

Costs of War: Excess Health Care Burdens During the Wars in Afghanistan and Iraq (Relative to the Health Care Experience Pre-War)

This report estimates the health care burden related to the wars in Iraq and Afghanistan by calculating the difference between the total health care delivered to U.S. military members during wartime (October 2001 to June 2012) and that which would have been delivered if pre-war (January 1998 to August 2001) rates of ambulatory visits, hospitalizations, and hospital bed days of active component members of the U.S. Armed Forces had persisted during the war. Overall, there were estimated excesses of 17,023,491 ambulatory visits, 66,768 hospitalizations, and 634,720 hospital bed days during the war period relative to that expected based on pre-war experience. Army and Marine Corps members and service members older than 30 accounted for the majority of excess medical care during the war period. The illness/injury-specific category of mental disorders was the single largest contributor to the total estimated excesses of ambulatory visits, hospitalizations, and bed days. The total health care burdens associated with the wars in Afghanistan and Iraq are undoubtedly greater than those enumerated in this report because this analysis did not address care delivered in deployment locations or at sea, care rendered by civilian providers to reserve component members in their home communities, care of veterans by the Departments of Defense and Veterans Affairs, preventive care for the sake of force health protection, and future health care associated with wartime injuries and illnesses.

The United States military has been continuously engaged in combat operations since October 2001. The most apparent medical effects of the war – musculoskeletal and internal organ injuries, traumatic brain injuries, vision and hearing decrements, and combat stress-related mental disorders – have been described and discussed in detail.¹⁻⁷ In addition, however, there are many disabling effects of wartime service that are not directly related to combat (e.g., family stress-related conditions, gynecological and fertility disorders, skin disorders, drug and alcohol abuse, motor vehicle accidents, depression, suicide ideation, sleep disorders).

On the other hand, some medical problems affect military members less during war than peace time. For example, while military members are serving in war zones, they are at lower risk of conditions that are endemic to the United States but not to war zones, are closely associated with recreational activities (e.g., bicycle,

snow ski, swimming accidents), and so on. Also, military members may defer seeking care for some conditions while serving in war zones.

Because some illnesses and injuries that affect service members while deployed are not war-related (e.g., cancers), while others that affect non-deployed service members are war-related (e.g., injuries during deployment-specific training, sleep disorders), it is difficult to precisely characterize the types and amounts of care delivered during wartime that are directly related to war fighting.

However, the health care burden related to war fighting can be indirectly estimated by calculating the difference between the total health care delivered to military members during wartime and that which would have been delivered if participation in the war had been averted. Such assessments require comprehensive records regarding the natures and frequencies of medical encounters of military members during the

war period (“observed experience”) – and a method of estimating the natures and frequencies of medical encounters of military members that would have occurred during the war period absent participation in the war (“expected experience”). The continuous surveillance for more than 15 years of the ambulatory visits and hospitalizations of U.S. military members (using standardized electronic medical records integrated in the Defense Medical Surveillance System)⁸ enables such estimates in relation to the wars in Afghanistan and Iraq.

This report summarizes differences between the medical care experience of active component members of the U.S. Armed Forces since the beginning of the wars in Afghanistan and Iraq and the medical care experience that would have occurred if the experience immediately prior to the war had persisted during the war.

METHODS

The surveillance period was divided into pre-war and during war periods. The pre-war period was defined as 1 January 1998 through 31 August 2001; the war period was defined as 1 October 2001 through 30 June 2012. The surveillance population included all individuals who served in the active component of the U.S. Army, Navy, Air Force, or Marine Corps any time during the surveillance period.

Medical encounters for all illnesses and injuries of interest were identified by ICD-9-CM diagnostic codes between 001-999 that were reported in primary (first-listed) diagnosis positions on standardized records of ambulatory visits and hospitalizations. Encounters that were documented with records with other than illness or injury-specific diagnosis codes (ICD-9-CM 001-999) in primary (first-listed) diagnostic positions were analyzed separately (detailed results not included in this report). Such encounters included those for care not specifically related to current illnesses or injuries (e.g., medical

examinations, immunizations, screening tests) (V codes) and those documented with records that indicated the external causes (E codes) rather than the natures of injuries in primary diagnostic positions.

All records used for the analyses were routinely transmitted to the Armed Forces Health Surveillance Center (AFHSC) and integrated in the Defense Medical Surveillance System (DMSS) for health surveillance purposes.⁸ The analyses included records of health care to military members in fixed U.S. military and civilian (contracted/reimbursed care) medical facilities but not records of care delivered in deployed medical facilities or those at sea.

Health care burdens were summarized in relation to the ambulatory visits, hospitalizations, and hospital bed days that were required for the assessment, treatment, and rehabilitation of illnesses and injuries in 25 categories. The conditions included in each illness/injury category were specified by the Global Burden of Disease study (as modified for use by the AFHSC).^{9,10}

For the pre-war and war periods, the total days of military service by members of the active components of the U.S. Armed Services and the numbers of ambulatory visits, hospitalizations, and hospital bed days associated with each illness and injury-specific category of interest were enumerated. This was the “observed experience” during estimates of excess/deficit war-related medical encounters. Rates of ambulatory visits, hospitalizations, and hospital bed days during the pre-war and war periods were calculated by dividing the numbers of the respective encounters by the total person-years of active component service. Rates were expressed as encounters per 1,000 person-years of service.

The numbers of ambulatory visits, hospitalizations, and hospital bed days that would have occurred during the war period if the pre-war experience had persisted were calculated by multiplying the relevant rates during the pre-war period by the cumulative time of military service of active component members during the war period. This was the “expected experience” during estimates of excess/deficit war-related medical encounters.

“Excess/deficit” numbers of ambulatory visits, hospitalizations, and hospital bed days during the war period (relative to the experience during the pre-war period) were calculated by subtracting the “expected” from the respective “observed” numbers.

RESULTS

During the 44-month pre-war period, active component members experienced 22,116,340 ambulatory visits (crude rate: 4,454.5 per 1,000 person-years [p-yrs]), 272,381 hospitalizations (crude rate: 54.9 per 1,000 p-yrs), and 1,202,578 hospital bed days (crude rate: 242.2 bed days per 1,000 p-yrs) for evaluation, treatment, and rehabilitation of illnesses and injuries. During the pre-war period, crude rates of ambulatory visits, hospitalizations, and hospital bed days were higher among service members who were female, in the Army, black non-Hispanic, and in health care occupations compared to their respective counterparts. In relation to age, crude rates of ambulatory visits were highest among the oldest (40+ years), and rates of hospitalizations and bed days were highest among the youngest (<20) service members (Table 1).

During the 129-month war period, active component members experienced 84,021,447 ambulatory visits (crude rate: 5,586.4 per 1,000 p-yrs), 891,903 hospitalizations (crude rate: 59.3 per 1,000 p-yrs), and 4,277,740 hospital bed days (crude rate: 284.4 bed days per 1,000 p-yrs) related to illnesses and injuries. During the war period, crude rates of ambulatory visits, hospitalizations, and hospital bed days were higher among females, Army members, black non-Hispanics, and those in health care occupations than their respective counterparts. In relation to age, crude rates of ambulatory visits, hospitalizations, and hospital bed days were highest among the oldest (40 and older), 20-24 year olds, and youngest (<20 years) aged military members, respectively (Table 1).

The ratios of crude overall rates (war period versus pre-war period) of ambulatory visits, hospitalizations, and hospital bed days were 1.25, 1.08, and 1.17, respectively.

By military/demographic subgroups:

Among all military/demographic subgroups, the largest relative increases in crude rates from the pre-war to war period were among 40+ year olds for ambulatory visits (relative rate: 1.39), 30-39 years for hospitalizations (relative rate: 1.19), and those in combat-specific occupations for hospital bed days (relative rate: 1.40) (Table 1).

The largest absolute increases in rates from the pre-war to war period were among 40+ year olds for ambulatory visits (rate difference: +2,208 per 1,000 p-yrs) and hospitalizations (rate difference: +9.49 per 1,000 p-yrs) and those in combat-specific occupations for hospital bed days (rate difference: +88.1 per 1,000 p-yrs). Of note, among females, rates of hospitalizations and hospital bed days were lower during the war than pre-war period. Also, among service members younger than 20 years, hospitalization (but not bed day) rates were lower during the war than pre-war period (Table 1).

Overall, there were estimated excesses of 17,023,491 ambulatory visits (mean: +131,965 per month), 66,768 hospitalizations (mean: +518 per month), and 634,720 hospital bed days (mean: +4,920 per month) during the war period relative to that expected based on pre-war experience (Table 1).

Army and Marine Corps members accounted for approximately one-half (50.4%) of all excess ambulatory visits, two-thirds (64.8%) of excess hospitalizations, and three-fourths (77.9%) of excess hospital bed days during the war period. Service members in combat-specific occupations accounted for 11.3 percent, 33.6 percent, and 42.6 percent of all war period-related excesses of ambulatory visits, hospitalizations, and hospital bed days, respectively. Of note, during the war period, females accounted for nearly one-fifth (18.8%) of all excess ambulatory visits but had “deficits” of hospitalizations and hospital bed days (Table 1).

By illness and injury-related categories:

During the pre-war period, injuries/poisonings, musculoskeletal disorders, and respiratory infections accounted for the most ambulatory visits; the most

hospitalizations were attributable to maternal conditions, injuries/poisonings, and mental disorders; and the most hospital bed days were attributable to mental disorders, maternal conditions, and injuries/poisonings (Table 2).

During the war period, injuries/poisonings, musculoskeletal disorders, and mental disorders accounted for the most ambulatory visits; the most hospitalizations were attributable to maternal conditions, mental disorders, and injuries/poisonings; and the most hospital bed days were attributable to mental disorders, injuries/poisonings, and maternal conditions (Table 2, Figure 1).

From the pre-war to the war period, mental disorders accounted for the largest

illness/injury-specific increases in rates of ambulatory visits, hospitalizations, and hospital bed days. During the war period (relative to the expected based on pre-war experience), mental disorders accounted for more than six million excess ambulatory visits, nearly 42,000 excess hospitalizations, and more than 300,000 excess hospital bed days. Remarkably, mental disorders accounted for 35 percent, 63 percent, and 48 percent of the total estimated excesses of ambulatory visits, hospitalizations, and hospital bed days, respectively, during the war period (Table 2, Figures 1,2).

As with mental disorders, during the war compared to the pre-war period, ambulatory visit rates were much higher for musculoskeletal conditions and “signs,

symptoms, and ill-defined conditions”; hospitalization rates were markedly higher for maternal conditions, skin diseases, and injuries/poisonings; and hospital bed day rates were remarkably higher for injuries/poisonings. Together, mental disorders, musculoskeletal disorders, and signs, symptoms, and ill-defined conditions accounted for 69 percent of all excess ambulatory visits; mental disorders, maternal conditions, skin diseases, and injuries/poisonings accounted for 93 percent of all excess hospitalizations; and mental disorders and injuries/poisonings accounted for 90 percent of all excess hospital bed days (Table 2, Figures 1,2).

Of note, of the 25 illness and injury-related categories of conditions of interest,

TABLE 1. Medical encounters for current illnesses or injuries (ICD-9-CM: 001-999), by demographic/military characteristics of active component members, U.S. Armed Forces, pre-war and during war periods

| | Pre-war period | | | | | | | War period | | |
|-------------------------------|-------------------------|------------|-------------------|------------------|-------------------|-----------|-------------------|-------------------------|------------|-------------------|
| | Ambulatory visits | | | Hospitalizations | | Bed days | | Ambulatory visits | | |
| | Person-years of service | No. | Rate ^a | No. | Rate ^a | No. | Rate ^a | Person-years of service | No. | Rate ^a |
| Total, all illnesses/injuries | 4,964,889 | 22,116,340 | 4,454.5 | 272,381 | 54.9 | 1,202,578 | 242.2 | 15,040,346 | 84,021,447 | 5,586.4 |
| Gender | | | | | | | | | | |
| Male | 4,256,508 | 16,489,895 | 3,874.0 | 164,742 | 38.7 | 772,200 | 181.4 | 12,848,343 | 63,410,270 | 4,935.3 |
| Female | 708,381 | 5,626,445 | 7,942.7 | 107,639 | 152.0 | 430,378 | 607.6 | 2,192,004 | 20,611,177 | 9,402.9 |
| Service branch | | | | | | | | | | |
| Army | 1,736,464 | 9,258,557 | 5,331.8 | 120,049 | 69.1 | 542,757 | 312.6 | 5,584,723 | 36,139,451 | 6,471.1 |
| Navy | 1,352,044 | 4,767,988 | 3,526.5 | 63,610 | 47.0 | 290,630 | 215.0 | 3,736,382 | 16,664,176 | 4,460.0 |
| Air Force | 1,246,724 | 5,976,529 | 4,793.8 | 60,939 | 48.9 | 244,744 | 196.3 | 3,700,542 | 22,220,729 | 6,004.7 |
| Marine Corps | 629,656 | 2,113,266 | 3,356.2 | 27,783 | 44.1 | 124,447 | 197.6 | 2,018,699 | 8,997,091 | 4,456.9 |
| Age group | | | | | | | | | | |
| <20 | 441,992 | 2,324,291 | 5,258.7 | 30,072 | 68.0 | 146,211 | 330.8 | 1,055,683 | 6,348,847 | 6,014.0 |
| 20-24 | 1,540,260 | 6,642,349 | 4,312.5 | 99,821 | 64.8 | 446,913 | 290.2 | 5,036,725 | 24,955,917 | 4,954.8 |
| 25-29 | 1,009,298 | 4,188,974 | 4,150.4 | 53,216 | 52.7 | 226,454 | 224.4 | 3,345,431 | 17,711,231 | 5,294.2 |
| 30-39 | 1,501,203 | 6,303,087 | 4,198.7 | 64,812 | 43.2 | 274,711 | 183.0 | 4,028,572 | 22,670,135 | 5,627.3 |
| 40+ | 472,135 | 2,657,639 | 5,629.0 | 24,460 | 51.8 | 108,289 | 229.4 | 1,573,936 | 12,335,317 | 7,837.2 |
| Race-ethnicity | | | | | | | | | | |
| White, non-Hispanic | 3,126,581 | 13,696,111 | 4,380.5 | 163,021 | 52.1 | 720,100 | 230.3 | 9,404,064 | 52,373,995 | 5,569.3 |
| Black, non-Hispanic | 969,155 | 4,822,853 | 4,976.3 | 64,418 | 66.5 | 286,581 | 295.7 | 2,592,763 | 15,976,729 | 6,162.0 |
| Hispanic | 413,092 | 1,705,637 | 4,129.0 | 21,467 | 52.0 | 95,282 | 230.7 | 1,575,029 | 8,204,758 | 5,209.3 |
| Other | 456,061 | 1,891,739 | 4,148.0 | 23,475 | 51.5 | 100,615 | 220.6 | 1,468,491 | 7,465,965 | 5,084.1 |
| Military occupation | | | | | | | | | | |
| Combat | 1,112,742 | 4,339,440 | 3,899.8 | 51,103 | 45.9 | 242,493 | 217.9 | 3,070,853 | 13,907,515 | 4,528.9 |
| Health care | 408,958 | 2,463,485 | 6,023.8 | 34,225 | 83.7 | 142,315 | 348.0 | 1,258,507 | 9,254,668 | 7,353.7 |
| Other | 3,443,189 | 15,313,415 | 4,447.5 | 187,053 | 54.3 | 817,770 | 237.5 | 10,710,986 | 60,859,264 | 5,681.9 |

^aRate per 1,000 person-years

three accounted for lower ambulatory visit rates, six accounted for lower hospitalization rates, and nine accounted for lower bed day rates during the war than in the pre-war period. The category of infectious and parasitic diseases was the only one that accounted for lower ambulatory visit, hospitalization, and bed day rates during the war than in the pre-war period (Table 2, Figure 3).

EDITORIAL COMMENT

This report estimates that, since the beginning of the wars in Afghanistan and Iraq, there have been approximately 17 million more ambulatory visits, 67 thousand

more hospitalizations, and 635 thousand more hospital bed days among active component military members than would have occurred if the pre-war experience had continued.

Unfortunately, while health care demands increased immediately with the initiation of war fighting, the health care burden will not return to pre-war levels immediately after the cessation of war. During the wars in Afghanistan and Iraq, many military members sustained injuries that may not have precluded the continuation of active service but do require continuing medical care (e.g., clinical follow-ups, treatment of complications, rehabilitation). Until all such individuals leave active military service, the cumulative

costs of war-related health care will increase.

Mental disorders accounted for nearly two-thirds of all estimated excess hospitalizations during the war period; and mental disorders and injuries/poisonings accounted for approximately 90 percent of all estimated excess hospital bed days. The predominance of these causes of excess hospitalizations and hospital bed days is not surprising, because they directly reflect the natures, durations, and intensities of the combat in Afghanistan and Iraq as well as the psychological stresses associated with prolonged and often repeated combat deployments.¹⁻⁷

In regard to ambulatory care, the largest proportions of excess visits were related

TABLE 1. (continued)

| | | | | War period versus pre-war period | | | | | | | | |
|------------------|-------------------|-----------|-------------------|----------------------------------|--------------------------|------------------------|-------------------------------|--------------------------|------------------------|-------------------------------|--------------------------|------------------------|
| Hospitalizations | | Bed days | | Ambulatory visits | | | Hospitalizations | | | Bed days | | |
| No. | Rate ^a | No. | Rate ^a | Rate difference, during - pre | "Excess/deficit, number" | During: pre rate ratio | Rate difference, during - pre | "Excess/deficit, number" | During: pre rate ratio | Rate difference, during - pre | "Excess/deficit, number" | During: pre rate ratio |
| 891,903 | 59.3 | 4,277,740 | 284.4 | 1,131.9 | 17,023,491 | 1.25 | 4.44 | 66,768 | 1.08 | 42.2 | 634,720 | 1.17 |
| 562,247 | 43.8 | 2,981,836 | 232.1 | 1,061.2 | 13,635,236 | 1.27 | 5.06 | 64,970 | 1.13 | 50.7 | 650,937 | 1.28 |
| 329,656 | 150.4 | 1,295,904 | 591.2 | 1,460.2 | 3,200,792 | 1.18 | -1.56 | -3,420 | 0.99 | -16.4 | -35,851 | 0.97 |
| 421,348 | 75.4 | 2,089,369 | 374.1 | 1,139.3 | 6,362,575 | 1.21 | 6.31 | 35,253 | 1.09 | 61.6 | 343,783 | 1.20 |
| 177,281 | 47.4 | 819,982 | 219.5 | 933.5 | 3,487,815 | 1.26 | 0.40 | 1,494 | 1.01 | 4.5 | 16,824 | 1.02 |
| 196,186 | 53.0 | 818,714 | 221.2 | 1,210.9 | 4,481,123 | 1.25 | 4.14 | 15,306 | 1.08 | 24.9 | 92,262 | 1.13 |
| 97,088 | 48.1 | 549,675 | 272.3 | 1,100.7 | 2,221,888 | 1.33 | 3.97 | 8,015 | 1.09 | 74.6 | 150,694 | 1.38 |
| 68,173 | 64.6 | 356,810 | 338.0 | 755.3 | 797,361 | 1.14 | -3.46 | -3,653 | 0.95 | 7.2 | 7,590 | 1.02 |
| 327,507 | 65.0 | 1,642,204 | 326.0 | 642.3 | 3,235,119 | 1.15 | 0.22 | 1,088 | 1.00 | 35.9 | 180,777 | 1.12 |
| 192,443 | 57.5 | 927,576 | 277.3 | 1,143.8 | 3,826,414 | 1.28 | 4.80 | 16,053 | 1.09 | 52.9 | 176,969 | 1.24 |
| 207,298 | 51.5 | 933,858 | 231.8 | 1,428.6 | 5,755,404 | 1.34 | 8.28 | 33,371 | 1.19 | 48.8 | 196,654 | 1.27 |
| 96,482 | 61.3 | 417,292 | 265.1 | 2,208.3 | 3,475,666 | 1.39 | 9.49 | 14,941 | 1.18 | 35.8 | 56,294 | 1.16 |
| 537,099 | 57.1 | 2,645,757 | 281.3 | 1,188.8 | 11,179,126 | 1.27 | 4.97 | 46,768 | 1.10 | 51.0 | 479,856 | 1.22 |
| 181,938 | 70.2 | 809,732 | 312.3 | 1,185.7 | 3,074,244 | 1.24 | 3.70 | 9,602 | 1.06 | 16.6 | 43,047 | 1.06 |
| 91,096 | 57.8 | 436,524 | 277.2 | 1,080.3 | 1,701,534 | 1.26 | 5.87 | 9,247 | 1.11 | 46.5 | 73,234 | 1.20 |
| 81,770 | 55.7 | 385,727 | 262.7 | 936.1 | 1,374,667 | 1.23 | 4.21 | 6,182 | 1.08 | 42.1 | 61,752 | 1.19 |
| 163,454 | 53.2 | 939,760 | 306.0 | 629.1 | 1,931,886 | 1.16 | 7.30 | 22,424 | 1.16 | 88.1 | 270,548 | 1.40 |
| 109,814 | 87.3 | 461,703 | 366.9 | 1,329.9 | 1,673,656 | 1.22 | 3.57 | 4,492 | 1.04 | 18.9 | 23,750 | 1.05 |
| 618,635 | 57.8 | 2,876,277 | 268.5 | 1,234.5 | 13,222,682 | 1.28 | 3.43 | 36,755 | 1.06 | 31.0 | 332,379 | 1.13 |

to mental disorders, musculoskeletal disorders, and illnesses without specific diagnoses (“signs, symptoms, and ill-defined conditions”) at the times of the subject visits. Again, the finding is not surprising. Previous *MSMR* reports have documented relatively high rates of neck, back, and joint problems after wartime deployments;¹¹ also, many illnesses with unknown or unconfirmed underlying causes resolve spontaneously or with treatment of the presenting signs and symptoms. The specific causes of such illnesses often are not confirmed or documented in standardized

medical records such as those used for this report.

Of interest, in this analysis, “infectious and parasitic diseases” was the only illness/injury category with lower rates of ambulatory visits, hospitalizations, and hospital bed days during the war than in the pre-war period. There are several explanations for the finding. For example, the infectious and parasitic diseases category does not include respiratory infectious diseases (which is a separate category of the modified Global Burden of Diseases classification system used here). Respiratory infectious diseases

are very common among military members, and there were excesses of hospitalizations and hospital bed days (but not ambulatory visits) attributable to them during the war period. However, even if respiratory infections had been included in the more general infectious diseases category, there would have been deficits of care for such diseases during the war relative to the pre-war period. Also, most infectious illnesses among active military members (e.g., gastrointestinal infections, sexually transmitted infections) have acute onsets and short clinical courses. When such infections affect

TABLE 2. Medical encounters for illnesses and injuries (ICD-9-CM 001-999), by Global Burden of Disease (modified) categories, among active component members, U.S. Armed Forces, pre-war and during war periods

| | Pre-war period | | | | | | War period | | |
|--|-------------------|-------------------|------------------|-------------------|-----------|-------------------|-------------------|-------------------|----------|
| | Ambulatory visits | | Hospitalizations | | Bed days | | Ambulatory visits | | Hospital |
| Burden of disease main categories | No. | Rate ^a | No. | Rate ^a | No. | Rate ^a | No. | Rate ^a | No. |
| Total illnesses/injuries (ICD 001-999) | 22,116,340 | 4,454.5 | 272,381 | 54.9 | 1,202,578 | 242.2 | 84,021,447 | 5,586.4 | 891,903 |
| Blood disorders | 47,192 | 9.5 | 1,140 | 0.2 | 5,730 | 1.2 | 212,927 | 14.2 | 3,753 |
| Cardiovascular diseases | 441,169 | 88.9 | 8,242 | 1.7 | 33,198 | 6.7 | 1,658,885 | 110.3 | 28,947 |
| Perinatal conditions | 3,587 | 0.7 | 17 | 0.0 | 142 | 0.0 | 27,553 | 1.8 | 177 |
| Congenital anomalies | 64,129 | 12.9 | 1,345 | 0.3 | 6,065 | 1.2 | 275,823 | 18.3 | 4,049 |
| Diabetes mellitus | 51,609 | 10.4 | 764 | 0.2 | 2,971 | 0.6 | 204,192 | 13.6 | 2,378 |
| Digestive diseases | 725,261 | 146.1 | 22,559 | 4.5 | 84,577 | 17.0 | 2,457,132 | 163.4 | 72,821 |
| Endocrine disorders | 64,904 | 13.1 | 753 | 0.2 | 2,540 | 0.5 | 321,251 | 21.4 | 2,583 |
| Genito-urinary diseases | 709,615 | 142.9 | 10,555 | 2.1 | 34,511 | 7.0 | 2,477,939 | 164.8 | 29,244 |
| Headache | 333,022 | 67.1 | 1,305 | 0.3 | 4,250 | 0.9 | 1,266,069 | 84.2 | 4,428 |
| Infectious/parasitic diseases | 1,170,300 | 235.7 | 7,908 | 1.6 | 33,256 | 6.7 | 3,045,543 | 202.5 | 17,546 |
| Injury and poisoning | 5,839,914 | 1,176.2 | 48,744 | 9.8 | 196,079 | 39.5 | 18,639,445 | 1,239.3 | 153,936 |
| Malignant neoplasms | 104,188 | 21.0 | 3,206 | 0.6 | 31,727 | 6.4 | 399,736 | 26.6 | 11,326 |
| Maternal conditions | 164,542 | 33.1 | 62,792 | 12.6 | 226,048 | 45.5 | 1,222,665 | 81.3 | 197,891 |
| Mental disorders | 1,709,397 | 344.3 | 39,432 | 7.9 | 326,659 | 65.8 | 11,210,705 | 745.4 | 161,385 |
| Metabolic/immunity disorders | 166,012 | 33.4 | 1,055 | 0.2 | 3,516 | 0.7 | 536,633 | 35.7 | 2,029 |
| Musculoskeletal diseases | 2,965,282 | 597.3 | 18,216 | 3.7 | 57,161 | 11.5 | 11,896,939 | 791.0 | 58,471 |
| Neurologic conditions | 108,768 | 21.9 | 1,963 | 0.4 | 14,353 | 2.9 | 1,498,522 | 99.6 | 9,661 |
| Nutritional disorders | 138,808 | 28.0 | 137 | 0.0 | 850 | 0.2 | 267,998 | 17.8 | 651 |
| Oral conditions | 65,601 | 13.2 | 4,391 | 0.9 | 11,309 | 2.3 | 285,973 | 19.0 | 10,382 |
| Other neoplasms | 179,359 | 36.1 | 3,782 | 0.8 | 15,748 | 3.2 | 721,785 | 48.0 | 11,709 |
| Respiratory diseases | 743,203 | 149.7 | 6,969 | 1.4 | 22,770 | 4.6 | 2,604,744 | 173.2 | 15,412 |
| Respiratory infections | 1,860,346 | 374.7 | 5,444 | 1.1 | 20,653 | 4.2 | 5,308,593 | 353.0 | 17,857 |
| Sense organ diseases | 1,668,797 | 336.1 | 1,325 | 0.3 | 5,090 | 1.0 | 5,489,637 | 365.0 | 2,770 |
| Signs and symptoms | 1,783,609 | 359.2 | 14,873 | 3.0 | 41,393 | 8.3 | 8,207,076 | 545.7 | 49,662 |
| Skin diseases | 1,007,726 | 203.0 | 5,464 | 1.1 | 21,982 | 4.4 | 3,783,682 | 251.6 | 22,835 |

^aRate per 1,000 person-years

non-deployed military members, medical encounters for evaluation and treatment are documented in medical records. However, when such illnesses affect deployed military members, they may be managed in deployed medical facilities but not documented in the health care records that were summarized for this report. Finally, the relatively low rates of infectious and parasitic diseases documented during the war period reflect, at least to some extent, the effective employment of countermeasures (e.g., food and water sanitation, arthropod vector control, immunizations, chemoprophylactic

drugs) against the many and diverse infectious disease threats that are endemic to Afghanistan and Iraq.¹²

The findings of this report should be interpreted with careful consideration of the objectives and inherent limitations of the analyses. Of note, the analyses were designed to estimate the “excess” health care delivered to active component military members in fixed (e.g., not deployed, at sea) U.S. military and civilian (contracted/reimbursed care) medical facilities since the beginning of war fighting in October 2001; as such, the total health care burdens

associated with the wars in Afghanistan and Iraq are much greater than those enumerated in this report.

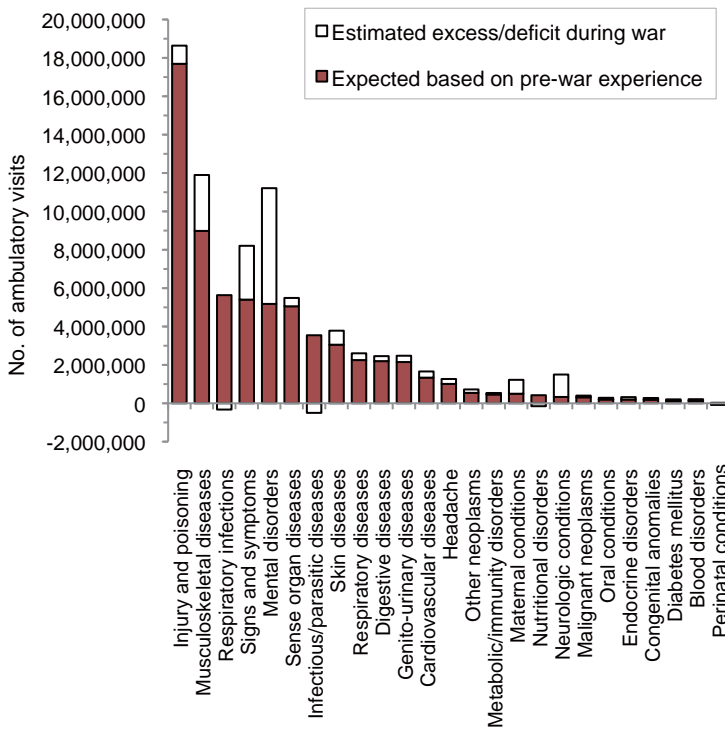
Also, although reserve component members played significant roles in the wars in Afghanistan and Iraq, analyses for this report were limited to the medical encounters of active component members only. Reserve component members often receive health care from civilian providers in their home communities; as such, comprehensive records of all of their medical encounters during the pre-war and during war periods were not available for analyses.

TABLE 2. (continued)

| | | | War period versus pre-war period | | | | | | | | | |
|----------|-------------------|-------------------|----------------------------------|----------|-------------|------------------|----------|------------|--------------|----------|-------------|------|
| | | | Ambulatory visits | | | Hospitalizations | | | Bed days | | | |
| izations | Bed days | | Rate | Excess/ | During: pre | Rate | Excess/ | During:pre | Rate | Excess/ | During: pre | |
| | Rate ^a | No. | difference | deficit, | rate ratio | difference | deficit, | rate ratio | difference | deficit, | rate ratio | |
| | | Rate ^a | during - pre | number | | during - pre | number | | during - pre | number | | |
| | 59.3 | 4,277,740 | 284.4 | 1,131.9 | 17,023,491 | 1.25 | 4.44 | 66,767.8 | 1.08 | 42.20 | 634,720 | 1.17 |
| | 0.2 | 17,027 | 1.1 | 4.7 | 69,966 | 1.49 | 0.02 | 299.6 | 1.09 | -0.02 | -331 | 0.98 |
| | 1.9 | 114,071 | 7.6 | 21.4 | 322,433 | 1.24 | 0.26 | 3,979.2 | 1.16 | 0.90 | 13,503 | 1.13 |
| | 0.0 | 1,433 | 0.1 | 1.1 | 16,687 | 2.54 | 0.01 | 125.5 | 3.44 | 0.07 | 1,003 | 3.33 |
| | 0.3 | 18,653 | 1.2 | 5.4 | 81,554 | 1.42 | 0.00 | -25.5 | 0.99 | 0.02 | 280 | 1.02 |
| | 0.2 | 9,240 | 0.6 | 3.2 | 47,851 | 1.31 | 0.00 | 63.6 | 1.03 | 0.02 | 240 | 1.03 |
| | 4.8 | 262,204 | 17.4 | 17.3 | 260,068 | 1.12 | 0.30 | 4,482.1 | 1.07 | 0.40 | 5,991 | 1.02 |
| | 0.2 | 8,368 | 0.6 | 8.3 | 124,635 | 1.63 | 0.02 | 301.9 | 1.13 | 0.04 | 673 | 1.09 |
| | 1.9 | 87,159 | 5.8 | 21.8 | 328,273 | 1.15 | -0.18 | -2,730.7 | 0.91 | -1.16 | -17,387 | 0.83 |
| | 0.3 | 13,498 | 0.9 | 17.1 | 257,231 | 1.25 | 0.03 | 474.7 | 1.12 | 0.04 | 623 | 1.05 |
| | 1.2 | 79,532 | 5.3 | -33.2 | -499,696 | 0.86 | -0.43 | -6,410.0 | 0.73 | -1.41 | -21,212 | 0.79 |
| | 10.2 | 859,752 | 57.2 | 63.1 | 948,349 | 1.05 | 0.42 | 6,273.8 | 1.04 | 17.67 | 265,762 | 1.45 |
| | 0.8 | 97,893 | 6.5 | 5.6 | 84,115 | 1.27 | 0.11 | 1,613.9 | 1.17 | 0.12 | 1,781 | 1.02 |
| | 13.2 | 686,060 | 45.6 | 48.2 | 724,211 | 2.45 | 0.51 | 7,672.6 | 1.04 | 0.09 | 1,283 | 1.00 |
| | 10.7 | 1,292,361 | 85.9 | 401.1 | 6,032,357 | 2.16 | 2.79 | 41,932.0 | 1.35 | 20.13 | 302,799 | 1.31 |
| | 0.1 | 7,743 | 0.5 | 2.2 | 33,726 | 1.07 | -0.08 | -1,167.0 | 0.63 | -0.19 | -2,908 | 0.73 |
| | 3.9 | 210,681 | 14.0 | 193.8 | 2,914,086 | 1.32 | 0.22 | 3,288.5 | 1.06 | 2.49 | 37,521 | 1.22 |
| | 0.6 | 66,818 | 4.4 | 77.7 | 1,169,027 | 4.55 | 0.25 | 3,714.4 | 1.62 | 1.55 | 23,338 | 1.54 |
| | 0.0 | 2,133 | 0.1 | -10.1 | -152,499 | 0.64 | 0.02 | 236.0 | 1.57 | -0.03 | -442 | 0.83 |
| | 0.7 | 25,029 | 1.7 | 5.8 | 87,245 | 1.44 | -0.19 | -2,919.8 | 0.78 | -0.61 | -9,230 | 0.73 |
| | 0.8 | 43,536 | 2.9 | 11.9 | 178,445 | 1.33 | 0.02 | 252.0 | 1.02 | -0.28 | -4,170 | 0.91 |
| | 1.0 | 60,233 | 4.0 | 23.5 | 353,328 | 1.16 | -0.38 | -5,699.5 | 0.73 | -0.58 | -8,745 | 0.87 |
| | 1.2 | 69,538 | 4.6 | -21.7 | -327,031 | 0.94 | 0.09 | 1,365.3 | 1.08 | 0.46 | 6,973 | 1.11 |
| | 0.2 | 10,110 | 0.7 | 28.9 | 434,280 | 1.09 | -0.08 | -1,243.9 | 0.69 | -0.35 | -5,309 | 0.66 |
| | 3.3 | 132,186 | 8.8 | 186.4 | 2,803,914 | 1.52 | 0.31 | 4,606.6 | 1.10 | 0.45 | 6,792 | 1.05 |
| | 1.5 | 102,482 | 6.8 | 48.6 | 730,935 | 1.24 | 0.42 | 6,282.7 | 1.38 | 2.39 | 35,891 | 1.54 |

FIGURE 1. Estimated numbers of medical encounters based on pre-war experience (“expected”) and excess/deficit numbers during war, by illness/injury category, active component, U.S. Armed Forces

a. Ambulatory visits



b. Hospitalizations

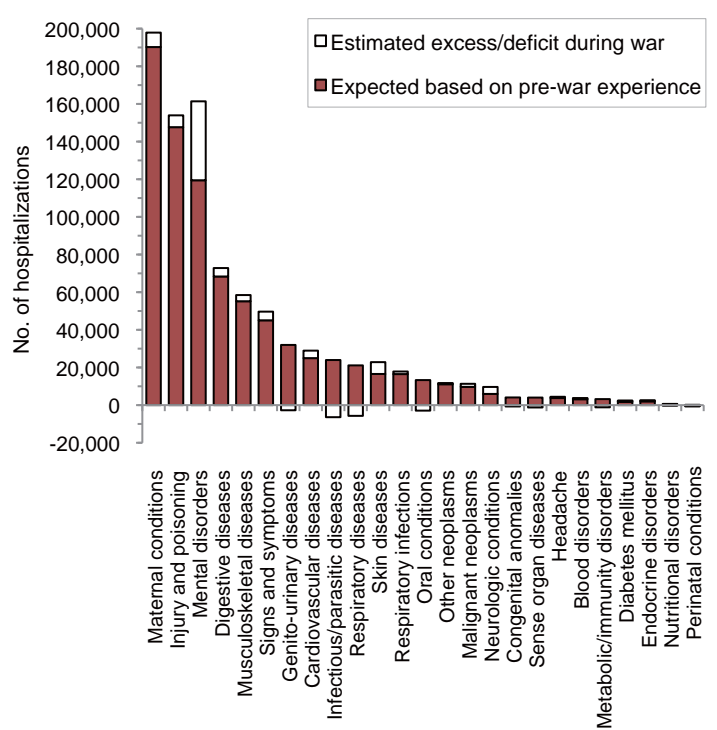
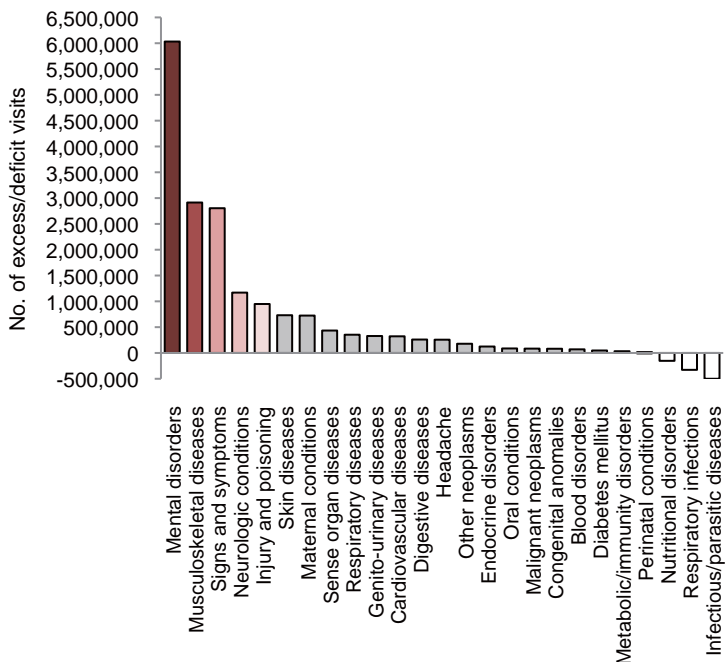


FIGURE 2. Estimated number of excess/deficit medical encounters, during war relative to pre-war period, by illness/injury category, active component, U.S. Armed Forces

a. Ambulatory visits



b. Hospitalizations

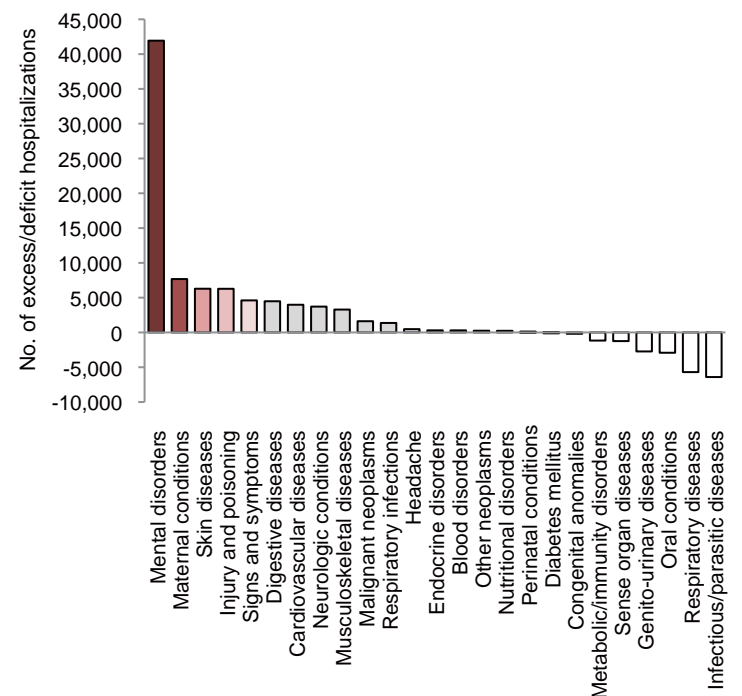


FIGURE 1. (continued)

c. Hospital bed days

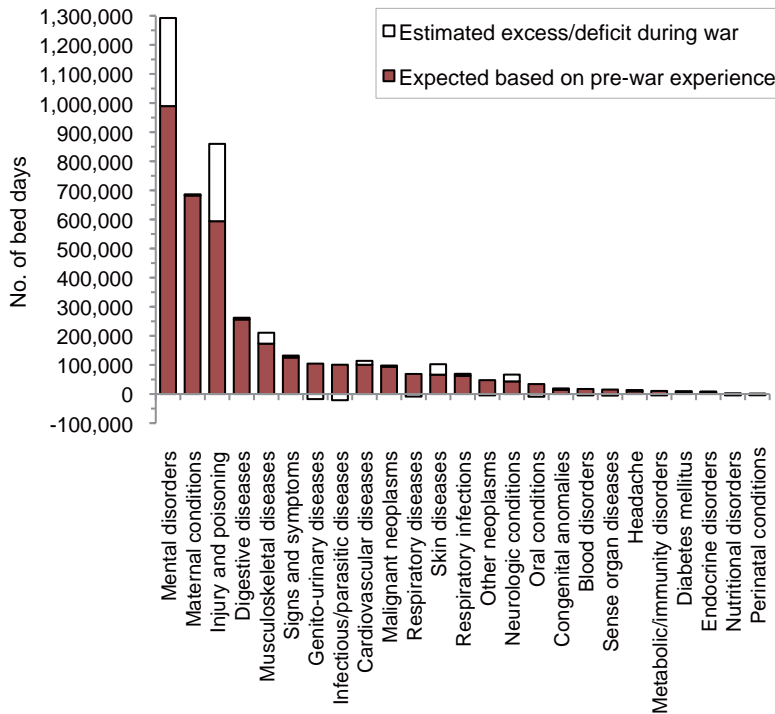
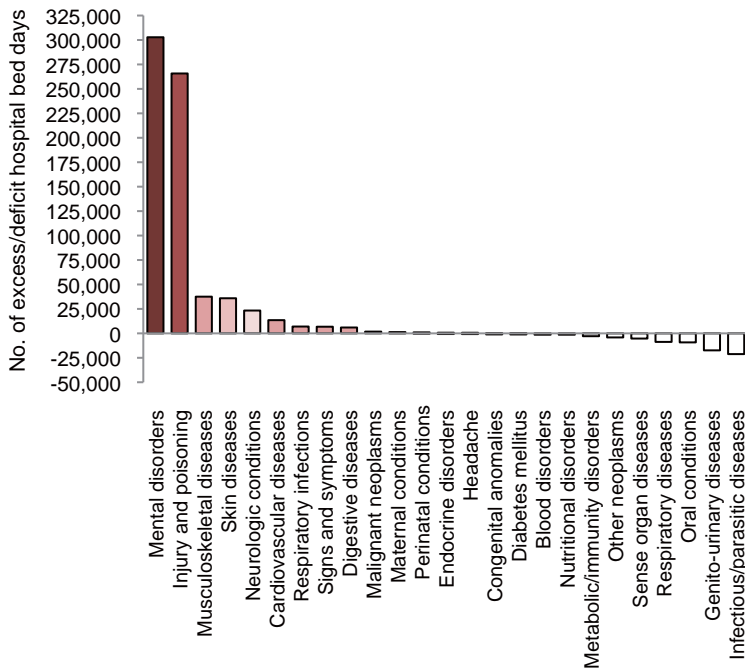


FIGURE 2. (continued)

c. Hospital bed days



In addition, many injuries sustained during the wars are chronically disabling but no longer life threatening. As such, the injuries and their complications will require decades of medical care. The health care received by military service veterans (e.g., through Military Health System and Veterans Health Administration hospitals and clinics) was not considered in this report.

Moreover, the health care that was delivered in deployed clinics and hospitals was not included in this analysis. The war-time-related health care that was not related to evaluation or treatment of a current illness or injury also was not included; such care includes pre- and post-deployment health assessments, deployment-related immunizations, pre-deployment HIV antibody screening, post-deployment mental health and hearing screening, deployment-related family counseling, and so on. Such health care is reported on medical records using diagnostic codes with V prefixes. Separate analyses of medical encounters with V- or E-coded primary (first-listed) diagnoses revealed more than 30 million excess ambulatory visits, more than 13,000 excess hospitalizations, and more than 184,000 excess hospital bed days during the war relative to the pre-war period (data not shown). The estimated excesses of such encounters are extraordinarily high because many force health protection measures were initiated or accelerated during the wars in Afghanistan and Iraq.

Clearly, if all war-related health care – since the beginning of the war until the last war veteran dies – could be accounted for, the health care burden attributable to the war would be much greater than that documented in this report.

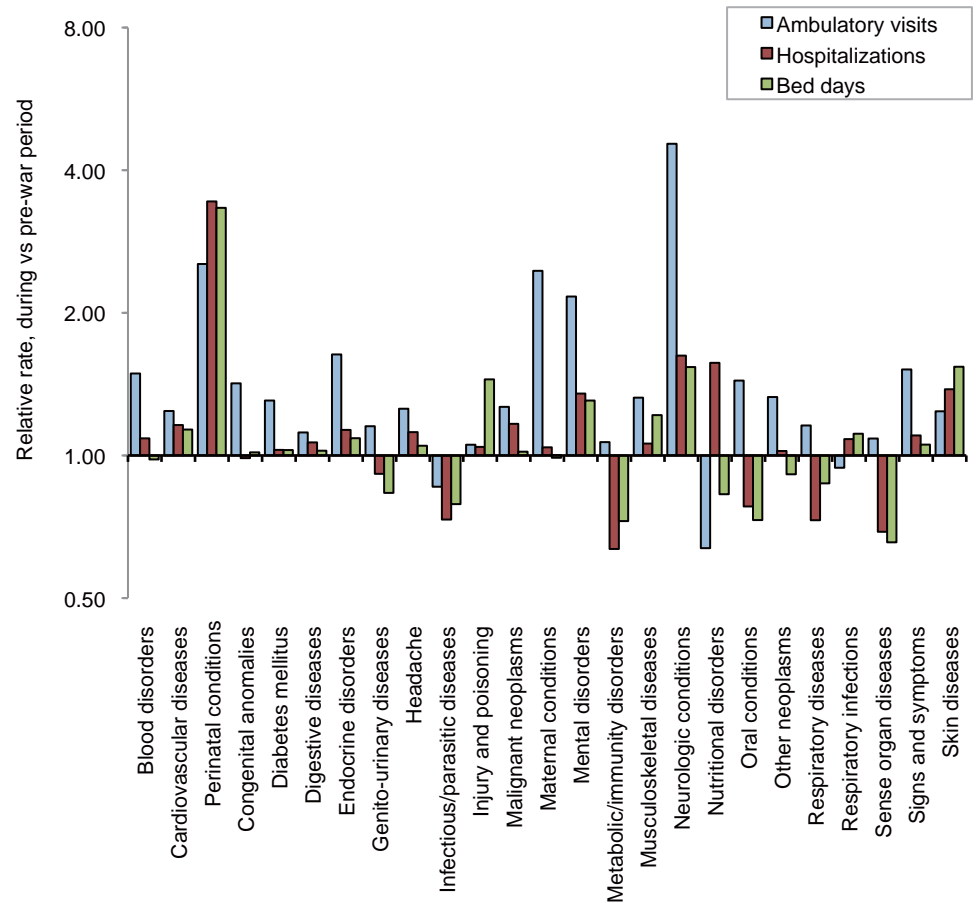
In summary, this report estimates the natures and numbers of excess medical encounters of active component members since the beginning of warfighting in Afghanistan and Iraq. The estimation methods used for the report were enabled by the Defense Medical Surveillance System, a health surveillance database that includes records of all medical encounters of active component military members in fixed military and civilian (reimbursed care) medical facilities for more than 15 years. Not surprisingly, since war fighting

began in Afghanistan and Iraq, mental disorders and injuries have accounted for the largest proportions by far of all excess hospitalizations and hospital bed days of U.S. military members. Finally, the total health care burdens associated with the wars are much greater than that reported here; unfortunately but inevitably, they will increase for decades after the cessation of war fighting.

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FIGURE 3. Rate ratios (during war versus pre-war) of ambulatory visits, hospitalizations, hospital bed days, by illness/injury categories, active component members, U.S. Armed Forces



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