Create a healthier force for tomorrow.
Visit us at
https://phc.amedd.army.mil/topics/campaigns/hof
## CONTENTS

2  —  Introduction

18  —  COVID-19

32  —  Medical Metrics

70  —  Environmental Health Indicators

92  —  Performance Triad

102  —  Installation Health Index, Rankings, and Profiles

160  —  Appendices
In this changing world, one constant is the requirement for our Soldiers to remain healthy and ready to achieve Force dominance. In its 7th annual installment, the 2021 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 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 2021 report reflects calendar year 2020 data).

The Coronavirus Disease 2019 (COVID-19) pandemic transformed military operations and healthcare delivery, and much of the global workforce shifted to telework in response. The 2021 Health of the Force report includes a new COVID-19 metric section for a deep dive into surveillance data and methods, the effect of the pandemic on military healthcare utilization, effects on physical and mental health, and local actions focused on Army Public Health Nursing and vaccination efforts. The report also outlines health disparities faced by racial and ethnic minority Soldiers and the unique health needs of female Soldiers. These highlights help to frame conversations and analyses necessary to effect real progress towards health equity. It is important to note that data included in this report were collected during unprecedented times. As certain components of routine healthcare delivery transitioned to telework due to COVID-19, the impact of decreased healthcare utilization in certain areas may represent outliers in rate changes.

As military healthcare evolves, so do the electronic medical reporting systems and access to surveillance data. In 2020, additional installations transitioned from the Armed Forces Health Longitudinal Technology Application to the Military Health System (MHS) GENESIS electronic health record system. The injury, behavioral health (BH), substance use disorder, sleep disorder, obesity, heat illness, and chronic disease medical metrics, as well as the newly added COVID-19 hospitalizations metric, were not reported for the following installations that transitioned to MHS GENESIS over the past 2 years: Fort Irwin, Fort Wainwright, Joint Base (JB) Elmendorf-Richardson, JB Lewis-McChord, and Presidio of Monterey. All other available AC demographics and metric data are reported in the installation profile pages.

After reviewing the 2021 Health of the Force report, installation leaders will have a sense of strengths and challenges in their community and can take action. By using the tools included in the report such as rankings; the Installation Health Index; and medical, wellness, and environmental metric data, leaders can prioritize health-related needs, establish baseline rates, and give context to intervention long-term outcomes. Utilizing the companion digital platform, Health of the Force Online, users can dynamically display health outcomes, compare populations, and examine trends in data. Leaders may also enact change using Spotlight and Local Action vignettes, which provide information on mitigating health and readiness issues, highlight resources, and offer calls to action based on successful interventions and programs.
Introduction

Report Highlights

Arrows indicate the direction of change comparing 2019 data to the 2020 data reported. GREEN denotes change in the desired direction; RED denotes change in the undesired direction.

COVID-19

67 cases of COVID-19 per 1,000 person-years were reported among Soldiers in 2020. Soldiers <25 years old had the highest rates, potentially due to the large number of trainees who were tested upon arrival to Initial Entry Training.

Substantial changes in the prevalence and incidence of many medical metrics were observed, likely an outcome of the pandemic and associated changes in healthcare utilization as well as military training and operations.

SLEEP DISORDER

9.0% of Soldiers had a sleep disorder diagnosis, a decrease of 35% from the previous reporting year.

INJURY

49% of Soldiers were diagnosed with a new injury in 2020, a decrease of 11% from 2019. Most injuries (70%) were cumulative musculoskeletal (MSK) overuse injuries.

OBESITY

18% of Soldiers were classified as obese (Body Mass Index (BMI)>30) in 2020, an increase of 7.9% from the previous reporting year. Racial disparities remained constant with Asian Soldiers having the lowest prevalence of obesity and Native Hawaiian/Pacific Islander Soldiers having the highest prevalence of obesity.

BEHAVIORAL HEALTH

15% of Soldiers had a diagnosis of one or more BH disorders, a decrease of 5.4% from the previous reporting year.

HEAT ILLNESS

2.6 cases of heat illness per 1,000 person-years were reported for Soldiers in 2020, a decrease of 23% from the previous reporting year.

SEXUALLY TRANSMITTED INFECTIONS

21 new chlamydia infections were reported per 1,000 person-years, a 16% decrease from the previous reporting year.

CHRONIC DISEASE

17% of Soldiers had a diagnosis of one or more chronic diseases, an 11% decrease from the previous reporting year.

AIR QUALITY

6.8% of Soldiers were assigned to an installation experiencing high-risk air quality (>20 poor air quality days/year), an increase from 6% in 2019. 3% of Soldiers at U.S. bases, and 45% of Soldiers at bases outside the U.S., were in a high-risk location.

SOLID WASTE DIVERSION

58% of installations tracked in this report met the Department of Defense (DOD) solid waste diversion goal, an improvement over 49% in 2019. 47% of installations in the U.S., and 91% of installations outside the U.S., met the goal.

SLEEP

38% of Soldiers attained 7 or more hours of sleep during work/duty weeks, which is consistent with data from 2019.

NUTRITION

<50% of Soldiers met the nutrition targets of eating 2 or more servings of fruits per day (30%) or 2 or more servings of vegetables per day (40%), which is consistent with data from 2019.

DEMographics

Approximately 474,000 AC Soldiers
77% <35 years old
15% female
21% Black or African American
16% Hispanic or Latino

Arrows indicate the direction of change comparing 2019 data to the 2020 data reported. GREEN denotes change in the desired direction; RED denotes change in the undesired direction.
Introduction

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 33% of the U.S. civilian employed workforce population (BLS 2021a). Soldiers are mostly male (85%) 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 2021a). 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 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 enumerates health disparities based on race and ethnicity for Army Senior Leaders (ASLs) to understand and ameliorate these health disparities.

Population by Sex and Year, AC Soldiers, 2016–2020

In 2020, the estimated average monthly AC Soldier population was 473,933 Soldiers. Enlisted personnel accounted for 81% of the AC Soldier population. From 2016 to 2020, the number of female Soldiers in the AC increased by 7.5%.

Distribution by Race and Ethnicity, AC Soldiers, 2020

The majority (68%) of AC Soldiers identified as White, followed by Black or African American (21%). Approximately 16% of Soldiers reported Hispanic or Latino ethnicity.

Distribution of Age by Race and Ethnicity, AC Soldiers, 2020

The above chart displays the distribution of age by race and ethnicity of Soldiers who are included in this year’s report. Soldiers who report more than one race are reported in each race category in which they identify. However, Soldiers who identify only as Hispanic or Latino with no race or Hispanic or Latino and a 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 are not represented in the graph.
About 13,000 Soldiers identified as Hispanic or Latino, but had an Unknown or Other 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 White (95%).

Quickly create presentations with health, wellness, and environmental data.

Inform actions that improve the health of your Force by accessing over 150 data visualizations across 20 metrics.

Filter data visualizations by reporting unit, year, or key demographic factors such as age, sex, race, and ethnicity.

From a CAC-enabled device, visit the Health of the Force homepage and select “Online Data” or visit https://tiny.army.mil/r/tMG6.
**Introduction**

**SPOTLIGHT**

**CALL TO ACTION:**
Enumerating and Addressing Health Disparities among Racial and Ethnic Minority Soldiers

One of the primary goals of public health reporting is to highlight disparities to inform interventions, programs, or services that improve the health and wellness of affected populations. The 2020 *Health of the Force* introduced race and ethnicity demographic data to describe the medical metrics for the AC Soldier population (APHC 2021a), and the current report reveals that racial and ethnic minority Soldiers have a higher occurrence of disease across several medical metrics compared to White (Not Hispanic or Latino) Soldiers (see Figures 1a and 1b).

Although reasons for health disparities across race and ethnicity groups are varied and complex, the concept of social determinants of health (SDOH) encompasses many of the critical drivers. SDOH are the conditions in which people are born, live, learn, work, play, worship, and age, and are often precursors to health disparities. The Healthy People 2030 (HP2030) initiative outlines five prioritized SDOH domains that impact health outcomes: economic stability, education, healthcare, social and community context, and neighborhood and built environment (HHS 2022). The World Health Organization (WHO) states SDOH are “mostly responsible for health inequities – unfair and avoidable differences in health status seen within and between countries” (WHO 2022).

Since SDOH are present throughout the life course, Soldiers enter the healthcare system with life experiences that can substantially influence their health status. More specifically, SDOH prior to military service impacts racial and ethnic minority Soldiers differently when compared to White (Not Hispanic or Latino) Soldiers. Recognizing the importance of SDOH, the Army, led by the Quality of Life Task Force, has placed renewed emphasis on quality of life indicators and how they impact Soldier health and readiness.

Although Soldiers have benefits that can minimize the impact of some health disparities, such as access to universal medical care, access to these benefits does not always equate to better health outcomes. The Institute of Medicine’s (IOM’s) publication Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care reported that racial and ethnic minorities tend to receive lower quality health care than non-minorities, even after accounting for access-related factors. These disparities were consistent across a range of illnesses and healthcare services (IOM 2003). Although significant improvements in healthcare quality have been made since the release of this landmark report, racial and ethnic disparities persist (AIHRQ 2021).

Other factors influencing health disparities among minorities can be framed using the social-ecological framework (i.e., individual, interpersonal, community, societal) (CDC 2020a; see Figure 2). Such factors include diet, community resources, and psychosocial stressors such as discrimination and goal-striving stress, which manifests when a person is unable to achieve a goal due to structural and psychological obstacles (Boulton and Wallace 2021).

The disparate burden of adverse health outcomes experienced by racial and ethnic minority Soldiers requires careful attention to critical drivers. SDOH can help guide public health research to understand risk factors in relation to health disparities. Encouraging ASLs to address findings for health disparities may be an impactful way to close the gap in health disparities among racial and ethnic minority Soldiers (Boulton and Wallace 2021). Further, systematically adopting a “Health in All Policies” approach would encourage integration of impacts of SDOH into policy and doctrine (Rudolph et al. 2013). Evidence in the current report aligns with civilian racial and ethnic health disparities and warrants investigation and application of practical and policy strategies to mitigate risk and optimize health and readiness for all Soldiers.

**Figure 1a. Prevalence of Medical Metrics by Race and Ethnicity, AC Soldiers, 2020**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any BH Disorder</td>
<td>37</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>12</td>
</tr>
<tr>
<td>Any Chronic Disease</td>
<td>16</td>
</tr>
<tr>
<td>Sleep Disorder</td>
<td>25</td>
</tr>
<tr>
<td>Obesity</td>
<td>21</td>
</tr>
</tbody>
</table>

**Figure 1b. Incidence of Medical Metrics by Race and Ethnicity, AC Soldiers, 2020**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rate per 1,000 Person-Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury</td>
<td>1,206</td>
</tr>
<tr>
<td>Sexually Transmitted Infections</td>
<td>35</td>
</tr>
<tr>
<td>COVID-19</td>
<td>75</td>
</tr>
</tbody>
</table>
An unintended pregnancy is defined as a pregnancy that is either mistimed (i.e., occurred earlier than desired) or unwanted. Unintended pregnancy is approximately 50% higher for female Active Duty Service members than for female civilians (OSD 2020a), which adversely impacts health and readiness. Most unintended pregnancies occur from not using contraception or not using contraception correctly and consistently. Women who want to prevent a pregnancy should have contraceptive counseling to review medical history, discuss contraceptive methods, and learn about correct contraceptive use to maximize its effectiveness against pregnancy.

Women may choose from a full range of contraceptive methods; however, these methods vary in effectiveness based on typical use (see figure). Long-acting reversible contraceptives are the most effective contraceptive method (e.g., intrauterine device (IUD)), as they are 99.5% effective in preventing pregnancy. Research also shows that improving access to care, such as walk-in contraceptive clinics, can decrease unintended pregnancies (Madden et al. 2019). As a result, efforts are underway in many military treatment facilities (MTFs) to accommodate walk-in contraception visits.

Decide + Be Ready is a free mobile application available to female Service members to help them review contraceptive and menstrual regulation options and discuss their preferences and concerns with a healthcare provider.
MENSTRUAL SUPPRESSION

Menstrual suppression is the process of using hormonal medication or devices to decrease or stop menstrual bleeding. Menstruation is not physiologically necessary for women who are not planning for a pregnancy and does not affect future fertility. Service women report that managing menstrual bleeding is an inconvenience and a challenge for hygiene. Physical and mental stress can cause changes to menstrual cycles, leading to irregularities or unplanned bleeding. Training and deployment environments amplify these challenges. Menstrual supplies, convenience, privacy, and adequate facilities are among the worries of women who deal with menstrual periods during training or deployment (Ricker et al. 2021).

Continuous hormonal contraception offers women the option to regulate and suppress menstrual bleeding. A variety of hormonal contraceptive methods is available for menstrual management, to include the pill, patches, rings, and IUDs. In addition to managing bleeding, menstrual suppression can also relieve menstrual cramping and common premenstrual symptoms such as breast pain, gastrointestinal symptoms, and mood changes.

While women report a desire for menstrual suppression, this practice is not common (Ricker et al. 2021). Potential barriers to the practice include limited availability of female healthcare providers, perceived stigma for seeking health care, lack of knowledge of the healthcare system, and lack of knowledge or training on women's healthcare topics (Eagan 2019).

Continuous hormonal contraception offers women the option to regulate and suppress menstrual bleeding. A variety of hormonal contraceptive methods is available for menstrual management, to include the pill, patches, rings, and IUDs. In addition to managing bleeding, menstrual suppression can also relieve menstrual cramping and common premenstrual symptoms such as breast pain, gastrointestinal symptoms, and mood changes.

Oral Health during Pregnancy

During pregnancy, hormone fluctuations exaggerate the inflammatory response, making pregnant women more prone to gingivitis (CDC 2019, ADA 2021). If left untreated, gingivitis can develop into periodontitis, an infection that destroys the structures supporting the teeth. Changes in eating habits (e.g., eating sugary snacks, more frequent snacking) and higher levels of acidity in the mouth due to vomiting, increase the risk of cavities (CDC 2019, ADA 2021). Some women may also experience a “pregnancy tumor”—a benign overgrowth of the gum tissue between teeth (ADA 2021).

Additionally, poor oral health during pregnancy can lead to poor health outcomes for both the baby and mother including preeclampsia, preterm birth, and low birth weight (Daalderop et al. 2018). A mother’s oral health status is also a strong predictor of the oral health status of her child (Dye et al. 2011). Consequently, maintaining a healthy diet and good oral hygiene (i.e., brushing twice per day, flossing daily) throughout pregnancy is essential. Furthermore, preventive dental treatment (e.g., professional dental cleaning) during pregnancy is both safe and highly recommended (ADA 2021, ACOG 2013).

Work-Related Musculoskeletal Health during Pregnancy

Many daily Soldier work activities involve manual materiel handling. Risk factors related to object weight, size, and design and mission requirements such as repetition and duration can increase work-related musculoskeletal disorders (WMSD) incidence and severity. During pregnancy, body changes in strength, laxity, center of gravity, and biomechanics can impact WMSD risks.

Increased body mass can impair balance, amplify stress on ligaments, and increase muscle and metabolic demands and likelihood of oeverexertion. Pregnancy-related physiological changes can result in ligament and joint laxity. This can impact WMSD risk because laxity may occur before weight gain limits physical activities and may increase muscle demand to stabilize joints. As abdominal girth increases, the horizontal distance increases between the spine and the item being lifted; thus increasing forces on the spine.

Maintaining MSK health can help Soldiers return to mission readiness post-pregnancy. Reduce exposures to biomechanical and energy expenditure demands by designing workstations and work tasks that allow workers to maintain neutral postures; avoid lifting from the floor or overhead; lift stable objects; use two hands; reduce object weights, excessive reaches, and lift duration and frequency; and use engineering controls.

Introduction

Pelvic Floor Health

The pelvic floor consists of muscles and other tissues that provide support to the pelvis. A healthy pelvic floor has strength and flexibility. Pelvic floor dysfunction is an umbrella term that describes a problem related to pelvic floor weakness, injury, or tightness. Common conditions that can indicate pelvic floor dysfunction include difficult urination, urinary incontinence, pelvic organ prolapse, painful intercourse, constipation, fecal incontinence, or generalized pain (Good and Solomon 2019). While no primary cause exists, contributing factors include habitual efforts to delay urination or defecation; surgical or obstetric trauma; sexual abuse; advancing age; obesity; childbearing; and hysterectomy (Good and Solomon 2019).

Pelvic floor dysfunction is underreported, underdiagnosed, and undertreated because the topic can be embarrassing and uncomfortable. Women have an estimated 25% lifetime risk of experiencing pelvic floor dysfunction (Good and Solomon 2019). Soldiers have added physical demands from physical and military training, which can expose women to frequent, high-load activities. Some military studies show more than 30% of female Soldiers report urinary incontinence during training (Criner 2001). Pelvic floor muscle training benefits women, leading to fewer episodes of leaking and a better quality of life (Damoulin et al. 2018).

Regardless of the cause, pelvic floor dysfunction should not go untreated. Women experiencing symptoms of pelvic floor dysfunction should discuss their concerns with their provider for further evaluation of the possible causes. Most women will need further evaluation by an OB/GYN provider and a physical therapist with specialized skills in pelvic floor physical therapy.

Actions to Promote Women’s Health

• Train healthcare providers to provide the full spectrum of contraceptive options.
• Support walk-in contraceptive clinic appointments.
• Promote menstrual health education at all levels of military medicine.
• Educate female Soldiers about menstrual suppression options.
• Encourage a timely medical evaluation when Soldiers disclose concerns about pelvic floor health.
• Stress the importance of attending physical therapy sessions.
• Include women’s health education in leadership training to promote awareness and support women’s health readiness.

Oral Health during Pregnancy

During pregnancy, hormone fluctuations exaggerate the inflammatory response, making pregnant women more prone to gingivitis (CDC 2019, ADA 2021). If left untreated, gingivitis can develop into periodontitis, an infection that destroys the structures supporting the teeth. Changes in eating habits (e.g., eating sugary snacks, more frequent snacking) and higher levels of acidity in the mouth due to vomiting, increase the risk of cavities (CDC 2019, ADA 2021). Some women may also experience a “pregnancy tumor”—a benign overgrowth of the gum tissue between teeth (ADA 2021).

Additionally, poor oral health during pregnancy can lead to poor health outcomes for both the baby and mother including preeclampsia, preterm birth, and low birth weight (Daalderop et al. 2018). A mother’s oral health status is also a strong predictor of the oral health status of her child (Dye et al. 2011). Consequently, maintaining a healthy diet and good oral hygiene (i.e., brushing twice per day, flossing daily) throughout pregnancy is essential. Furthermore, preventive dental treatment (i.e., professional dental cleaning) during pregnancy is both safe and highly recommended (ADA 2021, ACOG 2013).

Work-Related Musculoskeletal Health during Pregnancy

Many daily Soldier work activities involve manual materiel handling. Risk factors related to object weight, size, and design and mission requirements such as repetition and duration can increase work-related musculoskeletal disorders (WMSD) incidence and severity. During pregnancy, body changes in strength, laxity, center of gravity, and biomechanics can impact WMSD risks.

Increased body mass can impair balance, amplify stress on ligaments, and increase muscle and metabolic demands and likelihood of overexertion. Pregnancy-related physiological changes can result in ligament and joint laxity. This can impact WMSD risk because laxity may occur before weight gain limits physical activities and may increase muscle demand to stabilize joints. As abdominal girth increases, the horizontal distance increases between the spine and the item being lifted; thus increasing forces on the spine.

Maintaining MSK health can help Soldiers return to mission readiness post-pregnancy. Reduce exposures to biomechanical and energy expenditure demands by designing workstations and work tasks that allow workers to maintain neutral postures; avoid lifting from the floor or overhead; lift stable objects; use two hands; reduce object weights, excessive reaches, and lift duration and frequency; and use engineering controls.
Beyond the Health of the Force: Focusing on the Health of the Army Family

ASLs have made a strong commitment to increase support for Soldiers and Families as evidenced in the Army People Strategy (DA 2019). The time is now to engage in this focused effort—as such, the U.S. Army Public Health Center (APHC) and key Army partners have come together to understand, summarize, and communicate what is known and unknown about the health of the Army Family through the inaugural Health of the Army Family report.

The health, quality of life, and satisfaction of Army Families today have a direct impact on the total Army Force of tomorrow. More than half of Soldiers are married and/or have dependents, and more than one-third of recruits are heavily influenced by their family to join the Army (see figure). Research shows clear linkages between spousal satisfaction with Army life, spousal support for retention, and Soldiers’ actual retention decisions (OPA 2019). There- and unique military life events are related to satisfaction Army Family health (e.g., physical and psychological health) (DOD 2015). Research also suggests that factors of retention, and Soldiers’ actual retention decisions (OPA 2019). There- and unique military life events are related to satisfaction Army Family health (e.g., physical and psychological health) (DOD 2015). Research also suggests that factors of retention, and Soldiers’ actual retention decisions (OPA 2019). There-

Family Influences on Soldiers

- 57%  Percentage of AC Soldiers who have a spouse and/or dependents, 2018 (DOD 2018)
- 93%  Percentage of Soldiers who stay in the Army with support of a spouse, 2014 (OPA 2017)
- 39%  Percentage of new Army recruits who are greatly or very greatly influenced by Family to join Army, 2017 (OPA 2018)

Causes of Service Termination in Military Working Dogs

On the battlefield, Military Working Dogs (MWDs) are force multipliers and critical assets to the DOD. MWDs that leave service early represent a significant loss of investment and readiness of the Force.

A study examining service termination data from 2000 to 2004 (n=268), found that among dogs ≥5 years old at discharge, German Shepherd Dogs had a significantly lower age at discharge than Belgian Malinois (8.6 years vs 11 years, respectively; Evans et al. 2007). However, more current and comprehensive studies were warranted.

Army Veterinary Services (AVS) recently investigated causes of service termination in fiscal year 2019 (FY19) through FY20 among operational MWDs (n=637). The average age of service termination was 8.7 years (age range: 2.9–13) for German Shepherd Dogs compared to 9.2 years (age range: 2.4–13) for Belgian Malinois.

Of the 637 operational MWDs, 37 (5.8%) were terminated from service at <5 years old. Of these, 26 (70%) were terminated for medical reasons, with the remaining 11 being terminated for non-medical reasons. The top three causes of early medical service termination were behavior (n=4; 23%), heat injury (n=4; 15%), and multiple causes (n=3; 12%) (see figure). Unfortunately, service termination for behavior resulted in euthanasia more often than all the other causes of early service termination combined. Army MWDs were 2.6 times more likely to have early service termination for medical reasons compared to Air Force MWDs.

Some common diseases (e.g., neurologic/spinal cord injury, MSK/orthopedic disorders) are associated with advancing age and may be unavoidable, even with selective breeding and stringent service entry medical screenings. In addition to focusing on advanced medical and surgical treatments for the common causes of service termination, efforts should also focus on the leading causes of early medical service termination, mainly behavior and heat injury, as well as identifying Service-specific factors that contribute to early service termination. Improvements in all aspects of genetics, procurement, policy, and training (of MWDs, handlers, and AVS personnel) must be made to ensure that the DOD continues to have a strong fighting (and biting) canine force.

Causes of Medical Service Termination in Operational MWDs ≤5 Years Old (n=26), FY19–FY20

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of Terminations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior</td>
<td>17%</td>
</tr>
<tr>
<td>Heat injury</td>
<td>8%</td>
</tr>
<tr>
<td>Multi-system</td>
<td>4%</td>
</tr>
<tr>
<td>Euthanized</td>
<td>52%</td>
</tr>
<tr>
<td>Died</td>
<td>12%</td>
</tr>
<tr>
<td>Adopted</td>
<td>12%</td>
</tr>
<tr>
<td>Other**</td>
<td>4%</td>
</tr>
</tbody>
</table>

Notes:
* Refers to multiple causes (e.g., MSK and neurologic) occurring concurrently.
** Includes trauma; anesthetic arrest; foreign body migration; neoplasia; hemostasis; undetermined; and disease processes affecting the spinal cord, ligament, hip, immune system, or larynx.
“It is imperative that we continue to keep our foot on the pedal of Force health protection, not just of our Soldiers and our Civilians, but of our Family members and the 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 fight against COVID-19
COVID-19

COVID-19 is a respiratory illness caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) that is commonly characterized by fever, dry cough, and shortness of breath symptoms. 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. Similar to the U.S. civilian population, Soldiers are tested when they exhibit symptoms of COVID-19 and when they have come into close contact with a confirmed COVID-19 case. 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 training environments, with increased risk of exposure and transmission, the Army performed additional surveillance testing to identify asymptomatic SARS-CoV-2 positive cases. Incidence of COVID-19 was estimated using laboratory test results and COVID-19 cases reported through Disease Reporting System internet (DRI).

Incidence of COVID-19 by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020

There were 67 COVID-19 cases among Soldiers per 1,000 person-years. Incidence ranged from 7.5 to 228 COVID-19 cases per 1,000 person-years across Army installations.

Incidence of COVID-19 by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020

Among AC Soldiers, there were 67 COVID-19 cases per 1,000 person-years in 2020. 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 separate asymptomatic individuals who tested positive. Across all age groups, Hispanic or Latino Soldiers had the highest rates of COVID-19.

Females (72 COVID-19 Cases per 1,000 Person-Years)

Males (65 COVID-19 Cases per 1,000 Person-Years)

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. Similar to the U.S. civilian population, Soldiers are tested when they exhibit symptoms of COVID-19 and when they have come into close contact with a confirmed COVID-19 case.

Incidence of COVID-19 Hospitalizations by Sex and Age, AC Soldiers, 2020

In 2020, 1.0% of AC Soldier COVID-19 cases were hospitalized. The rate of COVID-19 hospitalizations among AC Soldiers was 0.72 per 1,000 person-years, and was higher among female Soldiers compared to male Soldiers, specifically among female Soldiers <35 years old. This difference may be attributed to obstetric admissions, as over 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, 2020

The 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 BH (13%), obstetrics (12%), injury (9.7%), ill-defined conditions (7.1%), and pulmonary diagnoses (6.8%).
Identifying and Mitigating COVID-19 Outbreaks in a Pandemic

When disease outbreaks occur, they are investigated by installation public health teams and reported to the DRSi. In 2020, 51 COVID-19-related outbreaks were reported from 12 installations. Most outbreaks reported to DRSi were in AC units (n=44, 86%) and involved an average of 32 cases (range 3 to 167, standard deviation (SD)=37). For each reported outbreak, the installation public health department responded by testing affected units, isolating or quarantining those exposed, disinfecting surfaces, and conducting contact tracing.

Because outbreaks are difficult to define and identify during a pandemic, the outbreaks reported to the DRSi likely did not account for all COVID-19 outbreaks that may have occurred across the Army enterprise. Outbreaks cannot be validated against other data sources, so if an outbreak occurs and is not reported, it cannot be identified from other sources. However, the outbreaks that were reported provide a peek into the challenges each installation faces when mitigating COVID-19 in their population. Mitigation was a challenge among training units, in barracks, and among those whose training required travel or close contact. Training installations that received thousands of trainees from across the United States each month were challenged with quarantining and isolating SARS-CoV-2 positive recruits.

In addition to monitoring DRSi outbreak reports, the APHC COVID-19 Surveillance Team referred to state health departments’ COVID-19 dashboards, media reports, and direct communication with installation public health departments when unexplained increases occurred at installations. The majority of installation-level case increases were due to spikes in cases in surrounding communities or changes to statewide mask mandates or social distancing guidance. For example, El Paso, Texas had the most significant increase in cases through October and November. When community hospitals were overwhelmed with patients, nearby William Beaumont Army Medical Center accepted emergent civilian cases. In turn, Fort Bliss saw a 500% increase in COVID-19 cases reported in October and a surge in hospitalizations in November (see figure).

Over the course of the pandemic, identifying COVID-19 outbreaks that could be mitigated and prevented has been difficult and continues to be a challenge among the Army population. By utilizing as many resources as possible, the APHC COVID-19 Surveillance Team has been able to provide context to the case numbers at affected installations.

Accomplishing Accurate, Real-Time Disease Surveillance during a Pandemic

In an ordinary year, surveillance of infectious diseases requires daily maintenance, ongoing education, and a knowledgeable team of public health professionals. The Army conducts surveillance of 70 reportable medical events (RMEs) using the DRSi, an online surveillance system. From 2010 to 2018, an average of 20,500 RME cases per year was reported to the DRSi from Army installations (Ambrose et al. 2019). In 2020 alone, nearly 82,000 cases were reported, resulting in a 300% increase in cases reported to the system; COVID-19 cases accounted for 75% of the approximately 82,000 cases reported. Further, a 300% increase in the number of new DRSi users in 2020 was observed as compared to the average number of new DRSi users per year in the previous 5 years.

In 2020, the APHC received numerous requests for information related to the pandemic, and the information reported in the DRSi was essential to providing those responses. Prompt and precise COVID-19 reports from installation public health offices to the DRSi were a necessity to inform public health mitigation efforts during the pandemic; however, some information was lacking. To ensure accuracy of cases reported, epidemiologists at the APHC conducted daily reviews of medical records for all patients with a diagnosis, hospitalization, or death due to COVID-19. As rapid reporting of a high volume of cases occurred throughout the pandemic, timeliness of case reports was monitored weekly, and delays were reported to regions and local commands. On average, 82% of cases reported to the DRSi were submitted by the MTF within 2 days of the patient’s diagnosis date; timeliness of reported cases decreased during the height of the pandemic due to the increased volume of cases. In response, epidemiologists at the APHC assisted multiple MTFs with reporting cases to reduce their backlog.

Surveillance of COVID-19 has truly been a team effort throughout the Army enterprise, requiring dedication and communication from a variety of public health practitioners. The COVID-19 pandemic demonstrated the manpower required to provide timely, actionable information on patient data, as well as the importance of consistent data validation practices to ensure accurate information was disseminated.
I worked closely with the local city and state health departments in efforts to decrease the spread of COVID-19.

APHN staff collected specimens at patients’ homes to protect hospital workers from being exposed at the start of the pandemic.

In meetings, commanders wanted to hear from us, and we had a seat at the table. People learned what contact tracing was and why we are important. We are the front line trying to stop the spread.

I was ecstatic to be actively using my skill for a real event that I had trained to do for years. My daily devotional and exercise regimen of six days per week helped with keeping the stress manageable when the op-tempo escalated.

We're sometimes the last person the group wants to hear from, but that doesn't stop us from saying what is important for them to know, even if it's unpopular.

Although APHNs and ARNG were prepared for emergency response, the scale of the pandemic was inconceivable. From setting up field hospitals to comforting patients in their final moments, APHNs and the ARNG were there every step of the way.

My staff went above and beyond in ensuring hospitalized patients could FaceTime their loved ones. Because our community relied on us so much I felt I could not let them down.

Contact tracing is vital to mitigating the spread of COVID-19. The expertise of APHNs and ARNG assisted states with the monumental task of identifying cases and reducing the spread.

The high information demand, increased case counts, multiple outbreaks, and frequently changing policies and guidelines undoubtedly took a toll on the well-being of these individuals. Regardless, APHNs and ARNG accepted their roles and recognized the impact of public perception to public health.

I hope the hard work of public health continues to prove its priceless value.

— Anonymous, ARNG

Since the introduction of COVID-19 vaccines in December 2020, Regional Health Command-Pacific has administered more than 200,000 doses. In Hawaii, Tripler Army Medical Center (TAMC) led COVID-19 preparedness and response efforts across the entire Hawaii MHS, U.S. Army Hawaii, U.S. Army Pacific, and operational platforms across the INDO-PACOM theater.

To deploy the vaccines efficiently, the team at TAMC developed the “Tripler Shot Tracker” application. This Tri-service, online appointment and accountability system was shared among the Army, Air Force, and Navy to facilitate the tracking of available vaccine across the Services, manage registration for mass vaccination events, and allow eligible patients to make vaccine appointments at their most convenient site.

Coupled with an extensive public education campaign and daily updates with military and state healthcare leaders, this systematic rollout allowed Tripler to target strategic leaders, high-risk beneficiaries, healthcare workers, and quick reaction forces. The aggressive, proactive approach included Saturday drive-thru opportunities, remote island visits, and events at high-traffic locations (e.g., Navy Exchange). TAMC's COVID-19 vaccination and public health campaign was identified as a "best practice" by Army public health experts and served as an example to other Army medical organizations.

These photos were taken on 5 January 2021 during Operation Hope at Hickam Air Force Base in Hawaii. Operation Hope was a single-day operation to vaccinate the front line Hawaii NG members on Oahu onboard a C-17 aircraft, which was provided by the Hawaii Air NG. Photos courtesy of TAMC.
Behavioral Health Advisory Team: Assessing the Impact of the COVID-19 Pandemic on Soldiers’ Behavioral Health

The COVID-19 pandemic exacerbated BH issues across the nation, increasing the need to better understand the impact of the pandemic on Soldiers’ BH. The Walter Reed Army Institute of Research (WRAIR) and the APHC developed the Behavioral Health Advisory Team (BHAT) – COVID-19 Survey to systematically assess key BH outcomes in the context of the COVID-19 pandemic and provide data-driven recommendations to local commands and the Army more broadly. Over 21,000 AC Soldiers at I Corps, 8th Army Korea, and U.S. Army Europe completed the survey from May to June 2020. The survey provided information about Soldiers’ BH during the pandemic, including risk and mitigation factors for negative BH outcomes.

Results indicated that about 1 in 7 Soldiers screened positive for anxiety with any related impairment (13%) or depression (14%). Female, Junior Enlisted, and racial/ethnic minority Soldiers were at elevated risk for anxiety with any related impairment (14%) or depression (13%) or anxiety for depression (13%). Moreover, half of Soldiers reported some negative financial impact because of the COVID-19 pandemic, Soldiers with greater COVID-19 stressors, fears, and concerns, and Soldiers who experienced more severe financial impacts during the pandemic, were more likely to screen positive for depression or anxiety.

The majority of Soldiers reported that their immediate supervisor engaged in constructive COVID-19 leadership behaviors. Soldiers who reported that their supervisor engaged in constructive COVID-19 leadership behaviors were less likely to screen positive for depression or anxiety.

63% of Soldiers indicated that their immediate supervisor leads by example by following health guidelines to reduce the spread of COVID-19.

Collectively, these results emphasized the need for Army leadership to acknowledge the impacts of the COVID-19 pandemic on Soldiers’ BH, especially for Junior Enlisted and racial/ethnic minority Soldiers. BH services, financial resources, and leadership support are important to help mitigate the impacts of the pandemic on Soldiers’ BH.


Effects of the COVID-19 Pandemic on Soldier Physical Fitness

Psychological and physical fitness are two facets of a well-rounded and operationally-ready Soldier. Fitness and BH are functionally linked; generally, as fitness increases, BH often improves (Callaghan 2004, Taylor et al. 1985). The first year of the COVID-19 pandemic presented challenges to maintaining optimal Soldier and unit readiness. To interrupt disease transmission and protect the health of Soldiers and other members of the Army community, the Army changed work and training schedules, implemented movement restrictions and social distancing orders, and temporarily closed some installation services, including fitness centers. It is plausible that these changes could negatively impact physical fitness.

In the BHAT – COVID-19 Survey described on the previous page and fielded in late Spring 2020 (WRAIR and APHC 2020), surveyed Soldiers cited limited opportunities for exercise as one of the top stressors associated with the pandemic. Despite the restrictions imposed during 2020, the overall impact on physical fitness in AC Soldiers appears minimal and within expected changes in fitness during any given year (Lyons et al. 2021). Recent data from the APHC demonstrated that muscular endurance (measured through Army Physical Fitness Test (APFT) Push-ups and Sit-ups) changed by less than one repetition and cardiopulmonary endurance (measured through APFT 2-mile run times) marginally decreased (e.g., slower run times by ~10 seconds or less) (see figure). Moreover, fitness changes between 2019 and 2020 were not as pronounced as they were between 2018 and 2019.

24% of Soldiers surveyed were very concerned about opportunities for exercise in the context of COVID-19.

Available data suggest that physical fitness was not affected substantially by mitigation efforts implemented during the pandemic year. Further exploration of these findings is warranted, as the observed results could be due to the timing of the BH survey discussed above, as well as the adoption of, and move towards the Army Combat Fitness Test (ACFT).

<table>
<thead>
<tr>
<th>Year</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td><img src="2018.png" alt="Females" /></td>
<td><img src="2018.png" alt="Males" /></td>
</tr>
<tr>
<td>2019</td>
<td><img src="2019.png" alt="Females" /></td>
<td><img src="2019.png" alt="Males" /></td>
</tr>
<tr>
<td>2020</td>
<td><img src="2020.png" alt="Females" /></td>
<td><img src="2020.png" alt="Males" /></td>
</tr>
</tbody>
</table>

* Performance change from 2018–2019 significantly different than performance change from 2019–2020 (p<0.01).

Source: Digital Training Management System from 2018 to 2020 for AC Soldiers.

Notes: Data are presented as mean ± SD. Soldier records represent complete matching fitness event records (e.g., Soldiers had complete 5-event APFT records with no alternate aerobic events) within each calendar year. Females: 2,013; Males: 92,773.
Food Insecurity Worsens among Soldiers during the COVID-19 Pandemic

Have you ever worried if your food would run out before you had money to purchase more? If so, you may not be alone. The U.S. Department of Agriculture (USDA) estimates that 1 in 10 households in the United States are food insecure (USDA 2019). Recent studies demonstrate that the U.S. Army may experience a higher prevalence of food insecurity than the general population (Wax and Stankorb 2016, Beymer et al. 2021). A recent survey showed that of all Soldiers who reported being likely to leave the Army after their current service period, almost half (46%) reported at least one food security concern (see figure; Beymer et al. 2021). These findings reflect how food insecurity may be associated with retention issues.

Another study at an Army installation reported that nearly 1 in 5 Active Duty Families were marginally food insecure (i.e., had anxiety over food sufficiency) at any point in 2019 (Rabbi bitt et al. 2022). In the first 6 months of 2020, marginal food insecurity affected 1 in 3 Active Duty Families. Therefore, 1 in 7 Active Duty Families transitioned from being food secure before the COVID-19 pandemic to marginally food insecure during the COVID-19 pandemic. These families were more likely to report financial insecurity as well as concerns about job security for their Family members (Rabbi bitt et al. 2022).

The Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program, is designed to help families guard against food insecurity. However, SNAP utilization continues to be low in the military (London and Hepin 2015). Low SNAP utilization could be because eligible Active Duty Families are either unaware of the program or are aware but do not qualify due to being over the income threshold. SNAP eligibility is key to minimizing the amount of disallowable Housing allowance due to prolonged computer use. Employers can help to make a workspace adjustable when the work surface itself is not.

To address food insecurity at their installation, ASLs should familiarize themselves with the economic security tools available online through Military OneSource (https://www.militaryonesource.mil/leaders-service-providers/economic-security/). Leaders should have discussions with Soldiers on resources such as SNAP; Special Supplemental Nutrition Program for Women, Infants, and Children; Army Community Services; and local civilian food pantry offerings. Other educational resources include nutrition, education, and shopping techniques with the registered dietitians on military installations. All of these strategies can help to provide a greater awareness and support to address food insecurity on military installations.

Likelihood to Leave the U.S. Army after the Current Service Period, by Food Insecurity, 2019 (n = 5,313)

<table>
<thead>
<tr>
<th>Food Insecurity Concerns</th>
<th>Likely to Leave the Army after Current Service Period</th>
<th>Neutral or Unlikely to Leave the Army after Current Service Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Food Security Concerns</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>1 or 2 Food Security Concerns</td>
<td>54%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Another study at an Army installation reported that nearly 1 in 5 Active Duty Families were marginally food insecure (i.e., had anxiety over food sufficiency) at any point in 2019 (Rabbit bitt et al. 2022). In the first 6 months of 2020, marginal food insecurity affected 1 in 3 Active Duty Families. Therefore, 1 in 7 Active Duty Families transitioned from being food secure before the COVID-19 pandemic to marginally food insecure during the COVID-19 pandemic. These families were more likely to report financial insecurity as well as concerns about job security for their Family members (Rabbit bitt et al. 2022).

The Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program, is designed to help families guard against food insecurity. However, SNAP utilization continues to be low in the military (London and Hepin 2015). Low SNAP utilization could be because eligible Active Duty Families are either unaware of the program or are aware but do not qualify due to being over the income threshold. SNAP eligibility is key to minimizing the amount of disallowable Housing allowance due to prolonged computer use. Employers can help to make a workspace adjustable when the work surface itself is not.

To address food insecurity at their installation, ASLs should familiarize themselves with the economic security tools available online through Military OneSource (https://www.militaryonesource.mil/leaders-service-providers/economic-security/). Leaders should have discussions with Soldiers on resources such as SNAP; Special Supplemental Nutrition Program for Women, Infants, and Children; Army Community Services; and local civilian food pantry offerings. Other educational resources include nutrition, education, and shopping techniques with the registered dietitians on military installations. All of these strategies can help to provide a greater awareness and support to address food insecurity on military installations.

The Shift to Telework: Physical, Behavioral, and Social Health Changes in the Remote Work Environment

The COVID-19 pandemic forced many DOD employees to shift their primary work location from the office to the household. It is important to consider the impacts associated with these changes on the physical, behavioral, and social health of workers.

From a physical perspective, in-home work spaces may present challenges related to imperfect computer workstations. Spaces that may be appropriate for short or irregular work periods may not be appropriate for full time use, thus impacting work-related MSK disorders. Proper workstation design provides workers with neutral postures at an appropriate distance from the keyboard and screen, while also giving the worker enough space to change position and perform a number of tasks efficiently. Optimal workstation design is complicated by differences in anatomy and work habits; therefore, chair and workstation adjustability is key to minimizing the amount of discomfort caused by prolonged computer use. External laptop accessories such as government-approved monitors, keyboards, and mice can help to make a workspace adjustable when the work surface itself is not.

Blue light exposure is another important consideration since employees may be working during non-peak periods, which may shift their work time into the evenings (Harvard Health 2020). The body uses blue light to regulate biological and sleep patterns, and blue light exposure close to bedtime may negatively affect sleep patterns, decrease concentration, and decrease physical and mental performance. Avoid digital screens 2–3 hours before bedtime and minimize exposure by enabling the device blue light filter or night mode. Current research on blue-light-blocking eyewear is inconclusive and more research is needed to determine effectiveness (APHC 2021b).

Past research suggested that teleworking may increase job satisfaction and reduce exhaustion and work-related stress (Allen et al. 2015). Possible reasons include decreased commute time and expense, more flexible work hours, and freedom to work independently. While each experience depends on a variety of individual strengths and limitations, some drawbacks may include social and professional isolation and decreased information sharing. Additionally, the lack of physical separation between work and home can cause work and family responsibilities to intermingle.

Telework can be optimized by ensuring in-home work spaces include ergonomic design, minimizing blue light exposure 2–3 hours before bedtime, and maintaining a healthy work-life balance with clear boundaries between work and personal obligations.
The Impact of COVID-19 Mitigation Measures during the 2020–2021 Influenza Season

Influenza causes significant morbidity and mortality annually in the United States. Over 65,000 influenza cases have been documented among individuals who visited Army MTFs between the 2013–2014 and 2019–2020 influenza seasons. The highest number of positive influenza specimens submitted to U.S. Army labs was recorded in the 2019–2020 influenza season. However, a sustained reduction in influenza activity began in March 2020 and continued into the 2020–2021 influenza season (see figure).

Prior to the development of COVID-19 vaccines, effective measures of slowing community spread of COVID-19 included enforcing mask-wearing (Liang et al. 2020), promoting proper hygiene (e.g., frequent hand washing, use of hand sanitizers), social distancing, and nationwide stay-at-home orders (Lasry et al. 2020). Shortly after these measures were implemented, influenza activity, measured by the percentage of positive influenza specimens, markedly decreased in the U.S. A 93% reduction in the median percentage of positive specimens submitted to U.S. Army labs within the continental U.S. and Hawaii was noted from the period of 29 September 2019 through 29 February 2020* to 1 March through 2 May 2020 (NARA 2020). Similarly, a 98% reduction was noted in the general U.S. population during a similar time period (Olsen et al. 2020).

This trend of low influenza activity continued into the 2020–2021 influenza season, when the weekly percentage of positive influenza specimens reached historical lows. From 27 September 2020 to 8 May 2021, 193 (0.25%) of 75,751 specimens tested for influenza at U.S. Army labs were positive; this was the lowest seasonal percentage recorded since the U.S. Army’s influenza surveillance system was fully established in 2013. In contrast, during similar time periods in the 2019–2020 and 2018–2019 influenza seasons, the percentage of positive influenza specimens were 15% and 13%, respectively. These data demonstrate that prevention measures, coupled with the seasonal influenza vaccine, may reduce the circulation of influenza viruses in future seasons.

* The time period before the COVID-19 outbreak was declared a national emergency in the U.S.
Medical Metrics

- Injury
- Behavioral Health
- Substance Use
- Sleep Disorders
- Obesity
- Tobacco Product Use
- Heat Illness
- Hearing
- Sexually Transmitted Infections
- Chronic Disease
Military Health System Utilization
Decreased during the COVID-19 Pandemic

The medical burden of illnesses and injuries is analyzed annually to summarize the overall impact of health conditions on the MHS. Three indicators—total medical encounters, hospital bed days, and Soldiers affected—measure the burden of medical encounters on the MHS for all International Classification of Diseases, 10th revision, Clinical Modification (ICD-10-CM) diagnoses organized into 16 diagnosis categories.

In 2020, all three burden indicators decreased compared to 2019, across all 16 diagnosis categories. Medical burden measures in the Army population are typically stable from year-to-year. The decreases observed in 2020 are likely due to the COVID-19 pandemic and associated delays in seeking non-essential care. Mitigation efforts (e.g., masking and social distancing) may have also contributed to the observed declines. Despite a small increase (1%) in the Army population, there were 16% fewer medical encounters, 19% fewer hospital bed days, and the number of affected Soldiers in each category was lower by an average of 12% in 2020.

The three diagnosis categories with the greatest proportional decreases from 2019 were Eye/Ear/Oral health conditions, Injuries, and Degenerative MSK conditions (28%, 23%, and 21% reductions, respectively; see figure). Medical encounters dropped dramatically with the onset of public health pandemic mitigation efforts, beginning in April 2020, and did not return to levels observed in 2019. Many of the Health of the Force medical metrics exhibited similar decreases in 2020, with lower incidence of medical diagnoses observed compared to previous years.

Healthcare utilization trends in the MHS during 2020 are reflected in the civilian health system. Several surveys have indicated that between 15% and 52% of U.S. adults delayed or avoided routine or emergency health care for pandemic-related reasons during 2020, with some respondents reporting that their health status deteriorated as a result (Findling et al. 2020). Federal public health guidance encouraged delaying non-essential healthcare appointments and elective medical procedures early in the pandemic (DOD 2020a). When these tactics are required to adhere to pandemic-mitigation protocols, provision of telehealth medical services may be one way to address access to care.
### Medical Metrics

#### Injury

Injury is a substantial contributor to the Army’s healthcare burden, impacting medical readiness and Soldier health. In a typical year, over half of all Soldiers experience an injury or injury-related MSK condition, accounting for approximately 2 million medical encounters and 10 million limited duty days (LDDs). Injuries are defined as damage or interruption of body tissue function caused by an energy transfer that exceeds tissue tolerance suddenly (acute trauma) or gradually (cumulative micro-trauma) (APHC 2017). Cumulative micro-traumatic MSK injuries are referred to as “overuse” injuries. 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 1,189 new injuries diagnosed among Soldiers per 1,000 person-years. Incidence ranged from 919 to 1,776 injuries per 1,000 person-years across Army installations. Incident injury visits decreased significantly at the onset of the COVID-19 pandemic and did not return to pre-pandemic levels during 2020 (see Military Health System Utilization Decreased during the COVID-19 Pandemic’ Spotlight on pages 34–35). Because physical training is a leading cause of Army injuries, injury frequency may have been impacted by modified or canceled physical training, especially at the beginning of the pandemic.

**Incidence of Injury by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020**

Among AC Soldiers, 1,189 new injuries were diagnosed per 1,000 person-years in 2020. The rate reflects the potential occurrence of injuries with a cause code. Cause coding of medical encounters provides essential information for prioritizing Army injury prevention efforts and monitoring effects of programs put in place by Army Leadership.

**Top Five Mechanisms of Unintentional Outpatient Injuries, AC Soldiers, 2020**

The leading mechanisms of injury among outpatient encounters for injuries with a cause code were overexertion (24%) and falls/slips/trips (20%). Note, however, that only 10% of outpatient injury encounters in 2020 included a cause code. Cause coding of medical encounters provides essential information for prioritizing Army injury prevention efforts and monitoring effects of programs put in place by Army Leadership.

**Percent Injured by Sex and Age, AC Soldiers, 2020**

Overall, 49% of Soldiers had a new injury in 2020, and 70% of these injuries were overuse injuries. Age is a risk factor for injuries, as 66% of Soldiers ≥45 years old received treatment for injuries, compared to 45% of Soldiers <25 years old (data not shown). Fifty-nine percent of female Soldiers had a diagnosed injury in 2020 compared to 47% of male Soldiers. For both male and female Soldiers across all age groups, overuse injuries commonly attributed to physical training accounted for the majority of injuries.

**Top Five Causes Associated with Temporary Professions for Injuries, AC Soldiers, 2020**

Sixty-nine percent of injury profiles captured by the e-Profile System in 2020 reported a specific cause. The top five causes accounted for 72% of LDDs, and the top two alone accounted for nearly half. Among both males and females, the top two causes were running and Soldier Occupational Specialty (SOS) work tasks (SOS work tasks include lifting, pushing, pulling, mechanical, and repair). Compared to 2019 (APHC 2021a), there were 25% fewer LDDs for injury in 2020.

---

[36] 2021 HEALTH OF THE FORCE REPORT

[37] MEDICAL METRICS
Armored Forces/Army Wellness Centers Assist The U.S. Army Band Members with Reduction of Musculoskeletal Injury Risk

MSK injuries impact the military community, with 70% of those injuries resulting from overuse (see Injury metric, page 37). MSK injury risks are linked to multiple factors, the most significant factors being a slower 2-mile run time on the APFT and a BMI of 25 or higher (APHC 2020a). Reducing MSK injury risk for Soldiers increases readiness.

The U.S. Army Band (TUSAB) is in a distinct position for increased MSK injury risk due to the naturally repetitive occupation of playing instruments and prolonged periods of time in relatively static postures. The APHC conducted a case study focusing on TUSAB to examine factors associated with MSK injuries (APHC 2020b). Conclusions from the study help clarify how the risk for an MSK injury increases among a population that may be prone to overuse through repetitive movements (see table). According to a survey of 221 respondents, lower performance on the three APFT events and higher body fat percentage were all associated with MSK pain.

The mission of the Armed Forces/Army Wellness Centers (AF/AWC) is to provide standardized primary prevention programs designed to promote and sustain healthy lifestyles and improve the overall well-being of Service members. The Fort Meade and Fort Belvoir Wellness Centers operationalized the case study findings by providing health education, assessments, and customized wellness plans. In particular, the two wellness centers conducted virtual classes to provide education on nutrition, fitness, sleep, and ACFT preparation. Each TUSAB member also received metabolic and body composition testing along with individual health coaching, which are intended to help reduce MSK injury risk through education on healthy weight loss strategies and fitness improvements. Members were also given information on personalized caloric targets to promote the achievement of healthy target bodyweights and exercise prescriptions based on individualized goals.

The wellness centers will continue to support TUSAB by monitoring progress and adhering to positive behavioral changes. Prevention and reduction of overuse-related injury may be facilitated by such strategies as participation in balanced personal physical training, physical training instruction from certified fitness professionals, adherence to ergonomic recommendations, footwear adjustments, planned rehearsal breaks, and leadership support for prevention efforts.

### Factors Associated with Injury and MSK Pain among TUSAB Members, 2021

<table>
<thead>
<tr>
<th>Modifiable Fitness Factors</th>
<th>Survey Respondents Only (n=221)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Factors for any injury</td>
<td>Risk Factors for Band-related injury</td>
</tr>
<tr>
<td>Fewer APFT sit-ups</td>
<td>✓</td>
</tr>
<tr>
<td>Fewer APFT push-ups</td>
<td>✓</td>
</tr>
<tr>
<td>Slower APFT 2-mile run time</td>
<td>✓</td>
</tr>
<tr>
<td>Higher body fat percentage</td>
<td>✓</td>
</tr>
</tbody>
</table>

- ✓: statistically significant association (p<0.05)
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 2020, 15% 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.

Prevalence of BH Disorder Diagnoses by Sex and Age, AC Soldiers, 2020

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., 15% and 6.8% for adjustment disorder for females and males, respectively). Substance use disorder was the only BH condition for which the prevalence among male Soldiers exceeded that among female Soldiers (3.4% and 2.4% for males and females, respectively).

Prevalence of BH Disorder Diagnoses by Condition, AC Soldiers, 2016–2020

Over the last 5 years, the proportion of AC Soldiers with a diagnosed BH disorder has decreased by 1%. The prevalence of BH disorders remained stable from 2017 to 2019, until 2020, when a 5.4% decrease in any BH disorder diagnosis occurred relative to 2019. This change was likely influenced by the decreased access to care observed during the COVID-19 pandemic.

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 do not receive timely treatment for BH concerns are at risk for negative outcomes and decreased readiness.

Behavioral Health Epidemiological Consultation Self-Assessment Tool

A BH Epidemiological Consultation (EPICON) is requested by a commander to scientifically assess quality of life issues at their installation. The APHC’s Division of Behavioral and Social Health Outcomes Practice (BSHOP) has conducted over 30 BH EPICONS across the globe (APHC 2021c). The team has conducted interviews and focus groups with over 5,000 key leaders and Service members, analyzed over 44,000 surveys, and reviewed more than 250 clinical charts of Service members who died by suicide or other preventable deaths (APHC 2021c). The knowledge and insights obtained by BH EPICONS are enriched by the early involvement of, and the ongoing conversations with, key leaders and stakeholders. The collaborative nature of the process has enhanced the team’s ability to triangulate the data to develop meaningful actionable recommendations in affected communities (APHC 2021c).

Using lessons learned, BSHOP developed a BH EPICON Self-Assessment Tool in 2021. This tool enables leaders to assess the need and gaps within their units across three critical domains: social health (e.g., communication challenges, social support and connectivity, living conditions), BH (e.g., alcohol use, sleep, BH stigma), and organizational environment (e.g., engaged leadership, occupational stressors, training schedules) (see figure). BSHOP, in collaboration with the People First Task Force (PFTF) Cohesion Assessment Team (CAT), will pilot the BH EPICON Self-Assessment Tool in FY22. During this pilot phase, BSHOP will provide consultation on the tool to help inform actionable recommendations and develop metrics to evaluate tool effectiveness. As trends of needs and gaps emerge across installations, PFTF aims to weave enterprise-level adjustments into the Army Campaign Plan to address shortfalls and leverage successful programs observed by the CAT (PFTF 2021).

Data obtained through the BH EPICON Self-Assessment Tool, coupled with data from Commander’s Risk Reduction Toolkit, can be used by current and incoming commanders to conduct a quick pulse-check on the SDOH at their installation. Focusing on SDOH as root causes can bring prevention upstream. Commanders can then capitalize on the Unit Ready and Resilient Teams to provide timely and targeted responses in reducing risk from harmful behaviors through the Commanding General’s Ready and Resilient Council process.

BH Profiles, AC Soldiers, 2020

During 2020, 9,780 Soldiers were put on temporary profiles longer than 7 days for issues related to BH. The mean length of these profiles was 51 LDDs. Adjustment disorder was the reason for the largest number of BH profiles, affecting 2,263 Soldiers (32% of those with BH profiles). BH profiles needing Combatant Command (COCOM) waivers, which affected 32 Soldiers (0.3%, not pictured in the below figure) were the longest of the BH profiles (72 LDDs, on average), followed by profiles for attention deficit hyperactivity disorder (ADHD), which affected 98 soldiers (1%, with 64 LDDs on average).

<table>
<thead>
<tr>
<th>BH Profile</th>
<th>Number of Soldiers</th>
<th>Average Number of LDDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustment Disorder</td>
<td>89</td>
<td>50</td>
</tr>
<tr>
<td>Depressive Disorder</td>
<td>97</td>
<td>53</td>
</tr>
<tr>
<td>Alcohol Use Disorder</td>
<td>92</td>
<td>41</td>
</tr>
<tr>
<td>Anxiety Disorder</td>
<td>56</td>
<td>49</td>
</tr>
<tr>
<td>BH Condition</td>
<td>62</td>
<td>58</td>
</tr>
<tr>
<td>Medication</td>
<td>58</td>
<td>63</td>
</tr>
<tr>
<td>Sleep Disorder</td>
<td>59</td>
<td>63</td>
</tr>
<tr>
<td>Substance Abuse Treatment</td>
<td>59</td>
<td>63</td>
</tr>
<tr>
<td>Drug Use Disorder</td>
<td>59</td>
<td>63</td>
</tr>
<tr>
<td>ADHD</td>
<td>59</td>
<td>63</td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td>59</td>
<td>63</td>
</tr>
</tbody>
</table>

Note: Categories are not mutually exclusive; Soldiers may have multiple profiles. One additional category not included in the chart is BH conditions requiring a COCOM waiver, which impacted 32 soldiers with 72 average LDDs.
Understanding How Warrior Adventure Quest Participation Impacts Behavioral Health Outcomes for Redeploying Soldiers

The U.S. Army Installation Management Command began implementing the Warrior Adventure Quest (WAQ), a Morale, Welfare, and Recreation (MWR) program, in 2008 to support Soldiers during the deployment cycle. Soldiers who participate in WAQ engage in adventure activities (e.g., rock climbing) followed by a leader-led after action debrief to reinforce unit cohesion and focus on social and behavioral health. The WAQ program aims to mitigate reintegration challenges, enhance combat readiness and deployability, and improve Soldiers’ well-being.

Research suggests that intensive physical activity is associated with reduced PTSD and depression symptoms (Ströhle 2019). As such, the APHC supported the Headquarters Department of Army, Deputy Chief of Staff, G-9 (Installations) to examine the WAQ program’s effectiveness in decreasing PTSD and depression symptoms. Although most Soldiers in both groups reported no symptoms for PTSD and depression (APHC 2021d), those who participated in WAQ had significantly lower average PTSD severity scores compared to those who did not participate in the program (see figure). There was no observed difference in depression severity scores when comparing WAQ participation status. These findings suggest a positive impact of WAQ on PTSD symptoms for redeploying Soldiers who participate in the program.


Differences in PTSD* and Depression1 Average Severity Scores Based on WAQ Participation

<table>
<thead>
<tr>
<th></th>
<th>Average Severity Score</th>
<th>PTSD</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAQ</td>
<td>N=10</td>
<td>Mean=20</td>
<td>Mean=6.0</td>
</tr>
<tr>
<td>Non-WAQ</td>
<td>N=10</td>
<td>Mean=23</td>
<td>Mean=6.2</td>
</tr>
</tbody>
</table>

* Indicates statistically significant difference (p<0.05) between groups
1 PTSD was measured with the Posttraumatic Stress Disorder Checklist – Civilian version (Bovin et al. 2016)
2 Depression was measured with the Patient Health Questionnaire (PHQ-8) (Wu Y et al. 2020)

WAQ strengthens unit cohesion through paintball at Fort Bragg, North Carolina. (U.S. Army Reserve photo by Spc. Nicholle Salvatierra)
Medical Metrics

Substance Use

Substance use disorder 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 Army Service members (APHC 2020c). 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 15,400 (3.2%) Soldiers were diagnosed with a substance use disorder in 2020.

Overall, 3.2% of Soldiers had a substance use disorder. Prevalence ranged from 1.4% to 4.8% across Army installations.

Prevalence of Substance Use Disorder Diagnoses by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020

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, except among American Indian/Alaskan Natives over age 45. 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 males <35 years old. The lowest prevalence among race, ethnicity, and sex categories was observed among Asian Soldiers.

Females (2.4% Average)

Males (3.4% Average)

Alcohol Use Disorder and Comorbidity

Alcohol use disorder (AUD) is a chronic condition that requires a holistic approach to prevention and treatment due to its physical and psychosocial impacts. From 2016 to 2019, 86% (n=581,391) of medical encounters for substance abuse or dependence among U.S. Army AC Soldiers were for alcohol. The Army population is deemed high risk for substance use disorders due to the high levels of stress and trauma, particularly associated with deployment (Brady et al. 2019).

Data from the Alcohol Use Disorder Identification Test-Concise (AUDIT-C) on the 2016 Periodic Health Assessment (PHA) were analyzed to characterize the population of Soldiers who screened positive for hazardous drinking behavior and potential AUD. Of the Soldiers who completed a PHA and the AUDIT-C in 2016, 7% (n=43,217) screened positive for hazardous drinking behavior and potential AUD. Indicators found to be significantly associated with higher odds of AUD include screening positive for symptoms of depression, reporting thoughts of violence, and reporting thoughts of suicide (see figure). These findings corroborate with conclusions from prior studies reporting comorbid AUD and other BH conditions (Seal et al. 2011, Stein et al. 2017, DA 2018).

These findings suggest the need to continue screening and treatment efforts for comorbidity conditions, as well as the need for novel preventive solutions targeted toward high-risk groups. The PHA provides a unique opportunity to refer Soldiers who screen positive for AUD to care, but it is not anonymous (i.e., Soldiers may be reluctant to report AUD to refer Soldiers who screen positive for hazardous drinking behavior and potential AUD. Of the Soldiers who completed the PHA (PHA) were analyzed to characterize the population of Soldiers who screened positive for hazardous drinking behavior and potential AUD. Of the Soldiers who completed a PHA and the AUDIT-C in 2016, 7% (n=43,217) screened positive for hazardous drinking behavior and potential AUD. Indicators found to be significantly associated with higher odds of AUD include screening positive for symptoms of depression, reporting thoughts of violence, and reporting thoughts of suicide (see figure). These findings corroborate with conclusions from prior studies reporting comorbid AUD and other BH conditions (Seal et al. 2011, Stein et al. 2017, DA 2018).

These findings suggest the need to continue screening and treatment efforts for comorbidity conditions, as well as the need for novel preventive solutions targeted toward high-risk groups. The PHA provides a unique opportunity to refer Soldiers who screen positive for AUD to care, but it is not anonymous (i.e., Soldiers may be reluctant to report symptoms of AUD due to disciplinary consequences). Commanders and unit leaders can complement these screening measures by being observant of behavioral changes among their subordinates and increasing awareness of programs (e.g., Embedded Behavioral Health (MEDCOM 2014) and Substance Use Disorder Clinical Care (DA 2020b)) to promote BH-seeking behaviors. A primary prevention effort might repack the current DOD educational campaign “Own Your Limits” (DOD 2020b) to target trainees before they are exposed to the potential occupational stressors of the Army. The curriculum might also focus on promoting the use of positive coping skills and the importance of social support.

Likelihood of Screening Positive for AUD in Relation to Key Indicators among U.S. Army Soldiers Who Completed the PHA (n = 43,217), 2016

Notes:

- Likelihood of screening positive for AUD is represented by adjusted Odds Ratio (aOR) comparing the odds of endorsing a given indicator to not endorsing the indicator. All aORs were produced using a logistic regression model controlling for sex, age, race-ethnicity. aORs (95% confidence interval) were as follows:
  - Thoughts of violence: 2.83 (2.56–3.13)
  - Depression: 2.92 (2.78–3.06)
  - Thoughts of suicide: 1.62 (1.45–1.80)

- Scores over 4 for males and over 3 for females on the AUDIT-C were considered positive for hazardous drinking behavior (score range: 0–12).

- Indicated by answering “Yes” to the following question: “Over the past month have you had thoughts or concerns that you might hurt or lose control with someone?”

- Scores over 14 on the PHQ-8 were considered positive for displaying moderate to severe depression symptoms (score range: 0–24).

- Indicated by answering “Yes” to the following question: “Over the past month, have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?”
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 was assessed in Health of the Force.

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.

9.0%
Overall, 9.0% of Soldiers had a sleep disorder.
Prevalence ranged from 4.4% to 19% across Army installations.

Prevalence of Sleep Disorders by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020
In 2020, approximately 9.0% 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 (7.2% Average)

Males (9.3% Average)

Prevalence of Sleep Disorders by Sex, AC Soldiers, 2016–2020
The prevalence of sleep disorder diagnoses decreased substantially in 2020. The most likely cause of this decrease is the COVID-19 pandemic (see ‘Military Health System Utilization Decreased during the COVID-19 Pandemic’ Spotlight on pages 34–35). The prevalence of sleep disorder diagnoses in males and females decreased by 32% and 47%, respectively, from 2019 to 2020.

Most Frequent Diagnosed Sleep Disorders by Sex, Race, and Ethnicity, AC Soldiers, 2020
Although the total prevalence of sleep disorder decreased in 2020, likely due to the pandemic, insomnia and sleep apnea diagnoses made up a large proportion of the diagnoses (80%). 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.

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

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

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

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).
Medical Metrics

Obesity

Obesity is a risk factor for metabolic syndrome, hypertension, type II diabetes, and cardiovascular disease, among other diseases. Early studies of COVID-19 patients indicate that being overweight or obese increases risks of hospitalization, poor disease outcomes, and mortality. Obesity increases the risk of hospitalization and death due to COVID-19.

BMI 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 MHS 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.” While BMI does not differentiate between lean and fat mass, BMI greater than or equal to 30 typically indicates excess body fat.

Accurate assessment of body fat for individuals requires more information than height and weight. 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 males. As people age, they tend to lose muscle mass, and percent body fat tends to increase.

The age- and sex-adjusted prevalence of obesity among employed U.S. adults was 27%.

In comparison, similarly adjusted prevalence of obesity among AC Soldiers was lower (18%).

Overall, 18% of Soldiers were classified as obese. Prevalence ranged from 13% to 27% across Army installations.

Source: Behavioral Risk Factor Surveillance System (BRFSS 2021)
**Medical Metrics**

**Tobacco Product Use**

Using tobacco products negatively impacts Soldier readiness by impairing physical fitness and increasing illness and absenteeism (DA 2015a). In *Health of the Force*, the prevalence of tobacco product use is estimated using data from the 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. For this report, smoking products are defined as cigarettes, cigars, cigarillos, bidis, pipes, and hookahs/waterpipes; smokeless products are defined as chewing tobacco, snuff, dip, snus, and dissolvable tobacco products; 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.

**Prevalence of Tobacco Product Use by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020**

The majority of tobacco product users were <35 years old. Across age groups, the prevalence of tobacco product use among male Soldiers was more than double that among female Soldiers. Tobacco product use was lowest among Black or African American Soldiers and Hispanic or Latino Soldiers. Tobacco product use was most common among Native Hawaiian/Pacific Islander Soldiers, followed by White Soldiers and American Indian or Alaskan Native Soldiers. The age- and sex-adjusted prevalence of tobacco product use among AC Soldiers (27%) is nearly triple the national estimate (4.0%).

Of the Soldiers who reported tobacco product use, most reported smoking (n= 52,971; 15%), followed by those who reported smokeless tobacco use (chewing or dipping) (n= 40,449; 11%). In 2020, 9.1% (n= 32,580) 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 (23%) (BRFSS 2021). Smoking product use among Soldiers (15%) is similar to that in the U.S. population (15%). Reported e-cigarette use in the Army (9.1%) is substantially lower than in the U.S. population (29%). The Army prevalence of smokeless tobacco product use (11%) is nearly triple the national estimate (4.0%). 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 (more than 100 cigarettes in their lifetime and currently smoking some days or every day). Additionally, self-reported e-cigarette use data in the BRFSS was inconsistent with and less complete as compared to the PHA.

**Prevalence of Tobacco Product Use by Type, Sex, and Age, AC Soldiers, 2020**

For both sexes, smoking tobacco products were the primary type of tobacco used across age groups. However, e-cigarette use among female Soldiers younger than 25 surpassed the prevalence of smoking tobacco product use in 2020. Male Soldiers most frequently reported using smoking products, followed by smokeless and e-cigarette products, with the exception of male Soldiers under age 25, who used e-cigarette products more frequently than smokeless products. Female Soldiers most frequently reported using smoking products followed by e-cigarette products and smokeless products, across age groups except for those <25 years old.
Convergence of Electronic Cigarette Use, Electronic Cigarette or Vaping-Associated Lung Injury, and Susceptibility to COVID-19

An electronic cigarette (E-cig), which was promoted as an alternative for regular cigarette smoking, potentially disrupts fitness, readiness, and health (Williams et al. 2021). With E-cigs, which contain the thinning agent vitamin E acetate, and with vaping liquid, which can contain cannabidiol or tetrahydrocannabinol, there is a heightened risk of intensive care unit admission and mortality from a condition termed Electronic Cigarette or Vaping-Associated Lung Injury (EVALI) (Williams et al. 2021). In 2019, an EVALI epidemic resulted in more than 2,800 hospitalizations and 68 deaths in the U.S. (Werner et al. 2020).

An examination of vaping frequencies at 30 installations within the continental United States noted two installations (JB Meyer-Henderson Hall and Fort Meade) in the U.S. Army Military District of Washington D.C. as having the highest E-cig use at 11% and 10%, respectively (APHC 2021a). Adverse health effects from vaping E-cigs included the potential for decreased combat readiness, leading to decreased Force lethality and the possibility of jeopardizing squad cohesion and mission success (Williams et al. 2021).

Recently, studies on E-cig use have observed associations between vaping, inflammatory airways disease (e.g., wheezing and chronic obstructive pulmonary disease (COPD)), and disrupted protective immunity against infection, including increased susceptibility to COVID-19 (Li et al. 2020). Consequently, studies have revealed a convergence between E-cig use, prevalence of EVALI, and susceptibility to COVID-19 (Li et al. 2020, Gaiha et al. 2020). A population-based study from August 2020 surveyed more than 4,300 adolescents and young adults aged 13 to 24 years old to examine the relationship between vaping E-cigs and vulnerability to contracting COVID-19 (Gaiha et al. 2020). Compared to non-users, individuals that vaped E-cigs alone and those that used both E-cigs and conventional tobacco products were respectively 5- and 7-fold more likely of having a COVID-19 diagnosis (Gaiha et al. 2020).

A more detailed statewide study has suggested, for the first time, a strong positive association between the proportion of E-cig vapers and the number of COVID-19 cases and deaths in the U.S. population (Li et al. 2020). Vaping E-cigs might be associated with an increased risk of developing both EVALI and COVID-19. Especially during the COVID-19 pandemic, it is strongly recommended that Service members, Family members, and Civilians in all age groups avoid vaping and exposure to E-cigs.
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 include heat exhaustion and heat stroke. These are RMEs that should be reported through the DRSi.

Heat illness was determined using specific diagnostic codes from inpatient and outpatient medical encounter records in the MDR, in addition to cases of heat exhaustion and heat stroke reported through DRSi. 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, 2020

In 2020, 1,105 incident cases of heat illness occurred. There was a much higher number of heat exhaustion cases (843) than heat stroke cases (262) in 2020. The number of incident cases of heat illness was highest during the warmer months (May through October), though heat exhaustion and heat stroke were diagnosed and reported year-round.

Incidence of Heat Illness by Age, AC Soldiers, 2020

The overall incidence rate of heat illness in 2020 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.

Incidence of Heat Illness by Installation*, AC Soldiers, 2020

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

Incidence of Heat Illness, AC Soldiers, 2016–2020

The Army continues to emphasize prevention, recognition, and reporting of heat illness cases. The incidence of diagnosed or reported heat illness cases, per 1,000 person-years, increased from 2016 to 2018 and then decreased through 2020. The observed incidence of heat illness in 2020 was lower than in the previous 4 years (see ‘Military Health System Utilization Decreased during the COVID-19 Pandemic’ Spotlight on pages 34–35 for information on the impact of COVID-19 on 2020 medical metrics).
The Army Heat Center at Fort Benning

Every year, there are over 4,000 encounters for exertional heat illness, with annual total direct medical care costs exceeding $2.4 million (Forrest et al. 2020). Numerous individual, mission-related, and environmental risk factors for exertional heat illness have been identified. However, the annual Army-wide incidence rate has remained relatively stable over the past 5 years, suggesting opportunities for improvement.

In 2019, the Army Heat Center was created in effort to reduce the burden of exertional heat illness. The foundation of the Heat Center’s programs is prevention through the identification and dissemination of best practices with demonstrated effectiveness. Heat Center staff provide education and training to support exertional heat illness prevention efforts through an annual heat forum, ASL engagements, and the training of leaders and cadre. A current initiative of the Heat Center includes exertional heat illness prevention training for Drill Sergeants and other cadre at all three Initial Entry Training Brigades at Fort Benning.

Data from the APHC indicates that heat illness incidence at Fort Benning decreased 29% from 2019 to 2020, a potentially promising indicator that prevention efforts are having the intended effect (APHC 2021e). Data for 2021 suggest a continued decline in incidence; however, these data must be interpreted with caution. The impact of COVID-19 mitigation efforts must be considered on exertional heat illness incidence to fully account for the declines between 2019 and 2021.

As heat illness is not unique to Fort Benning, Heat Center staff provide guidance and expertise upon request to other installations. To date, staff have conducted site visits to The Sabalauski Air Assault School at Fort Campbell; Cadet Summer Training at Fort Knox; Survival, Evasion, Resistance, and Escape school at Fort Rucker; and Officer Training School at Maxwell Air Force Base. During a site visit, local policies and procedures are reviewed, in the context of the training conducted at a particular site, and recommendations for best practices that should be sustained or implemented are provided in an after action report.

Awareness of risk factors for and prevention of exertional heat illness contributes to a medically-ready Force and reduces the burden to the military health-care system. For information about supporting the Heat Center initiative, please visit the Warrior Heat- and Exertion-Related Events Collaborative website at https://www.hprc-online.org/resources-partners/whec.
Medical Metrics

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, 2016–2020

STS is a measure of a hearing injury and is an average hearing decrease, in one or both ears, across three critical speech frequencies. A Soldier’s annual hearing test is evaluated against their baseline hearing test for the presence of an STS and potential hearing injury. The incidence of new STSs increased from 4.2% in 2016 to 4.5% in 2020 and continued to exceed the AHP hearing injury goal of ≤3%.

Prevalence of Projected Hearing Profiles, AC Soldiers, 2016–2020

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 at least a moderate 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 2020. The percentage of Soldiers with a projected ≥H-3 profile also did not exceed the AHP goal of ≤2%.

Percent Not Hearing Ready – Hearing Readiness Classification (HRC) 4, AC Soldiers, 2016–2020

All AC Soldiers are required to receive an annual hearing test. In 2020, over 11% of AC Soldiers were classified as not Hearing Ready (HRC 4). This prevalence is well above the AHP goal of ≤6%. AC Soldiers who are HRC 4 are either 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.

The onset of the COVID-19 pandemic hindered the AHP’s ability to conduct mass hearing test events, which substantially impacted hearing readiness. The percentage of AC Soldiers that were HRC 4 increased from 7.7% in the first quarter of 2020 to a high of 13% in the third quarter. As the AHP best practice guidelines for the different Health Protection Condition levels were established and implemented, rates began to trend downwards at the close of 2020 (data not shown).

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 APHC Hearing Conservation and Readiness Branch for assistance. What you hear—or don’t hear—matters!
**Sexually Transmitted Infections**

Chlamydia is a common sexually transmitted infection (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 2021a). 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. Since 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.

Chlamydia infections are included on the Nationally Notifiable Diseases List to support surveillance and monitoring efforts likewise rely on chlamydia cases reported by MTFs. Rates estimated for this report reflect new infections. Soldiers may have more than one chlamydia infection per calendar year. These rates are likely conservative due to under-reporting and the high proportion of non-symptomatic infections. Additionally, the COVID-19 pandemic introduced another layer of surveillance and response challenges.

The increase in reported chlamydia infections observed from 2016 to 2019 subsided in 2020, as rates abruptly dropped by 16% relative to 2019. Similar decreases in reported STIs were observed nationally in the wake of the COVID-19 pandemic (Pagaoa et al. 2021). The 2020 decrease was more substantial for males than females (a 24% decrease as compared to a 15% decrease among female Soldiers).

---

**Incidence of Reported Chlamydia Infections by Sex, AC Soldiers, 2016–2020**

The 2020 decline may reflect both a decrease in exposure due to social distancing and other COVID-19 precautions and a potential surveillance bias due to less healthcare utilization and shortages in staff and testing resources. STI testing was particularly limited due to an increased demand for common laboratory supplies, and STI response efforts were further diminished as staff conducting contact tracing and reporting were diverted to the COVID-19 response. The most substantial declines occurred shortly after the pandemic was declared in March 2020. A review of quarterly rates of reported chlamydia cases showed a 47% drop during the 2nd quarter of 2020 (relative to 2019), before rebounding in the 3rd quarter.

**Incidence of Reported Chlamydia Infections and Percent Change by Quarter Comparing 2020 to 2019, AC Soldiers**

The 2020 decline may reflect both a decrease in exposure due to social distancing and other COVID-19 precautions and a potential surveillance bias due to less healthcare utilization and shortages in staff and testing resources. STI testing was particularly limited due to an increased demand for common laboratory supplies, and STI response efforts were further diminished as staff conducting contact tracing and reporting were diverted to the COVID-19 response. The most substantial declines occurred shortly after the pandemic was declared in March 2020. A review of quarterly rates of reported chlamydia cases showed a 47% drop during the 2nd quarter of 2020 (relative to 2019), before rebounding in the 3rd quarter.

---

**Incidence of Reported Chlamydia Infections by Sex and Age, AC Soldiers, 2020**

The rate of reported chlamydia infections among female Soldiers was roughly 3 times the rate among male Soldiers. Rates were highest among female Soldiers <25 years old, with 101 reported infections per 1,000 person-years. These elevated rates may be partially due to increased screening among pregnant females and female Soldiers <25 years old.

---

**Incidence of Reported Chlamydia Infections by Race, Ethnicity, AC Soldiers, 2020**

Differences in rates 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 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 White (Not Hispanic or Latino) Soldiers. These disparities by race and ethnicity were observed among both male and female Soldiers. Notably, rates among male Black or African American Soldiers were 2–4 times higher than rates among male Soldiers identifying as another race or ethnicity. Similar differences in chlamydia incidence by race and ethnicity have been observed nationally (CDC 2021b).

---

**Medical Metrics**

Overall, 21 new chlamydia infections were reported per 1,000 person-years. Incidence ranged from 8.9 to 43 per 1,000 person-years across Army installations.
Destigmatizing Sexually Transmitted Infections Can Reduce Transmission and Promote Soldier Well-Being

The CDC estimates that there were 26 million new STIs (68 million total) in 2018, with 1 in 5 Americans infected at any given time and an associated $16 billion in medical costs (CDC 2021b, Kreisel et al. 2021). Despite these alarming statistics, STIs have remained a largely invisible epidemic. Stigma and shame have stymied STI prevention and control efforts. The National Academies of Sciences, Engineering, and Medicine (NASEM) was recently assigned to make evidence-based recommendations to reduce STI morbidity, economic burden, and barriers to health care (NASEM 2021). Based on documented STI disparities among U.S. military Service members relative to comparable U.S. peers, NASEM identified the U.S. military (primarily recruits and AC Service members) as a priority population warranting enhanced STI surveillance and prevention. Combating stigma was frequently cited as a critical component for success.

Historically, shame and fear tactics have been part of the strategy to reduce infection. However, these misguided practices have failed to reduce disease incidence, and they have contributed to making the problem worse by discouraging open communication and limiting treatment-seeking behavior (NASEM 2021). Although methods used to teach Soldiers about STIs are not different from those used with other populations, there are military-unique obstacles (e.g., service-specific policies prohibiting sexual activity during deployments) which can increase stigma and become a barrier to seeking care and/or contraceptives (Duke and Ames 2008). Alternatively, strategies that focus on reducing stigma and shame while promoting sexual health provide a successful framework for STI control, which routinely results in decreased STIs and improved care-seeking behavior (NASEM 2021).

**What can you do as an Army leader to help shift the STI paradigm?**

- Encourage your public health and medical profession-als to educate Soldiers regarding their sexual health. Soldiers can find resources at: https://phc.amedd.army.mil/topics/healthyliving/csfhvi/Pages/default.aspx.
- Promote training and competency testing among clinicians to facilitate stigma-free sexual health assessments and education during routine care. Normalizing this practice can reduce the stigma divide which is heightened among those who experience inequities due to race and ethnicity, national origin, sexual orientation, and gender identity.
- Support STI surveillance and prevention measures such as STI screening and condom distribution.

Together, we can shift the culture of how we discuss STIs from one of shame and stigmatization to one of health and responsibility.

Human Papillomavirus Vaccination: An Opportunity to Protect Military Families from Six Types of Cancer

Widespread human papillomavirus (HPV) vaccination could prevent over 31,000 cases of cancer in the U.S. each year (CDC 2020b), and yet relatively few military members receive this safe and effective vaccine. HPV is the most common STI with persistent infection linked to premalignant and malignant lesions of the cervix, vagina, vulva, anus, penis, and oropharynx, as well as genital warts. Although not required for service, HPV vaccination is a TRICARE®-covered benefit that is highly recommended for children and adults, ages 9 through 26, and may be appropriate for others in high-risk categories up to age 45 (ACOG Committee on Adolescent Health Care 2020, Chaturvedi et al. 2018, DHA 2018). Despite these recommendations, only 47% of females and 35% of males who initiated HPV vaccination during military service completed the series in 2007–2017 (Clark et al. 2018).

Solutions to increasing vaccination rates include making HPV vaccine a standard recommendation for military mem- bers upon accession to the military (Sitter et al. 2021) and ensuring a clear and consistent recommendation regarding vaccination. For current members, the annual PHA is an opportune time to offer the HPV vaccine to Soldiers and qualifying beneficiaries. Across a variety of populations and studies, the odds that someone will get the HPV vaccine is 10 times higher when they receive a provider recommen-dation (Brewer and Gilkey 2021).

To assess the feasibility of this approach, Womack Army Medical Center, Fort Bragg, North Carolina conducted a quality improvement project to begin administering the HPV vaccine to Soldiers in-processing at the Medical One Stop. The team trained nursing staff to use clear recom-mendations to educate Soldiers regarding their sexual health. For current members, the annual PHA is an opportune time to offer the HPV vaccine to Soldiers and qualifying beneficiaries. Across a variety of populations and studies, the odds that someone will get the HPV vaccine is 10 times higher when they receive a provider recommen-dation (Brewer and Gilkey 2021).

Approximately $10.7 to $22.9 billion in lifetime medical costs may be averted for respective non-cancer and cancer outcomes when the vaccine is administered to adolescents and adults through age 26 (Chesson et al. 2019). Indirect costs for personnel time and resources are also involved with healthcare and recovery from HPV-related diseases. HPV vaccination is a highly effective cancer and STI preven-tion strategy and can lead to a healthier and medically fit Force and MHS beneficiary population.
**Medical Metrics**

**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, 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 product 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.

**Prevalence of Chronic Disease by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020**

Among AC Soldiers in 2020, 19% of female Soldiers and 17% of male Soldiers had at least one chronic disease. The prevalence of chronic disease increased with age. With the exception of male Soldiers ≥45 years old, Black or African American Soldiers had the highest prevalence of chronic disease compared to Soldiers identifying as any other race. Hispanic or Latino Soldiers had the lowest overall prevalence of chronic disease.

**Prevalence of Chronic Disease by Disease Category, AC Soldiers, 2016–2020**

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 age ≥45 years old had the highest prevalence of arthritis among female Soldiers. American Indian/Alaskan Native Soldiers had the highest prevalence of arthritis among male Soldiers in all age categories.

**Prevalence of Arthritis by Sex, Age, Race, and Ethnicity, AC Soldiers, 2020**

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 age ≥45 years old had the highest prevalence of arthritis among female Soldiers. American Indian/Alaskan Native Soldiers had the highest prevalence of arthritis among male Soldiers in all age categories.

**Data suppressed due to small case numbers (<20 cases).**
Exercise Collapse Associated with Sickle Cell Trait

Exercise Collapse Associated with Sickle Cell Trait (ECAST) has been recognized as an emerging health issue in the military after a small number of Service member deaths in 2019 were attributed to ECAST. Like Sickle Cell Disease (SCD), Sickle Cell Trait (SCT) is an inherited condition present at birth. SCT reflects inheritance of the sickle cell gene, and while there are typically no symptoms of SCT, under extreme conditions, it can cause or contribute to collapse associated with physical exertion. SCT affects 1 to 3 million Americans and is present in 8–10% of the African American population (American Society of Hematology 2021).

Since 2006, newborns in the U.S. have been universally screened for SCD and SCT, meaning that most Service members serving today will not be aware of their SCT status or have a prior screening test due to lack of symptoms. While SCD is typically disqualifying for military service, SCT is not and does not require duty limitations. However, SCT has been associated with an increased relative risk of exercise-related sudden death and severe rhabdomyolysis* in Soldiers during or after excessive exertion. In studies of military personnel, the risk of exercise-related death in warfighters with SCT is reported to be up to approximately 40 times higher than those without SCT (Quattrone et al. 2015).

Screening for SCT is now required in the Army to identify at-risk Soldiers. In 2020, the Army began lab test SCT screenings for all trainees entering Initial Entry Training. Soldiers already in the Army will be screened at their next annual PHA if they have not been previously screened. Soldiers who have SCT receive additional targeted formal counseling, including genetic counseling, from a healthcare provider, as well as a short educational video (https://vimeo.com/427781393) about SCT and how to avoid ECAST, identify symptoms of ECAST experienced during exercise, and when to seek immediate medical attention. Soldiers with SCT are also counseled to follow universal training precautions (e.g., progressive exercise adaptation and conditioning, acclimation to the environment (e.g., heat, altitude), adherence to work-rest cycle guidance, staying well hydrated), which can help prevent injury and performance degradation in all warfighters.

* A potentially life-threatening condition that involves the breakdown of skeletal muscle fibers with leakage of muscle cell contents, including myoglobin, into the bloodstream.

SPOTLIGHT

Soldiers with SCT, first responders, and medical personnel can view additional ECAST educational videos at: https://www.hprc-online.org/articles/sickle-cell-trait-awareness

Soldiers complete a 5K in preparation for a jungle operations training course at Schofield Barracks, Hawaii, 14 May 2021. (U.S. Army photo by Spc. Jessica Scott)
Environmental Health Indicators

- Air Quality
- Drinking Water Quality
- Water Fluoridation
- Solid Waste Diversion
- Tick-borne Disease
- Mosquito-borne Disease
- Heat Risk
Poisonous 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, Sapoka et al. 2010). Further, recent studies report that both short- and long-term exposure to fine particulate matter are associated with increased COVID-19 infection and mortality rates (Wu X et al. 2020, Zhou et al. 2021). 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 Army installations located within the U.S. For installations located 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, 2020**
The chart shows the number of poor air quality days at selected Army installations in 2020. Annual poor air quality days ranged from 0 to 119, with the greatest number of poor air quality days occurring at installations in Italy and South Korea due to levels of PM$_{2.5}$.

<table>
<thead>
<tr>
<th>PM$_{2.5}$ Level</th>
<th>Days/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5 days/year</td>
<td>23</td>
</tr>
<tr>
<td>6–20 days/year</td>
<td>7</td>
</tr>
<tr>
<td>≥21 days/year</td>
<td>7</td>
</tr>
<tr>
<td>No data</td>
<td>6</td>
</tr>
</tbody>
</table>

**Distribution of Army Population by Air Quality Status, 2020**
The chart shows the distribution of the AC Soldier population based on the number of poor air quality days at their installation. More than half of the AC population was stationed at an installation that experienced good air quality throughout the year (≤ 5 poor air days/year). All but one of the installations experiencing chronically poor air quality were located outside of the continental U.S.

<table>
<thead>
<tr>
<th>PM$_{2.5}$ Level</th>
<th>Days/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5 days/year</td>
<td>57.5%</td>
</tr>
<tr>
<td>6–20 days/year</td>
<td>21.3%</td>
</tr>
<tr>
<td>≥21 days/year</td>
<td>6.8%</td>
</tr>
<tr>
<td>No data</td>
<td>14.5%</td>
</tr>
</tbody>
</table>

In 2020, poor air quality days at several U.S. Army installations were driven by higher than normal temperatures across the west and southwest. This led to spikes in ground-level ozone at Fort Bliss, Fort Carson, Fort Irwin, and 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 perennial air pollution source in Fairbanks, Alaska.

In Germany and Japan, most poor air quality days were due to ground-level ozone. In contrast, poor air quality days in Italy and South Korea were due primarily to PM$_{2.5}$. Industrial emissions and vehicular activity are responsible for degraded air quality conditions in both locations, with South Korea experiencing an influx of PM$_{2.5}$ from seasonal dust storms originating in western China and Mongolia. U.S. Army Garrison (USAG) Humphreys and USAG Vicenza continually experience the greatest number of poor air quality days relative to other installations tracked in Health of the Force.

Climate changes that fuel the rise of air pollution are also escalating the proliferation of airborne allergens like pollen. Pollen is produced across three seasons in North America with tree pollen peaking in spring, grass pollen in summer, and weed pollen in autumn. Exposure to the allergens in pollen can stimulate immune system overreaction, and lead to conditions ranging from itchy eyes and headaches, to life-threatening respiratory distress that impacts the well-being of the 19.2 million adults diagnosed with hay fever, as well as the 20 million adults diagnosed with asthma in the U.S. (Villarroel et al. 2019, NHIS 2019).

**Climate Effects on Air Quality: Pollen**
Shifts in precipitation, rises in seasonal temperatures, increases in atmospheric carbon dioxide, and more frost-free days have created the conditions that favor pollen production. Studies have shown that climate change in North America over just the last 30 years has led to pollen seasons that start earlier (+20 days), last longer (+8 days), produce more pollen (+21%), and induce pollen with greater allergenic potential (Anderegg et al. 2021, Ziska et al. 2019). Impacts are compounded in locations with high levels of air pollution like ground-level ozone, which can prime bronchial Airways to be more sensitive to the allergens (D’Amato et al. 2015). Absent changes in levels of greenhouse gas emissions, these conditions are expected to persist and worsen in the future.

Allergy sufferers can stay abreast of local pollen counts and sign up for pollen alerts by subscribing to the citizen tool box at the National Allergy Bureau hosted by the American Academy of Allergy, Asthma & Immunology. Information on plant species contributing to pollen production by locations and season can be found at the Allergy and Botany Research Library hosted at the Pollen Library.
Ready or Not: Wildfire Smoke is Here

Drought and rising temperatures associated with climate change have caused wildfires to become a seasonal staple in the United States. Wildfires consumed 10.1 million acres in 2020 (see figure), tying it with 2015 for the worst year in the decade (NICC 2020). The increasing frequency and range of wildfire has encroached on military operations and led to training curtailments, power outages, and base evacuations, as well as requests for DOD assistance with fire suppression efforts.

Beyond the danger to life and property, wildfire also produces smoke that is hazardous to human health. Fine particulate matter (PM) is the main component of wildfire smoke and the principal public health threat. Wildfire smoke can travel great distances and impair air quality thousands of miles away from its source. Recent wildfires originating in the western U.S. and Canada created smoke that caused poor air quality alerts in Detroit, New York City, and Boston. Wildfire smoke exposure can increase susceptibility and severity of respiratory infections, including COVID-19, and make recovery more difficult.

U.S. Federal agencies and trade associations have partnered to develop seminal guidance to protect schools, commercial buildings, and other public buildings from wildfire smoke intrusion. The Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events helps building managers prepare for wildfire smoke and protect their occupants (ASHRAE 2020). This framework recommends that all affected buildings have a Smoke Readiness Plan with the following instructions:

- Smoke Preparation Supplies
- HVAC Maintenance
- Optimization of Airflow
- Assessing Filter Conditions
- Limiting Smoke Intrusion
- Indoor PM2.5 Monitoring
- Temporary Clean Spaces
- Portable Air Cleaners

Anticipating and mitigating health impacts created by climate change must become an integral component of military occupational medicine and Force health protection. The EPA offers tools for managing wildfire impacts including real-time maps of wildfire location and the reach of wildfire smoke at: Fire and Smoke Map, and guidance for healthcare providers at: Wildfire Smoke and Your Patients’ Health.
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). Drinking water is considered “safe” when it does not present any significant risk to health, even over a lifetime of consumption. To facilitate this goal, EPA has issued health-based standards for more than 90 contaminants.

CWS must comply with contaminant limits, treatment techniques for water treatment plants, and periodic monitoring to ensure a safe water supply. Contaminant limits are designed to protect consumers from acute and non-acute health effects. Acute health effects are those that can develop shortly after contaminant exposure (e.g., hemorrhagic diarrhea caused by E. coli). Non-acute health effects result from repeated exposure to a contaminant over a longer period of time (e.g., kidney disease caused by inorganic mercury).

Drinking water supplies can be affected by contaminants that originate in manufacturing processes, agricultural practices, human and animal waste, naturally occurring chemicals and minerals, and aging water infrastructure. Depending on the contaminant of concern, the NPDWR specifies monitoring methods and frequencies to ensure treated drinking water meets the health-based standards. Monitoring results are reported to the local environmental authority in order to demonstrate compliance. 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 (CCR) prepared by local water purveyors.

Distribution of Army Installations by Drinking Water Quality Status, FY20

The chart shows the number of installations experiencing a health-based drinking water violation during FY20. The majority of installations tracked in this report had no health-based violations. Drinking water standards violated in FY20 included the Surface Water Treatment Rule (SWTR) and Total Coliform Rule. SWTR violations have occurred in each of the last 3 years, all within Germany.

Distribution of Army Population by Drinking Water Quality Status, FY20

The chart shows the distribution of AC Soldiers based on the drinking water violation status at their installation in FY20. Approximately 97% of AC Soldiers were stationed at installations where drinking water met all health-based drinking water standards.
Environmental Health Indicators

Water Fluoridation

The water fluoridation EHI reports the annual average fluoride concentration in the drinking water at Army installations. CWS practice fluoridation to prevent tooth decay and maintain oral health in both children and adults. Although the need for fluoride is most commonly associated with children, adults exposed to fluoridated water for most of their lives show lower rates of tooth decay (Slade et al. 2013). Fluoridated water is an important tool in maintaining Soldier dental readiness and preventing disease non-battle injuries.

Army regulations require drinking water supplies at Army installations to be “optimally fluoridated,” which refers to the CDC- and PHS-recommended fluoride level of 0.7 mg/L. The Safe Drinking Water Act (SDWA) also regulates fluoride in CWS with a maximum contaminant level of 4 mg/L. Most Army water systems need to fluoridate their water to achieve a level of fluoride beneficial to consumers. However, some areas of the U.S. have naturally occurring fluoride. In these areas, water systems may need to remove fluoride in order to meet federal and state standards.

To ensure optimally fluoridated water and compliance with the SDWA, water suppliers 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 CCR.

Distribution of Army Installations by Water Fluoridation Status, FY20

The chart shows the average fluoride concentration in drinking water at selected Army installations in FY20. Fluoride concentrations ranged from 0–1.46 mg/L. The number of installations providing optimally fluoridated water decreased from 21 in FY19 to 19 in FY20.

Distribution of Army Population by Water Fluoridation Status, FY20

The chart shows the distribution of AC Soldiers based on the level of fluoride in drinking water at Army installations in FY20. Over half of the AC Soldier population was stationed at an installation where drinking water did not meet the CDC-recommended level of fluoride.

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 (HHS) in HP2030. 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, 48.5% of the surveyed AC Army population was stationed at a garrison where drinking water was optimally fluoridated and 51.5% were at garrisons with suboptimal fluoride levels. In FY20, the proportion of the AC Army population with access to optimally fluoridated water at their garrison improved compared to FY19 (37.3%), although it continues to lag the availability to the U.S. population.

Eliminating Health Disparities

The Healthy People project sets data-driven national objectives to improve the health and well-being of U.S. citizens. Foundational principles and overarching goals of this initiative include health equity and elimination of disparities. Community water fluoridation is a proven intervention for eliminating dental health disparities and providing health support for an entire population. Fluoridated water is beneficial to all residents of a community and can positively impact force readiness by reducing suboptimal dental readiness. A 12-year study of recruits to the Canadian Armed Forces showed that those from municipalities with water fluoridation experienced fewer dental caries, compared to those from municipalities without fluoridation (Batsos et al. 2021). The benefits of water fluoridation were uniform across neighborhood income and military rank.

To measure progress with the HP2030 metric, CDC tracks the portion of the U.S. population served by CWS with optimally fluoridated water (CDC 2020c). As of 2018, 25 States have achieved the HP2030 goal of having 77.1% or more of their population served by CWS that are optimally fluoridated (see figure below).

Population Receiving Optimally Fluoridated Water

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Army (FY20)</td>
<td>48.5%</td>
<td>73.0%</td>
<td>77.1%</td>
</tr>
</tbody>
</table>

Installation Fluoridation Status by Water Supplier, FY20

<table>
<thead>
<tr>
<th>Installation Fluoridation Status</th>
<th>Fluoridated</th>
<th>Army-owned</th>
<th>Army-owned Contractor-operated</th>
<th>Purchased</th>
<th>Privatized</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoridated</td>
<td>24</td>
<td>9</td>
<td>5</td>
<td>11</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Army-owned</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Army-owned Contractor-operated</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

0.7–2.0 mg/L
<0.7 mg/L or 2.1–4.0 mg/L
No data
U.S.-based installation
Installation outside the U.S.

U.S. Population with Optimally Fluoridated Water, by State, 2018

Source: CDC 2020c
Wastewater: Public Health Intelligence from the Underground

Public health surveillance tools are essential to maintaining population health and protecting Force readiness. One tool that has shown promise as a sentinel of infectious disease outbreaks is wastewater surveillance, which has gained new relevance as a sentry for COVID-19.

Wastewater surveillance can be used to forecast potential outbreaks of infectious disease, particularly in congregate populations. SARS-CoV-2, the virus that causes COVID-19, is shed in human waste (Han et al. 2020). This occurs before a person has symptoms and even when they have no symptoms at all. SARS-CoV-2 can be genetically detected at extremely low levels in wastewater (Medema et al. 2020). Analyzing wastewater can indicate the potential for infectious disease transmission prior to symptomatic awareness or escalation of case rates.

In a pilot study, the APHC’s Environmental Health Engineering Division collected wastewater samples from Aberdeen Proving Ground’s two wastewater treatment plants weekly from October 2020 to September 2021 (see figure). Results showed that increased concentrations of SARS-CoV-2 in wastewater preceded the surge in cases that occurred in December 2020 to January 2021 and again in March to April 2021. The APHC’s wastewater surveillance efforts align with work being done at the Federal level. The DOD and a number of other Federal agencies are partnering to develop and implement the National Wastewater Surveillance System, a tool initiated by the CDC and the HHS in response to the COVID-19 pandemic (CDC 2022a). In the future, wastewater-based epidemiology can be used for continued Army surveillance of COVID-19 and other infectious disease threats, including influenza and superbugs. Wastewater concentrations of controlled substances (e.g., opioids) can be monitored to estimate use at the community level. Wastewater surveillance efforts do not require individual testing, so there is zero impact on Soldier readiness; ASLS can use results to inform when to employ or reduce disease mitigation strategies.

Microplastics and Nanoplastics as Environmentally-Persistent Pollutants and the Potential Risk to Human Health

Plastic products are ubiquitous, and their environmental persistence is problematic. Single-use plastic bags (polyethylene) or food containers (polystyrene) are among the widest used products. Global plastic production exceeds 320 million tons per year, of which 40% are single-use items (see figure; Geyer et al. 2017); even with recycling, plastics still escape to the environment.

Fugitive plastics become brittle and susceptible to mechanical breakdown, ultimately producing microplastics (MP; <5 millimeters (mm)) and nanoplastics (NP; <0.1 micrometer (µm)) that are now ubiquitous in air, land, and particularly water. MP/NP can either release chemicals acquired in the production process or adsorb environmental pollutants such as metals and organics, thus acting as vectors for environmental exposures. In the oceans, approximately 90% of the estimated 5 trillion pieces of plastic that range in size from 0.33 mm to 200 mm are MP (Eriksen et al. 2014).

The National Academy of Sciences, the EPA, and other agencies have assessed the impact of MP/NP on environmental health. While vertebrates and invertebrates ingest MPs, there is no evidence to date of bioaccumulation or adverse effects on wildlife or commercial fisheries. The potential risk to human health is an emerging and rapidly developing field. Exposure is likely to arise from direct inhalation and/or ingestion pathways, which potentially initiate or exacerbate pulmonary or gastrointestinal disease. Health effects could also be provoked by MP/NP acting as carriers of other pollutants—a significant data gap.

While no formal risk assessment is yet available for MP/NP, the EPA has concluded that the development of reliable, reproducible, and high quality methods for MP quantification is paramount to understanding the health risks. The APHC currently has no position on MP/NP; however, State and Federal agencies and non-governmental organizations are actively monitoring these emerging contaminants. Currently, there is no indication that MP/NP is directly affecting Soldier health, but exposure is taking place via water and food. Exposure reduction can be accomplished through education and reduction of plastic bottled water use.

Global Production, Use, and Fate of Polymer Resins, Synthetic Fibers, and Additives (1950 to 2015; in Million Metric Tons)

Global plastic production exceeds 320 million tons per year, of which 40% are single-use items (see figure; Geyer et al. 2017); even with recycling, plastics still escape to the environment.
The Solid Waste Diversion EHI measures success in diverting wastes from disposal in a landfill or incinerator, thereby reducing the release of waste-derived contaminants and the associated health risks. Diversion is calculated as the mass of diverted waste divided by the mass of the total waste stream, expressed as a percent. Beginning in FY20, DOD policy allows waste-to-energy (WTE) disposal to count as waste diversion in addition to traditional diversion methods, such as recycling and composting (OSD 2020b). However, WTE is excluded from installation diversion rates calculated for this report to preserve the metric’s relevance as an environmental health intervention, and to permit comparison to prior year data.

Waste constituents that can be released in the absence of diversion include chlorinated organics, heavy metals, and endocrine disruptors resulting from air emissions, surface runoff, and landfill leachate. Residential proximity to disposal sites has been significantly associated with increases in asthma, tuberculosis, diabetes, and depression (Tomita et al. 2020), as well as heightened risk of certain cancers (Lewis-Mich et al. 1998). Although preferable to landfilling, WTE incineration carries its own risks, creating persistent, bioaccumulative toxins like dioxin, which is carcinogenic and can affect endocrine, immune, and reproductive functions (Edelstein 2020).

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 FY.

Distribution of Army Installations by Solid Waste Diversion Rate, FY20

The chart shows the FY20 solid waste diversion rate at selected Army installations. Green status indicates that an installation met or exceeded the FY20 DOD solid waste diversion goal of 40%. Among installations outside the U.S., all but one achieved the DOD diversion goal.

The Solid Waste Diversion EHI measures success in diverting wastes from disposal in a landfill or incinerator, thereby reducing the release of waste-derived contaminants and the associated health risks. Diversion is calculated as the mass of diverted waste divided by the mass of the total waste stream, expressed as a percent. Beginning in FY20, DOD policy allows waste-to-energy (WTE) disposal to count as waste diversion in addition to traditional diversion methods, such as recycling and composting (OSD 2020b). However, WTE is excluded from installation diversion rates calculated for this report to preserve the metric’s relevance as an environmental health intervention, and to permit comparison to prior year data.

Waste constituents that can be released in the absence of diversion include chlorinated organics, heavy metals, and endocrine disruptors resulting from air emissions, surface runoff, and landfill leachate. Residential proximity to disposal sites has been significantly associated with increases in asthma, tuberculosis, diabetes, and depression (Tomita et al. 2020), as well as heightened risk of certain cancers (Lewis-Mich et al. 1998). Although preferable to landfilling, WTE incineration carries its own risks, creating persistent, bioaccumulative toxins like dioxin, which is carcinogenic and can affect endocrine, immune, and reproductive functions (Edelstein 2020).

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 FY.

Distribution of Army Installations by Solid Waste Diversion Rate, FY20

The chart shows the FY20 solid waste diversion rate at selected Army installations. Green status indicates that an installation met or exceeded the FY20 DOD solid waste diversion goal of 40%. Among installations outside the U.S., all but one achieved the DOD diversion goal.

The chart shows the FY20 solid waste diversion rate at selected Army installations. Green status indicates that an installation met or exceeded the FY20 DOD solid waste diversion goal of 40%. Among installations outside the U.S., all but one achieved the DOD diversion goal.

“...one that is inclusive, more equitable, and reflects the urgency of the climate crisis.”
—U.S. EPA Administrator Michael S. Regan, introducing the 2021 National Recycling Strategy

Tracking Army’s Progress

Of the installations tracked in this report, 25 met or exceeded the FY20 DOD diversion goal (40%) using traditional diversion methods. This is a decrease from FY19 when 28 installations were able to divert 40% or more of their solid waste. Only 17 installations diverted 50% of their waste in FY20, aligning with EPA’s 2030 recycling goal and DOD’s prior benchmark. When counting WTE incineration as diversion, AC installations averaged 50% diversion in FY20 (with 5% attributed to WTE) (see figure). Notably, 10 installations reported considerably higher diversion rates (an average of 41% higher) when counting WTE as diversion.

The Pandemic Effect

The COVID-19 pandemic has had profound effects on daily life and waste generation is no exception. With the escalation in residential trash from a stay-at-home workforce and plummeting waste generation from shuttered businesses, the waste industry has struggled to adapt. One notable fallout is the uptick in the consumption of single-use items that are unrecyclable (e.g., disposable wipes, gloves, and face masks; plastic packaging; and most takeout containers). Many of the very plastics touted as life-saving have contributed to unprecedented generation of waste without practicable means of diversion. This may have affected some installations’ ability to maintain diversion levels.

The Waste-To-Energy Dilemma

Recent DOD policy permitting WTE to count as diversion is at odds with EPA’s exclusion of WTE as a form of waste minimization (EPA 2021d); as such, energy recovery is among the less desirable options in EPA’s waste management hierarchy (EPA 2021e). In FY20, 11 AC installations sent over 44,400 tons of waste to WTE plants and more likely to be situated in communities of color or low-income areas [(0.5% of total U.S. electricity in 2019) (EIA 2021)]. Further, WTE plants are producing a relatively small share of energy, particularly in the U.S. (79% in the U.S. currently are), adding to the public health burden in these settings (Baptista and Perovich 2019). This may explain WTE generating a relatively small share of energy, particularly in the U.S. reduce WTE to count as diversion is at odds with EPA’s exclusion of WTE as a form of waste minimization (EPA 2021d); as such, energy recovery is among the less desirable options in EPA’s waste management hierarchy (EPA 2021e). In FY20, 11 AC installations sent over 44,400 tons of waste to WTE plants and more likely to be situated in communities of color or low-income areas [(0.5% of total U.S. electricity in 2019) (EIA 2021)]. Further, WTE plants are producing a relatively small share of energy, particularly in the U.S. (79% in the U.S. currently are), adding to the public health burden in these settings (Baptista and Perovich 2019).
Distribution of Army Population by Lyme Disease Risk, 2020

The Military Tick Identification/Infection Confirmation Kit Program (MilTICK) is a free tick identification service available to DOD-affiliated personnel; between 1,000 and 3,000 ticks are usually submitted each year. Lyme disease risk data came from MilTICK and environmental tick surveillance conducted by the Army Regional Public Health Commands. Installations with “No Data” did not participate in MilTICK in 2020, and no Army surveillance data were available for that year. Additional data were obtained from the CDC and scientific literature (CDC 2022b, Eisen et al. 2016, Li et al. 2019, Hyoung et al. 2018, Kim et al. 2020, Yamaji et al. 2018).

Lyme disease is the most common vector-borne disease in the U.S., with over 300,000 new cases estimated each year. 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 difficult to diagnose. If left untreated, Lyme disease can cause joint inflammation, memory problems, and even heart failure.

The tick-borne disease 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 risk data were obtained from MilTICK and environmental tick surveillance conducted by the Army Regional Public Health Commands. Installations with “No Data” did not participate in MilTICK in 2020, and no Army surveillance data were available for that year. Additional data were obtained from the CDC and scientific literature (CDC 2022b, Eisen et al. 2016, Li et al. 2019, Hyoung et al. 2018, Kim et al. 2020, Yamaji et al. 2018).

Distribution of Army Installations by Lyme Disease Risk, 2020

The chart shows the risk of Lyme disease at selected Army installations in 2020. Many installations with a low Lyme disease risk have elevated risks of other tick-borne diseases; for example, ehrlichiosis and an emerging red meat allergy have been associated with the bite of the lone star tick, which is common in the southeast U.S.

Distribution of Army Population by Lyme Disease Risk, 2020

The chart shows the percentage of AC Soldiers by Lyme disease risk status at their installation in 2020. The absence of MilTICK and Army tick surveillance data in 2020 has resulted in a failure to characterize nearly 45% of the AC Soldier population for risk of exposure to Lyme disease – this is a 10% increase over what was characterized in 2019, possibly because of the COVID-19 pandemic limiting training exercises and tick-borne disease exposures.

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 Lyme vector 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.

Not Just Lyme Disease — Co-infections Can Complicate Diagnosis

It’s not just Lyme disease that causes worry when facing a tick bite – ticks can transmit multiple pathogens, and can even be infected with multiple disease agents at once. The maps show numerous locations with ticks infected with the agent of Lyme disease also had ticks submitted that were infected with other agents that can cause Babesiosis (a malaria-like disease), and Anaplasmosis (a bacterial infection). Although rarer than Lyme disease, these diseases are becoming increasingly common as ticks expand their ranges. Tick-borne diseases can already be challenging to diagnose, and co-infection symptoms can mask or complicate Lyme disease symptoms, making diagnosis even harder. Ticks biting DOD beneficiaries can be submitted to MilTICK by healthcare providers through kits at MTFs, or by individuals through a mail-in process. Ticks species are identified, assessed for engorgement, and tested for human pathogens.

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

The mosquito-borne disease 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 no vaccines available for many mosquito-borne diseases; therefore, avoiding bites is the most important prevention method.

Data used to build the mosquito-borne disease 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, 2020**

The chart shows the risk of *Aedes* mosquito-borne diseases at selected Army installations in 2020. 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.

**Distribution of Army Population by Mosquito-borne Disease Risk, 2020**

The chart shows the distribution of AC Soldiers at risk of *Aedes* mosquito-borne disease at selected Army installations in 2020. Although a majority of installations are at low or moderate risk, nearly 40% of the AC Soldier population is at high risk for diseases transmitted by day-biting mosquitoes.

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).
Environmental Health Indicators

Heat Risk

The heat risk EHI reflects the number of days in the year when outdoor conditions heighten the risk of heat-related health issues. A heat risk day occurs when the National Weather Service 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 the factors 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 an Army installation, and whether the year of interest is consistent with the prior 10 years.

Globally, 2020 was the hottest year on record based on annual average surface temperatures, and the past 6 years have been the hottest 6 years over the historical record from 1880 to 2020 (NOAA 2021a). Within the U.S., 2020 was the fifth hottest year on record, and the five hottest years on record have occurred since 2012 (NOAA 2021b). The frequency, persistence, and magnitude of temperature rise has made heat the leading cause of weather-related fatalities in the U.S. over the last 30 years (NWS 2021). Additional consequences of rising temperatures include increases in outdoor air pollution, seasonal allergens, and weather-related mental health stress (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. Historic heat index at the county level was obtained from scientific literature (Dahl et al. 2019).

2020 Heat Risk Days at Army Installations

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

The chart shows the distribution of AC Soldiers based on the heat risk days documented at Army installations in 2020. Two-thirds of AC Soldiers were stationed at a location with more than 50 heat risk days during the year.

The chart shows the distribution of AC Soldiers based on the heat risk days documented at Army installations in 2020. Two-thirds of AC Soldiers were stationed at a location with more than 50 heat risk days during the year.

Heat Safety Tool App features location-specific real-time heat index, hourly forecasts, and occupational safety and health guidance to manage heat risk in outdoor settings.

Coming Soon: Federal Standard for Workplace Heat Exposure

Because climate change is making extreme heat more frequent and severe in the U.S., the Occupational Safety and Health Administration (OSHA) is moving forward with rulemaking for a Federal standard to prevent heat illness in occupational settings. The standard is expected to include measures for adequate hydration, shade, rest breaks, and acclimatization periods. Currently, 4 U.S. States have workplace heat standards, but they all differ on exposure variables, action thresholds, and mitigation measures. The Federal standard will attempt to harmonize best practices and establish unified criteria for exposure and intervention (FR 2021).

Environmental heat was the primary factor associated with 385 fatalities reported in U.S. workplaces between 2011 and 2019. All of these fatalities occurred in men, and 75% in workers 25–54 years old (BLS 2021b). In the same period, there were an average of 3,586 nonfatal injuries and illnesses per year, attributed to environmental heat in both indoor and outdoor work settings (BLS 2021c). Federal authorities believe these counts are vastly understated due to reporting gaps, coding errors, and failure to properly attribute heat as a factor in outcomes like heart attack and stroke.

Although the wet bulb globe temperature (WBGT) index remains the standard for assessing heat risk in military settings, OSHA offers a smartphone application that can help plan outdoor activities when WBGT data are not available. The OSHA-National Institute for Occupational Safety and Health Heat Safety Tool App features location-specific real-time heat index, hourly forecasts, and occupational safety and health guidance to manage heat risk in outdoor settings.
Army Wellness Centers Help Soldiers and Army Community Improve Health Behaviors

Unhealthy lifestyles and behaviors can increase Soldiers’ lifetime risk of developing various behaviorally-mediated chronic diseases and ultimately undermine the Army’s ability to maintain a ready Force. In 2019, 18% of AC Soldiers had a chronic disease (APHC 2021a). Fortunately, unhealthy behaviors (e.g., inadequate physical activity and poor dietary habits) are modifiable, and the risk of becoming medically non-ready can be mitigated through participating in services such as those offered at AWCs. Since 2008, AWCs have facilitated healthy behavior change through evidence-based health education, health coaching and assistance with goal-setting, and advanced fitness testing technology for Soldiers, Family members, Retirees, and Civilians.

As part of a robust and ongoing AWC evaluation strategy, the APHC assessed changes in anthropometric and health behavior outcomes among 40,386 AWC clients who were initially assessed at one of 25 operational AWCs between October 2014 and December 2015, and were tracked for 1 year after their initial assessment. The APHC examined the extent to which outcomes changed between the initial and most recent assessment, and whether the magnitude of observed changes differed between clients who set a goal relative to those who did not.

The AWC clients who completed an initial assessment and at least one follow-up assessment saw improvements in outcomes related to body fat, weight loss, general fitness, strength, and diet and nutrition. Clients who set goals during the initial AWC assessment, compared to those who did not, experienced greater improvement in outcomes related to body fat and weight loss, with statistically significant decreases in average body fat percentage and BMI as of the most recent follow-up (see figure). These findings further demonstrate the effectiveness of AWCs in positively impacting Soldier readiness and the health of the Total Army Family.

Overall, participation in AWC services, regardless of whether clients set specific goals, can improve a multitude of client health behaviors. Goal setting may be an additional driver of change for some outcomes, such as body composition. These findings further demonstrate the effectiveness of AWCs in positively impacting Soldier readiness and the health of the Total Army Family.

### The most common goals set by AWC clients were to—

- Lose body fat;  
- Lose weight;  
- Improve general fitness;  
- Improve strength; and  
- Improve diet and nutrition.

For more information on AWCs, visit: https://phc.amedd.army.mil/organization/hpw/Pages/ArmyWellnessCenters.aspx. Additional information from an evaluation of data from FY15 to FY17 can be found in the Military Health System Research Symposium Conference poster, Assessing the Impact of the U.S. Army Wellness Centers on Soldier and Other Clients’ Goal-Related Improvements in Health Behaviors and Chronic Disease Risk Factors (Via et al. 2021).

Healthy Mouth, Healthy Body, Healthy Force

The mouth is the window into the body and the entry point to the respiratory and digestive tracts. The foods we eat and how we eat them impact the health of our teeth and gums as well as our general health.

Frequent consumption of high-sugar food and beverages promotes the development of dental cavities, the most prevalent disease worldwide (Kasebaum et al. 2017). Bacteria found in dental plaque, the sticky film that forms on teeth, thrive on sugary and starchy foods. Acid released by the bacteria breaks down the tooth resulting in a cavity, a permanently damaged area. In addition to cavities, the buildup of plaque can lead to gingivitis and periodontitis, an infection that destroys the structures supporting the teeth.

The mouth and body connection is a two-way street. The mouth can reveal symptoms of multiple underlying systemic diseases including mucosal burning in patients with anemia, dental erosion in those with gastroesophageal reflux, and oral ulcerations in patients with lupus (Chi et al. 2010). Furthermore, oral disease, specifically periodontitis, has been associated with health conditions including cardiovascular disease, diabetes, stroke, and respiratory infection (AAP 2021, ADA 2019, Demmer and Desvarieux 2006, Mealey 2006, Scannapieco 2006). Notably, periodontal and systemic diseases share common risk factors, including poor diet and smoking (Genco and Genco 2014).

To promote healthy teeth and gums, Soldiers should—

- Limit between-meal snacking.  
- Brush with fluoridated toothpaste twice per day, and floss once per day.  
- Eat a balanced diet of nutrient-rich foods including vegetables, fruit, lean meat, dairy, nuts, and grains.  
- Substitute sugary snacks for healthy alternatives such as nuts, raw vegetables, cheese, and plain yogurt.  
- Drink water.  
- Visit the dentist at least once per year.

Oral health is essential to general health and well-being (HHS 2000). As such, poor Soldier oral health impacts the readiness of the Force, which is integral to the health of the nation.
Performance Triad

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 Army Regulation 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 2020 Azimuth Check. While a greater number of Soldiers completed the Azimuth Check in 2020 relative to 2019, the proportion of Soldiers meeting SAN targets is comparable between 2019 and 2020.
**Performance Triad**

### Sleep

The CDC (CDC 2020d) 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, 2020**

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, over one-third of Soldiers (38%) reported obtaining 7 or more hours of sleep. During weekends/days off, the majority of Soldiers (69%) 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, 2020**

A similar proportion of male (39%) and female (37%) Soldiers reported meeting the sleep target of 7 or more hours of sleep during work/duty weeks. Regardless of sex, Soldiers <25 years old had the lowest proportion meeting the sleep target of 7 or more hours of sleep during work/duty weeks. Among females, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target overall (42%), while Black or African American Soldiers had the lowest proportion overall. Among male Soldiers, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target overall (42%), while Black or African American Soldiers had the lowest proportion overall (30%).

**Female (37% Average)**

- 7 or more hours: 32
- 6 hours: 32
- 5 hours: 37
- 4 hours or less: 43

**Male (39% Average)**

- 7 or more hours: 29
- 6 hours: 32
- 5 hours: 37
- 4 hours or less: 43

**Percent of AC Soldiers Who Met the Weekend/Days-Off Sleep Target by Sex, Age, Race, and Ethnicity, 2020**

An equal proportion of male and female (69%) 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 females Soldiers, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target overall (76%), while Black or African American Soldiers had the lowest proportion overall (59%). Among males Soldiers, White (Not Hispanic or Latino) Soldiers (72%) and Asian Soldiers (72%) had the highest proportion meeting this target overall, while Black or African American Soldiers had the lowest proportion overall (59%).

**Female (69% Average)**

- 7 or more hours: 32
- 6 hours: 32
- 5 hours: 37
- 4 hours or less: 43

**Male (69% Average)**

- 7 or more hours: 32
- 6 hours: 32
- 5 hours: 37
- 4 hours or less: 43

---

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

---

94 2021 HEALTH OF THE FORCE REPORT

PERFORMANCE TRIAD 95
Performance Triad

Activity

The CDC recommends two physical activity targets (CDC 2020e). The first is attaining 2 or more days per week of resistance training. The second is attaining adequate aerobic activity. The amount of 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.

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

Overall, the majority of Soldiers met the activity targets. The majority of Soldiers (81%) engaged in resistance training 2 or more days per week. Most Soldiers (89%) achieved adequate moderate/vigorous aerobic activity targets.

Percent of AC Soldiers Who Met the Resistance Training Target by Sex, Age, Race, and Ethnicity, 2020

A greater proportion of male Soldiers (82%) relative to female Soldiers (76%) reported engaging in resistance training 2 or more days per week. Regardless of sex, or race and ethnicity, Soldiers ≥45 years old had the lowest proportion meeting the resistance training target. Among female Soldiers, Native Hawaiian/Pacific Islander Soldiers had the highest proportion meeting this target overall (86%), while Black or African American Soldiers had the lowest proportion overall (73%). Among male Soldiers, Native Hawaiian/Pacific Islander Soldiers had the highest proportion meeting this target overall (86%), while White (Not Hispanic or Latino) Soldiers had the lowest proportion overall (81%).

Percent of AC Soldiers Who Met the Aerobic Activity Target by Sex, Age, Race, and Ethnicity, 2020

A greater proportion of male Soldiers (89%) relative to female Soldiers (85%) achieved adequate moderate and/or vigorous aerobic activity targets. Regardless of sex, Soldiers ≥45 years old had the lowest proportion meeting the aerobic activity targets. Among female Soldiers, White (Not Hispanic or Latino) Soldiers (87%), American Indian/Alaskan Native Soldiers (87%), Native Hawaiian/Pacific Islander Soldiers (87%), and Hispanic or Latino Soldiers (87%) had the highest proportion meeting this target overall, while Black or African American Soldiers had the lowest proportion overall (83%). Among male Soldiers, White (Not Hispanic or Latino) Soldiers (90%) and Hispanic or Latino Soldiers (90%) had the highest proportion meeting this target overall, while Black or African American Soldiers had the lowest proportion overall (87%).
Nutrition

The USDA (HHS and USDA 2015) recommends two or more servings of fruits and two 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, 2020

Overall, less than half of Soldiers met the nutrition targets. Less than one-third of Soldiers (30%) met the target of two or more servings of fruits per day. Less than half of Soldiers (40%) met the target of two or more servings of vegetables per day.

A greater proportion of female Soldiers (33%) relative to male Soldiers (29%) reported eating two or more servings of fruits per day. Regardless of sex, Soldiers <25 years old had the lowest proportion meeting the nutrition target of two or more servings of fruit per day. Among female Soldiers, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target overall (36%), while Asian Soldiers (28%) and Native Hawaiian/Pacific Islander Soldiers (28%) had the lowest proportion overall. Among male Soldiers, White (Not Hispanic or Latino) Soldiers (30%) and Black or African American Soldiers (30%) had the highest proportion meeting this target overall (36%), while Native Hawaiian/Pacific Islander Soldiers (28%) and Hispanic or Latino Soldiers (28%) had the lowest proportion overall.

Percent of AC Soldiers Meeting the Fruit Consumption Target by Sex, Age, Race, and Ethnicity, 2020

A greater proportion of female Soldiers (43%) relative to male Soldiers (39%) reported eating two or more servings of vegetables per day. Regardless of sex, Soldiers <25 years old had the lowest proportion meeting the nutrition target of two or more servings of vegetables per day. Among female Soldiers, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target overall (50%), while Native Hawaiian/Pacific Islander Soldiers had the lowest proportion overall (34%). Among male Soldiers, White (Not Hispanic or Latino) Soldiers had the highest proportion meeting this target overall (43%), while Native Hawaiian/Pacific Islander Soldiers (34%) and Hispanic or Latino Soldiers (34%) had the lowest proportion overall.

Nutrition Performance Triad

Prevalence of meeting this nutrition target ranged from 19% to 46% across Army installations. Overall, 40% of Soldiers reported eating two or more servings of vegetables per day. Prevalence of meeting this nutrition target ranged from 31% to 60% across Army installations.
Physical and Behavioral Characteristics of Soldiers who Obtain Recommended Sleep

Just over one-third of U.S. Army Soldiers meet the NSF’s recommended guidelines of 7 or more hours of sleep per night (APHC 2021a). Insufficient sleep is associated with negative health impacts such as increased injury risk; impaired decision making and reaction time; decreased cognitive, metabolic, and immune functions; increased fatigue and tiredness; decreased anaerobic and endurance performance; and increased prevalence of cigarette smoking (Fullagar et al. 2015, Bruce et al. 2017, Vitale et al. 2019, Grier et al. 2020). Therefore, identifying those who do not achieve optimal sleep duration and intervening to promote increases in sleep have the potential to positively impact many aspects of Soldier well-being.

In a recent investigation by the APHC, male and female Soldiers with a lower body fat percentage were more likely to meet sleep recommendation guidelines than those with higher body fat percentages. Soldiers who were categorized as obese were less likely to meet sleep recommendation guidelines compared to those who were categorized as normal weight. Male Soldiers who were non-smokers and/or had greater aerobic endurance (as indicated by APFT 2-mile run times) were more likely to meet the guidelines compared to smokers and Soldiers with lower aerobic endurance (see figure). These results are consistent with previous research that has reported better sleep health among those with healthy body compositions, positive health behaviors, and greater fitness (Krueger and Friedman 2009, Phillips and Danner 1995, Jaehne et al. 2009, Costa and Esteves 2018).

Results from the APHC study as well as previous studies can inform how Soldiers may improve their sleep. Sleep impacts associated with tobacco use can reverse after cessation (Jaehne et al. 2009, Zhang et al. 2006). Likewise, Soldiers may be more likely to have healthier sleeping habits if they regularly eat breakfast, maintain their aerobic and strength training, and pass their APFT in the top quartile (Lentino et al. 2013). Maintaining a healthy body weight, being a non-smoker, and having higher aerobic endurance are associated with meeting sleep recommendation guidelines and may ultimately improve Soldier performance and reduce injury risk.

### Physical and Behavioral Characteristics and Likelihood of Sleeping ≥7 Hours, 2018–2019

<table>
<thead>
<tr>
<th>Physical and Behavioral Characteristic</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Body Fat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤18.28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.66*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.29–21.12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.63*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.13–23.77%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.38*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥23.78%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tobacco Status</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smoker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette Smoking and Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette Smoking and the Likelihood of Sleeping ≥7 Hours for Males</td>
<td></td>
<td></td>
</tr>
<tr>
<td>elementType</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤29.04%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.56*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.05–31.96%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.86*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.97–34.97%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2-Mile Run Times and Smoking</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smoker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette Smoking and Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette Smoking and the Likelihood of Sleeping ≥7 Hours for Males</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
- Smoking and run time figures not shown for females due to non-significant associations with sleeping ≥7 hours.
- Significant difference compared to reference group (p<0.05). Reference group represented by "1.00*".
- Body fat and run time categories represent quartiles with approximately equal numbers of Soldiers in each.

### Performance Triad

**Summary**

Percent of AC Soldiers Meeting SAN Targets, 2020

**Sleep**
- 38% obtained 7 or more hours of sleep on weeknights/duty nights.
- 69% obtained 7 or more hours of sleep on weekends/non-duty nights.

**Activity**
- 81% engaged in resistance training 2 or more days per week.
- 89% achieved adequate moderate and/or vigorous aerobic activity targets.

**Nutrition**
- 30% ate 2 or more servings of vegetables per day.
- 40% ate 2 or more servings of fruits per day.
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**
  - 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.
  - Higher IHI scores reflect comparatively better installation health. IHI scores less than -2 (i.e., more than 2 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.

- **IHI Percentile**
  - The percentile for a given installation is the probability of having an IHI equal to or lower than that installation’s IHI.
  - 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, STI), 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%)

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

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.).
Installation Health Index

Rankings by Medical Metrics

The health data used to rank installations are adjusted by age and sex to allow for a more accurate comparison of health outcomes throughout the Force. In contrast, the medical metrics pages report crude estimates. Installations outside of the U.S. are ranked separately from U.S.-based installations due to differences which may bias their comparison.

Red, amber, and green color-coding symbolizes installation health status compared to the average Health of the Force installations.

The ranking order is based on adjusted, unrounded rates. 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

### Injury

<table>
<thead>
<tr>
<th>Installation</th>
<th>Incidence (per 1,000 person-years, age- and sex-adjusted average (and range) for the installations presented, 2020)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JB Myer-Henderson Hall</td>
<td>1,189 (955-1,597)</td>
</tr>
<tr>
<td>Fort Stewart</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Bliss</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Jackson</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>USAG West Point</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Belvoir</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Leavenworth</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Hawaii</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Drum</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Riley</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>JB San Antonio</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Gordon</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Huachucha</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Leonard Wood</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Benning</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Polk</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>JB Langley-Eustis</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Rucker</td>
<td>1,190 (956-1,598)</td>
</tr>
<tr>
<td>Fort Lake</td>
<td>1,190 (956-1,598)</td>
</tr>
</tbody>
</table>

### Chronic Disease

<table>
<thead>
<tr>
<th>Installation</th>
<th>Chronic Disease Prevalence, age- and sex-adjusted average (and range) for the installations presented, 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>JB Myer-Henderson Hall</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Jackson</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>JB Langley-Eustis</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Rucker</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Lake</td>
<td>15% (12%-18%)</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>15% (12%-18%)</td>
</tr>
</tbody>
</table>

#### Installations Outside the U.S.

- **JB Vicenza**
- **USAG Vicenza**
- **USAG Asbach**
- **USAG Wiesbaden**
- **USAG Stuttgart**
- **USAG Bavaria**
- **USAG Donggu**
- **USAG Humphreys**
- **USAG Rheinland-Pfalz**

#### Installations Outside the U.S.

- **USAG Vicenza**
- **USAG Asbach**
- **USAG Wiesbaden**
- **USAG Donggu**
- **USAG Humphreys**
- **USAG Yongsan-Casey**
- **USAG Rheinland-Pfalz**

#### Installations Outside the U.S.

- **USAG Vicenza**
- **USAG Asbach**
- **USAG Wiesbaden**
- **USAG Donggu**
- **USAG Yongsan-Casey**
- **USAG Rheinland-Pfalz**
- **Japan**
### Installation Profiles

The below footnotes pertain to the installation profiles found on pages 109–150.

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 AWC or AFWC logo on an installation profile page indicates that an AWC/AFWC is located at that installation.
Installation Profile Summaries

U.S. Installations

Fort Belvoir

Demographics: Approximately 3,200 AC Soldiers
45% <35 years old, 23% female

Main Healthcare Facility: Fort Belvoir Community Hospital

VIRGINIA

INSTALLATION ARMY MEDICAL METRICS

<table>
<thead>
<tr>
<th></th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Value Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,412</td>
<td>1,140</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>24</td>
<td>21</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.2</td>
<td>3.0</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>19</td>
<td>13</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>26</td>
<td>24</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>17</td>
<td>19</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>8.9</td>
<td>16</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>33</td>
<td>22</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL HEALTH INDICATORS

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.70 mg/L
- Solid waste diversion rate: 56%
- Mosquito-borne disease risk: High
- Lyme disease risk: High
- Heat risk: 63 days/year

PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 43% (Army: 38%)
- 7+ hours of sleep (weekend or non-duty night): 71% (Army: 69%)
- 2+ days per week of resistance training: 75% (Army: 81%)
- 150+ minutes per week of aerobic activity: 85% (Army: 89%)
- 2+ servings of fruits per day: 32% (Army: 30%)
- 2+ servings of vegetables per day: 44% (Army: 40%)

Installation Health Index Score: -0.9 (20–29th percentile)

Footnotes: See page 107.
**Installation Profile Summaries**

### Fort Benning

**Demographics:** Approximately 22,000 AC Soldiers  
85% <35 years old, 6.7% female  
Main Healthcare Facility: Martin Army Community Hospital

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,287</td>
<td>1,393</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>9.8</td>
<td>13</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.9</td>
<td>2.2</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>5.4</td>
<td>9.1</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>14</td>
<td>17</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>29</td>
<td>28</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>11</td>
<td>14</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>11</td>
<td>18</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

### Fort Bliss

**Demographics:** Approximately 2,600 AC Soldiers  
81% <35 years old, 15% female  
Main Healthcare Facility: William Beaumont Army Medical Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,033</td>
<td>1,068</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>17</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.6</td>
<td>4.3</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>9.8</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>20</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>28</td>
<td>28</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>28</td>
<td>24</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>17</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

### Environmental Health Indicators⁴

- **Fort Benning:**  
  - Poor air quality: 1 days/year  
  - Poor water quality: 0 days/year  
  - Water fluoridation: 0.60 mg/L  
  - Solid waste diversion rate: 23%  
  - Mosquito-borne disease risk: High  
  - Lyme disease risk: Low  
  - Heat risk: 110 days/year  

- **Fort Bliss:**  
  - Poor air quality: 23%  
  - Poor water quality: 0 days/year  
  - Water fluoridation: 0.83 mg/L  
  - Solid waste diversion rate: 51%  
  - Mosquito-borne disease risk: Moderate  
  - Lyme disease risk: No Data  
  - Heat risk: 102 days/year

**Performance Triad Measures**

- **Fort Benning:**  
  - 7+ hours of sleep (weeknight/duty night): 39%  
  - 7+ hours of sleep (weekend or non-duty night): 69%  
  - 2+ days per week of resistance training: 83%  
  - 150+ minutes per week of aerobic activity: 88%  
  - 2+ servings of fruits per day: 36%  
  - 2+ servings of vegetables per day: 47%

- **Fort Bliss:**  
  - 7+ hours of sleep (weeknight/duty night): 35%  
  - 7+ hours of sleep (weekend or non-duty night): 66%  
  - 2+ days per week of resistance training: 80%  
  - 150+ minutes per week of aerobic activity: 89%  
  - 2+ servings of fruits per day: 28%  
  - 2+ servings of vegetables per day: 36%  

**Installation Health Index Score⁴:** -0.4 (30–39th percentile)  
**Installation Health Index Score⁴:** -0.2 (40–49th percentile)

Footnotes: See page 107.

---

Footnotes: See page 107.
### Installation Profile Summaries

**Fort Bragg**

Demographics: Approximately 45,000 AC Soldiers
77% <35 years old, 13% female

Main Healthcare Facility: Womack Army Medical Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,153</td>
<td>1,182</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>11</td>
<td>12</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.1</td>
<td>3.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>9.7</td>
<td>11</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>17</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>28</td>
<td>28</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>21</td>
<td>22</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.76 mg/L
- Solid waste diversion rate: 25%
- Mosquito-borne disease risk: High
- Lyme disease risk: Moderate
- Heat risk: 86 days/year

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 40% (Installation), 38% (Army)
- 2+ days per week of resistance training: 90% (Installation), 89% (Army)
- 150+ minutes per week of aerobic activity: 40% (Installation), 40% (Army)
- 2+ servings of fruits per day: 34% (Installation), 30% (Army)
- 2+ servings of vegetables per day: 43% (Installation), 40% (Army)

Installation Health Index Score: 0.4 (60–69th percentile)

---

**Fort Campbell**

Demographics: Approximately 28,000 AC Soldiers
85% <35 years old, 12% female

Main Healthcare Facility: Blanchfield Army Community Hospital

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,663</td>
<td>1,226</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.3</td>
<td>3.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.6</td>
<td>8.7</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>20</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>31</td>
<td>30</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>18</td>
<td>17</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>13</td>
<td>17</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 48% (Installation), 44% (Army)
- Poor water quality: 25% (Installation), 19% (Army)
- Water fluoridation: Low (Installation), Moderate (Army)
- Solid waste diversion rate: 25% (Installation), 23% (Army)
- Mosquito-borne disease risk: High (Installation), Moderate (Army)
- Lyme disease risk: Low (Installation), Moderate (Army)
- Heat risk: 90 days/year (Installation), 91 days/year (Army)

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 38% (Installation), 38% (Army)
- 2+ days per week of resistance training: 84% (Installation), 81% (Army)
- 150+ minutes per week of aerobic activity: 30% (Installation), 30% (Army)
- 2+ servings of fruits per day: 30% (Installation), 30% (Army)
- 2+ servings of vegetables per day: 39% (Installation), 40% (Army)

Installation Health Index Score: -0.1 (40–49th percentile)

Footnotes: See page 107.
## Installation Profile Summaries

### Installation: Fort Carson

**Demographics:** Approximately 25,000 AC Soldiers
- 84% <35 years old, 14% female

**Main Healthcare Facility:** Evans Army Community Hospital

### Medical Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,066</td>
<td>1,122</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.7</td>
<td>4.3</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.3</td>
<td>8.4</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>15</td>
<td>16</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>30</td>
<td>30</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>26</td>
<td>23</td>
<td>21</td>
<td>8.9–43</td>
</tr>
</tbody>
</table>

### Footnotes:
- See page 107.

### Installation Health Index Score:
- **0.4 (60–69th percentile)**

---

### Installation: Fort Drum

**Demographics:** Approximately 15,000 AC Soldiers
- 86% <35 years old, 12% female

**Main Healthcare Facility:** Guthrie Army Health Clinic

### Medical Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,109</td>
<td>1,179</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.5</td>
<td>3.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>5.7</td>
<td>8.2</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>21</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>30</td>
<td>29</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>21</td>
<td>18</td>
<td>21</td>
<td>8.9–43</td>
</tr>
</tbody>
</table>

### Footnotes:
- See page 107.

### Installation Health Index Score:
- **0.0 (40–49th percentile)**

---

### Performance Triad Measures

- **7+ hours of sleep (weeknight/duty night):**
  - Fort Carson: 38% (36%–38%)
  - Fort Drum: 38% (36%–38%)

- **2+ days per week of resistance training:**
  - Fort Carson: 89% (81%–89%)
  - Fort Drum: 91% (89%–91%)

- **2+ servings of fruits per day:**
  - Fort Carson: 29% (30%–29%)
  - Fort Drum: 30% (30%–30%)

- **7+ hours of sleep (weekend or non-duty night):**
  - Fort Carson: 69% (69%–69%)
  - Fort Drum: 68% (69%–68%)

- **150+ minutes per week of aerobic activity:**
  - Fort Carson: 82% (81%–82%)
  - Fort Drum: 84% (81%–84%)

- **2+ servings of vegetables per day:**
  - Fort Carson: 40% (40%–40%)
  - Fort Drum: 38% (40%–38%)

- **7+ hours of sleep (weekend or non-duty night):**
  - Fort Carson: 69% (69%–69%)
  - Fort Drum: 68% (69%–68%)

- **2+ servings of fruits per day:**
  - Fort Carson: 29% (30%–29%)
  - Fort Drum: 30% (30%–30%)

- **2+ servings of vegetables per day:**
  - Fort Carson: 40% (40%–40%)
  - Fort Drum: 38% (40%–38%

### Environmental Health Indicators

- **Poor air quality:**
  - Fort Carson: 7 days/year
  - Fort Drum: 59% (44%–69%)

- **Water fluoridation:**
  - Fort Carson: 0.38 mg/L
  - Fort Drum: High

- **Solid waste diversion rate:**
  - Fort Carson: 44%
  - Fort Drum: 59%

- **Mosquito-borne disease risk:**
  - Fort Carson: Low
  - Fort Drum: Moderate (69%–89%)

- **Lyme disease risk:**
  - Fort Carson: No data
  - Fort Drum: High (81%–89%)

- **Heat risk:**
  - Fort Carson: 0 days/year
  - Fort Drum: 40% (38%–40%)

### Footnotes:
- See page 107.
### Installation Profile Summaries

#### Fort Gordon

**Demographics:** Approximately 9,000 AC Soldiers  
74% <35 years old, 20% female  
**Main Healthcare Facility:** Dwight D. Eisenhower Army Medical Center

### Installation Health Index Score

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,368</td>
<td>1,312</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>15</td>
<td>14</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.1</td>
<td>2.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>7.2</td>
<td>7.0</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>25</td>
<td>24</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>21</td>
<td>22</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>20</td>
<td>17</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night): 34%  
- 7+ hours of sleep (weekend or non-duty night): 69%  
- 2+ days per week of resistance training: 77%  
- 150+ minutes per week of aerobic activity: 87%  
- 2+ servings of fruits per day: 33%  
- 2+ servings of vegetables per day: 44%  

### Environmental Health Indicators

- Poor air quality: 4 days/year  
- Poor water quality: 0 days/year  
- Water fluoridation: 0.71 mg/L  
- Solid waste diversion rate: 25%  
- Mosquito-borne disease risk: High  
- Lyme disease risk: No data  
- Heat risk: 112 days/year

### Installation Health Index Score: -0.3 (30–39th percentile)

---

#### Fort Hood

**Demographics:** Approximately 36,000 AC Soldiers  
62% <35 years old, 16% female  
**Main Healthcare Facility:** Carl R. Darnall Army Medical Center

### Installation Health Index Score

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,176</td>
<td>1,218</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>18</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.7</td>
<td>4.4</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.5</td>
<td>11</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>19</td>
<td>20</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>29</td>
<td>29</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>32</td>
<td>28</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>18</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night): 33%  
- 7+ hours of sleep (weekend or non-duty night): 66%  
- 2+ days per week of resistance training: 80%  
- 150+ minutes per week of aerobic activity: 88%  
- 2+ servings of fruits per day: 27%  
- 2+ servings of vegetables per day: 36%  

### Environmental Health Indicators

- Poor air quality: 1 days/year  
- Poor water quality: 0 days/year  
- Water fluoridation: No data  
- Solid waste diversion rate: 0 days/year  
- Mosquito-borne disease risk: Moderate  
- Lyme disease risk: No data  
- Heat risk: 115 days/year

### Installation Health Index Score: -0.6 (20–29th percentile)

---

Footnotes: See page 107.
## Installation Profile Summaries

### Fort Huachuca

**Demographics:** Approximately 4,100 AC Soldiers 78% <35 years old, 17% female

**Main Healthcare Facility:** Raymond W. Bliss Army Health Clinic

#### MEDICAL METRICS

<table>
<thead>
<tr>
<th></th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,363</td>
<td>1,334</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>9.7</td>
<td>10</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.6</td>
<td>1.6</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.1</td>
<td>9.3</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>18</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>25</td>
<td>25</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>11</td>
<td>10</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>18</td>
<td>20</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- 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: No data
- Heat risk: 51 days/year

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (week/night/duty night): 41% (Army: 38%)
- 7+ hours of sleep (weekend or non-duty night): 74% (Army: 69%)
- 2+ days per week of resistance training: 81% (Army: 81%)
- 150+ minutes per week of aerobic activity: 91% (Army: 89%)
- 2+ servings of fruits per day: 30% (Army: 30%)
- 2+ servings of vegetables per day: 41% (Army: 40%)

**Installation Health Index Score**: 0.5 (30–39th percentile)

Footnotes: See page 107.

### Fort Irwin

**Demographics:** Approximately 4,100 AC Soldiers 76% <35 years old, 13% female

**Main Healthcare Facility:** Weed Army Community Hospital

#### MEDICAL METRICS

<table>
<thead>
<tr>
<th></th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>--</td>
<td>--</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>--</td>
<td>--</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>--</td>
<td>--</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>--</td>
<td>--</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>32</td>
<td>32</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>18</td>
<td>18</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>--</td>
<td>--</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 20%
- Poor water quality: 0 days/year
- Water fluoridation: No data
- Solid waste diversion rate: 38%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: No data
- Heat risk: 86 days/year

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (week/night/duty night): 35% (Army: 38%)
- 2+ days per week of resistance training: 83% (Army: 81%)
- 2+ servings of fruits per day: 31% (Army: 30%)
- 2+ servings of vegetables per day: 41% (Army: 40%)

**Installation Health Index Score**: Not Calculated

Footnotes: See page 107.

---

Installation Profile Summaries — MHS GENESIS data were unavailable for these metrics.
### Fort Jackson

**Demographics:** Approximately 9,300 AC Soldiers
86% <35 years old, 27% female

**Main Healthcare Facility:** Moncrief Army Health Clinic

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,079</td>
<td>1,167</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>14</td>
<td>2.1</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>5.1</td>
<td>15</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>12</td>
<td>28</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- Poor air quality: 1 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.53 mg/L
- Solid waste diversion rate: 30%
- Mosquito-borne disease risk: High
- Lyme disease risk: Low
- Heat risk: 97 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 33% 38%
- 7+ hours of sleep (weekend or non-duty night): 64% 69%
- 2+ days per week of resistance training: 81% 81%
- 150+ minutes per week of aerobic activity: 88% 89%
- 2+ servings of fruits per day: 30% 30%
- 2+ servings of vegetables per day: 41% 40%

**Installation Health Index Score:** 1.2 (80–89th percentile)

---

### Fort Knox

**Demographics:** Approximately 4,600 AC Soldiers
63% <35 years old, 23% female

**Main Healthcare Facility:** Ireland Army Community Hospital

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,341</td>
<td>1,189</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>28</td>
<td>21</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- Poor air quality: 37% 38%
- Poor water quality: 39% 38%
- Water fluoridation: 5.36 mg/L 5.36 mg/L
- Solid waste diversion rate: 30% 30%
- Mosquito-borne disease risk: 81% 81%
- Lyme disease risk: Moderate 30% 30%
- Heat risk: 41 days/year 41 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 46% 38%
- 7+ hours of sleep (weekend or non-duty night): 69% 69%
- 2+ days per week of resistance training: 79% 81%
- 150+ minutes per week of aerobic activity: 87% 89%
- 2+ servings of fruits per day: 30% 30%
- 2+ servings of vegetables per day: 44% 40%

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

---

Footnotes: See page 107.
## Installation Profile Summaries

### Fort Leavenworth

**Demographics:** Approximately 3,100 AC Soldiers  
48% <35 years old, 16% female  
**Main Healthcare Facility:** Munson Army Health Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,369</td>
<td>1,169</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>17</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.1</td>
<td>2.8</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>15</td>
<td>11</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>25</td>
<td>20</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>21</td>
<td>23</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>10</td>
<td>17</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>31</td>
<td>21</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.45 mg/L
- Solid waste diversion rate: 30%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: Low
- Heat risk: 67 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 45% (38%)
- 7+ hours of sleep (weekend or non-duty night): 71% (69%)
- 2+ days per week of resistance training: 77% (81%)
- 150+ minutes per week of aerobic activity: 89% (89%)
- 2+ servings of fruits per day: 33% (30%)
- 2+ servings of vegetables per day: 47% (40%)

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

### Fort Lee

**Demographics:** Approximately 6,700 AC Soldiers  
76% <35 years old, 25% female  
**Main Healthcare Facility:** Kenner Army Health Clinic

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,776</td>
<td>1,597</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>15</td>
<td>16</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.4</td>
<td>2.7</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>7.7</td>
<td>9.3</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
<td>19</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>24</td>
<td>25</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>9.1</td>
<td>7.0</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>16</td>
<td>20</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- Poor air quality: No data
- Poor water quality: 0 days/year
- Water fluoridation: 0.61 mg/L
- Solid waste diversion rate: High
- Mosquito-borne disease risk: High
- Lyme disease risk: Moderate
- Heat risk: 63 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 32% (38%)
- 7+ hours of sleep (weekend or non-duty night): 61% (69%)
- 2+ days per week of resistance training: 78% (81%)
- 150+ minutes per week of aerobic activity: 88% (89%)
- 2+ servings of fruits per day: 26% (30%)
- 2+ servings of vegetables per day: 34% (40%)

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

Footnotes: See page 107.
Installation Profile Summaries

Fort Leonard Wood
Demographics: Approximately 10,000 AC Soldiers
85% < 35 years old, 22% female
Main Healthcare Facility: General Leonard Wood Army Community Hospital

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
<th>Injury (rate per 1,000)</th>
<th>1,355</th>
<th>1,378</th>
<th>1,189</th>
<th>919–1,776</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>9.7–24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.7</td>
<td>2.0</td>
<td>3.2</td>
<td>1.4–4.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.9</td>
<td>10</td>
<td>9.0</td>
<td>4.4–19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
<td>18</td>
<td>13</td>
<td>18–27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>12–34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>9.2</td>
<td>7.7</td>
<td>21</td>
<td>8.9–43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>13</td>
<td>19</td>
<td>17</td>
<td>11–33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fort Meade
Demographics: Approximately 4,000 AC Soldiers
62% < 35 years old, 20% female
Main Healthcare Facility: Kimbrough Ambulatory Care Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
<th>Injury (rate per 1,000)</th>
<th>1,204</th>
<th>1,109</th>
<th>1,189</th>
<th>919–1,776</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral health (%)</td>
<td>20</td>
<td>18</td>
<td>15</td>
<td>9.7–24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.2</td>
<td>2.4</td>
<td>3.2</td>
<td>1.4–4.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>14</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>27</td>
<td>25</td>
<td>18</td>
<td>13–27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>20</td>
<td>22</td>
<td>27</td>
<td>12–34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>9.3</td>
<td>11</td>
<td>21</td>
<td>8.9–43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>26</td>
<td>20</td>
<td>17</td>
<td>11–33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ENVIRONMENTAL HEALTH INDICATORS
- Poor air quality: No data
- Poor water quality: 0 days/year
- Water fluoridation: 0.90 mg/L
- Solid waste diversion rate: 40%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: Moderate
- Heat risk: 62 days/year

Performance Triad Measures
- 7+ hours of sleep (weeknight/duty night): 35% Installation, 38% Army
- 7+ hours of sleep (weekend or non-duty night): 67% Installation, 69% Army
- 2+ days per week of resistance training: 83% Installation, 81% Army
- 150+ minutes per week of aerobic activity: 90% Installation, 89% Army
- 2+ servings of fruits per day: 29% Installation, 30% Army
- 2+ servings of vegetables per day: 39% Installation, 40% Army

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

Footnotes: See page 107.
Installation Profile Summaries

**Fort Polk**

Demographics: Approximately 7,700 AC Soldiers
82% <35 years old, 13% female
Main Healthcare Facility: Bayne-Jones Army Community Hospital

| MEDICAL METRICS | Crude Value | Adjusted Value | Value | Range
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,358</td>
<td>1,414</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>18</td>
<td>19</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.8</td>
<td>4.4</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>19</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>33</td>
<td>33</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>26</td>
<td>23</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: No data
- Poor water quality: 0 days/year
- Water fluoridation: 0.90 mg/L
- Solid waste diversion rate: 38%
- Mosquito-borne disease risk: High
- Lyme disease risk: No data
- Heat risk: 107 days/year

Installation Health Index Score: -2.3 (<20th percentile)

**Fort Riley**

Demographics: Approximately 15,000 AC Soldiers
85% <35 years old, 13% female
Main Healthcare Facility: Irwin Army Community Hospital

| MEDICAL METRICS | Crude Value | Adjusted Value | Value | Range
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,140</td>
<td>1,222</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.6</td>
<td>4.2</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.5</td>
<td>9.0</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>19</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>32</td>
<td>31</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>38</td>
<td>32</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>13</td>
<td>19</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 46%
- Water fluoridation: Low
- Solid waste diversion rate: 84%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: Low
- Heat risk: 76 days/year

Installation Health Index Score: 0.7 (20–29th percentile)

Footnotes: See page 107.
### Installation Profile Summaries

#### Fort Rucker

**Demographics:** Approximately 2,800 AC Soldiers  
65% <35 years old, 15% female  
**Main Healthcare Facility:** Lyster Army Health Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Value</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,639</td>
<td>1,498</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>10</td>
<td>9.6</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.6</td>
<td>15</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>14</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>20</td>
<td>18</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>20</td>
<td>19</td>
<td>27</td>
<td>12–34</td>
</tr>
</tbody>
</table>

#### STIs: Chlamydia infection (rate per 1,000)

| Value | 12 | 13 | 21 | 8.9–43 |

**Environment Health Indicators⁴**

- Poor air quality: No data
- Poor water quality: 0 days/year
- Water fluoridation: 0.66 mg/L
- Solid waste diversion rate: 59%
- Mosquito-borne disease risk: High
- Lyme disease risk: No data

**Perfomance Triad Measures**

- 7+ hours of sleep (weeknight/duty night): 47% | 38%
- 7+ hours of sleep (weekend or non-duty night): 71% | 69%
- 2+ days per week of resistance training: 81% | 81%
- 150+ minutes per week of aerobic activity: 88% | 89%
- 2+ servings of fruits per day: 29% | 30%
- 2+ servings of vegetables per day: 43% | 40%

**Environment Health Index Score**: -0.9 (<20th percentile)

#### Fort Sill

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

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Value</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,348</td>
<td>1,457</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>18</td>
<td>20</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.3</td>
<td>3.5</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.4</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>19</td>
<td>21</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>32</td>
<td>32</td>
<td>27</td>
<td>12–34</td>
</tr>
</tbody>
</table>

#### STIs: Chlamydia infection (rate per 1,000)

| Value | 15 | 12 | 21 | 8.9–43 |

**Environment Health Indicators⁴**

- Poor air quality: 38%
- Poor water quality: High
- Water fluoridation: Low
- Solid waste diversion rate: 69%
- Mosquito-borne disease risk: 89%
- Lyme disease risk: Low

**Perfomance Triad Measures**

- 7+ hours of sleep (weeknight/duty night): 31% | 38%
- 7+ hours of sleep (weekend or non-duty night): 65% | 69%
- Water fluoridation: 0.58 mg/L
- Solid waste diversion rate: 82% | 81%
- Mosquito-borne disease risk: High
- Lyme disease risk: Low

**Environment Health Index Score**: -2.0 (<20th percentile)
Installation Profile Summaries

Fort Stewart

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

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>994</td>
<td>1,046</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>17</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.8</td>
<td>3.7</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.1</td>
<td>10</td>
<td>9</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>19</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>29</td>
<td>29</td>
<td>27</td>
<td>12–34</td>
</tr>
</tbody>
</table>

STIs: Chlamydia infection (rate per 1,000) | 24 | 21 | 21 | 8.9–43 |

Chronic disease (%) | 15 | 19 | 17 | 11–33 |

ENVIRONMENTAL HEALTH INDICATORS

- Poor air quality: No data
- Poor water quality: 0 days/year
- Water fluoridation: 0.99 mg/L
- Solid waste diversion rate: 61%
- Mosquito-borne disease risk: High
- Lyme disease risk: No data
- Heat risk: 130 days/year

PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 35% / 38%
- 7+ hours of sleep (weekend or non-duty night): 66% / 69%
- 2+ days per week of resistance training: 81% / 81%
- 150+ minutes per week of aerobic activity: 89% / 89%
- 2+ servings of fruits per day: 29% / 30%
- 2+ servings of vegetables per day: 37% / 40%

Footnotes: See page 107.

Installation Health Index Score: -0.1 (40–49th percentile)

Fort Wainwright

Demographics: Approximately 6,400 AC Soldiers
88% <35 years old, 11% female
Main Healthcare Facility: Bassett Army Community Hospital

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>--</td>
<td>--</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>--</td>
<td>--</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>--</td>
<td>--</td>
<td>9</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>--</td>
<td>--</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>34</td>
<td>33</td>
<td>27</td>
<td>12–34</td>
</tr>
</tbody>
</table>

STIs: Chlamydia infection (rate per 1,000) | 20 | 17 | 21 | 8.9–43 |

Chronic disease (%) | -- | -- | 17 | 11–33 |

ENVIRONMENTAL HEALTH INDICATORS

- Poor air quality: 0%
- Poor water quality: 0 days/year
- Water fluoridation: No data
- Solid waste diversion rate: 0%
- Mosquito-borne disease risk: 0 days/year
- Lyme disease risk: No data
- Heat risk: 0 days/year

PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 37% / 38%
- 7+ hours of sleep (weekend or non-duty night): 71% / 69%
- 2+ days per week of resistance training: 82% / 81%
- 150+ minutes per week of aerobic activity: 89% / 89%
- 2+ servings of fruits per day: 29% / 30%
- 2+ servings of vegetables per day: 39% / 40%

Footnotes: See page 107.

Installation Health Index Score: Not Calculated

Footnotes: MHS GENESIS data were unavailable for these metrics.

Footnotes: See page 107.
### Installation Profile Summaries

#### Hawaii

Demographics: Approximately 19,000 AC Soldiers  
77% <35 years old, 19% female  
Main Healthcare Facility: Tripler Army Medical Center and Schofield Barracks Health Clinic

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Value</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,174</td>
<td>1,171</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>14</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.8</td>
<td>2.8</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.7</td>
<td>9.6</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>18</td>
<td>17</td>
<td>11–33</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>22</td>
<td>23</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>30</td>
<td>28</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>17</td>
<td>18</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

#### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night): 41%  
- 7+ hours of sleep (weekend or non-duty night): 70%  
- 2+ days per week of resistance training: 81%  
- 150+ minutes per week of aerobic activity: 89%  
- 2+ servings of fruits per day: 30%  
- 2+ servings of vegetables per day: 40%

Installation Health Index Score: 0.5 (60–69th percentile)

---

#### JB Elmendorf-Richardson

Demographics: Approximately 4,900 AC Soldiers  
88% <35 years old, 9.2% female  
Main Healthcare Facility: Joint Base Elmendorf-Richardson Health and Wellness Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Value</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>--</td>
<td>--</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>--</td>
<td>--</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>--</td>
<td>--</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>--</td>
<td>--</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>29</td>
<td>27</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>22</td>
<td>18</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>--</td>
<td>--</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

#### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night): 35%  
- 7+ hours of sleep (weekend or non-duty night): 69%  
- Water fluoridation: 0.46 mg/L  
- Solid waste diversion rate: 29%  
- Mosquito-borne disease risk: High  
- Lyme disease risk: No data  
- Heat risk: 8 days/year

Installation Health Index Score: Not Calculated

---

---

**Notes:**  
Footnotes: See page 107.
## JB Langley-Eustis

**Demographics:** Approximately 5,300 AC Soldiers  
71% <35 years old, 16% female  
Main Healthcare Facility: McDonald Army Health Clinic

### Installation Health Index Score

:\[ 
\text{安装健康指数分数} = -0.9 (~20^{th} 百分位) 
\]

### Installation Profile Summaries

#### Medical Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,533</td>
<td>1,492</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>16</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.9</td>
<td>3.0</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>9.8</td>
<td>9.2</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>21</td>
<td>21</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>21</td>
<td>22</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>16</td>
<td>15</td>
<td>21</td>
<td>8.9–43</td>
</tr>
</tbody>
</table>

#### Installation Army Performance Triad Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Percentage</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>38%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>66%</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>77%</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>87%</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>28%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>37%</td>
<td>40%</td>
<td></td>
</tr>
</tbody>
</table>

#### Environmental Health Indicators

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.76 mg/L
- Solid waste diversion rate: 55%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: Moderate
- Heat risk: 76 days/year

### Footnotes

- MHS GENESIS data were unavailable for these metrics.
- See page 107.

---

## JB Lewis-McChord

**Demographics:** Approximately 27,000 AC Soldiers  
80% <35 years old, 16% female  
Main Healthcare Facility: Madigan Army Medical Center

### Installation Health Index Score

:\[ 
\text{安装健康指数分数} = \text{未计算} 
\]

### Installation Profile Summaries

#### Medical Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>--</td>
<td>--</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>--</td>
<td>--</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>--</td>
<td>--</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>--</td>
<td>--</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>28</td>
<td>28</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>26</td>
<td>25</td>
<td>21</td>
<td>8.9–43</td>
</tr>
</tbody>
</table>

#### Installation Army Performance Triad Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Percentage</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>38%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>70%</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>82%</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>89%</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>31%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>39%</td>
<td>40%</td>
<td></td>
</tr>
</tbody>
</table>

#### Environmental Health Indicators

- Poor air quality: 11 days/year
- Poor water quality: 0 days/year
- Water fluoridation: No Data
- Solid waste diversion rate: 43%
- Mosquito-borne disease risk: Low
- Lyme disease risk: No Data
- Heat risk: 7 days/year

### Footnotes

- See page 107.

---
### JB Myer-Henderson Hall

**Demographics:** Approximately 2,100 AC Soldiers
- 77% <35 years old, 11% female
**Main Healthcare Facility:** Andrew Rader Army Health Clinic

#### MEDICAL METRICS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>963</td>
<td>982</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>16</td>
<td>17</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.4</td>
<td>3.2</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>7.9</td>
<td>9.0</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
<td>16</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>26</td>
<td>25</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>13</td>
<td>14</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>16</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

#### ENVIRONMENTAL HEALTH INDICATORS

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.70 mg/L
- Solid waste diversion rate: 50%
- Mosquito-borne disease risk: High
- Lyme disease risk: Moderate
- Heat risk: 64 days/year

#### PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 48% Army, 38% Installation
- 7+ hours of sleep (weekend or non-duty night): 77% Army, 69% Installation
- 2+ days per week of resistance training: 84% Army, 81% Installation
- 150+ minutes per week of aerobic activity: 91% Army, 89% Installation
- 2+ servings of fruits per day: 35% Army, 30% Installation
- 2+ servings of vegetables per day: 53% Army, 40% Installation

### JB San Antonio

**Demographics:** Approximately 7,800 AC Soldiers
- 61% <35 years old, 30% female
**Main Healthcare Facility:** San Antonio Military Medical Center

#### MEDICAL METRICS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,513</td>
<td>1,301</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>22</td>
<td>19</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.2</td>
<td>2.4</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>15</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>14</td>
<td>17</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>14</td>
<td>14</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>26</td>
<td>20</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

#### ENVIRONMENTAL HEALTH INDICATORS

- Poor air quality: 10 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.22 mg/L
- Solid waste diversion rate: 50%
- Mosquito-borne disease risk: High
- Lyme disease risk: Moderate
- Heat risk: 150 days/year

#### PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 36% Army, 38% Installation
- 7+ hours of sleep (weekend or non-duty night): 68% Army, 69% Installation
- 2+ days per week of resistance training: 77% Army, 81% Installation
- 150+ minutes per week of aerobic activity: 86% Army, 89% Installation
- 2+ servings of fruits per day: 33% Army, 30% Installation
- 2+ servings of vegetables per day: 47% Army, 40% Installation

---

Footnotes: See page 107.
Installation Profile Summaries

Presidio of Monterey

Demographics: Approximately 1,400 AC Soldiers
85% <35 years old, 24% female
Main Healthcare Facility: Presidio of Monterey Army Health Clinic

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>--</td>
<td>--</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>--</td>
<td>--</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>--</td>
<td>--</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>--</td>
<td>--</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>19</td>
<td>19</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>*</td>
<td>*</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>--</td>
<td>--</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- Poor air quality: 15 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.25 mg/L
- Solid waste diversion rate: 0%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: No Data
- Heat risk: 0 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 44% vs 38%
- 7+ hours of sleep (weekend or non-duty night): 83% vs 69%
- 2+ days per week of resistance training: 80% vs 81%
- 150+ minutes per week of aerobic activity: 92% vs 89%
- 2+ servings of fruits per day: 46% vs 30%
- 2+ servings of vegetables per day: 60% vs 40%

**Installation Health Index Score**: Not Calculated

USAG West Point

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

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,217</td>
<td>1,121</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>12</td>
<td>11</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.1</td>
<td>2.2</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>9</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>15</td>
<td>15</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>12</td>
<td>15</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>*</td>
<td>*</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>26</td>
<td>21</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- Poor air quality: 52%
- Poor water quality: 0 days/year
- Water fluoridation: High
- Solid waste diversion rate: Moderate
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: High
- Heat risk: 27 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 38% vs 38%
- 7+ hours of sleep (weekend or non-duty night): 70% vs 69%
- 2+ days per week of resistance training: 74% vs 81%
- 150+ minutes per week of aerobic activity: 84% vs 89%
- 2+ servings of fruits per day: 35% vs 30%
- 2+ servings of vegetables per day: 43% vs 40%

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

Footnotes: See page 107.
- MHS GENESIS data were unavailable for these metrics.
  * Data supressed.

Installation Health Index Score: Not Calculated

Footnotes: See page 107.
Personnel and medical data were not available for cadets; estimates are limited to permanent party AC Soldiers.
* Data supressed.
Installation Profile Summaries

Installations Outside the United States

- [Map of Installations Outside the United States]

- 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

- Installation Army Health Index Score: 1.4 (≥90th percentile)

## MEDICAL METRICS

<table>
<thead>
<tr>
<th></th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>940</td>
<td>935</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.0</td>
<td>2.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>5.1</td>
<td>5.0</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>22</td>
<td>21</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>25</td>
<td>25</td>
<td>27</td>
<td>12–34</td>
</tr>
</tbody>
</table>

**STIs: Chlamydia infection (rate per 1,000)**

- 17
- 19
- 21
- 8.9–43

**Chronic disease (%)**

- 17
- 16
- 17
- 11–33

### Footnotes:
See page 107.
Installation Profile Summaries

**USAG Ansbach**

Demographics: Approximately 1,100 AC Soldiers  
82% <35 years old, 13% female  
Main Healthcare Facility: Ansbach Army Health Clinic; Landstuhl Regional Medical Center

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>954</td>
<td>982</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>15</td>
<td>14</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.0</td>
<td>3.7</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>4.6</td>
<td>5.5</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>15</td>
<td>17</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>30</td>
<td>28</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>*</td>
<td>*</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>12</td>
<td>15</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 31% 38%
- 7+ hours of sleep (weekend/non-duty night): 70% 69%
- 2+ days per week of resistance training: 79% 81%
- 150+ minutes per week of aerobic activity: 88% 89%
- 2+ servings of fruits per day: 21% 30%
- 2+ servings of vegetables per day: 30% 40%

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 1 days/year
- Poor water quality: 3 days/year
- Water fluoridation: 0.70 mg/L
- Solid waste diversion rate: 63%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: High
- Heat risk: 2 days/year

Installation Health Index Score: **1.9** (≥90th percentile)

Footnotes: See page 107.

* Data suppressed

**USAG Bavaria**

Demographics: Approximately 10,000 AC Soldiers  
84% <35 years old, 12% female  
Main Healthcare Facility: U.S. Army Health Clinic Grafenwoehr

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>986</td>
<td>1,036</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.2</td>
<td>4.0</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>4.4</td>
<td>5.9</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>32</td>
<td>30</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>22</td>
<td>20</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>13</td>
<td>17</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 37% 38%
- 7+ hours of sleep (weekend/non-duty night): 69% 69%
- Water fluoridation: 0.60 mg/L
- Solid waste diversion rate: 40%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: High
- Heat risk: 1+ days per week

Installation Health Index Score: **1.2** (80–89th percentile)

Footnotes: See page 107.
Installation Profile Summaries

**USAG Daegu**

**Demographics:** Approximately 3,200 AC Soldiers
78% <35 years old, 20% female
Main Healthcare Facility: Wood Army Health Clinic

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,141</td>
<td>1,132</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.1</td>
<td>3.3</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.8</td>
<td>7.7</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>19</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>24</td>
<td>25</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>38</td>
<td>29</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**Performance Triad Measures**

- 7+ hours of sleep (weeknight/duty night): 32% (Installation) 38% (Army)
- 7+ hours of sleep (weekend or non-duty night): 65% (Installation) 69% (Army)
- 2+ days per week of resistance training: 81% (Installation) 81% (Army)
- 150+ minutes per week of aerobic activity: 88% (Installation) 89% (Army)
- 2+ servings of fruits per day: 27% (Installation) 30% (Army)
- 2+ servings of vegetables per day: 37% (Installation) 40% (Army)

**Environmental Health Indicators**

- Poor air quality: 39 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.71 mg/L
- Solid waste diversion rate: 66%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: Moderate
- Heat risk: 49 days/year

Installation Health Index Score: 0.3 (60–69th percentile)

**USAG Humphreys**

**Demographics:** Approximately 8,000 AC Soldiers
78% <35 years old, 19% female
Main Healthcare Facility: Brian D. Allgood Army Community Hospital

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,212</td>
<td>1,193</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.1</td>
<td>3.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.6</td>
<td>7.5</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
<td>18</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>43</td>
<td>34</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>16</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**Performance Triad Measures**

- 7+ hours of sleep (weeknight/duty night): 36% (Installation) 38% (Army)
- 7+ hours of sleep (weekend or non-duty night): 69% (Installation) 69% (Army)
- Water fluoridation: 0.00 mg/L
- Solid waste diversion rate: 81%
- Mosquito-borne disease risk: 49 days/year
- Lyme disease risk: Moderate
- Heat risk: 37 days/year

Installation Health Index Score: 0.3 (60–69th percentile)

Footnotes: See page 107.
**USAG Rheinland-Pfalz**

Demographics: Approximately 5,600 AC Soldiers
72% <35 years old, 22% female

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

### Installation Profile Summaries

<table>
<thead>
<tr>
<th>Medical Metrics</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,262</td>
<td>1,203</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>20</td>
<td>19</td>
<td>18</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.7</td>
<td>4.9</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>12</td>
<td>12</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>19</td>
<td>20</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>24</td>
<td>26</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>25</td>
<td>25</td>
<td>21</td>
<td>8.9–43</td>
</tr>
</tbody>
</table>

### Environmental Health Indicators

- Poor air quality: 3 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.91 mg/L
- Solid waste diversion rate: 38%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: High
- Heat risk: 9 days/year

**Performance Triad Measures**

- 7+ hours of sleep (weeknight/duty night): Installation 38% Army 38%
- 7+ hours of sleep (weekend or non-duty night): Installation 70% Army 69%
- 2+ days per week of resistance training: Installation 76% Army 81%
- 150+ minutes per week of aerobic activity: Installation 86% Army 89%
- 2+ servings of fruits per day: Installation 30% Army 30%
- 2+ servings of vegetables per day: Installation 39% Army 40%

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

Footnotes: See page 107.

---

**USAG Stuttgart**

Demographics: Approximately 1,600 AC Soldiers
53% <35 years old, 13% female

Main Healthcare Facility: The Stuttgart Army Health Clinic

### Installation Profile Summaries

<table>
<thead>
<tr>
<th>Medical Metrics</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,129</td>
<td>1,027</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.1</td>
<td>2.5</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>11</td>
<td>7.4</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>23</td>
<td>20</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>24</td>
<td>27</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>*</td>
<td>*</td>
<td>21</td>
<td>8.9–43</td>
</tr>
</tbody>
</table>

### Environmental Health Indicators

- Poor air quality: 2 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.70 mg/L
- Solid waste diversion rate: 30%
- Mosquito-borne disease risk: Moderate
- Lyme disease risk: High
- Heat risk: 6 days/year

**Performance Triad Measures**

- 7+ hours of sleep (weeknight/duty night): Installation 45% Army 38%
- 7+ hours of sleep (weekend or non-duty night): Installation 71% Army 69%
- 2+ days per week of resistance training: Installation 83% Army 81%
- 150+ minutes per week of aerobic activity: Installation 89% Army 89%
- 2+ servings of fruits per day: Installation 32% Army 30%
- 2+ servings of vegetables per day: Installation 45% Army 40%

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

Footnotes: See page 107.

*Data suppressed
### USAG Vicenza

**Demographics:** Approximately 3,500 AC Soldiers
- 80% <35 years old, 11% female

**Main Healthcare Facility:** Vicenza Army Health Clinic

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>919</td>
<td>973</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.2</td>
<td>3.1</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>5.7</td>
<td>6.7</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>13</td>
<td>14</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>29</td>
<td>28</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>15</td>
<td>15</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>12</td>
<td>15</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- **Poor air quality:** 100 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.10 mg/L
- **Solid waste diversion rate:** 56%
- **Mosquito-borne disease risk:** Moderate
- **Lyme disease risk:** Moderate
- **Heat risk:** 50 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 38% (Installation), 38% (Army)
- 7+ hours of sleep (weekend/non-duty night): 70% (Installation), 69% (Army)
- 2+ days per week of resistance training: 86% (Installation), 81% (Army)
- 150+ minutes per week of aerobic activity: 92% (Installation), 89% (Army)
- 2+ servings of fruits per day: 29% (Installation), 30% (Army)
- 2+ servings of vegetables per day: 39% (Installation), 40% (Army)

**Installation Health Index Score:** 1.8 (≥90th percentile)

### USAG Wiesbaden

**Demographics:** Approximately 1,400 AC Soldiers
- 72% <35 years old, 18% female

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

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,059</td>
<td>1,021</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>16</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.5</td>
<td>4.5</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>9.0</td>
<td>8.6</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>19</td>
<td>19</td>
<td>18</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>24</td>
<td>24</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>17</td>
<td>16</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**
- **Poor air quality:** 10 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** High
- **Solid waste diversion rate:** Moderate
- **Mosquito-borne disease risk:** High
- **Lyme disease risk:** High
- **Heat risk:** 8 days/year

**PERFORMANCE TRIAD MEASURES**
- 7+ hours of sleep (weeknight/duty night): 39% (Installation), 38% (Army)
- 7+ hours of sleep (weekend/non-duty night): 72% (Installation), 69% (Army)
- 2+ days per week of resistance training: 77% (Installation), 81% (Army)
- 150+ minutes per week of aerobic activity: 89% (Installation), 89% (Army)
- 2+ servings of fruits per day: 27% (Installation), 30% (Army)
- 2+ servings of vegetables per day: 39% (Installation), 40% (Army)

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

---

Footnotes: See page 107.
### Installation Profile Summaries

#### USAG Yongsan-Casey

**Demographics:** Approximately 5,100 AC Soldiers
75% <35 years old, 17% female

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

<table>
<thead>
<tr>
<th>MEDICAL METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,149</td>
<td>1,130</td>
<td>1,189</td>
<td>919–1,776</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>9.7–24</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.9</td>
<td>2.9</td>
<td>3.2</td>
<td>1.4–4.8</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>6.9</td>
<td>7.5</td>
<td>9.0</td>
<td>4.4–19</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>13–27</td>
</tr>
<tr>
<td>Tobacco product use (%)</td>
<td>26</td>
<td>26</td>
<td>27</td>
<td>12–34</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>32</td>
<td>28</td>
<td>21</td>
<td>8.9–43</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>16</td>
<td>17</td>
<td>17</td>
<td>11–33</td>
</tr>
</tbody>
</table>

#### Performance Triad Measures

<table>
<thead>
<tr>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>34%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>67%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>80%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>87%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>28%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>38%</td>
</tr>
</tbody>
</table>

#### Performance Triad Measures

<table>
<thead>
<tr>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>34%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>67%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>80%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>87%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>28%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>38%</td>
</tr>
</tbody>
</table>

#### Environmental Health Indicators

<table>
<thead>
<tr>
<th>Yongsan</th>
<th>Casey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor air quality:</td>
<td>45 days/year</td>
</tr>
<tr>
<td>Poor water quality:</td>
<td>0 days/year</td>
</tr>
<tr>
<td>Water fluoridation:</td>
<td>0.25 mg/L</td>
</tr>
<tr>
<td>Solid waste diversion rate:</td>
<td>66%</td>
</tr>
<tr>
<td>Mosquito-borne disease risk:</td>
<td>High</td>
</tr>
<tr>
<td>Lyme disease risk:</td>
<td>No data</td>
</tr>
<tr>
<td>Heat risk:</td>
<td>37 days/year</td>
</tr>
</tbody>
</table>

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

Footnotes: See page 107.
## Installation Profile Summaries

### At a glance...

#### Profiles (2020)

<table>
<thead>
<tr>
<th>Installation</th>
<th>End-strength</th>
<th>&lt;35 years old (%)</th>
<th>Female population (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Belvoir</td>
<td>3,200</td>
<td>45</td>
<td>23</td>
</tr>
<tr>
<td>Fort Benning</td>
<td>22,000</td>
<td>85</td>
<td>6.7</td>
</tr>
<tr>
<td>Fort Bliss</td>
<td>2,600</td>
<td>81</td>
<td>15</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>45,000</td>
<td>77</td>
<td>13</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>28,000</td>
<td>85</td>
<td>12</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>25,000</td>
<td>84</td>
<td>14</td>
</tr>
<tr>
<td>Fort Drum</td>
<td>15,000</td>
<td>86</td>
<td>12</td>
</tr>
<tr>
<td>Fort Gordon</td>
<td>9,000</td>
<td>74</td>
<td>20</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>36,000</td>
<td>82</td>
<td>16</td>
</tr>
<tr>
<td>Fort Huachuca</td>
<td>4,100</td>
<td>78</td>
<td>17</td>
</tr>
<tr>
<td>Fort Irwin</td>
<td>4,100</td>
<td>76</td>
<td>15</td>
</tr>
<tr>
<td>Fort Jackson</td>
<td>9,300</td>
<td>86</td>
<td>27</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>4,600</td>
<td>63</td>
<td>23</td>
</tr>
<tr>
<td>Fort Leavenworth</td>
<td>3,100</td>
<td>48</td>
<td>16</td>
</tr>
<tr>
<td>Fort Lee</td>
<td>6,700</td>
<td>76</td>
<td>25</td>
</tr>
<tr>
<td>Fort Leonard Wood</td>
<td>10,000</td>
<td>85</td>
<td>22</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>4,000</td>
<td>62</td>
<td>20</td>
</tr>
<tr>
<td>Fort Polk</td>
<td>7,700</td>
<td>82</td>
<td>13</td>
</tr>
<tr>
<td>Fort Riley</td>
<td>15,000</td>
<td>85</td>
<td>13</td>
</tr>
<tr>
<td>Fort Rucker</td>
<td>2,800</td>
<td>65</td>
<td>15</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>12,000</td>
<td>85</td>
<td>16</td>
</tr>
<tr>
<td>Fort Stewart</td>
<td>20,000</td>
<td>84</td>
<td>16</td>
</tr>
</tbody>
</table>

#### INSTALLATIONS OUTSIDE THE UNITED STATES

<table>
<thead>
<tr>
<th>Installation</th>
<th>End-strength</th>
<th>&lt;35 years old (%)</th>
<th>Female population (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Wainwright</td>
<td>6,400</td>
<td>88</td>
<td>11</td>
</tr>
<tr>
<td>Hawaii</td>
<td>19,000</td>
<td>77</td>
<td>19</td>
</tr>
<tr>
<td>JB Elmendorf-Richardson</td>
<td>4,900</td>
<td>88</td>
<td>9.2</td>
</tr>
<tr>
<td>JB Langley-Eustis</td>
<td>5,300</td>
<td>71</td>
<td>16</td>
</tr>
<tr>
<td>JB Lewis-McChord</td>
<td>27,000</td>
<td>80</td>
<td>16</td>
</tr>
<tr>
<td>JB Myer-Henderson Hall</td>
<td>2,100</td>
<td>77</td>
<td>11</td>
</tr>
<tr>
<td>JB San Antonio</td>
<td>7,800</td>
<td>61</td>
<td>30</td>
</tr>
<tr>
<td>Presidio of Monterey</td>
<td>1,400</td>
<td>85</td>
<td>24</td>
</tr>
<tr>
<td>USAG West Point</td>
<td>1,500</td>
<td>54</td>
<td>20</td>
</tr>
</tbody>
</table>

#### Japan

- USAG Ansbach: 1,100, 82, 13
- USAG Bavaria: 10,000, 84, 12
- USAG Daegu: 3,200, 78, 20
- USAG Humphreys: 8,000, 78, 19
- USAG Rheinland-Pfalz: 5,600, 72, 22
- USAG Stuttgart: 1,600, 53, 13
- USAG Vicenza: 3,500, 80, 11
- USAG Wiesbaden: 1,400, 72, 18
- USAG Yongsan-Casey: 5,100, 75, 17

---

Footnotes: See page 107.
### Installation Profile Summaries

#### Selected Medical Metrics

Presented values are adjusted for age and sex

<table>
<thead>
<tr>
<th>Installation</th>
<th>Injury rate per 1,000</th>
<th>Behavioral health (%)</th>
<th>Sleep disorder (%)</th>
<th>Tobacco product use (%)</th>
<th>Obesity (%)</th>
<th>STIs: Chlamydia infection (rate per 1,000)</th>
<th>Tobacco use (%)</th>
<th>Chronic disease (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Belvoir</td>
<td>1,140</td>
<td>21</td>
<td>3.0</td>
<td>13</td>
<td>25</td>
<td>19</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Fort Benning</td>
<td>1,393</td>
<td>13</td>
<td>2.2</td>
<td>9.1</td>
<td>17</td>
<td>28</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Fort Bliss</td>
<td>1,068</td>
<td>17</td>
<td>4.3</td>
<td>12</td>
<td>20</td>
<td>28</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>1,182</td>
<td>12</td>
<td>3.1</td>
<td>11</td>
<td>17</td>
<td>28</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>1,226</td>
<td>15</td>
<td>3.1</td>
<td>8.7</td>
<td>20</td>
<td>31</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>1,122</td>
<td>15</td>
<td>4.3</td>
<td>8.4</td>
<td>16</td>
<td>30</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>Fort Drum</td>
<td>1,179</td>
<td>12</td>
<td>3.1</td>
<td>8.2</td>
<td>21</td>
<td>29</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Fort Gordon</td>
<td>1,312</td>
<td>14</td>
<td>2.1</td>
<td>7.0</td>
<td>24</td>
<td>22</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>1,218</td>
<td>18</td>
<td>4.4</td>
<td>11</td>
<td>10</td>
<td>29</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>Fort Huachuca</td>
<td>1,334</td>
<td>10</td>
<td>1.6</td>
<td>9.3</td>
<td>18</td>
<td>25</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Fort Irwin</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Fort Jackson</td>
<td>1,078</td>
<td>15</td>
<td>1.9</td>
<td>8.3</td>
<td>16</td>
<td>25</td>
<td>9.0</td>
<td>17</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>1,167</td>
<td>16</td>
<td>2.4</td>
<td>12</td>
<td>19</td>
<td>24</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Fort Leavenworth</td>
<td>1,169</td>
<td>17</td>
<td>2.8</td>
<td>11</td>
<td>20</td>
<td>24</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Fort Lee</td>
<td>1,597</td>
<td>16</td>
<td>2.7</td>
<td>9.3</td>
<td>19</td>
<td>25</td>
<td>7.0</td>
<td>20</td>
</tr>
<tr>
<td>Fort Leonard Wood</td>
<td>1,378</td>
<td>14</td>
<td>2.0</td>
<td>10</td>
<td>18</td>
<td>27</td>
<td>7.7</td>
<td>19</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>1,109</td>
<td>18</td>
<td>2.4</td>
<td>12</td>
<td>25</td>
<td>22</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Fort Polk</td>
<td>1,414</td>
<td>19</td>
<td>4.4</td>
<td>12</td>
<td>19</td>
<td>33</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Fort Riley</td>
<td>1,222</td>
<td>15</td>
<td>4.2</td>
<td>9.0</td>
<td>19</td>
<td>32</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>Fort Rucker</td>
<td>1,498</td>
<td>9.6</td>
<td>1.5</td>
<td>12</td>
<td>18</td>
<td>19</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>1,457</td>
<td>20</td>
<td>3.5</td>
<td>12</td>
<td>21</td>
<td>32</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Fort Stewart</td>
<td>1,046</td>
<td>17</td>
<td>3.7</td>
<td>10</td>
<td>19</td>
<td>29</td>
<td>21</td>
<td>20</td>
</tr>
</tbody>
</table>

**Footnotes:** See page 107.
-- MHS GENESIS data were unavailable for these metrics.

### INSTALLATIONS OUTSIDE THE UNITED STATES

<table>
<thead>
<tr>
<th>Installation</th>
<th>Injury rate per 1,000</th>
<th>Behavioral health (%)</th>
<th>Sleep disorder (%)</th>
<th>Tobacco product use (%)</th>
<th>Obesity (%)</th>
<th>STIs: Chlamydia infection (rate per 1,000)</th>
<th>Tobacco use (%)</th>
<th>Chronic disease (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Wainwright</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Hawaii</td>
<td>1,171</td>
<td>14</td>
<td>2.8</td>
<td>9.6</td>
<td>18</td>
<td>23</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>JB Elmendorf-Richardson</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>JB Langley-Eustis</td>
<td>1,492</td>
<td>16</td>
<td>3.0</td>
<td>9.2</td>
<td>21</td>
<td>22</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>JB Lewis-McChord</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>JB Myer-Henderson Hall</td>
<td>982</td>
<td>17</td>
<td>3.2</td>
<td>9.0</td>
<td>16</td>
<td>25</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>JB San Antonio</td>
<td>1,301</td>
<td>19</td>
<td>2.4</td>
<td>12</td>
<td>18</td>
<td>17</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>Presidio of Monterey</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>USAG West Point</td>
<td>1,121</td>
<td>11</td>
<td>2.2</td>
<td>9</td>
<td>15</td>
<td>15</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>

**Footnotes:** See page 107.
-- MHS GENESIS data were unavailable for these metrics.
* Data suppressed

**Army**

<table>
<thead>
<tr>
<th>Injury rate per 1,000</th>
<th>Behavioral health (%)</th>
<th>Sleep disorder (%)</th>
<th>Tobacco product use (%)</th>
<th>Obesity (%)</th>
<th>STIs: Chlamydia infection (rate per 1,000)</th>
<th>Tobacco use (%)</th>
<th>Chronic disease (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,189</td>
<td>15</td>
<td>3.2</td>
<td>9.0</td>
<td>18</td>
<td>27</td>
<td>21</td>
<td>17</td>
</tr>
</tbody>
</table>

**Footnotes:** See page 107.
-- MHS GENESIS data were unavailable for these metrics.
* Data suppressed
### Environmental Health Indicators

<table>
<thead>
<tr>
<th>Installation</th>
<th>Poor air quality (days per year)</th>
<th>Poor water quality (days per year)</th>
<th>Solid waste diversion rate (%)</th>
<th>Mosquito-borne disease risk</th>
<th>Lyme disease risk</th>
<th>Heat risk (days per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Belvoir</td>
<td>0</td>
<td>0</td>
<td>0.70</td>
<td>56</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Fort Benning</td>
<td>1</td>
<td>0</td>
<td>0.60</td>
<td>23</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Bliss</td>
<td>18</td>
<td>0</td>
<td>0.83</td>
<td>51</td>
<td>Moderate</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>0</td>
<td>0</td>
<td>0.76</td>
<td>25</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>0</td>
<td>0</td>
<td>0.68</td>
<td>48</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>7</td>
<td>0</td>
<td>0.38</td>
<td>44</td>
<td>Low</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Drum</td>
<td>0</td>
<td>0</td>
<td>0.71</td>
<td>59</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Fort Gordon</td>
<td>4</td>
<td>0</td>
<td>0.71</td>
<td>25</td>
<td>High</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>1</td>
<td>0</td>
<td>0.20</td>
<td>42</td>
<td>Moderate</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Huachuca</td>
<td>2</td>
<td>0</td>
<td>0.65</td>
<td>0</td>
<td>Moderate</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Irwin</td>
<td>27</td>
<td>0</td>
<td>1.46</td>
<td>20</td>
<td>Moderate</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Jackson</td>
<td>1</td>
<td>0</td>
<td>0.53</td>
<td>30</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>0</td>
<td>0</td>
<td>0.83</td>
<td>37</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Leavenworth</td>
<td>0</td>
<td>0</td>
<td>0.45</td>
<td>30</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Lee</td>
<td>No Data</td>
<td>0</td>
<td>0.61</td>
<td>37</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Fort Leonard Wood</td>
<td>No Data</td>
<td>0</td>
<td>0.90</td>
<td>40</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>2</td>
<td>0</td>
<td>0.64</td>
<td>16</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Fort Polk</td>
<td>No Data</td>
<td>0</td>
<td>0.90</td>
<td>38</td>
<td>High</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Riley</td>
<td>No Data</td>
<td>0</td>
<td>0.84</td>
<td>46</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Rucker</td>
<td>No Data</td>
<td>0</td>
<td>0.66</td>
<td>59</td>
<td>High</td>
<td>No Data</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>1</td>
<td>0</td>
<td>0.58</td>
<td>38</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Fort Stewart</td>
<td>No Data</td>
<td>0</td>
<td>0.99</td>
<td>61</td>
<td>High</td>
<td>No Data</td>
</tr>
</tbody>
</table>

### INSTALLATIONS OUTSIDE THE UNITED STATES

<table>
<thead>
<tr>
<th>Installation</th>
<th>Poor air quality (days per year)</th>
<th>Poor water quality (days per year)</th>
<th>Solid waste diversion rate (%)</th>
<th>Mosquito-borne disease risk</th>
<th>Lyme disease risk</th>
<th>Heat risk (days per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Wainwright</td>
<td>37</td>
<td>0</td>
<td>0.40</td>
<td>Low</td>
<td>No Data</td>
<td>0</td>
</tr>
<tr>
<td>Hawaii</td>
<td>0</td>
<td>0</td>
<td>0.64</td>
<td>29</td>
<td>High</td>
<td>No Data</td>
</tr>
<tr>
<td>JB Elmendorf-Richardson</td>
<td>0</td>
<td>0</td>
<td>0.46</td>
<td>10</td>
<td>Low</td>
<td>0</td>
</tr>
<tr>
<td>JB Langley-Eustis</td>
<td>0</td>
<td>0</td>
<td>0.76</td>
<td>55</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>JB Lewis-McChord</td>
<td>11</td>
<td>0</td>
<td>0.84</td>
<td>43</td>
<td>Low</td>
<td>No Data</td>
</tr>
<tr>
<td>JB Myer-Henderson Hall</td>
<td>0</td>
<td>0</td>
<td>0.70</td>
<td>50</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>JB San Antonio</td>
<td>10</td>
<td>0</td>
<td>0.22</td>
<td>38</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Presidio of Monterey</td>
<td>15</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td>Moderate</td>
<td>No Data</td>
</tr>
<tr>
<td>USAG West Point</td>
<td>0</td>
<td>0</td>
<td>0.61</td>
<td>52</td>
<td>Moderate</td>
<td>High</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Installation</th>
<th>Poor air quality (days per year)</th>
<th>Poor water quality (days per year)</th>
<th>Solid waste diversion rate (%)</th>
<th>Mosquito-borne disease risk</th>
<th>Lyme disease risk</th>
<th>Heat risk (days per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>10</td>
<td>0</td>
<td>1.03</td>
<td>59</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>USAG Ansbach</td>
<td>1</td>
<td>3</td>
<td>0.70</td>
<td>63</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>USAG Bavaria</td>
<td>0</td>
<td>365</td>
<td>0.60</td>
<td>62</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>USAG Daegu</td>
<td>39</td>
<td>0</td>
<td>0.71</td>
<td>66</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>USAG Humphreys</td>
<td>119</td>
<td>0</td>
<td>0.00</td>
<td>72</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>USAG Rheinland-Pfalz</td>
<td>3</td>
<td>0</td>
<td>0.91</td>
<td>38</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>USAG Stuttgart</td>
<td>2</td>
<td>0</td>
<td>0.70</td>
<td>54</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>USAG Vicenza</td>
<td>100</td>
<td>0</td>
<td>0.10</td>
<td>56</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>USAG Wiesbaden</td>
<td>10</td>
<td>0</td>
<td>0.00</td>
<td>58</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>USAG Yongsan</td>
<td>45</td>
<td>0</td>
<td>0.25</td>
<td>66</td>
<td>High</td>
<td>No Data</td>
</tr>
<tr>
<td>Camp Casey</td>
<td>57</td>
<td>0</td>
<td>0.29</td>
<td>42</td>
<td>No Data</td>
<td>No Data</td>
</tr>
</tbody>
</table>

Footnotes: See page 107.
### Installation Profile Summaries

#### Performance Triad

<table>
<thead>
<tr>
<th>Installation</th>
<th>7+ hours of sleep (weeknights) (%)</th>
<th>7+ hours of sleep (weekends) (%)</th>
<th>2+ days per week of resistance training (%)</th>
<th>150+ minutes per week of aerobic activity (%)</th>
<th>2+ servings of fruits per day (%)</th>
<th>2+ servings of vegetables per day (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Belvoir</td>
<td>43</td>
<td>71</td>
<td>75</td>
<td>85</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>Fort Benning</td>
<td>39</td>
<td>69</td>
<td>83</td>
<td>88</td>
<td>36</td>
<td>47</td>
</tr>
<tr>
<td>Fort Bliss</td>
<td>35</td>
<td>66</td>
<td>80</td>
<td>89</td>
<td>28</td>
<td>36</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>40</td>
<td>69</td>
<td>84</td>
<td>90</td>
<td>34</td>
<td>43</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>38</td>
<td>70</td>
<td>84</td>
<td>91</td>
<td>30</td>
<td>39</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>38</td>
<td>69</td>
<td>82</td>
<td>89</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td>Fort Drum</td>
<td>36</td>
<td>68</td>
<td>84</td>
<td>91</td>
<td>30</td>
<td>38</td>
</tr>
<tr>
<td>Fort Gordon</td>
<td>34</td>
<td>69</td>
<td>77</td>
<td>87</td>
<td>33</td>
<td>44</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>33</td>
<td>66</td>
<td>80</td>
<td>88</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>Fort Huachuca</td>
<td>41</td>
<td>74</td>
<td>81</td>
<td>91</td>
<td>30</td>
<td>41</td>
</tr>
<tr>
<td>Fort Irwin</td>
<td>35</td>
<td>67</td>
<td>83</td>
<td>90</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td>Fort Jackson</td>
<td>33</td>
<td>64</td>
<td>81</td>
<td>88</td>
<td>30</td>
<td>41</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>46</td>
<td>69</td>
<td>79</td>
<td>87</td>
<td>30</td>
<td>44</td>
</tr>
<tr>
<td>Fort Leavenworth</td>
<td>45</td>
<td>71</td>
<td>77</td>
<td>89</td>
<td>33</td>
<td>47</td>
</tr>
<tr>
<td>Fort Lee</td>
<td>32</td>
<td>61</td>
<td>78</td>
<td>88</td>
<td>26</td>
<td>34</td>
</tr>
<tr>
<td>Fort Leonard Wood</td>
<td>35</td>
<td>67</td>
<td>83</td>
<td>90</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>Fort Meade</td>
<td>41</td>
<td>74</td>
<td>77</td>
<td>87</td>
<td>30</td>
<td>44</td>
</tr>
<tr>
<td>Fort Polk</td>
<td>37</td>
<td>68</td>
<td>84</td>
<td>90</td>
<td>30</td>
<td>38</td>
</tr>
<tr>
<td>Fort Riley</td>
<td>37</td>
<td>71</td>
<td>81</td>
<td>88</td>
<td>28</td>
<td>36</td>
</tr>
<tr>
<td>Fort Rucker</td>
<td>47</td>
<td>71</td>
<td>81</td>
<td>88</td>
<td>29</td>
<td>43</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>31</td>
<td>65</td>
<td>82</td>
<td>90</td>
<td>26</td>
<td>35</td>
</tr>
<tr>
<td>Fort Stewart</td>
<td>35</td>
<td>66</td>
<td>81</td>
<td>89</td>
<td>29</td>
<td>37</td>
</tr>
</tbody>
</table>

*Army 38 69 81 89 30 40

Footnotes: See page 107.

### INSTALLATIONS OUTSIDE THE UNITED STATES

<table>
<thead>
<tr>
<th>Installation</th>
<th>7+ hours of sleep (weeknights) (%)</th>
<th>7+ hours of sleep (weekends) (%)</th>
<th>2+ days per week of resistance training (%)</th>
<th>150+ minutes per week of aerobic activity (%)</th>
<th>2+ servings of fruits per day (%)</th>
<th>2+ servings of vegetables per day (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>41</td>
<td>70</td>
<td>81</td>
<td>89</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>JB Elmendorf-Richardson</td>
<td>35</td>
<td>69</td>
<td>82</td>
<td>89</td>
<td>32</td>
<td>37</td>
</tr>
<tr>
<td>JB Langley-Eustis</td>
<td>38</td>
<td>66</td>
<td>77</td>
<td>87</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>JB Lewis-McChord</td>
<td>38</td>
<td>70</td>
<td>82</td>
<td>89</td>
<td>31</td>
<td>39</td>
</tr>
<tr>
<td>JB Myer-Henderson Hall</td>
<td>48</td>
<td>77</td>
<td>84</td>
<td>91</td>
<td>35</td>
<td>53</td>
</tr>
<tr>
<td>JB San Antonio</td>
<td>36</td>
<td>68</td>
<td>77</td>
<td>86</td>
<td>33</td>
<td>47</td>
</tr>
<tr>
<td>Presidio of Monterey</td>
<td>44</td>
<td>83</td>
<td>80</td>
<td>92</td>
<td>46</td>
<td>60</td>
</tr>
<tr>
<td>USAG West Point</td>
<td>38</td>
<td>70</td>
<td>74</td>
<td>84</td>
<td>35</td>
<td>43</td>
</tr>
</tbody>
</table>

*Army 38 69 81 89 30 40

Footnotes: See page 107.
METHODS

I. Methodological and Data Updates

The 2021 edition of Health of the Force includes updates to methods and data that limit direct comparison to prior reports. Changes to this report, which impacted multiple metrics, are summarized below. Changes affecting a specific metric are included in the method summary for that metric.

- The Coronavirus Disease 2019 (COVID-19) pandemic and the Army’s public health response had dramatic influences on health care and healthcare utilization patterns. The 2021 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 metrics by quarter within 2020, and annually over the previous 4 years, were also assessed.

- 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.

- Population ‘at a glance’ end-strength numbers, which had been based on December Defense Manpower Data Center (DMDC) rosters in previous Health of the Force reports, were estimated using person-time to better align with other population estimates used in the report. The person-time estimates provide a more accurate accounting of the average population during the calendar year.

- Installation assignments for Soldiers stationed in South Korea were modified to account for the restructuring of the U.S. Army presence in the region. Specifically, U.S. Army Garrison (USAG) Red Cloud was closed; nearby installations such as Camp Casey, which were previously grouped under USAG Red Cloud for Health of the Force reporting, were merged with USAG Yongsan to form USAG Yongsan-Casey. All other changes in Soldiers’ installation affiliation were captured based on unit ZIP codes.

- The injury, behavioral health (BH), substance use disorder, sleep disorder, obesity, heat illness, and chronic disease medical metrics, as well as the newly added COVID-19 hospitalizations metric, were not reported for installations that transitioned electronic medical record systems from the Armed Forces Health Longitudinal Technology Application to the Military Health System (MHS) GENESIS electronic health record system. For the 2020 Health of the Force, Joint Base (JB) Lewis-McChord and Presidio of Monterey were excluded from these metrics, and in the 2021 edition of Health of the Force, Fort Irwin, Fort Wainwright, and JB Elmendorf-Richardson were additionally impacted. All other Active Component (AC) demographics and metrics available for these installations were reported in the installation profile pages.
II. AC Soldier Population and Installation Selection

Demographic summaries (i.e., age, sex, race, and ethnicity) include all AC Soldiers at installations affected by the MHS GENESIS transition. AC Soldier demographics were obtained from 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 2020) 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 population 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 contributed 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 U.S. Bureau of Labor Statistics (BLS) data for employed U.S. adults 18 to 62 years old (BLS 2021a). Age 62 was used as a cut-point based on Army Regulation (AR), which sets age limits for active service (AR 600-8-24 and AR 135-180) (DA 2020c, DA 2015b).

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, 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 U.S. Centers for Disease Control and Prevention (CDC), the Robert Wood Johnson Foundation, and the United Health Foundation. For the AC Soldier population, 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 2018).

Data used to calculate medical metric estimates were abstracted from the MHS Data Repository (MDR), the Disease Reporting System Internet (DRSI), and the Periodic Health Assessment (PHA). MDR outpatient 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). Height and weight data were captured through the MDR Clinical Data Repository (CDR) Vitals table. 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 metrics, laboratory data were obtained from Navy and Marine Corps Public Health Center (NMCPHC) using Composite Health Care System Health Level 7 (HL7) (NMCPHC 2019). NMCPHC-HL7 data were consolidated with DRSI and MDR data for COVID-19 identification (NMCPHC 2019).

Data sources for each medical metric are summarized in Table 1. DMDC personnel rosters were used to compute denominators for rate and prevalence calculations 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 was used for the respective medical metric numerator.

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

*Medical metrics that were included in the calculation of the Installation Health Index (IHI) are identified with an asterisk.
Appendices

Table 1. Medical Metric Data Sources

<table>
<thead>
<tr>
<th>Medical Metric</th>
<th>Numerator</th>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury*</td>
<td>MDR</td>
<td>DMDC</td>
</tr>
<tr>
<td>Behavioral Health</td>
<td>MDR</td>
<td>DMDC</td>
</tr>
<tr>
<td>Substance Use</td>
<td>MDR</td>
<td>DMDC</td>
</tr>
<tr>
<td>Sleep Disorders*</td>
<td>MDR</td>
<td>DMDC</td>
</tr>
<tr>
<td>Obesity*</td>
<td>MDR (CDR Vitals)</td>
<td>MDR (CDR Vitals)</td>
</tr>
<tr>
<td>Tobacco Product Use*</td>
<td>PHA</td>
<td>PHA</td>
</tr>
<tr>
<td>Heat Illness</td>
<td>DRSi, MDR</td>
<td>DMDC</td>
</tr>
<tr>
<td>Hearing</td>
<td>DOEHRS-HC; MEDPROS</td>
<td>DOEHRS-HC; MEDPROS</td>
</tr>
<tr>
<td>Sexually Transmitted Infections (Chlamydia)*</td>
<td>DRSi</td>
<td>DMDC</td>
</tr>
<tr>
<td>Chronic Disease*</td>
<td>MDR</td>
<td>DMDC</td>
</tr>
<tr>
<td>COVID-19</td>
<td>DRSi, MDR, NMCPHC-HL7</td>
<td>DMDC</td>
</tr>
</tbody>
</table>

Unless otherwise specified, MDR data include CAPER, SIDR, TED-Ni and TED-I. See Acronyms and Abbreviations appendix for acronym definitions.

*Included in the IHI

Medical metrics that are dependent on MDR data exclude Soldiers assigned to installations affected by the MHS GENESIS transition. Metrics that do not depend on MDR include all Soldiers regardless of installation assignment.

Medical metric values were not displayed on the installation profile pages if <20 cases were reported.

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.

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

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 case definition were captured in the numerator of incidence rates; follow-up visits less than 60 days apart were excluded. The 60-day incidence rule used for the injury metric was recently updated to more accurately identify and exclude follow-up encounters for the same injury (APHC 2021a). Rather than requiring the same injury diagnosis be used multiple times, follow-up injury visits are now identified as diagnoses within 60 days with the same injury type and injured body region (e.g., hand, shoulder, knee, foot). In addition, recognizing that “pain” is a common first diagnosis, the revised injury incidence rule also considers whether a pain diagnosis is associated with a more specific diagnosis within 60 days. If a medical encounter with a more specific injury diagnosis occurs within 60 days of the 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. These revisions to the injury incidence rule resulted in exclusion of additional follow-up injuries from reported incident injury rates, resulting in lower injury rates than previously reported in Health of the Force.

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 disorders, personality disorders, and psychoses) among AC Soldiers and trainees was estimated using International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM) and ICD-10-CM codes identified in Soldiers’ MDR medical records. Case definitions established by the APHC were applied for the seven disorders of interest. Soldiers could have one or more diagnosed BH conditions. A composite measure, “any BH 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 is the same as for last year’s report. However, the case definition differs from those used in reports for 2017 and earlier, in which Soldiers who had ever had a qualifying BH diagnosis recorded in their military medical record were considered prevalent cases. For the 2021 report, the look-back period for existing cases was limited to 12 months in order to more accurately reflect the percentage of Soldiers with current diagnoses.

Medical Operational Data System e-Profile data were analyzed to assess temporary profiles of 7 or more days for selected BH conditions. The data provide context regarding the potential readiness impact of BH conditions.
3. Substance Use

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 disorders among AC Soldiers, a subcomponent of the BH disorder measure, 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-9-CM and 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 case definition used for this year’s Health of the Force is the same as for last year’s report. However, the case definition differs from those used in reports for 2017 and earlier, in which Soldiers who had ever had a qualifying substance use disorder diagnosis recorded in their military medical record were considered prevalent cases. For the 2021 report, the look-back period for existing cases was limited to 12 months in order to more accurately reflect the percentage of Soldiers with current diagnoses.

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-9-CM and 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.

5. Obesity*

Obesity prevalence: Percentage of AC Soldiers with an average body mass index (BMI) greater than or equal to 30 as captured in CDR Vitals during the calendar year

BMI was calculated from height and weight measurements obtained from MDR’s CDR Vitals module and captured during direct care outpatient medical encounters for AC Soldiers and trainees. 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.

Prevalence of obesity for AC Soldiers was compared to that of the employed U.S. population 18 to 64 years old, 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 76% of AC Soldiers completed a PHA in 2020. 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 to 64 years old, 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.
Appendices

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., at least 100 cigarettes smoked in their lifetime) 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 2020 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 Armed Forces Health Surveillance Division (AFHSD) (AFHSD 2019). Heat illness ICD-10-CM codes were selected and validated by subject matter experts at the APHC 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 (STS): Percentage of AC Soldiers who received a periodic test (90-day, Annual, Pre-deployment, Post-deployment, Termination, or Other) that identified a new positive STS (i.e., average reduction of 10 decibels or more at 2000, 3000, and 4000 hertz relative to the reference audiogram in either ear) 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 2020, over 87% 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., 29 CFR 1910.95(g)(10)(i)). 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 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 (STIs) - 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. Estimation were derived from DRSi medical event reports and 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 data were not available for the month of onset. This is a change from the installation assignment process used in last year’s Health of the Force report. Last year, DRSi records linked with personnel records outside the 3-month window were retained, and the military treatment facility (MTF) reporting the case was used to determine installation assignment. The updated method of assigning location aligns with other incidence-based medical metrics (i.e., injury and heat illness).

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

Prior Health of the Force reports included a summary of chlamydia screening data for MHS-enrolled female AC Soldiers <25 years old. A comparison of reported chlamydia case rates between the Army AC Soldier and general U.S. populations was also provided, after controlling for differences in age and sex distribution. These assessments were excluded from the 2021 report due to the unavailability of data.

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 (2010–2020). 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 were identified via either positive SARS-CoV-2 tests documented in NMCPHC-HL7 laboratory data, or a confirmed or probable medical event report submitted to the DRSI. COVID-19 hospitalizations were identified using the ICD-10-CM code for COVID-19 (U07.1) 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.

IV. Performance Triad

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 2020, 28% 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 (e.g., 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 and includes the percentage of Soldiers reporting 7 or more hours of sleep within a 24-hour period. Sleep metrics were based on Azimuth Check survey 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. The first activity target included in this report is the percentage of Soldiers meeting the recommended 2 or more days per week of resistance training. Data for this metric were derived from an Azimuth Check survey question asking Soldiers to report the average number of days per week, in the last 30 days, in which they participated in resistance training. The second activity target is the percentage of Soldiers meeting aerobic exercise targets, which may be met by performing either 75 minutes of vigorous aerobic activity per week, 150 minutes of moderate activity per week, or an equivalent combination of moderate and vigorous activity. The equivalent combination is based on a formula in which vigorous activity is more heavily weighted than moderate activity. The data for this metric were 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.

3. Nutrition

Nutrition targets were informed by 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

*Medical metrics that were included in the calculation of the IHI are identified with an asterisk.
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, U.S. Environmental Protection Agency (EPA), and the United Health Foundation. Metrics that appear in Health of the Force reflect exposures potentially incurred by the AC population relative to a specific geographic location defined by the installation of assignment. Metrics include severity of exposure to an environmental hazard (air quality, drinking water quality, mosquito-borne disease, tick-borne disease), success of an intervention to improve health (water fluoridation), or diminish a health hazard (solid waste diversion).

EHIs were calculated for Army installations and JBs 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.

EHIs included in the IHI computation are designated with an asterisk in the section header.

### V. Environmental Health Indicators

#### Air Quality

**Air Quality**

The metric for air quality is the number of days in a year when outdoor air pollution near an Army installation violates the corresponding short-term (≤24 hours) U.S. National Ambient Air Quality Standard (NAAQS). For U.S. installations, the number of poor air quality days is obtained from Air Quality Index (AQI) Reports and Daily Data summaries on the EPA Air Data 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 or all of the general public. Poor air quality days for a U.S. Army installation are 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 U.S. Army installations are located: Fort Lee, Fort Leonard Wood, Fort Polk, Fort Riley, Fort Rucker, and Fort 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 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

#### 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 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.

1. Air Quality*

   EHIs included in the IHI computation are designated with an asterisk.

<table>
<thead>
<tr>
<th>Azimuth Check</th>
<th>USDA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruit</strong></td>
<td></td>
</tr>
<tr>
<td>Fresh, frozen, canned or dried, or 100% fruit juices. A serving is 1 cup of fruit or ½ cup of fruit juice.</td>
<td></td>
</tr>
<tr>
<td>1 cup of fruit or 100% fruit juice, or ½ cup of dried fruit can be considered as 1 cup from the Fruit Group.</td>
<td></td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td></td>
</tr>
<tr>
<td>Fresh, frozen, canned, cooked, or raw. A serving is 1 cup of raw vegetables or ½ cup of cooked vegetables.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

*EHIs that were included in the calculation of the IHI are identified with an asterisk.
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 for fluoride of 2.0 mg/L, and the maximum contaminant level (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 that result in waste being consigned to landfills or incinerators, resulting 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. The solid waste diversion rate 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 rates 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 rate excludes waste generated from privatized housing, and construction and demolition activities.

Army installations at JBs 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 Elmdorf-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 rate goal. A diversion rate ≥ 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%).

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

5. Mosquito-borne Disease

The metric for mosquito-borne disease 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).
6. Tick-borne Disease

The metric for tick-borne disease 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.

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 2020, 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 2009–2018 were 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. 2021).

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

7. Heat Risk

The metric for heat risk reflects the number of days in a year when outdoor temperatures heighten the risk of heat-related health impacts, and whether the year of interest is consistent or different 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 National Weather Service heat index is above 90°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. The mean and standard deviation (SD) for the prior 10 years were calculated. Annual heat risk days for the year of interest were compared to the prior 10-year average ±1 SD to show whether the year of interest is consistent with the prior decade.

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 the 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 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 SD (amount of variation in data values for a given metric) the installation is from the 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 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 EHI – 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 redistributed across the remaining metrics. The resulting weighted averages of these metrics were then standardized using the mean and SD across all installations presented in Health of the Force (with the exception of installations which transitioned to MHS GENESIS: Fort Wainwright, Fort Irwin, JB Elmdendorf-Richardson, JB Lewis-McChord, and Presidio of Monterey) to create the IHI score for each installation. IHI scores were not calculated for installations that transitioned to MHS GENESIS.

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.

IHI (and rankings of supporting medical metrics) for installations outside of the U.S. are ranked and presented separately from U.S.-based installations. 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.

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 and reported to two significant figures. 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.
Appendices

VIII. Data Limitations

Changes in methodology in this report, compared to prior Health of the Force reports, prevent direct comparisons of measures across the reports. Updated trend charts are provided for affected metrics, and additional details regarding installation demographics and metric components are included to provide clarity.

- Most medical metrics presented in the Health of the Force are based on healthcare utilization data, and the COVID-19 pandemic introduced changes in healthcare use, which may have created bias in the medical metric estimates reported in 2020. 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 ICD-9-CM and ICD-10-CM codes entered in patient medical records are subject to coding errors. Additionally, derived estimates of disease frequency may be underestimated given that individuals may not seek care or may choose to seek care outside the MHS or the TRICARE claims network.

- The STI (chlamydia) and heat illness metrics rely on reporting compliance. Chlamydia estimates are likely underestimated given the high proportion of asymptomatic infections that are undetected. Furthermore, the exclusion of medical encounter and laboratory data may contribute to the underestimation of chlamydia rates. Due to low case counts, STI data by age and heat illness data by sex, race, and ethnicity were not reported.

- 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 (68%). 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.

- Azimuth Check data used for the P3 measures were aggregated across demographic strata, and counts below 40 were not reported. Thus, adjustment 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, which 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 EHI relies on mosquito specimens acquired by installations and forwarded to the supporting Public Health Command Region 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 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.

Suggested citation:
ACKNOWLEDGMENTS

Health of the Force Working Group

John Ambrose, PhD, MPH, CHES1
Health of the Force Medical Metrics Team Lead
Clinical Public Health and Epidemiology Directorate

Amy Millikan Bell, MD, MPH4
Health of the Force Chair
APHC Medical Advisor

Matthew Beymer, PhD, MPH1
Health of the Force Deputy Editor-in-Chief
Division of Behavioral and Social Health Outcomes Practice

Jason Embrey1
Health of the Force Senior Designer
Visual Information and Digital Media Division

Andrew Fiore1,3
ORISE Fellow
Population Health Reporting Program

Erin Anderson Goodell, PhD, ScM1,8
Health of the Force Editor-in-Chief
Division of Behavioral and Social Health Outcomes Practice

Ivy Mushamiri, PhD, MPH1,7
Health of the Force Sleep, Activity, and Nutrition Team Lead
Public Health Assessment Division

Lisa Polyak, MSE, MHS1
Health of the Force Environmental Health Metrics Team Lead
Environmental Health Sciences and Engineering Directorate

Lisa Ruth, PhD1
Health of the Force Project Manager
Population Health Reporting Program

Ivan Walters1
Health of the Force Technical Editor
Publication Management Division

Shaina Zobel1
Health of the Force Product Manager
Population Health Reporting Program

Health of the Force Data Analysts

Mathew Allman, MPH, CPH1,8,11
Behavioral Health, Substance Use Disorders, and Tobacco Product Use Metrics Lead
Division of Behavioral and Social Health Outcomes Practice

Sara Birkmire1
Drinking Water Quality and Water Fluoridation Metrics Lead
Environmental Health Engineering Division

Phyon Christopher, MPH1
Unit Identification Code List Lead
Injury Prevention Program

Abimbola Daferiogho, MPH1
Sleep, Activity, and Nutrition Metric Lead
Public Health Assessment Division

Shamola Dye, MPH1,9
Senior Epidemiologist
Injury Prevention Branch

Lanna Forrest, PhD, MSPH1,19
Senior Epidemiologist
Injury Prevention Branch

Kelly Gibson, MPH1,2
Epidemiologist
Hearing Conservation and Readiness Branch

Christopher Hill, MPH, CPH1
Epidemiologist
Division of Behavioral and Social Health Outcomes Practice

Matt Inscoe, MPH1
Epidemiologist
Injury Prevention Program

Nikki Jordan, MPH1
Sexually Transmitted Infections Metric and Installation Health Index Lead
Disease Epidemiology Branch

Gabrielle Kaplansky, MPH4,8
Epidemiologist
Division of Behavioral and Social Health Outcomes Practice

Juliana Kebisek, MPH4
Mosquito-Keratoconjunctivitis Disease Metric Lead
Disease Epidemiology Program

Matthew Kenny, MPH1
Epidemiologist
Injury Prevention Branch

Katherine Kotas, MPH4
Chronic Disease, Heat Illness, and Sleep Disorders Metrics Lead
Disease Epidemiology Branch

Joseph M. Kupina, LEHS1,7
Project Coordinator
Disease Epidemiology Branch

Deborah Lake, AuD, CCC-A1
Hearing Metric Lead
Injury Prevention Branch

Olivia Mahlmann, MPH6,11
Epidemiologist
Injury Prevention Branch

Anthony Marquez, MPH, CPH1,8,11
Obesity Metric Lead
Injury Prevention Branch

Alexis Maule, PhD1,11
Epidemiologist
COVID-19 Metric and Demographics Lead
Disease Epidemiology Branch

Ashleigh McCabe, MPH1,2
Data Acquisition Lead
Injury Prevention Branch

Robyn Napolny, PhD1
Tick-borne Disease Metric Lead
Molecular Biology Section

Anna Renner, PhD1
Injury Metric Lead
Injury Prevention Program

Patricia Riggsy1
Solid Waste Diversion Metric Lead
Environmental Health Sciences Division

Jessica Sharkey, MPH1,8
Lead Epidemiologist
Armed Forces Health Surveillance Division

Anita Spiess, MSPH1
Epidemiologist
Division of Behavioral and Social Health Outcomes Practice

Larry Webber, LEHS1
Air Quality Metric Lead
Environmental Health Engineering Division

Health of the Force Content Developers

Joseph Abraham, ScD1
Epidemiologist
Clinical Public Health and Epidemiology Directorate

Amy Adler, PhD6
Clinical Research Psychologist
Center for Military Psychiatry and Neuroscience

Desmond Bannon, PhD, DABT1
Toxicologist
Health Effects Program

Desmond Bibio, DrPH, MPH1
Health Scientist
Population Health Reporting Program

Heather Bayko, MPH1
Epidemiologist
One Health Division

Anita Spiess, MSPH1
Epidemiologist
Division of Behavioral and Social Health Outcomes Practice

LTC Lana Bernat, DNP, CNM, CPHQ4
Director of Female Force Readiness and Health
Patient Care Integration, G-3/5/7

Joseph Abraham, ScD1
Epidemiologist
Clinical Public Health and Epidemiology Directorate
Appendices

Health of the Force
Content Developers

Jay Clasing, PhD, CPE, OTR/L
Vision Scientist
Tri-Service Vision Conservation and Readiness Branch

Zoe Cox1,3
ORISE Participant
Visual Information and Digital Media Division

LTC David DeGroot, PhD, FACSM13
Director
The Army Heat Center

COL Michael Franco14
Director
Joint Health Services

Claudia Geary, MS, MPH1,3
ORISE Participant
Public Health Assessment Division

Nkechinyere Gibson, MPH1
Public Health Scientist
Public Health Assessment Division

Melissa Gilkey, PhD10
Associate Professor
Department of Health Behavior

Stephanie Gomez, PhD1
Health Statistician
Public Health Assessment Division

LTC Angelina Gerardo, DVM, MPH, DACVPM14
Epidemiology Chief
Department of Defense Military Working Dog Veterinary Service

Douglas Holl1
Media Relations Officer
Public Affairs and Marketing Division

Kellie Hundemer, MS, ACSM-CPT16
Health Educator
Fort Belvoir Armed Forces Wellness Center

Michael Jarka, PhD, MSc1,3
Program Evaluator
Public Health Assessment Division

Brantley Jarvis, PhD1
Research Psychologist
Division of Behavioral and Social Health Outcomes Practice

Joel Jenkins, MA, LSSBB14
Chief
Executive Services

T. Renee Johnson1
Project Officer
Health Promotion Operations Division

Christopher Larsen, MED16
Public Affairs Specialist
Directorate of Communications

Nicole Leth, MPH, CHES, NSCA-CPT1
Director
Fort Belvoir Armed Forces Wellness Center

MAJ Sarah Luciano, DVM, MPH, DACVPM1
One Health Division Chief
Veterinary Services and Public Health Sanitation Directorate

Charles McCannon, MD, MBA, MPH, JD, FACPM1
Staff Physician
Disease Epidemiology Branch

Kelsey McCoskey, MS, OTR/L, CPE, CSPHP1
Ergonomist
Industrial Hygiene Field Services Division

Lauren Ogdzenski, MPH1
Public Health Accreditation Advisor and Public Health Scientist
Public Health Assessment Division

Okan Olgaç, MSPH1
Health Statistician
Veterinary Metrics Division

Joseph Pecko, PhD, LCSW1
Social Worker
Division of Behavioral and Social Health Outcomes Practice

MAJ Emily Penick, MD, FACOG1
Chief and Gynecologic Oncologist
Department of Gynecologic Surgery & Obstetrics

Joseph Pierce, PhD1
Health Scientist
Injury Prevention Branch

Michelle Phillips1
Visual Information Specialist
Visual Information and Digital Media Division

Phillip Quartana, PhD6
Research Psychologist
Center for Military Psychiatry and Neuroscience

Joanna Reagan, MS, MHA, MSS, RDN1
Public Health Nutritionist
Health Education and Application Division

Kevin Russell, PE1
Chief
Water Resources Branch

Theresa Jackson Santo, PhD, MPH1
Chief
Public Health Assessment Division

Kiara Scatilffe-Carrion, MPH1
Epidemiologist
Disease Epidemiology Branch

Amber Scharbo, MS, ATC, ACSM-CPT15
Health Educator
Fort Belvoir Armed Forces Wellness Center

Katherine Schauenhuyyn, PhD, MHS1
Epidemiologist
Division of Behavioral and Social Health Outcomes Practice

John Graham Snodgrass1
Visual Information Specialist
Visual Information and Digital Media Division

Maisha Toussaint, PhD, MPH1
Epidemiologist
Division of Behavioral and Social Health Outcomes Practice

LTC James Truong, OD, PhD1
Vision Scientist
Tri-Service Vision Conservation and Readiness Branch

Christina Via, MPH1
Health Statistician
Public Health Assessment Division

Emily Warren, MA1,3
ORISE Participant
Public Health Assessment Division

MAJ James Waters, DNP-PH, MPH, RN, CPH1
Army Public Health Nurse
Army Public Health Nursing Branch

Eren Youmans Watkins, PhD, MPH1
Chief
Division of Behavioral and Social Health Outcomes Practice

Chanel Weaver1
Chief
Public Affairs and Marketing Division

Marc A. Williams PhD, FAAAAI, COR1
Biologist
Health Effects Division

184 2021 HEALTH OF THE FORCE REPORT
Appendices

Health of the Force
Contributors

Ms. Sharon Ayala
Dr. Abigail Bickford
Ms. Cynthia Branton
CPT Ronald Cole
Ms. Elizabeth Estrada
Ms. Laura Mitvalsky
Mr. John O’Sullivan
MAJ Charles Rettig
Ms. Kimberley Rockwood
LTC Michael Superior
Mr. Jacob Smith

Health of the Force
Steering Committee

Dr. Joseph Abraham
Dr. Amy Millikan Bell
Ms. Amanda Braasch
Ms. Cynthia Branton
Dr. Michelle Canham-Chervak
Mr. Kevin Delaney
LTC Christa Goodwin
Ms. Nikki Jordan
MAJ Sarah Luciano
Ms. Kelsey McCoskey
Ms. Laura Mitvalsky
Ms. Jessica Nichols
Mr. Todd Richards
LTC Jean Rubanick
Dr. Lisa Ruth
Ms. Anita Spiess
Mr. George (Ginn) White

1 U.S. Army Public Health Center
2 Defense Health Agency
3 Oak Ridge Institute for Science and Education
4 Office of the Surgeon General
5 General Dynamics Information Technology
6 Walter Reed Army Institute of Research
7 Knowesis Inc.
8 Vornack Army Medical Center
9 Installation Management Command
10 University of North Carolina at Chapel Hill
11 Cherokee Nation Strategic Programs
12 Rader Health Clinic
13 Martin Army Community Hospital
14 LTC Daniel E. Holland Memorial Military Working Dog Hospital
15 SST-STS Solutions and Training
16 Joint Task Force National Capital Region
17 Carl R. Darnall Army Medical Center
18 Tripler Army Medical Center
19 William Beaumont Army Medical Center
20 Regional Health Command-Pacific
21 Public Health Command-Pacific

REFERENCES


Appendices


ACRONYMS AND ABBREVIATIONS

2MR – 2-mile run
AAP – American Academy of Periodontology
AC – Active Component
ACFT – Army Combat Fitness Test
ACOG – American College of Obstetricians and Gynecologists
ADA – American Dental Association
ADHD – Attention deficit hyperactivity disorder
AFHSD – Armed Forces Health Surveillance Division
AFWC – Armed Forces Wellness Center
AHP – Army Hearing Program
AHRQ – Agency for Healthcare Research and Quality
ANOVA – Analysis of Variance
aOR – Adjusted Odds Ratio
APA – American Psychological Association
APFT – Army Physical Fitness Test
APG – Aberdeen Proving Ground
APHC – U.S. Army Public Health Center
APHNs – Army Public Health Nurses
AQR – Air Quality Index
AR – Army Regulation
ARMG – Army National Guard
ASLS – Army Senior Leaders
AUD – Alcohol use disorder
AUDIT-C – Alcohol Use Disorder Identification Test-Concise
AVS – Army Veterinary Services
AWC – Army Wellness Center
BH – Behavioral health
BHAT – Behavioral Health Advisory Team
BMI – Body Mass Index
BRFSS – Behavioral Risk Factor Surveillance System
BSHOP – Behavioral and Social Health Outcomes Practice
CAPER – Comprehensive Ambulatory Professional Encounter Record
CAT – Cohesion Assessment Team
CCR – Consumer Confidence Report
CDC – U.S. Centers for Disease Control and Prevention
CDR – Clinical Data Repository
COCOM – Combatant Command
COPD – Chronic obstructive pulmonary disease
COVID-19 – Coronavirus Disease 2019
CWS – Community water systems
DA – U.S. Department of the Army
DMDC – Defense Manpower Data Center
DOD – Department of Defense
DOEHHS-CDC – Defense Occupational and Environmental Health Readiness System – Hearing Conservation
DRSI – Disease Reporting System internet
ECAST – Exercise Collapse Associated with Sickle Cell Trait
E-cig – Electronic cigarette
EHI – Environmental Health Indicator
EIA – U.S. Energy Information Administration
EPA – U.S. Environmental Protection Agency
EPICON – Epidemiological Consultation
EVALI – E-cigarette or Vaping-Associated Lung Injury
FR – Federal Register
FY – Fiscal year
HHS – U.S. Department of Health and Human Services
HL7 – Health Level 7
HP2030 – Healthy People 2030
HPV – Human papillomavirus
HRC – Hearing Readiness Classification
HRP – Hand release push-up
ICD-10-CM – International Classification of Diseases, 10th revision, Clinical Modification
ICD-9-CM – International Classification of Diseases, 9th revision, Clinical Modification
IHI – Installation Health Index
IOM – Institute of Medicine
IUD – Intrauterine device
JB – Joint Base
LDDS – Limited duty days
LT – Leg tuck
MCL – Maximum contaminant level
MDL – Maximum detect limit
MDR – Military Health System Data Repository
MEDPROS – Medical Protection System
MHS – Military Health System
MITTICK – Military Tick Identification/Infection Confirmation Kit Program
MOB – Military Occupational Specialty
Appendices

Defense Occupational and Environmental Health Readiness System – Hearing Conservation (DOHRS-HC), 60, 163–164, 169
Demographics, 3, 5–6, 8–11, 109–139, 141–150, 162–164, 168–169, 177–178, 181
Drinking water quality, (See Environment.)
Drinking water, (See Environment.)
Disinfecting, 22
Electronic cigarette (e-cig), (See Tobacco.)
Electronic cigarette or Vaping-Associated Lung Injury (EVALI), 54
Environmental and Compliance History Online (ECHO), 77
Environment, 2–3, 9, 11, 14, 20, 29, 37, 43, 58, 60, 64, 68, 72–89, 102, 109–139, 141–150
Exposure, 2, 77, 79, 82, 89–90
Exhibit, 77
Expires, 2
Family, 6, 11, 16, 19, 26, 28–29, 40, 44, 46, 54, 65, 77, 90, 93
Fluoridation, (See Environment.)
Food insecurity, 28
Fort Belvoir, 38, 103–106, 109, 152, 154, 156, 158
Fort Bragg, 45, 57, 65, 74, 103–106, 112, 152, 154, 156, 158
Fort Campbell, 57–59, 103–106, 112, 152, 154, 156, 158
Fort Carson, 57, 73, 103–106, 114, 152, 154, 156, 158
Fort Drum, 103–106, 115, 152, 154, 156, 158
Fort Gordon, 103–106, 116, 152, 154, 156, 158
Fort Hood, 57, 103–106, 117, 152, 154, 156, 158
Fort Huachuca, 103–106, 118, 152, 154, 156, 158
Fort Irwin, 3, 73, 106, 119, 152, 154, 156, 168, 171, 178
Fort Jackson, 103–106, 120, 152, 154, 156, 158
Fort Knox, 58, 103–106, 121, 152, 154, 156, 158
Fort Leavenworth, 103–106, 122, 152, 154, 156, 158
Fort Lewis, 103–106, 123, 152, 154, 156, 158, 173
Fort Leonard Wood, 57–103, 106, 124, 152, 154, 156, 158, 173
Fort Myer, (See JB Myer-Henderson Hall.)
Fort Polk, 57, 103–106, 126, 152, 154, 156, 158, 173
Fort Richardson, (See JB Eilendorf-Richardson.)
Fort Riley, 103–106, 127, 152, 154, 156, 158, 173
Fort Rucker, 58, 103–106, 128, 152, 154, 156, 158, 173
Fort Sill, 58, 103–106, 129, 152, 154, 156, 158
Fort Stewart, 57, 103–106, 130, 152, 154, 156, 158, 173
Fort Wainwright, 3, 73, 106, 131, 153, 155, 157, 161, 178
Fruits, 5, 9, 109, 139–140, 141–150, 171–172
G
Global Assessment Tool (GAT), 93
H
Hawaii, 25, 30, 57, 69, 103–106, 132, 153, 155, 157, 159, 161, 169
Hearing, 60–61, 169
Hearing Readiness Classification, 61
Significant threshold shift (STS), 60
Healthy People 2030 (HP2030), 11, 77, 79
Health System Utilization, 34–35
Medical Readiness, 3, 58, 61
Medical Protection System (MEDPROS), 60–61
Medical Care, 11, 26, 58, 61
Medical Treatment Facility (MTF), 13, 23, 85
Military Health System (MHS), 3, 25, 34, 36, 50, 65, 90, 135, 138
Military Health System Clinical Data Repository Vitalis (CDR Vitalis), 50–51
Military Health System Data Repository (MDR), 36, 40, 46, 48, 56, 66
Military Health System Population Health Portal (MHSPHP), 50–51
Military Health System Readiness Reporting System (MRRS), 36, 40, 46, 48, 56, 66
Military Treatment Facility (MTF), 13, 23, 85
Military Working Dog (MWD), 17

INDEX

202 2021 HEALTH OF THE FORCE REPORT
Visit us at
https://phc.amedd.army.mil/topics/campaigns/hof

2021 HEALTH OF THE FORCE
Create a healthier force for tomorrow.
2021
HEALTH OF THE FORCE REPORT

Visit us at https://phc.amedd.army.mil/topics/campaigns/hof