 CENTCOM AOR during the period. The outcome of interest in this analysis was medical evacuations during the surveillance period from the CENTCOM AOR (e.g., Afghanistan or Iraq) to a medical treatment facility outside the CENTCOM AOR. Records of all medical evacuations conducted by the U.S. Transportation Command (TRANSCOM) maintained in the TRANSCOM Regulating and Command & Control Evacuation System (TRAC2ES) were utilized. Evacuations were included in the analysis if the affected service member had 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.

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 17 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. In addition, a new category was added this year for evacuations that resulted in a diagnosis of COVID-19 (ICD-10: U07.1). 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 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) 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. To better understand the reasons for medical

WHAT ARE THE NEW FINDINGS?

The numbers of medical evacuations of service members in 2020 were roughly similar to the numbers for the previous 4 years. The proportions of evacuations that were due to battle injuries remained relatively steady during this period except for a small peak in January 2020. Evacuations for mental health disorders were the most common, followed by non-battle injury and poisoning, and COVID-19.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

Only 1,207 service members were evacuated during 2020, 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.

evacuations among those whose only diagnoses post-evacuation were for administrative examinations, the patients' histories documented in the TRAC2ES records were examined.

The disposition after each medical evacuation was determined by using the disposition code associated with the medical encounter that was used for documenting the category of the medical evacuation. Inpatient disposition categories were 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 were 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 2020, a total of 1,207 medical evacuations of service members from the CENTCOM AOR were followed by at least 1 medical encounter in a fixed medical facility outside the operational theater **(Table 1)**. Overall, there were more medical evacuations for mental health disorders (n=328; 27.2%) 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=231; 19.1%); other conditions (ICD-10: Z00-Z99, except pregnancy-related codes; n=120; 9.9%); signs, symptoms, and ill-defined conditions (n=105; 8.7%); musculoskeletal system/connective tissue disorders (n=89; 7.4%); and disorders of the digestive system (n=77; 6.4%). All of the above categories were associated with more evacuations than the number of evacuations for battle injuries (n=59; 4.9%). The top 3 categories—mental health disorders (most frequently adjustment and depressive disorders); non-battle injuries (primarily fractures of extremities, strains, and sprains); and other conditions (primarily encounters for administrative examinations)—accounted for more than half (56.3%) of all evacuations **(Table 1)**. Upon examination of the patient history documented in the TRAC2ES record, 99 of the 120 evacuations for other conditions mentioned COVID-19 as the primary indication for medical evacuation and almost all of these records (n=98) also mentioned the patient having a positive laboratory test result for COVID-19 **(data not shown)**.

During 2016–2020, the annual number of medical evacuations attributable to battle injuries was highest in 2017 (n=71), decreased in 2018 (n=56), and remained relatively stable through 2019 (n=58) and 2020 (n=59) **(Figure)**. However, there was a peak in the monthly number of medical evacuations attributable to battle injuries in January

TABLE 1. Numbers and percentages of medical encounters following medical evacuation from theater, by major ICD-10 diagnostic category, U.S. Armed Forces, 2020

	Total		Males		Females	
Major diagnostic category (ICD-10 codes)	No.	%	No.	%	No.	%
Mental health disorders (F01–F99)	328	27.2	252	25.2	76	36.7
Non-battle injury and poisoning (S00–T88, DOD0101–DOD0105)	231	19.1	194	19.4	37	17.9
Other (Z00 - Z99, except pregnancy related)[a]	120	9.9	112	11.2	8	3.9
Signs, symptoms and ill-defined conditions (R00–R99)	105	8.7	89	8.9	16	7.7
Musculoskeletal system (M00–M99)	89	7.4	72	7.2	17	8.2
Digestive system (K00–K95)	77	6.4	74	7.4	3	1.4
Battle injury (from TRAC2ES records)	59	4.9	49	4.9	10	4.8
Nervous system and sense organs (G00 - G99, H00 - H95)	48	4.0	42	4.2	6	2.9
Genitourinary system (N00–N99)	32	2.7	23	2.3	9	4.3
Circulatory system (I00–I99)	30	2.5	25	2.5	5	2.4
COVID-19 (U07.1)	23	1.9	20	2.0	3	1.4
Respiratory system (J00–J99, U07.0)	13	1.1	12	1.2	1	0.5
Neoplasms (C00–D49)	12	1.0	9	0.9	3	1.4
Infectious and parasitic diseases (A00–B99)	11	0.9	9	0.9	2	1.0
Skin and subcutaneous tissue (L00–L99)	10	0.8	7	0.7	3	1.4
Endocrine, nutrition, immunity (E00–E89)	9	0.7	8	0.8	1	0.5
Pregnancy and delivery (O00–O99, relevant Z codes)	7	0.6	0	0.0	7	3.4
Hematologic and immune disorders (D50–D89)	2	0.2	2	0.2	0	0.0
Congenital anomalies (Q00–Q99)	1	0.1	1	0.1	0	0.0
Total	1,207	100.0	1,000	100.0	207	100.0

ICD, International Classification of Diseases; No., number; TRAC2ES, U.S. Transportation Command (TRANSCOM) Regulating and Command & Control Evacuation System; COVID-19, coronavirus-2019.
[a]98 of these medical evacuations had a positive laboratory test for COVID-19 documented in the patient history in TRAC2ES.

2020 (n=32) **(Figure)**. The annual number of medical evacuations attributable to non-battle injuries and diseases remained relatively stable, ranging between a low level in 2016 (n=1,013) and a peak in 2018 (n=1,210). The number in 2020 (n=1,148) was the second highest count during the 5-year period.

Demographic and military characteristics

The number of medical evacuations in 2020 was higher among males (n=1,000) than females (n=207) **(Table 1, 2)**. The most frequent causes of medical evacuations among male service members were mental health disorders (n=252; 25.2%); non-battle injury and poisoning (n=194; 19.4%); other conditions (n=112; 11.2%); and signs, symptoms, and ill-defined conditions (n=89; 8.9%) **(Table 1)**. Among female service members, the most frequent causes of medical evacuations were mental health disorders (n=76; 36.7%); non-battle injury and poisoning (n=37; 17.9%); musculoskeletal system conditions (n=17; 8.2%); and signs, symptoms, and ill-defined conditions (n=16; 7.7%).

Compared to males, female service members had notably higher percentages of medical evacuations for mental health disorders and genitourinary system disorders **(Table 1)**. In contrast, male service members had higher percentages of evacuation for non-battle related injuries, other conditions (encounters for administrative examinations for COVID-19), 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 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)**. In 2020, most medical evacuations (86.9%) were characterized as having routine precedence. The remainder had priority (10.8%) or urgent (2.3%) precedence. All but 5 (0.4%) of the medical evacuations were accomplished through military transport **(Table 2)**.

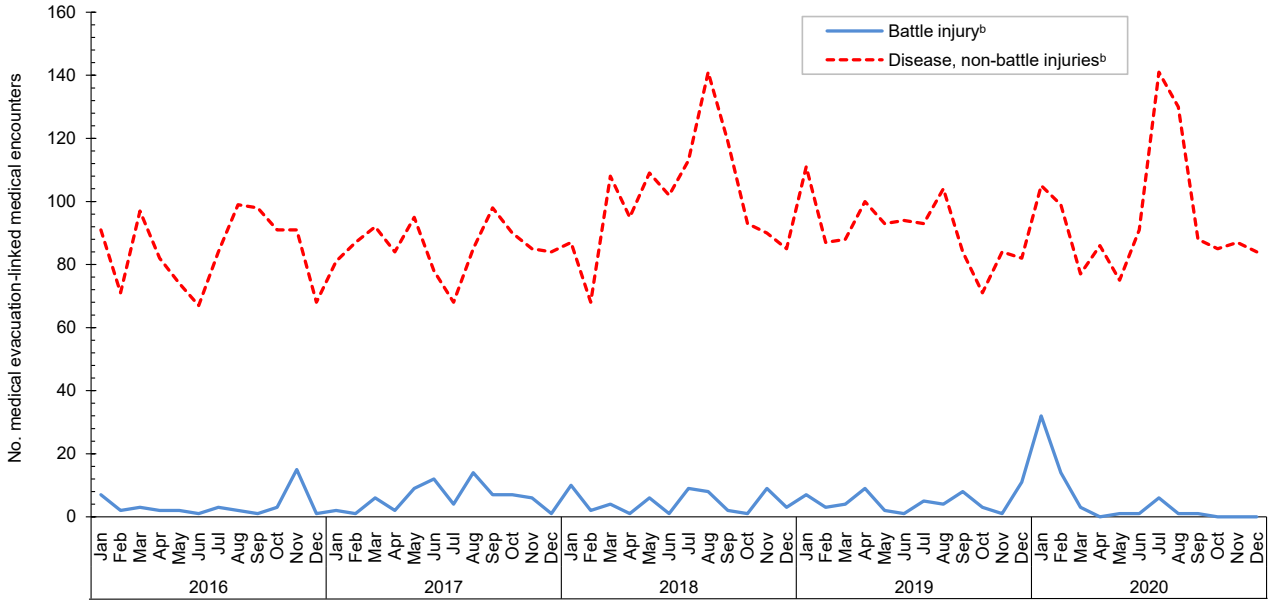
Most frequent specific diagnoses

Among both males and females in 2020, 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 second most common 3-digit diagnosis for males, and the fifth most common for females, was Z02 ("encounter for administrative examination"). The next most common 3-digit diagnoses for males were fractures at the hand and wrist level, dorsalgia, fracture of the lower leg, and major depressive disorder. For females, the second through fourth most common 3-digit diagnoses were for major depressive disorders (single episode and recurrent), and other anxiety disorders **(Table 3)**.

Disposition

Of the 1,207 medical evacuations reported in 2020, a total of 472 (39.1%) resulted in inpatient encounters. About four-fifths (81.4%) of all service members

FIGURE. Numbers of medical evacuations of U.S. service members for battle injuries and for disease and non-battle injuries, by month, 2016–2020[a]



[a]Note: Operation Resolute Support (ORS) began on 1 Jan 2015 and continued through the rest of the surveillance period. 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.
No., number.

who were hospitalized after medical evacuations were discharged back to duty. Slightly more than one-tenth (10.8%) of service members who were hospitalized after medical evacuations were transferred or discharged to other facilities **(Table 4)**.

Return to duty dispositions were much more likely after hospitalizations for non-battle injuries (79.1%) than for battle injuries (26.1%). The majority (73.9%) of battle injury-related hospitalizations and a little more than one-tenth (11.6%) of non-battle injury-related hospitalizations resulted in transfers/discharges to other facilities **(Table 4)**.

About three-fifths (n=735; 60.9%) of all medical evacuations resulted in outpatient encounters only. Of the service members who were treated exclusively in outpatient settings after evacuations, the majority (73.3%) were discharged back to duty without work/duty limitations; 13.6% were released with work/duty limitations; 1.9% were discharged to "home sick" for recuperation; and 1.2% were admitted/transferred to a civilian hospital. Service members treated as outpatients after battle injury-related evacuations were more likely to be released without limitations (n=31; 86.1%) than medical evacuees treated as outpatients for non-battle injuries (n=109; 75.7%) **(Table 4)**.

EDITORIAL COMMENT

This report documented that only 4.9% of all medical evacuations during 2020 were associated with battle injuries. Counts of evacuations for battle injuries remained relatively low during the surveillance period, likely reflecting the reduced amount of combat operations in the CENTCOM 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 January 2020. Several of these evacuations appeared to be related to the Iranian ballistic missile attack on the U.S. al-Asad Air Base in Iraq.[6]

Most evacuations in 2020 were attributed to mental health disorders, followed by non-battle injuries and poisonings;

TABLE 2. Demographic and military characteristics of service members medically evacuated from the U.S. Central Command area of responsibility, U.S. Armed Forces, 2020

	No.	% total
Total	1,207	100.0
Sex		
Male	1,000	82.9
Female	207	17.1
Race/ethnicity group		
Non-Hispanic White	697	57.7
Non-Hispanic Black	209	17.3
Hispanic	188	15.6
Asian/Pacific Islander	40	3.3
Other/unknown	73	6.0
Age group (years)		
<20	34	2.8
20–24	359	29.7
25–29	291	24.1
30–34	198	16.4
35–39	141	11.7
40–44	79	6.5
45+	105	8.7
Service		
Army	772	64.0
Navy	142	11.8
Air Force	249	20.6
Marine Corps	44	3.6
Component		
Active	846	70.1
Reserve/Guard	361	29.9
Rank/grade		
Junior enlisted (E1–E4)	489	40.5
Senior enlisted (E5–E9)	506	41.9
Junior officer (O1–O3, W1–W3)	128	10.6
Senior officer (O4–O10, W4–W5)	84	7.0
Military occupation		
Combat-specific[a]	249	20.6
Motor transport	27	2.2
Repair/engineering	339	28.1
Communications/intelligence	259	21.5
Health care	83	6.9
Other/unknown	250	20.7
Marital status		
Married	652	54.0
Single, never married	487	40.3
Other/unknown	68	5.6
Education level		
High school or less	693	57.4
Some college	209	17.3
College	239	19.8
Other/unknown	66	5.5
Precedence[b]		
Routine	1,049	86.9
Priority	130	10.8
Urgent	28	2.3
Transport_mode_num[b]		
Military	1,202	99.6
Commercial	2	0.2
Other/unknown	3	0.2

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

TABLE 3. Most frequent 3-digit ICD-10 diagnoses from medical evacuations, by sex, U.S. Armed Forces, 2020

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	161	F43	Reaction to severe stress, and adjustment disorders	49
Z02	Encounter for administrative examination	83	F32	Major depressive disorder, single episode	8
S62	Fracture at wrist and hand level	30	F33	Major depressive disorder, recurrent	7
M54	Dorsalgia	29	F41	Other anxiety disorders	7
S82	Fracture of lower leg, including ankle	27	Z02	Encounter for administrative examination	7
F32	Major depressive disorder, single episode	22	S82	Fracture of lower leg, including ankle	6

ICD, International Classification of Diseases; No., number.

administrative examinations for COVID-19; signs, symptoms, and ill-defined conditions; and musculoskeletal disorders. Evacuations during the entire 5-year surveillance period followed a similar but slightly different pattern, with mental health disorders being the most frequent followed by non-battle injuries; signs, symptoms and ill-defined conditions; musculoskeletal disorders; and digestive system disorders. In 2020, male service members had higher percentages of evacuation for non-battle related injuries, other conditions (encounters for administrative examinations for COVID-19), and digestive system conditions compared to female service members. As in previous years, the majority of service members who were evacuated were returned to normal duty status following their post-evacuation hospitalizations or outpatient encounters. In addition, 63% of those evacuated for battle injuries were returned to duty immediately after their initial health care encounters.

TABLE 4. Dispositions after inpatient or outpatient encounters following medical evacuation, U.S. Armed Forces, 2020

Disposition	Total		Battle injury		Non-battle injury and poisoning	
	No.	%	No.	%	No.	%
Total	1,207	100.0	59	4.9	230	19.1
Inpatient	472	39.1	23	39.0	86	37.4
Returned to duty	384	81.4	6	26.1	68	79.1
Transferred/discharged to other facility	51	10.8	17	73.9	10	11.6
Discharged home	1	0.2	0	0.0	0	0.0
Separated	0	0.0	0	0.0	0	0.0
Died	0	0.0	0	0.0	0	0.0
Other/unknown	36	7.6	0	0.0	8	9.3
Outpatient	735	60.9	36	61.0	144	62.6
Released without limitation	539	73.3	31	86.1	109	75.7
Released with work/duty limitation	100	13.6	3	8.3	18	12.5
Sick at home/quarters	14	1.9	2	5.6	0	0.0
Immediate referral	0	0.0	0	0.0	0	0.0
Admitted/transferred to civilian hospital	9	1.2	0	0.0	4	2.8
Died	0	0.0	0	0.0	0	0.0
Discharged home	0	0.0	0	0.0	0	0.0
Other/unknown	73	9.9	0	0.0	13	9.0

No., number.

Overall, the changes in numbers of medical evacuations over the course of the surveillance period reflect the end of Operation Enduring Freedom in 2014, the beginning of Operation Freedom's Sentinel, and the deployment of troops to Afghanistan, Iraq, and Syria.[3] The relatively low percentage of medical evacuations in 2020 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 supports the idea that most deployers were sufficiently healthy for deployment. However, it is not surprising that such conditions are occasionally diagnosed among deployed service members. For example, there was 1 medical evacuation for congenital anomalies in 2020 that was due to Meckel's diverticulum, a bulge in the lower part of the small intestine that is leftover from the umbilical cord at birth (**data not shown**). Because congenital anomalies may not be identified and diagnosed until later in life,[7] the infrequent detection of such diagnoses during deployment is not unexpected.

The proportion of medical evacuations attributed to mental health disorders (27.2%) was very similar to the proportion reported in recent *MSMR* analyses of medical evacuations in 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.[1,8] However, that 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 males (peak of 20.9% in 2010) and females (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 CENTCOM AOR.[9] 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.[9] 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.[9]

COVID-19 accounted for a significant number of medical evacuations out of CENTOM AOR in 2020. However, many of these evacuations were documented as administrative examinations. If the total number of evacuations for administrative examinations that also documented a positive laboratory test result for COVID-19 in the TRAC2ES patient history field (n=98) are considered, then the total number of evacuations for COVID-19 would be 121, which is much higher than the 23 records that had a diagnosis for U07.1. Taking into account these administrative examinations would make COVID-19 the third leading cause of medical evacuation out of CENTCOM AOR in 2020. However, not all of these evacuations may have been medically necessary and may have instead been driven by guidance, policies, and procedures in-theater.[4,5]

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 males and females, can be misleading; for example, such comparisons do not account for differences between the groups in other characteristics (e.g., age, grade, military occupation, locations, 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 (first-listed) 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 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).

REFERENCES

1. Armed Forces Health Surveillance Branch. Medical evacuations out of the U.S. Central Command, active and reserve components, U.S. Armed Forces, 2019. *MSMR*. 2020;27(5):27–32.
2. McInnis, KJ. The 2019-2020 Iran Crisis and U.S. Military Deployments. *Congressional Research Service.* 9 January 2020. Accessed 11 April 2021. https://fas.org/sgp/crs/natsec/IF11403.pdf.
3. Lead Inspector General for Overseas Contingency Operations. *Operation Freedom's Sentinel: Report to the United States Congress*. Accessed 11 April 2021. https://www.stateoig.gov/system/files/lead_inspector_general_for_operation_freedoms_sentinel_dec_2020.pdf.
4. U.S. Central Command. COVID-19 Pandemic Playbook for Operational Environments. 12 May 2020. Accessed 25 March 2021. https://jts.amedd.army.mil/assets/docs/USCENTCOM_COVID-19_Pandemic_Playbook.pdf
5. Stanila V, Wells N, Ziadeh C, Stahlman S. Air Evacuation of Service Members for COVID-19 in U.S. Central Command and U.S. European Command From 11 March 2020 Through 30 September 2020. *MSMR*. 2020;27(12):14–17.
6. Correll, DS and Snow S. Eleven Troops Injured after Iran's Strike against al-Asad Airbase, says CENTCOM. *Military Times.* January 17, 2020. Accessed 07 May 2021. https://www.militarytimes.com/news/your-military/2020/01/17/11-troops-injured-after-irans-strike-against-al-asad-airbase-says-centcom/
7. The Centers for Medicare and Medicaid Services and the National Center for Health Statistics. *ICD-10-CM Official Guidelines for Coding and Reporting. FY 2021.* Accessed 11 April 2021. https://www.cdc.gov/nchs/data/icd/10cmguidelines-FY2021.pdf
8. Armed Forces Health Surveillance Center. Medical evacuations from Operation Iraqi Freedom/Operation New Dawn, active and reserve components, U.S. Armed Forces, 2003–2011. *MSMR*. 2012;19(2):18–21.
9. United States Government Accountability Office. Report to Congressional Committees. Defense health care: DOD is meeting most mental health care access standards, but it needs a standard for follow-up appointments. April 2016. Accessed 11 April 2021. https://www.gao.gov/assets/680/676851.pdf

Morbidity Burdens Attributable to Various Illnesses and Injuries, Deployed Active and Reserve Component Service Members, U.S. Armed Forces, 2020

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 (CENTCOM) and the U.S. Africa Command (AFRICOM) areas of operations during the 2020 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 CENTCOM or AFRICOM or where the name of the theater of operation was missing or null; by default, this excluded encounters in the U.S. Northern Command, U.S. European Command, U.S. Indo-Pacific Command, or U.S. Southern Command theaters of operations. In addition, TMDS-recorded medical encounters where the data source was identified as Shipboard Automated Medical System (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 CENTCOM or AFRICOM (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, 9th Revision [ICD-9] code between 001 and 999 or beginning with V27 or with an International Classification of Diseases, 10th Revision [ICD-10] code between A00 and T88 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 policymaking 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.

WHAT ARE THE NEW FINDINGS?

As in previous years, among service members deployed during 2020, injury/poisoning, musculoskeletal diseases and signs/symptoms accounted for more than half of the total health care burden during deployment. The percentage of encounters attributable to mental health disorders increased slightly over that observed in 2019 but remained below levels seen in the period 2008-2014. Compared to garrison disease burden, deployed service members had relatively higher proportions of encounters for respiratory infections, skin diseases, and infectious and parasitic diseases.

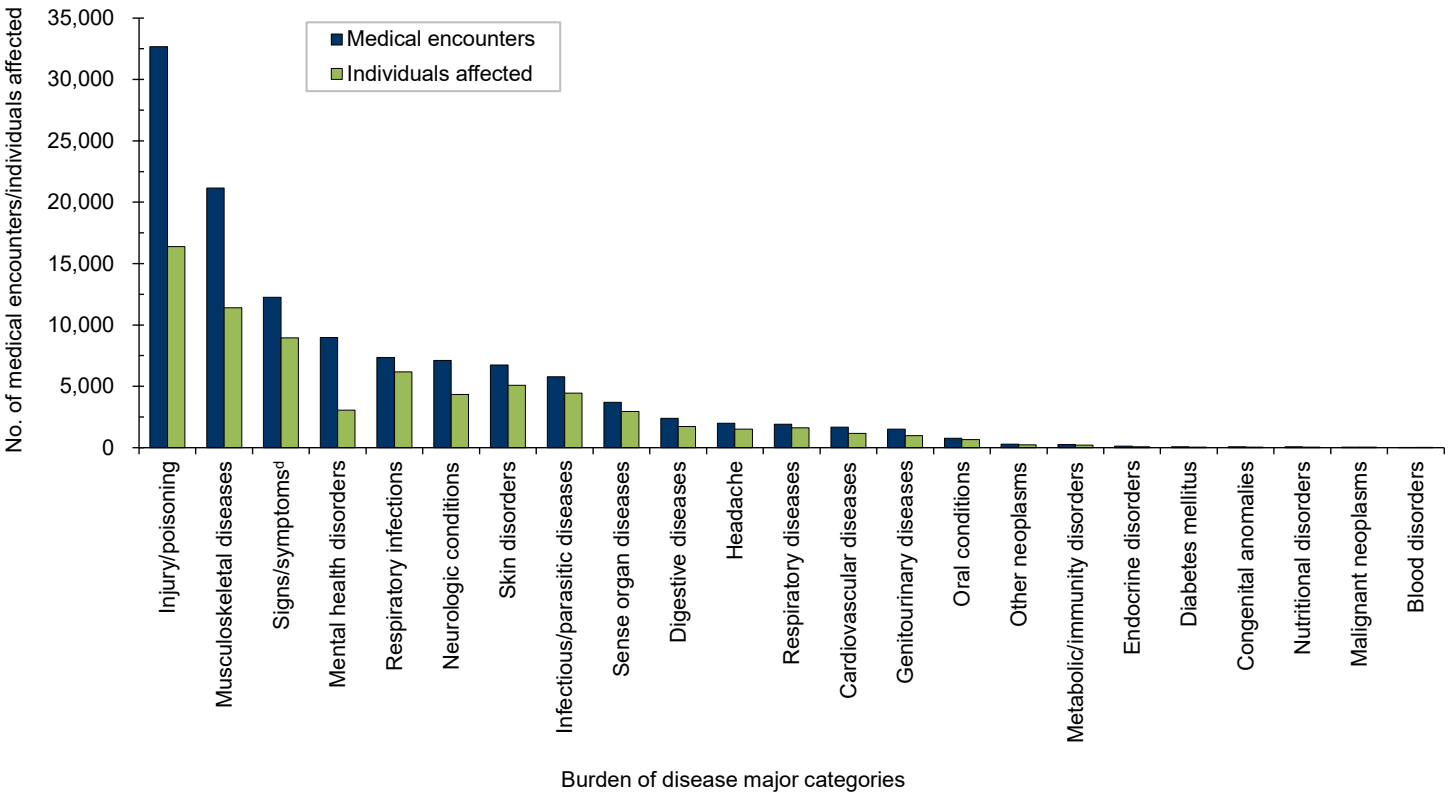
WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

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 2020, a total of 154,203 medical encounters occurred among 58,440 individuals while deployed to Southwest Asia/Middle East and Africa. Of the total

FIGURE 1a. Medical encounters[a] and individuals affected,[b] by burden of disease major category,[c] deployed male service members, U.S. Armed Forces, 2020



[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.

medical encounters, 205 (0.13%) were indicated to be hospitalizations **(data not shown)**. A majority of the medical encounters (75.8%), individuals affected (80.4%), and hospitalizations (79.5%) occurred among males **(Figures 1a, 1b)**.

Medical encounters/individuals affected by burden of disease categories

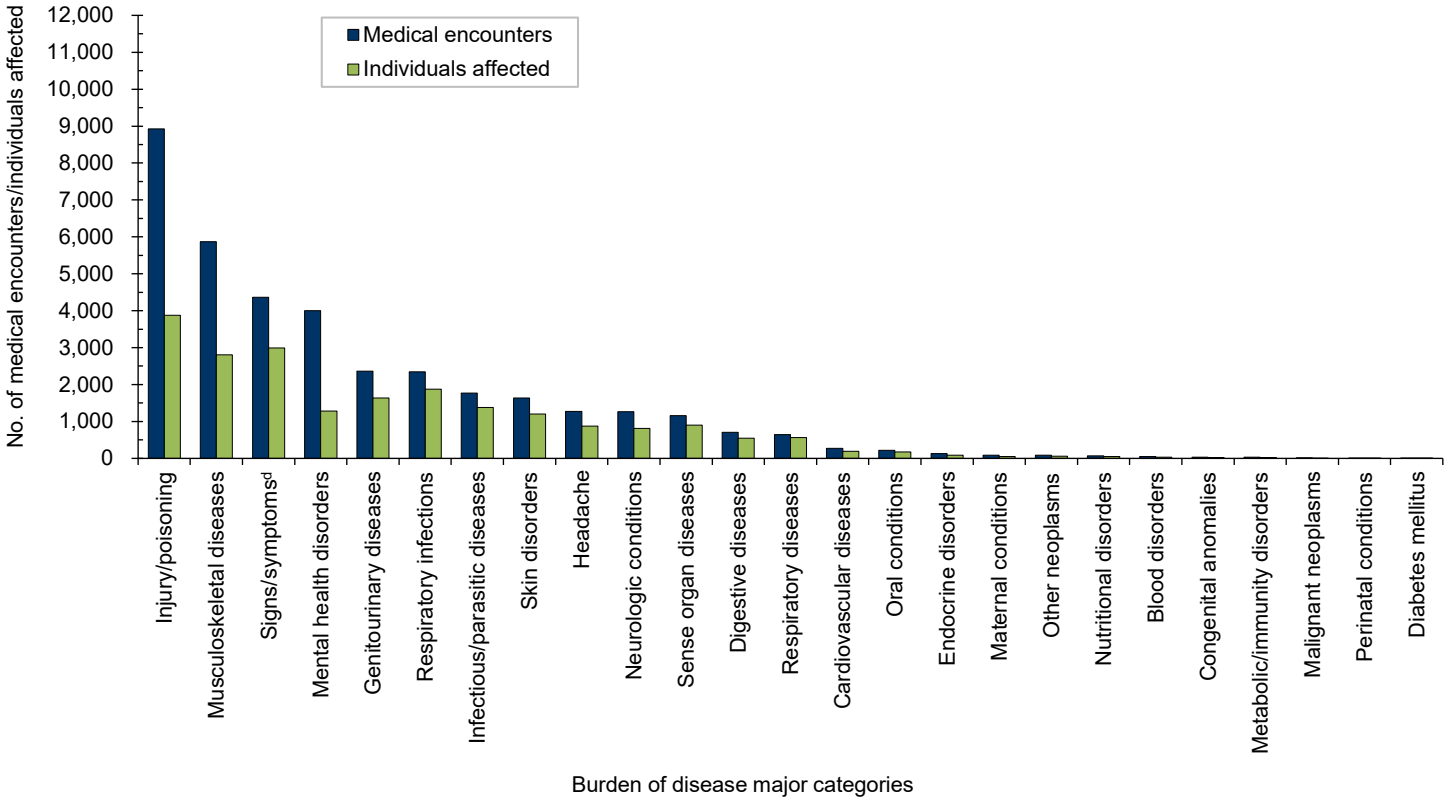
During 2020, the percentages of total medical encounters by burden of disease categories in both deployed men and women were generally similar; in both sexes, more encounters were attributable to injury/poisoning, musculoskeletal diseases, and signs/symptoms (including ill-defined conditions) than any other categories **(Figures 1a, 1b, 2a, 2b)**. Of note, females had a greater proportion of medical encounters for genitourinary diseases (6.3%) compared to males (1.3%).

Among both males and females, 5 burden conditions (other back problems, arm and shoulder injuries, knee injuries, all other signs and symptoms, and upper respiratory infections) were among the top 6 burden conditions that accounted for the most medical encounters in 2020 **(Figures 3a, 3b)**. The remaining burden conditions among the top 6 were organic sleep disorders (specifically, circadian rhythm disorders) among males and foot and ankle injuries among females.

The 4-digit ICD-10 code with the most medical encounters in the other back problems category during 2020 was for low back pain **(data not shown)**. For all other musculoskeletal diseases, the most common 4-digit ICD code for both males and females was for cervicalgia. The most common 4-digit ICD-10 codes for arm and 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 nasopharyngitis (i.e., common cold) **(data not shown)**.

Of note, among males, less than 0.3% of all medical encounters during deployment were associated with any of the following major morbidity categories: other neoplasms, metabolic/immunity disorders, endocrine disorders, diabetes mellitus, congenital anomalies, nutritional disorders, and malignant neoplasms **(Figure 1a)**. Among females, less than 0.3% of all medical encounters during deployment were

FIGURE 1b. Medical encounters[a] and individuals affected,[b] by burden of disease major category,[c] deployed female service members, U.S. Armed Forces, 2020



[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.

associated with maternal conditions, other neoplasms, nutritional disorders, blood disorders, congenital anomalies, metabolic/immunity disorders, malignant neoplasms, perinatal conditions, and diabetes mellitus **(Figure 1b)**.

Among both sexes in 2020, injury/poisoning, musculoskeletal diseases, and signs/symptoms were the top 3 categories that affected the most individuals. **(Figures 1a, 1b)**.

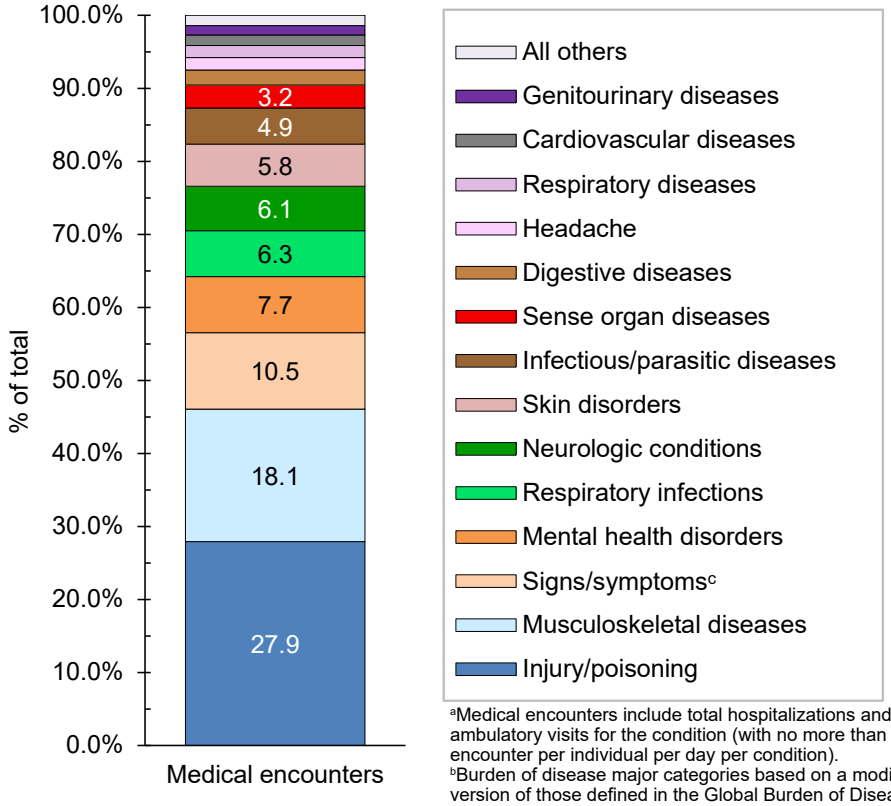
EDITORIAL COMMENT

This report documents the morbidity and health care burden among U.S. military members while deployed to Southwest Asia/Middle East and Africa during 2020. Similar to results from earlier surveillance periods,[1,3] 3 burden categories—injury/poisoning, musculoskeletal diseases, and signs/symptoms—together accounted for more than 50% of the total health care burden in theater among both male and female deployers.

Compared to the distribution of major burden of disease categories documented in garrison, this report also demonstrates a relatively greater proportion 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 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.[4] This finding may be due to a number of factors including predeployment screening and the continued emphasis on promoting psychological health and resilience in deployed service members.

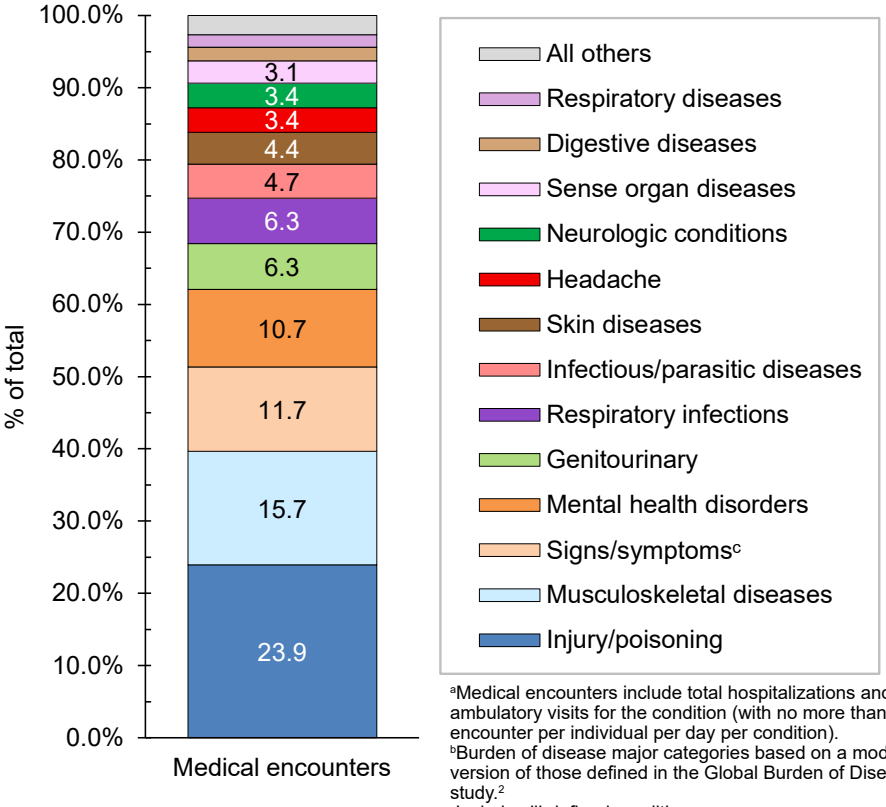
However, 4 of the top 5 major burden of disease categories in-theater—injury/

FIGURE 2a. Percentage of medical encounters,[a] by burden of disease major category,[b] deployed male service members, U.S. Armed Forces, 2020



[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, 2020



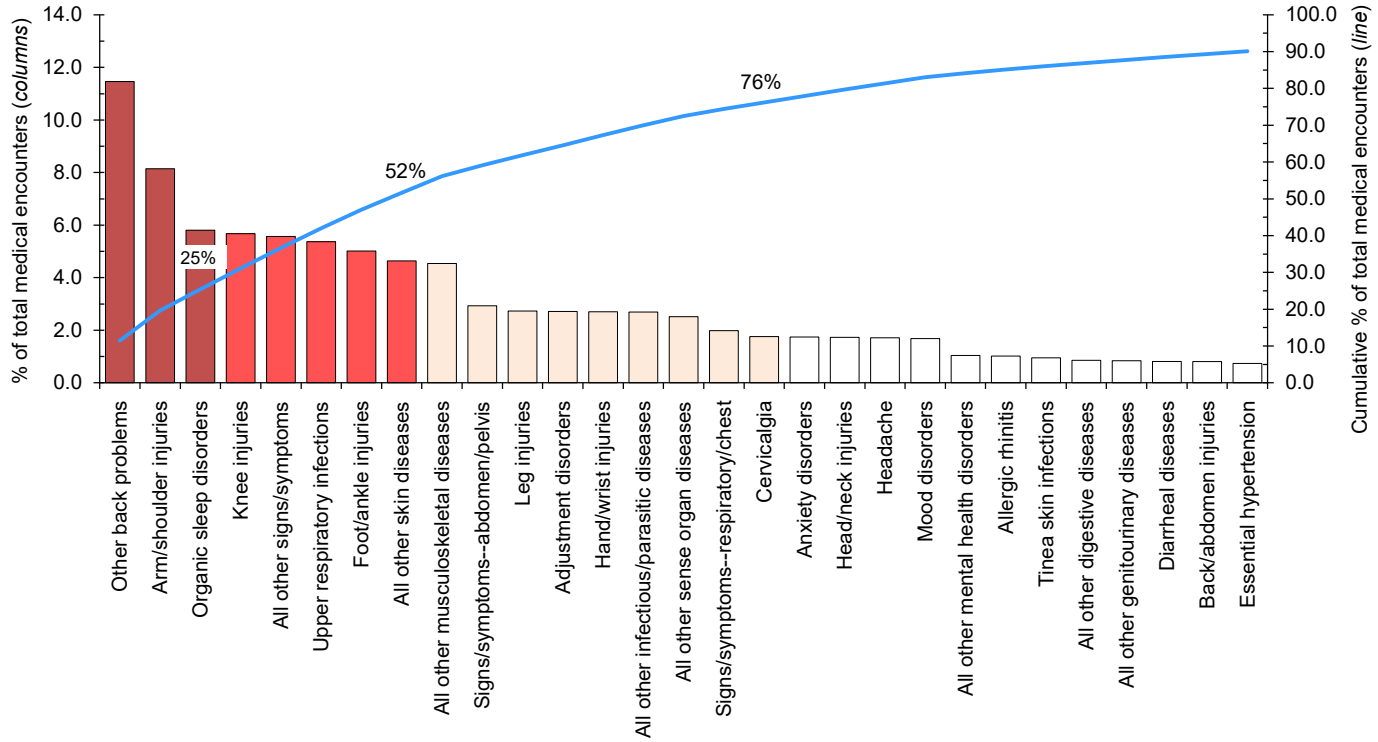
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[2]
[c]Includes ill-defined conditions.

poisoning, musculoskeletal diseases, signs/symptoms, and mental health disorders—were the same as those reported in non-deployed settings.[4] Injury and musculoskeletal diseases ranked first and second in both settings. 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 predeployment medical screening is diminished health care burdens (as documented in the TMDS) related to certain disease categories.

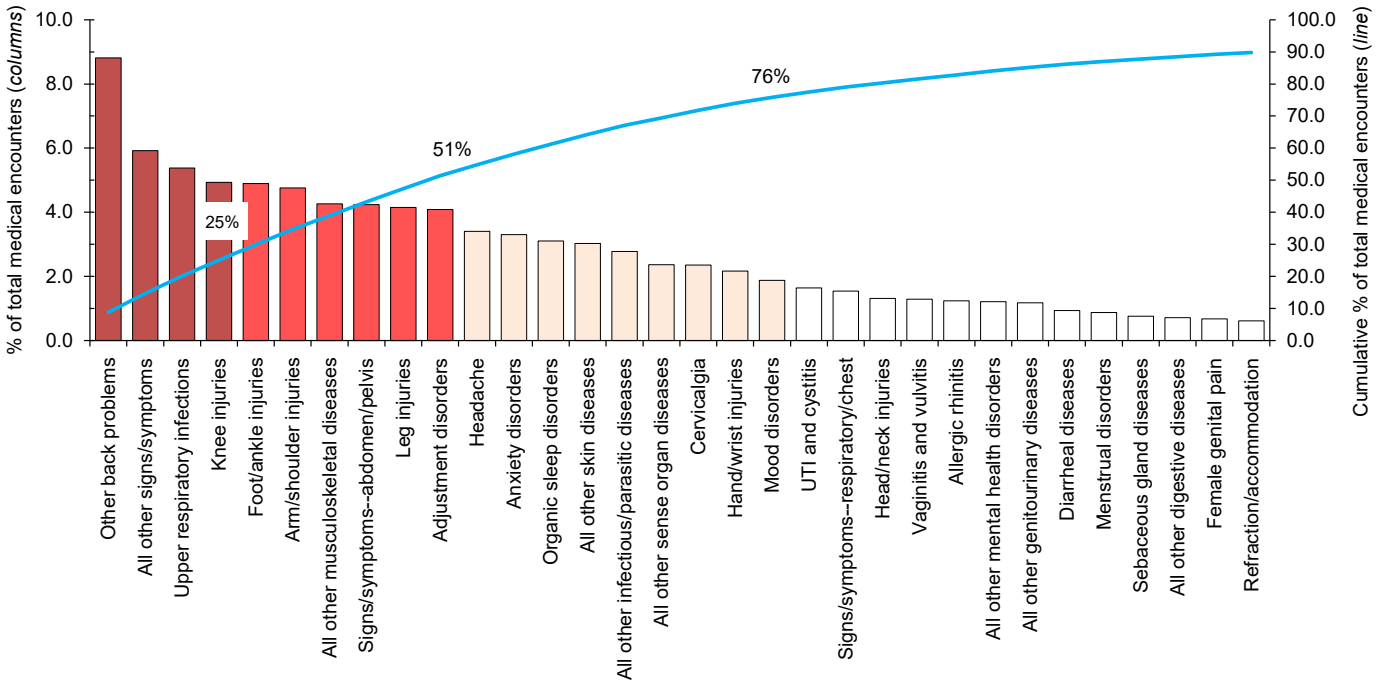
Interpretation of the data in this report should be done with consideration of some limitations. Not all medical encounters in theaters of operation are captured in the TMDS. Some care is rendered by medical personnel at small, remote, or austere forward locations where electronic documentation of diagnoses 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 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

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, 2020



[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, 2020



[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.

the injury was suffered as a birth trauma rather than using a code indicating injury in an adult) warrant care 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.

REFERENCES

1. Armed Forces Health Surveillance Branch. Morbidity burdens attributable to various illnesses and injuries, deployed active and reserve component service members, U.S. Armed Forces, 2019. *MSMR*. 2020; 27(5): 33–38.
2. Murray CJ and Lopez AD, eds. In: *Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, MA: Harvard University Press; 1996:120–122.
3. Armed Forces Health Surveillance Branch. Morbidity burdens attributable to various illnesses and injuries in deployed (per Theater Medical Data Store [TMDS]) active and reserve component service members, U.S. Armed Forces, 2008–2014. *MSMR*. 2015;22(8):17–22.
4. Armed Forces Health Surveillance Branch. Absolute and relative morbidity burdens attributable to various illnesses and injuries, active component, U.S. Armed Forces, 2020. *MSMR*. 2021;28(5): 2–9.

Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries, Non-service Member Beneficiaries of the Military Health System, 2020

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 2019, there were approximately 9.57 million beneficiaries eligible for health care in the MHS: 1.40 million active duty and activated reserve component service members, 1.66 million active duty family members, 190,000 Guard/Reserve members, 810,000 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 the Uniformed Services (i.e., military medical treatment facilities [MTFs]) or from civilian health care resources (i.e., outsourced [purchased] care) that supplement direct military medical care.[1] In 2020, approximately 6.28 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 of 16 categories of illnesses and injuries 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 update and provides a summary of care provided to non-service members in the MHS during calendar year 2020. 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 2020. The surveillance population included all non-service member beneficiaries of the MHS who had at least 1 hospitalization or outpatient medical encounter during 2020

WHAT ARE THE NEW FINDINGS?

In 2020, 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 years, musculoskeletal diseases accounted for the most morbidity and health care burdens, and among adults aged 65 years or older, cardiovascular diseases accounted for the most. As in previous years, the results of this analysis demonstrate that most health care services in the Military Health System are delivered to non-service member beneficiaries rather than to service members.

WHAT IS THE IMPACT ON READINESS AND FORCE HEALTH PROTECTION?

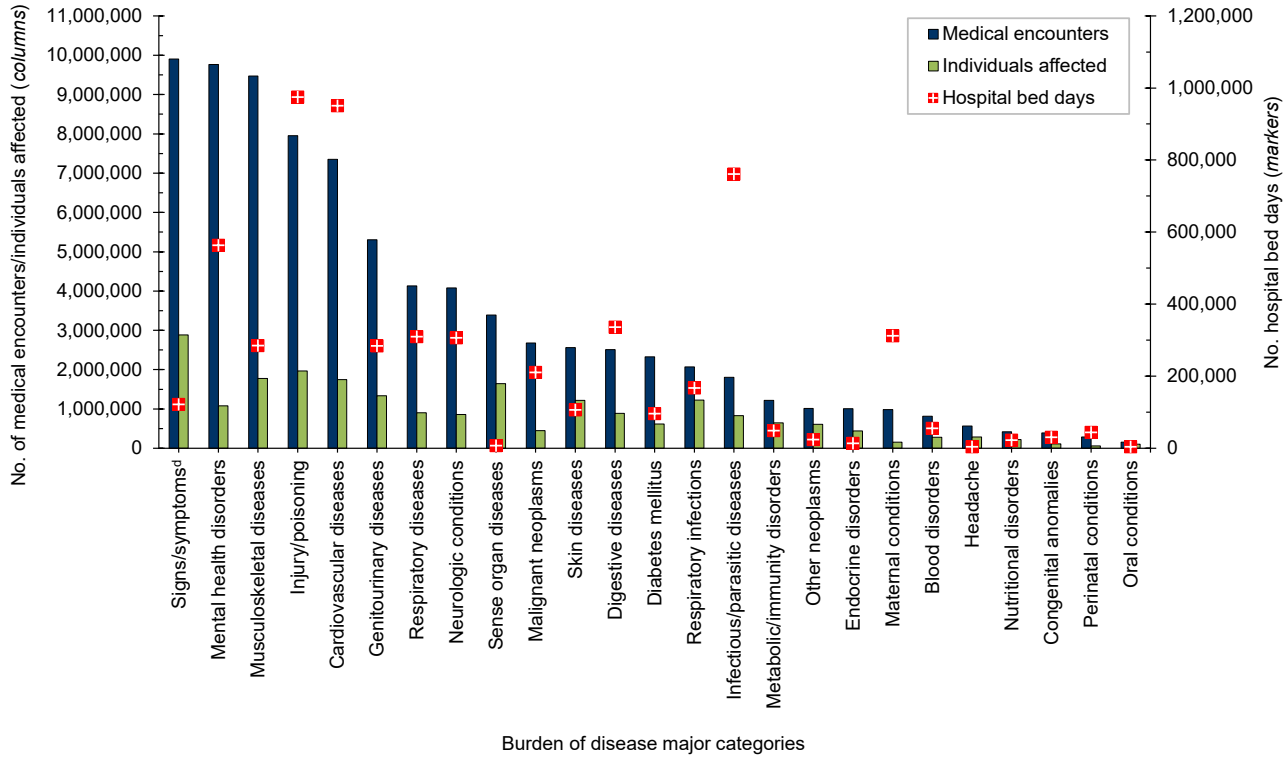
Illness and injury among military family member dependents may negatively impact service members' readiness and their focus on the mission by contributing to stress or by affecting the mental health status of the service member. The provision of health care services to non-service member beneficiaries 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, 2020

	Medical encounters		Individuals affected		Hospital bed days		Medical encounters per individual affected
	No.	% total	No.	% total	No.	% total	
All non-service member beneficiaries	82,165,960	---	6,283,982	---	6,040,345	---	13.1
Source							
Direct care only	8,029,056	9.8	659,160	10.5	406,559	6.7	n/a
Outsourced care only	74,136,904	90.2	4,654,433	74.1	5,633,786	93.3	n/a
Direct and outsourced care	n/a	n/a	970,389	15.4	n/a	n/a	n/a
Age group[c]							
0–17 years	11,236,430	13.7	1,350,529	21.5	448,418	7.4	8.3
18–44 years	12,376,592	15.1	1,416,484	22.5	680,173	11.3	8.7
45–64 years	17,188,968	20.9	1,446,057	23.0	915,790	15.2	11.9
65 years or older	41,363,957	50.3	2,070,901	33.0	3,995,964	66.2	20.0

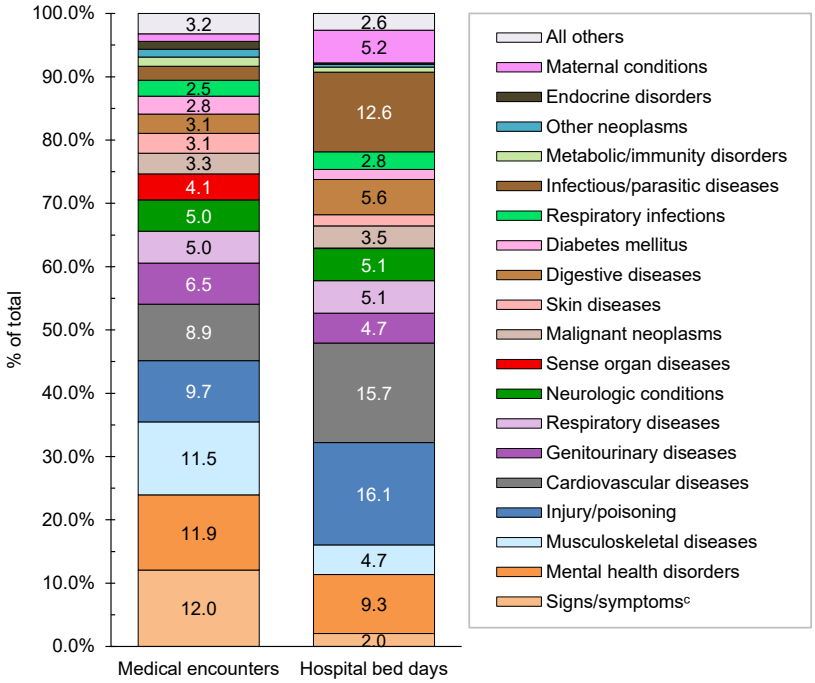
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Individuals with at least 1 hospitalization or ambulatory visit for the condition.
[c]Information on age was missing for 11 individuals.

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, 2020



[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, 2020

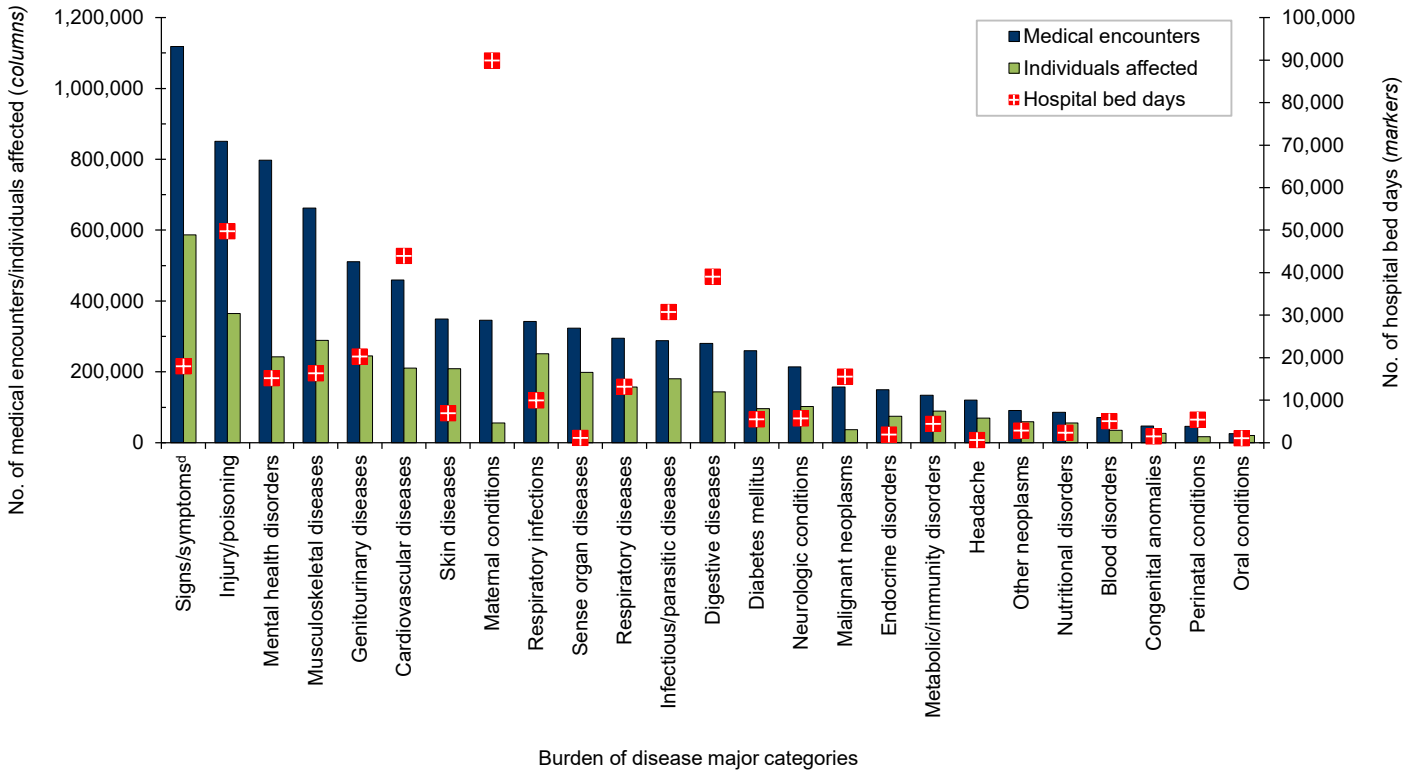


[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Includes ill-defined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

either through a military medical facility/provider or a civilian facility/provider (if paid for by the MHS). For this analysis, all inpatient and outpatient medical encounters were summarized according to the primary (first-listed) diagnoses documented on administrative records of the encounters if the diagnoses were reported with International Classification of Diseases, 10th Revision (ICD-10) codes that indicate the natures of illnesses or injuries (i.e., ICD-10 codes A00–T88). Nearly all records of encounters with first-listed diagnoses that were Z-codes (care other than for a current illness or injury—e.g., general medical examinations, after care, vaccinations) or V/W/X/Y-codes (indicators of the external causes but not the natures of injuries) were excluded from the analysis; however, encounters with primary diagnoses of Z37 ("outcome of delivery, single liveborn") were retained.

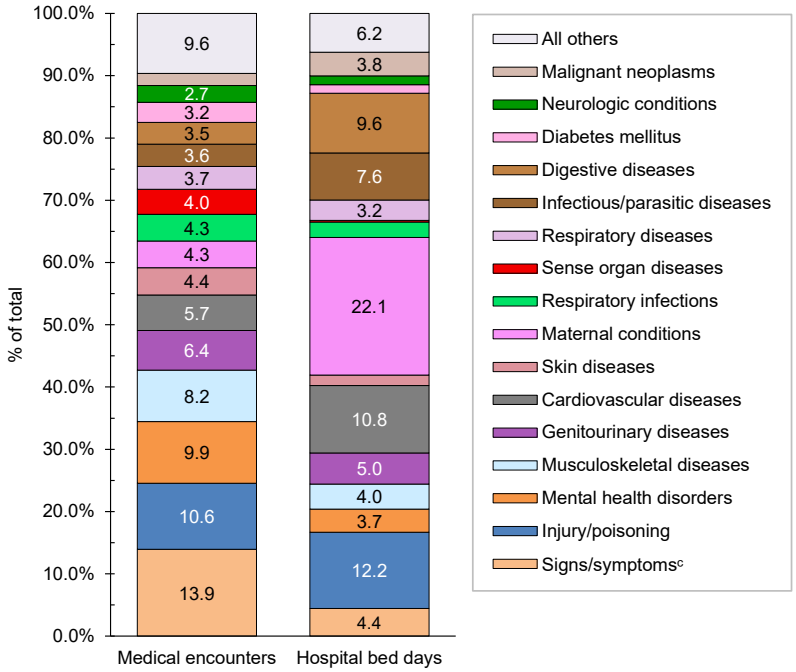
For summary purposes, all illness- and injury-specific diagnoses (as defined by the ICD-10) were grouped into 153 burden of

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, 2020



[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, 2020



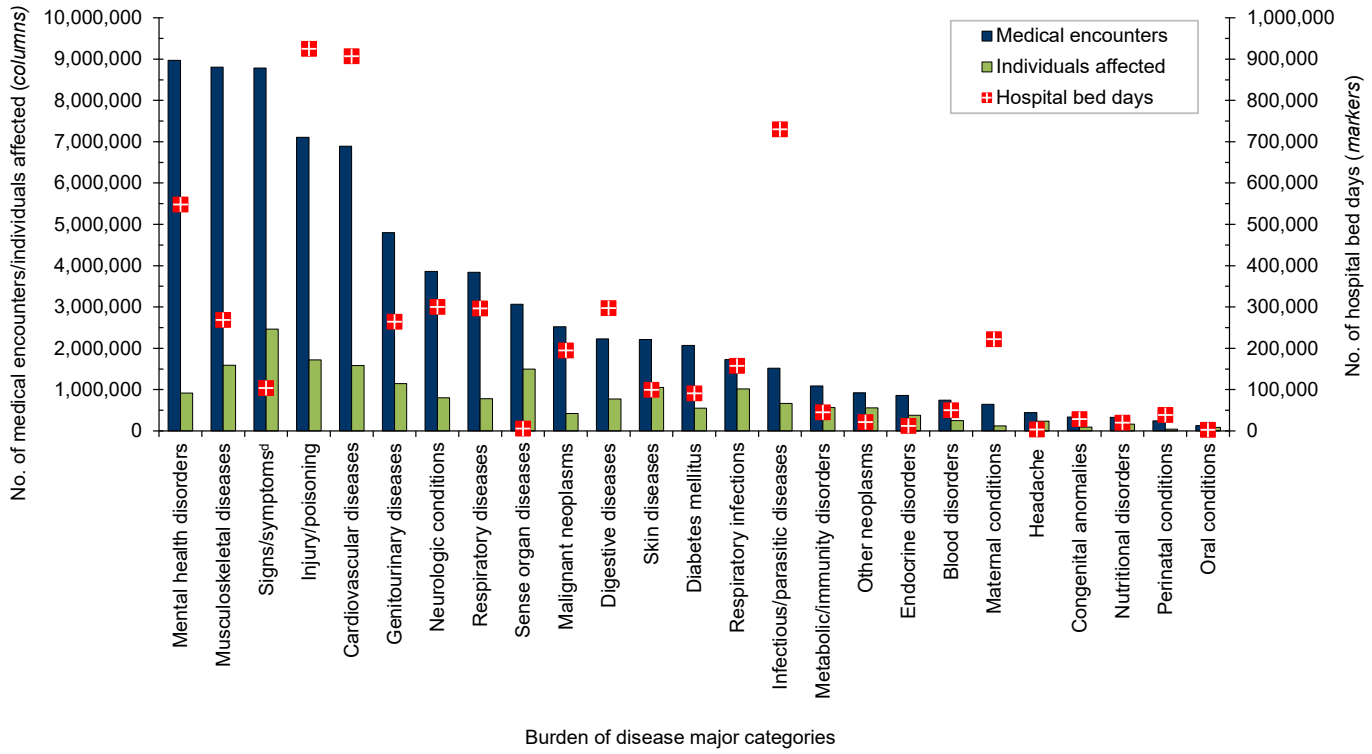
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Includes ill-defined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

disease-related conditions and 25 major categories based on a modified 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 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

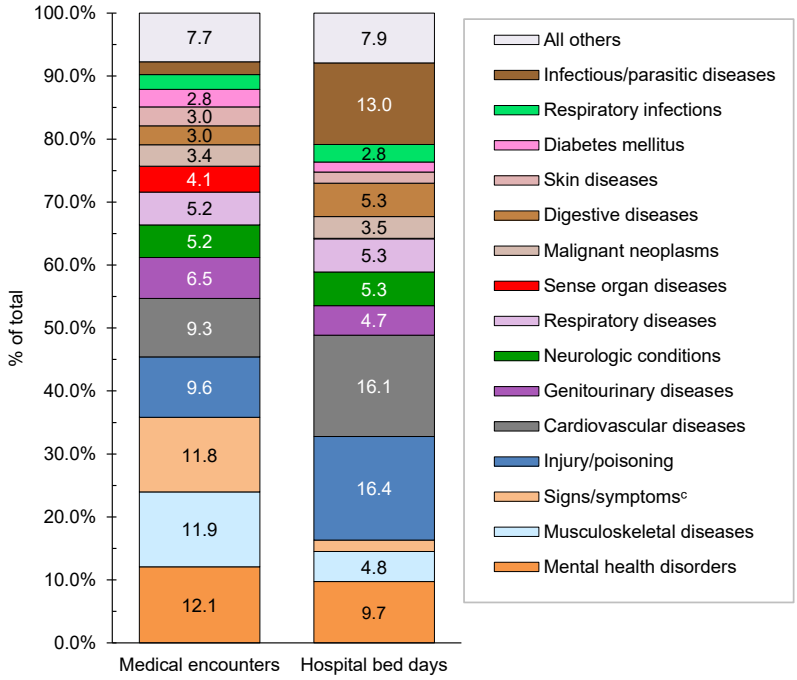
In the population of non-service member MHS care recipients in 2020, there were more females (56.9%) than males (43.1%); more infants, children, and adolescents (those younger than 20 years old: n=1.49

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, 2020



[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, 2020



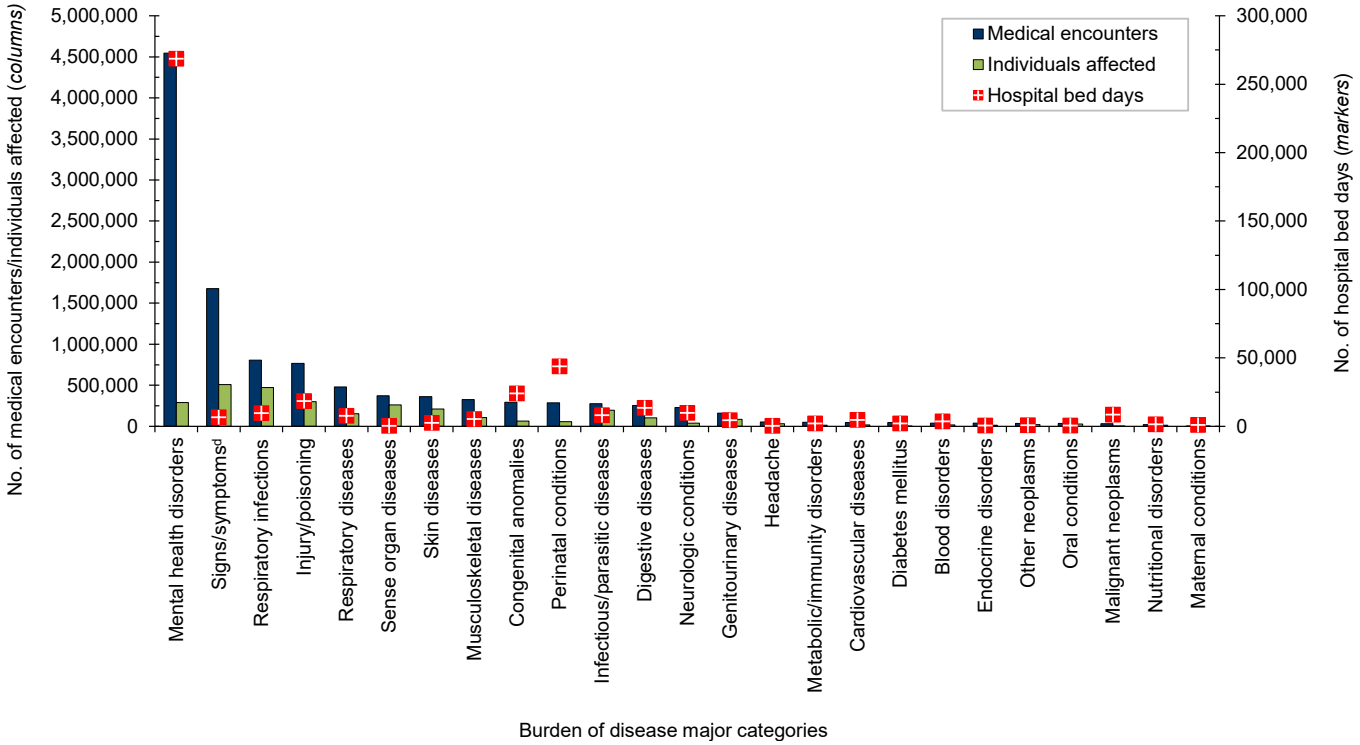
[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease study.[3]
[c]Includes ill-defined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

million; 23.8%) and more seniors (those aged 65 years or older: n=2.07 million; 33.0%) than younger (aged 20–44 years: n=1.27 million; 20.3%) or older (aged 45–64 years: n=1.45 million; 23.0%) adults **(data not shown)**.

In 2020, a total of 6,283,982 non-service member beneficiaries of the MHS had 82,165,960 medical encounters **(Table)**. Thus, on average, each individual who accessed care from the MHS had 13.1 medical encounters over the course of the year. The top 3 morbidity-related categories, which accounted for more than one-third (35.5%) of all medical encounters, were signs/symptoms and ill-defined conditions (12.0%), mental health disorders (11.9%), and musculoskeletal diseases (11.5%) **(Figures 1a, 1b)**. The illness/injury categories that affected the most beneficiaries who received any care were signs/symptoms and ill-defined conditions (45.9%), injury/poisoning (31.3%), and musculoskeletal diseases (28.2%).

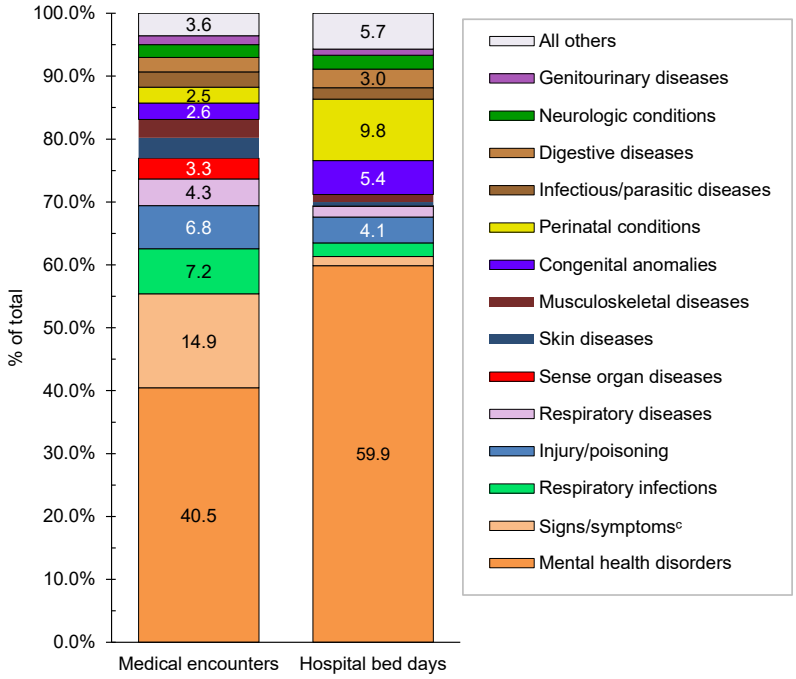
Injury/poisoning accounted for more hospital bed days (n=974,618) than any

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 years, 2020



[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]Mental health disorders accounted for 302,508 hospital bed days in 2019 (not shown in figure).
[e]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 years, 2020



[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.

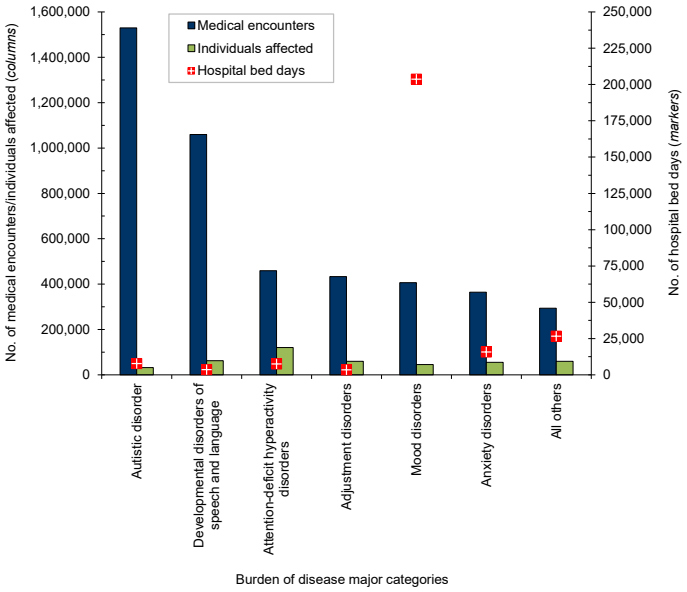
other illness/injury category and 16.1% of all hospital bed days overall **(Figures 1a, 1b)**. An additional 43.2% of all bed days were attributable to cardiovascular diseases (15.7%), infectious/parasitic diseases (12.6%), mental health disorders (9.3%), and digestive diseases (5.6%).

Of note, among all non-service member beneficiaries in 2020, maternal conditions (including pregnancy complications and delivery) accounted for relatively more hospital bed days (n=312,268; 5.2%) than individuals affected (n=158,558; 2.5%) **(Figure 1a)**.

Direct care vs. outsourced care

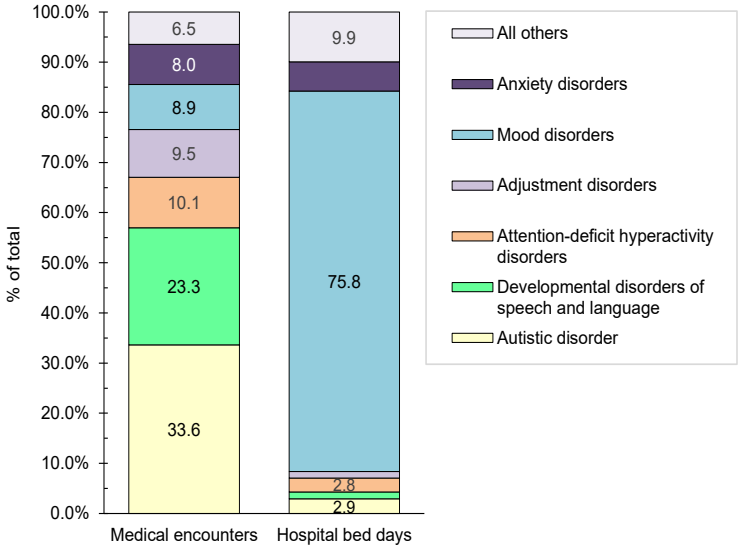
In 2020, among non-service member beneficiaries, most medical encounters (90.2%) were in non-military medical facilities (outsourced care) **(Table)**. Of all beneficiaries with any illness or injury-related encounters during the year, many more received exclusively outsourced care (n=4,654,433; 74.1%) than either military medical (direct) care only (n=659,160;

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 years, 2020



[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.
No., number.

FIGURE 4d. Percentages of medical encounters[a] and hospital bed days for mental health disorders by the conditions accounting for the most morbidity burden, pediatric non-service member beneficiaries, aged 0–17 years, 2020



[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=970,389; 15.4%). By far, most inpatient care (93.3% 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 musculoskeletal diseases, cardiovascular diseases, and neurological conditions were relatively more common in outsourced (11.9%, 9.3%, and 5.2%, respectively) compared to direct (8.2%, 5,7%, and 2.7%, respectively) care.

Maternal conditions accounted for 22.1% of all direct care bed days but only 3.9% of all outsourced care bed days **(Figures 2a, 2b, 3a, 3b)**. However, mental health disorders, infectious/parasitic diseases, cardiovascular diseases, injury/poisoning, and neurologic conditions accounted for relatively more of all outsourced than direct care bed days (% of outsourced vs. % of direct care bed days: mental health disorders, 9.7% vs. 3.7%; infectious/parasitic diseases, 13.0%, 7.6%; cardiovascular, 16.1% vs. 10.8%; injury/poisoning, 16.4%, 12.2%; neurologic conditions, 5.3% vs. 1.4%).

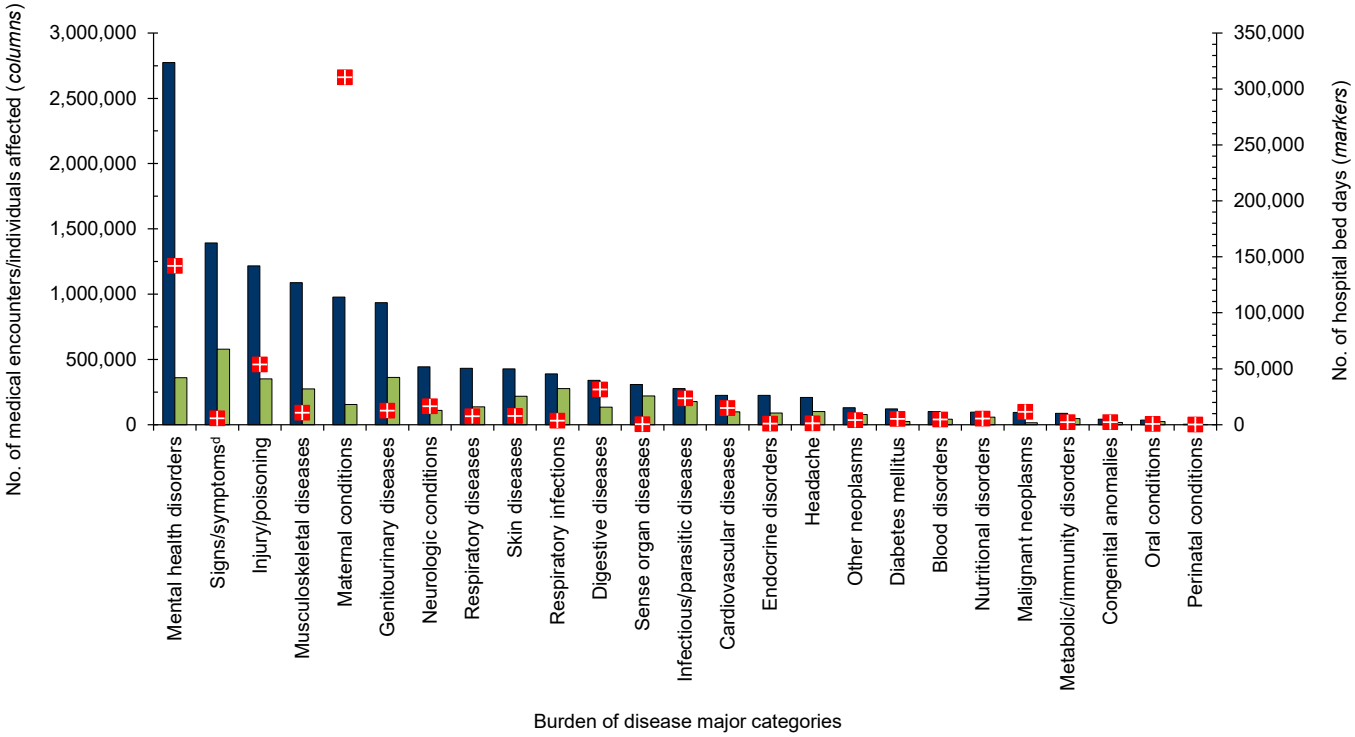
Pediatric beneficiaries (aged 0–17 years)

In 2020, pediatric beneficiaries accounted for 13.7% of all medical encounters, 21.5% of all individuals affected, and 7.4% of all hospital bed days **(Table)**. On average, each affected individual had 8.3 medical encounters during the year.

Mental health disorders accounted for slightly more than two-fifths (40.5%; n=4,546,586) of all medical encounters and 59.9% of all hospital bed days (n=268,522) among pediatric beneficiaries **(Figures 4a, 4b)**. On average, each pediatric beneficiary who was affected by a mental health disorder had 15.8 mental health disorder-related encounters during the year. More than two-thirds (67.1%) of all medical encounters for mental health disorders among pediatric beneficiaries were for autistic disorder (33.6%), followed by developmental disorders of speech and language (23.3%), and attention deficit disorders (10.1%) **(Figures 4c, 4d)**. On average, there were 47.9 autism-related encounters per individual affected with autistic disorder and 16.9 encounters for developmental disorders of speech and language per individual affected with those specific disorders **(data not shown)**. Despite the high numbers of encounters associated with these 3 categories of mental health disorders, slightly more than three-quarters (75.8%) of mental health disorder-related hospital bed days were attributable to mood disorders, and 28.2% of mood disorder-related bed days were attributable to "disruptive mood dysregulation disorder" **(data not shown)**.

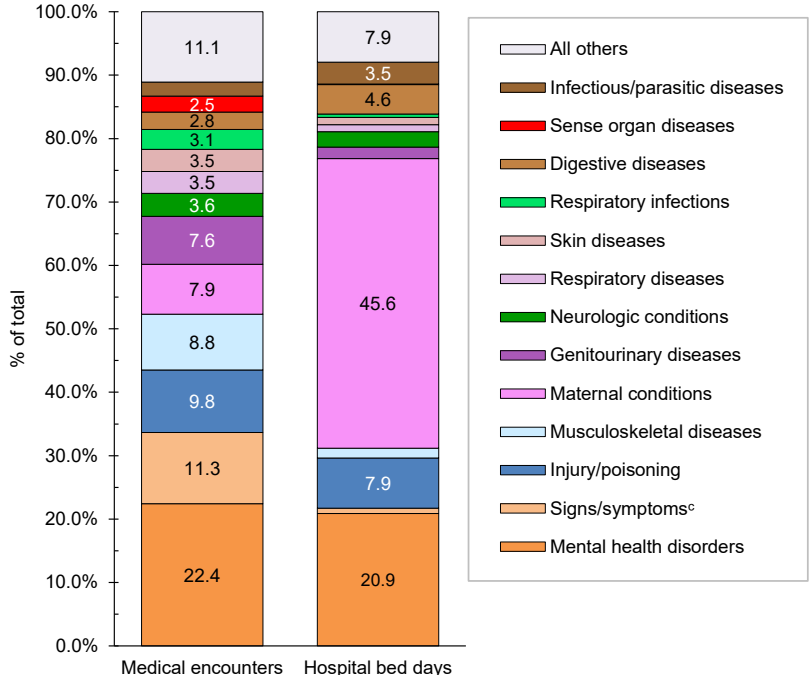
Among pediatric beneficiaries overall, "conditions arising during the perinatal period" (i.e., perinatal conditions) accounted for the second most hospital bed days (n=43,821; 9.8%) **(Figures 4a, 4b)**. Of note, among pediatric beneficiaries with at least 1 illness or injury-related diagnosis, those with malignant neoplasms had the second highest number of related encounters per affected individual (14.0). The highest numbers of malignant neoplasm-related encounters were attributable to leukemias, "all other malignant neoplasms," and brain neoplasms, while the highest numbers of bed days were attributable to leukemias, brain

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 years, 2020



[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 years, 2020



[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.

neoplasms, and "all other malignant neoplasms" **(data not shown)**.

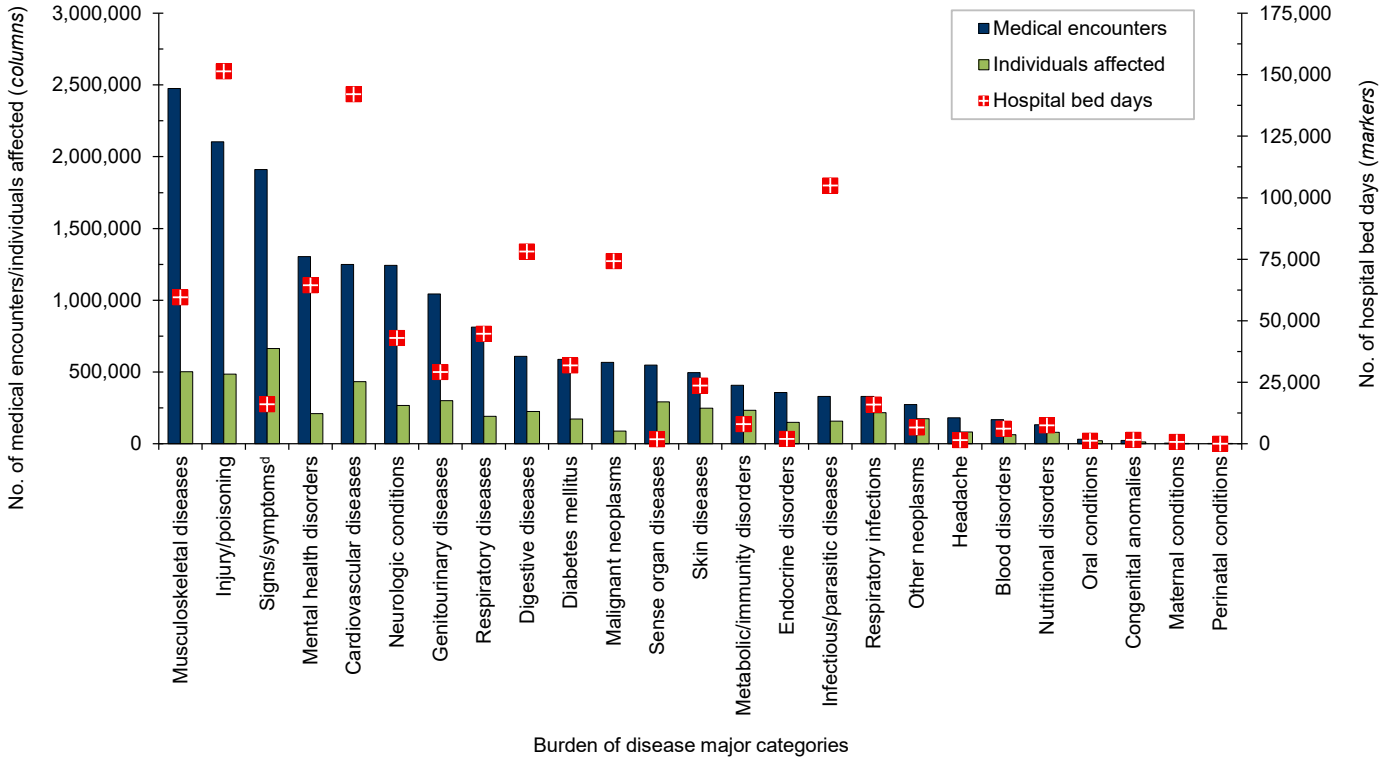
Finally, respiratory infections (including upper and lower respiratory infections and otitis media) accounted for relatively more medical encounters among pediatric beneficiaries (7.2% and 2.2%, respectively) when compared to any older age group of beneficiaries **(Figures 4b, 5b, 6b, and 7b)**.

Beneficiaries aged 18–44 years

In 2020, non-service member beneficiaries aged 18–44 years accounted for 15.1% of all medical encounters, 22.5% of all individuals affected, and 11.3% of hospital bed days **(Table)**. On average, each individual affected with an illness or injury (any cause) had 8.7 medical encounters during the year.

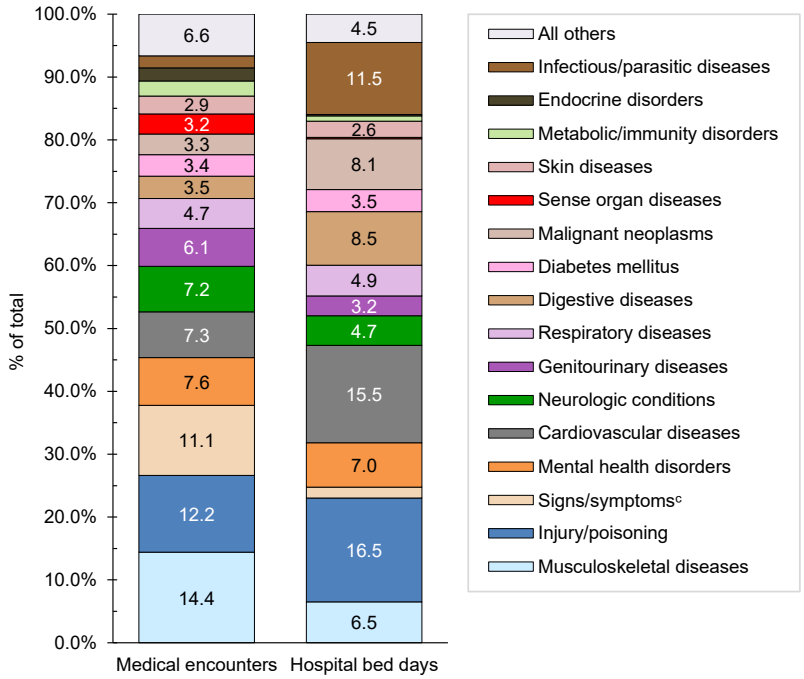
Among beneficiaries aged 18–44 years, the morbidity-related category that accounted for the most medical encounters was mental health disorders (n=2,774,051; 22.4% of all encounters) **(Figures 5a, 5b)**. Among these adult beneficiaries, mental

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 years, 2020



[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 years, 2020

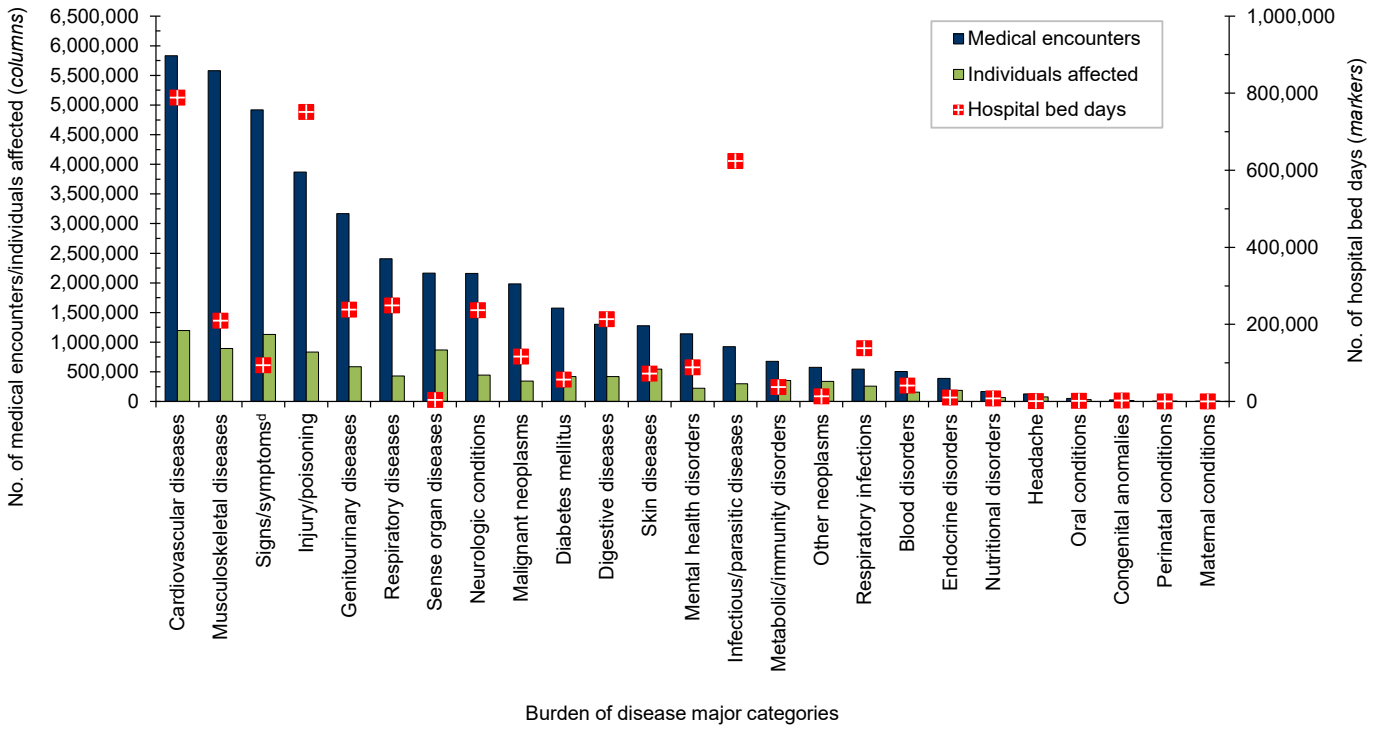


[a]Medical encounters include total hospitalizations and ambulatory visits for the condition (with no more than 1 encounter per individual per day per condition).
[b]Burden of disease major categories based on a modified version of those defined in the Global Burden of Disease Study.[3]
[c]Includes ill-defined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

health disorders accounted for slightly more than a quarter (25.5%) of all bed days, and, on average, each adult affected by a mental health disorder had 7.7 mental health disorder-related encounters during the year. Mood disorders (30.9%), anxiety disorders (31.5%), and adjustment disorders (17.7%) accounted for approximately four-fifths (80.1%) of all mental health disorder-related medical encounters among beneficiaries aged 18–44 years **(data not shown)**.

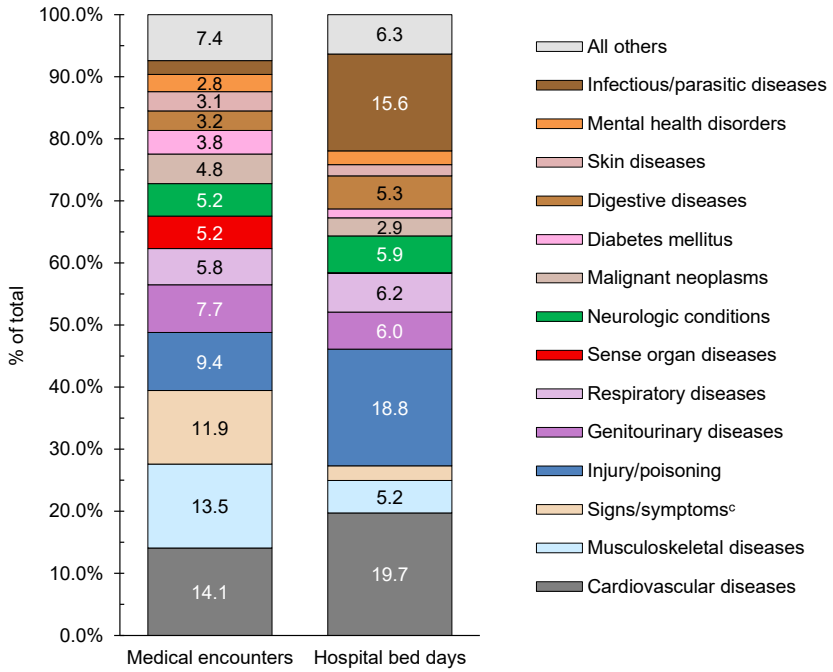
Among adults aged 18–44 years, maternal conditions accounted for more than two-fifths (45.6%) of all bed days and, on average, 6.3 medical encounters per affected individual **(Figures 5a, 5b)**. Normal deliveries accounted for 10.4% of maternal condition-related medical encounters **(data not shown)**. Adults aged 18–44 years accounted for nearly all (99.4%) maternal condition-related bed days among beneficiaries not in military service. Although adults aged 18–44 years had the second lowest percentage of total medical encounters (15.1%), if morbidity burdens associated

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 years or older, 2020



[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 years or older, 2020



[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.

with maternal conditions were excluded from the overall analysis, this age group would account for even lower percentages of total medical encounters (13.9%) and the lowest percentage of total hospital bed days (6.1%) when compared to any other age group **(data not shown).**

Among beneficiaries aged 18–44 years with at least 1 illness or injury-related diagnosis, those with malignant neoplasms had the second most (along with maternal conditions) category-specific encounters per affected individual (6.5). Of all malignant neoplasms, breast cancer accounted for the most malignant neoplasm-related encounters (28.9% of the total) **(data not shown).**

Beneficiaries aged 45–64 years

In 2020, non-service member beneficiaries aged 45–64 years accounted for 20.9% of all medical encounters, 23.0% of all individuals affected, and 15.2% of hospital bed days **(Table).** On average, each affected individual had 11.9 medical encounters during the year.

Of all morbidity-related categories, musculoskeletal diseases accounted for the most medical encounters (n=2,476,302; 14.4%) among older adult beneficiaries **(Figures 6a, 6b)**. In addition, in this age group, back problems accounted for 43.9% of all musculoskeletal disease-related encounters **(data not shown)**. Injury/poisoning accounted for more hospital bed days (16.5% of the total) than any other category of illnesses or injuries, and other complications not otherwise specified (NOS) and leg injuries accounted for 44.5% and 18.9%, respectively, of all injury/poisoning-related bed days **(data not shown)**. Digestive diseases accounted for a larger percentage (8.5%) 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 (6.5), mental health disorders (6.2), musculoskeletal diseases (4.9), neurologic conditions (4.6), injury/poisoning (4.3), respiratory diseases (4.3), and maternal conditions (4.2) **(Figures 6a, 6b)**. Malignant neoplasms (8.1%) accounted for a larger proportion of total bed days among beneficiaries aged 45–64 years than among the other age groups of beneficiaries. Breast cancer accounted for nearly one quarter (24.1 %) of all malignant neoplasm-related encounters among older adult beneficiaries **(data not shown)**.

Beneficiaries aged 65 years or older

In 2020, non-service member beneficiaries aged 65 years or older accounted for approximately half (50.3%) of all medical encounters, nearly one-third (33.0%) of all individuals affected, and approximately two-thirds (66.2%) of hospital bed days **(Table 1)**. On average, each affected individual had 20.0 medical encounters during the year.

Of all morbidity-related categories, musculoskeletal diseases (n=5,832,066; 14.1%) and cardiovascular diseases (n=5,579,928; 13.5%) accounted for the most medical encounters, but cardiovascular diseases accounted for the most bed days (788,950 days; 19.7%) **(Figures 7a, 7b)**. Back problems accounted for a little more than one-third (35.8%) of all musculoskeletal disease-related medical encounters and 37.0% of hospital bed days **(data not shown)**. Taken together, essential hypertension (26.8%), ischemic heart disease (13.7%), and cerebrovascular disease (10.0%) accounted for slightly more than half (50.5%) of all cardiovascular disease-related medical encounters, and cerebrovascular disease accounted for over one-third (33.7%) 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 (6.3), malignant neoplasms (5.8), respiratory diseases (5.8), respiratory diseases (5.6), diseases of the genitourinary system (5.4), mental health disorders (5.1), and cardiovascular diseases (4.9) **(Figure 7a)**. In this age group, melanomas and other skin cancers (19.6%); prostate cancer (14.5%); breast cancer (12.3%); and trachea, bronchus, and lung cancers (10.1%) accounted for more than half (56.5%) of all malignant neoplasm-related encounters **(data not shown)**. Chronic obstructive pulmonary disease accounted for nearly one-third of all medical encounters (32.4%) and 21.4% of all bed days attributable to respiratory diseases **(data not shown)**.

Infectious and parasitic diseases (15.6%) 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)**. Coronavirus disease 2019 (COVID-19) accounted for more than one-quarter (27.4%) of infectious/parasitic-related medical encounters and 44.9% of hospital bed days **(data not shown)**. In contrast to infectious/parasitic diseases, mental health disorders accounted for smaller percentages of medical encounters (2.8%) and bed days (2.2%) among the oldest age group compared to the younger age groups.

EDITORIAL COMMENT

This report documents that a large majority of the health care services for current illness and injury (excluding encounters with diagnoses identified by Z-codes) that are provided through the MHS to non-service member beneficiaries are delivered in non-military medical facilities (i.e., outsourced [purchased] care). The report also documents that there are pronounced differences in the types of morbidity and the natures of the care provided for evaluation and treatment across age groups of beneficiaries. Of particular note, individuals aged 65 years or older —33.0% of all non-service member beneficiaries—accounted for approximately half (50.3%) of all medical encounters and two-thirds (66.2%) of all hospital bed days delivered to all such beneficiaries.

In 2020, 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 years) and younger adult (aged 18–44 years) beneficiary age groups. Developmental disorders were a significant driver of health care utilization among pediatric beneficiaries with 67.1% of medical encounters for mental health disorders attributable to autistic disorder, developmental speech/language disorders, or attention-deficit hyperactivity disorders. Of particular note, children affected by autistic disorder had, on average, 47.9 autism-related encounters each during the 1-year surveillance period.

Although mental health disorders also accounted for more medical encounters among young adult (18–44 years) 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 (22.4%) than pediatric (40.5%) beneficiaries. Also, as expected, the mental health disorders that accounted for the largest health care burdens among younger adults (18–44 years)—mood, anxiety, 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 years were for maternal conditions because this age group encompasses nearly all women of childbearing age. Among older adults (aged 45–64 years), musculoskeletal diseases were the greatest contributors to morbidity and

health care burdens, and among adults aged 65 years or older, cardiovascular diseases accounted for the most morbidity and health care burdens.

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 (44.9%) 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.

REFERENCES

1. Department of Defense. Evaluation of the TRICARE Program: Fiscal Year 2020 Report to Congress: Access, Cost, and Quality Data Through Fiscal Year 2019. Accessed 6 May 2021. https://www.health.mil/Reference-Center/Reports/2020/06/29/Evaluation-of-the-TRICARE-Program-Fiscal-Year-2020-Report-to-Congress
2. Armed Forces Health Surveillance Center. Absolute and relative morbidity burdens attributable to various illnesses and injuries, non-service member beneficiaries of the Military Health System, 2013. *MSMR*. 2014;21(4):23–30.
3. Murray CJ and Lopez AD, eds. In: *Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, MA: Harvard University Press; 1996:120–122.

BUSTING PTSD MYTHS

Fact: While not everyone who experiences trauma will develop Posttraumatic Stress Disorder, it is a common invisible wound.

1 in 5 active duty service members show signs of a psychological health concern

7 to 8% of people will experience PTSD at some point in their lives

10 to 14% of service members who served in Iraq and/or Afghanistan have developed PTSD

5 MYTHS & FACTS ABOUT PTSD

Seeking help is a sign of strength, but the myths about PTSD can discourage service members from taking the first step.

MYTH: PTSD is always combat-related

FACT:
PTSD can be caused by many types of traumatic experiences like house fires, car accidents and sexual assaults.

MYTH: Service members with PTSD all have the same symptoms

FACT:
Everybody experiences PTSD differently. Symptoms vary in intensity and can include nightmares, flashbacks and trouble concentrating.

MYTH: Only service members experience PTSD

FACT:
Anyone who faces a traumatic event can develop PTSD. It can affect people of any age, gender, race or income level.

MYTH: Service members can never recover from PTSD

FACT:
PTSD is treatable and getting help early can significantly improve your symptoms. PTSD can recur, but treatment can make you feel in control and give you tools to cope.

MYTH: Getting help for PTSD will hurt my ability to get or maintain a security clearance

FACT:
Most service members who seek help from a psychological health professional are able to get or maintain a clearance.

SEEK CARE

PTSD symptoms may not appear until months or years later[1]. If you have gone through trauma and are experiencing anger, trouble sleeping, nightmares, intrusive memories, sadness or other concerns, seek care as these may be signs of PTSD. Contact a health care provider to assess your symptoms and discuss treatment options.

WANT TO LEARN MORE?

Psychological Health Resource Center
Call/Chat with a health resource consultant 24/7 at 866-966-1020

Military Crisis Line
Call 800-273-8255 and press 1, or chat online at veteranscrisisline.net/get-help/chat for confidential help

National Center for PTSD
Visit ptsd.va.gov for PTSD treatment and care options

Connect with Us on Social Media
facebook.com/realwarriors
twitter.com/realwarriors

REAL WARRIORS ★ REAL BATTLES
REAL STRENGTH

MHS Military Health System
health.mil

[1] https://www.ptsd.va.gov/understand/what/ptsd_basics.asp

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