U.S.ARMY

DHA
Defense Health Agency

DCPH-A
(formerly U.S. Army Public Health Center)

2022 HEALTH OF THE FORCE

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2022 HEALTH OF THE FORCE

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U.S. Army photo by Pvt. Kyler Hembree

Welcome to the 2022 *Health of the Force* Report

When leveraged and used to prioritize interventions, population health data serve as a powerful force multiplier. Now in its 8th annual installment, the *Health of the Force* report documents conditions that influence the health and medical readiness of the U.S. Army Active Component (AC) Soldier population. Leaders can use *Health of the Force* to optimize health promotion measures, and it can effect culture changes that influence both individual Soldiers and Army institutions. *Health of the Force* presents Army-wide and installation-level demographics and data for more than 20 health, wellness, and environmental indicators at 41 installations worldwide. Installations included in *Health of the Force* are those where the AC population exceeds 1,000 Soldiers. Data presented in this report reflect status for the prior year (i.e., the 2022 report reflects calendar year 2021 data).

EVOLVING HEALTHCARE DATA REPORTING

In line with changes in the previous two *Health of the Force* reports, additional installations have transitioned from the Armed Forces Health Longitudinal Technology Application (AHLTA) to the Military Health System (MHS) GENESIS electronic health record system. Six installations transitioned to MHS GENESIS in 2021: Hawaii and Forts Carson, Huachuca, Leavenworth, Leonard Wood, and Riley. **For the 11 total transitioned installations, metrics derived from Soldiers' medical records are reported in *Health of the Force* but are physically separated from the presentation of AHLTA installation data.** Readers are cautioned against comparing installation data across health record systems, as medical encounter data are decremented in the new record system compared to historical data for these installations.

HEALTH EQUITY: CONTINUING THE CONVERSATION

As the Coronavirus Disease 2019 (COVID-19) pandemic continues to impact military operations and healthcare delivery, the 2022 *Health of the Force* report retains COVID-19 metrics and provides deep dives into prevention strategies, impacts of modified training on injury rates, and infection disparities. The report also sheds light on other areas where health inequities or disparities exist, including women's reproductive health, food insecurity, and substance use among sexual minority Service members. These highlights not only continue some of the conversations that have become key elements of the report, but also foster ongoing progress toward health equity.

APPLYING DATA FOR REAL LIFE CHANGE

Army Senior Leaders rely on robust data to characterize the health of their Soldiers, including strengths that should be sustained and challenges that require mitigation. The *Health of the Force* Online data platform can be used to dynamically display health outcomes, compare populations, and examine trends in data over time. The Spotlight and Local Action vignettes provide information on both how the *Health of the Force* data may be used to inform community health improvement and prevention strategies as well as how to address specific health and readiness issues through resources and calls to action.

Report Highlights

COVID-19

COVID-19

115 cases of COVID-19 per 1,000 person-years were reported among Soldiers in 2021. This rate is higher compared to 2020 due to the emergence of the Delta and Omicron variants of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

MEDICAL METRICS

INJURY

52% of Soldiers were diagnosed with a new injury in 2021. A majority of these injuries (70%) were overuse injuries.

BEHAVIORAL HEALTH

16% of Soldiers had a diagnosis of one or more behavioral health (BH) disorders in 2021. Diagnoses trended slightly up in 2021 relative to 2020 (14%), which may be the result of delays in seeking BH care during the pandemic.

SUBSTANCE USE

3.3% of Soldiers had a substance use disorder (SUD) diagnosis in 2021, a slight upward trend relative to 2020 (3.1%), which may be associated with changes in healthcare utilization during the pandemic.

SLEEP DISORDERS

14% of Soldiers had a diagnosed sleep disorder. The prevalence has remained relatively stable since 2017.

OBESITY

20% of Soldiers were classified as obese (body mass index (BMI)>30) in 2021.

TOBACCO PRODUCT USE

27% of Soldiers reported using any type of tobacco product in 2021, including smoke-generating, smokeless, and e-cigarette products.

HEAT ILLNESS

2.6 cases of heat illness per 1,000 person-years were reported for Soldiers in 2021. Soldiers less than 25 years old had the highest incidence of heat illness.

HEARING

91% of Soldiers were classified as hearing ready in 2021, an improvement from a five-year low of 89% in 2020.

SEXUALLY TRANSMITTED INFECTIONS

20 cases of chlamydia per 1,000 person-years were reported for Soldiers in 2021. Female Soldiers less than 25 years old had the highest incidence – this is likely due to increased screening in this group.

CHRONIC DISEASE

17% of Soldiers had a diagnosis of one or more chronic diseases. The prevalence has decreased over the last 5 years.

DEMOGRAPHICS

Approximately **477,000** AC Soldiers

77% <35 years old
16% Female

21% Black or African American
17% Hispanic or Latino

ENVIRONMENTAL HEALTH INDICATORS

WATER FLUORIDATION

17 of 42 Installations received optimally fluoridated water in fiscal year (FY) 2021, with decreases every year since FY19. Privatized, government owned, contractor operated, and purchased systems contributed to the decreases between FY20 and FY21.

TICK-BORNE DISEASE RISK

33% of the 42 installations with populations of disease-carrying ticks did not submit tick surveillance data to an Army Public Health entity in 2021. This left these installations uncharacterized for their specific tick-borne disease risks which may include Lyme as well as other tick-borne diseases that can be life-threatening.

MOSQUITO-BORNE DISEASE RISK

>85% of tracked installations were categorized as having moderate or high risk of mosquito-borne disease. A warming climate increases the range where mosquitoes live and expands the number of days when mosquitoes are active and able to transmit disease.

PERFORMANCE TRIAD

SLEEP

34% of Soldiers met the sleep target of 7 or more hours of sleep during work/duty weeks, which is consistent with data from 2020.

ACTIVITY

>70% of Soldiers met activity targets of achieving adequate moderate/vigorous aerobic activity (88%), engaging in resistance training 2 or more days per week (78%), and attaining **both** adequate aerobic activity and resistance training per week (72%).

NUTRITION

<40% of Soldiers met the nutrition targets of eating 2 or more servings of fruits per day (27%) or 2 or more servings of vegetables per day (38%), which is consistent with data from 2020.

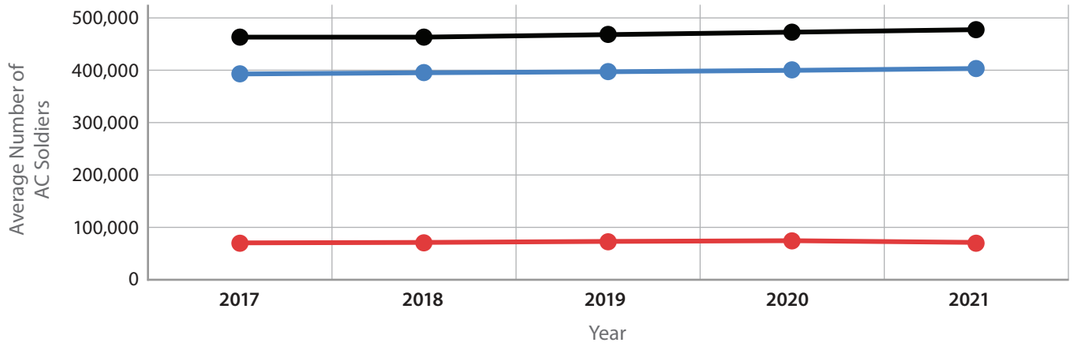
Demographics

The AC Soldier population differs from the U.S. civilian employed workforce population of adults aged 18 years or older with respect to the distribution of age, sex, race, and ethnicity. For example, 77% of Soldiers are <35 years old, compared to only 34% of the U.S. civilian employed workforce population (BLS 2022a). Soldiers are mostly male (84%) compared to the U.S. civilian employed workforce population, which is 53% male and 47% female. Further, 21% of Soldiers are Black or African American, compared to approximately 12% in the U.S. civilian workforce population, and roughly 17% of Soldiers are Hispanic or Latino ethnicity, compared to almost 18% of the U.S. civilian workforce population (BLS 2022b). It is important to keep these comparisons in mind, as health status and health disparities are often linked with age, sex, race, and ethnicity. When possible, *Health of the Force* adjusts health metrics observed among the U.S. civilian population to fit the age and sex distribution of the Army in order to facilitate meaningful comparisons between the populations.

The U.S. Army recognizes that all Soldiers should have a fair and just opportunity to achieve optimal health and well-being, and that Soldiers and their Families may experience health disparities based on age, sex, race, and ethnicity. The Army is uniquely positioned to improve health equity for all Soldiers by addressing potential disparities that may negatively impact individual and unit readiness. The *Health of the Force* provides Leaders with data to support policies and programs that enable optimal health and readiness for all.

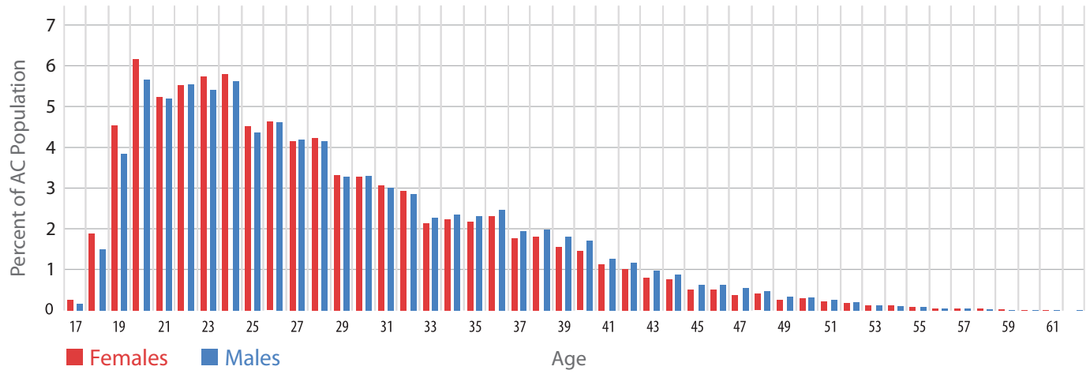
Population by Sex and Year, AC Soldiers, 2017–2021

In 2021, the estimated average monthly AC Soldier population was 477,294 Soldiers. Enlisted personnel accounted for 81% of the AC Soldier population. From 2017 to 2021, the number of female Soldiers in the AC increased by 8.0%.



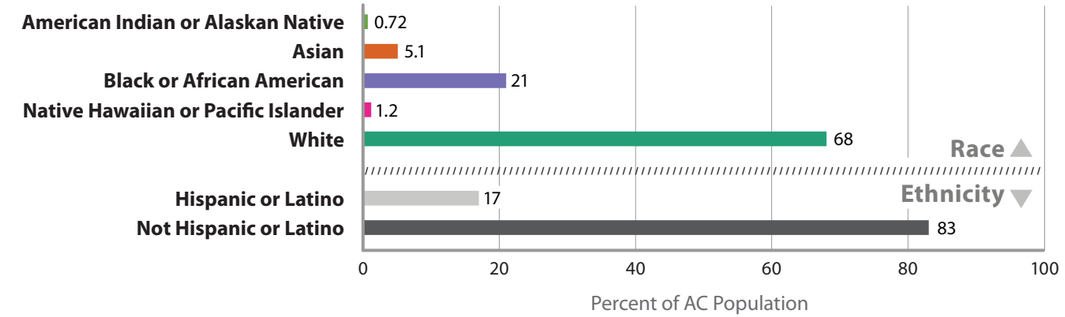
	2017	2018	2019	2020	2021
Female	68,636	69,469	71,265	73,308	74,125
Male	394,754	395,043	397,666	400,685	403,169
Total	463,390	464,512	468,931	473,993	477,294

Age Distribution by Sex, AC Soldiers, 2021



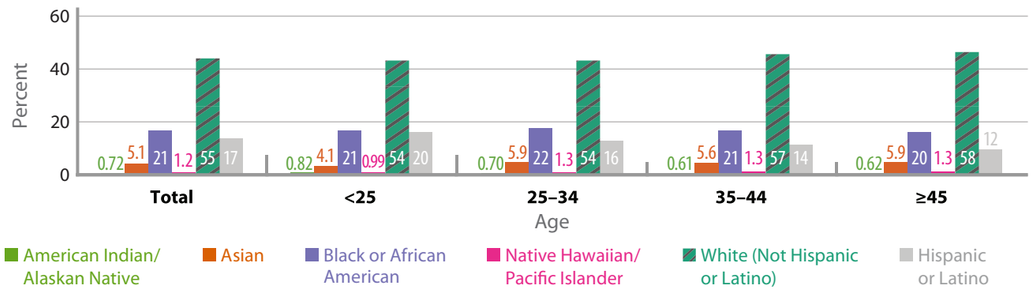
Distribution of Race and Ethnicity, AC Soldiers, 2021

The majority (68%) of AC Soldiers identified as White, followed by Black or African American (21%). Approximately 17% of Soldiers reported Hispanic or Latino ethnicity.



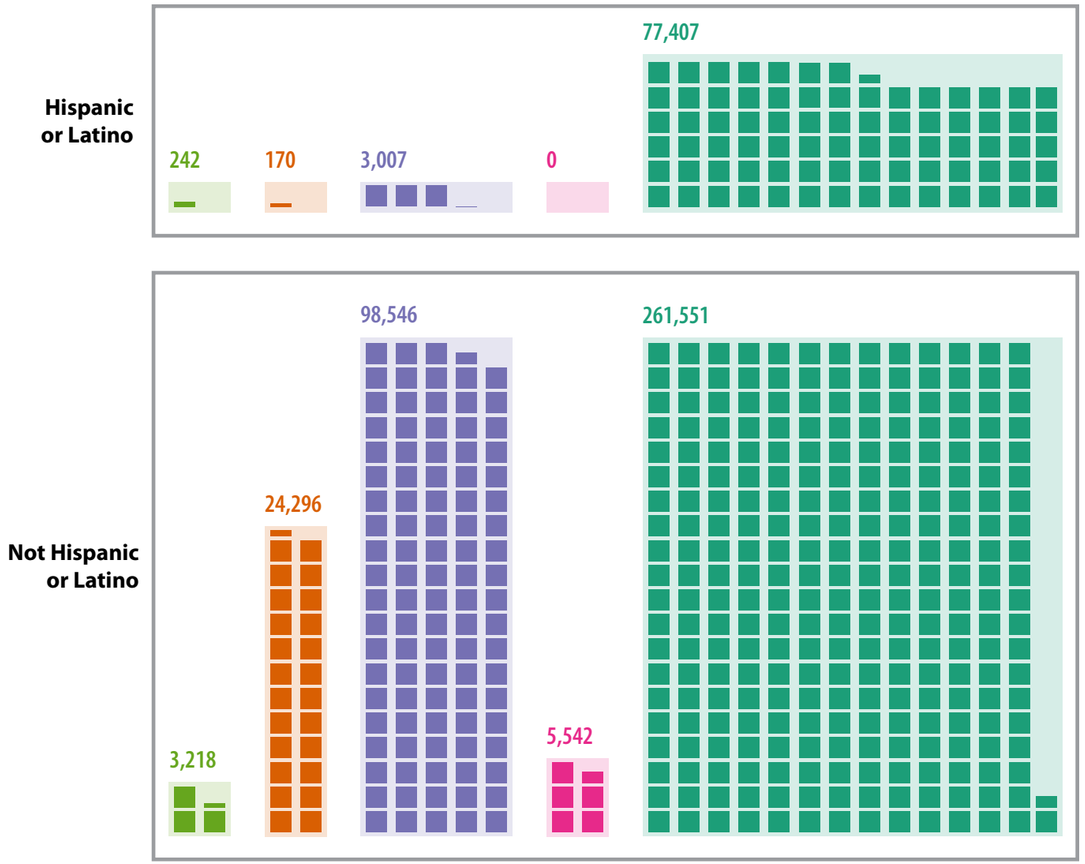
Note: Soldiers are reported in five categories of race and two categories of ethnicity. Approximately 3.5% of Soldiers had an other or unknown race. Hispanic or Latino Soldiers with other or unknown race are reported only in the Hispanic or Latino category. Soldiers who identified as Not Hispanic or Latino with an other or unknown race are not represented in this chart.

Distribution of Race and Ethnicity by Age, AC Soldiers, 2021



The above chart displays the distribution of race and ethnicity by age of Soldiers who are included in this year's report. Soldiers who identify only as Hispanic or Latino with an other or unknown race or Hispanic or Latino and White race are only included in the "Hispanic or Latino" category. Soldiers who identify as Not Hispanic or Latino with an other or unknown race, fewer than 1% of the AC Soldier population, are not represented in the chart.

Intersection of Race and Ethnicity,* AC Soldiers, 2021



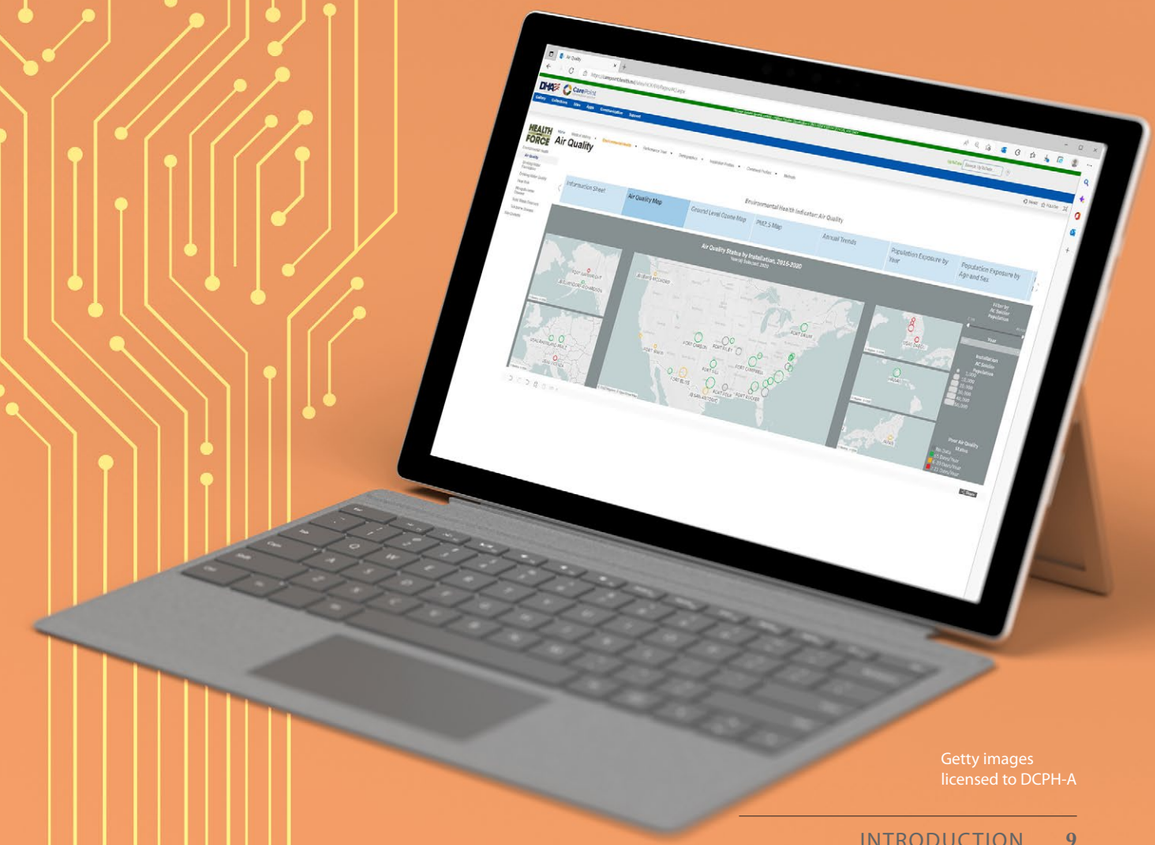
☐ = 1,000 Soldiers;
smaller boxes represent increments smaller than 1,000 Soldiers.

American Indian/Alaskan Native · Asian · Black or African American · Native Hawaiian/Pacific Islander · White

* About 13,000 Soldiers identified as Hispanic or Latino, but had an other or unknown race. For this visualization, these Soldiers were placed under the White race, as a majority of Hispanic or Latino Soldiers with an identified race were classified as White (95%).

HEALTH OF THE FORCE ONLINE

- **Senior Army Leaders require reliable health information and awareness of environmental threats that affect Soldier readiness.**
- ***Health of the Force* Online summarizes key health, environmental, and wellness metrics with data visualizations and geographic distributions.**
- **Visitors can interface with dashboards to make comparative analyses of trends and health outcomes that are stratified by installation or Army Command elements.**
- **Using a CAC-enabled device, visit https://carepoint.health.mil/sites/HOF/Pages/Home.aspx to engage with data dashboards and inform decision making.**



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Featured Spotlight

Innovative Tools to Promote Female Soldiers' Reproductive Health

Women currently comprise 18.9% of the total Force and are the fastest growing demographic in the military (DoD 2021a). Research has shown that urinary tract infections, vaginal infections, and menstrual symptoms are the most common gynecologic problems that prompt female Soldiers to seek care during deployment (Trego 2007). Prevention is critical for avoiding these problems. Easy access to health information enables female Soldiers to understand not only how deployment could affect their gynecologic health, but also the measures they can take to prevent or manage these problems.

Pregnancy, postpartum, and gynecologic conditions also have an impact on readiness (Trego 2007). During pregnancy, significant physiologic changes occur that predispose women to injury. Physical activity in pregnancy carries minimal risk and helps women return to optimal fitness and body composition following pregnancy.

This spotlight aims to raise awareness of two innovative programmatic tools that Army Leaders can use and promote to help female Soldiers optimize their reproductive health, thus improving readiness and retention.

LOCAL ACTION

Web Application to Support Female Service Members' Healthcare Needs

The Defense Health Agency's (DHA's) Deployment Readiness Education for Servicewomen (DRES) is a progressive web application designed to support female Service members across the Force by providing comprehensive healthcare information that is focused on the unique environment they face before, during, and after deployment.

The DRES app offers female Service members relevant healthcare information to better prepare them for operational environments. The app also educates them on preventive and appropriate self-care actions to reduce the likelihood of medical complications. These app features may contribute to greater efficiency in the healthcare system and better access to care, since patients are able to successfully prevent or self-treat minor medical problems.

The app is organized into three sections: Preparing for Deployment, During Deployment, and Returning from Deployment. Topics include women's health apps, navigating the MHS, contraceptive service, preventive health screenings, nutrition, sexual health and sexually transmitted infections (STIs), menstrual health management, mental health, injury prevention, pregnancy, family planning, connecting with family during deployment, and deployment checklists. The app is inclusive of all gender identities and sexual orientations.

The DRES app is a useful tool for Leaders who want to help promote the health and readiness of their female Service members. Interested users can download the free webapp at https://mobile.health.mil/dres. A fact sheet providing more information is available at https://health.mil/Reference-Center/Fact-Sheets/2022/08/09/DRES-App.

Effects of Army Pregnancy Postpartum Physical Training on Physical Fitness and Body Composition

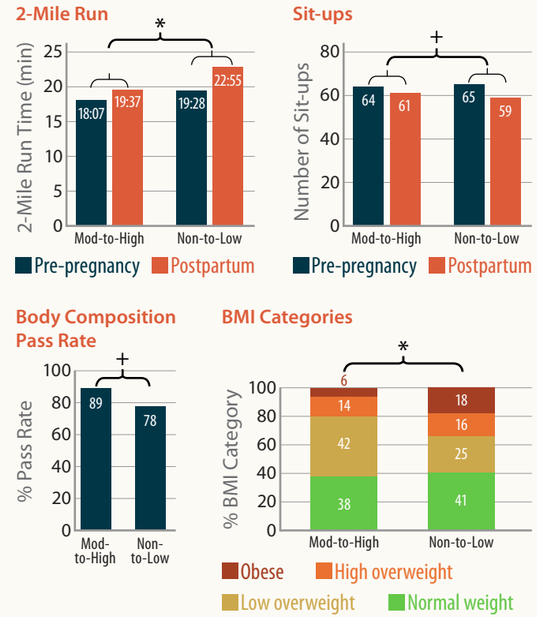
The benefits of engaging in moderate to vigorous physical activity during pregnancy and postpartum are well documented (ACOG 2020). Pregnancy and postpartum physical training is particularly important for AC Soldiers who are required to meet body composition standards and sustain high levels of physical strength and endurance following postpartum deferment. Furthermore, pregnancy is one of the leading reasons for Soldier profiles (APHC 2021a). To meet the unique needs associated with physical fitness training during pregnancy and postpartum, Army Pregnancy Postpartum Physical Training (P3T) was developed and implemented across Army installations in 2006. P3T has been cited as a best practice, specifically to reduce musculoskeletal (MSK) injury (DoD 2020).

Nested within Field Manual 7-22, *Holistic Health and Fitness*, the flexible P3T program can be executed under the direction of a certified P3T leader within a unit or through a consolidated installation-level program (DA 2020a). P3T is designed to provide safe, standardized physical training and education that assists and encourages female Soldiers to continue physical training during pregnancy and improve their fitness levels postpartum.

An investigation of 596 enlisted AC Soldiers examined the relationship between participation in P3T and physical fitness and body composition using data from the U.S. Army Public Health Center (APHC) (now known as Defense Centers for Public Health – Aberdeen (DCPH-A)) (APHC 2020a). Moderate-to-high (≥60%) and non-to-low (<60%) P3T participation levels as indicated by the percentage of exercise sessions attended were compared on the following: pass rates on the first postpartum Army Physical Fitness Test (APFT) and first postpartum Army Body Composition Program (ABCP) and changes in APFT performance levels from pre-pregnancy to postpartum recovery. Regarding the change in APFT performance from pre-pregnancy to postpartum, moderate-to-high participation in P3T showed significantly improved two-mile run time and marginally improved sit-up performance, compared to non-to-low participation (see figure). Results showed no significant differences between the participation groups for push-up performance (data not shown). Soldiers with non-to-low P3T participation were more likely to be highly overweight or obese. APFT failure rates between the groups were statistically similar.

Findings suggest that moderate-to-high P3T participation improves outcomes related to postpartum physical performance and readiness. Army Leaders should support and facilitate high P3T participation among their pregnant and postpartum Soldier population. Wider adoption of the P3T in military populations should also be explored.

P3T Participation and Postpartum Outcomes, AC Soldiers (n=596)



Source: Digital Training Management System (DTMS)

Notes:
Based on reported DTMS data of AC Soldiers who had a live delivery between August 2017 and January 2018.

Participant groups were categorized as Moderate-to-High (≥60% P3T participation) and Non-to-Low (<60% P3T participation) based on P3T exercise attendance rosters.

**p <0.05; +p <0.10*

SPOTLIGHT

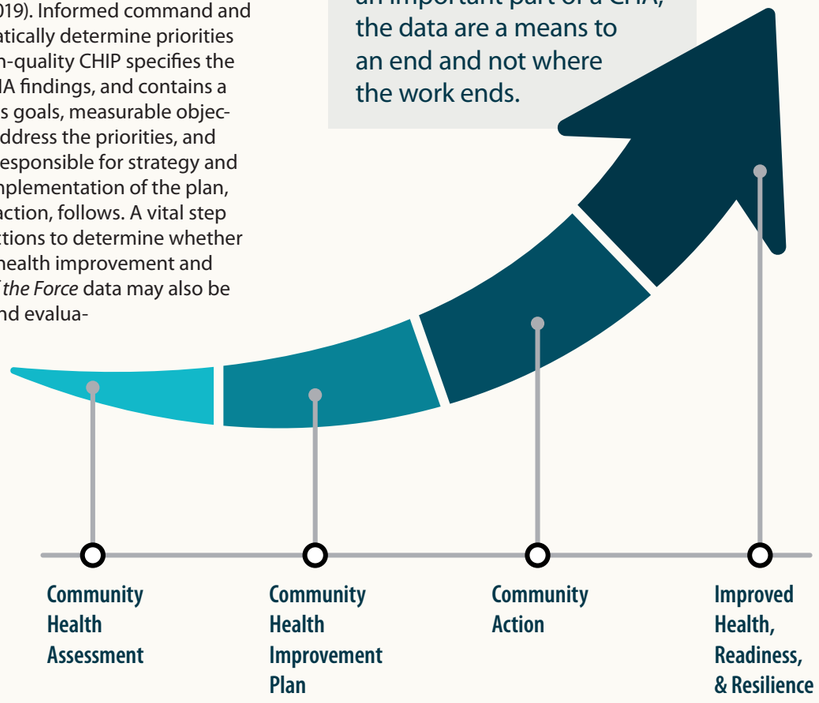
Using *Health of the Force* Data as a Catalyst for Action to Improve Health, Readiness, and Resilience

Health of the Force **contains meaningful and actionable data that are a key component of a step-wise community health improvement planning process to translate community health-related findings into action (CDC 2022a). Undertaking this process is a public health best practice that determines how improvements to health, readiness, and resilience can be realized** (CDC 2022a, PHAB 2019). ***Health of the Force*** **data are an integral part of a command or community health assessment (CHA), which in turn informs the development of a community health improvement plan (CHIP). A CHIP's ultimate goal is to drive action to improve Force and Family health, readiness, and resilience.**

Through this process, *Health of the Force* data should be synthesized with other military, national, state, and local data to present in and complete the CHA. A comprehensive CHA also includes data on Soldiers' and other community members' perceptions and experiences related to health and readiness (PHAB 2019). Informed command and community members systematically determine priorities for collaborative action. A high-quality CHIP specifies the priorities, links them to the CHA findings, and contains a detailed action plan that states goals, measurable objectives, timelines, strategies to address the priorities, and the organizations or persons responsible for strategy and task execution (PHAB 2019). Implementation of the plan, i.e., command or community action, follows. A vital step of this process is evaluating actions to determine whether they achieved their intended health improvement and readiness outcomes. *Health of the Force* data may also be used to support monitoring and evaluation of community actions, for example, serving as a baseline measurement prior to action, or for monitoring changes over time following implementation of strategies. Partnerships, collaboration, and Army Leader engagement in these processes are vital to ensure *Health of the Force* is not just a report, but a catalyst for action to support our Warfighters and their Families (NACCHO n.d.).

Community Health Improvement Planning Process

Health of the Force data are an important part of a CHA; the data are a means to an end and not where the work ends.



SPOTLIGHT

Dental Emergencies 101

Given the challenges of the Army profession (e.g., irregular work hours, training, travel, deployments to austere locations), a Soldier may not have immediate access to a dentist should a dental-related emergency arise. Knowing how to handle some of these emergencies can mean the difference between saving and losing a tooth (ADA 2022).

A knocked-out tooth (i.e., the entire tooth is completely dislodged) is an extremely time-sensitive dental emergency. Since the root is covered with living cells, the longer the tooth is outside the mouth, the lower its chance of survival. The best treatment is to immediately place the tooth back in the socket (without touching the root) (AAE 2022). If that is not possible, the tooth can be held inside the mouth (against the cheek) or placed in milk (not water!) to keep it moist until a dentist can reinsert it (AAE 2022).

An accidental oral injury, such as biting your lip, tongue, or cheek, can cause bleeding, swelling, and/or pain. Rinsing with warm salt water and applying a cold compress will help keep the area clean and ease the pain.

A broken or chipped tooth, while not necessarily an emergency, can be inconvenient, sensitive, and/or painful. Until a dentist is accessible, chew on the opposite side of your mouth. To dislodge food from the area, floss gently and rinse with warm water.

DCPH-A photo by Graham Snodgrass

To prevent dental-related emergencies (ADA 2022)—

Wear a mouthguard during activities that may result in oral injury (e.g., military training, contact sports, riding a bicycle).

Avoid chewing things that can crack teeth (e.g., ice, popcorn kernels).

Avoid using your teeth to open bottles or packages, or to cut or carry objects.

Keep your mouth healthy by drinking water, eating a healthy diet, brushing twice a day, and flossing once a day.

SPOTLIGHT

Patient Safety Events in the Army Veterinary Service

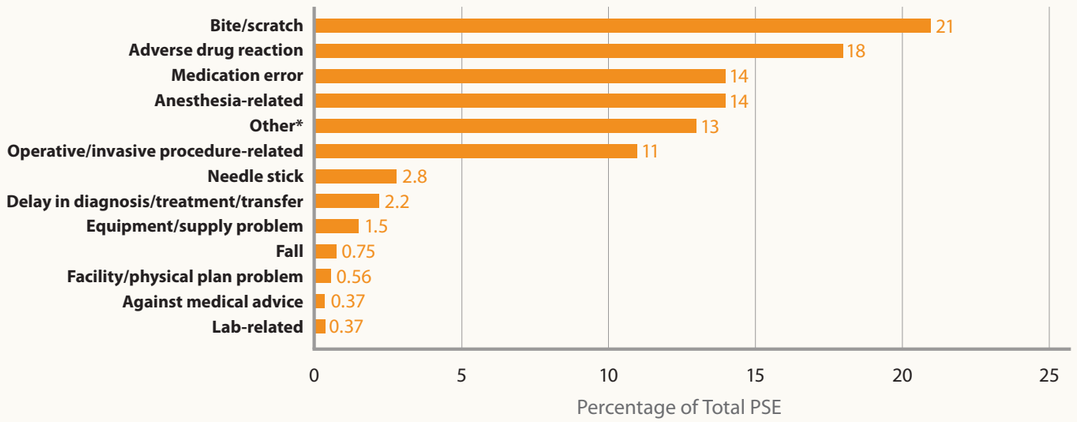
In 2018, Office of The Surgeon General/U.S. Army Medical Command (MEDCOM) policy established the Patient Safety Program – Veterinary to improve veterinary and provider safety by outlining actions to be taken when adverse events related to the delivery of veterinary care in a U.S. Army Veterinary Treatment Facility (VTF) occur. The policy defines a patient safety event (PSE) as an incident that resulted in, or could have resulted in, an unanticipated and adverse outcome for a veterinary patient during the course of treatment; or any event resulting in injury to a client or VTF staff member during the provision of care.

Army Veterinary Service (AVS) personnel provide the full spectrum of veterinary care within 137 VTFs located on Army, Navy, Air Force, and Marine Corps installations globally. From the Program's inception in 2018 to June 2022, AVS personnel have reported 536 PSEs (0.04% of AVS patient encounters world-wide).

Privately-owned animals represent the majority (78%) of reported PSEs, followed by Military Working Dogs (17%), a reflection of the patient population seen at the VTF. Multiple species are represented, with canine PSEs being the most reported (79%) and feline PSEs being the second (19%). Of the total reported PSEs, 89% were actual events, while 11% were "close calls," defined as events or situations that could have resulted in harm to the veterinary patient. PSEs fall into 13 classifications (see figure). The top four reported categories include Bite/scratch (21%), Adverse drug reaction (18%), Medication error (14%), and Anesthesia-related (14%).

AVS leadership uses findings from the Patient Safety Program – Veterinary to implement veterinary care delivery system redesigns that will reduce the likelihood of harm and promote patient safety. Examples include revision of guidelines to include algorithms to assess/treat hypersensitivity reactions, and the addition of behavior capabilities within the electronic veterinary record to communicate patient bite risk. Supporting a culture of safety is a leadership-driven and team effort.

Prevalence of Patient Safety Events (n=536), FY18–June 2022



** Includes collapse/sudden death, primary medical problem-related, stress-induced, patient escape, retained surgical gauze, lacerated in VTF, trauma*

Military Working Dog SStash gets his injured leg examined prior to having his new outfitted leg brace put on at LTC Daniel E. Holland Memorial Military Working Dog Hospital at Joint Base San Antonio-Lackland, Texas, April 2, 2015. Photo by Staff Sgt. Michael Ellis.

DCPH-A photo by Graham Snodgrass

COVID-19

“The Nation called; the Army was there with the relevant expertise, equipment, and technology to respond to this unprecedented public health crisis. We will not rest until the virus no longer threatens our Nation.”

—Lieutenant General R. Scott Dingle

The U.S. Army Surgeon General and Commanding General,
U.S. Army Medical Command, speaking about the Army’s response to COVID-19

COVID-19

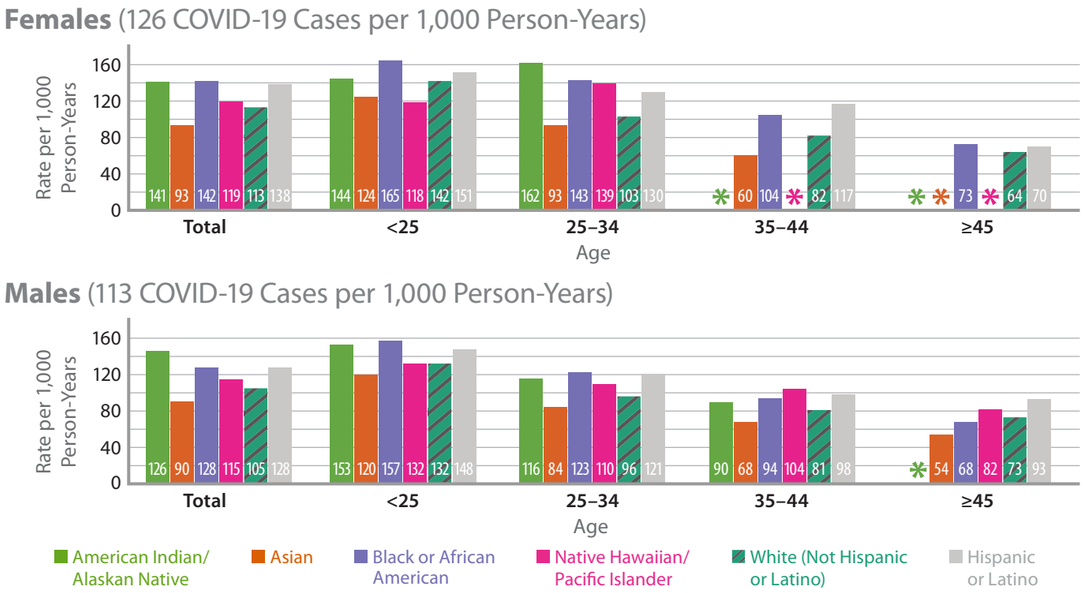
COVID-19 is a respiratory illness caused by SARS-CoV-2 that is commonly characterized by fever, dry cough, and shortness of breath. The virus is spread through respiratory droplets and aerosolized particles, and the most effective prevention measures include vaccination, wearing a face covering over your nose and mouth, social distancing, and proper hygiene practices. During the global pandemic, the Army has balanced public health and safety with maintaining an operationally ready force, continuing training where quarantining and social distancing was often difficult. In 2021, the U.S. Army mandated that AC Soldiers get vaccinated against COVID-19. Incidence of COVID-19 was estimated using laboratory test results and COVID-19 cases reported through the Disease Reporting System internet (DRSi).

There were 115 COVID-19 cases among Soldiers per 1,000 person-years.

Incidence ranged from 36 to 277 COVID-19 cases per 1,000 person-years across Army installations.

Incidence of COVID-19 by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

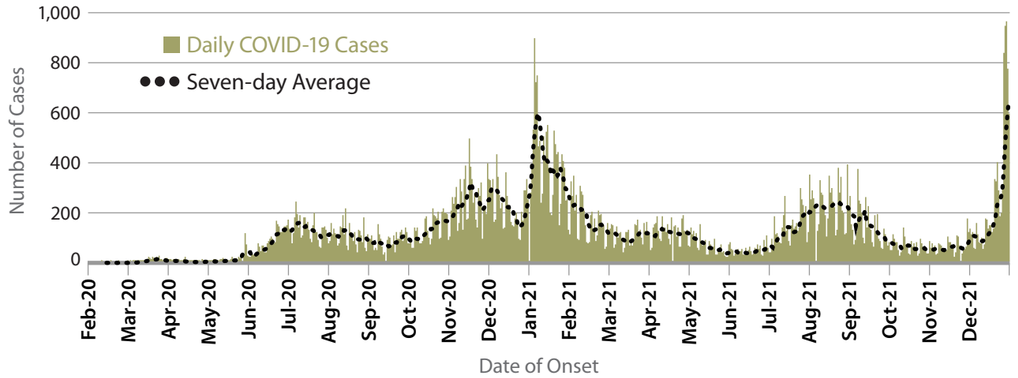
Among AC Soldiers, there were 115 COVID-19 cases per 1,000 person-years in 2021. The rates of COVID-19 were highest among Soldiers <25 years old, most likely because of the large number of trainees in this group who were being tested upon arrival to Initial Entry Training. The purpose of this testing was to identify and isolate asymptomatic individuals who tested positive. Across most age groups, American Indian/Alaskan Native, Black or African American, Native Hawaiian/ Pacific Islander, and Hispanic or Latino Soldiers had higher rates of COVID-19 compared to White (Not Hispanic or Latino) and Asian Soldiers.



** Data suppressed due to small case numbers (<20 cases).*

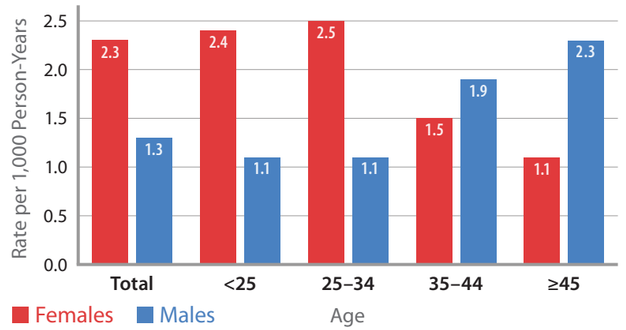
Daily COVID-19 Cases and Seven-Day Average, AC Soldiers, 2020–2021

In 2021, rates of COVID-19 increased across the demographic factors examined in the *Health of the Force* report (i.e., age, sex, race, and ethnicity) compared to 2020 due to the emergence of several SARS-CoV-2 variants of concern. Both the Delta and Omicron variants have mutations that increase transmissibility of SARS-CoV-2, and vaccines that were readily available in 2021 demonstrated reduced effectiveness against Omicron infection.



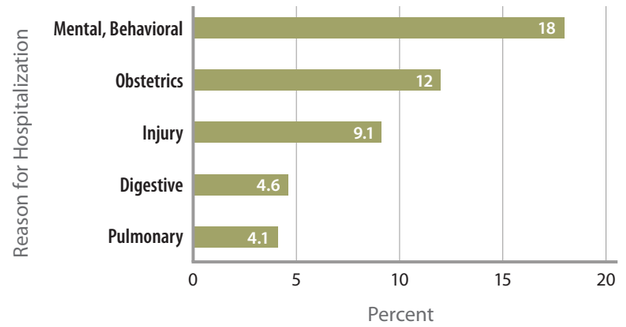
Incidence of COVID-19 Hospitalizations by Sex and Age, AC Soldiers, 2021

In 2021, 1.3% of AC Soldier COVID-19 cases were hospitalized. The rate of COVID-19 hospitalizations among AC Soldiers was 1.4 per 1,000 person-years, and was almost two times higher among female Soldiers compared to male Soldiers, specifically among female Soldiers <35 years old. This difference may be attributed to obstetric admissions; 50% of female Soldiers hospitalized with COVID-19 were admitted for conditions related to pregnancy. Among Soldiers ≥35 years old, male Soldiers were hospitalized with COVID-19 at a higher rate compared to female Soldiers.



Top Reasons for Hospitalization among COVID-19 Patients by Burden of Disease Category, AC Soldiers, 2021

The U.S. Centers for Disease Control and Prevention (CDC) counts any individual admitted to the hospital with a positive SARS-CoV-2 test result as a COVID-19 hospitalization. It is possible that the primary reason for hospitalization was not due to symptoms or complications related to COVID-19. The most frequent non-infectious disease diagnoses among hospitalized AC Soldier COVID-19 cases were mental, behavioral (18%), obstetrics (12%), injury (9.1%), digestive (4.6%), and pulmonary (4.1%).



Highlighting Disparities in COVID-19 Rates by Military Service Characteristics among AC Soldiers

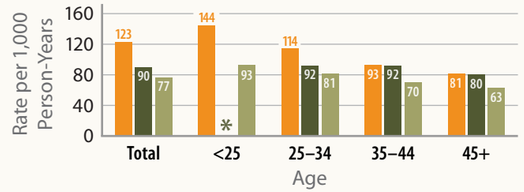
In the AC Soldier population, rates of COVID-19 differ by demographic characteristics such as sex, age, race, and ethnicity (see COVID-19 metric, pages 18–19). Other characteristics that are specific to military service, including rank and military occupational specialty (MOS), may increase risk of exposure to SARS-CoV-2.

In 2021, Enlisted Soldiers had higher rates of COVID-19 compared to Officers and Warrant Officers. The relationship between rank and COVID-19 incidence was consistent, even within Soldiers of the same age group, race, and ethnicity (see figures). The differences in rates of COVID-19 among rank groups were largest among Soldiers <35 years old. Unlike other Soldiers, the unmarried, junior Enlisted Soldiers are required to live in unaccompanied housing, most often in barracks. These communal living situations, with shared bathroom, eating, and recreation spaces, may have limited options for social distancing. Often, younger Enlisted Soldiers and Officers have more training requirements compared to more senior-ranking Soldiers.

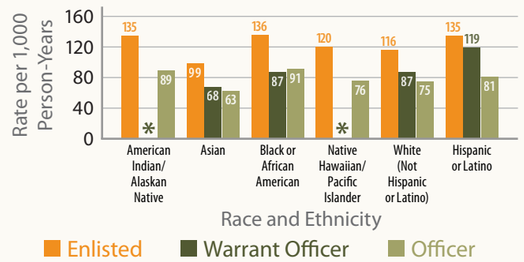
Similar to essential jobs in the civilian workforce, there are military occupations that require Soldiers to physically go into work and interact with co-workers. Data from 2021 show that the highest rates of COVID-19 were observed in the Infantry, Transportation, Quartermaster/Supply, Armor, and Engineering branches (see table). The table also shows the MOSs with the highest rates of COVID-19 within each functional branch.

In training environments where the likelihood of disease transmission is increased due to close contact among large groups of Soldiers, the Army has performed additional surveillance testing to identify and isolate asymptomatic, SARS-CoV-2-positive cases. In communities where COVID-19 disease transmission remains high, the Army should continue to implement disease mitigation measures where possible, including proper hand hygiene, use of personal protective equipment, social distancing, and vaccination. These efforts can protect Soldiers against COVID-19 and other infectious diseases such as influenza and streptococcus. Soldiers training and continuing to perform their jobs – even during a pandemic – ensures Force readiness and protects national security.

Incidence of COVID-19 by Rank and Age, AC Soldiers, 2021



Incidence of COVID-19 by Rank, Race, and Ethnicity, AC Soldiers, 2021



*Data suppressed due to small case numbers (<20 cases).

Incidence of COVID-19 by Branch and MOS, AC Soldiers, 2021

Branch / MOS*	COVID-19 Rate (per 1,000 person-years) ▼
Infantry	**135**
Trainee	*1,565*
Infantryman	*124*
Indirect Fire Infantryman	*119*
Transportation	**133**
Motor Transport Operator	*138*
Transportation Management Coordinator	*126*
Cargo Specialist	*126*
Quartermaster/Supply	**130**
Water Treatment Specialist	*142*
Parachute Rigger	*142*
Automated Logistical Specialist	*134*
Armor	**129**
Cavalry Scout	*142*
M1 Armor Crewman	*141*
Armor Senior Sergeant	*100*
Engineering	**125**
Bridge Crew Member	*176*
Combat Engineer	*147*
Horizontal Construction Engineer	*125*

*Data suppressed for MOSs with <500 Soldiers.

Prevention Strategies to Reduce Transmission of COVID-19 and Other Infectious Diseases

The COVID-19 pandemic has presented unprecedented complications to military training and operations. As a result, public health experts have had to research, develop, and implement numerous methods for the reduction of COVID-19 transmission. Over the course of the COVID-19 pandemic, the Army has implemented numerous interventions at the installation level (see figure).

Since SARS-CoV-2 is primarily spread by respiratory aerosols and droplets from person to person, air quality in gathering places continues to be a focus of reducing transmission risk. Implementing effective ventilation and filtration in indoor environments can greatly reduce the concentration of SARS-CoV-2 particles in the air. As the concentration of viral particles in air decreases, the likelihood of an individual inhaling the virus and becoming infected also decreases (CDC 2021a). Scientists can use carbon dioxide (CO_2) levels to measure ventilation in a given airspace, with high levels indicating poor ventilation. Keeping CO_2 levels as low as possible can help reduce the presence of aerosols containing the SARS-CoV-2 virus (Peng and Jimenez 2021). When prevention methods such as vaccination, masking, and social distancing are used in conjunction with improved indoor air quality, transmission of the SARS-CoV-2 virus is minimized.

Army Strategies for Prevention of COVID-19 Transmission

- Establish routine maintenance of HVAC systems to improve air ventilation in installation facilities.
- Explore additional ways to monitor COVID-19, such as distribution of real-time CO_2 data.
- Encourage eligible personnel to receive COVID-19 vaccinations and boosters.
- Encourage/promote handwashing, social distancing when possible, and properly spaced beds in barracks.
- Utilize COVID-19 screening procedures.
- Increase and amplify risk communication signage throughout installations.

DCPH-A photo by Graham Snodgrass

Medical Metrics

- Injury
- Behavioral Health
- Substance Use
- Sleep Disorders
- Obesity
- Tobacco Product Use
- Heat Illness
- Hearing
- Sexually Transmitted Infections
- Chronic Disease

SUSTAINED SPOTLIGHT

HEALTHCARE UTILIZATION:

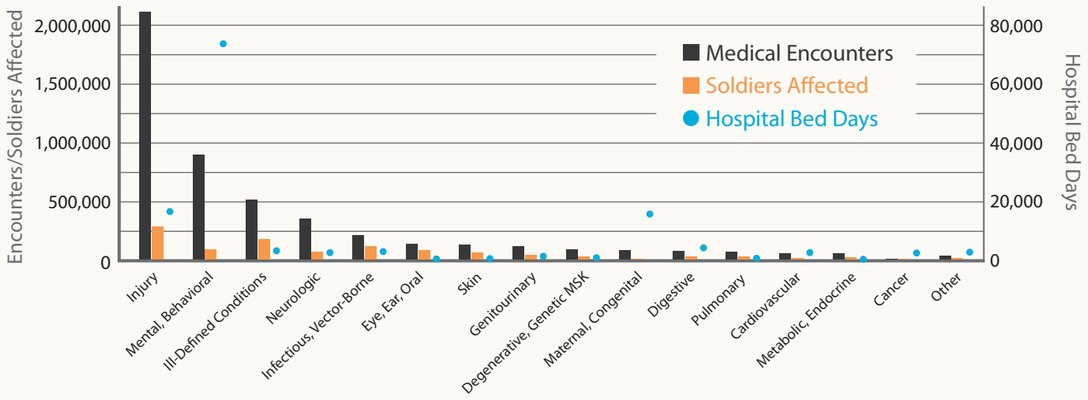
Information for Prevention Planning and Measuring Medical Readiness

In addition to reporting on specific medical metrics in *Health of the Force*, the DCPH-A consolidates the millions of primary diagnoses (i.e., first listed diagnosis per medical encounter) for all Soldier encounters into 16 categories. The burden that each category of diagnoses has on the MHS can then be estimated and compared using the following summary measures: 1) the number of inpatient and outpatient medical encounters, 2) the number of Soldiers affected, and 3) the number of hospital bed days. Because these measures represent different aspects of impact or severity, each is useful in prioritizing prevention goals.

For example, among all Soldiers' diagnoses categorized in 2021 (see figure), injuries resulted in the greatest number of medical encounters and individual Soldiers affected. These metrics were two and three times greater, respectively, compared to the second-most burdensome category of diagnoses: mental and behavioral health. Therefore, prioritizing injury prevention strategies may result in an overall reduction in outpatient medical encounters. However, mental and behavioral health diagnoses were associated with three times as many hospital bed days compared to injury diagnoses, a finding that should encourage initiatives aimed at enhancing BH and reducing the need for hospitalization.

Medical encounters and hospitalizations can be used as a measure of Soldier readiness, as they result in losses to training and duty time. The DCPH-A produces an annual medical burden comparison for Army installations, as public health goals are often best implemented at the local level and with installation partners such as the Commander's Ready and Resilient Council. These installation-specific burden data are accessible through the *Health of the Force* Online dashboards.

Medical Encounters, Soldiers Affected, and Hospital Bed Days by Category, AC Soldiers, 2021



DCPH-A photo by Graham Snodgrass

Injury

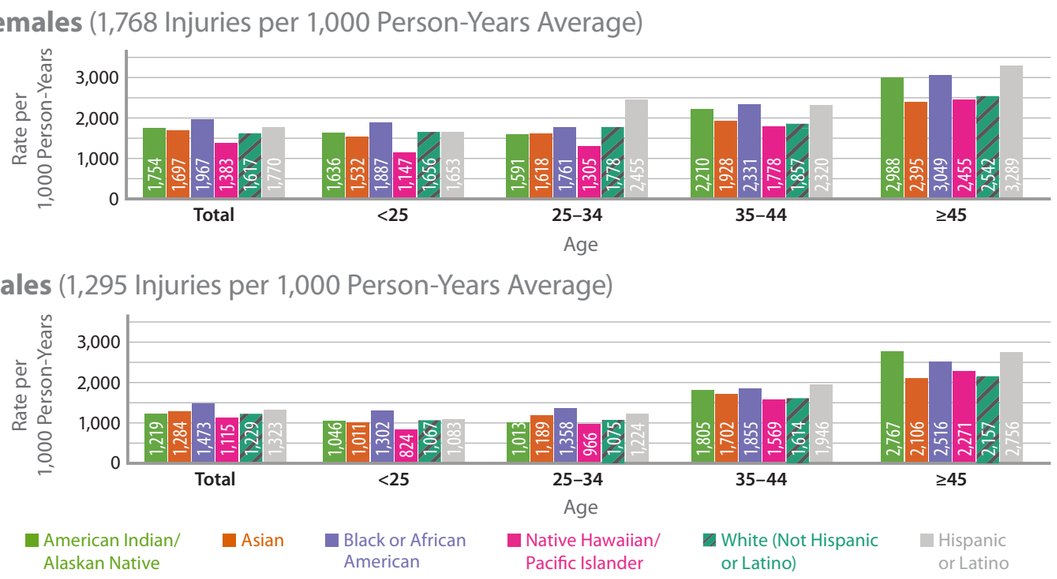
Injury is a substantial contributor to the Army's healthcare burden, impacting medical readiness and Soldier health. An injury is damage or interruption of body tissue function caused by an energy transfer that exceeds tissue tolerance, either suddenly (acute trauma) or gradually (cumulative micro-trauma) (APHC 2017). Cumulative micro-traumatic MSK injuries are commonly referred to as "overuse" injuries. Historically, over half of all Soldiers experience an injury or injury-related MSK condition, accounting for approximately 2 million medical encounters and 8 million days of limited duty per year. Injury incidence was estimated using injury-specific diagnostic codes from inpatient and outpatient medical encounter records in the Military Health System Data Repository (MDR).

There were 1,368 new injuries diagnosed among Soldiers per 1,000 person-years.

Incidence ranged from 849 to 2,084 injuries per 1,000 person-years across Army installations.

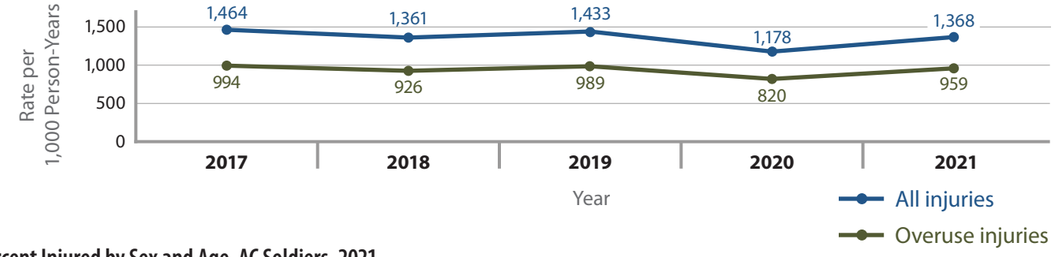
Incidence of Injury by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

Among AC Soldiers, 1,368 new injuries were diagnosed per 1,000 person-years in 2021. The incidence rate reflects the potential occurrence of multiple injuries per Soldier. **Injury rates were higher among female Soldiers, Soldiers ≥35 years old, and Black or African American and Hispanic or Latino Soldiers.** Native Hawaiian/Pacific Islander Soldiers had lower rates of injury than Soldiers of other races.



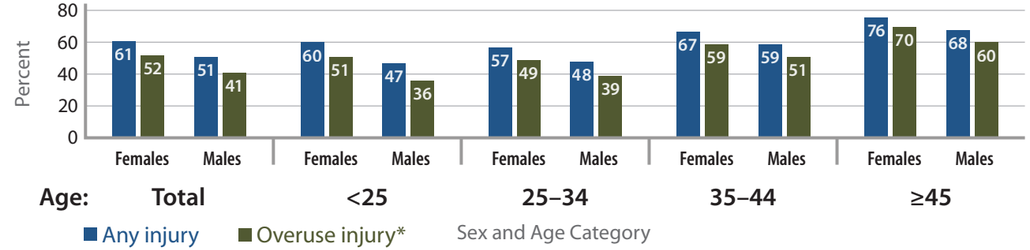
Incidence of Injury per 1,000 Person-Years, AC Soldiers, 2017–2021

Compared to the average injury rates from previous non-pandemic years (2017–2019), the incidence rates for all new injuries and new overuse injuries were lower in 2021, but approximately 16% higher than in 2020.



Percent Injured by Sex and Age, AC Soldiers, 2021

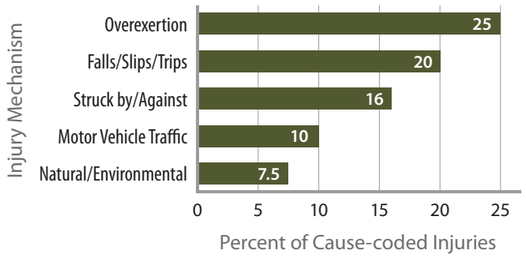
Overall, 52% of Soldiers had a new injury in 2021, and 70% of these injuries were overuse injuries. Age is a risk factor for injuries, as 69% of Soldiers ≥45 years old received medical treatment for injuries, compared to 49% of Soldiers <25 years old. **Sixty-one percent of female Soldiers had a diagnosed injury compared to 51% of male Soldiers in 2021.** For both male and female Soldiers across all age groups, overuse injuries commonly attributed to physical training accounted for the majority of injuries.



**Soldiers with overuse injuries are represented in both injury categories.*

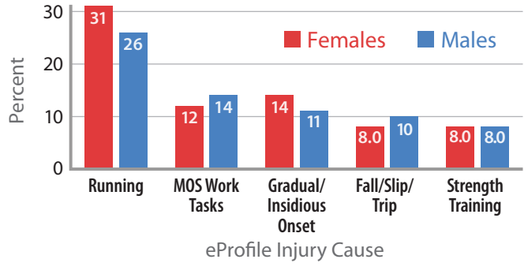
Top Five Mechanisms of Unintentional Outpatient Injuries, AC Soldiers, 2021

The leading mechanisms of injury among outpatient encounters for injuries with a cause code were overexertion (25%) and falls/slips/trips (20%). Note, however, that only 9% of outpatient injury encounters in 2021 included a cause code. Cause coding of medical encounters provides essential information for prioritizing Army injury prevention efforts and monitoring effectiveness of injury prevention programs.



Top Five Causes Associated with Temporary Profiles for Injuries, AC Soldiers, 2021

In 2021, MSK injury was the leading reason for Soldier profiles, with a total of 8.8 million limited duty days (LDDs) assigned to MSK injury profiles in the Army's electronic profile (eProfile) system. Seventy-three percent of injury profiles in 2021 reported a specific cause. The top five causes of injury LDDs were running (27%), MOS work tasks (13%), gradual/insidious onset (12%), fall/slip/trip (9%), and strength training (8%). The top five causes accounted for 51% of LDDs. The number of injury-related LDDs in 2021 increased 16% over 2020, but was still lower than 2019.



Note: MOS work tasks include lifting, pushing, pulling, mechanical, and repair.

SPOTLIGHT

Impact of COVID-19 Training Modifications on Injury Rates in Basic Combat Training

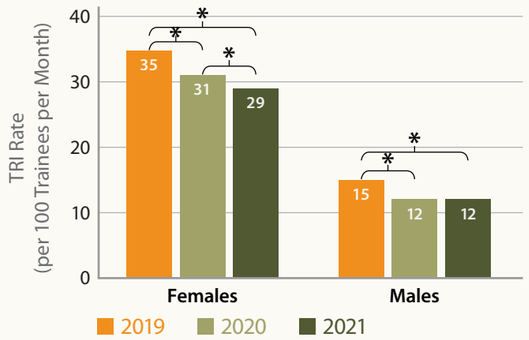
Trainees in Army Basic Combat Training (BCT) have the highest injury rate of any Army subgroup (USAPHC 2012; Barbeau et al. 2021; Jones et al. 2017; Molloy et al. 2012; Springer and Ross 2011). Studies show that low entry-level physical fitness is a leading risk factor for BCT injuries (Blacker et al. 2008; Jones et al. 2017; Knapik et al. 2001; Molloy et al. 2012). For these reasons, the DCPH-A Injury Prevention Branch closely monitors BCT for training-related injuries (TRI), defined as MSK injuries of the low back and lower extremities.

In March and April 2020, the Army implemented distancing measures and face coverings to minimize COVID-19 transmission and protect Soldiers' health (OUSD 2020a; OUSD 2020b). A modified BCT program of instruction (POI) was implemented on 20 April 2020 (TRADOC 2020). Class sizes were initially smaller, and classroom training was consolidated into the first 2 weeks. Other modifications allowed a more gradual increase in physical training and physically demanding tasks. The mandatory physical fitness test and any training that required close contact among trainees were temporarily suspended but were reinstituted in early 2021. Other POI modifications continued in 2021.

Preliminary surveillance findings for 2020 showed lower BCT TRI rates compared to 2017 through 2019 (APHC 2021a, APHC 2022b). It was unclear whether the lower rates were a temporary result of the Army's initial pandemic response and the suspension of certain BCT training requirements. As a result, a follow-up analysis was conducted to compare 2021 TRI rates.

The figure shows the sex-specific TRI rates in 2019, 2020, and 2021. TRI rates for males and females were each significantly lower in 2020 and 2021 compared to 2019. The TRI rate for females was significantly lower in 2021 compared to 2020, while the rate for males was unchanged compared to 2020. Continued surveillance is needed to monitor BCT TRI injury trends and track the long-term impact of the BCT POI modification.

BCT TRI Rates By Sex, 2019–2021



**Statistically significant at p<0.05 level.*

(Left) A trainee slides down a rope during an obstacle course while training at BCT on Fort Sill on April 23, 2020. (U.S. Army Photo by SGT Amanda Hunt)

SPOTLIGHT

Decision Aid Reduces Impact of Cold Weather-related Injuries

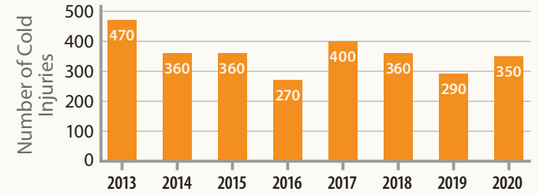
Soldiers working in cold weather environments risk sustaining cold-weather injuries such as frostbite and hypothermia. From 2013 to 2021, there were 1,382 frostbite injuries, 1,059 non-freezing cold injury casualties, and 409 cases of hypothermia in U.S. Army Soldiers (AFHSB 2018, AFHSD 2021). The graph shows the total number of cold injuries across these cold seasons. These injuries cause ~5 lost duty days per Soldier at a total yearly cost of ~$4.5M, reduce unit readiness, and can increase chances of mission failure (APHC 2017). Preventing these injuries is critical since Soldiers often train and operate in austere conditions; this is especially true as the Arctic becomes more important to our national security.

The U.S. Army Research Institute of Environmental Medicine (USARIEM) developed the Cold Weather Ensemble Decision Aid (CoWEDA), a user-friendly computer- and mobile-based application that enables predictions for the risk and time to reach potential for frostbite and hypothermia (see figure). Based on simple inputs for environmental conditions (e.g., temperature, humidity, wind speed), individual work rates or activities, and anticipated clothing worn, CoWEDA calculates the likely time to reach frostbite by body region (e.g., hands, feet, face) and/or hypothermia (Potter et al. 2020, Xu et al. 2021). The CoWEDA can also be used to calculate the amount of clothing insulation needed to prevent cold injuries, based on different mission or condition scenarios.

USARIEM research is underway to add additional functionality to CoWEDA, including complex interactions such as impacts of wetted clothing. Other ongoing work seeks the development of more individualized and sophisticated algorithms to accurately predict frostbite risk in discrete areas of the body and by individual features.

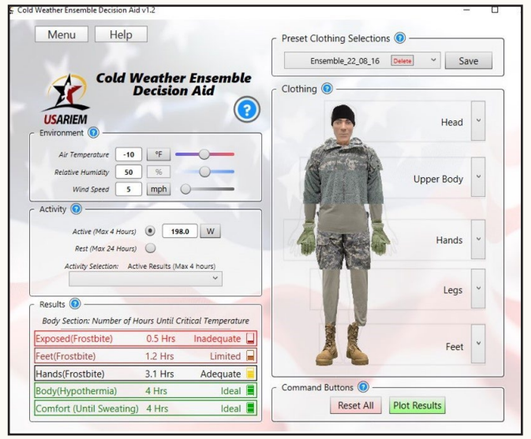
The CoWEDA is a preventive medicine tool built to provide leadership, clothing developers, and mission planners a quantifiable means to identify the risk of cold injuries so training and other activities can be conducted rigorously, but safely, in extreme environments. The software is still being refined, but those who are interested in using CoWEDA may contact USARIEM at usarmy.natick.medcom-usariem.mbx.usariem-webmaster@health.mil.

Total Number of Cold Injuries by Cold Season, 2013–2020



Note: Years presented indicate the start of each Cold Season in October or November; each season ended in March or April of the following year.

CoWEDA Computer Interface



Note: The screenshot shows the risk of frostbite and hypothermia in a hypothetical scenario of a Soldier's exposure to -10°F and 5 mph wind speed while cleaning a rifle and wearing different layers of the Extended Cold Weather Clothing System.

SPOTLIGHT

Changes to DoD Instruction 1308.03, *DoD Physical Fitness and Body Composition Program*

The newly revised Department of Defense Instruction (DoDI) 1308.03 (DoD 2022a) represents the first update in 20 years to overarching policy on physical fitness and body composition (PF/BC). DoDI 1308.03 provides the framework and prescribes policies and procedures for Service-wide PF/BC, yet it allows the individual Services to establish programs to suit their respective needs and mission, consistent with established scientific principles of physical training.

The Instruction requires at least annual PF/BC testing, which can be tailored to include occupation-specific standards.

The allowable height-weight BMI equivalent standards for males (19–27.5 $kg*m^{-2}$) and females (19–26 $kg*m^{-2}$), and the body fat standards for males (18–26%) and females (26–36%) remain unchanged. However, several changes to the BC assessment methods have been approved:

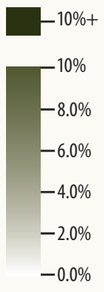
- BC may be assessed using various screening methods such as height-weight or waist-to-height ratios. Percent body fat can be assessed by multiple methods including the "tape test" (TT), bioelectrical impedance analysis, BodPod, or dual-energy x-ray absorptiometry (DEXA).
- BC determination based on abdominal or waist circumferences must be corrected for height to avoid bias against short or tall Service members. It was previously proposed that a single waist circumference measurement be used for screening; however, Army data demonstrated that waist circumference without height adjustment was biased against taller Soldiers. In these cases, waist circumference increased ~1" for each ~3" and ~5" in height among male and female Soldiers, respectively, without corresponding BMI or body fat changes.

Regarding BC standards, the updated Instruction permits the Services to make allowances for highly fit Service members. Army data from 2019 show that 2.8% of female Soldiers and 1.5% of male Soldiers who failed the BC standards according to the TT still scored high (≥270 points) on the legacy APFT (see table).

Because the Instruction now recognizes the association of PF/BC with injury risks, the Services are required to report injury rates annually. To facilitate reporting, the Instruction includes a functional definition of injuries. Revised DoDI 1308.03 is important for maintaining healthy PF/BC levels, both of which relate to injury occurrence and medical non-readiness.

Failed Body Fat TT Standards and APFT Performance by Sex, AC Soldiers, 2019

APFT Performance (Score) Bin	Female Soldiers n=1,130 (% TT failures)	Male Soldiers n=6,603 (% TT failures)
1–179	425 (37.6)	2843 (43.1)
180–189	89 (7.9)	566 (8.6)
190–199	106 (9.4)	643 (9.7)
200–209	117 (10.4)	681 (10.3)
210–219	88 (7.8)	577 (8.7)
220–229	92 (8.1)	438 (6.6)
230–239	72 (6.4)	310 (4.7)
240–249	47 (4.2)	225 (3.4)
250–259	36 (3.2)	141 (2.1)
260–269	26 (2.3)	80 (1.2)
270–279	15 (1.3)	65 (1.0)
280–289	11 (1.0)	16 (0.2)
290–299	4 (0.4)	15 (0.2)
300	2 (0.2)	3 (0.1)
Total	1,130 (100%)	6,603 (100%)



Note: Data are from the DTMS.

DCPH-A photo by Graham Snodgrass

Behavioral Health

The psychological and social well-being of Soldiers and their families is influenced by the stressors of military life. Unrecognized and untreated BH conditions can lead to negative outcomes for Soldiers, including decreased readiness, risk of early discharge, and suicidal behavior, among others.

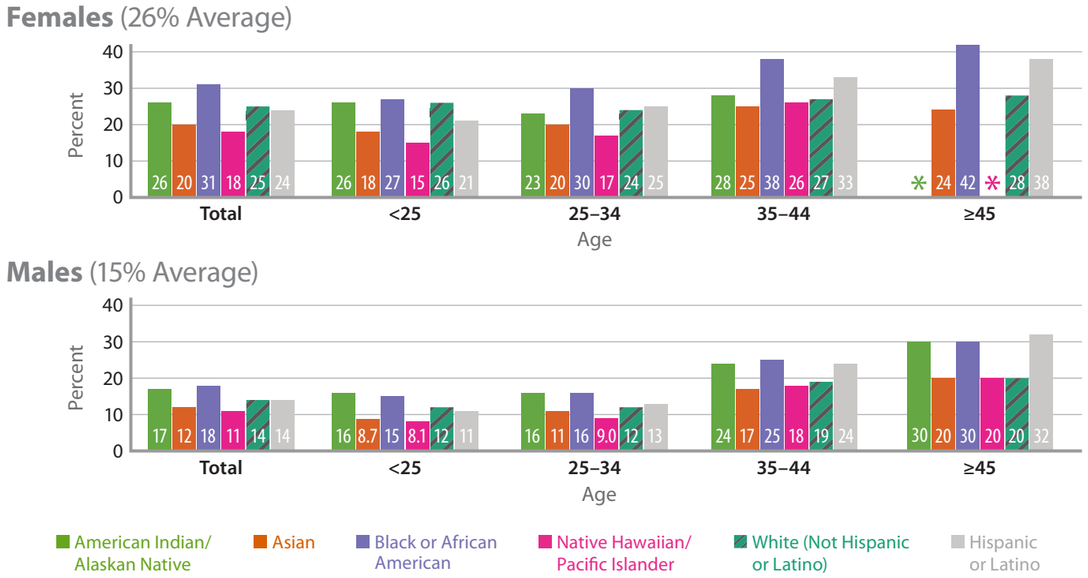
The prevalence of BH disorders was estimated using specific diagnostic codes from inpatient and outpatient medical records in the MDR. In 2021, **16% of Soldiers had a diagnosis of one or more BH disorders,** which include adjustment disorders, mood disorders, anxiety disorders, posttraumatic stress disorder (PTSD), substance use disorders, personality disorders, and psychoses.

Overall, 16% of Soldiers had a diagnosed BH disorder.

Prevalence ranged from 11% to 31% across Army installations.

Prevalence of BH Disorder Diagnoses by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

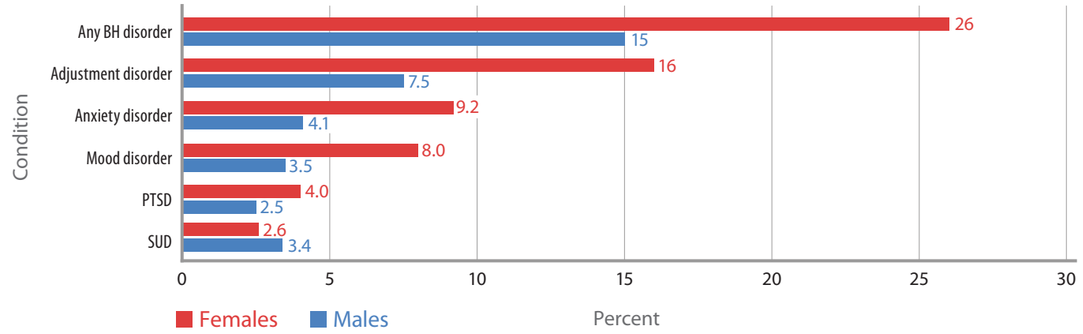
The prevalence of any BH diagnosis was higher among female Soldiers relative to male Soldiers in all age and race categories. BH diagnoses were more common among older Soldiers (≥35 years old) relative to younger Soldiers. Asian and Native Hawaiian/Pacific Islander Soldiers had the lowest prevalence of BH diagnoses, while Black or African American and American Indian/Alaskan Native Soldiers had the highest prevalence of BH diagnoses.



** Data suppressed due to small case numbers (<20 cases).*

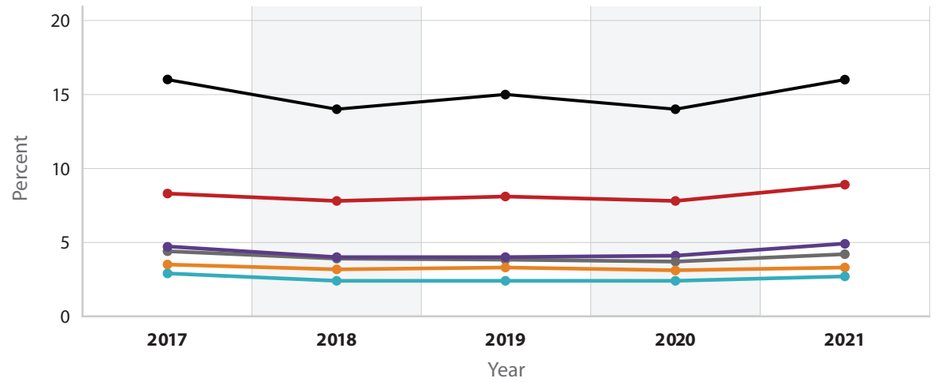
Prevalence of BH Disorder Diagnoses by Sex, AC Soldiers, 2021

The most common BH diagnosis was adjustment disorder. The proportions of female Soldiers diagnosed with adjustment disorder, anxiety disorder (excluding PTSD), or mood disorder were twice that of male Soldiers (e.g., 16% and 7.5% for adjustment disorder for females and males, respectively). Substance use disorder was the only BH condition evaluated for which the prevalence among male Soldiers exceeded that among female Soldiers (3.4% and 2.6% for males and females, respectively).



Prevalence of BH Disorder Diagnoses by Condition, AC Soldiers, 2017–2021

The proportion of AC Soldiers with diagnosed BH disorders remained relatively stable in 2018–2020, followed by an increase in 2021 across all categories of BH diagnoses reported. The increase in BH disorder diagnoses in 2021 may be the result of Soldiers seeking care following limited access to BH care during the first year of the COVID-19 pandemic.



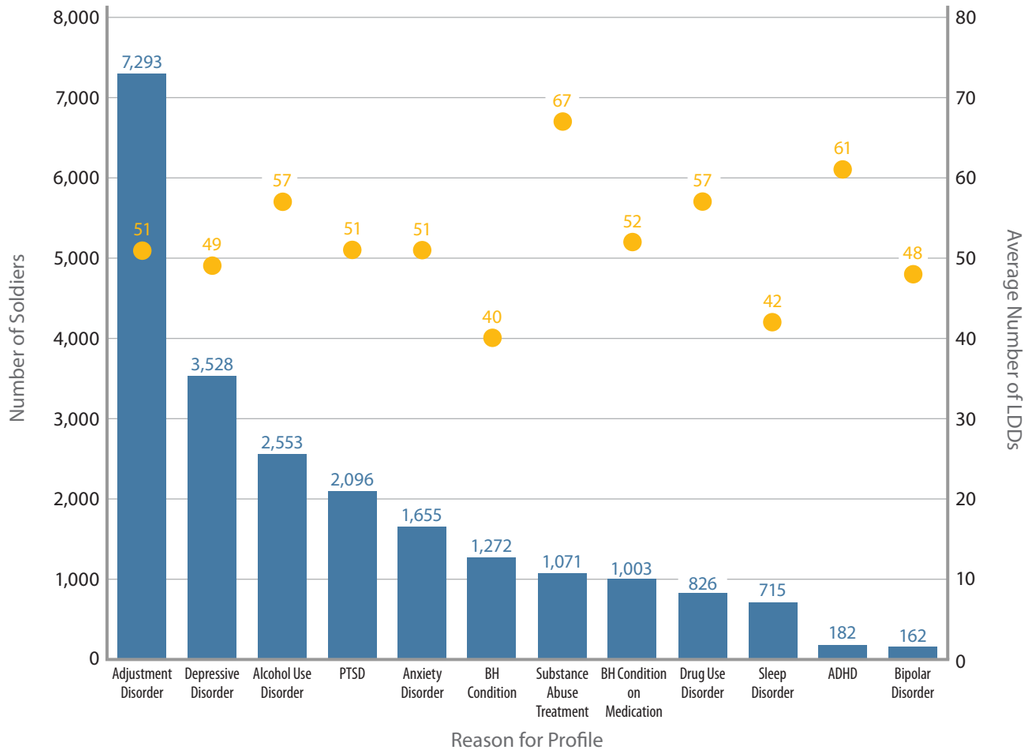
	2017	2018	2019	2020	2021
Any BH disorder	16	14	15	14	16
Adjustment disorder	8.3	7.8	8.1	7.8	8.9
Anxiety disorder	4.7	4.0	4.0	4.1	4.9
Mood disorder	4.4	3.9	3.8	3.7	4.2
PTSD	2.9	2.4	2.4	2.4	2.7
SUD	3.5	3.2	3.3	3.1	3.3

Less than 1% of AC Soldiers were diagnosed with a personality disorder or psychosis.

Early identification and treatment of BH concerns among Soldiers is a priority for the Army. Soldiers who seek and receive treatment for BH concerns are less likely to experience negative outcomes and decreased readiness when compared to their peers who do not seek treatment for BH concerns.

BH Profiles, AC Soldiers, 2021

In 2021, 20,510 Soldiers were put on temporary profiles longer than 7 days for issues related to BH. This is a large increase in the number of Soldiers on temporary profiles reported in the 2020 *Health of the Force* report when 9,780 Soldiers had temporary BH profiles, though this number is similar to 2019 results (18,660 individuals). The average length of these profiles was 52 LDDs. Adjustment disorder was the reason for the largest number of BH profiles, affecting 7,293 Soldiers (36% of those with BH profiles). Substance abuse treatment profiles, affecting 1,071 Soldiers (5.2%), were the longest of the behavioral health profiles (67 LDDs, on average).



Note: Categories are not mutually exclusive: Soldiers may have multiple profiles. One additional category not included in the graph is BH conditions requiring a Combatant Command waiver, which impacted 132 Soldiers with 66 LDDs, on average.

LOCAL ACTION

Life Stressors and Nonclinical BH Support Services

Soldiers seeking BH care from clinical providers for help with personal and social life challenges may be forgoing readily-available, nonclinical primary prevention support services. Using nonclinical supports to address more common life stressors can help reduce the burden on overextended BH clinical service providers, which have limited resources and capacity. Such use may also help mitigate general distress and curb the development of BH syndromes, which represent the second most common medical reason for nondeployability (Hepner et al. 2021).

Nonclinical support services can provide Soldiers with coping strategies for a variety of psychological and social concerns. For example, Soldiers expressing general stress and anxiety related to work, finances, family, and daily life can obtain short-term, solution-focused counseling from Military and Family Life Counselors (MFLCs), spiritual guidance from Chaplains, and psycho-educational training from Army Community Service (ACS).

A recent study found evidence of the benefits of nonclinical support services, noting that, "there were largely positive outcomes…reductions in problem severity, stress, and anxiety, and less problem interference with work and their personal lives after [MFLC] counseling" (Trail et al. 2018).

Leaders, battle buddies, and Family members should encourage Soldiers to seek support for life, work, and relationship concerns through sources such as Chaplains, MFLCs, and ACS. Reinforcing Soldiers' use of these services can help alleviate stressors that do not require BH care, as well as increase BH provider capacity. BH care can be "right-sized" by reducing the need for specialized BH treatment while also reserving it for Soldiers who are in acute distress or need clinical disorder management.

SPOTLIGHT

ARMY INTEGRATED PREVENTION:

A Systems Approach to the Primary Prevention of Harmful Behaviors in Our Ranks

Preventing harmful behaviors such as suicide, sexual assault, and substance abuse is critical in supporting the Army's "People First" philosophy. Holistic and integrated primary prevention creates conditions to reduce the incidence of harmful behaviors while building positive command climates and protecting the Force. Integrated primary prevention is the result of activities that simultaneously address risk and protective factors contributing to multiple harmful behaviors across multiple levels of influence. Though the Army is pivoting towards primary prevention, many current programs were designed for intervention and response, are targeted toward identifying high-risk individuals, and outline actions to take immediately before and after a harmful behavior occurs. In contrast, integrated primary prevention presents a comprehensive upstream approach.

Several recent reports (DoD 2021b, DoD 2022b, DoD 2023) and entities such as the Army's People First Task Force have identified the need for a coherent, integrated plan to protect the Army's people and enable the Army to execute a comprehensive, integrated, and adaptive prevention system. The Army and DoD should set the conditions by which primary prevention can be institutionalized down through installations, organizations, geographic and functional commands, units, and teams, thereby ultimately reaching Soldiers, Families, and Civilians. This systems approach connects actions impacting risk and protective factors and leverages relationships among all levels of the enterprise. To achieve this desired end state, the Army should execute key strategic actions, including but not limited to:

ACTION 01 **Establish Prevention Infrastructure**

ACTION 02 **Establish Primary Prevention**

ACTION 03 **Become a Learning Organization Optimized for Prevention**

> ***The strength of the Army relies upon the strength of its people. Effective prevention builds and maintains the strength of Soldiers, units, and ultimately the Army.***

The Army should also prioritize the professionalization of the Army's prevention workforce; recognition of the role of the social determinants of health in prevention; effective governance; and a commitment to research and program evaluation. This organizational shift toward primary prevention, combined with Leader investment at all levels to increase individual, organizational, and community-level protective factors, will more effectively address risk for harmful behaviors.

SPOTLIGHT

PEOPLE FIRST:

The Fight for Food Security Through Recognition and Leader Communication

The U.S. Department of Agriculture defines food insecurity as "limited or uncertain access to adequate food" (USDA 2022). Recent studies of U.S. Army installations have indicated food insecurity prevalence from 16% to 33% (Wax and Stankorb 2016, Beymer et al. 2021, Rabbitt et al. 2022). However, these studies were not representative of the entire DoD.

Recent analyses of the *2020 DoD-wide Status of Forces Survey of Active Duty Members* (SOFS-A) show that prevalence of food insecurity among Service members was 24% in 2020 (DoD 2022a). The SOFS-A results indicate junior enlisted Service members are most likely to experience food insecurity. Additionally, Active Duty members living on base and those with unemployed spouses may experience higher levels of food insecurity. There were no significant differences in food insecurity when different U.S. regions, marital status, and number of children were examined. In addition, the *2021 Survey of Active-Duty Spouses* demonstrated that 25% of Active Duty spouses experienced food insecurity (OPA 2022b).

Service members with food insecurity have less support for staying in the military from their partner and family; have more stress in their personal and military life; are less satisfied with certain aspects of the military, including compensation; and report poorer individual and unit readiness (OPA 2022c).

Army Leaders can engage with Service members and Families who are struggling with food insecurity by being supportive and offering to help identify resources.

The *Military Leaders Economic Security Toolkit* through Military OneSource (DoD n.d.) includes a two-question screener as well as prompts for starting a conversation about food insecurity.

https://www.militaryonesource.mil/leaders-service-providers/economic-security/

Local Military and Family Support Centers can guide Service members to community resources such as local food banks; Federal programs such as the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); and other on-post resources such as the Defense Commissary Agency, Chaplain Services, and Emergency Relief.

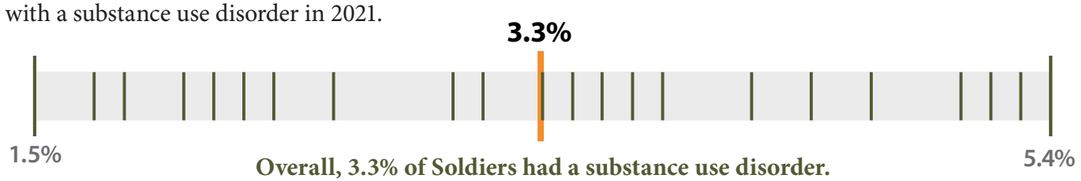
Local Military and Family Support Centers can guide Service members to community resources such as local food banks.

Getty image licensed to DCPH-A

Substance Use

Substance use disorder (SUD) includes the misuse of alcohol, cannabis, cocaine, hallucinogens, opioids, sedatives, or stimulants. According to the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition*, a substance use disorder diagnosis is based on evidence of impaired control, social impairment, risky use, and pharmacological criteria (APA 2013). The misuse of alcohol, prescription medications, and other drugs can impact Soldier readiness and resilience and may have negative effects on family, friends, and the Army community. Drug and alcohol overdoses are the leading method of suicide attempts among Soldiers (APHC 2020b). The Army continues to adapt prevention and treatment efforts to the unique characteristics of military life and culture.

In the *Health of the Force*, substance use disorder prevalence was estimated using specific diagnostic codes from inpatient and outpatient medical encounters in the MDR. More than 17,500 Soldiers were diagnosed with a substance use disorder in 2021.

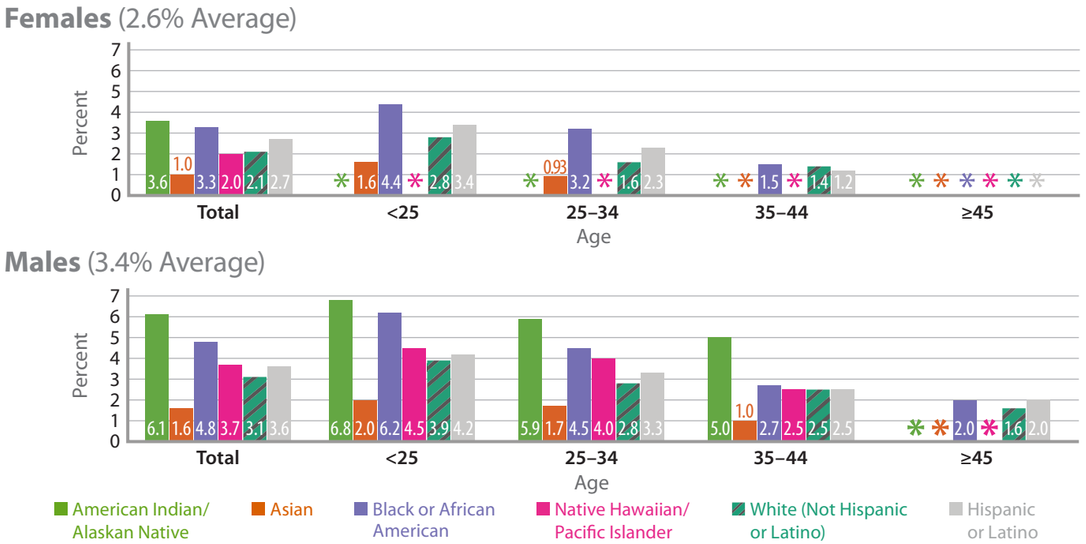


Overall, 3.3% of Soldiers had a substance use disorder.

Prevalence ranged from 1.5% to 5.4% across Army installations.

Prevalence of SUD Diagnoses by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

The prevalence of substance use disorders generally decreased with age. Prevalence was greater among Soldiers <25 years old than among those in any other age group. **Male Soldiers had a higher prevalence of substance use disorder diagnoses relative to female Soldiers in all age and race categories.** The highest prevalence was observed among American Indian or Alaskan Native Soldiers, followed by Black or African American Soldiers. In all race and ethnicity categories, the highest prevalence was observed in male Soldiers <35 years old. The lowest prevalence among race, ethnicity, and sex categories was observed among Asian Soldiers.



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SPOTLIGHT

Substance Use and Sexual Minority Soldiers:
THE MISSION TO UNCOVER POTENTIAL DISPARITIES

Minority stress is the long-term accrual of stress that results from the chronic experience of stigma and leads to poor health outcomes. This theory was originally proposed as a reason why lesbian, gay, and bisexual (LGB) members experience higher rates of health disparities (Meyer 2003, Schuler et al. 2022, Wilchek-Aviad and Oren 2022). Subsequent studies have demonstrated that LGB adults experience a greater burden of behavioral health disorders and poor physical health when compared to heterosexuals (Gonzales and Henning-Smith 2017, Potter and Patterson 2019, Heslin and Alfier 2022). While studies have examined substance use disparities by sexual orientation in the civilian population, there are few data on substance use inequities among Service members in the U.S. military (Kahle et al. 2020, Rice et al. 2019, Schuler et al. 2019a, Schuler et al. 2019b, Taggart et al. 2019, Schuler et al. 2018).

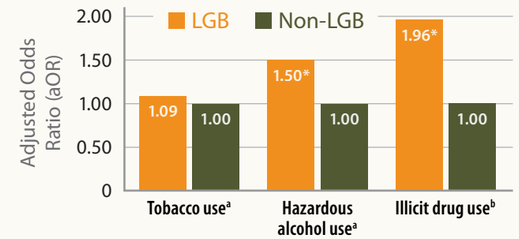
Using data collected from the *2018 Health Related Behaviors Survey*, a recent study examined the relationships between sexual minority status, mental health, and various measures of substance use among AC Service members (Kaplansky et al. 2023). The analysis reported that there was no difference between LGB and non-LGB Service members for tobacco use in the past 30 days (see figure). However, LGB Service members were more likely to report hazardous alcohol use in the past 30 days and illicit drug use in the past year. Given that sexual orientation is related to adverse mental health outcomes, which are subsequently related to substance misuse, the principles of minority stress theory appear to be valid in the military population (Meyer 2003). Further exploration of the unique stressors experienced by LGB Service members is needed.

The Army has several programs to prevent and treat substance abuse and misuse, such as the Sole Provider Program (NCRPI n.d.), Army Substance Use Disorder Clinical Care (ARD n.d.), Army Substance Abuse Program (DA 2020b), and the DoD Drug Demand Reduction Program (OSS n.d.). While additional data are needed to draw definitive conclusions, available data highlight a potential issue about the need for all Soldiers, including sexual minorities, to have a stigma-free pathway to proactively engage in substance use care, such as the Army's Voluntary Care Substance Use Disorder treatment path.

A Service member tells their story of struggle and acceptance.

U.S. Army photo

Odds of Substance Use Comparing LGB and Non-LGB Service Members (n=17,166), 2018



Notes: Each aOR was produced using a logistic regression model controlling for sex, age, race/ethnicity, education level, marital status, Service branch, probable PTSD, and psychological distress. The aORs (95% confidence interval) for each substance use outcome were as follows:

- *Hazardous alcohol use: 1.50 (1.12-2.00)*
- *Tobacco use: 1.09 (0.84-1.40)*
- *Illicit drug use: 1.96 (1.04-3.96)*

[a] Past 30 days; [b] Past year

**p <0.05, indicating a significant difference in odds comparing LGB to Non-LGB*

Sleep Disorders

High-quality sleep is critical to Soldier readiness and mission success. Quality sleep can help increase productivity and decrease the risk of accidents, errors, and injuries. The prevalence of sleep disorders that can impair Soldier readiness and physical and cognitive function, including sleep apnea, insomnia, hypersomnia, circadian rhythm sleep disorder, and narcolepsy were assessed.

The prevalence of sleep disorders was determined using specific diagnostic codes from inpatient and outpatient medical encounter records in the MDR. Soldiers may have more than one sleep disorder; however, the overall prevalence of sleep disorders represents the percentage of AC Soldiers who have at least one of the sleep disorders assessed.

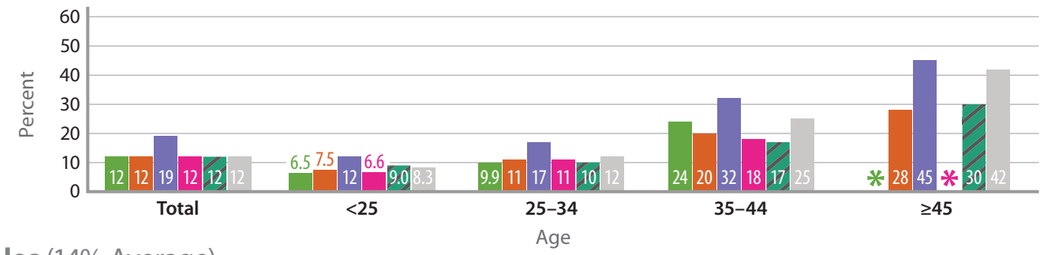
Overall, 14% of Soldiers had a sleep disorder.

Prevalence ranged from 8.5% to 25% across Army installations.

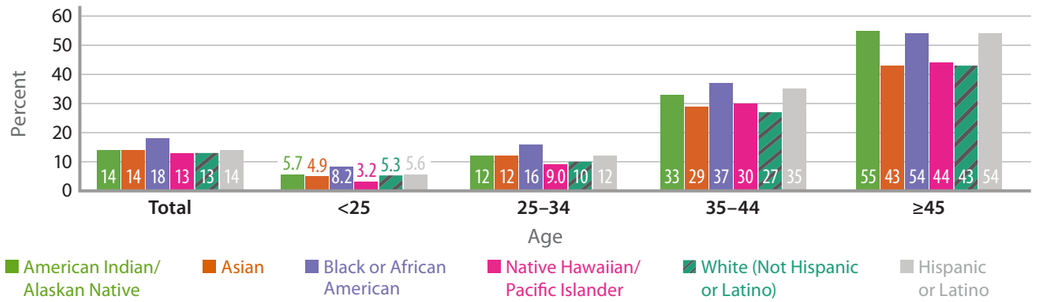
Prevalence of Sleep Disorders by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

In 2021, approximately 14% of Soldiers had a sleep disorder. **The prevalence of sleep disorders increased with age and was more common among male Soldiers than female Soldiers in the older age categories.** Apart from male Soldiers ≥45 years old, Black or African American Soldiers had the highest prevalence of sleep disorders compared to Soldiers in other race or ethnicity categories.

Females (14% Average)



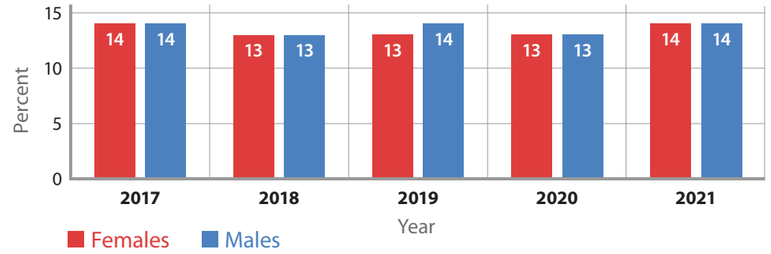
Males (14% Average)



**Data suppressed due to small case numbers (<20 cases).*

Prevalence of Sleep Disorders by Sex, AC Soldiers, 2017–2021

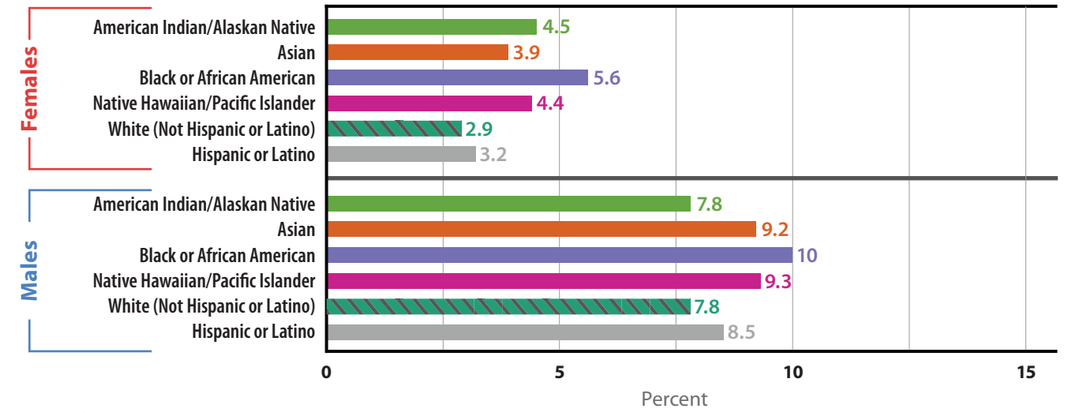
The prevalence of sleep disorder diagnoses remained relatively stable between 2017 and 2021.



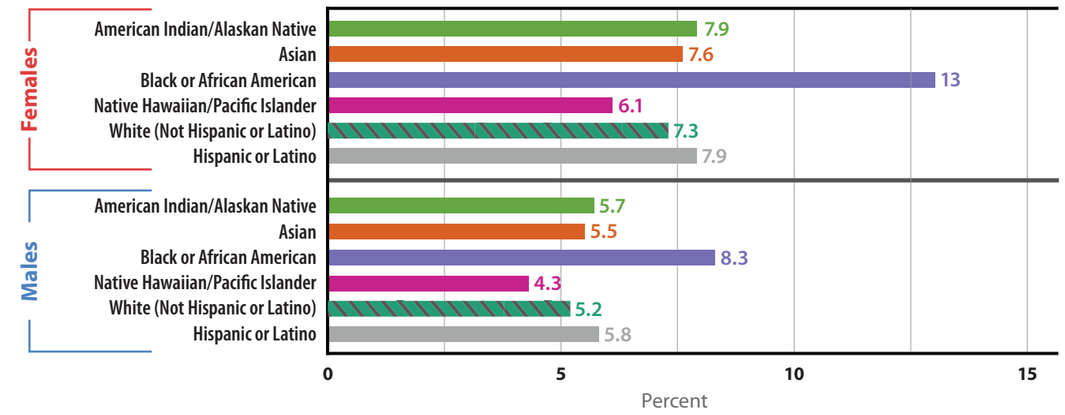
Most Frequently Diagnosed Sleep Disorders by Sex, Race, and Ethnicity, AC Soldiers, 2021

Insomnia and sleep apnea diagnoses made up more than 70% of the diagnosed sleep disorders in 2021. **For both male and female Soldiers, the prevalence of both insomnia and sleep apnea was highest among Black or African American Soldiers.** The prevalence of insomnia was higher among female Soldiers and the prevalence of sleep apnea was higher among male Soldiers.

Sleep Apnea



Insomnia



SPOTLIGHT

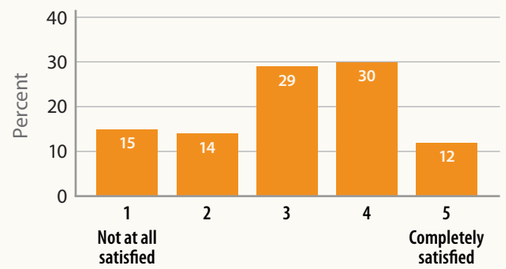
Obstructive Sleep Apnea and Treatment with Oral Appliance Therapy

Obstructive sleep apnea (OSA) is a highly prevalent and costly disorder among U.S. Army Soldiers (Moore et al. 2021, Rogers et al. 2016) and is associated with numerous chronic illnesses (Gharibeh and Mehra 2010, Rogers et al. 2016). Between 2014 and 2019, there were 87,404 incident diagnoses of OSA among AC Soldiers; yearly incidence rates ranged from 274 to 330 cases per 10,000 person-years (APHC 2022a). OSA can negatively impact sleep quality, potentially increasing the risk of fatigue and depression, impairing physical performance, diminishing alertness, and decreasing the ability to perform complicated cognitive tasks (AASM 2020, Gharibeh and Mehra 2010, Rogers et al. 2016). A major risk factor for OSA is elevated BMI (AASM 2020); in 2021, 20% of AC Soldiers were classified as obese (DCPH-A 2023).

The gold standard treatment for OSA is positive airway pressure (PAP) therapy (Levine et al. 2018). However, it is expensive, requires a power source and maintenance, and is associated with poor compliance (Lettieri et al. 2011, Mysliwiec et al. 2015). Oral appliance therapy (OAT) is the leading alternative to PAP therapy for those with mild to moderate OSA (Lim et al. 2006, Sutherland et al. 2015). OAT appliances are similar to a mouth guard, help keep the airway open by repositioning and/or stabilizing the lower jaw, and are delivered by qualified Dental Sleep Medicine providers.

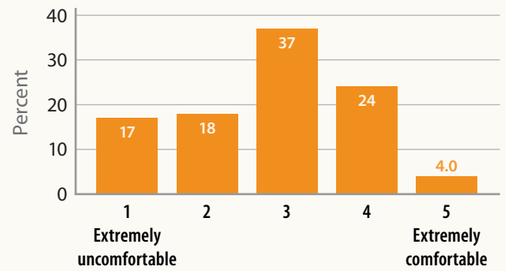
In a recent survey of AC Soldiers with an OSA diagnosis from 2014 to 2019, 9% (n=795) of respondents reported treatment with OAT (APHC 2022a). On a scale of 1 to 5, the majority of Soldiers treated with OAT (59%, n=439) reported being satisfied or very satisfied (score of 3 or 4; see figure). A similar majority (61%, n=457) reported their treatment with OAT was comfortable or very comfortable (score of 3 or 4; see figure). The most common reported OAT side effect was jaw soreness. Of the 296 Soldiers who reported seeking help from a dentist for a problem with OAT, 62% (n=185) reported their problem was successfully addressed. The oral appliance is small, lightweight, less expensive than PAP therapy (Knowles et al. 2021), and requires no electricity. Ease of use and lower cost, coupled with Soldier reports of satisfaction and comfort, make OAT well-suited to improve medical readiness of Soldiers with OSA.

Satisfaction Levels among AC Soldiers Treated with OAT following OSA Diagnosis (n = 751)*



*Missing or invalid responses: n = 44
Source: APHC 2022a

Comfort Levels among AC Soldiers Treated with OAT following OSA Diagnosis (n = 753)*



*Missing or invalid responses: n = 42
Source: APHC 2022a

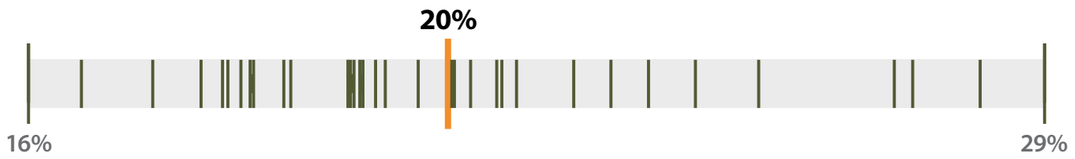
DCPH-A photo by Graham Snodgrass

Obesity

Obesity is a risk factor for metabolic syndrome, hypertension, type II diabetes, and cardiovascular disease, among other diseases. Early studies of non-military SARS-CoV-2 patients indicate that being overweight or obese increases risks of hospitalization, poor disease outcomes, and mortality. Obesity increases the risk of being admitted to the hospital due to COVID-19 by 113% and increases the risk of death by 90% (Senthilingam 2021). Over the past 5 years, the overall obesity prevalence of AC Soldiers has steadily increased from 17% to 20%.

BMI provides an estimate of body fat in adults and is calculated by dividing weight in kilograms by the square of height in meters. The measurements used to calculate BMI are non-invasive and inexpensive to obtain. For the *Health of the Force*, BMI was calculated using Soldiers' height and weight measurements obtained during outpatient medical encounters and stored in the Military Health System Clinical Data Repository Vitals (CDR Vitals). The CDC defines BMI greater than 18.5 but less than 25 as "normal weight," BMI greater than or equal to 25 but less than 30 as "overweight," and BMI greater than or equal to 30 as "obese" (CDC 2022b).

BMI greater than or equal to 30 typically indicates excess body fat. However, BMI does not differentiate between lean and fat mass, and accurate assessment of body fat for individuals using BMI requires more information. The relationship between BMI and body fat is influenced by age and sex. Among males, especially younger males, BMI is more highly correlated with lean muscle mass than percent body fat. Males and females of a given height and weight will have the same calculated BMI; however, females will have, on average, a higher percent body fat compared to their male counterparts. As people age, they tend to lose muscle mass, and percent body fat tends to increase.



Overall, 20% of Soldiers were classified as obese.

Prevalence ranged from 16% to 29% across Army installations.

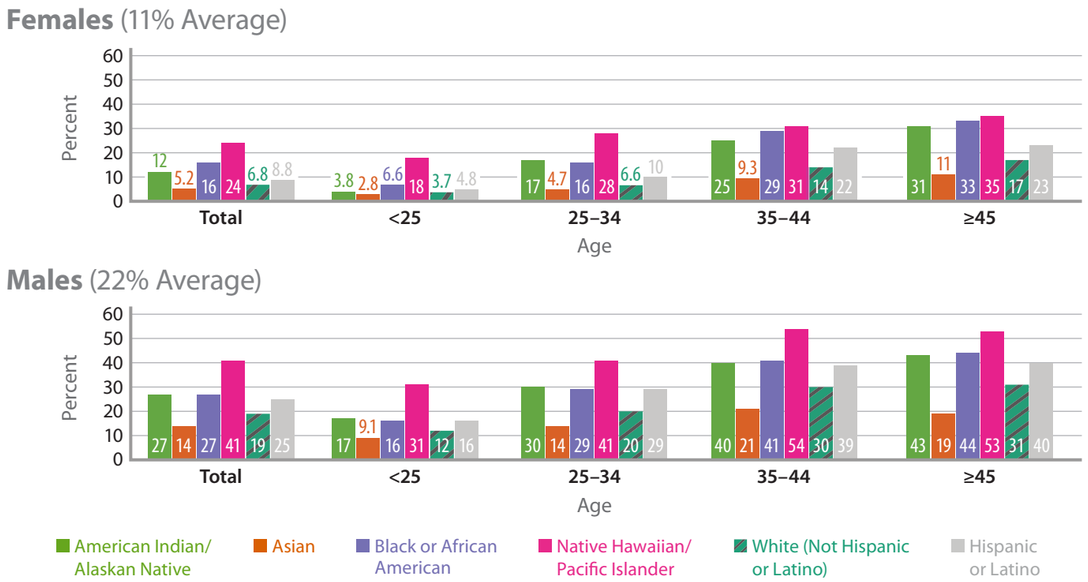
The age- and sex-adjusted prevalence of obesity among employed U.S. adults was 29%.

In comparison, similarly adjusted prevalence of obesity among AC Soldiers was lower (21%).

Source: Behavioral Risk Factor Surveillance System (BRFSS 2022)

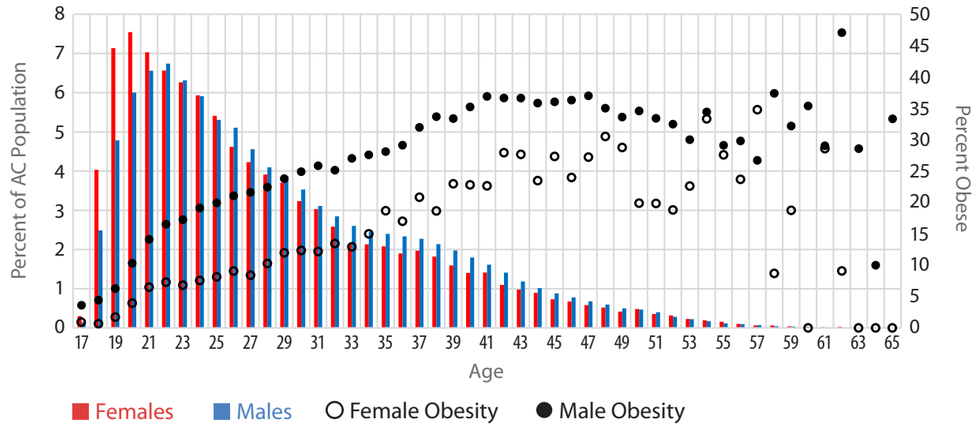
Prevalence of Obesity by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

Among AC Soldiers, the prevalence of obesity varied widely by race and ethnicity. The prevalence of obesity was lower for female Soldiers than males. **Obesity prevalence was lowest for Asian Soldiers and highest for Native Hawaiian/ Pacific Islander Soldiers.**



Age Distribution and Prevalence of Obesity, AC Soldiers, 2021

The overall prevalence of obesity among AC Soldiers was 20%. Among Soldiers of both sexes, the prevalence of obesity increased with age until the mid-40s.



Source: CDR Vitals, from the outpatient encounter record

Tobacco Product Use

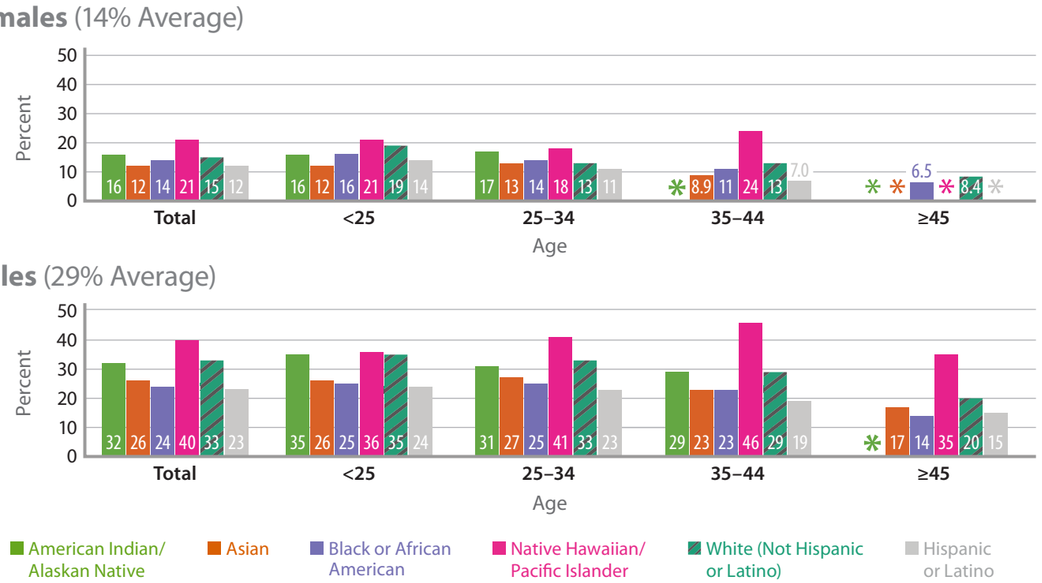
Using tobacco products negatively impacts Soldier readiness by impairing physical fitness and increasing illness and absenteeism (DA 2015). In *Health of the Force*, the prevalence of tobacco product use is estimated using data from the Periodic Health Assessment (PHA; DoD 2016a), a survey that includes a question about which tobacco products Soldiers have used on at least one day in the last 30 days. Due to changes in the question across recent years of the PHA, a multi-year trend analysis of tobacco product use is not provided. For this report, smoking products are defined as cigarettes, cigars, cigarillos, bidis, pipes, and hookah/waterpipes; smokeless products are defined as chewing tobacco, snuff, dip, snus, and dissolvable tobacco products; and e-cigarettes are defined as electronic cigarettes or vape pens. Soldiers complete the PHA as part of a regular physical exam used to determine whether they qualify for deployment. Because Soldiers self-report these data, they may underreport their tobacco usage, or not report it at all.

Including e-cigarette use, 27% of Soldiers reported using tobacco products.

Prevalence ranged from 12% to 32% across Army installations.

Prevalence of Tobacco Product Use by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

The majority of tobacco product users were <35 years old. **Across age groups, the prevalence of tobacco use among male Soldiers was more than double that among female Soldiers.** Tobacco use was lowest among Black or African American Soldiers and Hispanic Soldiers. Tobacco use was most common among Native Hawaiian or Pacific Islander Soldiers, followed by White Soldiers and American Indian or Alaskan Native Soldiers.

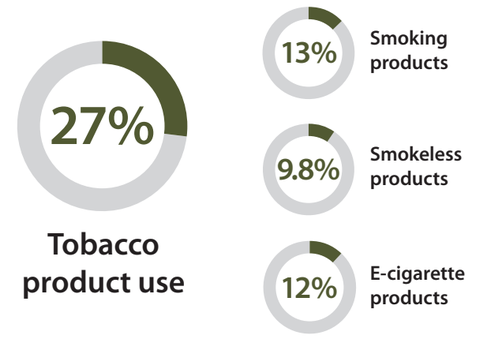


**Data suppressed due to small case numbers (<20 cases).*

Prevalence of Tobacco Product Use, AC Soldiers, 2021

Of the Soldiers who reported tobacco use, most reported smoking (n= 45,588; 13%), followed by those who reported smokeless tobacco use (chewing or dipping) (n=35,237; 9.8%). In 2021, 12% (n= 43,881) of Soldiers who completed the PHA reported the use of e-cigarette products.

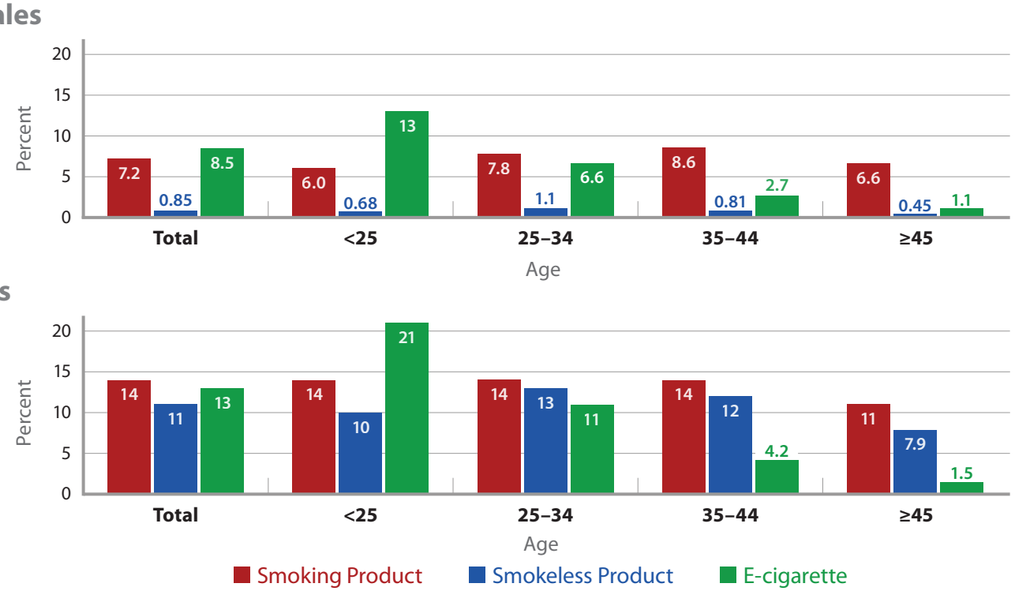
The age- and sex-adjusted prevalence of tobacco product use among AC Soldiers (27%) is higher than in the U.S. population (20%) (BRFSS 2022). Smoking product use among Soldiers (13%) is approximately equivalent to that in the U.S. population (13%). Reported e-cigarette use in the Army (12%) is higher than in the U.S. population (7.4%). The Army prevalence of smokeless tobacco product use (9.8%) is about two and a half times greater than the national estimate (3.8%).



U.S. population tobacco product use is estimated using BRFSS data, which were adjusted to the AC Soldier age and sex distribution for employed individuals. Tobacco use is defined differently in the BRFSS than in the PHA. While the PHA considers any use for at least one day in the past 30 days, BRFSS has a more stringent requirement (at least 100 cigarettes in their lifetime (5 packs) and currently smokes every or some days). Additionally, self-reported e-cigarette use data in the BRFSS was inconsistent with and less complete compared to the PHA.

Prevalence of Tobacco Product Use by Type, Sex, and Age, AC Soldiers, 2021

For both sexes, smoking products were the primary type of tobacco used for most age groups. However, e-cigarette use among both male and female Soldiers younger than 25 years old surpassed the prevalence of smoking product use in 2021. Male Soldiers ≥25 years old most frequently reported using smoking products, followed by smokeless and then e-cigarette products. Female Soldiers ≥25 years old most frequently reported using smoking products followed by e-cigarette products. Less than 1% of female Soldiers reported using smokeless products.



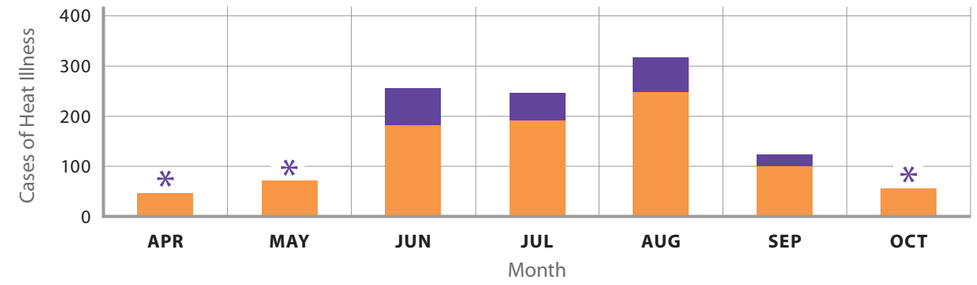
Heat Illness

Heat illness refers to a group of conditions that occur when the body is unable to compensate for increased body temperatures due to hot and humid environmental conditions and/or exertion during exercise or training. These illnesses exist along a continuum of symptoms and, in the most severe cases, can be life threatening. The heat illnesses assessed in *Health of the Force* are heat exhaustion and heat stroke.

Both heat exhaustion and heat stroke are reportable medical events that should be documented in the DRSi. Additional heat illness cases not documented in DRSi were identified using specific diagnostic codes from inpatient and outpatient medical encounter records in the MDR. Soldiers may experience more than one heat illness event in the calendar year; however, only their first or incident case was counted.

Incident Cases of Heat Illness by Month*, AC Soldiers, 2021

In 2021, 1,231 incident cases of heat illness occurred. There was a higher number of heat exhaustion (952) cases than heat stroke (279) cases. The number of incident cases of heat illness was highest during the warmer months (April through October), though heat exhaustion and heat stroke were diagnosed and reported year-round.

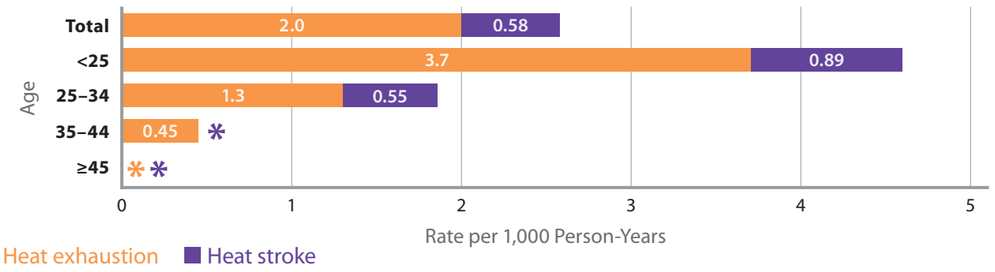


	APR	MAY	JUN	JUL	AUG	SEP	OCT
Heat stroke	*	*	73	56	68	24	*
Heat exhaustion	47	71	182	190	249	100	56

**Months not shown had <20 cases for heat exhaustion and/or heat stroke.*

Incidence of Heat Illness by Age, AC Soldiers, 2021

The overall incidence of heat illness in 2021 was 2.6 cases per 1,000 person-years. **When stratified by age group, the incidence of heat exhaustion and heat stroke, per 1,000 person-years, was highest in AC Soldiers <25 years old.**



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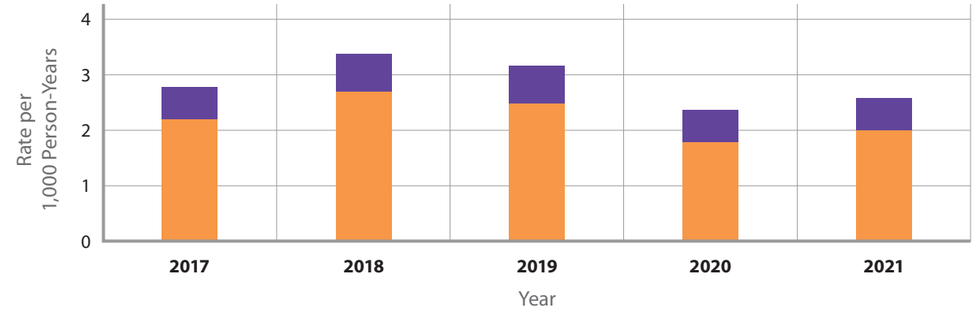
Incidence of Heat Illness, AC Soldiers, 2017–2021

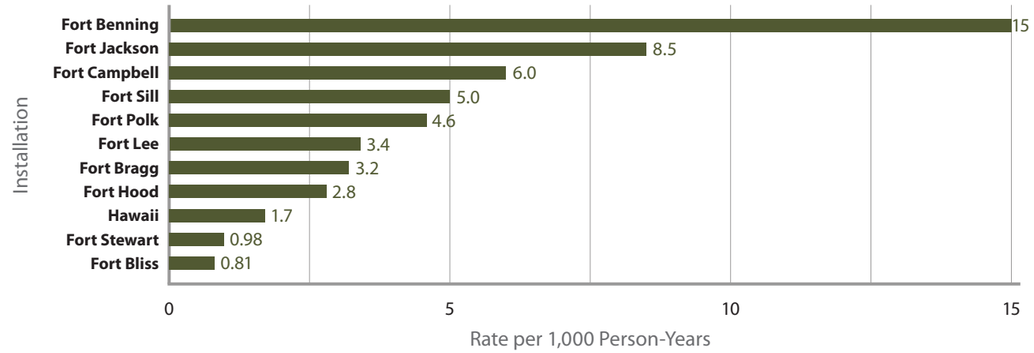
The Army continues to emphasize prevention, recognition, and reporting of heat illnesses. The incidence of heat illness cases decreased from 2018 to 2020 and then increased slightly in 2021. However, the incidence of heat illness in 2021 remained lower than the years prior to the COVID-19 pandemic.



	2017	2018	2019	2020	2021
Heat stroke	0.58	0.68	0.67	0.57	0.58
Heat exhaustion	2.2	2.7	2.5	1.8	2.0

Incidence of Heat Illness by Installation*, AC Soldiers, 2021

Geographic location, climate, and Soldier population (e.g., trainee populations) are factors that can affect heat illness incidence. Several of the installations with relatively higher heat illness incidence rates are in the Southeastern U.S.



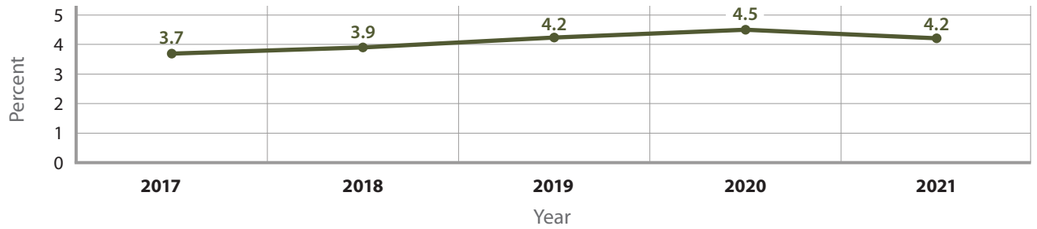
** Installations not shown in the graph had fewer than 20 heat illness cases (heat exhaustion and heat stroke combined).*

Hearing

Good hearing preserves situational awareness during critical communication and auditory tasks (e.g., verbal conversation, acoustic stealth, sound detection, sound identification, and sound localization) and is crucial to the success of training and mission execution in both conventional and unconventional operations. The Army Hearing Program (AHP) uses metrics to monitor hearing injuries and hearing readiness among AC Soldiers. Hearing readiness is an essential component of medical readiness and is monitored via the Medical Protection System (MEDPROS) using Defense Occupational and Environmental Health Readiness System – Hearing Conservation (DOEHRS-HC) hearing test data. DOEHRS-HC is the DoD system of record for audiometric surveillance.

Percent New Significant Threshold Shifts (STSs), AC Soldiers, 2017–2021

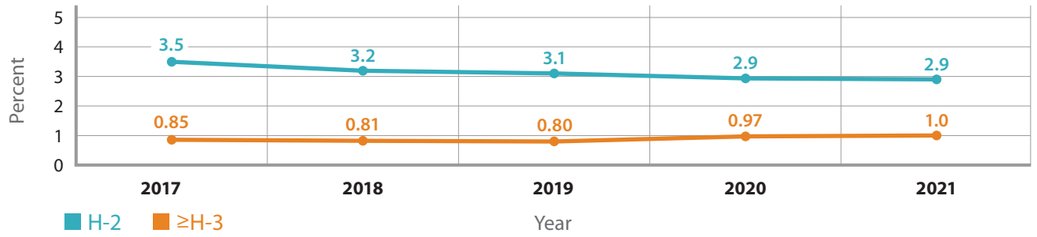
STS is an average hearing decrease, in one or both ears, across three critical speech frequencies, and represents a potential hearing injury. A Soldier's annual hearing test is evaluated against their baseline hearing test for the presence of an STS. In 2021, the incidence of STSs was 4.2%, which exceeded the AHP goal of ≤3%.



Source: DOEHRS-HC Data Repository

Prevalence of Projected Hearing Profiles, AC Soldiers, 2017–2021

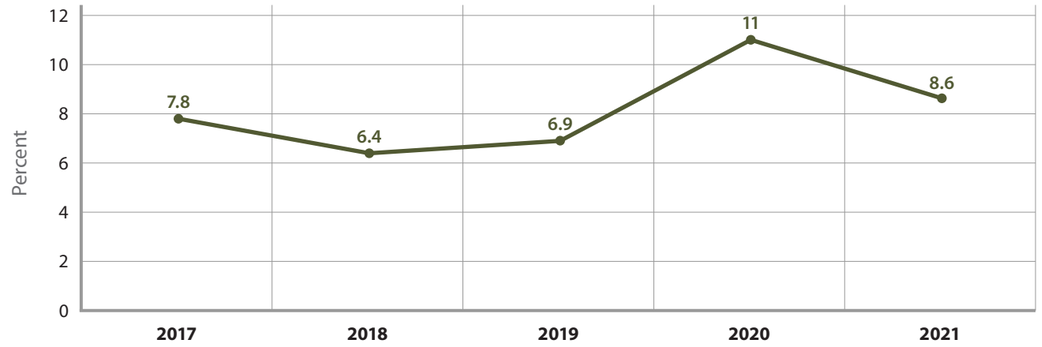
AC Soldiers assigned a projected H-2 hearing profile may have a clinically significant hearing loss. AC Soldiers assigned a projected ≥H-3 profile may have a moderate or greater degree of hearing loss and may require a fitness-for-duty hearing evaluation. Soldiers with newly identified projected H-2 or ≥H-3 profiles are referred for diagnostic hearing evaluations. **The AHP prevalence goal of ≤3% projected H-2 profiles was achieved in 2021. The percentage of Soldiers with a projected ≥H-3 profile also met the AHP goal of ≤2%.**



Source: DOEHRS-HC Data Repository

Percent Not Hearing Ready – Hearing Readiness Classification (HRC) 4, AC Soldiers, 2017–2021

All AC Soldiers are required to receive an annual hearing test. In 2021, 8.6% of AC Soldiers were classified as not hearing ready (HRC 4), which exceeded the AHP goal of ≤6%. The percentage of not hearing ready Soldiers began to recover in 2021 due to improvements in Health Protection Conditions, increased access to care, and use of emergent boothless audiometry technology. AC Soldiers who are HRC 4 are: overdue for their annual hearing test (HRC 4A); require follow-up hearing testing to identify their true hearing ability (HRC 4B); or missed the 90-day follow-up hearing test window (HRC 4C).



Source: MEDPROS

What's New in the AHP?

In 2021, the AHP conducted a proof-of-concept study at select Army installations to determine if the AHP could augment traditional fixed facility hearing test capabilities with boothless audiometric systems. These systems allow for physical distancing during hearing tests because tests are not conducted in a conventional hearing test booth. The study supports the continued use of the boothless audiometric systems, as the test results were similar to those obtained in the traditional test environment. This technology has the potential to expand hearing test capabilities in both traditional and operational environments and improve hearing readiness rates across the enterprise.

The sense of hearing is crucial for Soldier performance, affecting both survivability and lethality. Hearing injuries impact mission performance during garrison activities, training, deployments, and combat. Soldiers are susceptible to noise-induced hearing loss (NIHL), in part, because such injuries are often painless, progressive, and lack the immediacy for medical care associated with an open wound or broken bone. **NIHL is preventable with the use of noise control engineering, monitoring audiometry, appropriate hearing protection, hearing health education, and AHP command enforcement!**

Contact your installation AHP Manager, Regional Audiology Consultant, or the DCPH-A Hearing Conservation and Readiness Branch for assistance. **What you hear—or don't hear—matters!**

Sexually Transmitted Infections

Chlamydia is a common STI in both the civilian and military populations. The CDC estimates that approximately 4 million new infections occur in the U.S. each year (CDC 2021b). Most chlamydia infections do not cause symptoms which might prompt one to seek treatment. Without treatment, adverse reproductive health complications such as pelvic inflammatory disease, ectopic pregnancy (i.e., pregnancy outside the uterus), chronic pelvic pain, and infertility can occur. Symptomatic infections and long-term complications can compromise Soldier readiness and well-being.

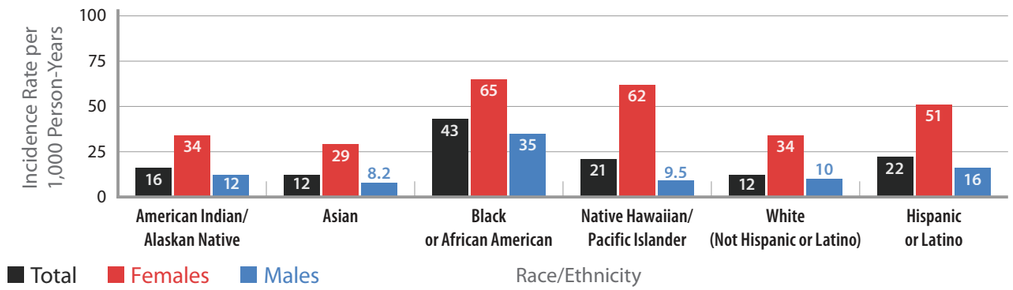
Because many who are infected are unaware, chlamydia screening is essential to prevent further transmission and progression to severe disease outcomes. Because complications disproportionately affect women, the U.S. Preventive Services Task Force recommends that sexually active females <25 years old, and those at increased risk (e.g., individuals with multiple sexual partners), be screened annually.

The DoD and CDC mandate reporting of chlamydia infections to support surveillance and prevention efforts. Cases of chlamydia reported through the DRSi are used to estimate rates for the *Health of the Force* and reflect newly reported infections. Soldiers may have more than one chlamydia infection reported per calendar year. These rates likely underestimate the true incidence due to under-reporting and the high proportion of asymptomatic infections.

Overall, 20 new chlamydia infections were reported per 1,000 person-years.
Incidence ranged from 5.1 to 40 per 1,000 person-years across Army installations.

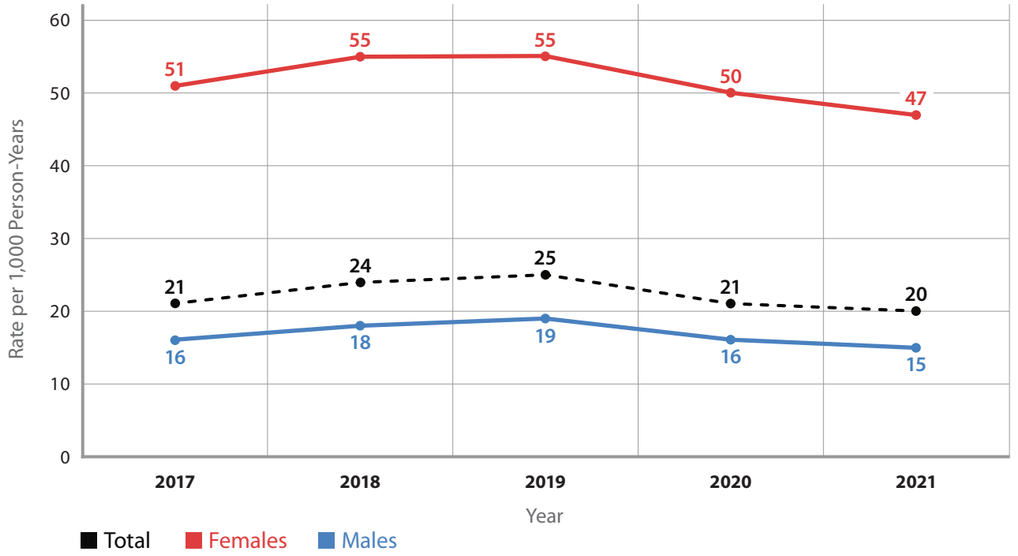
Incidence of Reported Chlamydia Infection by Sex, Race, and Ethnicity, AC Soldiers, 2021

Differences in incidence of reported chlamydia infections were observed by race and ethnicity, with higher rates observed among Black or African American Soldiers (rates were more than 3 times those reported among Asian and White (Not Hispanic or Latino) Soldiers). Native Hawaiian/Pacific Islander Soldiers and Hispanic or Latino Soldiers had rates that were roughly twice the rate observed among Asian and White (Not Hispanic or Latino) Soldiers. These disparities by race and ethnicity were observed among both male and female Soldiers. **Disparities by race and ethnicity were more pronounced among male Soldiers than in female Soldiers. Among male Black or African American Soldiers, rates were 2–4 times higher than rates among male Soldiers identifying as another race or ethnicity, whereas rates among female Black or African American Soldiers relative to other racial and ethnic groups did not exceed a two-fold elevation.** Similar differences in chlamydia incidence by race and ethnicity have been observed nationally (CDC 2021b).



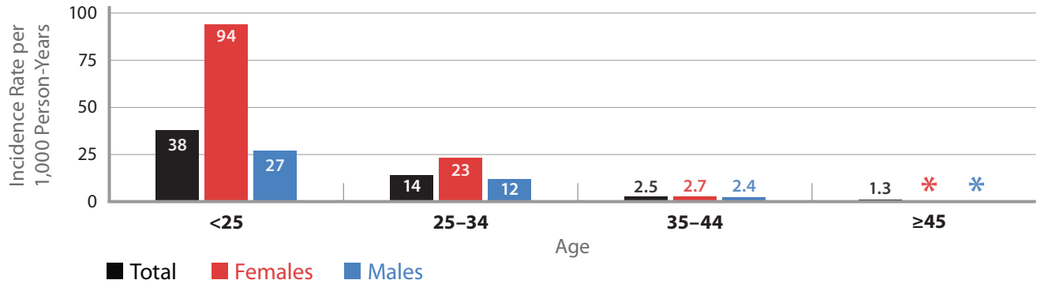
Incidence of Reported Chlamydia Infections by Sex, AC Soldiers, 2017–2021

The increase in reported chlamydia infections observed from 2017 to 2019 declined in 2020 and continued to decrease in 2021. This trend in rate of reported chlamydia incidence mirrors that reported through DoD surveillance (AFHSD 2022). Similar decreases in reported STIs were also observed nationally in 2020 when the COVID-19 pandemic began; however, national rates began increasing in 2021 while Army rates continued to decline (CDC 2022c). **Rates declined equally for AC men and women with a 6% decline in 2021 relative to 2020.**



Incidence of Reported Chlamydia Infection by Sex and Age, AC Soldiers, 2021

The rate of reported chlamydia infections among female Soldiers was 3 times the rate among male Soldiers. Rates were highest among female Soldiers <25 years old, with 94 reported infections per 1,000 person-years. The sex-specific differences in reported rates are likely due to increased screening among pregnant females and female Soldiers <25 years old.



**Data suppressed due to small case numbers (<20 cases).*

Chronic Disease

Many chronic diseases can limit Soldiers' medical readiness. The chronic diseases assessed in *Health of the Force* include cardiovascular disease, hypertension, cancer, asthma, arthritis, chronic obstructive pulmonary disease (COPD), and diabetes. Each of these chronic diseases can be prevented and/or managed in part by adopting healthy lifestyle choices such as maintaining a healthy diet, exercising regularly, and avoiding tobacco use.

The prevalence of chronic diseases was determined using specific diagnostic codes from inpatient and outpatient medical encounter records in the MDR. Soldiers may have more than one chronic disease. The overall prevalence of chronic disease represents the proportion of AC Soldiers who have at least one of the chronic diseases assessed.

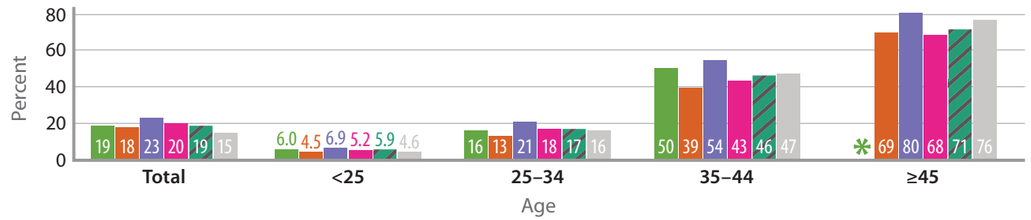
Overall, 17% of Soldiers had a diagnosed chronic disease.

Prevalence ranged from 10% to 34% across Army installations.

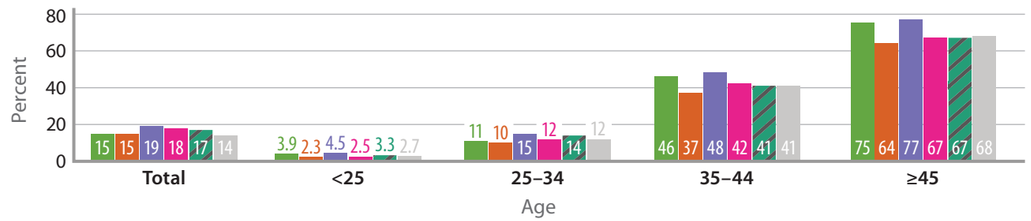
Prevalence of Chronic Disease by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

Among AC Soldiers in 2021, 20% of female Soldiers and 17% of male Soldiers had at least one chronic disease. The prevalence of chronic disease increased with age. **Black or African American Soldiers had the highest prevalence of chronic disease compared to Soldiers identifying as any other race in every age group.** Hispanic or Latino Soldiers had the lowest overall prevalence of chronic disease.

Females (20% Average)



Males (17% Average)

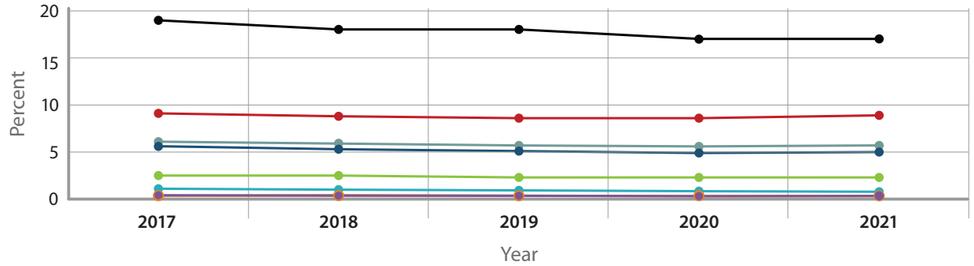


American Indian/Alaskan Native · Asian · Black or African American · Native Hawaiian/Pacific Islander · White (Not Hispanic or Latino) · Hispanic or Latino

**Data suppressed due to small case numbers (<20 cases).*

Prevalence of Chronic Disease by Disease Category, AC Soldiers, 2017–2021

In 2021, 17% of AC Soldiers had at least one chronic disease. Among AC Soldiers, the prevalence of any chronic disease had been decreasing since 2017 before stabilizing in 2021. However, the apparent decrease from 2019 to 2021 may have been due, at least in part, to changes in health care utilization associated with the COVID-19 pandemic and response. **The most prevalent chronic disease in 2021 was arthritis (8.9%), followed by cardiovascular disease (5.7%).** Hypertension (high blood pressure), although a contributor to cardiovascular disease, was analyzed separately to characterize its distinct burden.



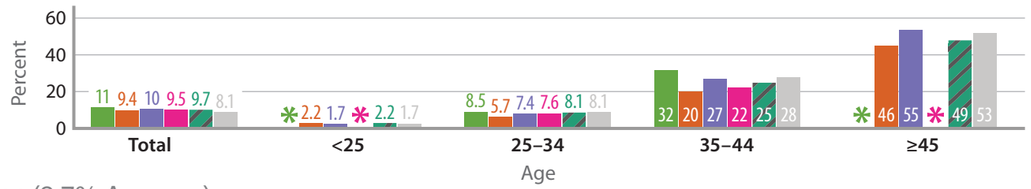
	2017	2018	2019	2020	2021
Any (%)	19	18	18	17	17
Arthritis (%)	9.1	8.8	8.6	8.6	8.9
Cardiovascular (%)	6.1	5.9	5.7	5.6	5.7
Hypertension (%)	5.6	5.3	5.1	4.9	5.0
Asthma (%)	2.5	2.5	2.3	2.3	2.3
COPD (%)	1.1	1.0	0.92	0.84	0.78
Cancer (%)	0.36	0.37	0.35	0.35	0.36
Diabetes (%)	0.41	0.37	0.32	0.32	0.35

Note: The sum of disease categories is greater than the "Any" chronic disease prevalence, as Soldiers may have more than one condition.

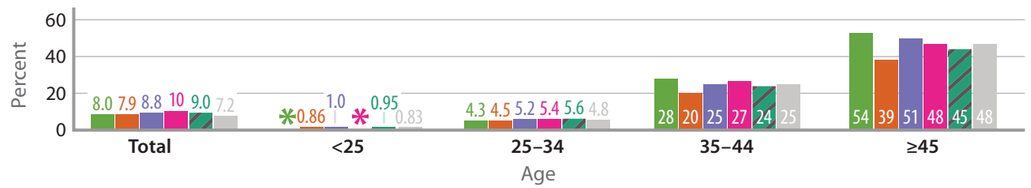
Prevalence of Arthritis by Sex, Age, Race, and Ethnicity, AC Soldiers, 2021

Arthritis is the common name for a group of inflammatory conditions that affect joints, the tissue around the joints, and other connective tissue. Arthritis is consistently the most prevalent chronic disease among AC Soldiers. Arthritis can be related to overuse injuries and severe injuries to the joints, and is most common among Soldiers ≥45 years old. Black or African American Soldiers had the highest prevalence of arthritis among female Soldiers ≥45 years old, and American Indian/Alaskan Native Soldiers had the highest prevalence of arthritis among female Soldiers for all age categories combined. American Indian/Alaskan Native Soldiers had the highest prevalence of arthritis among male Soldiers ≥45 years old, and Native Hawaiian/Pacific Islander Soldiers had the highest prevalence of arthritis among male Soldiers for all age categories combined.

Females (9.8% Average)



Males (8.7% Average)



American Indian/Alaskan Native · Asian · Black or African American · Native Hawaiian/Pacific Islander · White (Not Hispanic or Latino) · Hispanic or Latino

**Data suppressed due to small case numbers (<20 cases).*

DCPH-A photo by Graham Snodgrass

Environmental Health Indicators

- Air Quality
- Drinking Water Quality
- Water Fluoridation
- Solid Waste Diversion
- Tick-borne Disease Risk
- Mosquito-borne Disease Risk
- Heat Risk

SPOTLIGHT

Managing Occupational Exposure to PFAS

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) refers to a large class of man-made chemicals that can accumulate and persist in the human body and the environment following exposure. PFAS are found in many industrial and consumer products because of their properties of resistance to heat, stains, water, and grease. Although PFAS are not uniquely attributable to DoD activities, the DoD began using aqueous film-forming foam (AFFF) that contained PFAS in the 1970s. Although PFAS is being discontinued in AFFF, some remaining AFFF stockpiles contain PFAS. Because it quickly extinguishes petroleum-based and liquid fuel fires, AFFF is mission-critical for the DoD (ASDR 2021).

The National Academies of Sciences, Engineering, and Medicine (NASEM) found sufficient evidence of an association of PFAS with four diseases and health outcomes, and limited or suggestive evidence of an association with six others (NASEM 2022).

Health Effects of PFAS

Sufficient evidence of an association:

- **Decreased antibody response (in adults and children)**
- **Dyslipidemia* (in adults and children)**
- **Decreased infant and fetal growth**
- **Increased risk of kidney cancer (in adults)**

Limited or suggestive evidence of an association

- **Increased risk of breast cancer (in adults)**
- **Increased risk of testicular cancer (in adults)**
- **Liver enzyme alterations (in adults and children)**
- **Increased risk of pregnancy-induced hypertension (gestational hypertension and preeclampsia)**
- **Thyroid disease and dysfunction (in adults)**
- **Increased risk of ulcerative colitis (in adults)**

Source: NASEM 2022
**Unhealthy levels of lipids (fats) in the blood.*

Congress requires the DoD to offer and provide blood testing for PFAS to all DoD firefighters at the time of their annual occupational health exams (GPO 2019). The voluntary blood test which currently detects six PFAS compounds found in AFFF formulations (DoD 2022c) may be expanded to detect additional PFAS compounds in the future.

Concentrations of PFAS in the blood (serum or plasma) are measures of exposure and not harm. There is currently no known correlation between blood levels and risk of developing any specific disease, so these tests have little or no clinical value at present. Research is ongoing to better characterize the risk of exposure to PFAS and development of adverse health effects, as well as to determine appropriate testing protocols to inform clinical management.

For firefighters specifically, their proper use of respirators and turnout gear while fighting fuel fires reduces or prevents PFAS exposure from AFFF use. The DoD goal for its federal firefighters is to minimize their potential exposure to PFAS in AFFF by limiting AFFF use to actual fires and eliminating its use in training exercises. Additionally, the DoD is actively engaged in research to find suitable PFAS-free AFFF firefighting alternatives (ASDR 2021).

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Air Quality

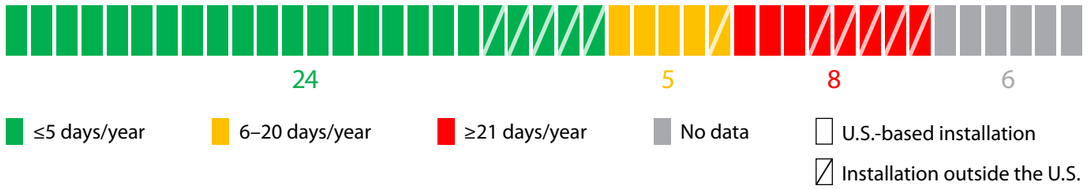
The air quality environmental health indicator (EHI) shows how frequently the outdoor air near an Army installation is in violation of health-based standards. It reports the number of days in a calendar year when air pollution levels near the installation were deemed unhealthy for some or all of the general public (i.e., days when the U.S. Environmental Protection Agency (EPA) Air Quality Index (AQI) was greater than 100).

Poor air quality can contribute to both acute and chronic health problems for personnel who train, work, exercise, or reside in an affected area. A growing body of evidence implicates air pollution in a range of conditions including cardiovascular and respiratory disease, cancer, type 2 diabetes, adult cognitive decline, childhood obesity, and adverse birth outcomes (Bowe et al. 2018, Chen et al. 2017, Alderete et al. 2017, Sapkota et al. 2010). Worldwide, the air pollutants responsible for most poor air quality days are ground-level ozone and fine particulate matter known as $PM_{2.5}$.

Outdoor air pollution levels are measured at monitoring stations operated by State and Federal environmental authorities. Using these data, the EPA tracks and archives a daily AQI for over 1,000 counties in the U.S. The EPA AQI is used to determine the number of poor air quality days at locations where Army installations are situated within the U.S. Outside the U.S., air quality data are obtained from host nation environmental authorities and converted to the EPA AQI to determine the number of poor air quality days in the year of interest.

Distribution of Army Installations by Air Quality Status, 2021

The chart shows the number of poor air quality days at selected Army installations in 2021. Annual poor air quality days ranged from 0 to 113, with the greatest number of poor air quality days occurring at garrisons in South Korea and Italy.

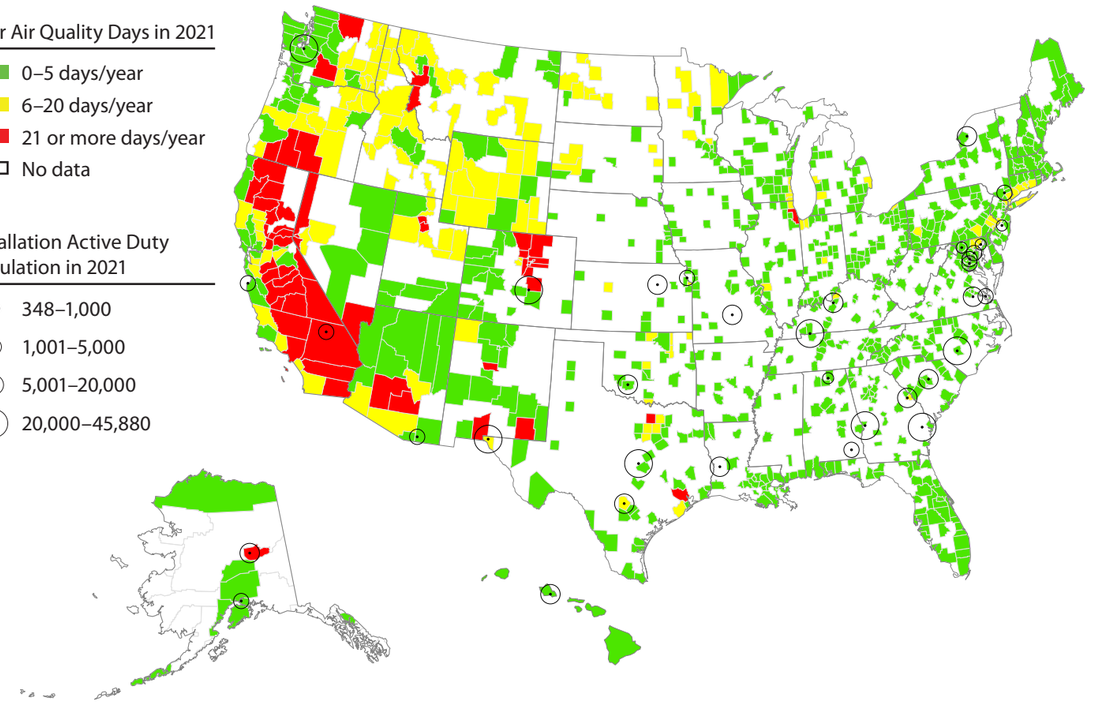


Distribution of Army Population by Air Quality Status, 2021

The chart shows the distribution of the AC Soldier population based on the number of poor air quality days at their installation. **Nearly two-thirds of the AC population was stationed at an installation that experienced good air quality.** The majority of Soldiers in high risk (red) air quality regions (67%) were stationed in the U.S.

Poor Air Quality Days in the U.S. by County, 2021

Annual days when the EPA AQI is greater than 100 (EPA 2022a)

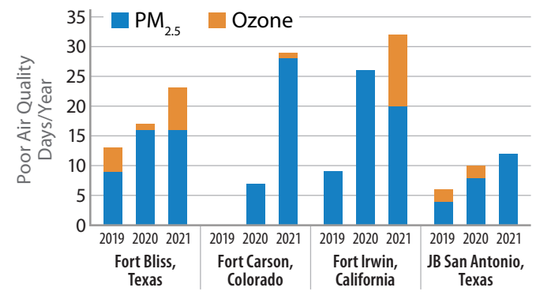


What's Happening at Army Installations?

In 2021, poor air quality days at several Army installations in the U.S. were driven by higher than normal temperatures across the west and southwest. This led to spikes in ground level ozone at Forts Bliss, Carson, Irwin, and Joint Base (JB) San Antonio. Fort Wainwright experienced high levels of $PM_{2.5}$ in winter months due to the seasonal use of fireplaces and wood-burning stoves, which is a chronic condition in Fairbanks, Alaska.

All installations in Germany experienced good air quality in 2021, with few poor air days. However, installations in Italy, Japan, and South Korea were in the moderate and high risk air quality categories. Poor air days in Japan (14) were due exclusively to summer ozone levels, while both ozone and $PM_{2.5}$ contributed to poor air quality in Italy and South Korea. In 2021, U.S. Army Garrison (USAG) Vicenza (97) and USAG Humphreys (113) experienced the greatest number of poor air quality days relative to other installations tracked in *Health of the Force*.

Air Pollutants Contributing to Poor Air Quality Days at Selected Army Installations, 2019–2021



Drinking Water Quality

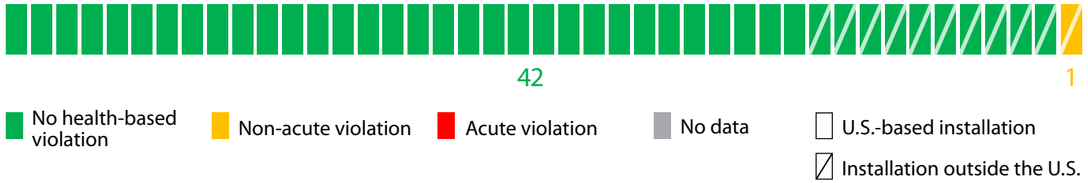
The drinking water quality EHI reflects whether community water systems (CWS) serving Army garrisons comply with health-based standards promulgated in the National Primary Drinking Water Regulations (NPDWR). The NPDWR defines maximum contaminant levels (MCLs) – the maximum level of a contaminant allowed in water delivered to consumers. These standards protect the public from consuming water that presents a risk to human health. The MCLs are legally enforceable and water utilities are required to meet them.

EPA has issued heath-based standards for more than 90 contaminants. These standards are designed to protect consumers from acute and non-acute health effects resulting from exposure to the contaminant. Health-based violations fall into three categories: 1) exceedances of MCLs, 2) exceedances of maximum residual disinfectant levels, which specify the highest concentrations of disinfectants allowed in drinking water, and 3) treatment technique requirements, which specify certain processes intended to reduce the level of a contaminant. Drinking water can be considered "safe" when it does not present any significant risk to health, even over a lifetime of consumption.

To ensure CWS are meeting health-based standards, they perform regular monitoring and reporting. Monitoring results are reported to the local environmental authority in order to demonstrate compliance with standards. The *Health of the Force* NPDWR compliance data for CWS serving Army garrisons come from an annual environmental data survey conducted by the Deputy Chief of Staff, G-9 (Installations), from the EPA Safe Drinking Water Information System (SDWIS), and from annual Consumer Confidence Reports (CCRs) prepared by local water purveyors.

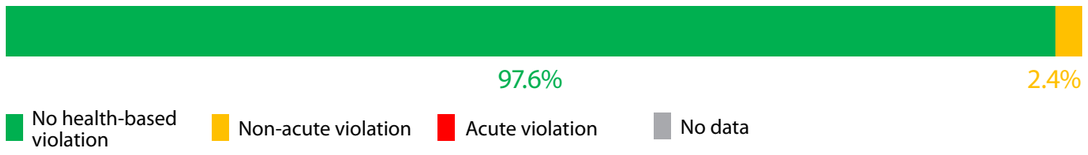
Distribution of Army Installations by Drinking Water Quality Status, FY21

The chart shows the number of installations experiencing a health-based drinking water violation during FY21. The majority of installations tracked in this report had no health-based violations. The one drinking water standard violated in FY21 was attributed to the Surface Water Treatment Rule (SWTR). SWTR violations have occurred in each of last 4 years, all within Germany.



Distribution of Army Population by Drinking Water Quality Status, FY21

The chart shows the distribution of AC Soldiers based on drinking water violation status at their installation in FY21. Nearly 98% of AC Soldiers were stationed at installations where drinking water met all health-based drinking water standards.



What's Happening at Army Installations?

When comparing Army CWS to those across the U.S., the Army has performed favorably since FY16. In FY21, 97.6% of the AC population at Army installations tracked in *Health of the Force* were served by CWS with no health-based violations, compared to the national value of 92.6% (EPA 2022b). The Army continues to exceed the 92.1% goal for population healthy water access established in Healthy People 2030 (HP2030) (HHS 2022b). A health-based drinking water violation was documented at one Army CWS in FY21 and was a violation of non-acute health effect standard. The water at USAG Bavaria – Garmisch (Artillery Kaserne and Breitenau Family Housing Area) was not properly chlorinated, a violation of the SWTR.

The EPA tracks health-based violations at U.S. CWS and found that violations of the SWTR were the most common violations nationally (EPA 2022c). Army CWS experienced the same trend during FY18–FY21. Improved treatment or operational practices may be necessary to rectify these conditions. However, these changes can be time and/or resource intensive.

Population Served by CWS with No Reported Health-Based Violations

Consumers can learn more about their water quality in the annual CCR for their CWS, or at the EPA SDWIS (https://www.epa.gov/enviro/sdwis-search).

Climate Impacts on Water Quality: Wildfire

In the western U.S., more than half of the freshwater resources originate on forested land. Within these watersheds, wildfires have increased in frequency and severity in recent decades. Persistent wildfire events can have a devastating impact on water quality and will likely continue to impact watersheds due to climate change.

Wildfires affect watersheds during active burning as well as long after the fire is contained, increasing the potential for flooding, debris flows, and landslides. These events release sediment, nutrients, and chemicals such as polycyclic aromatic hydrocarbons (Huan et al. 2018), and heavy metals (Kelly et al. 2006) into source waters. In addition to contaminants and runoff generated from burned vegetation, burned infrastructure, electronics, plastics, and cars may also contaminate water sources with toxic chemicals. Water treatment plants must then contend with increased sediment loading of water reservoirs, shortened reservoir lifetime, and changes in source water chemistry that require modifications to treatment processes.

Military installations will continue to be vulnerable to wildfires for the near future (OUSD 2019). Utilities can mitigate wildfire impacts with emergency response plans that address wildfires, diversification of water sources, expanding water storage, and planning for post-fire monitoring and treatment processes (EPA 2022d).

Water Fluoridation

The water fluoridation EHI reports the annual average fluoride concentration in the drinking water at Army installations. CWS practice fluoridation to maintain oral health in both children and adults by strengthening tooth enamel. The frequent and consistent contact with low levels of fluoride provided by water fluoridation is very effective in preventing tooth decay.

Water fluoridation is one of the most cost-effective methods of delivering fluoride to all community members regardless of age, education, or income level (CDC 1999). A 2016 study found that community water fluoridation in the U.S. provides approximately $6.5 billion dollars a year in net cost savings, primarily by avoiding direct dental treatment costs (tooth restorations and extractions) and indirect costs (losses of productivity and follow-up treatment) (O'Connell et al. 2016).

Fluoride is a naturally occurring chemical, released from rocks into soil, water, and air. Water systems adjust the amount of fluoride in water so it is distributed to consumers at the recommended optimal level. Army Regulation (AR) 40-35 requires drinking water supplies at Army installations to be "optimally fluoridated," referring to the CDC- and U.S. Public Health Service-recommended fluoride level of 0.7 mg/L (DA 2016). The Safe Drinking Water Act (SDWA) also regulates fluoride in CWS to an MCL of 4 mg/L to prevent bone damage, and to a secondary MCL of 2 mg/L to prevent dental fluorosis in young children.

To ensure optimally fluoridated water and compliance with the SDWA, water suppliers routinely monitor fluoride levels and report them to the local environmental authority. Data on fluoridation levels in Army CWS come from an annual survey conducted by the Deputy Chief of Staff, G-9 (Installations) and SDWA-mandated CCRs.

Distribution of Army Installations by Water Fluoridation Status, FY21

The chart shows the average fluoride concentration in drinking water at selected Army installations in FY21. Fluoride concentrations ranged from 0–1.35 mg/L. The number of installations providing optimally fluoridated water decreased for the second year in a row, from 21 in FY19 to 17 in FY21.

Distribution of Army Population by Water Fluoridation Status, FY21

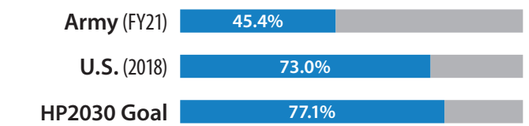
The chart shows the distribution of AC Soldiers based on the level of fluoride in drinking water at Army installations in FY21. More than half of the AC Soldier population was stationed at an installation where drinking water was not optimally fluoridated.

How Does the Army Compare?

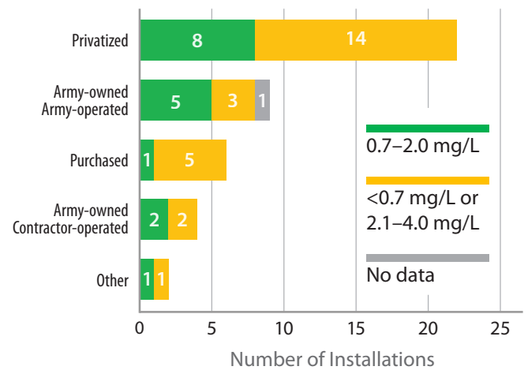
The CDC uses the Water Fluoridation Reporting System to track the status of water fluoridation in local communities. Fluoridation of CWS is also one of the oral health objectives established by the U.S. Department of Health and Human Services in HP2030 (HHS 2022c). The current objective is for 77.1% of the U.S. population served by CWS to receive optimally fluoridated water by 2030. In 2018, 73.0% of the U.S. population served by CWS received optimally fluoridated water.

Based on data available at the time of this report, 45.4% of the surveyed AC Army population was assigned to a garrison where drinking water was optimally fluoridated and 54.3% were at garrisons with suboptimal (<0.7 mg/L) fluoride levels. In FY21, the proportion of the AC Army population with access to optimally fluoridated water at their garrison was less than FY20 (48.5%), and it continues to lag the overall U.S. population.

Population Receiving Optimally Fluoridated Water



Installation Fluoridation Status by Water Supplier, FY21

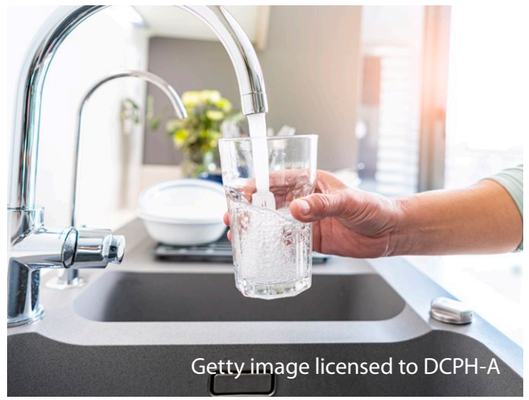


How is Water Fluoridated?

CWS add one of three chemicals to adjust the fluoride level in their water (CDC 2019). Fluorosilicic acid (FSA) is a liquid solution used by the majority of water systems in the U.S., primarily due to its lower cost, ease of feeding, and high purity. It is a byproduct of phosphate fertilizer manufacturing and recovered as a vapor.

Sodium fluorosilicate and sodium fluoride are derived from processing FSA. Partially neutralizing FSA with either sodium chloride or caustic soda yields sodium fluorosilicate, a dry powder. Completely neutralizing the fluorosilicate with caustic soda yields sodium fluoride, also a dry powder additive. Sodium fluoride was the first additive used for water fluoridation and is typically used in small water systems.

Solution feeders add the fluoride chemicals to drinking water. If dry fluoride chemicals are used, they are first dissolved using a saturator. Fluoride solutions are stored in a day tank, which stores enough solution to treat the water for at least a day.



Cost, handling requirements, space, and equipment are all factors that determine which chemical is used. All fluoride chemicals used in drinking water must meet National Sanitation Foundation and American Water Works Association standards.

Solid Waste Diversion

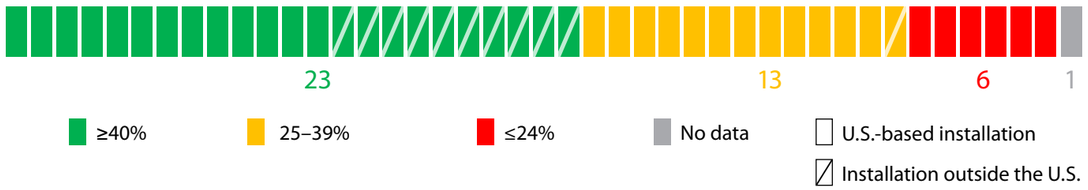
The Solid Waste Diversion EHI measures progress in diverting wastes from disposal, thereby reducing the release of waste-derived contaminants and health risks associated with landfilling and incineration. Diversion is calculated as the mass of diverted waste divided by the mass of the total waste stream, expressed as a percent. Although DoD policy allowed waste-to-energy (WTE) disposal to count as diversion in 2021 (OSD 2020), recent guidance excludes WTE from diversion goals (CEQ 2022). For this reason, and to preserve the metric's significance to environmental health and to permit prior year comparisons, WTE efforts are excluded in this report in favor of traditional diversion practices such as recycling and composting.

Waste constituents that may be released via air emissions, surface runoff, and landfill leachate include chlorinated organics, heavy metals, endocrine disruptors, and dioxins. Residential proximity to disposal sites has been associated with increases in tuberculosis, diabetes, and depression (Tomita et al. 2020). Further, antibiotic residues from the healthcare and pharmaceutical industries have been shown to proliferate generations of antibiotic-resistant bacteria and antibiotic resistance genes, able to pass from the environment back to humans. Food waste disposal can also pose health risks; decomposition creates organic leachate that can lead to the growth of pathogens such as *Salmonella* and *Clostridium perfringens* (Anand et al. 2021). DHA, DoD's leading health agency, charges its facilities with minimizing the amount and impact of food waste (DHA 2022).

The Solid Waste Annual Reporting for the Web is the Army system of record for installation solid waste diversion data, operated by the Deputy Chief of Staff, G-9. Installations generating more than 1 ton of non-hazardous solid waste per day report tonnage for waste generation and diversion efforts semiannually. These data are used to compute metrics for the DoD's Integrated Solid Waste Management Measures of Merit, reported by fiscal year.

Distribution of Army Installations by Solid Waste Diversion Rate, FY21

The chart shows the FY21 solid waste diversion rate at selected Army installations. Green status indicates that an installation met or exceeded the FY21 DoD solid waste diversion goal of 40%. This goal is likely to change based on a recent Executive Order (EO) that calls for 50% diversion from landfills by 2025 (EO 14057). Installations outside the U.S. (10 of 11) continue to outperform those within the U.S. (13 of 32) in terms of meeting the DoD 40% diversion goal.



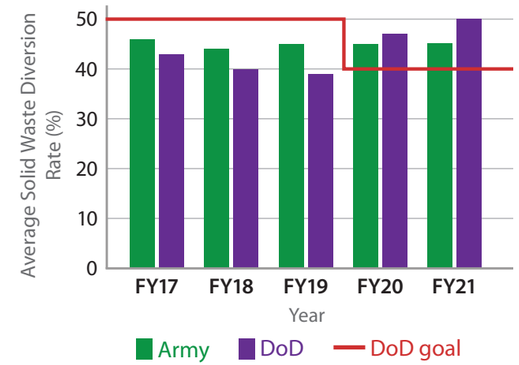
"Addressing food loss and waste is key to a resilient, climate-smart food system."

— U.S. Secretary of Agriculture Tom Vilsack

Army Waste Diversion

Of the installations tracked in this report, 23 met or exceeded the FY21 DoD diversion goal of 40%. This is a decrease from the previous two years when 25 (FY20) and 28 (FY19) installations were able to divert 40% or more of their solid waste. Only 16 installations diverted 50% of their waste in FY21, meeting EPA's 2030 recycling goal and the EO 14057 benchmark for 2025. In FY21, the average diversion rate among all Army AC installations remained steady at 45% for the third year in a row, failing to keep pace with the average DoD diversion rate, which reached 50%.

Army and DoD Solid Waste Diversion Rates, FY17–FY21



Food Waste: The Next Nut to Crack

With diversion rates plateauing, waste generators need to target food waste, estimated to make up almost 22% of the U.S. solid waste stream (EPA 2020). Food and related compostables were found to be 40–70% of the undiverted waste at Army installations (USACE 2020). Food waste is seldom diverted; EPA estimates that in 2018, food made up 24% of landfilled waste and 22% of waste burned for energy recovery (EPA 2022e). Additionally, generation of food waste is on the rise; U.S. annual tonnage has more than tripled since 1960 (EPA 2022f). Perhaps more telling is *how* food is wasted; 30–40% of the U.S. food supply is never eaten, much of the loss attributed to the agricultural industry and wasteful consumers (EPA 2022b). Globally, poorer countries suffer food loss more often from lack of refrigeration and inadequate transportation, and not from overabundance and profligate consumer habits, bringing food waste into focus as an equity issue.

"Imagine walking out of a grocery store with four bags of groceries, dropping one in the parking lot, and just not bothering to pick it up."

—Dana Gunders
Executive Director, ReFED

Adobe Stock image licensed to DCPH-A

Army Food Waste Reduction and Diversion Efforts

Of AC installations with food services, 32% reported food waste diversion in 2021, but EO 14057's emphasis on food waste may increase those numbers. The EO implementing guidance stresses food waste reduction to curtail methane generation and combat global warming (CEQ 2022). A dozen states have instituted food waste regulations, some of which amount to tax incentives for diversion, but others such as Maryland require food waste generators to compost (including DoD facilities). The Army proposes to fund offsite composting pilots and has studied commercial food waste processors and tracking systems in dining facilities. Some installations donate food; Fort Jackson reported donating over 33 tons during 2017–2019 (Warren 2020, EPA 2019). In the private sector, innovative apps like **Flashfood** and **Too Good To Go** allow supermarkets and restaurants to sell excess or nearly expired food at reduced prices (Toeniskoetter 2022). If we are to meet the ambitious waste diversion goals of 2025 and beyond, nothing can be left on the table.

SPOTLIGHT

The Greening of Health Care

In addition to focusing on patient outcomes, today's healthcare facilities (HCFs) care about their environmental footprint, acknowledging the link between environmental impacts and health status. In the U.S., HCFs consume nearly 10% of the total energy used in commercial buildings, produce 8.5% of greenhouse gas emissions, and generate over 5 million tons of waste annually (PGH 2022a). While some environmental impacts are beyond an Army HCF's control, waste generation may be managed locally through operational procedures and procurement policies.

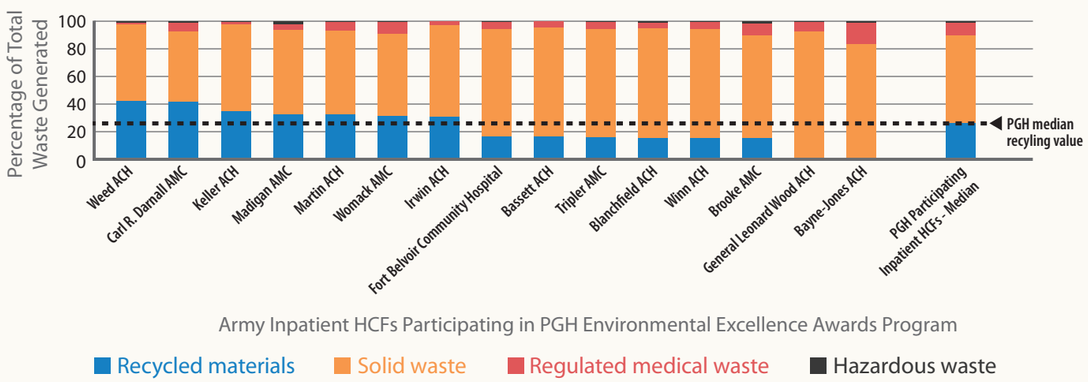
Practice Greenhealth (PGH), an organization dedicated to enhancing environmental stewardship in health care, tracks sustainability efforts among U.S. medical facilities. The DHA leverages its PGH membership to institute an annual data call using PGH's Environmental Excellence Awards Program. In 2021, 27 Army HCFs joined over 250 other U.S. hospitals in submitting data measuring their sustainability performance in categories such as leadership, procurement, energy and water usage, and waste management. Waste reporting captures diversion efforts—recycling, donation, reuse, and source reduction—that go beyond cans and cardboard to medically-unique items such as surgical wrap and medical instruments.

Army HCFs captured 3,355 tons of traditional recyclables in 2021, along with items such as irrigation bottles and lead aprons which may not be reflected in that total. Although 78% of civilian HCFs donated medical supplies (PGH 2022b), only six Army HCFs reported donating items such as linens, medical equipment, and consumable clinical supplies. Over half of participating Army HCFs (16 of 27) reprocessed medical devices, a form of reuse that involves collecting, refurbishing, and repurchasing over 25 qualifying items such as pulse oximeters, catheters, scalpels, and fall alarms.

In 2021, participating Army HCFs reduced solid waste generation by 35% from their baseline years—and by 5% from 2020—but there's room for improvement. Less than a third of Army HCFs reported reducing food waste, which can make up as much as 15% of a hospital's waste stream, and participation in recycling and donation was low: 8 of 15 reporting Army inpatient HCFs fell below the PGH median recycled materials value (26%) (see figure).

Implementing and tracking waste reduction measures that focus on both traditional diversion and the unique wastes of medical facilities is the path forward to sustainable health care.

Distribution of Waste Generated at Army Inpatient HCFs, 2021



Source: PGH Environmental Excellence Awards, provided by DHA Sustainability and Environmental Programs
Note: ACH=Army Community Hospital; AMC=Army Medical Center

LOCAL ACTION

CORONA AND LYME:

How a Respiratory Pandemic Changed Military Tick Testing

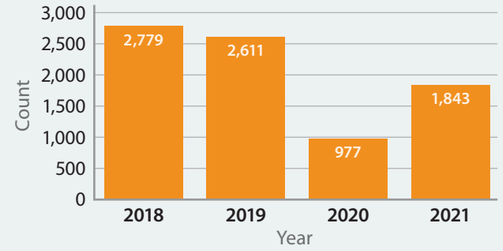
The Military Tick Identification/Infection Confirmation Kit (MilTICK) program is a free service that tests and identifies ticks that have been removed from DoD personnel and dependents and sent to the program in mail-in "tick kits." MilTICK reports results on the risks associated with a tick bite, including whether the tick was infected with the agent of Lyme disease or another tick-borne infection.

During the summer of 2020, U.S. residents spent more time outdoors than in 2019. However, the CDC reported fewer patients seeking treatment for tick bites, possibly reflecting people's unwillingness to seek care in person and risk COVID-19 exposure (McCormick et al. 2020). During a typical year, MilTICK receives 2,500–3,000 ticks; in 2020, submissions dropped to fewer than 1,000 ticks (see figure), similar to the pattern the CDC observed in the civilian population.

While the summer of 2021 saw increased MilTICK submissions, they remained below pre-pandemic totals. To remind beneficiaries of the MilTICK program, an awareness campaign encouraging participation was launched for Lyme Disease Awareness Month in May 2022. Additionally, two articles were published, information was posted frequently on social media sites, and numerous email solicitations were sent. As a result, the number of tick kits requested in May 2022 alone eclipsed the entire demand for tick kits in 2021.

Increasing awareness and participation in MilTICK across all Services will enable U.S. Military personnel to be better protected against tick-borne diseases. Look for posts tagged #MilTICK on DCPH-A's social media channels for tick education and tick bite prevention tips.

MilTICK Submissions, 2018–2021



Note: A submission may have contained more than one tick.

#MilTICK social media post from 2022 promoting National Lyme Disease Awareness Month

Tick-borne Disease Risk

The tick-borne disease risk EHI reflects the risk of acquiring Lyme disease at Army installations. Lyme disease risk is defined as low, moderate, or high risk of coming into contact with a Lyme vector tick that is infected with the agent of Lyme disease. These ticks can be found on and around Army installations, and Soldiers can be bitten while working or recreating on-post, or when spending time outside in tick habitat off-post.

Lyme disease is the most common vector-borne disease in the U.S., with over 400,000 new cases diagnosed and treated each year, based on insurance data (CDC 2022d). Bites from blacklegged ticks (also called "deer ticks") cause the majority of Lyme disease cases in the U.S. Ticks capable of transmitting Lyme disease are found worldwide, so the risk is present abroad as well as at home. Lyme and many other tick-borne diseases have similar symptoms, such as fever, headache, rash, and fatigue, which can make them tricky to diagnose. If left untreated, Lyme disease can cause joint inflammation, memory problems, and even heart failure.

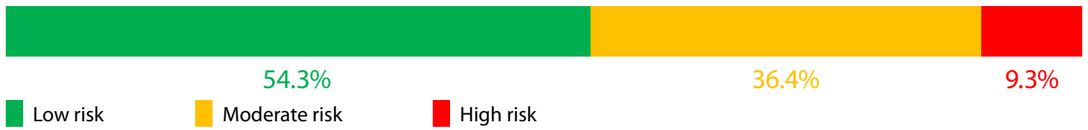
MilTICK is a free tick identification and testing service available to DoD-affiliated personnel; approximately 1,000–3,000 ticks are submitted each year. Lyme disease risk data came from MilTICK and environmental tick surveillance conducted by the Army Regional Public Health Commands. Installations flagged as having "No data" did not participate in MilTICK in 2021, and no surveillance data were available for that year. In the absence of installation-specific surveillance data, risk can still be approximated by determining if the installation is likely to have populations of vector ticks present, and whether there have been cases of Lyme disease diagnosed nearby. Data on human cases and tick ranges were obtained from the CDC and scientific literature (CDC 2022e, Eisen et al. 2016, Li et al. 2019, Hyoung et al. 2019, Kim et al. 2020, Yamaji et al. 2018).

Distribution of Army Installations by Lyme Disease Risk, 2021

The majority of installations were low to moderate risk, with only 8 installations having a high risk of coming into contact with a tick infected with the agent of Lyme disease. However, even installations with a low risk of Lyme disease can still have populations of other disease-carrying ticks. Of 42 installations with populations of disease-carrying ticks present, 28 (67%) sent tick surveillance data to an Army Public Health entity (no disease carrying ticks are found in Hawaii).

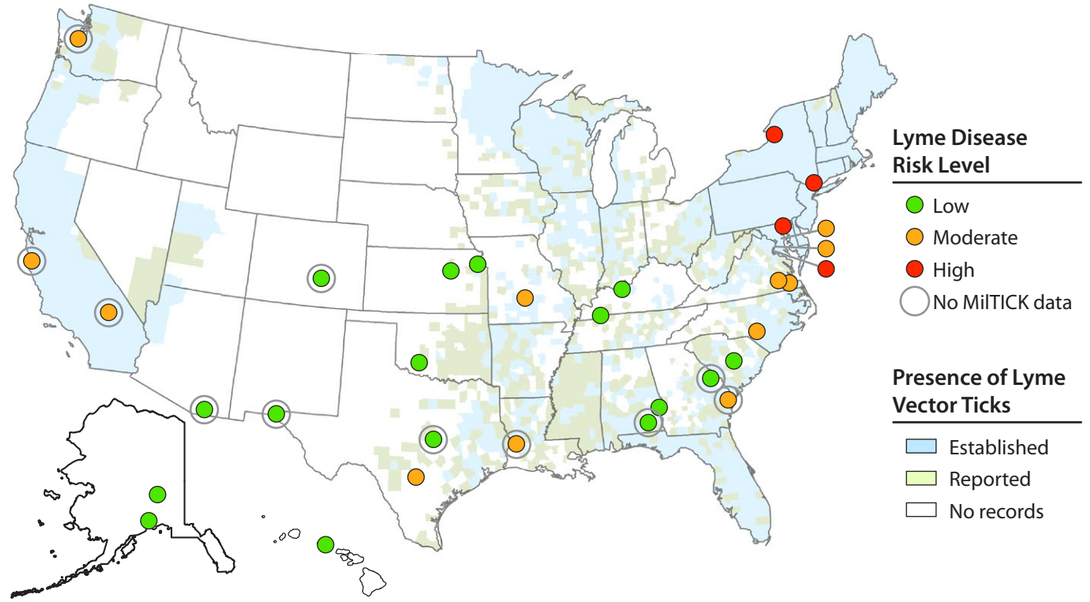
Distribution of Army Population by Lyme Disease Risk, 2021

The chart shows the percentage of AC Soldiers by Lyme disease risk status at their installation in 2021. The majority of AC Soldiers are at low and moderate risk for exposure to Lyme disease. However, the nature of Army training exercises may place Soldiers at higher risk than their civilian counterparts. **Especially at installations with moderate and high risk, tick checks should ALWAYS be conducted after spending time in tick habitats such as forests or fields.** Any ticks found biting should be submitted to MilTICK for testing.



Presence of Lyme Disease Vector Ticks and Risk of Lyme Disease at Selected U.S. Army Installations

The likelihood of coming into contact with a tick that is infected with the agent of Lyme disease varies tremendously based on climate, habitat, and wildlife communities present at an Army installation. **In the U.S., Soldiers at installations in the northeast, midwest, and mid-Atlantic are at greatest risk of contracting Lyme disease, although Lyme vector ticks and the Lyme bacteria are present in many other areas and are spreading.** For installations where no Army surveillance data were available, risk was imputed by the presence or absence of vector ticks, and reports of Lyme disease cases nearby.



#TickTalk – Busting Tick Myths on Social Media

Finding an attached tick can be a scary experience, and can prompt a lot of questions that need answers: is this a tick? How do I safely remove it? Will I get sick? Unfortunately, there is a lot of bad information spread by well-meaning people both online and in person. One place to get accurate information is on DCPH-A social media channels. Posts tagged with #TickTalk are aimed at busting common tick myths, spreading facts, and providing resources so that Army beneficiaries experiencing a tick bite can get the information they need quickly. Social media posts tagged #MilTICK also provide information on how to get a tick test kit and submit human-biting ticks for rapid testing to the MilTICK program. Check out the DCPH-A social media channels to learn why ticks don't fall from trees (but are still often found biting people's heads!), and why eating matches or using nail polish or petroleum jelly are unsafe and ineffective ways to repel or remove ticks.

Visit the MilTICK website at:
https://phc.amedd.army.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx

Mosquito-borne Disease Risk

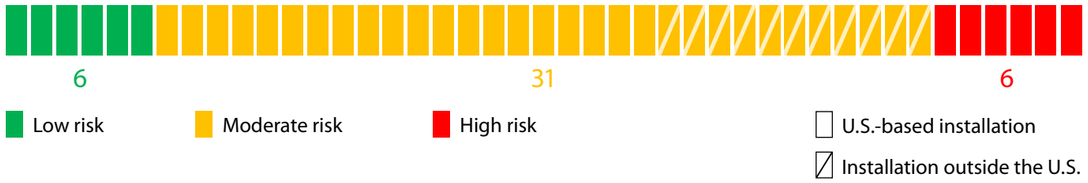
The mosquito-borne disease risk EHI reflects the risk of being infected with dengue, chikungunya, and Zika viruses transmitted by day-biting *Aedes* mosquitoes at Army installations. The warming global climate continues to increase the range where mosquitoes live and thrive, and expands the portion of the year when mosquitoes are active and able to transmit disease (Kamal et al. 2018, Kraemer et al. 2015, Reinhold et al. 2018). This metric characterizes the window of possible vector activity and disease transmission, the presence of local vectors, and confirmed human cases (locally acquired and travel-related) into a location-specific risk index.

Health impacts from *Aedes* mosquitoes range from allergic reaction and dermatitis to debilitating infection and birth defects. Mosquito-borne pathogens often circulate in mosquito populations long before humans are infected and diagnosed. Because of this, robust installation-level vector surveillance is necessary to create an early warning system for mosquito-borne disease threats. **There are currently no vaccines to protect humans from these mosquito-borne diseases; therefore, avoiding bites is the most important prevention method.**

Data used to build the mosquito-borne disease risk EHI came from a variety of sources. These sources included models on mosquito species behavior, community surveillance reports on mosquito populations and human case confirmation, and local daily weather reports provided by the U.S. Air Force 14th Weather Squadron.

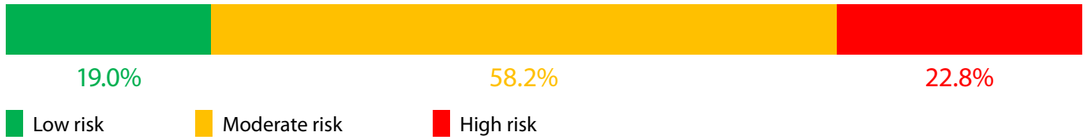
Distribution of Army Installations by Mosquito-borne Disease Risk, 2021

The chart shows the risk of *Aedes* mosquito-borne diseases at selected Army installations in 2021. While the *Aedes albopictus* mosquito is more likely to be found in cooler climates than its vector counterpart *Aedes aegypti*, the presence of both species in an area greatly increases the risk of disease transmission. There were fewer installations at high risk of mosquito-borne disease in 2021 compared to 2020; this change was primarily driven by fewer imported human cases of disease at those locations.



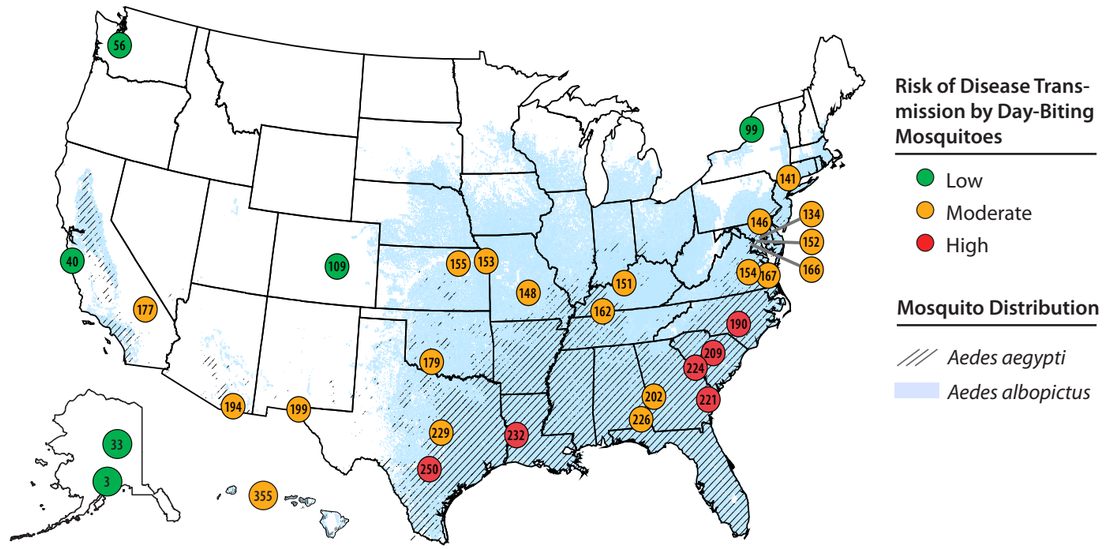
Distribution of Army Population by Mosquito-borne Disease Risk, 2021

The chart shows the percentage of AC Soldiers at risk of *Aedes* mosquito-borne disease at selected Army installations in 2021. The majority of installations have remained at moderate risk since 2020, and fewer AC Soldiers are at high risk for diseases transmitted by day-biting mosquitoes than in 2020.



Mosquito-borne Disease Risk and Transmission Days

The icons on the risk map indicate an installation's risk of select mosquito-borne disease (Zika, chikungunya, or dengue) transmission by day-biting *Aedes* mosquitoes. The number in the icon represents the number of days per year that day-biting mosquitoes are likely to be active and able to transmit a disease-causing pathogen. The distribution of *Aedes* species of concern are shown in the underlying map and represent the 50–100% probability that they are present based on spatial modeling (Kraemer et al. 2015).



Move Over Mosquitoes…Bed Bugs are Here, Too!

Mosquitoes are not the only blood-sucking arthropod that bites Soldiers: bed bugs also feed on humans! However, unlike mosquitoes, bed bugs only come out at night and cannot fly, relying instead on living in close proximity to their host to feed. As their name suggests, bed bugs are often found around beds and in bedrooms, where they bite sleeping people. All life stages of this pest, including both females and males, need a blood meal to continue their life cycle. Although bed bugs are not known to transmit any diseases to humans, their bites can be quite a nuisance—they can cause welts, itchiness, allergic reactions, and can lead to secondary skin infections. People battling bed bug infestations are also prone to insomnia, anxiety, and depression—all of which influence Soldier readiness. **Bed bugs rely on humans to spread them from place to place, and the transient nature of our military population creates a unique risk for spreading these pests.**


Common Bed Bug
DCPH-A photo by Graham Snodgrass

If you are experiencing problems with bed bugs in military housing, please report it to your immediate supervisor. More information about bed bugs and what to do about them is located on the DCPH-A website: https://phc.amedd.army.mil/PHC%20Resource%20Library/ento-bedbugs-factsheet.pdf

Heat Risk

The heat risk EHI tracks outdoor conditions that heighten the risk of heat-related health issues. A heat risk day occurs when the National Weather Service (NWS) heat index is greater than 90°F for one or more hours during a day. Heat index incorporates outdoor temperature and relative humidity which are recognized as the principal environmental agents of heat illness (Mora et al. 2017). The EHI reports the number of heat risk days per year in proximity to Army installations, and whether the incident year is consistent with the prior decade.

Globally, 2021 was the 6th hottest year on record based on annual average land temperatures, and the past seven years have been the hottest recorded during 1880–2021 (NOAA 2022a). In the U.S., 2021 was the 4th hottest year on record, with the six hottest years occurring in the last decade (NOAA 2022b). Heat has been the leading cause of weather-related fatalities in the U.S. every year during 2018–2021, and in 15 of the last 30 years (NWS 2022). Increases in outdoor air pollution, seasonal allergens, and weather-related mental health stress are also associated with rising temperatures (USGCRP 2016).

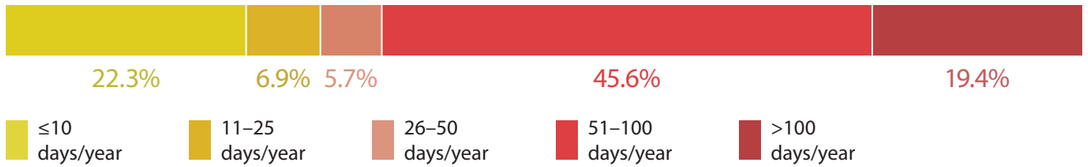
Outdoor temperature, relative humidity, and the associated heat index used to characterize area-wide heat risk were acquired from weather stations nearest the population center of an installation. Weather data were provided by the U.S. Air Force 14th Weather Squadron. Heat risk days at the county level in the continental U.S. were obtained from the National Environmental Public Health Tracking Network (CDC 2022f).

Distribution of Army Installations by Heat Risk Days, 2021

Of the Army installations tracked for this report, 23 experienced more than 50 heat risk days in 2021. Most of these high risk installations are concentrated in the mid-Atlantic and southeast U.S. Heat risk days ranged from 0 to 132 days per year in 2021.

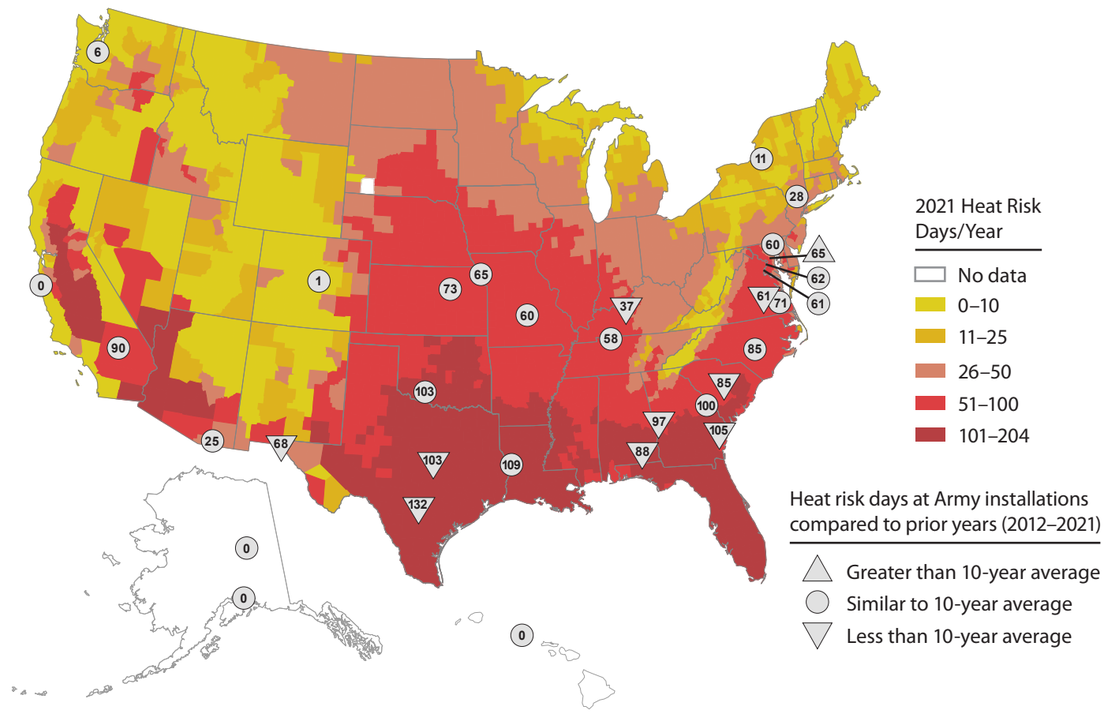
Distribution of Army Population by Heat Risk Days, 2021

The chart shows the distribution of AC Soldiers based on the heat risk days documented at Army installations in 2021. **Two-thirds of AC Soldiers were stationed at a location with more than 50 heat risk days during 2021.**



Heat Risk Days in the United States by County, 2021

Annual days with one or more hours when the NWS Heat Index is above 90°F.

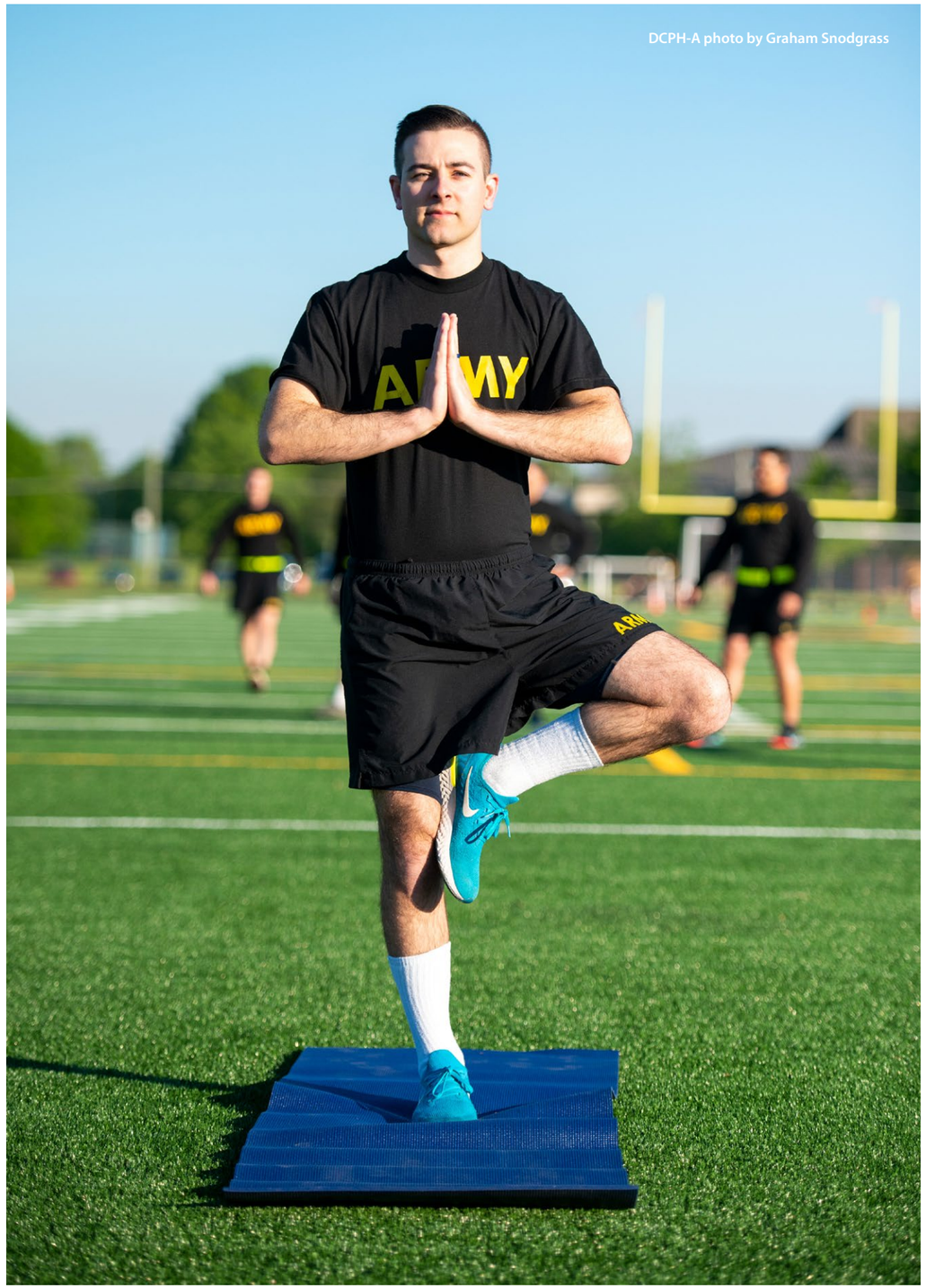


National Weather Service Launches HeatRisk Forecast

A recent survey on the impact of extreme weather found that 51% of U.S. adults were affected by hot weather or heat waves in the last five years (NPR 2022). More people reported being affected by heat than any other type of extreme weather including drought, hurricanes, wildfire, flooding, or winter storms. Among those experiencing extreme heat, many reported that household members faced serious health problems resulting from lack of cooling in their home. Health impacts from heat were significantly greater for minority respondents: 25% of Native American adults, 18% of Hispanic or Latino adults, 14% of Black or African American adults, and 14% of Asian adults who were affected by extreme heat said their households faced serious health problems resulting from inadequate home air conditioning (compared to 7% of White adults).

To help citizens prepare for heat events, the NWS has developed a **HeatRisk** Prototype forecast designed to communicate heat stress in the coming week, and who may be most affected. Risk is conveyed using a numeric and color scale, similar to the EPA Air Quality Index. The forecast reflects whether temperatures are unusual for the time of year, the duration of a heat event, and magnitude of diurnal cooling. More information on the **HeatRisk** Prototype forecast is available from the NWS at https://www.wrh.noaa.gov/wrh/heatrisk/.

Level	Meaning
0	No elevated risk
1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
4	Very High Risk for entire population due to long duration heat, with little to no relief overnight



Performance Triad

- Sleep
- Activity
- Nutrition

Sleep, activity, and nutrition (SAN), also known as the Performance Triad (P3), work together as the pillars of optimal physical, behavioral, and emotional health. Neglect of any single SAN domain can lead to suboptimal performance and, in some cases, injury. The interrelationships between SAN elements is critical for maximizing Soldier performance—for example, Soldiers need to have balanced nutrients to fuel their physical activity, and physical activity can impact the amount and quality of sleep. Leaders and Soldiers need information about the SAN targets that Soldiers do not meet to address those deficiencies.

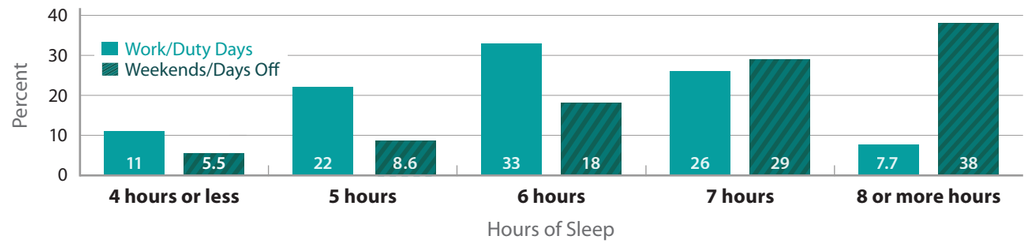
The Azimuth Check, previously known as the Global Assessment Tool, is a survey designed to assess an individual's SAN behaviors, among other behaviors and domains. Soldiers are required to complete the Azimuth Check annually per AR 350-53, *Comprehensive Soldier and Family Fitness* (DA 2014). The data presented here summarize the proportions of Soldiers who met expert-defined SAN targets based on data reported in the 2021 Azimuth Check. While the percentage of Soldiers who completed the Azimuth Check was lower in 2021 (20%) relative to 2020 (28%), the proportion of Soldiers meeting SAN targets is comparable between 2020 and 2021.

Sleep

The CDC (CDC 2020a) and the National Sleep Foundation (NSF 2020) both recommend adults obtain 7 or more hours of sleep per night. On the Azimuth Check, Soldiers report the average approximate hours of sleep they obtain within a 24-hour period, during work/duty weeks and weekends/days off.

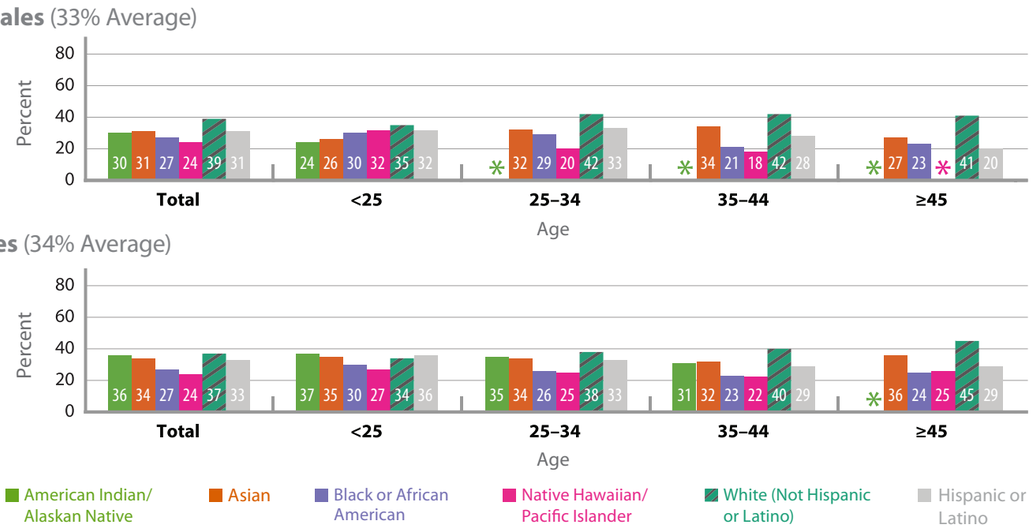
Percent of AC Soldiers Who Met Sleep Targets, 2021

Overall, a smaller proportion of Soldiers reported meeting the sleep target of 7 or more hours of sleep during work/duty weeks than on weekends/days off. **During work/duty weeks, about one-third of Soldiers (34%) reported obtaining 7 or more hours of sleep. During weekends/days off, the majority of Soldiers (68%) reported obtaining 7 or more hours of sleep.**



Percent of AC Soldiers Who Met the Work/Duty Weeks Sleep Target by Sex, Age, Race, and Ethnicity, 2021

A similar proportion of males (34%) and females (33%) reported meeting the sleep target of 7 or more hours of sleep during work/duty weeks. Among both female and male Soldiers, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target (39% and 37%, respectively), while Native Hawaiian/Pacific Islander Soldiers had the lowest proportion (24% for both).



*Data suppressed due to small case numbers (<40 cases).

Overall, 34% of Soldiers reported meeting the sleep target of 7 or more hours of sleep during work/duty weeks.

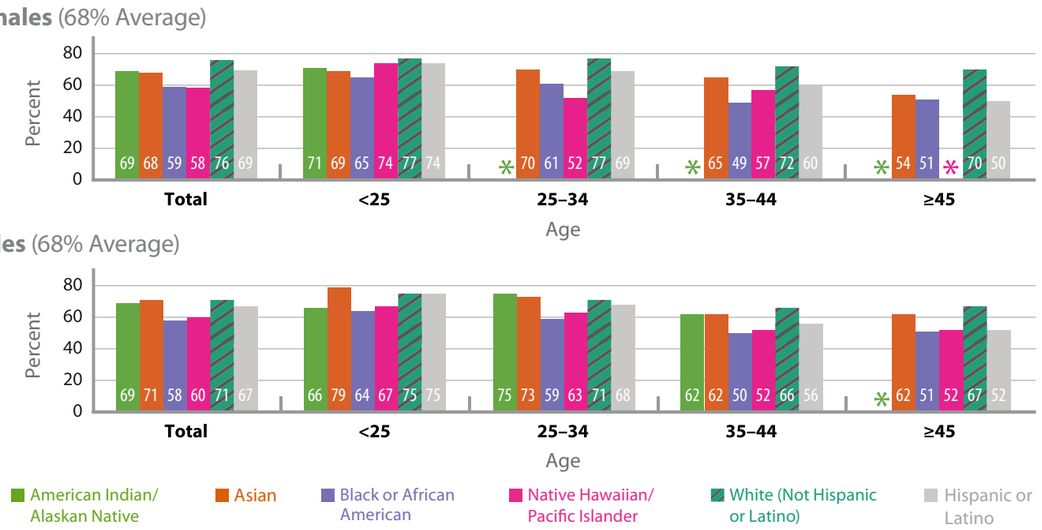
Prevalence of meeting this sleep target ranged from 27% to 45% across Army installations.

Overall, 68% of Soldiers reported meeting the sleep target of 7 or more hours of sleep during weekends/days off.

Prevalence of meeting this sleep target ranged from 63% to 84% across Army installations.

Percent of AC Soldiers Who Met the Weekend/Days-Off Sleep Target by Sex, Age, Race, and Ethnicity, 2021

An equal proportion of male (68%) and female (68%) Soldiers reported meeting the sleep target of 7 or more hours of sleep during the weekend/days off. Regardless of sex, Soldiers ≥35 years old had the lowest proportion meeting the sleep target of 7 or more hours of sleep during the weekend/days off. Among female Soldiers, White (Not Hispanic or Latino) Soldiers (76%) had the highest proportion meeting this target, while Native Hawaiian/Pacific Islander Soldiers (58%) and Black or African American Soldiers (59%) had the lowest proportions. Among male Soldiers, White (Not Hispanic or Latino) Soldiers (71%) and Asian Soldiers (71%) had the highest proportion meeting this target, while Black or African American Soldiers (58%) had the lowest proportion.



*Data suppressed due to small case numbers (<40 cases).

SPOTLIGHT

Maximizing Mental Acuity in the Military

A significant correlation between mental acuity and sleep loss impacts mission success and the overall well-being of the Force. With each 24-hour period of sleep deprivation experienced by Service members, there is a 25–35% degradation in cognitive performance, and conditions of operational settings may contribute to sleep deprivation (DoD 2021c).

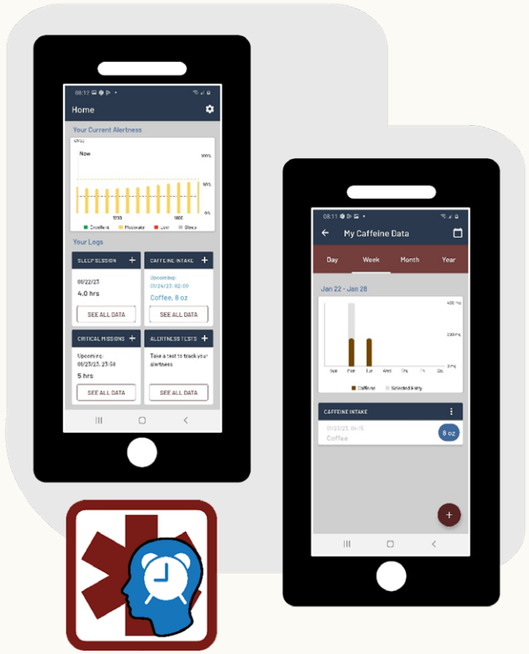
Technology that enhances alertness is a new solution to address this issue. The U.S. Army Medical Materiel Development Activity, in collaboration with the Biotechnology High Performance Computing Software Applications Institute and the Walter Reed Army Institute of Research, is leading the way to develop the ***2B-Alert*** mobile application.

2B-Alert is an individualized tool that is customized to monitor a Service member's current alertness level, predict future alertness levels, and provide customized recommendations to enhance mission performance (Reifman et al. 2019). Through a statistical learning algorithm, the application uses a Service member's sleep and wake cycles, caffeine intake amounts and times, and baseline psychomotor vigilance tests (PVTs, which objectively assess an individual's change in alertness based on sleep loss) to create personalized fatigue management strategies (see figure).

With its performance predictive and fatigue management technology, ***2B-Alert*** aims to maximize the mental acuity of every Service member during every mission.

The 2B-Alert web tool is currently available at http://2b-alert-web.bhsai.org. The 2B-Alert mobile application is currently in development and planned for release in August 2023 to DoD App stores such as the TRADOC App Gateway. Interested users may send an email to usarmy.detrick.medcom-usammda.mbx.usammda-pao@health.mil or call (301) 619-7056 for more information.

2B-Alert Mobile Application



Note: This screenshot shows a hypothetical scenario and fatigue management results for a male Army Ranger who is deployed to Afghanistan and has a reversed sleep cycle (sleeps during the day and executes missions at night). He has input the following information into the 2B-Alert application: 2 energy drinks consumed in the last 24 hours, at 1600 and 1730 hours; rest has been adequate for a week prior, although lower in quality than normal; and the current mission is expected to last 6 hours. PVT results have been previously loaded to account for his baseline alertness. Results indicate the need for an additional caffeine boost at 2100 hours to bolster his alertness level during the mission.

U.S. Army photo by MSG Michel Sauret

Activity

The CDC recommends adults attain 150 minutes of moderate-intensity aerobic activity and 2 or more days of resistance training per week (CDC 2020b).

On the Azimuth Check, Soldiers report the average number of days per week in which they engaged in (a) vigorous activity and (b) moderate activity in the last 30 days, and the average number of minutes per day in which they engaged in these activities. The amount of physical activity can be attained in one of three ways:

—150 minutes a week of moderate-intensity aerobic activity, or
—75 minutes a week of vigorous-intensity aerobic activity, or
—An equivalent combination of moderate- and vigorous-intensity aerobic activity.

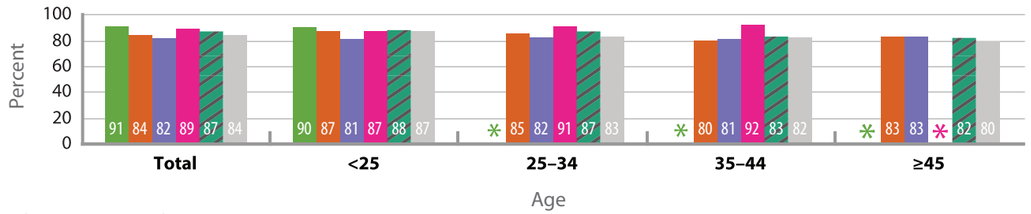
Soldiers also report the average number of days per week in which they participated in resistance training in the last 30 days.

Overall, the majority of Soldiers met the activity targets. Most Soldiers (88%) achieved adequate moderate/vigorous aerobic activity. The majority of Soldiers (78%) engaged in resistance training 2 or more days per week. Nearly three-fourths of Soldiers (72%) attained adequate aerobic activity and resistance training per week.

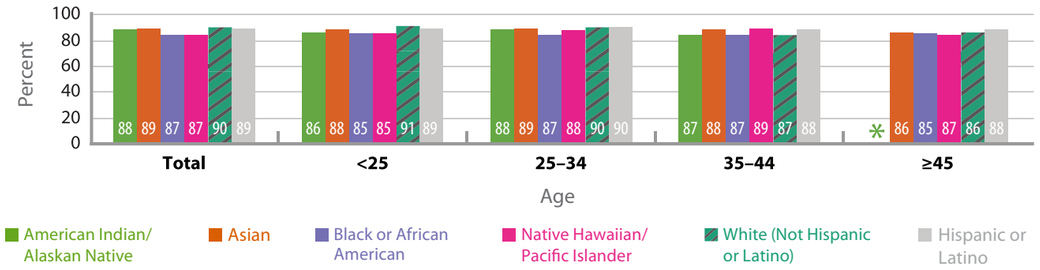
Percent of AC Soldiers Who Met the Aerobic Activity Target by Sex, Age, Race, and Ethnicity, 2021

A greater proportion of male Soldiers (89%), relative to female Soldiers (84%), achieved adequate moderate and/or vigorous aerobic activity. Among female Soldiers, American Indian/Alaskan Native Soldiers (91%) had the highest proportion meeting this target, while Black or African American Soldiers (82%) had the lowest proportion. Among male Soldiers, White (Not Hispanic or Latino) Soldiers (90%) had the highest proportion meeting this target, while Black or African American Soldiers (87%) and Native Hawaiian/Pacific Islander Soldiers (87%) had the lowest proportion.

Females (84% Average)



Males (89% Average)



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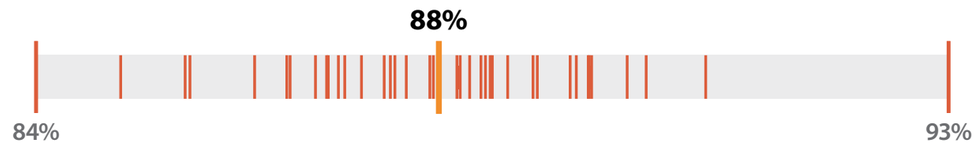
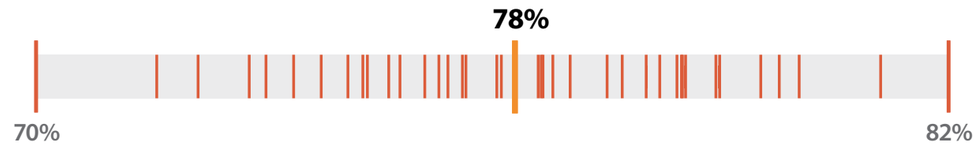


Overall, 88% of Soldiers achieved adequate moderate and/or vigorous aerobic activity.

Prevalence of meeting this activity target ranged from 84% to 93% across Army installations.



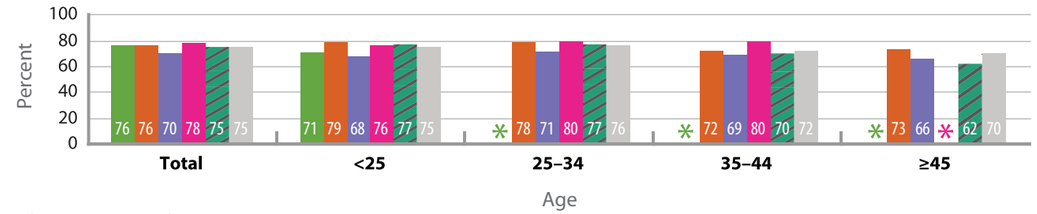
Overall, 78% of Soldiers reported engaging in resistance training 2 or more days per week.

Prevalence of meeting this activity target ranged from 70% to 82% across Army installations.

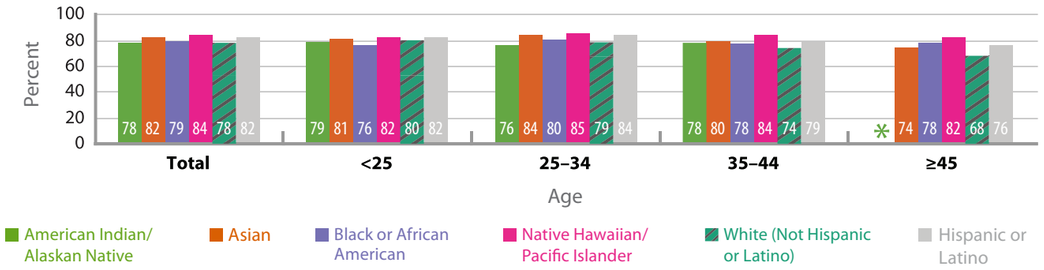
Percent of AC Soldiers Who Met the Resistance Training Target by Sex, Age, Race, and Ethnicity, 2021

A greater proportion of male Soldiers (79%), relative to female Soldiers (73%), reported engaging in resistance training 2 or more days per week. Regardless of sex, Soldiers ≥45 years old had the lowest proportion meeting the resistance training target. Among female Soldiers, Native Hawaiian/Pacific Islander Soldiers (78%) had the highest proportion meeting this target, while Black or African American Soldiers had the lowest proportion (70%). Among male Soldiers, Native Hawaiian/Pacific Islander Soldiers (84%) had the highest proportion meeting this target, while American Indian/Alaskan Native Soldiers (78%), White (Not Hispanic or Latino) Soldiers (78%), and Black or African American Soldiers (79%) had the lowest proportion.

Females (73% Average)



Males (79% Average)



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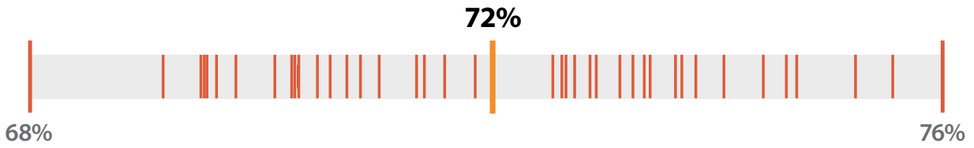
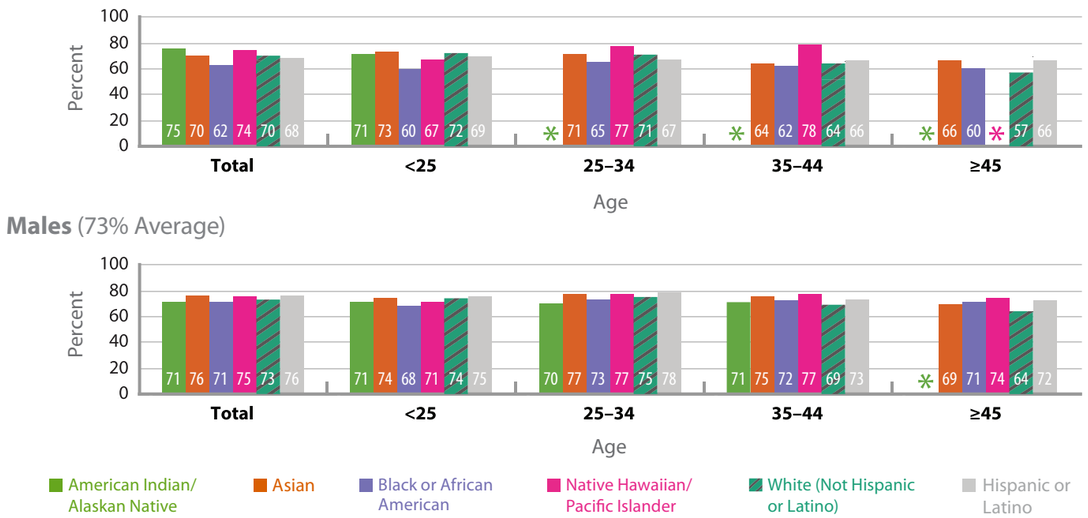


Overall, 72% of Soldiers achieved both aerobic activity and resistance training targets.

Prevalence of meeting this activity target ranged from 68% to 76% across Army installations.

Percent of AC Soldiers Meeting both Aerobic Activity and Resistance Training Targets by Sex, Age, Race and Ethnicity, 2021

A greater proportion of male Soldiers (73%), relative to female Soldiers (67%), achieved adequate aerobic activity and engaged in resistance training 2 or more days per week. Regardless of sex, Soldiers ≥45 years old had the lowest proportion meeting the combined aerobic activity and resistance training target. Among female Soldiers, American Indian/Alaskan Native Soldiers (75%) and Native Hawaiian/Pacific Islander Soldiers (74%) had the highest proportion meeting this target, while Black or African American Soldiers (62%) had the lowest proportion. Among male Soldiers, Asian Soldiers (76%), Hispanic or Latino Soldiers (76%), and Native Hawaiian/Pacific Islander Soldiers (75%) had the highest proportion meeting this target, while American Indian/Alaskan Native Soldiers (71%) and Black or African American Soldiers (71%) had the lowest proportion.



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SUSTAINED SPOTLIGHT

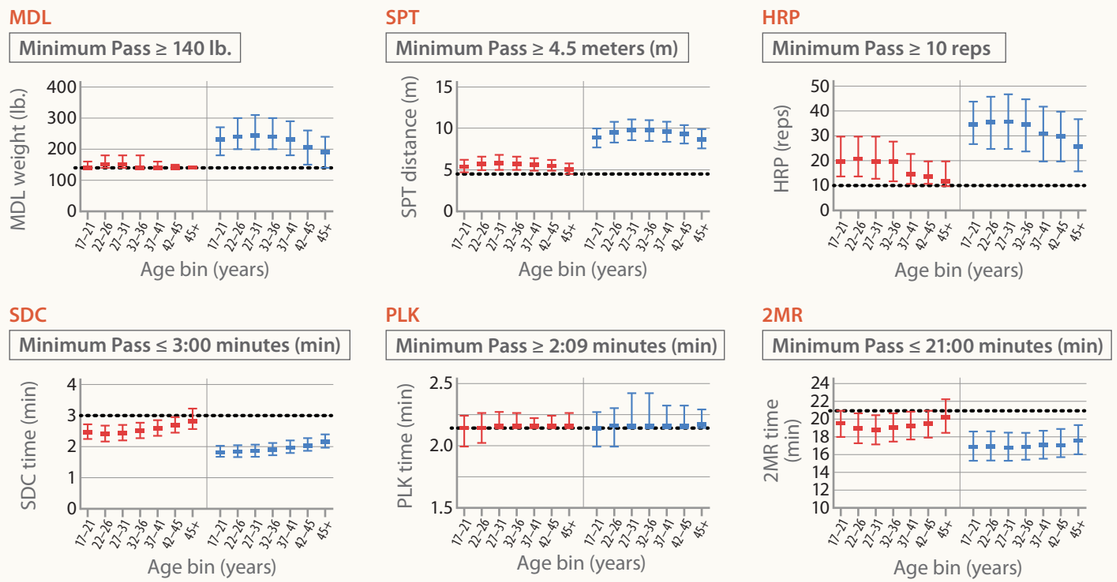
The Army Combat Fitness Test: Sex- and Age-related Performance Patterns

The Army Combat Fitness Test (ACFT) assesses a spectrum of fitness components (e.g., muscular strength and power, agility, and aerobic and anaerobic endurance) required of military-relevant, physically demanding tasks. The current version of the ACFT includes the three-repetition maximum deadlift (MDL), standing power throw (SPT), hand release push-up (HRP), sprint-drag-carry (SDC), plank (PLK), and 2-mile run (2MR) (DA n.d.).

The ACFT was originally designed with sex- and age-neutral standards for each of its six events. However, since the test's October 2020 implementation, the events and performance standards have evolved to include scoring adjustments for sex and age, effective April 2022. Adopting the ACFT as the Army's fitness test of record has led to important, positive shifts in Soldier physical training (APHC 2021b, APHC 2021c).

During the time covered by the current analysis (April–December 2021), and based on a sex- and age-neutral performance standard per event, results demonstrated that 1) females performed markedly less well compared to males on all ACFT events except the PLK; and 2) physical performance varied by age, with performance improving from the youngest age groups up to the mid-30s, then declining for older age groups. These findings mirror physical performance observations previously documented in other large populations (Hoffmann et al. 2019). The ACFT data presented (see figure) provide a baseline for comparison with future patterns of performance on the ACFT, as well as normative performance targets for male and female Soldiers of varying ages.

ACFT Six-Event Performance, AC Soldiers, by Sex and Age, 2021



Notes:
For events excluding PLK: Females, n=34,022 to 38,574; Males, n=227,432 to 241,043. For PLK: Females, n=15,603; Males, n=7,875.
Within each box plot, the square represents the median (50th percentile), and the lower and upper tails represent the 25th and 75th percentiles, respectively.

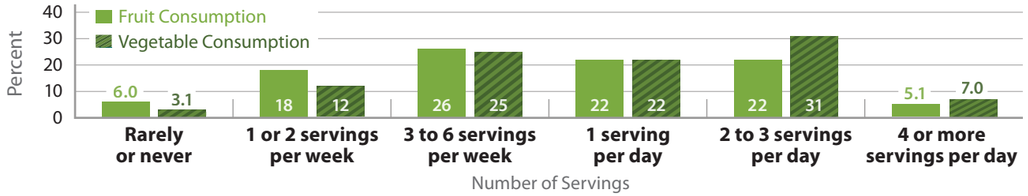
Nutrition

The U.S. Department of Health and Human Services and U.S. Department of Agriculture (HHS and USDA 2015) recommend 2 or more servings of fruits and 2 or more servings of vegetables per day.

On the Azimuth Check, Soldiers report the approximate servings of fruits and vegetables they consumed during the past 30 days. Most Soldiers' fruit consumption ranged from 3 to 6 servings per week to 2 to 3 servings per day. Vegetable consumption was slightly higher, with more Soldiers reporting multiple servings per day.

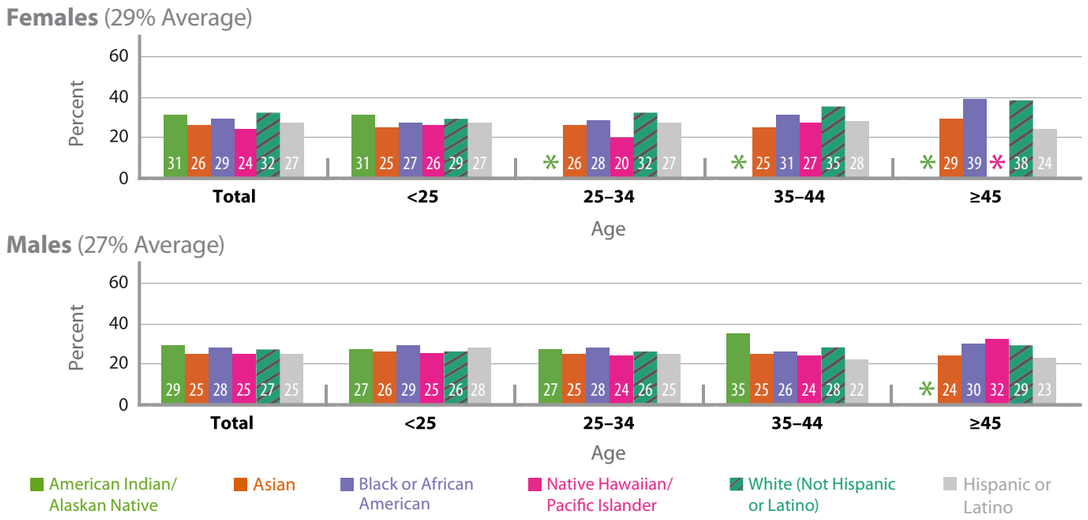
Percent of AC Soldiers Who Met the Nutrition Targets, 2021

Overall, less than half of Soldiers met the nutrition targets. About one-fourth of Soldiers (27%) met the target of 2 or more servings of fruits per day. About one-third of Soldiers (38%) met the target of 2 or more servings of vegetables per day.



Percent of AC Soldiers Meeting the Fruit Consumption Target by Sex, Age, Race, and Ethnicity, 2021

A greater proportion of female Soldiers (29%), relative to male Soldiers (27%), reported eating 2 or more servings of fruits per day. **Regardless of sex, Soldiers ≥45 years old had the highest proportion meeting the fruit consumption target.** Among female Soldiers, White (Not Hispanic or Latino) Soldiers (32%) and American Indian/Alaskan Native Soldiers (31%) had the highest proportion meeting this target, while Native Hawaiian/Pacific Islander Soldiers (24%) had the lowest proportion. Among male Soldiers, American Indian/Alaskan Native Soldiers (29%) and Black or African American Soldiers (28%) had the highest proportion meeting this target, while Asian Soldiers (25%), Native Hawaiian/Pacific Islander Soldiers (25%) and Hispanic or Latino Soldiers (25%) had the lowest proportion.



*Data suppressed due to small case numbers (<40 cases).

Overall, 27% of Soldiers reported eating 2 or more servings of fruits per day.

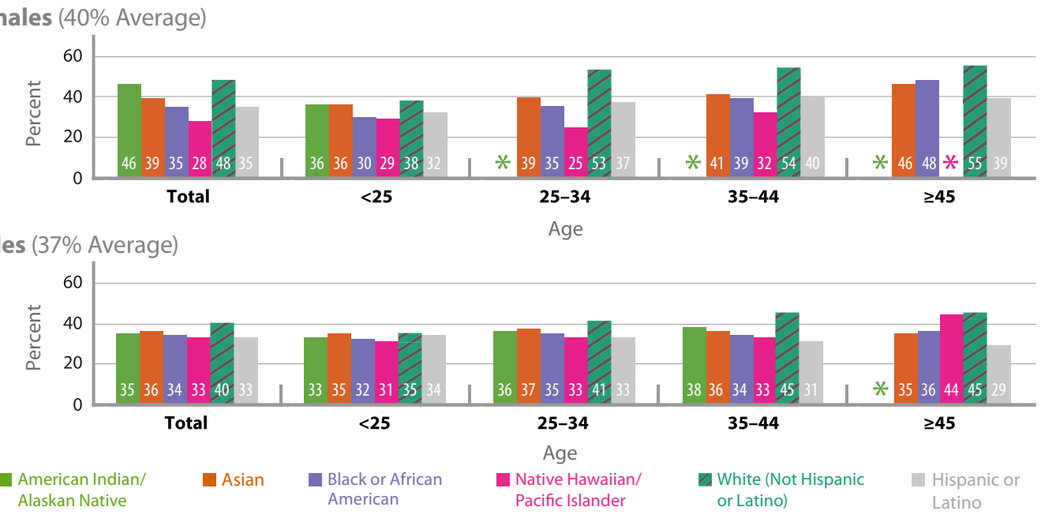
Prevalence of meeting this nutrition target ranged from 18% to 49% across Army installations.

Overall, 38% of Soldiers reported eating 2 or more servings of vegetables per day.

Prevalence of meeting this nutrition target ranged from 31% to 61% across Army installations.

Percent of AC Soldiers Meeting the Vegetable Consumption Target by Sex, Age, Race, and Ethnicity, 2021

A greater proportion of female Soldiers (40%), relative to male Soldiers (37%), reported eating 2 or more servings of vegetables per day. Regardless of sex, Soldiers <25 years old had the lowest proportion meeting the vegetable consumption target. Among female Soldiers, White (Not Hispanic or Latino) Soldiers (48%) had the highest proportion meeting this target, while Native Hawaiian/Pacific Islander Soldiers (28%) had the lowest proportion. Among male Soldiers, White (Not Hispanic or Latino) Soldiers (40%) had the highest proportion meeting this target, while Native Hawaiian/Pacific Islander Soldiers (33%) and Hispanic or Latino Soldiers (33%) had the lowest proportion.



*Data suppressed due to small case numbers (<40 cases).

Installation Health Index

The *Health of the Force* presents metrics with the intent of revealing actionable interpretations of health data. The Installation Health Index (IHI) is a composite measure that can be used to gauge the health of installation populations. **The purpose of the IHI is to motivate discussions about successes and challenges that can be leveraged across the Force.**

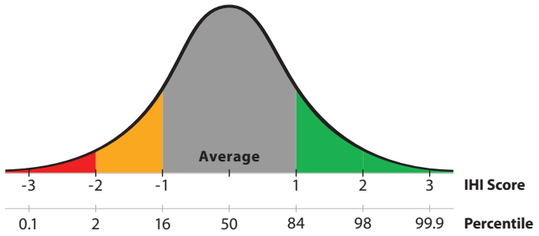
The IHI combines installation-specific metric scores, each calculated by contrasting the installation's metric value to the average value for the installations evaluated (subsequently referred to as the Army average). It also incorporates the number of poor air quality days, an environmental health metric. The IHI consists of two components: a score and a percentile.

How should the IHI be interpreted?

IHI Score	IHI Percentile
The IHI is a weighted average of z-scores corresponding to six installation medical metric values and an installation air quality score. IHI scores are standardized such that a score of zero represents the average across the Army installations included in the 2020 *Health of the Force*; positive scores are above-average, and negative scores are below-average.	Percent of the total number of installations that are equal to or below a given installation score.
Higher IHI scores reflect comparatively better installation health. IHI scores less than -2 (i.e., more than 2 standard deviations (SD) below the average) are color-coded in red. IHI scores between -1 and -2 (i.e., between 1 and 2 SD below the average) are color-coded in yellow; IHI scores greater than or equal to 1 (i.e., ≥1 SD above the average) are color-coded in green.	Higher IHI percentiles reflect more favorable installation health relative to other installations.

The IHI incorporates age- and sex-adjusted values for six medical metrics (injury, obesity, sleep disorders, chronic disease, tobacco product use, STIs), and installation air quality. The weights given to each metric for calculation of the IHI are shown here.

- Injury (30%)
- Obesity (BMI) (15%)
- Sleep disorders (15%)
- Chronic disease (15%)
- Tobacco product use (15%)
- STIs (chlamydia) (5%)
- Air quality (5%)

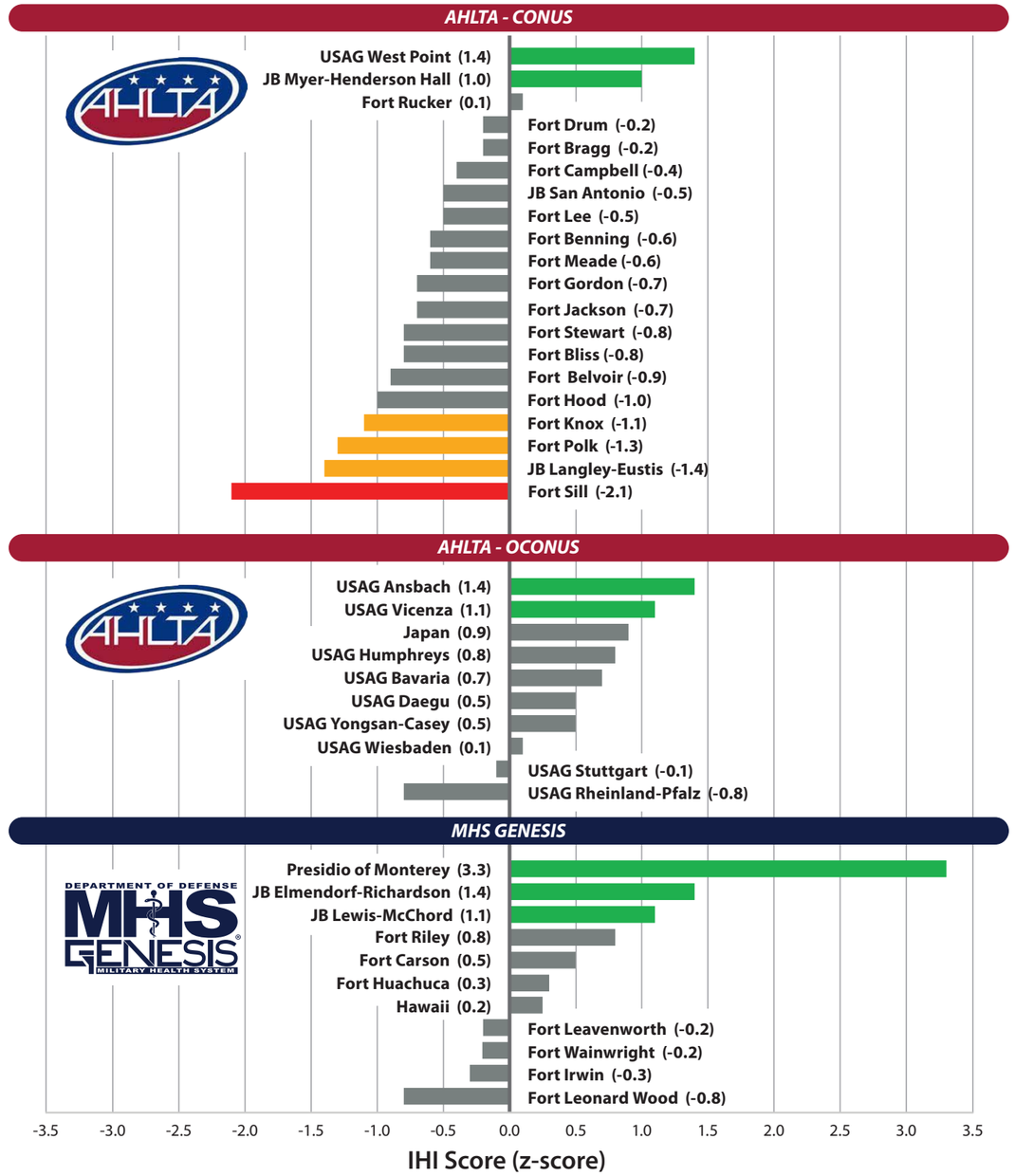


See the Methods Appendix for more information on the IHI.

The IHI should not be compared with prior years due to changes in data sources and methodology (e.g., new weighting, new metric inclusion criteria, new tobacco product use definitions, etc.).

Ranking by Installation Health Index Score

Installations are separated by electronic health record system and should not be compared across systems due to known data decrements resulting from the installation transition from AHLTA to MHS GENESIS.



The ranking order is based on unrounded scores. U.S.-based installations and installations outside the U.S. are ranked separately.

COLOR-CODE KEY:

GREEN = Better than the Army average by 1 or more SD

AMBER = Worse than the Army average by between 1 and 2 SD

RED = Worse than the Army average by more than 2 SD

NO COLOR ADDED = About the same as the Army average

Installation Profiles

The below footnotes pertain to the installation profiles found on pages 92–134.

1. Crude values are not adjusted by age and sex.

2. Adjusted values are weighted averages of crude age- and sex-specific frequencies, where the weights are the proportions of Soldiers in the corresponding age and sex categories of the 2015 Army AC population. By using a common adjustment standard, we are able to make valid comparisons across installations because it controls for age and sex differences in the population which might influence crude rates.

3. The Army values represent crude values for the entire Army, and the ranges represent crude values for the installations included in the report.

4. EHI color coding (green, amber, and red) indicates metric status at the affected installation. Green denotes the desired condition.

5. The IHI is a standardized weighted average of scores corresponding to six medical metrics and an air quality metric. The percentile reflects the approximate probability of having an IHI equal to or lower than the installation's IHI. Higher percentiles reflect better installation health.

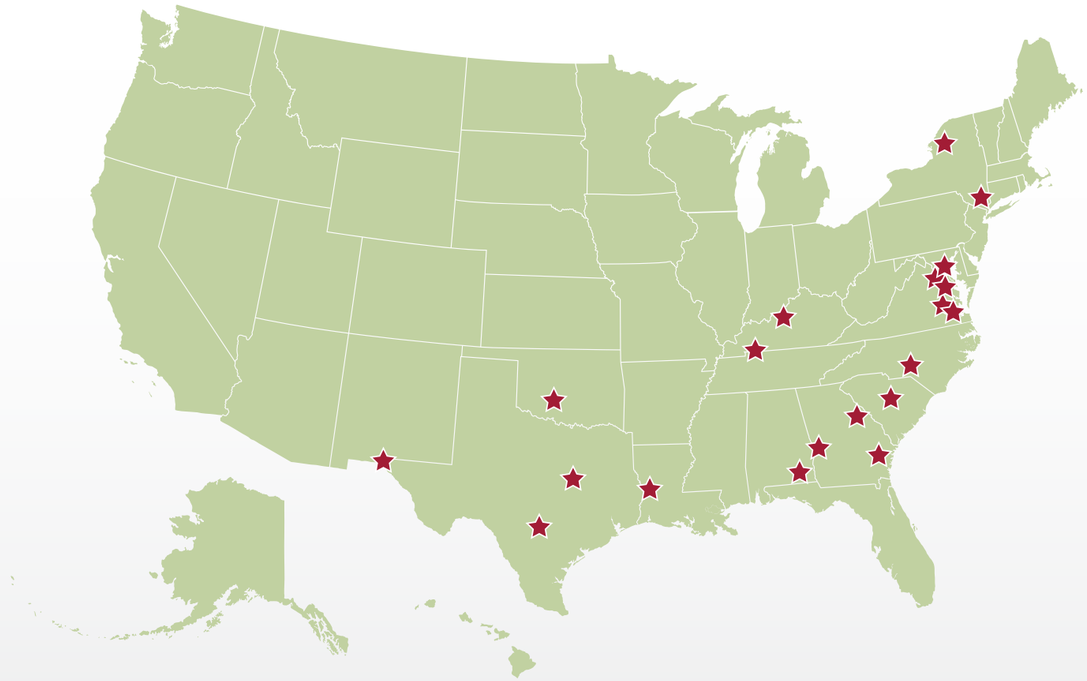
* Medical metric values were not displayed if <20 cases were reported.

NOTES:

For the IHI calculations, air quality status was imputed from the surrounding Air Quality Control Region when no air quality data were available for an installation.

The inclusion of the Army Wellness Center (AWC) or Armed Forces Wellness Center (AFWC) logo on an installation profile page indicates that an AWC/AFWC is located at that installation.

AHLTA - CONUS Installations



AHLTA

AHLTA - CONUS Installations

- Fort Belvoir
- Fort Benning
- Fort Bliss
- Fort Bragg
- Fort Campbell
- Fort Drum
- Fort Gordon
- Fort Hood
- Fort Jackson
- Fort Knox
- Fort Lee
- Fort Meade
- Fort Polk
- Fort Rucker
- Fort Sill
- Fort Stewart
- JB Langley-Eustis
- JB Myer-Henderson Hall
- JB San Antonio
- USAG West Point

Fort Belvoir

Demographics: Approximately 3,000 AC Soldiers
47% <35 years old, 23% female
Main Healthcare Facility: Fort Belvoir Community Hospital
Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,719	1,483	1,368	849–2,084
Behavioral health (%)	26	25	16	11–31
Substance use disorder (%)	2.5	3.3	3.3	1.5–5.4
Sleep disorder (%)	25	19	14	8.5–25
Obesity (%)	26	22	20	16–29
Tobacco product use (%)	17	20	27	12–32
STIs: Chlamydia infection (rate per 1,000)	7.9	16	20	5.1–40
Chronic disease (%)	34	22	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
4 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.69 mg/L

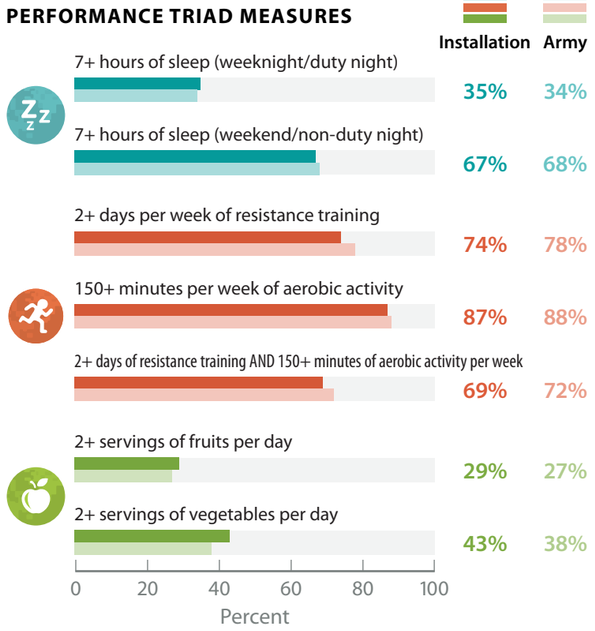
Solid waste diversion rate:
37%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
High

Heat risk:
61 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.9 (20–29th percentile)**

AFWC ARMED FORCES WELLNESS CENTER

Footnotes: See page 90.

Fort Benning

Demographics: Approximately 22,000 AC Soldiers
86% <35 years old, 6% female
Main Healthcare Facility: Martin Army Community Hospital
Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,568	1,670	1,368	849–2,084
Behavioral health (%)	11	14	16	11–31
Substance use disorder (%)	1.7	2.0	3.3	1.5–5.4
Sleep disorder (%)	8.9	14	14	8.5–25
Obesity (%)	17	19	20	16–29
Tobacco product use (%)	28	27	27	12–32
STIs: Chlamydia infection (rate per 1,000)	9.8	12	20	5.1–40
Chronic disease (%)	12	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
3 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.77 mg/L

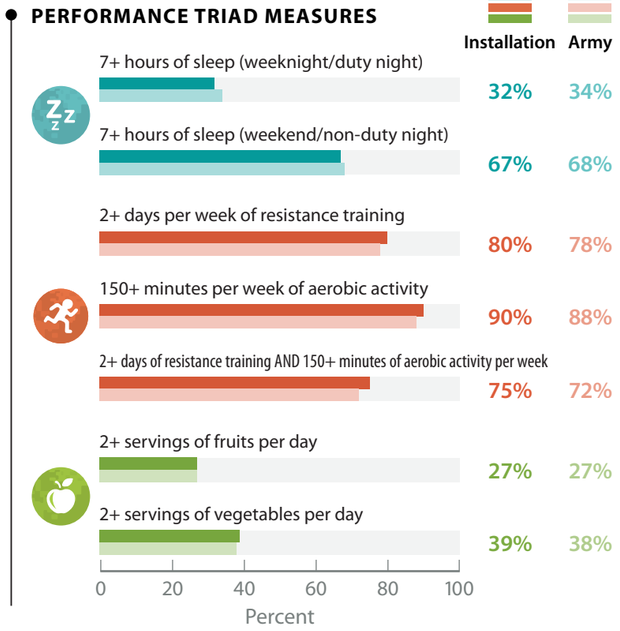
Solid waste diversion rate:
20%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
97 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.6 (20–29th percentile)**

AWC ARMY WELLNESS CENTER

Footnotes: See page 90.

Fort Bliss

Demographics: Approximately 26,000 AC Soldiers
81% <35 years old, 16% female
Main Healthcare Facility: William Beaumont Army Medical Center
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,308	1,360	1,368	849–2,084
Behavioral health (%)	18	19	16	11–31
Substance use disorder (%)	4.6	4.4	3.3	1.5–5.4
Sleep disorder (%)	16	18	14	8.5–25
Obesity (%)	21	22	20	16–29
Tobacco product use (%)	28	28	27	12–32
STIs: Chlamydia infection (rate per 1,000)	34	30	20	5.1–40
Chronic disease (%)	15	18	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
19 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.86 mg/L

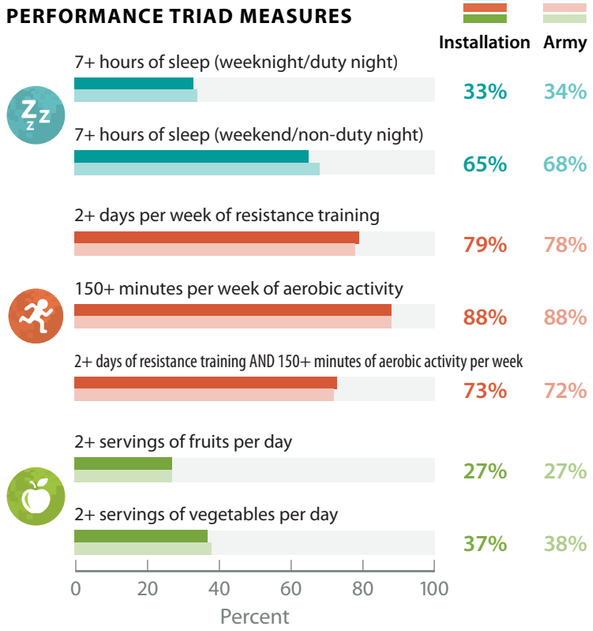
Solid waste diversion rate:
56%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
68 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.8 (20–29th percentile)**

Footnotes: See page 90.

Fort Bragg

Demographics: Approximately 46,000 AC Soldiers
77% <35 years old, 13% female
Main Healthcare Facility: Womack Army Medical Center
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,505	1,535	1,368	849–2,084
Behavioral health (%)	13	14	16	11–31
Substance use disorder (%)	3.7	3.7	3.3	1.5–5.4
Sleep disorder (%)	14	15	14	8.5–25
Obesity (%)	18	18	20	16–29
Tobacco product use (%)	27	27	27	12–32
STIs: Chlamydia infection (rate per 1,000)	23	23	20	5.1–40
Chronic disease (%)	16	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
1 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.67 mg/L

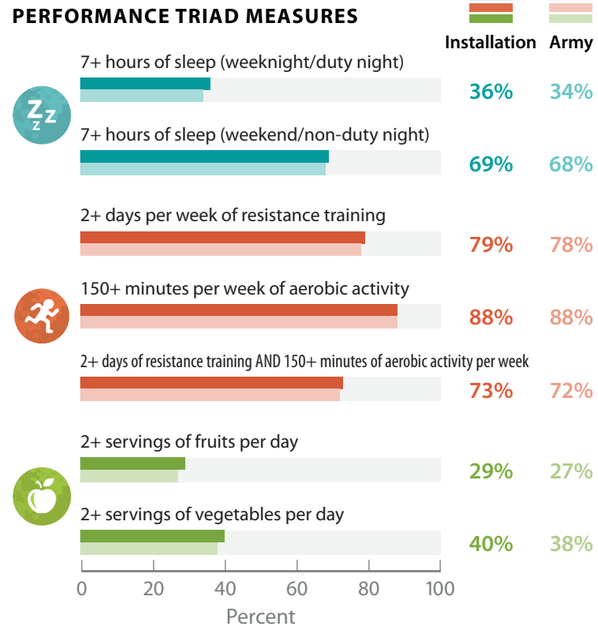
Solid waste diversion rate:
30%

Mosquito-borne disease risk:
High

Lyme disease risk:
Moderate

Heat risk:
85 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.2 (40–49th percentile)**

Footnotes: See page 90.

Fort Campbell

Demographics: Approximately 28,000 AC Soldiers
85% <35 years old, 12% female
Main Healthcare Facility: Blanchfield Army Community Hospital
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,345	1,429	1,368	849–2,084
Behavioral health (%)	15	16	16	11–31
Substance use disorder (%)	3.1	2.9	3.3	1.5–5.4
Sleep disorder (%)	12	15	14	8.5–25
Obesity (%)	20	21	20	16–29
Tobacco product use (%)	30	30	27	12–32
STIs: Chlamydia infection (rate per 1,000)	21	19	20	5.1–40
Chronic disease (%)	14	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.64 mg/L

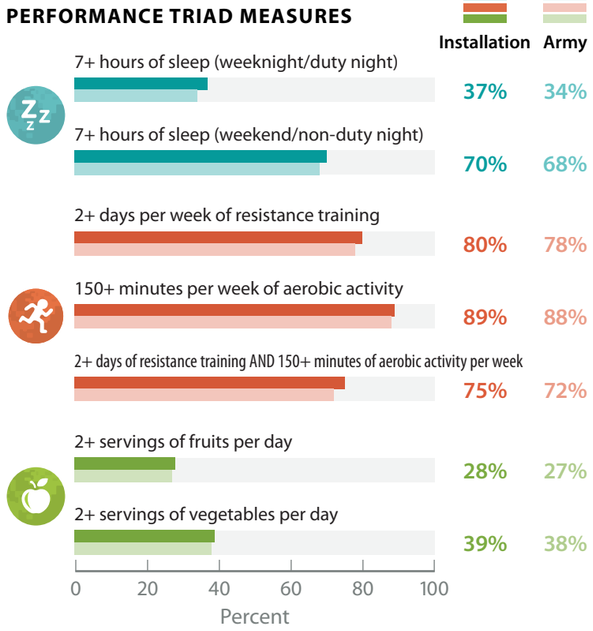
Solid waste diversion rate:
36%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
58 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.4 (30–39th percentile)**

Footnotes: See page 90.

Fort Drum

Demographics: Approximately 15,000 AC Soldiers
86% <35 years old, 12% female
Main Healthcare Facility: Guthrie Army Health Clinic
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,428	1,525	1,368	849–2,084
Behavioral health (%)	13	14	16	11–31
Substance use disorder (%)	3.5	3.2	3.3	1.5–5.4
Sleep disorder (%)	9.4	12	14	8.5–25
Obesity (%)	20	22	20	16–29
Tobacco product use (%)	28	27	27	12–32
STIs: Chlamydia infection (rate per 1,000)	20	17	20	5.1–40
Chronic disease (%)	13	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.73 mg/L

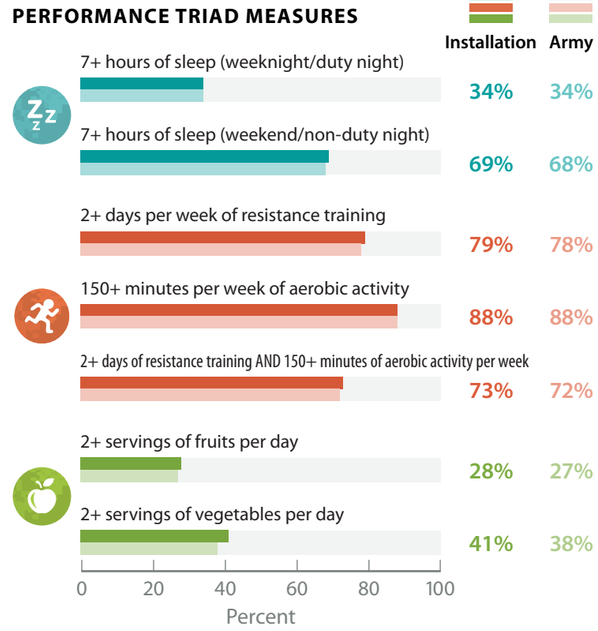
Solid waste diversion rate:
42%

Mosquito-borne disease risk:
Low

Lyme disease risk:
High

Heat risk:
11 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.2 (40–49th percentile)**

Footnotes: See page 90.

Fort Gordon

Demographics: Approximately 8,700 AC Soldiers
73% <35 years old, 19% female
Main Healthcare Facility: Dwight D. Eisenhower Army Medical Center
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,617	1,556	1,368	849–2,084
Behavioral health (%)	19	18	16	11–31
Substance use disorder (%)	2.5	2.5	3.3	1.5–5.4
Sleep disorder (%)	15	15	14	8.5–25
Obesity (%)	26	25	20	16–29
Tobacco product use (%)	21	22	27	12–32
STIs: Chlamydia infection (rate per 1,000)	13	12	20	5.1–40
Chronic disease (%)	20	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
7 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.72 mg/L

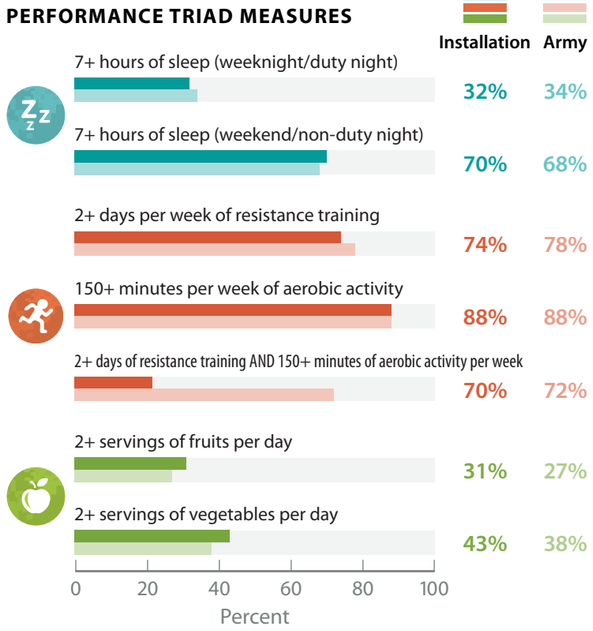
Solid waste diversion rate:
18%

Mosquito-borne disease risk:
High

Lyme disease risk:
Low

Heat risk:
100 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.7 (20–29th percentile)**

Footnotes: See page 90.

Fort Hood

Demographics: Approximately 36,000 AC Soldiers
82% <35 years old, 16% female
Main Healthcare Facility: Carl R. Darnall Army Medical Center
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,417	1,465	1,368	849–2,084
Behavioral health (%)	19	19	16	11–31
Substance use disorder (%)	4.9	4.6	3.3	1.5–5.4
Sleep disorder (%)	15	18	14	8.5–25
Obesity (%)	21	22	20	16–29
Tobacco product use (%)	28	29	27	12–32
STIs: Chlamydia infection (rate per 1,000)	29	25	20	5.1–40
Chronic disease (%)	16	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
3 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.20 mg/L

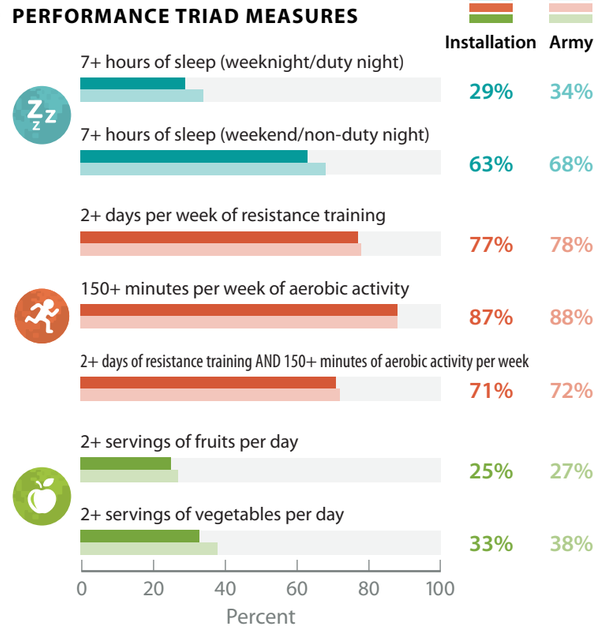
Solid waste diversion rate:
37%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
103 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-1.0 (<20th percentile)**

Footnotes: See page 90.

Fort Jackson

Demographics: Approximately 8,100 AC Soldiers
84% <35 years old, 25% female
Main Healthcare Facility: Moncrief Army Health Clinic
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	2,084	1,927	1,368	849–2,084
Behavioral health (%)	17	17	16	11–31
Substance use disorder (%)	1.5	1.9	3.3	1.5–5.4
Sleep disorder (%)	9.4	12	14	8.5–25
Obesity (%)	16	19	20	16–29
Tobacco product use (%)	24	26	27	12–32
STIs: Chlamydia infection (rate per 1,000)	12	8	20	5.1–40
Chronic disease (%)	15	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
1 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.50 mg/L

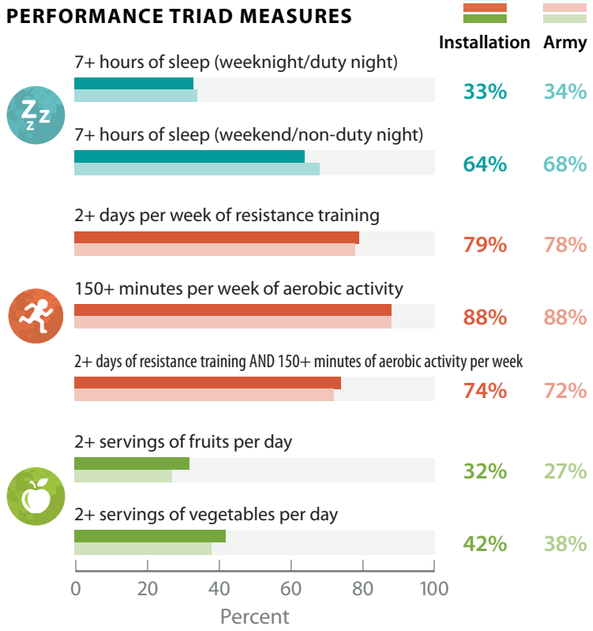
Solid waste diversion rate:
29%

Mosquito-borne disease risk:
High

Lyme disease risk:
Low

Heat risk:
85 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.7 (20–29th percentile)**

Footnotes: See page 90.

Fort Knox

Demographics: Approximately 5,100 AC Soldiers
62% <35 years old, 23% female
Main Healthcare Facility: Ireland Army Community Hospital
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,651	1,459	1,368	849–2,084
Behavioral health (%)	23	20	16	11–31
Substance use disorder (%)	2.0	2.1	3.3	1.5–5.4
Sleep disorder (%)	24	19	14	8.5–25
Obesity (%)	25	22	20	16–29
Tobacco product use (%)	22	23	27	12–32
STIs: Chlamydia infection (rate per 1,000)	12	12	20	5.1–40
Chronic disease (%)	32	24	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
1 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.67 mg/L

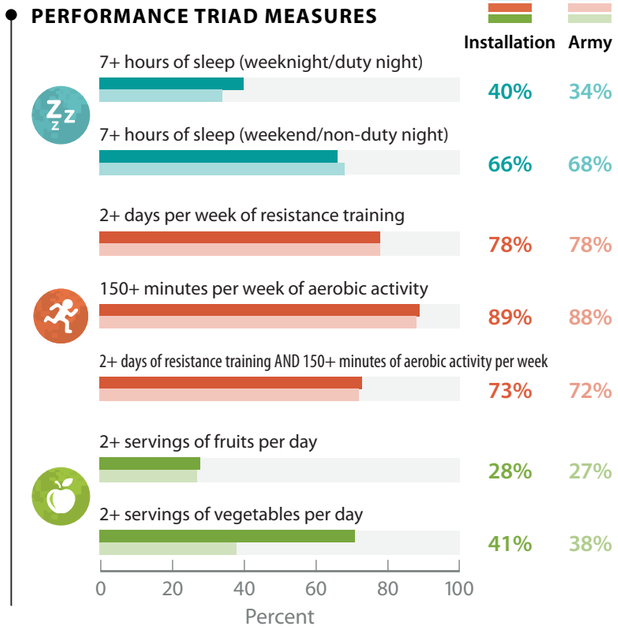
Solid waste diversion rate:
46%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
37 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-1.1 (<20th percentile)**

Footnotes: See page 90.

Fort Lee

Demographics: Approximately 6,500 AC Soldiers
77% <35 years old, 23% female
Main Healthcare Facility: Kenner Army Health Clinic
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,722	1,642	1,368	849–2,084
Behavioral health (%)	18	17	16	11–31
Substance use disorder (%)	2.4	2.4	3.3	1.5–5.4
Sleep disorder (%)	14	15	14	8.5–25
Obesity (%)	19	20	20	16–29
Tobacco product use (%)	21	22	27	12–32
STIs: Chlamydia infection (rate per 1,000)	5.1	4.1	20	5.1–40
Chronic disease (%)	19	20	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
No data

Poor water quality:
0 days/year

Water fluoridation:
0.46 mg/L

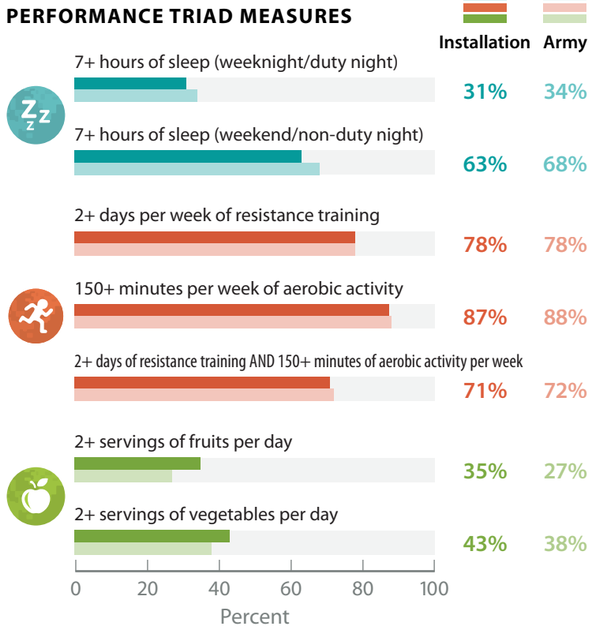
Solid waste diversion rate:
30%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
61 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.5 (30–39th percentile)**

Footnotes: See page 90.

Fort Meade

Demographics: Approximately 4,100 AC Soldiers
62% <35 years old, 20% female
Main Healthcare Facility: Kimbrough Ambulatory Care Center
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,430	1,276	1,368	849–2,084
Behavioral health (%)	23	21	16	11–31
Substance use disorder (%)	2.5	2.7	3.3	1.5–5.4
Sleep disorder (%)	21	18	14	8.5–25
Obesity (%)	29	27	20	16–29
Tobacco product use (%)	20	22	27	12–32
STIs: Chlamydia infection (rate per 1,000)	Data suppressed	Data suppressed	20	5.1–40
Chronic disease (%)	25	20	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
1 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.62 mg/L

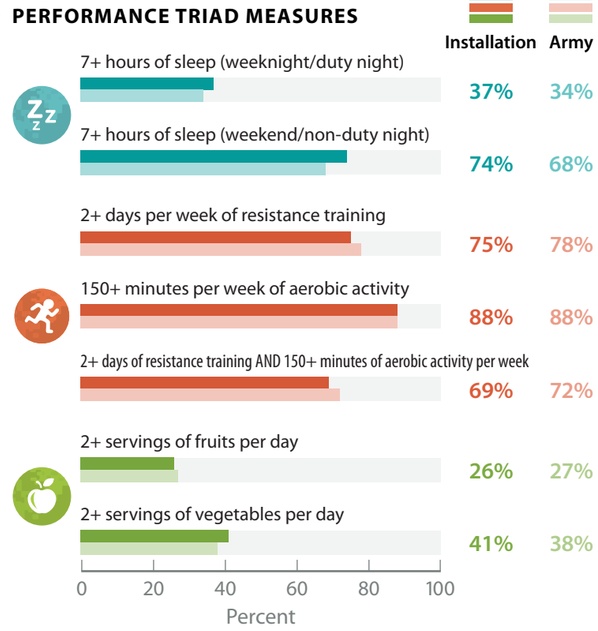
Solid waste diversion rate:
34%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
65 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.6 (20–29th percentile)**

Footnotes: See page 90.

Fort Polk

Demographics: Approximately 7,800 AC Soldiers
82% <35 years old, 13% female

Main Healthcare Facility: Bayne-Jones Army Community Hospital

Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,226	1,307	1,368	849–2,084
Behavioral health (%)	21	22	16	11–31
Substance use disorder (%)	5.4	5.0	3.3	1.5–5.4
Sleep disorder (%)	16	19	14	8.5–25
Obesity (%)	19	21	20	16–29
Tobacco product use (%)	31	31	27	12–32
STIs: Chlamydia infection (rate per 1,000)	25	22	20	5.1–40
Chronic disease (%)	19	23	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
No data

Poor water quality:
0 days/year

Water fluoridation:
0.90 mg/L

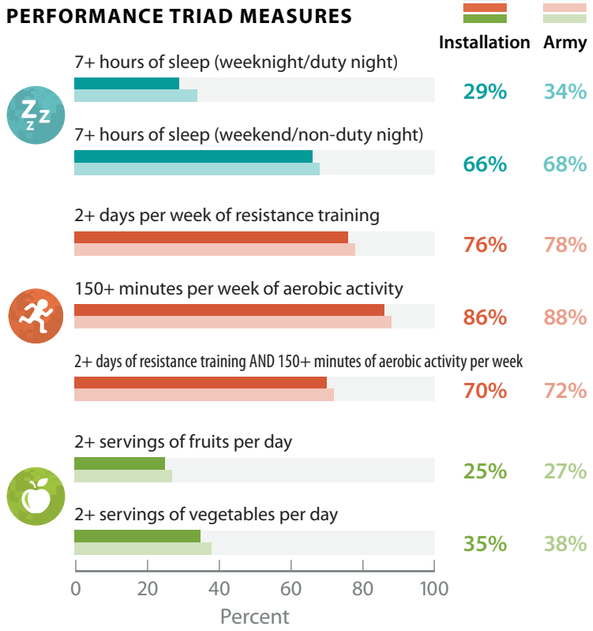
Solid waste diversion rate:
55%

Mosquito-borne disease risk:
High

Lyme disease risk:
Modareate

Heat risk:
109 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-1.3(<20th percentile)**

Footnotes: See page 90.

Fort Rucker

Demographics: Approximately 2,800 AC Soldiers
65% <35 years old, 16% female

Main Healthcare Facility: Lyster Army Health Center

Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,651	1,501	1,368	849–2,084
Behavioral health (%)	12	11	16	11–31
Substance use disorder (%)	1.7	1.8	3.3	1.5–5.4
Sleep disorder (%)	18	16	14	8.5–25
Obesity (%)	22	20	20	16–29
Tobacco product use (%)	17	17	27	12–32
STIs: Chlamydia infection (rate per 1,000)	11	10	20	5.1–40
Chronic disease (%)	23	20	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
No Data

Poor water quality:
0 days/year

Water fluoridation:
0.68 mg/L

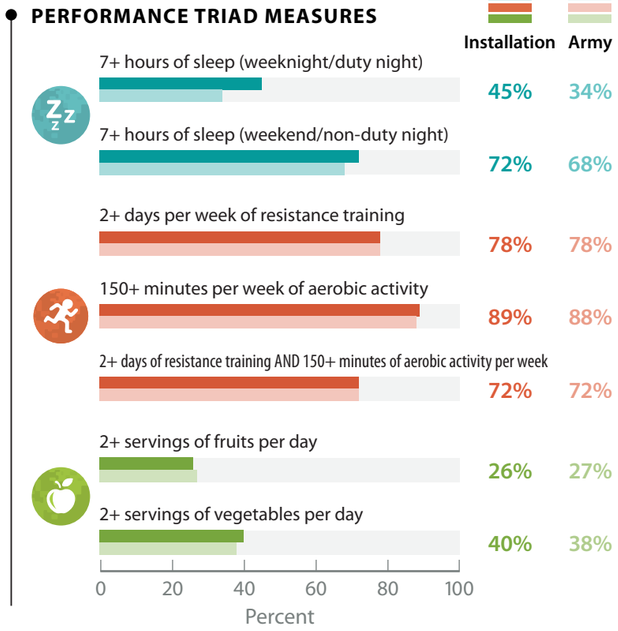
Solid waste diversion rate:
57%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
88 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.1 (50–59th percentile)**

Footnotes: See page 90.

Fort Sill

Demographics: Approximately 12,000 AC Soldiers
85% <35 years old, 16% female
Main Healthcare Facility: Reynolds Army Community Hospital
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,703	1,762	1,368	849–2,084
Behavioral health (%)	22	24	16	11–31
Substance use disorder (%)	3.9	3.9	3.3	1.5–5.4
Sleep disorder (%)	14	18	14	8.5–25
Obesity (%)	22	24	20	16–29
Tobacco product use (%)	32	32	27	12–32
STIs: Chlamydia infection (rate per 1,000)	13	11	20	5.1–40
Chronic disease (%)	15	21	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
2 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.61 mg/L

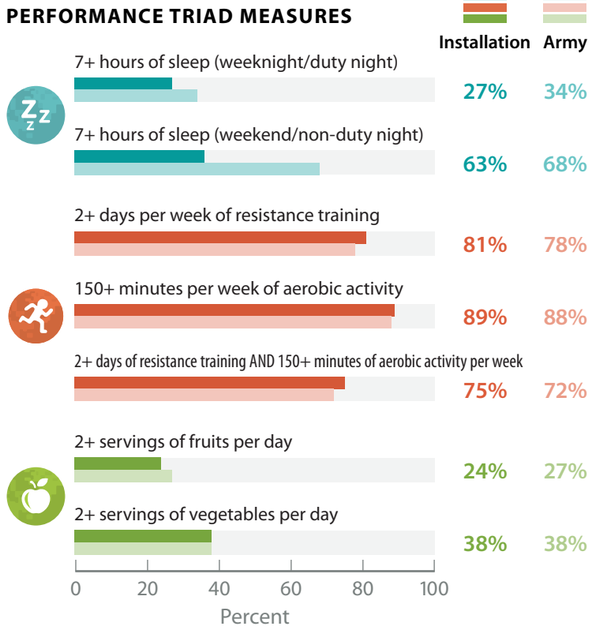
Solid waste diversion rate:
44%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
103 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-2.1 (<20th percentile)**

Footnotes: See page 90.

Fort Stewart

Demographics: Approximately 20,000 AC Soldiers
84% <35 years old, 16% female
Main Healthcare Facility: Winn Army Community Hospital
Electronic Health Record: AHLTA

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,338	1,387	1,368	849–2,084
Behavioral health (%)	19	20	16	11–31
Substance use disorder (%)	4.1	4.0	3.3	1.5–5.4
Sleep disorder (%)	14	16	14	8.5–25
Obesity (%)	20	21	20	16–29
Tobacco product use (%)	29	29	27	12–32
STIs: Chlamydia infection (rate per 1,000)	28	24	20	5.1–40
Chronic disease (%)	16	20	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
No Data

Poor water quality:
0 days/year

Water fluoridation:
0.99 mg/L

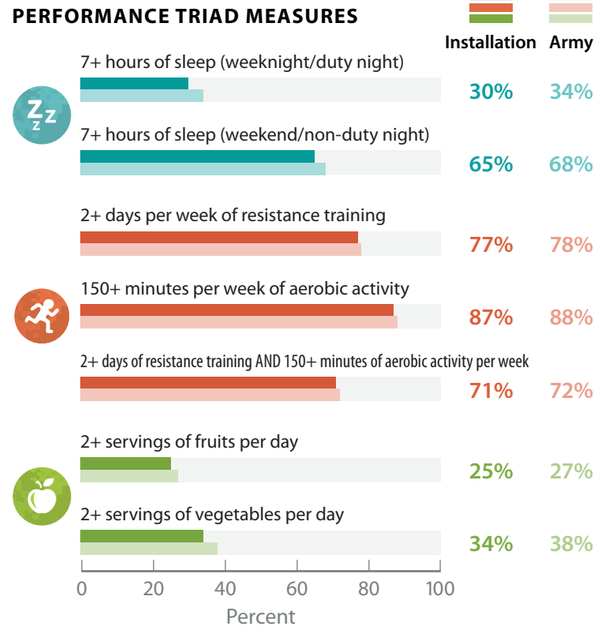
Solid waste diversion rate:
62%

Mosquito-borne disease risk:
High

Lyme disease risk:
Moderate

Heat risk:
105 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.8 (20–29th percentile)**

Footnotes: See page 90.

JB Langley-Eustis

Demographics: Approximately 5,000 AC Soldiers
69% <35 years old, 17% female
Main Healthcare Facility: McDonald Army Health Clinic
Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,826	1,774	1,368	849–2,084
Behavioral health (%)	19	18	16	11–31
Substance use disorder (%)	2.4	2.4	3.3	1.5–5.4
Sleep disorder (%)	16	15	14	8.5–25
Obesity (%)	24	24	20	16–29
Tobacco product use (%)	23	24	27	12–32
STIs: Chlamydia infection (rate per 1,000)	19	19	20	5.1–40
Chronic disease (%)	24	21	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.74 mg/L

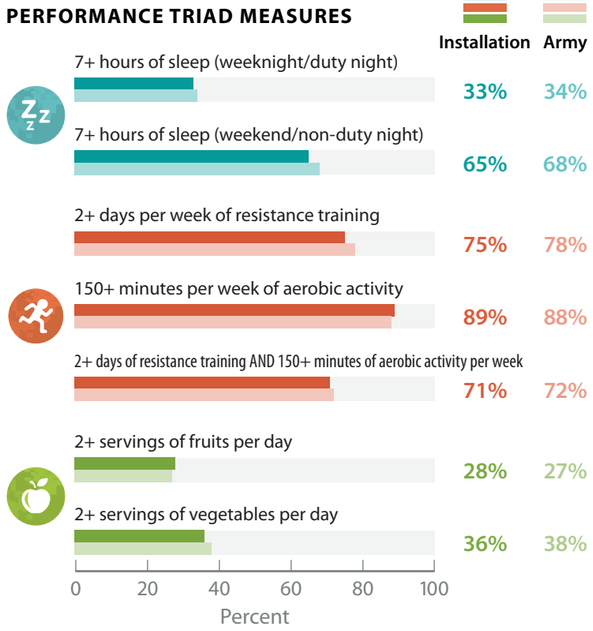
Solid waste diversion rate:
59%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
71 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-1.4 (<20th percentile)**

AFWC ARMED FORCES WELLNESS CENTER

Footnotes: See page 90.

JB Myer-Henderson Hall

Demographics: Approximately 2,100 AC Soldiers
76% <35 years old, 12% female
Main Healthcare Facility: Andrew Rader U.S. Army Health Clinic
Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,277	1,286	1,368	849–2,084
Behavioral health (%)	18	19	16	11–31
Substance use disorder (%)	2.5	2.4	3.3	1.5–5.4
Sleep disorder (%)	12	13	14	8.5–25
Obesity (%)	17	17	20	16–29
Tobacco product use (%)	22	23	27	12–32
STIs: Chlamydia infection (rate per 1,000)	17	18	20	5.1–40
Chronic disease (%)	16	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
4 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.70 mg/L

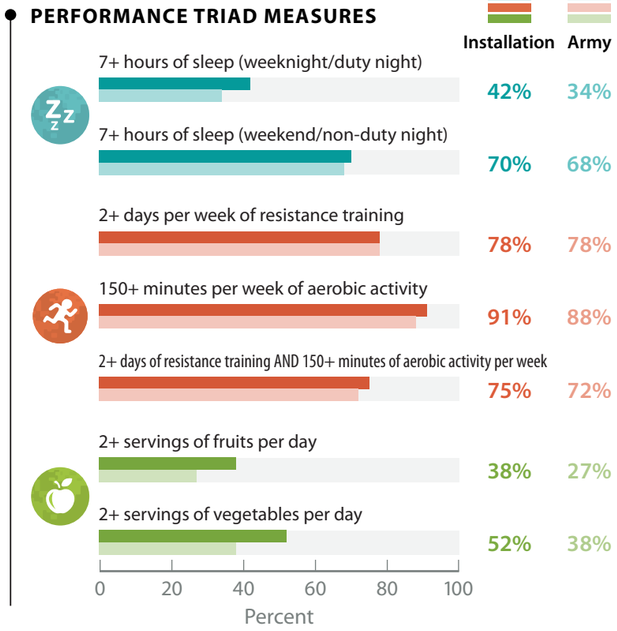
Solid waste diversion rate:
52%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
62 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **1.0 (80–89th percentile)**

AWC ARMY WELLNESS CENTER

Footnotes: See page 90.

JB San Antonio

Demographics: Approximately 7,700 AC Soldiers
60% <35 years old, 30% female
Main Healthcare Facility: Brooke Army Medical Center
Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,620	1,409	1,368	849–2,084
Behavioral health (%)	24	21	16	11–31
Substance use disorder (%)	2.1	2.2	3.3	1.5–5.4
Sleep disorder (%)	23	19	14	8.5–25
Obesity (%)	22	21	20	16–29
Tobacco product use (%)	14	18	27	12–32
STIs: Chlamydia infection (rate per 1,000)	13	13	20	5.1–40
Chronic disease (%)	29	22	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
12 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.25 mg/L

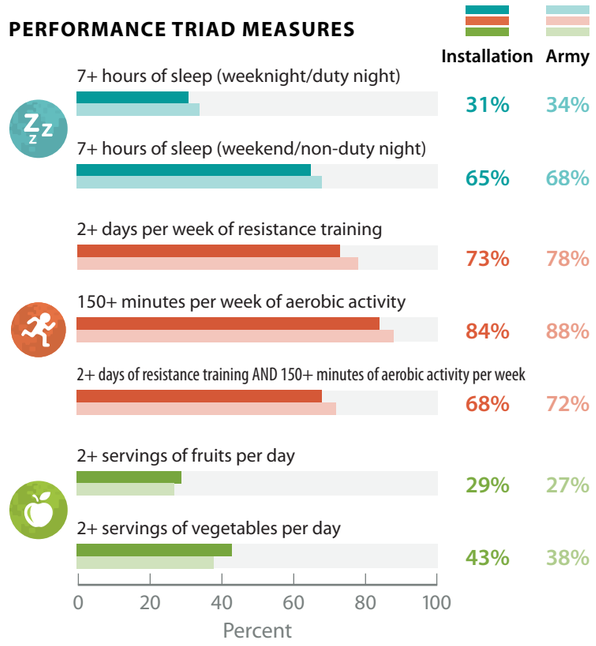
Solid waste diversion rate:
24%

Mosquito-borne disease risk:
High

Lyme disease risk:
Moderate

Heat risk:
132 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.5 (30–39th percentile)**

AFWC ARMED FORCES WELLNESS CENTER

Footnotes: See page 90.

USAG West Point

Demographics: Approximately 1,500 AC Soldiers
54% <35 years old, 20% female
Main Healthcare Facility: Keller Army Community Hospital
Electronic Health Record: AHLTA

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,329	1,187	1,368	849–2,084
Behavioral health (%)	17	15	16	11–31
Substance use disorder (%)	2.1	2.4	3.3	1.5–5.4
Sleep disorder (%)	13	11	14	8.5–25
Obesity (%)	17	17	20	16–29
Tobacco product use (%)	12	16	27	12–32
STIs: Chlamydia infection (rate per 1,000)	Data Suppressed	Data Suppressed	20	5.1–40
Chronic disease (%)	27	22	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
1 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.69 mg/L

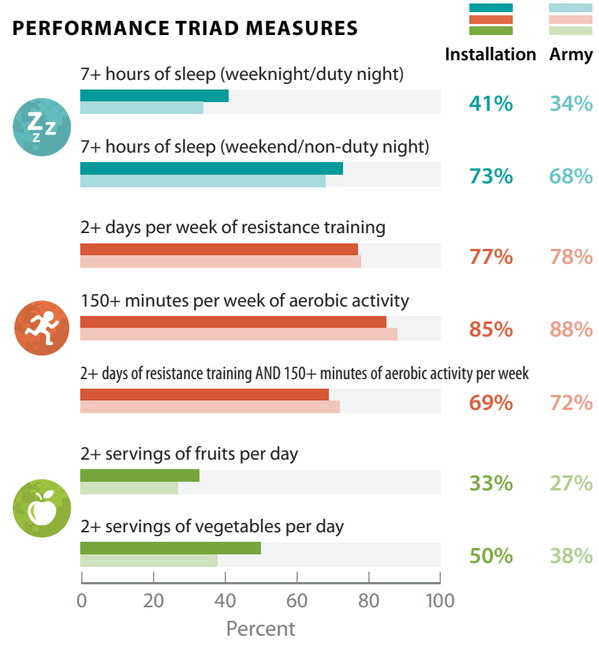
Solid waste diversion rate:
50%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
High

Heat risk:
28 days/year

PERFORMANCE TRIAD MEASURES

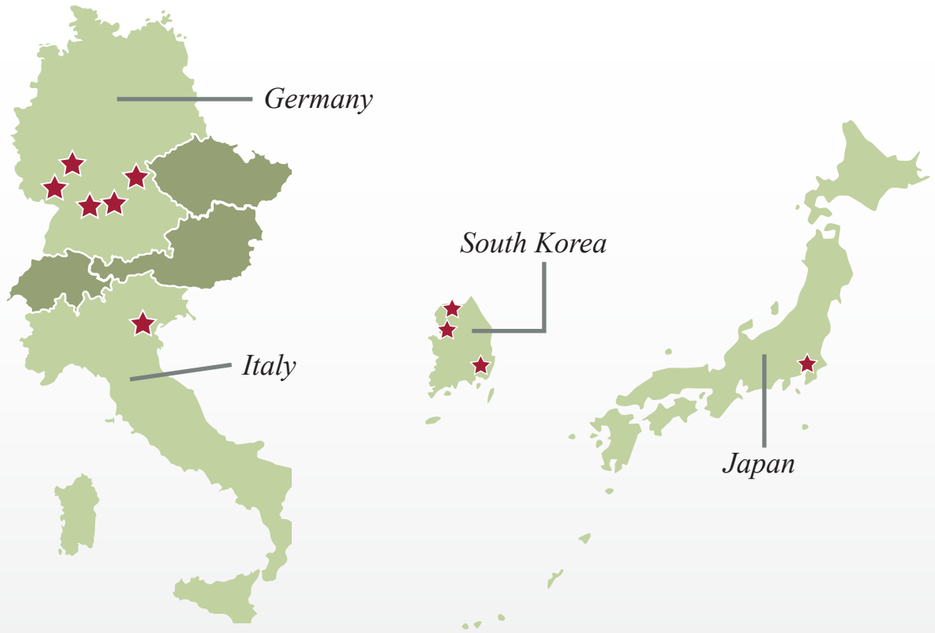


Installation Health Index Score[5]: **1.4 (≥90th percentile)**

AWC ARMY WELLNESS CENTER

Footnotes: See page 90.

AHLTA - OCONUS Installations



AHLTA - OCONUS Installations

Japan
USAG Ansbach
USAG Bavaria
USAG Daegu
USAG Humphreys
USAG Rheinland-Pfalz
USAG Stuttgart
USAG Vicenza
USAG Wiesbaden
USAG Yongsan-Casey

Japan

Demographics: Approximately 2,600 AC Soldiers
74% <35 years old, 14% female
Main Healthcare Facility: The BG Crawford F. Sams U.S. Army Health Clinic
Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,124	1,122	1,368	849–2,084
Behavioral health (%)	14	14	16	11–31
Substance use disorder (%)	2.2	2.2	3.3	1.5–5.4
Sleep disorder (%)	10	10	14	8.5–25
Obesity (%)	23	23	20	16–29
Tobacco product use (%)	24	24	27	12–32
STIs: Chlamydia infection (rate per 1,000)	19	21	20	5.1–40
Chronic disease (%)	18	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
14 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.99 mg/L

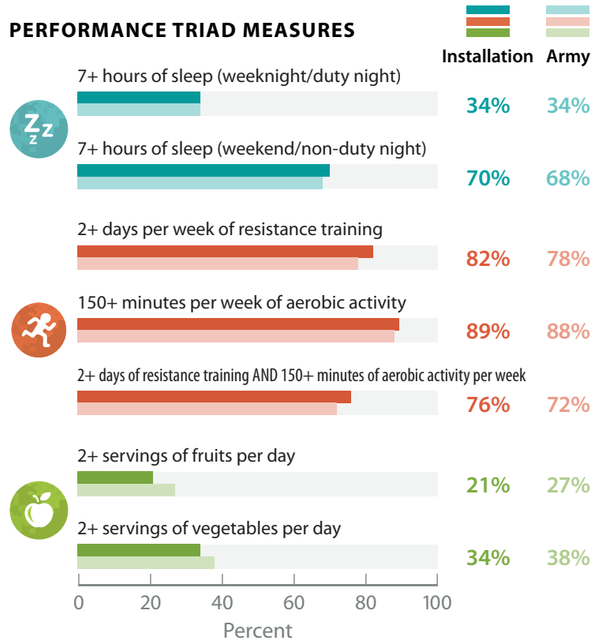
Solid waste diversion rate:
40%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
51 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.9 (80–89th percentile)**

Footnotes: See page 90.

USAG Ansbach

Demographics: Approximately 1,200 AC Soldiers
83% <35 years old, 14% female

Main Healthcare Facility: Ansbach Army Health Clinic;
Landstuhl Regional Medical Center

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	976	1,020	1,368	849–2,084
Behavioral health (%)	15	15	16	11–31
Substance use disorder (%)	3.4	2.9	3.3	1.5–5.4
Sleep disorder (%)	10	12	14	8.5–25
Obesity (%)	19	20	20	16–29
Tobacco product use (%)	30	29	27	12–32
STIs: Chlamydia infection (rate per 1,000)	30	27	20	5.1–40
Chronic disease (%)	11	14	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.60 mg/L

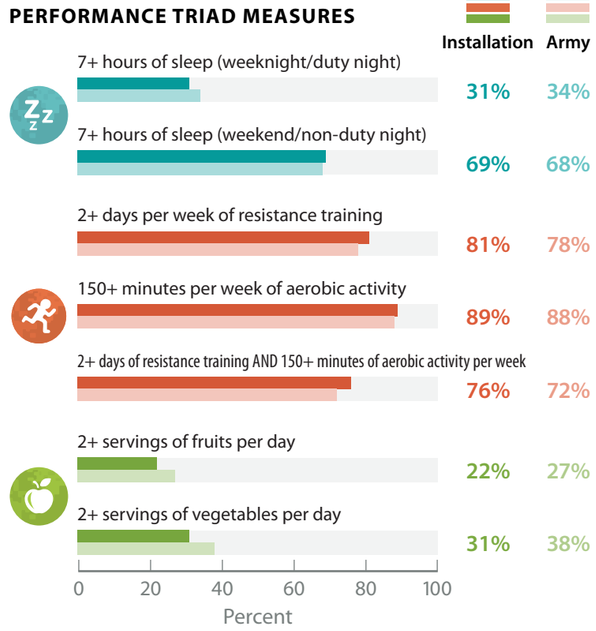
Solid waste diversion rate:
63%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
High

Heat risk:
0 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **1.4 (≥90th percentile)**

Footnotes: See page 90.

USAG Bavaria

Demographics: Approximately 10,000 AC Soldiers
85% <35 years old, 13% female

Main Healthcare Facility: U.S. Army Health Clinic Grafenwoehr

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,092	1,148	1,368	849–2,084
Behavioral health (%)	15	15	16	11–31
Substance use disorder (%)	3.7	3.4	3.3	1.5–5.4
Sleep disorder (%)	11	13	14	8.5–25
Obesity (%)	18	19	20	16–29
Tobacco product use (%)	32	30	27	12–32
STIs: Chlamydia infection (rate per 1,000)	22	19	20	5.1–40
Chronic disease (%)	13	18	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
365 days/year

Water fluoridation:
0.64 mg/L

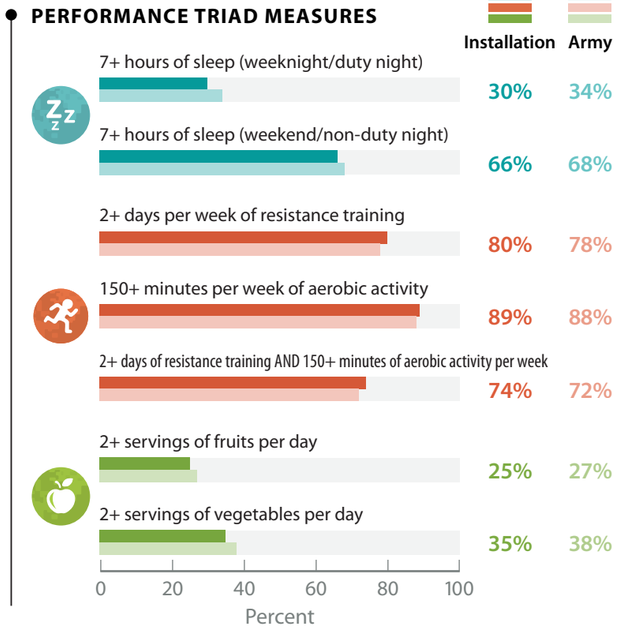
Solid waste diversion rate:
50%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
High

Heat risk:
11 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.7 (70–79th percentile)**

Footnotes: See page 90.

USAG Daegu

Demographics: Approximately 3,100 AC Soldiers
77% <35 years old, 20% female
Main Healthcare Facility: Wood Army Health Clinic
Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,037	1,033	1,368	849–2,084
Behavioral health (%)	13	13	16	11–31
Substance use disorder (%)	2.2	2.2	3.3	1.5–5.4
Sleep disorder (%)	13	14	14	8.5–25
Obesity (%)	19	20	20	16–29
Tobacco product use (%)	26	27	27	12–32
STIs: Chlamydia infection (rate per 1,000)	39	32	20	5.1–40
Chronic disease (%)	16	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
51 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.70 mg/L

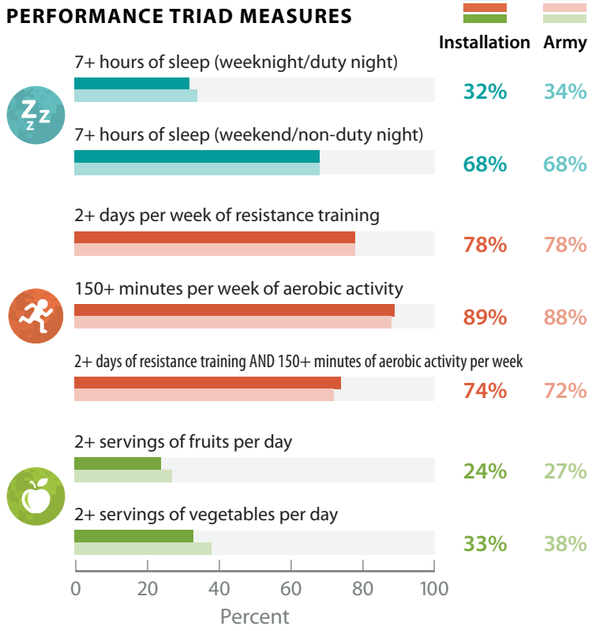
Solid waste diversion rate:
67%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
45 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.5 (70–79th percentile)**

Footnotes: See page 90.

USAG Humphreys

Demographics: Approximately 7,800 AC Soldiers
78% <35 years old, 18% female
Main Healthcare Facility: Brian D. Allgood Army Community Hospital
Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,105	1,100	1,368	849–2,084
Behavioral health (%)	14	14	16	11–31
Substance use disorder (%)	3.5	3.4	3.3	1.5–5.4
Sleep disorder (%)	12	13	14	8.5–25
Obesity (%)	18	19	20	16–29
Tobacco product use (%)	25	25	27	12–32
STIs: Chlamydia infection (rate per 1,000)	40	32	20	5.1–40
Chronic disease (%)	14	16	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
113 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.0 mg/L

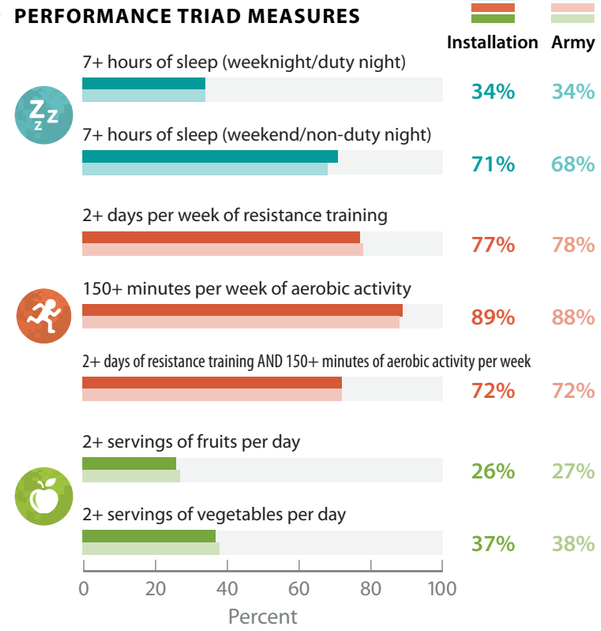
Solid waste diversion rate:
75%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
42 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.8 (70–79th percentile)**

Footnotes: See page 90.

USAG Rheinland-Pfalz

Demographics: Approximately 6,400 AC Soldiers
73% <35 years old, 22% female

Main Healthcare Facility: Kleber Health Clinic (aka U.S. Army Health Clinic Kaiserslautern); Landstuhl Regional Medical Center

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,429	1,368	1,368	849–2,084
Behavioral health (%)	21	20	16	11–31
Substance use disorder (%)	4.1	4.3	3.3	1.5–5.4
Sleep disorder (%)	20	20	14	8.5–25
Obesity (%)	21	22	20	16–29
Tobacco product use (%)	24	25	27	12–32
STIs: Chlamydia infection (rate per 1,000)	31	31	20	5.1–40
Chronic disease (%)	21	20	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.73 mg/L

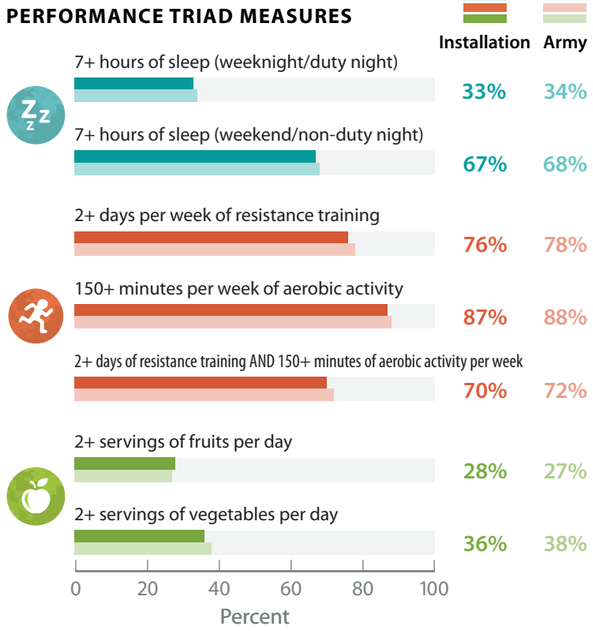
Solid waste diversion rate:
40%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
High

Heat risk:
4 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.8 (20–29th percentile)**

Footnotes: See page 90.

USAG Stuttgart

Demographics: Approximately 1,600 AC Soldiers
55% <35 years old, 13% female

Main Healthcare Facility: The Stuttgart Army Health Clinic

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,485	1,349	1,368	849–2,084
Behavioral health (%)	18	17	16	11–31
Substance use disorder (%)	3.4	4.1	3.3	1.5–5.4
Sleep disorder (%)	23	19	14	8.5–25
Obesity (%)	21	17	20	16–29
Tobacco product use (%)	24	26	27	12–32
STIs: Chlamydia infection (rate per 1,000)	18	28	20	5.1–40
Chronic disease (%)	25	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
2 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.80 mg/L

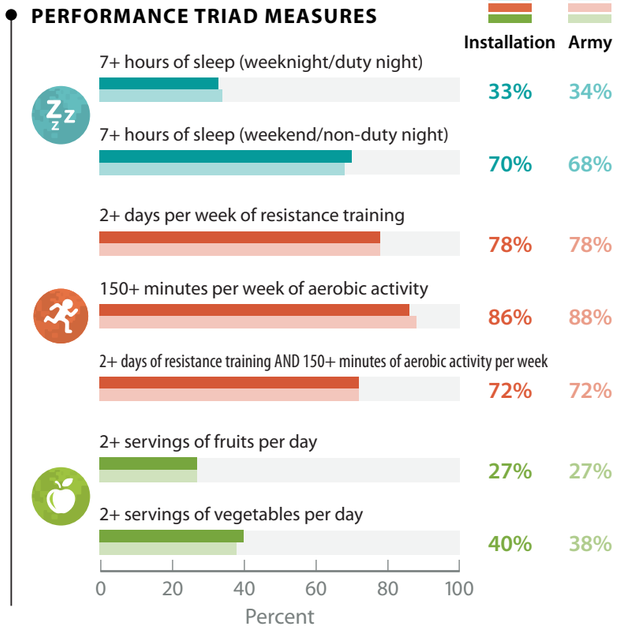
Solid waste diversion rate:
58%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
High

Heat risk:
3 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.1 (40–49th percentile)**

Footnotes: See page 90.

USAG Vicenza

Demographics: Approximately 3,600 AC Soldiers
80% <35 years old, 12% female

Main Healthcare Facility: Vicenza Army Health Clinic

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,071	1,126	1,368	849–2,084
Behavioral health (%)	14	15	16	11–31
Substance use disorder (%)	3.8	3.5	3.3	1.5–5.4
Sleep disorder (%)	11	13	14	8.5–25
Obesity (%)	16	17	20	16–29
Tobacco product use (%)	29	27	27	12–32
STIs: Chlamydia infection (rate per 1,000)	18	18	20	5.1–40
Chronic disease (%)	13	15	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
97 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.0 mg/L

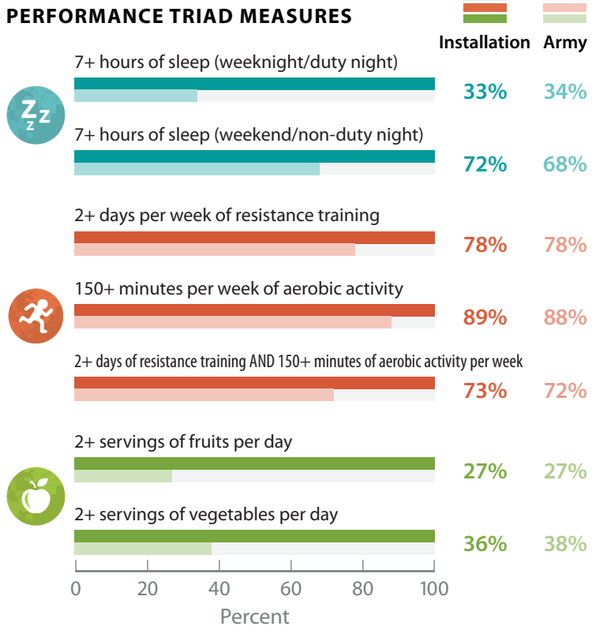
Solid waste diversion rate:
56%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
47 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **1.1 (80–89th percentile)**

Footnotes: See page 90.

USAG Wiesbaden

Demographics: Approximately 1,400 AC Soldiers
73% <35 years old, 19% female

Main Healthcare Facility: U.S. Army Health Clinic Wiesbaden; Landstuhl Regional Medical Center

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,250	1,216	1,368	849–2,084
Behavioral health (%)	18	17	16	11–31
Substance use disorder (%)	3.3	3.4	3.3	1.5–5.4
Sleep disorder (%)	17	17	14	8.5–25
Obesity (%)	20	20	20	16–29
Tobacco product use (%)	24	25	27	12–32
STIs: Chlamydia infection (rate per 1,000)	21	20	20	5.1–40
Chronic disease (%)	19	18	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
5 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.0 mg/L

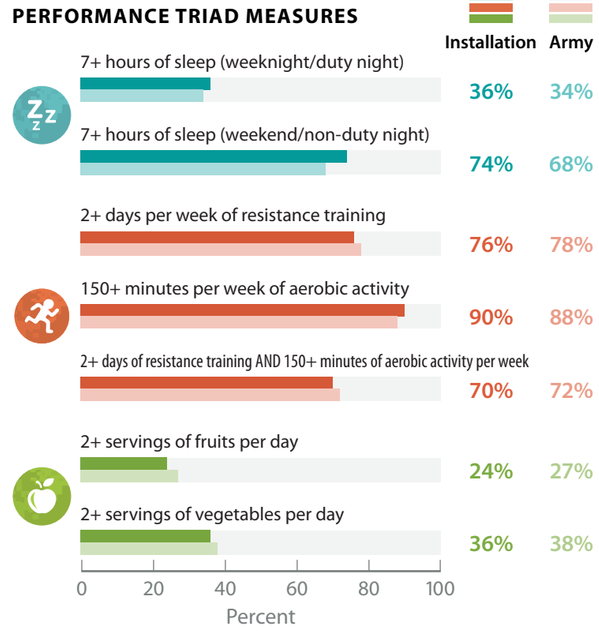
Solid waste diversion rate:
55%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
2 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.1 (50–59th percentile)**

Footnotes: See page 90.

USAG Yongsan-Casey

Demographics: Approximately 4,700 AC Soldiers
76% <35 years old, 16% female

Main Healthcare Facility: USAG Yongsan Hospital/Camp Casey Health Clinic SCMH

Electronic Health Record: AHLTA OCONUS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,101	1,097	1,368	849–2,084
Behavioral health (%)	13	14	16	11–31
Substance use disorder (%)	3.3	3.2	3.3	1.5–5.4
Sleep disorder (%)	13	13	14	8.5–25
Obesity (%)	19	20	20	16–29
Tobacco product use (%)	28	28	27	12–32
STIs: Chlamydia infection (rate per 1,000)	34	30	20	5.1–40
Chronic disease (%)	15	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Yongsan	Casey
Poor air quality: **38 days/year**	Poor air quality: **52 days/year**
Poor water quality: **0 days/year**	Poor water quality: **0 days/year**
Water fluoridation: **0.25 mg/L**	Water fluoridation: **No data**
Solid waste diversion rate: **34%**	Solid waste diversion rate: **54%**
Mosquito-borne disease risk: **Moderate**	Mosquito-borne disease risk: **Moderate**
Lyme disease risk: **Moderate**	Lyme disease risk: **Moderate**
Heat risk: **41 days/year**	Heat risk: **36 days/year**

PERFORMANCE TRIAD MEASURES

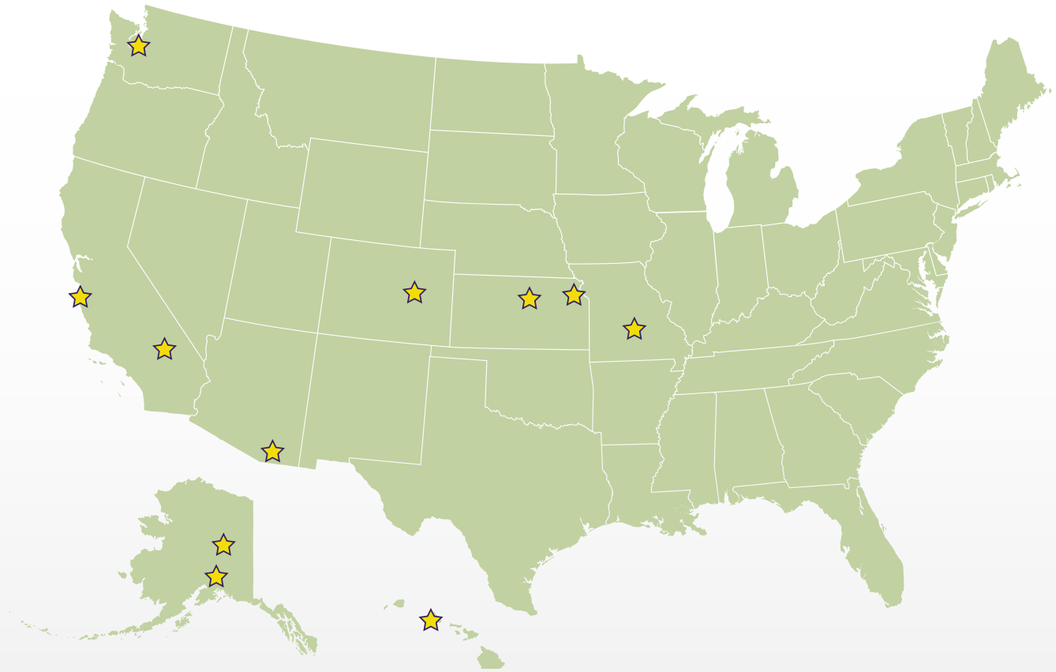
	Installation	Army
7+ hours of sleep (weeknight/duty night)	33%	34%
7+ hours of sleep (weekend or non-duty night)	70%	68%
2+ days per week of resistance training	79%	78%
150+ minutes per week of aerobic activity	86%	88%
2+ days of resistance training AND 150+ minutes of aerobic activity per week	70%	72%
2+ servings of fruits per day	28%	27%
2+ servings of vegetables per day	36%	38%

Installation Health Index Score[5]: **0.5 (60–69th percentile)**

AWC ARMY WELLNESS CENTER

Footnotes: See page 90.

MHS GENESIS Installations



DEPARTMENT OF DEFENSE MHS GENESIS® MILITARY HEALTH SYSTEM

MHS GENESIS Transition Dates

10.21.2017 – **JB Lewis-McChord**
09.01.2019 – **Presidio of Monterey**
09.26.2020 – **Fort Irwin**
10.31.2020 – **Fort Wainwright**
10.31.2020 – **JB Elmendorf-Richardson**
04.24.2021 – **Fort Huachuca**
04.24.2021 – **Fort Carson**
04.24.2021 – **Fort Leavenworth**
04.24.2021 – **Fort Leonard Wood**
04.24.2021 – **Fort Riley**
09.25.2021 – **Hawaii**

Fort Carson

Demographics: Approximately 26,000 AC Soldiers
84% <35 years old, 14% female
Main Healthcare Facility: Evans Army Community Hospital
Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,054	1,116	1,368	849–2,084
Behavioral health (%)	16	16	16	11–31
Substance use disorder (%)	4.5	4.2	3.3	1.5–5.4
Sleep disorder (%)	12	14	14	8.5–25
Obesity (%)	18	19	20	16–29
Tobacco product use (%)	30	29	27	12–32
STIs: Chlamydia infection (rate per 1,000)	19	17	20	5.1–40
Chronic disease (%)	13	17	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
28 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.50 mg/L

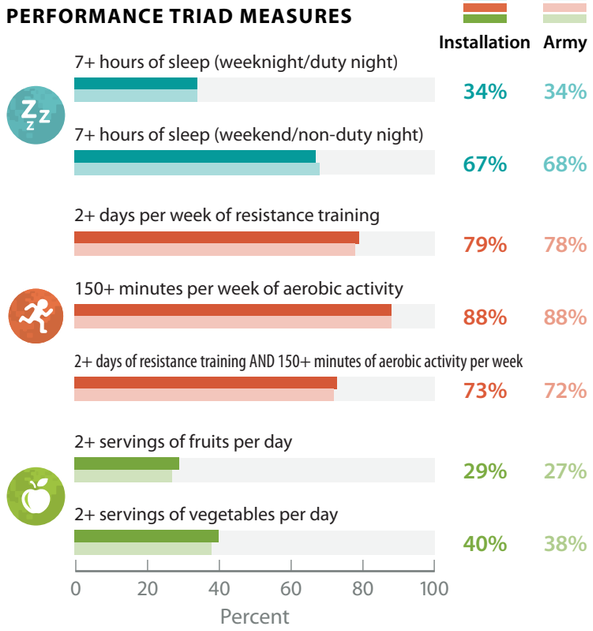
Solid waste diversion rate:
38%

Mosquito-borne disease risk:
Low

Lyme disease risk:
Low

Heat risk:
1 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.5 (60–69th percentile)**

Footnotes: See page 90.

Fort Huachuca

Demographics: Approximately 4,100 AC Soldiers
78% <35 years old, 17% female
Main Healthcare Facility: Raymond W. Bliss Army Health Clinic
Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,325	1,320	1,368	849–2,084
Behavioral health (%)	13	13	16	11–31
Substance use disorder (%)	2.3	2.3	3.3	1.5–5.4
Sleep disorder (%)	12	13	14	8.5–25
Obesity (%)	20	20	20	16–29
Tobacco product use (%)	24	25	27	12–32
STIs: Chlamydia infection (rate per 1,000)	7.9	7.0	20	5.1–40
Chronic disease (%)	20	21	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
2 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.65 mg/L

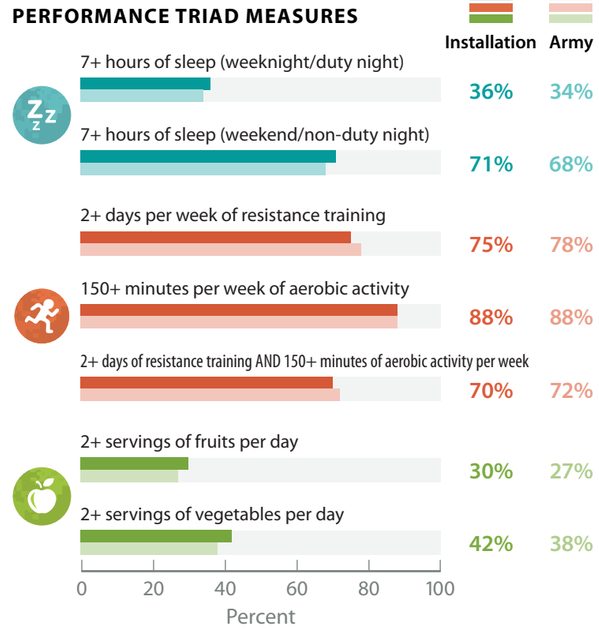
Solid waste diversion rate:
0%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
25 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.3 (60–69th percentile)**

Footnotes: See page 90.

Fort Irwin

Demographics: Approximately 4,200 AC Soldiers
77% <35 years old, 14% female
Main Healthcare Facility: Weed Army Community Hospital
Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,185	1,195	1,368	849–2,084
Behavioral health (%)	17	16	16	11–31
Substance use disorder (%)	4.8	4.5	3.3	1.5–5.4
Sleep disorder (%)	15	16	14	8.5–25
Obesity (%)	23	23	20	16–29
Tobacco product use (%)	30	30	27	12–32
STIs: Chlamydia infection (rate per 1,000)	19	17	20	5.1–40
Chronic disease (%)	16	18	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
30 days/year

Poor water quality:
0 days/year

Water fluoridation:
1.35 mg/L

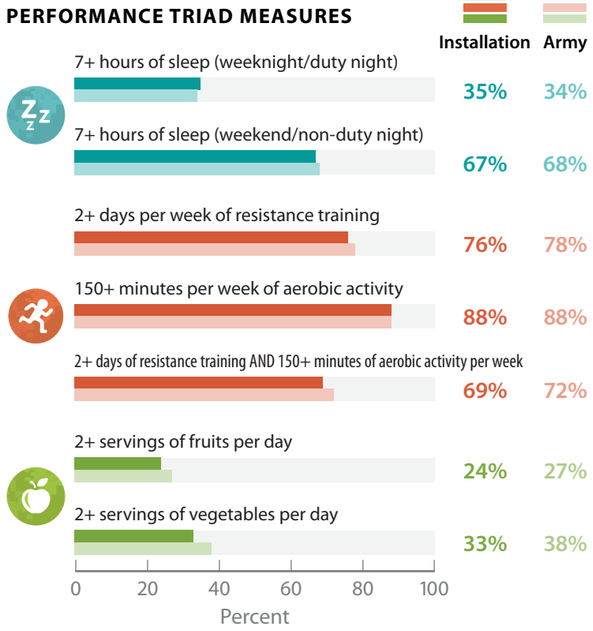
Solid waste diversion rate:
16%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
90 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.3 (30–39th percentile)**

Footnotes: See page 90.

Fort Leavenworth

Demographics: Approximately 3,100 AC Soldiers
49% <35 years old, 15% female
Main Healthcare Facility: Munson Army Health Center
Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,395	1,213	1,368	849–2,084
Behavioral health (%)	18	17	16	11–31
Substance use disorder (%)	2.2	2.8	3.3	1.5–5.4
Sleep disorder (%)	18	14	14	8.5–25
Obesity (%)	26	22	20	16–29
Tobacco product use (%)	22	24	27	12–32
STIs: Chlamydia infection (rate per 1,000)	Data suppressed	Data suppressed	20	5.1–40
Chronic disease (%)	33	22	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
2 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.46 mg/L

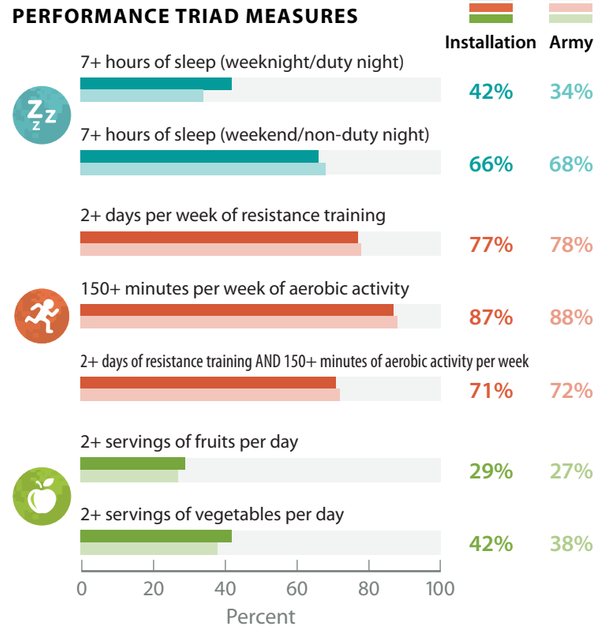
Solid waste diversion rate:
35%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
65 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.2 (40–49th percentile)**

Footnotes: See page 90.

Fort Leonard Wood

Demographics: Approximately 8,400 AC Soldiers
83% <35 years old, 21% female

Main Healthcare Facility: General Leonard Wood Army Community Hospital

Electronic Health Record: MHS GENESIS

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	1,583	1,554	1,368	849–2,084
Behavioral health (%)	15	16	16	11–31
Substance use disorder (%)	1.7	1.8	3.3	1.5–5.4
Sleep disorder (%)	12	15	14	8.5–25
Obesity (%)	21	21	20	16–29
Tobacco product use (%)	28	29	27	12–32
STIs: Chlamydia infection (rate per 1,000)	12	10	20	5.1–40
Chronic disease (%)	15	20	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
No data

Poor water quality:
0 days/year

Water fluoridation:
1 mg/L

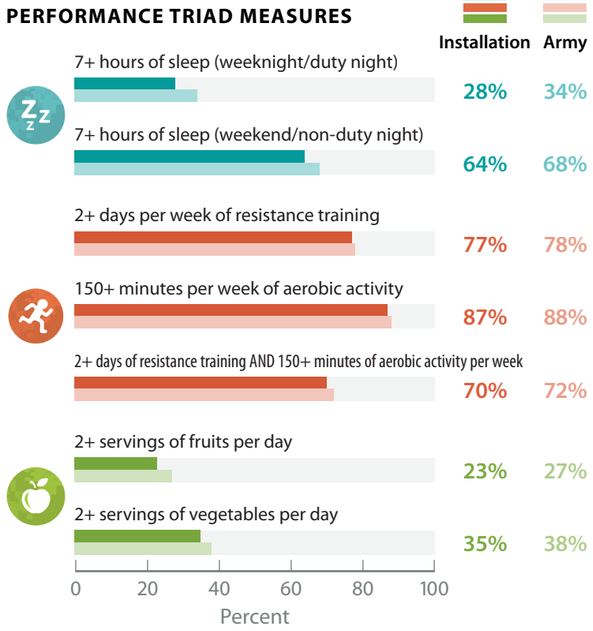
Solid waste diversion rate:
43%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Moderate

Heat risk:
60 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.8 (20–29th percentile)**

Footnotes: See page 90.

Fort Riley

Demographics: Approximately 15,000 AC Soldiers
85% <35 years old, 14% female

Main Healthcare Facility: Irwin Army Community Hospital

Electronic Health Record: MHS GENESIS

MEDICAL METRICS	INSTALLATION Crude Value[1]	INSTALLATION Adjusted Value[2]	ARMY Value	ARMY Range[3]
Injury (rate per 1,000)	849	930	1,368	849–2,084
Behavioral health (%)	14	14	16	11–31
Substance use disorder (%)	4.0	3.7	3.3	1.5–5.4
Sleep disorder (%)	9.8	12	14	8.5–25
Obesity (%)	19	21	20	16–29
Tobacco product use (%)	31	31	27	12–32
STIs: Chlamydia infection (rate per 1,000)	25	20	20	5.1–40
Chronic disease (%)	13	18	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
No data

Poor water quality:
0 days/year

Water fluoridation:
0.84 mg/L

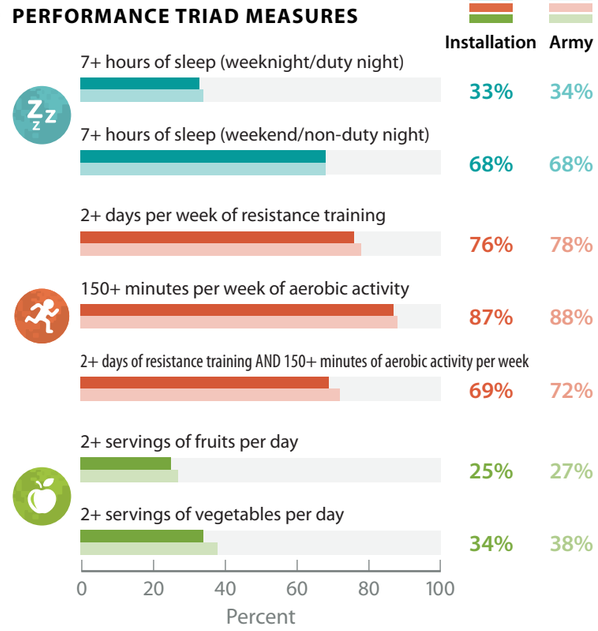
Solid waste diversion rate:
60%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
73 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.8 (70–79th percentile)**

Footnotes: See page 90.

Fort Wainwright

Demographics: Approximately 6,700 AC Soldiers
88% <35 years old, 11% female

Main Healthcare Facility: Bassett Army Community Hospital

Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,085	1,185	1,368	849–2,084
Behavioral health (%)	14	15	16	11–31
Substance use disorder (%)	2.9	2.5	3.3	1.5–5.4
Sleep disorder (%)	12	15	14	8.5–25
Obesity (%)	15	20	20	16–29
Tobacco product use (%)	32	31	27	12–32
STIs: Chlamydia infection (rate per 1,000)	22	19	20	5.1–40
Chronic disease (%)	12	19	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
34 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.39 mg/L

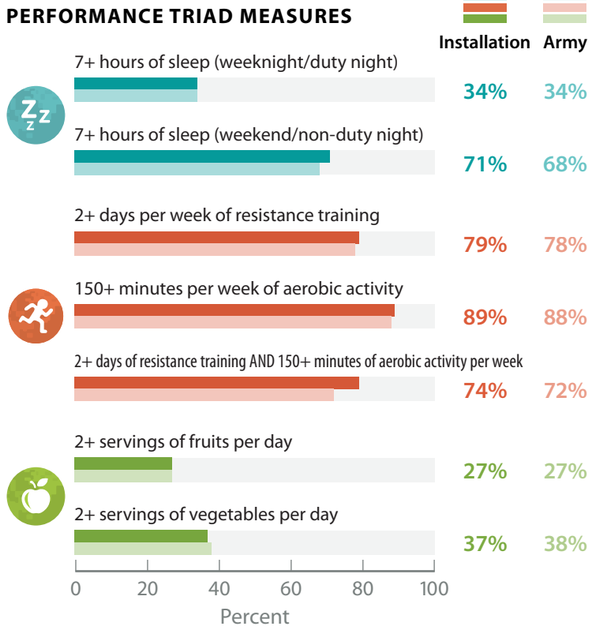
Solid waste diversion rate:
No data

Mosquito-borne disease risk:
Low

Lyme disease risk:
Low

Heat risk:
0 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **-0.2 (40–49th percentile)**

Footnotes: See page 90.

Hawaii

Demographics: Approximately 19,00 AC Soldiers
78% <35 years old, 19% female

Main Healthcare Facility: Tripler Army Medical Center and Schofield Barracks Health Clinic

Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,357	1,356	1,368	849–2,084
Behavioral health (%)	16	15	16	11–31
Substance use disorder (%)	2.7	2.7	3.3	1.5–5.4
Sleep disorder (%)	14	15	14	8.5–25
Obesity (%)	20	21	20	16–29
Tobacco product use (%)	22	23	27	12–32
STIs: Chlamydia infection (rate per 1,000)	25	23	20	5.1–40
Chronic disease (%)	17	18	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.71 mg/L

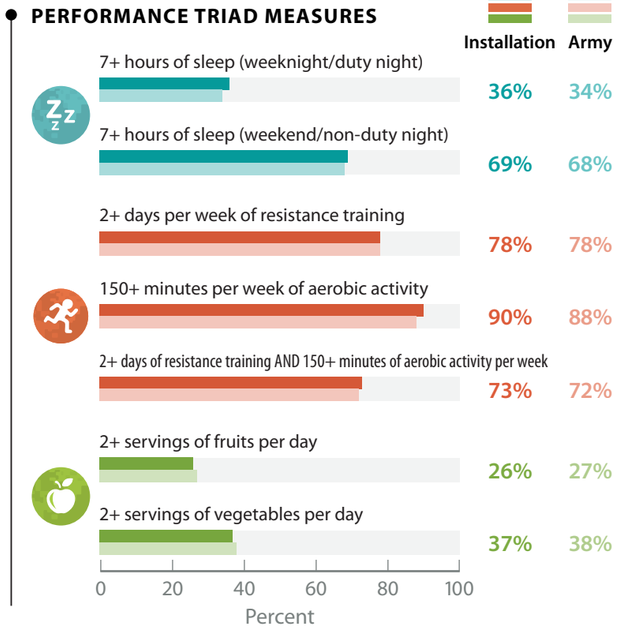
Solid waste diversion rate:
29%

Mosquito-borne disease risk:
Moderate

Lyme disease risk:
Low

Heat risk:
0 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **0.2 (50–59th percentile)**

Footnotes: See page 90.

JB Elmendorf-Richardson

Demographics: Approximately 4,700 AC Soldiers
88% <35 years old, 9% female

Main Healthcare Facility: Joint Base Elmendorf-Richardson Health and Wellness Center

Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,223	1,277	1,368	849–2,084
Behavioral health (%)	12	13	16	11–31
Substance use disorder (%)	3.9	3.6	3.3	1.5–5.4
Sleep disorder (%)	8.5	11	14	8.5–25
Obesity (%)	11	14	20	16–29
Tobacco product use (%)	30	28	27	12–32
STIs: Chlamydia infection (rate per 1,000)	9.3	8.0	20	5.1–40
Chronic disease (%)	10	16	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
2 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.38 mg/L

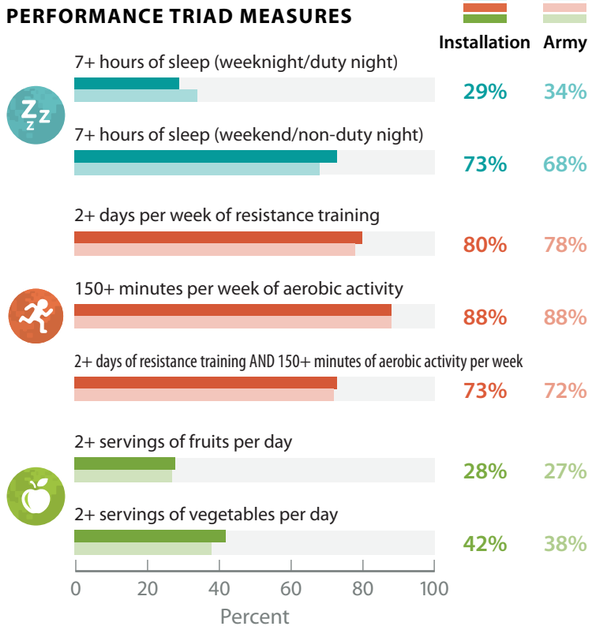
Solid waste diversion rate:
13%

Mosquito-borne disease risk:
Low

Lyme disease risk:
Low

Heat risk:
0 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **1.4 (≥90th percentile)**

Footnotes: See page 90.

JB Lewis-McChord

Demographics: Approximately 28,000 AC Soldiers
80% <35 years old, 16% female

Main Healthcare Facility: Madigan Army Medical Center

Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,140	1,173	1,368	849–2,084
Behavioral health (%)	15	15	16	11–31
Substance use disorder (%)	2.7	2.7	3.3	1.5–5.4
Sleep disorder (%)	12	14	14	8.5–25
Obesity (%)	17	19	20	16–29
Tobacco product use (%)	27	27	27	12–32
STIs: Chlamydia infection (rate per 1,000)	26	24	20	5.1–40
Chronic disease (%)	13	15	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.81 mg/L

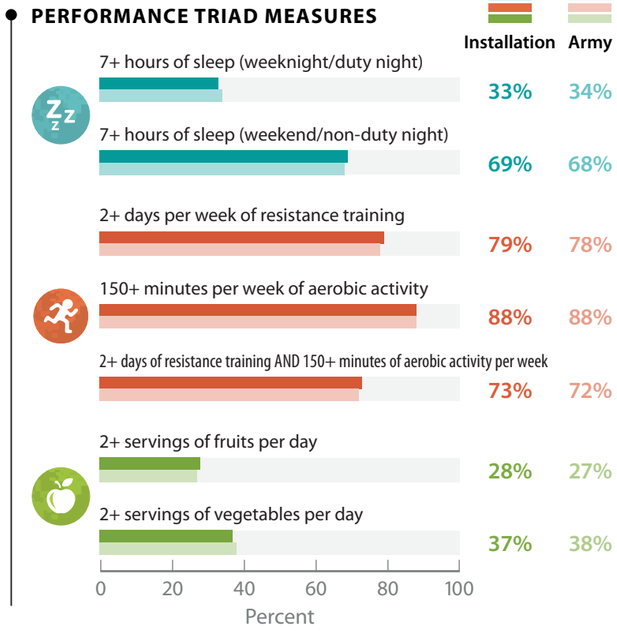
Solid waste diversion rate:
36%

Mosquito-borne disease risk:
Low

Lyme disease risk:
Moderate

Heat risk:
6 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **1.1 (80–89th percentile)**

Footnotes: See page 90.

Presidio of Monterey

Demographics: Approximately 1,500 AC Soldiers
87% <35 years old, 24% female

Main Healthcare Facility: Presidio of Monterey Army Health Clinic

Electronic Health Record: MHS GENESIS

	INSTALLATION		ARMY	
MEDICAL METRICS	Crude Value[1]	Adjusted Value[2]	Value	Range[3]
Injury (rate per 1,000)	1,010	1,054	1,368	849–2,084
Behavioral health (%)	17	17	16	11–31
Substance use disorder (%)	3.0	3.1	3.3	1.5–5.4
Sleep disorder (%)	10	13	14	8.5–25
Obesity (%)	9.0	10	20	16–29
Tobacco product use (%)	15	15	27	12–32
STIs: Chlamydia infection (rate per 1,000)	Data suppressed	Data suppressed	20	5.1–40
Chronic disease (%)	10	16	17	10–34

ENVIRONMENTAL HEALTH INDICATORS[4]

Poor air quality:
0 days/year

Poor water quality:
0 days/year

Water fluoridation:
0.25 mg/L

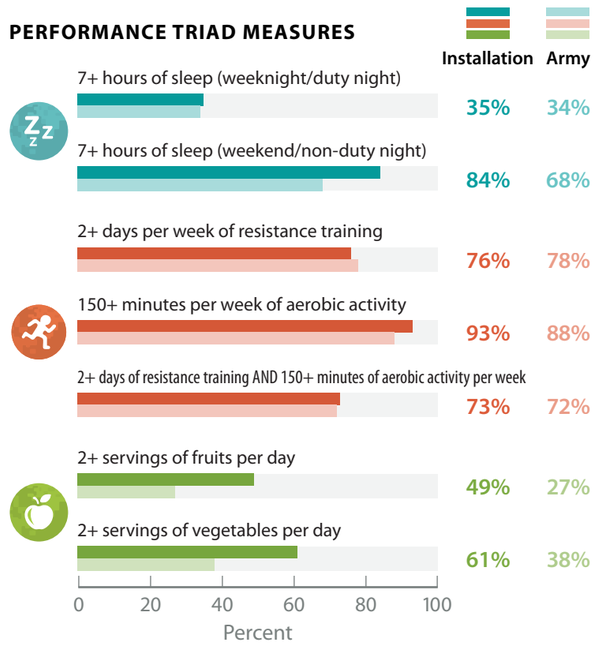
Solid waste diversion rate:
7.0%

Mosquito-borne disease risk:
Low

Lyme disease risk:
Moderate

Heat risk:
0 days/year

PERFORMANCE TRIAD MEASURES



Installation Health Index Score[5]: **3.3 (≥90th percentile)**

AWC ARMY WELLNESS CENTER

Footnotes: See page 90.

U.S. Army photo

At a glance...

Profiles (2021)

	End-strength	<35 years old (%)	Female population (%)
Fort Belvoir	3,000	47	23
Fort Benning	22,000	86	6
Fort Bliss	26,000	81	16
Fort Bragg	46,000	77	13
Fort Campbell	28,000	85	12
Fort Carson	26,000	84	14
Fort Drum	15,000	86	12
Fort Gordon	8,700	73	19
Fort Hood	36,000	82	16
Fort Huachuca	4,100	78	17
Fort Irwin	4,200	77	14
Fort Jackson	8,100	84	25
Fort Knox	5,100	62	23
Fort Leavenworth	3,100	49	15
Fort Lee	6,500	77	23
Fort Leonard Wood	8,400	83	21
Fort Meade	4,100	62	20
Fort Polk	7,800	82	13
Fort Riley	15,000	85	14
Fort Rucker	2,800	65	16
Fort Sill	12,000	85	16
Fort Stewart	20,000	84	16

Profiles (2021)

	End-strength	<35 years old (%)	Female population (%)
Fort Wainwright	6,700	88	11
Hawaii	19,000	78	19
JB Elmendorf-Richardson	4,700	88	9
JB Langley-Eustis	5,000	69	17
JB Lewis-McChord	28,000	80	16
JB Myer-Henderson Hall	2,100	76	12
JB San Antonio	7,700	60	30
Presidio of Monterey	1,500	87	24
USAG West Point	1,500	54	20

INSTALLATIONS OUTSIDE THE UNITED STATES

Japan	2,600	74	14
USAG Ansbach	1,200	83	14
USAG Bavaria	10,000	85	13
USAG Daegu	3,100	77	20
USAG Humphreys	7,800	78	18
USAG Rheinland-Pfalz	6,400	73	22
USAG Stuttgart	1,600	55	13
USAG Vicenza	3,600	80	12
USAG Wiesbaden	1,400	73	19
USAG Yongsan-Casey	4,700	76	16

Selected Medical Metrics

Presented values are adjusted for age and sex

AHLTA - CONUS	Injury (rate per 1,000)	Behavioral health (%)	Substance use disorder (%)	Sleep disorder (%)	Obesity (%)	Tobacco product use (%)	STIs: Chlamydia infection (rate per 1,000)	Chronic disease (%)
Fort Belvoir	1,483	25	3.3	19	22	20	16	22
Fort Benning	1,670	14	2.0	14	19	27	12	19
Fort Bliss	1,360	19	4.4	18	22	28	30	18
Fort Bragg	1,535	14	3.7	15	18	27	23	17
Fort Campbell	1,429	16	2.9	15	21	30	19	19
Fort Drum	1,525	14	3.2	12	22	27	17	19
Fort Gordon	1,556	18	2.5	15	25	22	12	19
Fort Hood	1,465	19	4.6	18	22	29	25	19
Fort Jackson	1,927	17	1.9	12	19	26	8.0	19
Fort Knox	1,459	20	2.1	19	22	23	12	24
Fort Lee	1,642	17	2.4	15	20	22	4.1	20
Fort Meade	1,276	21	2.7	18	27	22	*	20
Fort Polk	1,307	22	5.0	19	21	31	22	23
Fort Rucker	1,501	11	1.8	16	20	17	10	20
Fort Sill	1,762	24	3.9	18	24	32	11	21
Fort Stewart	1,387	20	4.0	16	21	29	24	20
JB San Antonio	1,409	21	2.2	19	21	18	13	22
JB Langley-Eustis	1,774	18	2.4	15	24	24	19	21
JB Myer-Henderson Hall	1,286	19	2.4	13	17	23	18	17
USAG West Point	1,187	15	2.4	11	17	16	*	22
Army	**1,368**	**16**	**3.3**	**14**	**20**	**27**	**20**	**17**

Footnotes: See page 90.

Selected Medical Metrics

Presented values are adjusted for age and sex

AHLTA - OCONUS	Injury (rate per 1,000)	Behavioral health (%)	Substance use disorder (%)	Sleep disorder (%)	Obesity (%)	Tobacco product use (%)	STIs: Chlamydia infection (rate per 1,000)	Chronic disease (%)
Japan	1,122	14	2.2	10	23	24	21	17
USAG Ansbach	1,020	15	2.9	12	20	29	27	14
USAG Bavaria	1,148	15	3.4	13	19	30	19	18
USAG Daegu	1,033	13	2.2	14	20	27	32	17
USAG Humphreys	1,100	14	3.4	13	19	25	32	16
USAG Rheinland-Pfalz	1,368	20	4.3	20	22	25	31	20
USAG Stuttgart	1,349	17	4.1	19	17	26	28	17
USAG Vicenza	1,126	15	3.5	13	17	27	18	15
USAG Wiesbaden	1,216	17	3.4	17	20	25	20	18
USAG Yongsan-Casey	1,097	14	3.2	13	20	28	30	17

MHS GENESIS								
Fort Carson	1,116	16	4.2	14	19	29	17	17
Fort Huachuca	1,320	13	2.3	13	20	25	7	21
Fort Irwin	1,195	16	4.5	16	23	30	17	18
Fort Leavenworth	1,213	17	2.8	14	22	24	*	22
Fort Leonard Wood	1,554	16	1.8	15	21	29	10	20
Fort Riley	930	14	3.7	12	21	31	20	18
Fort Wainwright	1,185	15	2.5	15	20	31	19	19
Hawaii	1,356	15	2.7	15	21	23	23	18
JB Elmendorf-Richardson	1,277	13	3.6	11	14	28	8.0	16
JB Lewis-McChord	1,173	15	2.7	14	19	27	24	15
Presidio of Monterey	1,054	17	3.1	13	10	15	*	16
Army	**1,368**	**16**	**3.3**	**14**	**20**	**27**	**20**	**17**

Footnotes: See page 90.

Environmental Health Indicators

	Poor air quality (days per year)	Poor water quality (days per year)	Water fluoridation (mg/L)	Solid waste diversion rate (%)	Mosquito-borne disease risk	Lyme disease risk	Heat risk (days per year)
Fort Belvoir	4	0	0.69	37	Moderate	High	61
Fort Benning	3	0	0.77	20	Moderate	Low	97
Fort Bliss	19	0	0.86	56	Moderate	Low	68
Fort Bragg	1	0	0.67	30	High	Moderate	85
Fort Campbell	0	0	0.64	36	Moderate	Low	58
Fort Carson	28	0	0.50	38	Low	Low	1
Fort Drum	0	0	0.73	42	Low	High	11
Fort Gordon	7	0	0.72	18	High	Low	100
Fort Hood	3	0	0.20	37	Moderate	Low	103
Fort Huachuca	2	0	0.65	0.0	Moderate	Low	25
Fort Irwin	30	0	1.35	16	Moderate	Moderate	90
Fort Jackson	1	0	0.50	29	High	Low	85
Fort Knox	1	0	0.67	46	Moderate	Low	37
Fort Leavenworth	2	0	0.46	35	Moderate	Low	65
Fort Lee	No Data	0	0.46	30	Moderate	Moderate	61
Fort Leonard Wood	No Data	0	1	43	Moderate	Moderate	60
Fort Meade	1	0	0.62	34	Moderate	Moderate	65
Fort Polk	No Data	0	0.90	55	High	Moderate	109
Fort Riley	No Data	0	0.84	60	Moderate	Low	73
Fort Rucker	No Data	0	0.68	57	Moderate	Low	88
Fort Sill	2	0	0.61	44	Moderate	Low	103
Fort Stewart	No Data	0	0.99	62	High	Moderate	105

Environmental Health Indicators

	Poor air quality (days per year)	Poor water quality (days per year)	Water fluoridation (mg/L)	Solid waste diversion rate (%)	Mosquito-borne disease risk	Lyme disease risk	Heat risk (days per year)
Fort Wainwright	34	0	0.39	No data	Low	Low	0
Hawaii	0	0	0.71	29	Moderate	Low	0
JB Elmendorf-Richardson	2	0	0.38	13	Low	Low	0
JB Langley-Eustis	0	0	0.74	59	Moderate	Moderate	71
JB Lewis-McChord	0	0	0.81	36	Low	Moderate	6
JB Myer-Henderson Hall	4	0	0.70	52	Moderate	Moderate	62
JB San Antonio	12	0	0.25	24	High	Moderate	132
Presidio of Monterey	0	0	0.25	7.0	Low	Moderate	0
USAG West Point	1	0	0.69	50	Moderate	High	28
INSTALLATIONS OUTSIDE THE UNITED STATES							
Japan	14	0	0.99	40	Moderate	Low	51
USAG Ansbach	0	0	0.6	63	Moderate	High	0
USAG Bavaria	0	365	0.64	50	Moderate	High	11
USAG Daegu	51	0	0.70	67	Moderate	Moderate	45
USAG Humphreys	113	0	0.0	75	Moderate	Moderate	42
USAG Rheinland-Pfalz	0	0	0.73	40	Moderate	High	4
USAG Stuttgart	2	0	0.8	58	Moderate	High	3
USAG Vicenza	97	0	0.0	56	Moderate	Low	47
USAG Wiesbaden	5	0	0.0	55	Moderate	Moderate	2
USAG Yongsan	38	0	0.25	34	Moderate	Moderate	41
Camp Casey	52	0	No Data	54	Moderate	Moderate	36

Performance Triad

	7+ hours of sleep [weeknights] (%)	7+ hours of sleep [weekends] (%)	2+ days per week of resistance training (%)	150+ minutes per week of aerobic activity (%)	Met aerobic and resistance target (%)	2+ servings of fruits per day (%)	2+ servings of vegetables per day (%)
Fort Belvoir	35	67	74	87	69	29	43
Fort Benning	32	67	80	90	75	27	39
Fort Bliss	33	65	79	88	73	27	37
Fort Bragg	36	69	79	88	73	29	40
Fort Campbell	37	70	80	89	75	28	39
Fort Carson	34	67	79	88	73	29	40
Fort Drum	34	69	79	88	73	28	41
Fort Gordon	32	70	74	88	70	31	43
Fort Hood	29	63	77	87	71	25	33
Fort Huachuca	36	71	75	88	70	30	42
Fort Irwin	35	67	76	88	69	24	33
Fort Jackson	33	64	79	88	74	32	42
Fort Knox	40	66	78	89	73	28	41
Fort Leavenworth	42	66	77	87	71	29	42
Fort Lee	31	63	78	87	71	35	43
Fort Leonard Wood	28	64	77	87	70	23	35
Fort Meade	37	74	75	88	69	26	41
Fort Polk	29	66	76	86	70	25	35
Fort Riley	33	68	76	87	69	25	34
Fort Rucker	45	72	78	89	72	26	40
Fort Sill	27	63	81	89	75	24	38
Fort Stewart	30	65	77	87	71	25	34
Army	**34**	**68**	**78**	**88**	**72**	**27**	**38**

Performance Triad

	7+ hours of sleep [weeknights] (%)	7+ hours of sleep [weekends] (%)	2+ days per week of resistance training (%)	150+ minutes per week of aerobic activity (%)	Met aerobic and resistance target (%)	2+ servings of fruits per day (%)	2+ servings of vegetables per day (%)
Fort Wainwright	34	71	79	89	74	27	37
Hawaii	36	69	78	90	73	26	37
JB Elmendorf-Richardson	29	73	80	88	73	28	42
JB Langley-Eustis	33	65	75	89	71	28	36
JB Lewis-McChord	33	69	79	88	73	28	37
JB Myer-Henderson Hall	42	70	78	91	75	38	52
JB San Antonio	31	65	73	84	68	29	43
Presidio of Monterey	35	84	76	93	73	49	61
USAG West Point	41	73	77	85	69	33	50
INSTALLATIONS OUTSIDE THE UNITED STATES							
Japan	34	70	82	89	76	21	34
USAG Ansbach	31	69	81	89	76	22	31
USAG Bavaria	30	66	80	89	74	25	35
USAG Daegu	32	68	78	89	74	24	33
USAG Humphreys	34	71	77	89	72	26	37
USAG Rheinland-Pfalz	33	67	76	87	70	28	36
USAG Stuttgart	33	70	78	86	72	27	40
USAG Vicenza	33	72	78	89	73	27	36
USAG Wiesbaden	36	74	76	90	70	24	36
USAG Yongsan-Casey	33	70	79	86	70	28	36
Army	**34**	**68**	**78**	**88**	**72**	**27**	**38**

APPENDICES

- *Methods*
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- *Acronyms and Abbreviations*
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METHODS

I. Methodological and Data Updates

The 2022 edition of *Health of the Force* includes updates to methods and data that limit direct comparison to prior reports. Changes which impacted multiple metrics are summarized below. Changes affecting a specific metric are included in the method summary for that metric.

- The Coronovirus Disease 2019 (COVID-19) pandemic and the Army's public health response had dramatic influences on health care and healthcare utilization patterns. The 2022 edition of *Health of the Force* includes a specific COVID-19 metric. When appropriate, the *Health of the Force* evaluated the impact of the COVID-19 pandemic on medical metrics, comparing monthly healthcare utilization prior to, and during, the pandemic. Changes in metric estimates in 2021 were compared to the previous four years (2017–2020).
- Soldier assigned unit ZIP code reference tables, used to identify installation affiliation, were updated to include previously unmapped ZIP codes. This update improved data retention relative to previous *Health of the Force* analyses when unmapped personnel records were excluded. On average, Army population estimates derived from person-time increased by 1–2% per year as compared with estimates used in previous reports. This enhancement further improved linkage with, and capture of, medical metric data, resulting in more accurate Army metric estimates.
- For the first time in the *Health of the Force* report, the injury, behavioral health (BH), substance use disorder, sleep disorder, obesity, heat illness, chronic disease, and COVID-19 hospitalizations metrics were reported for installations that transitioned from the Armed Forces Health Longitudinal Technology Application (AHLTA) to the Military Health System (MHS) GENESIS electronic health record system. The installations whose medical treatment facilities (MTFs) transitioned to MHS GENESIS and the date of the transition are listed in Table 1. Note that there is a gap in availability of MHS GENESIS data for two of the earliest installations to transition to the new electronic health record system: Joint Base (JB) Lewis-McChord and Presidio of Monterey. Data from these installations were not available from the date of their transition to MHS GENESIS through 1 October 2019.

Table 1. MHS GENESIS Transition Dates

Installation	Date of Transition to MHS GENESIS	Data Availability in MHS Data Repository (MDR)
JB Lewis-McChord	21 October 2017	1 October 2019
Presidio of Monterey	1 September 2019	1 October 2019
Ft. Irwin	26 September 2020	26 September 2020
Ft. Wainwright	31 October 2020	31 October 2020
JB Elmendorf-Richardson	31 October 2020	31 October 2020
Ft. Huachuca	24 April 2021	24 April 2021
Ft. Carson	24 April 2021	24 April 2021
Ft. Leavenworth	24 April 2021	26 April 2021
Ft. Leonard Wood	24 April 2021	24 April 2021
Ft. Riley	24 April 2021	24 April 2021
Hawaii	25 September 2021	25 September 2021

- For most medical metrics, annual estimates are presented for the current reporting year, and the previous four years (2017–2021). Methodological and data updates implemented in the current reporting cycle were applied to estimates for previous years. As a result, updated estimates may differ slightly from those in previous editions of *Health of the Force*. The BH and substance use disorder metrics received updates to the case definition for identifying diagnoses in the outpatient setting. In previous iterations of this report, diagnostic codes in BH outpatient encounter data included secondary diagnostic codes. The updated case definition includes only primary outpatient encounter diagnostic codes.
- The Performance Triad (P3) includes a new activity metric in the 2022 edition of *Health of the Force*. Historically, most Soldiers met the targets for aerobic activity and resistance training established by the Centers for Disease Control and Prevention (CDC), raising questions about whether the targets established for the civilian population are relevant for a military population. Given the CDC's recommendations, the 2022 edition of *Health of the Force* includes a third activity metric to report the proportion of Soldiers who met both aerobic and resistance training targets (CDC 2020b).
- To better reflect the risk of Lyme disease, the tick-borne disease risk metric was revised to provide a score for all installations regardless of whether Army Public Health data were available for the installation. In previous years, installations without Army data received a score of "No data." Lyme disease risk scores are created by considering Army installation-specific data as well as published data on tick ranges and locally-acquired Lyme disease cases.

II. Active Component Soldier Population Demographics and Installation Selection

Active Component (AC) Soldier demographics (i.e., age, sex, race, and ethnicity) were obtained from Defense Manpower Data Center (DMDC) personnel rosters. Person-time was used to estimate age-, sex-, race-, and ethnicity-specific population sizes. Soldier age was calculated as the difference between the mid-point of the calendar year (1 July 2021) and the date of birth.

Race and ethnicity were defined based on Office of Management and Budget (OMB)-recommended categories (FR 1997). Hispanic ethnicity was analyzed separately from race, so measures in the Hispanic category are not independent from the racial categories presented. DMDC personnel records including race and ethnicity categories other than those specified by OMB, including no specified race or ethnicity, were categorized as other/unknown. Soldiers in the other/unknown category contributed to AC Army estimates but were excluded from race- and ethnicity-specific summaries. DMDC data lack sufficient detail to identify Soldiers who identify as multi-racial.

AC Soldier populations for installations that appear in *Health of the Force* were estimated from AC Soldier person-time in DMDC personnel rosters. A Soldier's contribution to the AC person-time denominator was defined as the number of months of the year that the Soldier was on active duty and assigned to a particular installation. A Soldier on active duty for an entire year contributed one person-year to the denominator (population). Similarly, a Soldier on active duty for 6 months would contribute half a person-year to the denominator (population). Using this approach, population counts reflect the actual amount of time each Soldier contributed to the AC cohort.

Soldier demographics were compared to those of the U.S. workforce using Bureau of Labor and Statistics data for employed U.S. adults 18 to 62 years of age (BLS 2022a, BLS 2022b). Age 62 was used as a cut-point based on the Army regulations (ARs) that set age limits for active service: AR 135-180 (DA 2015b) and AR 600-8-24 (DA 2020c).

For the BH, chronic disease, obesity, tobacco product use, and sleep disorder metrics, Soldiers were assigned to the last ZIP code of assignment during the calendar year. For the injury, heat illness, COVID-19, and chlamydia metrics, installation assignment was determined based on the Soldier's assigned unit ZIP code during the month of the event, or within 3 months if data were not available for the month of the event.

Installations that appear in *Health of the Force* profile pages are those with a population of 1,000 or more AC Soldiers as determined by person-time estimates. Personnel and medical data were not available for cadets; therefore, U.S. Army Garrison (USAG) West Point estimates derived from the DMDC data were limited to permanent-party AC Soldiers.

III. Medical Metrics

Medical metrics were adapted from nationally recognized health indicators routinely tracked by public health authorities such as the CDC, the Robert Wood Johnson Foundation, and the United Health Foundation. For the AC Soldier population, the Defense Centers for Public Health – Aberdeen (DCPH-A) metrics met the following criteria for inclusion in *Health of the Force*: 1) the importance of the problem to Force health and readiness (e.g., prevalence and severity of the condition), 2) the preventability of the problem, 3) the feasibility of the metric, 4) the timeliness and frequency of data capture, and 5) the strength of supporting evidence (HHS 2022a).

Metrics and supporting health outcomes included in the report are described below. **Metrics included in the Installation Health Index (IHI) computation are designated with an asterisk in the section heading.**

Data sources for each medical metric are summarized in Table 2. Data used to calculate medical metric estimates were abstracted from the MDR, the Defense Medical Surveillance System (DMSS), the Disease Reporting System-internet (DRSi), and the Periodic Health Assessment (PHA). MDR outpatient healthcare encounters were captured through the Comprehensive Ambulatory Professional Encounter Record (CAPER) and the TRICARE Encounter Record – Non-Institutional (TED-NI). MDR inpatient admissions were captured through the Standard Inpatient Data Record (SIDR) and the TRICARE Encounter Record – Institutional (TED-I). MHS GENESIS outpatient healthcare encounters and inpatient admissions were obtained from the Armed Forces Health Surveillance Division's (AFHSD) DMSS database. Height and weight data were captured through the MDR Clinical Data Repository (CDR) Vitals table and the MHS GENESIS Vitals File. Hearing readiness and test data were obtained from the Medical Protection System (MEDPROS) and the Defense Occupational and Environmental Health Readiness System – Hearing Conservation (DOEHRS-HC). For the COVID-19 medical metric, laboratory data were obtained from from the Navy and Marine Corps Public Health Center (NMCPHC) (now known as Defense Centers for Public Health – Portsmouth), using Composite Health Care System (CHCS) Health Level 7 (HL7) and the MHS GENESIS Laboratory File (NMCPHC 2019). NMCPHC-HL7 data were consolidated with DRSi and MDR data for COVID-19 identification (NMCPHC 2019).

DMDC personnel rosters were used to compute denominators for incidence and prevalence estimates for injury, BH, substance use disorder, sleep disorder, heat illness, chlamydia, and COVID-19 metrics. Denominators for hearing, obesity, and tobacco product use metrics were computed using the same data source as used for the respective medical metric numerator.

For the injury, chlamydia, heat illness, and COVID-19 metrics, only medical encounter records that could be validated from DMDC within 3 months of the medical encounter date were included. The BH, substance use disorder, chronic disease, sleep disorder, obesity, and tobacco product use metrics included medical encounter data validated from DMDC within the calendar year.

Table 2. Medical Metric Data Sources

Medical Metric	Numerator	Denominator
Injury	MDR, DMSS	DMDC
Behavioral Health	MDR, DMSS, MODS e-Profile	DMDC
Substance Use	MDR, DMSS	DMDC
Sleep Disorders	MDR, DMSS	DMDC
Obesity	MDR (CDR and MHS GENESIS Vitals)	MDR (CDR and MHS GENESIS Vitals)
Tobacco Product Use	PHA	PHA
Heat Illness	DRSi, MDR, DMSS	DMDC
Hearing	DOEHRS-HC; MEDPROS	DOEHRS-HC; MEDPROS
Sexually Transmitted Infections (Chlamydia)	DRSi	DMDC
Chronic Disease	MDR, DMSS	DMDC
COVID-19	DRSi, MDR, DMSS, NMCPHC-HL7 CHCS and MHS GENESIS	DMDC

Unless otherwise specified, MDR data include CAPER, SIDR, TED-NI and TED-I.

See Acronyms and Abbreviations appendix for acronym definitions.

1. Injury*

Injury incidence rate: Number of newly diagnosed injuries per 1,000 person-years among AC Soldiers in the calendar year

The incidence rates of new injuries were evaluated for AC Soldiers and trainees. Estimates were derived from outpatient and inpatient medical and personnel records. Installation assignment was determined from DMDC personnel data based on the Soldier's assigned unit ZIP code during the month of the injury, or within 3 months if data were unavailable for the month of the injury. Rates were calculated using Soldier person-time and expressed per 1,000 person-years. The percentage of Soldiers who received at least one new injury diagnosis during the calendar year was also reported by age and sex category.

Injuries were defined using *A Taxonomy of Injuries for Public Health Monitoring and Reporting* (APHC 2017), which identifies injury diagnoses from the *International Classification of Diseases, 10th revision, Clinical Modification* (ICD-10-CM). Injury is defined as any damage to, or interruption of, body tissue caused by an energy transfer (energy may be mechanical, thermal, nuclear, electrical, or chemical). Injury diagnoses predominantly include those for traumatic injuries (ICD-10-CM S- and selected T-codes) and for injury-related musculoskeletal conditions (selected ICD-10-CM M-codes).

Initial medical encounters with diagnosis codes included in the injury case definition were captured in the numerator of incidence rates; follow-up visits less than 60 days apart were excluded.

*Medical metrics that were included in the calculation of the IHI are identified with an asterisk.

Follow-up injury visits are identified as diagnoses within 60 days with the same injury type and detailed body region (e.g., hand, shoulder, knee, foot) (APHC 2021a). If a medical encounter with a more specific injury diagnosis occurs within 60 days of a generalized pain diagnosis and the injured body region is the same, the pain-related encounter is considered related and is not counted as an incident injury.

2. Behavioral Health

BH disorder prevalence: Percentage of AC Soldiers with at least one qualifying BH diagnosis in the calendar year

The annual prevalence of seven sets of diagnosed BH disorders of interest (adjustment disorders, mood disorders, anxiety disorders, posttraumatic stress disorder, substance use disorder, personality disorders, and psychoses) among AC Soldiers and trainees was estimated using ICD-10-CM codes identified in Soldiers' MDR medical records. Case definitions established by the DCPH-A were applied for the seven disorders of interest. Soldiers could have one or more diagnosed BH conditions. A composite measure, "any behavioral health disorder," included Soldiers with any of these seven sets of disorder diagnoses. Installation assignment was determined from DMDC personnel records using the Soldiers' last assigned unit ZIP code for the calendar year.

The case definition used for this year's *Health of the Force* has been updated from the definition used in previous years. For the 2022 *Health of the Force* report, the case definition restricted the outpatient diagnosis criteria to include only primary diagnoses, without the use of secondary diagnoses. The decision to change the methodology for the BH metric was twofold: the primary reason for the change was to align the *Health of the Force* report with current BH surveillance practices at DCPH-A, and the second was to simplify the analysis process for generating the BH and SUD metrics. Changes were made in consultation with stakeholders across the Public Health Enterprise. The exclusion of secondary diagnoses led to small decreases in the final values for some of the BH metric results (e.g., annual prevalence of any BH disorder was 14.75% in 2020 and 14.43% in 2021, a decrease of 2.2%). No restrictions were applied to the inpatient medical data for BH diagnoses, which included all qualifying BH diagnoses in any of the first eight diagnostic positions. Comparisons of results in the current BH metric to historical *Health of the Force* reports should be interpreted with caution due to these changes.

Medical Operational Data System (MODS) e-Profile data were analyzed to assess temporary profiles of seven or more days for selected BH conditions. The data provide context regarding the potential readiness impact of BH conditions.

3. Substance Use Disorder

Substance use disorder prevalence: Percentage of AC Soldiers with at least one qualifying substance use disorder diagnosis in the calendar year

The prevalence of substance use disorder among AC Soldiers, a subcomponent of the BH prevalence metric, was also evaluated independently. Substance use disorder diagnoses, which include alcohol, opioids, cannabis, sedatives, cocaine, other stimulants, hallucinogens, inhalants, and other psychoactive substance related disorders, are presented as an aggregate substance use disorder metric.

Substance use disorder prevalence was estimated using ICD-10-CM diagnosis codes identified in Soldiers' MDR medical records. Soldiers could have one or more diagnosed substance use disorders. Installation assignment was determined from DMDC personnel records using the Soldiers' last assigned unit ZIP code for the calendar year.

The substance use disorder case definition used for this year's *Health of the Force* has been updated relative to previous years' case definitions. For the 2022 *Health of the Force report*, the case definition restricted the outpatient diagnosis criteria to include only primary diagnoses without the use of secondary diagnoses. The substance use disorder metric is a subset of the BH metric. The decision to change the methodology was twofold: the primary reason for the change was to align the *Health of the Force* report with current BH surveillance practices at DCPH-A, and the second was to simplify the analysis process for generating the BH metrics. Changes were made in consultation with stakeholders across the Public Health Enterprise. The exclusion of secondary diagnoses led to small decreases in the final values for some of the results (e.g., annual prevalence of substance use disorder was 3.2% in 2020 and 3.08% in 2021, a decrease of 3.9%). No restrictions were applied to the inpatient medical data for substance use disorder diagnoses, which include all qualifying substance use disorder diagnoses in any of the first eight diagnostic positions. Comparisons of results in the current metric to historical *Health of the Force* reports should be interpreted with caution due to these changes.

4. Sleep Disorders*

Sleep disorder prevalence: Percentage of AC Soldiers with at least one qualifying sleep disorder diagnosis in the calendar year

Sleep disorders were defined as a diagnosis of one or more of the following conditions: insomnia, hypersomnia, circadian rhythm sleep disorder, sleep apnea, narcolepsy and cataplexy, parasomnia, and sleep-related movement disorders. The prevalence of sleep disorders among AC Soldiers and trainees was estimated from ICD-10-CM diagnosis codes identified in Soldiers' MDR medical records. A sleep disorder case was defined as one qualifying inpatient encounter diagnosis in the calendar year, or one outpatient encounter with a sleep disorder as the first diagnosis in the year, or two outpatient encounters diagnoses within 365 days, only one of which must be in the calendar year. Installation assignment was determined using Soldiers' last assigned unit ZIP code in DMDC personnel records for the calendar year.

*Medical metrics that were included in the calculation of the IHI are identified with an asterisk.

5. Obesity*

Obesity prevalence: Percentage of AC Soldiers with an outpatient medical encounter captured in CDR Vitals in the calendar year who have a body mass index (BMI) greater than or equal to 30

BMI was calculated from height and weight measurements obtained from the MDR's CDR Vitals module and captured during direct care outpatient medical encounters for AC Soldiers and trainees. CDR Vitals has been found to have the most consistent capture of Soldier height/weight data year-to-year. Approximately 54% of AC Soldiers had a recorded height and weight measurement during an outpatient healthcare visit. BMI was not calculated for females who had a pregnancy-related diagnosis code in their outpatient record or who were assigned a pregnancy-related Medicare Severity Diagnosis Related Group code in their inpatient record.

Most Soldiers with data captured in CDR had multiple outpatient encounter records, and for these, the mean BMI was calculated. The denominator for obesity prevalence was the subset of Soldiers with at least one set of height and weight data recorded in the CDR Vitals during the calendar year. Installation assignment was determined using Soldiers' last assigned unit ZIP code in DMDC personnel records for the calendar year.

Prevalence of obesity for AC Soldiers was compared to that of the employed U.S. population, aged 18–64 years, after adjusting both populations by age and sex using the 2015 Army AC Soldier population distribution as the adjustment standard (Watkins et al. 2018). Readily available survey data from the Behavioral Risk Factor Surveillance System (BRFSS) were used for the comparison to the U.S. population.

6. Tobacco Product Use*

Tobacco product use prevalence: Percentage of AC Soldiers who completed the PHA in the calendar year and who reported having used at least one tobacco product in the 30 days prior to completing the PHA

Tobacco product usage data were obtained from the PHA, which collects self-reported information on respondents' current smoking behavior, use of smokeless tobacco, and e-cigarette use. Approximately 68% of AC Soldiers completed a PHA in 2021. Installation assignment was determined by the Soldier's last assigned unit ZIP code recorded in DMDC personnel records for the calendar year.

The measure "any tobacco product use" includes Soldiers who use e-cigarettes, smoking tobacco products, smokeless tobacco products, or any combination of these three product types. This differs from the "any tobacco product use" measure in last year's report, which excluded Soldiers who reported only using e-cigarettes.

Tobacco product use among the U.S. population, aged 18–64 years, was compared to that of the AC Soldier population by adjusting military and national prevalence estimates to the 2015 AC Soldier age and sex distribution (Watkins et al. 2018). BRFSS survey data were used for the analysis of the U.S. population.

*Medical metrics that were included in the calculation of the IHI are identified with an asterisk.

In 2018, tobacco product use questions were modified in the PHA to collect more detailed information regarding the types of tobacco used, including e-cigarette/vaping information. Questions were also reworded to include any use within the past 30 days. This broader definition of current tobacco product use may have resulted in the inclusion of casual users in addition to the frequent users identified in prior assessments.

To be categorized as a tobacco product user in national surveys such as the BRFSS, the respondent must meet a designated use threshold (e.g., 100 cigarettes) and self-report current use, as opposed to any use in the past 30 days, as is queried in the PHA. Soldiers who used e-cigarettes exclusively were reported as a tobacco product user if they reported ever using e-cigarettes. As a result of these differences in measurements, AC Soldier tobacco product use prevalence estimates may be inflated relative to U.S. estimates. Comparisons of 2021 PHA data to historical pre-2018 PHA data and to national data should be interpreted with caution.

7. Heat Illness

Heat illness incidence rate: Number of new, or incident, heat exhaustion and heat stroke cases diagnosed or reported per 1,000 person-years among AC Soldiers in the calendar year

Incident heat illness cases among AC Soldiers and trainees were identified in the Defense Health Agency's Weather-related Injury Repository, which captures a selection of ICD-10-CM codes in inpatient and outpatient medical encounter records from the MDR, and medical event reports of heat exhaustion and heat stroke submitted through the DRSi. The medical event reports used to identify heat illnesses were adapted from standard case definitions of heat exhaustion and heat stroke established by the AFHSD (DHA – AFHSD 2019). Heat illness ICD-10-CM codes were selected and validated by subject matter experts at DCPH-A and AFHSD. Soldiers were counted as an incident case if they had an initial encounter for a heat illness within the calendar year. Consistent with the AFHSD case definition, Soldiers were considered an incident case only once per calendar year. Installation assignment was determined by the Soldier's assigned unit ZIP code at the time of the heat illness event based on the month of the heat illness event, plus or minus 3 months.

8. Hearing

Percent New Significant Threshold Shifts (STSs): Percentage of AC Soldiers who received a periodic test (90-day, Annual, Pre-deployment, Post-deployment, Termination, or Other) that identified an average reduction of 10 dB or more at 2000, 3000, and 4000 Hz relative to the reference audiogram in either ear (i.e., a new positive STS) in the calendar year
Prevalence of Projected Hearing Profiles: Percentage of AC Soldiers with a hearing test (Reference, Periodic, or Follow-up) in the calendar year who have a probable clinically significant hearing loss or hearing loss requiring a fitness-for-duty hearing evaluation (i.e., a projected H-2 or ≥ H-3 hearing profile) documented on their most recent hearing test
Percent Not Hearing Ready: Percentage of AC Soldiers who are Not Hearing Ready based on a Hearing Readiness Classification (HRC) 4 (i.e., Soldiers who are either overdue for annual hearing test, need a follow-up hearing test, or who missed their follow-up hearing test window)

All AC Soldiers are required to receive a hearing test annually. In 2021, over 89% of AC Soldiers received a hearing test. Hearing test data are aggregated by and reported in the Department of Defense (DoD) system of record for audiometric surveillance, the DOEHRS-HC according to DoD and Army-specific regulations and business rules (e.g., Section 1910.95(g)(10)(i) of Title 29, Code of Federal Regulations). Army hearing loss and injury data supporting the STS and Projected Hearing Profile metrics are obtained from standard and ad hoc DOEHRS-HC Data Repository (DR) reports. Army hearing readiness data are obtained from the MEDPROS. DOEHRS-HC data is one data source used by MEDPROS to assign a Soldier's HRC status.

9. Sexually Transmitted Infections (Chlamydia)*

Sexually transmitted infections (Chlamydia) incidence rate: Number of new chlamydia cases reported per 1,000 person-years among AC Soldiers in the calendar year

Incidence rates of new reported chlamydia cases were evaluated for AC Soldiers and trainees. Estimates were derived from DRSi medical event reports and DMDC personnel records.

Installation assignment was determined based on the Soldier's assigned unit ZIP code during the month of chlamydia onset, or within 3 months if Soldier location data were not available for the month of onset.

New (incident) cases were identified from medical event reports submitted through the DRSi using modified incidence rules published by the AFHSD (AFHSD 2015). Specifically, initial case reports and those occurring more than 30 days from a previously reported case onset date were counted as a new case. Rates were computed using Soldier person-time and expressed per 1,000 person-years.

*Medical metrics that were included in the calculation of the IHI are identified with an asterisk.

10. Chronic Disease*

Chronic disease prevalence: Percentage of AC Soldiers with at least one qualifying new or existing chronic disease diagnosis in the calendar year

The prevalence of seven chronic conditions of interest (asthma, arthritis, chronic obstructive pulmonary disease, cancer, diabetes, cardiovascular conditions, and hypertension) among AC Soldiers and trainees was estimated from ICD-9-CM and ICD-10-CM diagnosis codes identified in the Soldier's MDR medical records. In 2020, an ICD-10-CM diagnosis code for eosinophilic asthma was added to the asthma chronic disease category. Prevalent cases of chronic conditions were identified by diagnoses at any point within the window of available medical encounter data (2010–2021). Soldiers with one or more of the selected conditions were identified for the analysis, and Army-level trends were provided for each diagnostic subset. Installation assignment was determined by the Soldier's last assigned unit ZIP code recorded in DMDC personnel records for the calendar year.

11. COVID-19

COVID-19 incidence rate: Number of AC Soldiers who had a positive severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) laboratory test or a medical event report per 1,000 person-years among AC Soldiers in the calendar year

COVID-19 among AC Soldiers and trainees was identified via either positive SARS-CoV-2 tests documented in NMCPHC-HL7 CHCS and MHS GENESIS laboratory data, or a confirmed or probable medical event report submitted to the DRSi. Unlike last year, reinfections were counted as COVID-19 cases. Cases included initial positive SARS-CoV-2 tests or medical event report, in addition to any positive SARS-CoV-2 tests or medical event report more than 90 days after a previous SARS-CoV-2 infection. Infections less than 90 days apart were excluded. COVID-19 hospitalizations were identified using the ICD-10-CM code for COVID-19 (U.071) in the primary or secondary diagnostic position in inpatient medical encounter records. For inpatient encounters, the ICD-10 Official Guidelines for Coding and Reporting require COVID-19 to be coded as the principal diagnosis, with a few exceptions (e.g., obstetrics, sepsis, and transplant complications), even if the Soldier was asymptomatic or was not hospitalized for symptoms or complications related to COVID-19. For all COVID-19 hospitalizations among AC Soldiers, the non-COVID-19 diagnosis in the primary or secondary diagnostic position was placed into broad diagnostic categories to quantify the number of hospitalizations most likely due to COVID-19 complications compared to other reasons (e.g., injury, obstetrics, and BH). Installation assignment was determined by the Soldier's assigned unit ZIP code based on the month of the COVID-19 positive laboratory test or reported date of disease onset, plus or minus 3 months.

*Medical metrics that were included in the calculation of the IHI are identified with an asterisk.

IV. Performance Triad

P3 metrics reflect the percentage of Soldiers meeting national sleep, activity, and nutrition (SAN) guidelines (e.g., CDC, National Sleep Foundation (NSF)). The P3 measures were obtained in aggregate from the Army Resiliency Directorate in coordination with the Army Analytics Group. Estimates were derived from relevant survey items collected within the Physical Domain of the Azimuth Check (previously the Global Assessment Tool). Soldiers are required to complete the Azimuth Check annually per AR 350–53 (DA 2014). In 2021, 20% of AC Soldiers completed the Azimuth Check. The P3 data were reported as an aggregated summary statistic when at least 40 responses were available per stratum (i.e., installation, sex, age, race, and ethnicity group). Installation assignment was determined by the Soldier's last assigned unit ZIP code for the calendar year.

1. Sleep

The sleep target was based on CDC and NSF guidelines (CDC 2020a, NSF 2020) and includes the percentage of Soldiers reporting 7 or more hours of sleep within a 24-hour period. Sleep metrics were derived from Azimuth Check questions assessing self-reported average hours of sleep per 24-hour period during work/duty weeks and weekends/days-off.

2. Activity

Activity targets were based on CDC recommendations (CDC 2020b) and include the percentage of Soldiers attaining adequate aerobic activity and 2 or more days of resistance training per week. Aerobic activity was derived from a series of Azimuth Check questions asking about the average number of days per week, in the last 30 days, in which the Soldier engaged in (a) vigorous activity and (b) moderate activity, as well as the average number of minutes per day in which the Soldier engaged in these activity levels. Data were analyzed to identify Soldiers who attained 150 minutes of moderate activity per week, 75 minutes of vigorous activity per week, or an equivalent combination of moderate and vigorous activity. The equivalent combination of moderate and vigorous aerobic activity was based on a formula in which vigorous activity is more heavily weighted than moderate activity. Resistance training was derived from one Azimuth Check question assessing self-reported number of days per week, in the last 30 days, in which the Soldier participated in resistance training.

3. Nutrition

Nutrition targets were informed by U.S. Department of Health and Human Services (HHS) and U.S. Department of Agriculture (USDA) recommendations (HHS and USDA 2015), which reflect the volume of fruits and vegetables that should be consumed daily. However, the related Azimuth Check questions ask Soldiers to report the average number of fruit and vegetable servings consumed over the last 30 days. Definitions of both USDA and Azimuth Check servings are described in Table 3. Due to differences in how servings of fruits and vegetables are quantified and how consumption frequencies are measured, targets for fruit and vegetable consumption were analyzed as the percentage of Soldiers eating 2 or more servings of fruits and vegetables, respectively, per day.

Table 3. USDA and Azimuth Check Servings

	Azimuth Check	USDA
Fruit	Fresh, frozen, canned or dried, or 100% fruit juices. A serving is 1 cup of fruit or ½ cup of fruit juice.	1 cup of fruit or 100% fruit juice, or ½ cup of dried fruit, can be considered as 1 cup from the Fruit Group.
Vegetables	Fresh, frozen, canned, cooked, or raw. A serving is 1 cup of raw vegetables or ½ cup of cooked vegetables.	1 cup of raw or cooked vegetables or vegetable juice, or 2 cups of raw leafy greens, can be considered as 1 cup from the Vegetable Group.

V. Environmental Health Indicators

Environmental Health Indicators (EHIs) are adapted from nationally recognized environmental health metrics tracked by public health authorities such as the CDC, Healthy People 2030, and the U.S. Environmental Protection Agency (EPA). Metrics that appear in *Health of the Force* reflect exposures incurred by the AC population relative to a specific geographic location. Installation of assignment is used as a proxy for the location of exposure. Metrics include severity of exposure to an environmental hazard (air quality, drinking water quality, mosquito-borne disease risk, tick-borne disease risk, heat risk), success of an intervention to improve health (water fluoridation), or success in diminishing a health hazard (solid waste diversion).

EHIs were calculated for Army installations and joint bases with a population of 1,000 or more AC Soldiers as determined by person-time estimates. This included the 42 installations shown in the Installation Profiles as well as Aberdeen Proving Ground (APG), Maryland. APG was retained as a legacy installation due to recent years when its AC Soldier population was greater than 1,000, and the significance of regional environmental exposures. Due to closure and relocation, populations formerly attributed to USAG Red Cloud and USAG Yongsan have been realigned to a new installation known as USAG Yongsan-Casey. Since USAG Yongsan and Camp Casey are geographically distinct and separated by 30 miles, EHIs were reported for both locations.

1. Air Quality*

The metric for air quality is the number of days in a year when an outdoor air pollutant violates the corresponding short-term (≤ 24 hours) U.S. National Ambient Air Quality Standard (NAAQS) near an Army installation. For installations in the U.S., the number of poor air quality days is obtained from Air Quality Index (AQI) Reports and Daily Data summaries on the EPA AirData website. The AQI is a daily numerical index derived from air pollution measurements at State- and Federally-operated monitoring stations throughout the U.S. An AQI score greater than 100 indicates that local air pollution levels are higher than a short-term NAAQS, and that the air quality is considered unhealthy for some

*EHIs that were included in the calculation of the IHI are identified with an asterisk.

or all of the general public. Poor air quality days were calculated as the sum of all days in a calendar year when the local AQI score is greater than 100. Air monitoring data were not available for airsheds where the following Army installations are located: Forts Lee, Leonard Wood, Polk, Riley, Rucker, and Stewart. For the purpose of the IHI computation, missing installation values were set to 0 as the lack of an air monitoring station is deemed indicative of low risk/need.

For installations outside the U.S., poor air quality days were determined by converting local air pollutant monitoring data to a daily AQI based on the relevant short-term NAAQS. Days when the AQI was greater than 100 were summed to determine the annual number of poor air quality days. Air monitoring data were obtained from the Air Quality e-Reporting database at the European Environment Agency for installations in Germany and Italy, and host nation environmental authorities for installations in Japan and South Korea.

Green, amber, and red thresholds were established to create an awareness of air quality status in the affected community and to encourage participation in the behavior modifications recommended by public health authorities on days when air quality is degraded. The desired status is fewer poor air quality days. Thresholds were based on the mean and top 5% of poor air quality days per year in U.S. counties where ambient air monitoring occurs.

- **Green**: ≤5 poor air quality days per year
- **Amber**: 6–20 poor air quality days per year
- **Red**: ≥21 poor air quality days per year

2. Drinking Water Quality

The metric for drinking water quality is whether an Army installation's potable water system meets health-based standards under the Safe Drinking Water Act (SDWA). Data on drinking water violations were obtained from an annual environmental data call issued by the Deputy Chief of Staff, G-9, Environmental Division. If there is uncertainty in these data, details of a violation are verified by discussion with garrison environmental staff. Additional references were used to verify drinking water violations, including the EPA Safe Drinking Water Information System database, and the annual Consumer Confidence Report (CCR) for the potable water system(s) serving the installation. The CCR is an EPA-mandated report published annually by the water purveyor to inform consumers about their local drinking water quality.

Green, amber, and red thresholds were established for the purpose of creating awareness of water quality status in the affected community. Compliance with all health-based drinking water standards is the desired status.

- **Green**: No violation of any health-based drinking water standard
- **Amber**: Violation of a drinking water standard for non-acute health effects when population exposure has occurred
- **Red**: Violation of a drinking water standard for acute health effects when population exposure has occurred

3. Water Fluoridation

The metric for water fluoridation is the annual average concentration of fluoride in the potable water provided to an Army installation. This concentration is compared to the CDC-recommended optimal fluoride concentration of 0.7 mg/L, the SDWA secondary maximum contaminant level (MCL) for fluoride of 2.0 mg/L, and the MCL of 4.0 mg/L. Fluoride concentration data for potable water systems serving Army installations were obtained from an annual data call issued by the Deputy Chief of Staff, G-9, Environmental Division. Installations that treat their own potable water measure fluoride levels at least annually and submit this information in reports to the local water regulatory authority, were included in the data call. For installations that purchase potable water, fluoride levels were obtained from the annual CCR for community water system(s) that provides potable water to the installation.

Green, amber, and red thresholds were established to create awareness of water quality status in the affected community. A fluoride concentration of 0.7 mg/L is the desired status. A fluoride concentration greater than 4.0 mg/L is a violation of the SDWA MCL.

- **Green**: Average fluoride concentration is 0.7–2.0 mg/L
- **Amber**: Average fluoride concentration is less than 0.7 mg/L or from 2.1-4.0 mg/L
- **Red**: Any fluoride concentration >4.0 mg/L

4. Solid Waste Diversion

The metric for solid waste diversion evaluates the Army's progress in diverting non-hazardous solid waste from traditional disposal methods, such as landfills or incinerators, that result in second-order health consequences. Diversion occurs when waste is recycled, composted, mulched, or donated. Beginning in 2020, DoD has permitted disposal at a waste-to-energy facility to count as diversion. Solid waste diversion is calculated as the annual mass of diverted waste divided by the annual mass of the total waste stream (diverted plus disposed) and is expressed as a percentage.

Solid waste data were obtained from the Solid Waste Annual Reporting for the Web (SWARWeb) database, which is operated by the Deputy Chief of Staff, G-9, Energy and Facilities Engineering. Solid waste managers report their facility's tonnage for waste, recycling, and other diversion efforts to SWARWeb semiannually. SWARWeb calculates diversion and economic benefits according to the DoD Solid Waste Measures of Merit in DoDI 4715.23 (DoD 2016b). For quality assurance, waste management reports for certain installations are reviewed, and installations are contacted to verify data integrity, spot anomalies, and analyze waste generation details. The solid waste diversion calculation excludes waste generated from privatized housing, and construction and demolition activities.

Joint bases where Army is not the lead Service do not have a SWARWeb reporting requirement but are still required to compute diversion rates to meet DoD requirements. Solid waste disposal tonnage and diversion rates from JB Elmendorf-Richardson, JB Langley-Eustis, and JB San Antonio were obtained by request from the Integrated Solid Waste Management compliance manager of the Air Force Civil Engineer Center.

Green, amber, and red thresholds were established for the purpose of creating awareness of solid waste management practices and tracking conformance with the current DoD solid waste diversion goal. Diversion ≥ 40% is the desired status, as established in the 2020 update to the DoD Integrated Solid Waste Management Metrics (the prior goal for diversion of non-hazardous solid waste had been 50%) (OSD 2020).

- **Green**: ≥40% solid waste diversion rate
- **Amber**: 25–39% solid waste diversion rate
- **Red**: ≤24% solid waste diversion rate

5. Mosquito-borne Disease Risk

The metric for mosquito-borne disease risk is an index reflecting the risk of being infected with dengue, chikungunya, and Zika viruses by day-biting mosquitoes (*Aedes aegypti* and *Aedes albopictus*) at an Army installation. The risk estimate is calculated by combining applied modeling methods for the number of total and high transmission days per year, likelihood an installation has certain mosquito species, and the presence of local and imported cases of dengue, chikungunya, and Zika viruses.

The index score ranges from 0 to 13 and indicates the risk of contact with a dengue-, chikungunya-, or Zika-competent mosquito vector (day-biting mosquito) at each Army installation. Variables in the index include total transmission days, high transmission days, presence of *Aedes aegypti* and *Aedes albopictus* in the local environment, and confirmation of imported or locally-acquired human cases of dengue, chikungunya, and Zika viruses in the area near the Army installation. An index score of 0–4.0 represents negligible or low risk. A score of 4.5–8.5 represents a moderate risk and suggests that the mosquito species may be present, but disease transmission may be low or underreported. A score of 9.0–13.0 represents a high risk of endemic mosquito vector presence and potential disease transmission on an installation.

Green, amber, and red categories were established to create awareness of selected mosquito-borne disease risks in the affected community and to encourage participation in recommended behavior modifications, such as eliminating breeding and harborage sites, using screens and self-closing doors, and using the DoD Insect Repellent System when active outdoors (permethrin-treated clothing, repellent on exposed skin, proper wear of uniform).

- **Green**: Risk index score 0–4.0
- **Amber**: Risk index score 4.5–8.5
- **Red**: Risk index score 9.0–13.0

6. Tick-borne Disease Risk

The metric for tick-borne disease risk is an index reflecting the risk of coming into contact with a Lyme vector tick (i.e., the blacklegged tick *Ixodes scapularis* or other *Ixodes* species tick) that is infected with the agent of Lyme disease at an Army installation. The risk estimate variables include whether an installation is in the predicted range for a Lyme vector tick, the number of human cases of Lyme disease in that county, the number of human-biting ticks identified as Lyme vector ticks submitted to Army programs, such as the Military Tick Identification/Infection Confirmation Kit (MilTICK) Program, and the number of Lyme vector ticks carrying the Lyme disease pathogen tested by Army programs.

The index score ranges from 0 to 5 and indicates the risk of contact with a Lyme vector tick infected with the agent of Lyme disease. An index score of 0 to 1 represents a low risk of coming into contact with a Lyme vector tick and being exposed to the agent of Lyme disease. A score of 2 to 3 represents a moderate risk of coming into contact with a Lyme vector tick and being exposed to the agent of Lyme disease. A score of 4 to 5 represents a high risk of coming into contact with a Lyme vector tick and being exposed to the agent of Lyme disease. If no installation-specific tick surveillance data were available from an Army Public Health entity, the installation received a score but was also flagged as having "No Data." Installations without site-specific surveillance data are not characterized as thoroughly as those that do participate in surveillance programs.

Tick-borne disease risk data (tick identification and testing) were compiled from ticks submitted to MilTICK. Human-biting ticks are voluntarily submitted to MilTICK through MTFs or individuals who have access to the MilTICK kits. All ticks submitted to MilTICK are included in a long-term passive surveillance dataset; MilTICK does not actively collect ticks from the environment at DoD installations (i.e., active surveillance).

When no MilTICK data were available for 2021, data from environmental tick surveillance conducted by the Army Regional Public Health Commands were used. These ticks were actively collected from pets, wildlife, and the environment, as well as humans in some locations outside the U.S.

Additional data from the CDC on reported Lyme disease cases by county for the years 2009–2019 were also used to estimate risk. All CDC data from this period reflect the case definition, which allowed for reporting of "confirmed" and "probable" cases. Only counties with >100 cases of Lyme disease in the 10-year period were included in order to rule out travel-related cases. County-level surveillance data were also included to determine the range of Lyme vector ticks, as published most recently by the CDC (Eisen et al. 2016).

No county data were available for Army installations outside the U.S, so recent publications were consulted for estimates of Lyme disease risk (Li et al. 2019, Hyoung et al. 2019, Kim et al. 2020, Yamaji et al. 2018). Green, amber, and red categories were established for the purpose of creating awareness of Lyme disease risk in the affected community and to encourage participation in surveillance programs such as MilTICK, and behavior modifications such as tick checks and measures recommended by the DoD Insect Repellent System when active outdoors (permethrin-treated clothing, repellent use, proper wear of uniform).

Green: Index score of 0–1; no or low risk of contacting a Lyme vector tick

Amber: Index score of 2–3; moderate risk of contacting a Lyme vector tick

Red: Index score of 4–5; high risk of contacting a Lyme vector tick

7. Heat Risk

The metric for heat risk reflects the number of days in a year when outdoor conditions heighten the risk of heat-related health impacts, and whether the year of interest differs from the prior 10-year period. Heat risk days are calculated as the number of days in a calendar year with at least 1 hour when the local National Weather Service heat index is above 90^{0}F. This corresponds to an outdoor heat status of "Extreme Caution" as classified by the National Weather Service.

Hourly measurements for outdoor temperature and relative humidity were obtained from land-based airport weather stations in closest proximity to installation cantonment areas or population centers. Using these data, the U.S. Air Force 14th Weather Squadron computes hourly heat index values for each location of interest. Annual heat risk days were calculated for the year of interest and each of the 10 years prior to the year of interest. Annual heat risk days for the year of interest are compared to the prior 10-year average to see if the incident year differs by more than one standard deviation.

There are no externally promulgated benchmarks. Any day that is a heat risk day has the potential to be high risk.

VI. Installation Health Index

The core metrics included in this report were prioritized for inclusion and weighting in the IHI calculation based on the prevalence of the condition or factor, the potential health or readiness impact, the preventability of the condition or factor, the validity of the data, and supporting evidence. Although BH impacts readiness, the BH medical metric was removed from the IHI in 2018 to avoid stigmatizing Soldiers who seek treatment, and because treatment options for BH conditions are not uniformly available across all installations.

To allow more valid comparisons, selected installation-specific medical metrics (injury, obesity, sleep disorders, chronic disease, tobacco product use, and sexually transmitted infections (STIs) (chlamydia)) were adjusted by age and sex using the 2015 U.S. Army population distribution as the standard (Watkins et al. 2018). Direct standardization techniques were used whereby crude installation rates for each population strata (i.e., males 17–24, females 17–24, males 45–64, and females 45–64) were multiplied by the standard and summed across strata to compute the installation adjusted rates.

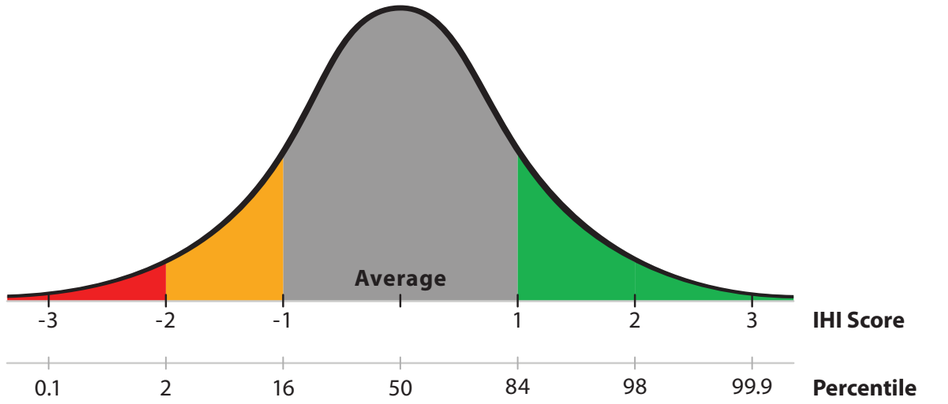
To generate the IHI, the selected age- and sex- adjusted medical metrics for each included installation were individually standardized to the average across these installations using z-scores. Z-scores follow a standard normal distribution and reflect the number of standard deviations (amount of variation in data values for a given metric) the installation is from the Army average for that medical metric. Values above the average have positive z-scores, while values below the average have negative z-scores.

In addition to the six age- and sex-adjusted medical metrics, the IHI also includes one unadjusted installation environmental health metric: number of poor air quality days. The air quality data are not normally distributed, and they vary widely by geographic location, particularly for installations outside the U.S., where the number of poor air quality days tend to be substantially higher relative to the mean across all installations. Accordingly, the number of poor air quality days at each installation was scored as follows: installations with missing or non-reported air quality data received an air quality score of 0, and thus do not affect the IHI score; installations with zero reported poor air quality days received an air quality score of 2, the highest (best) possible score; installations with between 1 and 4 poor air quality days received an air quality score of 1; installations with between 5 and 20 poor air quality days received an air quality score of -1; and installations with greater than 20 poor air quality days received an air quality score of -2, the lowest (worst) possible score. These groupings align with risk categories used in the Environmental Health Indicator – Air Quality section of *Health of the Force*.

Each installation's IHI is a standardized score (z-score) calculated by pooling the metric-specific scores for that installation. Metric-specific scores were weighted to prioritize the metrics that most impact medical readiness, as follows: injury–30%, sleep disorders–15%, obesity–15%, chronic disease–15%, tobacco product use–15%, STI (chlamydia)–5%, and air quality–5%. For installations with suppressed metric data, the corresponding metric's weight was equally distributed across the remaining metrics. The resulting weighted averages of these metrics were then standardized using the mean and standard deviation across all installations presented in *Health of the Force* to create the IHI score for each installation.

For ease of interpretation, the IHI is presented as a percentile as well as a z-score. The IHI percentile is equal to the area under the standard normal probability distribution for each installation's IHI score. The IHI percentiles are categorized as follows: <20%, 20–29%, 30–39%, 40–49%, 50–59%, 60–69%, 70–79%, 80–89%, and ≥90%. Higher percentiles reflect more favorable health status.

Normally Distributed Data Curve



IHI and rankings of supporting medical metrics are presented in three groups: installations outside of the U.S., Continental U.S. (CONUS) installations where MTFs are using the AHLTA electronic health record, and CONUS installations where MTFs are using the MHS GENESIS electronic health record. The health status and health records of Soldiers stationed outside the U.S. may vary in ways that could create bias when compared to U.S.-based Soldiers. As an example, Soldiers assigned outside the U.S. are more likely to meet deployment medical standards compared to Soldiers stationed at U.S. installations. There may also be systematic differences in healthcare delivery, since installations outside the U.S. may be more likely to outsource health care. Within MDR and DMSS, there are decrements in the number of medical encounters from MTFs using AHLTA compared to MTFs using MHS GENESIS. Specifically, the number of medical encounters appears to decrease after installations transition to MHS GENESIS.

VII. Installation Profile Summaries

Installation assignments for AC Soldiers and trainees (excluding cadets) were determined by assigned unit ZIP code. The installation profile summary pages report population estimates, and age and sex distributions. Population estimates were derived from person-time calculated from DMDC personnel rosters. Person-time, which is analogous to Full-Time Equivalents, estimates the average number of Soldiers at an installation during the year. Installations with a high turnover, such as those with a large trainee population, may not be accustomed to calculating their population size in this way. These estimates are intended to be a frame of reference and do not necessarily correspond to the population evaluated for each metric included in the installation.

VIII. Data Limitations

- Changes in sources of data and methodology in this report, compared to prior *Health of the Force* reports, prevent direct comparisons of measures across the reports.
- The COVID-19 pandemic caused changes in healthcare use that may affect the medical metric estimates reported for 2020 and 2021. Changes in rates and prevalence of reported conditions may not reflect actual changes in disease occurrence, but instead reflect pandemic-related use of the medical system. Furthermore, while the AC Soldier patient population may be representative of the AC Soldier population overall under ordinary circumstances, patients seen during the pandemic may be less representative.
- Since medical metrics are based on healthcare utilization, elevated estimates may not be indicative of a problem, but rather may reflect a greater emphasis on detection and treatment.
- Composite measures such as the IHI, which aggregate medical metrics, may mask important differences for each metric. It is important to examine the component metrics for which more targeted prevention programs may be developed.
- Metrics based on diagnostic codes (e.g., ICD-10-CM) entered in patient medical records are subject to coding errors.
- Estimates of disease frequency may be underestimates of actual disease frequencies given that individuals may not seek care or could choose to seek care outside the MHS or the TRICARE network.
- The STI (chlamydia) metric relies on reporting compliance. Chlamydia estimates are likely underestimated given the high proportion of asymptomatic infections that are undetected.
- The obesity proportions reported in *Health of the Force* are estimated from BMI calculated for a subset of the AC Soldier population that had an outpatient clinical encounter with recorded height and weight measurements during the calendar year (54%). It is possible that this subgroup may not be representative of the AC Soldier population. Although unverified, obese Soldiers may be more likely to have an outpatient visit than a non-obese Soldier; this would result in an overestimation of obesity prevalence for the AC Soldier population. Also, while useful as a population-level proxy for obesity, BMI alone should not be used to diagnose obesity in individuals.
- P3 and tobacco use metrics, which are based on self-reported data (Azimuth Check and PHA), are limited to a subset of the population (i.e., survey respondents), and these subgroups may not be representative of the AC Soldier population. Approximately 20% and 68% of AC Soldiers completed the Azimuth Check and PHA, respectively, in 2021.
- Azimuth Check data used for the P3 measures were aggregated across demographic strata, and counts below 40 were not reported. Thus, adjustments for age and sex were not possible for installation-specific data.
- DMDC race and ethnicity data were not sufficiently detailed to determine which Soldiers identified as multi-racial. Multiple DMDC records per Soldier with different race or ethnicity specified were also possible over the 5-year timeframe; in this situation, the most frequently used entry was selected and may not reflect the actual race or ethnicity of the Soldier.
- Personnel and medical data for cadets were not available; therefore, medical metric estimates for USAG West Point estimates that rely on DMDC-derived data are limited to permanent-party AC Soldiers.
- The Air Quality EHI relies on outdoor ambient air monitoring data that were deemed representative of air pollution levels experienced by the population working and living in the locale where the Army installation is situated. The metric does not reflect exposures from indoor air pollution sources.
- The Solid Waste Diversion EHI relies on SWARWeb solid waste generation and diversion data that may reflect estimates rather than the actual weight of materials.
- The Mosquito-borne Disease Risk EHI relies on mosquito specimens acquired by installations and forwarded to the supporting Army Regional Public Health Commands for identification and pathogen testing. Robustness of the risk characterizations is dependent upon installation surveillance programs collecting specimens and ensuring delivery to the supporting region for identification and testing.
- The Tick-borne Disease Risk EHI relies on tick specimens submitted to the MilTICK for identification and pathogen testing. Robustness of the risk estimate is dependent upon installation populations submitting human ticks to the MilTICK for analysis.

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12 U.S. Army Medical Materiel and Development Activity
13 Goldbelt APEX
14 Tri-Service Center for Oral Health Studies
15 U.S. Army People First Task Force

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ACRONYMS AND ABBREVIATIONS

2MR – 2-mile run
ABCP – Army Body Composition Program
AC – Active Component
ACFT – Army Combat Fitness Test
ACH – Army Community Hospital
ACS – Army Community Service
AFFF – Aqueous film-forming foam
AFHSB – Armed Forces Health Surveillance Branch
AFHSD – Armed Forces Health Surveillance Division
AFWC – Armed Forces Wellness Center
AHLTA – Armed Forces Health Longitudinal Technology Application
AHP – Army Hearing Program
AMC – Army Medical Center
aOR – Adjusted odds ratio
APFT – Army Physical Fitness Test
APG – Aberdeen Proving Ground
APHC – U.S. Army Public Health Center
AQI – Air Quality Index
AR – Army Regulation
AVS – Army Veterinary Services
AWC – Army Wellness Center
BCT – Basic Combat Training
BH – Behavioral health
BLS – Bureau of Labor Statistics
BMI – Body mass index
BRFSS – Behavioral Risk Factor Surveillance System
CAPER – Comprehensive Ambulatory Professional Encounter Record
CCR – Consumer Confidence Report
CDC – U.S. Centers for Disease Control and Prevention
CDR – Military Health System Clinical Data Repository
CHA – Community health assessment
CHCS – Composite Health Care System
CHIP – Community health improvement plan
CONUS – Continental U.S.
COPD – Chronic obstructive pulmonary disease
COVID-19 – Coronavirus Disease 2019
CoWEDA – Cold Weather Ensemble Decision Aid
CWS – Community water systems
DCPH-A – Defense Centers for Public Health – Aberdeen
DHA – Defense Health Agency
DMDC – Defense Manpower Data Center
DMSS – Defense Medical Surveillance System
DoD – Department of Defense
DoDI – Department of Defense Instruction
DOEHRS-HC – Defense Occupational and Environmental Health Readiness System – Hearing Conservation
DR – Data Repository
DRES – Deployment Readiness Education for Servicewomen
DRSi – Disease Reporting System internet
DTMS – Digital Training Management System
EHI – Environmental Health Indicator
EO – Executive Order
EPA – U.S. Environmental Protection Agency
FSA – Fluorosilicic acid
FY – Fiscal year
HCF – Healthcare facility
HHS – U.S. Department of Health and Human Services
HL7 – Health Level 7
HP2030 – Healthy People 2030
HRC – Hearing Readiness Classification
HRP – Hand release push-up
ICD-10-CM – International Classification of Diseases, 10th revision, Clinical Modification
IHI – Installation Health Index
JB – Joint Base
LGB – Lesbian, gay, and bisexual
LDD – Limited duty day
MCL – Maximum contaminant level
MDL – Maximum deadlift
MDR – Military Health System Data Repository
MEDCOM – U.S. Army Medical Command
MEDPROS – Medical Protection System
MFLC – Military and Family Life Counselor
MHS – Military Health System
MilTICK – Military Tick Identification/Infection Confirmation Kit Program
MODS – Medical Operational Data System
MOS – Military occupational specialty
MSK – Musculoskeletal
MTF – Medical treatment facility
NAAQS – U.S. National Ambient Air Quality Standard
NASEM – National Academies of Sciences, Engineering, and Medicine

NIHL – Noise-induced hearing loss
NMCPHC – Navy and Marine Corps Public Health Center
NPDWR – National Primary Drinking Water Regulations
NSF – National Sleep Foundation
NWS – National Weather Service
OAT – Oral appliance therapy
OMB – Office of Management and Budget
OSA – Obstructive sleep apnea
P3 – Performance Triad
P3T – Army Pregnancy Postpartum Physical Training
PAP – Positive airway pressure
PFAS – Perfluoroalkyl and polyfluoroalkyl substances
PF/BC – Physical fitness and body composition
PGH – Practice Greenhealth
PHA – Periodic Health Assessment
PLK – Plank
$PM_{2.5}$ – Fine particulate matter generally 2.5 micrometers and smaller
POI – Program of instruction
PSE – Patient safety event
PTSD – Posttraumatic stress disorder
PVT – Psychomotor vigilance test
SAN – Sleep, activity, and nutrition
SARS-CoV-2 – Severe acute respiratory syndrome coronavirus 2
SD – Standard deviation
SDC – Sprint-drag-carry
SDWA – Safe Drinking Water Act
SDWIS – Safe Drinking Water Information System
SIDR – Standard Inpatient Data Record
SOFS-A – *2020 DoD-Wide Status of Forces Survey of Active Duty Members*
SPT – Standing power throw
STI – Sexually transmitted infection
STS – Significant threshold shift
SUD – Substance use disorder
SWARWeb – Solid Waste Annual Reporting for the Web
SWTR – Surface Water Treatment Rule
TED-I – TRICARE Encounter Record – Institutional
TED-NI – TRICARE Encounter Record – Non-Institutional
TRADOC – U.S. Army Training and Doctrine Command
TRI – Training-related injury
TT – Tape test
USAG – U.S. Army Garrison
USARIEM – U.S. Army Research Institute of Environmental Medicine
USDA – U.S. Department of Agriculture
VTF – Veterinary treatment facility
WTE – Waste-to-energy

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