Create a healthier force for tomorrow.

2018

HEALTH OF THE FORCE

Create a healthier force for tomorrow.

— U.S. Army Public Health Center —
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A suite of products to help YOU improve Force readiness!

Explore Health of the Force

Metric Pages
Discover more about health readiness, health behaviors, and environmental health indicators.

Spotlights
Review articles on emerging issues, promising programs, and local actions.

Installation Profiles and Rankings
Explore installation-level strengths and challenges.

Methods, Contact Us, and U.S. Army Public Health Center (APHC) Web Site
Learn more about the science behind Health of the Force.

Health of the Force Online
Create customizable charts for your population and metrics of interest.

Our Purpose
Empower Army senior leaders with knowledge and context to improve Army health and Soldier readiness.

Scan Here
Welcome to the 2018 *Health of the Force* Report

The health of the individual Soldier is the foundation of the Army’s ability to deploy, fight, and win against any adversary. *Health of the Force* provides an evidence-based portrait of the health and well-being of the U.S. Army Active Component (AC) Soldier population. Leaders can use *Health of the Force* data to inform health promotion and prevention measures, as well as drive cultural and programmatic changes necessary to achieve Force dominance.

The *Health of the Force* report reflects medical, wellness, and environmental data for the prior year (i.e., the 2018 report reflects calendar year 2017 data). Such data include key health metrics and Performance Triad indicators to help leaders optimize Soldier health and performance. An expanded environmental health section describes how the condition of the environment plays an integral role in Soldiers’ ability to work, train, and deploy. Educational spotlights distributed throughout the report highlight emerging threats to health readiness and promote programs that have successfully influenced health status within the Army.

Throughout *Health of the Force*, readers will find salient health issues illustrated through infographics and charts. A new style of range chart is introduced with vertical lines indicating the distribution of installation rates. Installation profiles provide a report card on 40 Army installations (30 in the U.S. and 10 outside the U.S.) with average AC populations greater than 1,000. Installation rankings are presented for selected key metrics: injury, obesity, tobacco use, and chronic disease.

Medical readiness classification summaries are excluded from the 2018 *Health of the Force* due to lack of data. The transition to the *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) medical coding system introduced more diagnosis codes for injury. This necessitated a comprehensive evaluation and categorization of injury codes and, as a result of the expanded injury diagnosis code options, injury rates are higher than have been reported previously in *Health of the Force* (2015–2017). Complete surveillance data for Soldiers assigned to Joint Base Lewis-McChord (JBLM) were unavailable due to the Madigan Army Medical Center’s transition to the new Military Health System electronic health record (Genesis). Therefore, JBLM is not reflected in metrics that were derived from Defense Medical Surveillance System data. Finally, Aberdeen Proving Ground was removed from the 2018 report because its 2017 average AC Soldier population fell below the inclusion threshold of 1,000 Soldiers.

The 2018 print edition will be enhanced by *Health of the Force* Online, a digital interface that will allow readers to drill down into available data. Together, these *Health of the Force* products can facilitate informed decisions that ultimately improve the readiness, health, and well-being of Soldiers and the Total Army Family.
In 2017, approximately 1,821 new injuries were diagnosed per 1,000 person-years.

Rates were higher in women and older Soldiers.

56% of Soldiers had a new injury.
That's more than 3 injuries per affected Soldier.

71% of all injuries were cumulative micro-traumatic musculoskeletal “overuse” injuries.

15% of Soldiers had a behavioral health diagnosis.

12% of Soldiers had a sleep disorder.

Behaviors health diagnosis rates were higher among female Soldiers.

Sleep disorders increased with age and were more common among men than women.
## OBESITY

17% of Soldiers were classified as obese.

compared to 26% of a similar population of U.S. adults.

## TOBACCO USE

23% of Soldiers reported tobacco use.

The majority of smokers are 34 years of age or younger.

## HEAT ILLNESS

The number of reported heat illnesses has increased over the past 4 years.

Rates are highest among junior enlisted, males, and Soldiers <25 years of age.

## REPORT HIGHLIGHTS

Reports

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEXUALLY TRANSMITTED INFECTIONS</td>
<td>Reported chlamydia infection rates were 34% higher in 2017 than in 2013.</td>
</tr>
<tr>
<td></td>
<td>Army screening rates are markedly higher than those observed nationally.</td>
</tr>
<tr>
<td>TOBACCO USE</td>
<td>23% of Soldiers reported tobacco use.</td>
</tr>
<tr>
<td></td>
<td>The majority of smokers are 34 years of age or younger.</td>
</tr>
<tr>
<td>ENVIRONMENTAL HEALTH INDICATORS</td>
<td>Only 1 in 3 AC Soldiers attained the target amount of 7 or more hours of sleep on duty days.</td>
</tr>
<tr>
<td></td>
<td>Less than 50% of Soldiers are eating the minimum recommended servings of fruits and vegetables.</td>
</tr>
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<td></td>
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<tr>
<td>PERFORMANCE TRIAD</td>
<td>46% of the surveyed Army population received optimally fluoridated water.</td>
</tr>
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</tbody>
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### REPORT HIGHLIGHTS

- **Sexually Transmitted Infections**: Reported chlamydia infection rates were 34% higher in 2017 than in 2013. Army screening rates are markedly higher than those observed nationally.
- **Performance Triad**: Only 1 in 3 AC Soldiers attained the target amount of 7 or more hours of sleep on duty days. Less than 50% of Soldiers are eating the minimum recommended servings of fruits and vegetables.

### Overview

- **Obesity**: 17% of Soldiers were classified as obese, compared to 26% of a similar population of U.S. adults.
- **Tobacco Use**: 23% of Soldiers reported tobacco use. The majority of smokers are 34 years of age or younger.
- **Heat Illness**: The number of reported heat illnesses has increased over the past 4 years. Rates are highest among junior enlisted, males, and Soldiers <25 years of age.
- **Sexually Transmitted Infections**: Reported chlamydia infection rates were 34% higher in 2017 than in 2013. Army screening rates are markedly higher than those observed nationally.
- **Performance Triad**: Only 1 in 3 AC Soldiers attained the target amount of 7 or more hours of sleep on duty days. Less than 50% of Soldiers are eating the minimum recommended servings of fruits and vegetables.

### Environmental Health Indicators

- **Water Fluoridation**: 46% of the surveyed Army population received optimally fluoridated water.
- **Air Quality**: 10% of the surveyed Army population experienced more than 20 poor air quality days per year.
What *Health of the Force* Metrics Mean to Medical Readiness

Readiness is the U.S. Army’s number one priority as declared by GEN Mark A. Milley, Chief of Staff, in August 2015 and reaffirmed by Secretary of the Army, Dr. Mark Esper, in his November 2017 confirmation address. In an effort to achieve the highest level of medical readiness, the Army initiated a Medical Readiness Transformation in June 2016. This empowered commanders by providing direct access to Soldiers’ medical readiness status, profiles, and pending requirements.

During calendar year 2017, 86% of the AC Army was medically ready (Medical Readiness Classification (MRC) 1 or 2). Of AC Soldiers, 11% were classified as MRC3, and 3.0% as MRC4, both of which indicate medical non-readiness.

The standardized public health status reporting detailed in *Health of the Force* aims to further assist Army leaders in understanding the leading causes of medical non-readiness. Through annual analysis of medical metrics, health behaviors, and environmental health indicators, *Health of the Force* identifies health-related strengths and challenges that directly impact Force health. The report highlights the top two contributors to medical non-readiness: injuries and behavioral health conditions. The report also considers conditions and behaviors (e.g., obesity and tobacco use) that contribute to these diagnoses.

Through refined methodology, the 2018 report has identified that over 70% of the Army injury burden is due to cumulative micro-traumatic musculoskeletal overuse injuries, with higher incidence of injury in female Soldiers and older Soldiers (both male and female). Additionally, current analyses demonstrate that the incidence of behavioral health diagnoses is higher among female Soldiers, older Soldiers are more likely to have a posttraumatic stress disorder (PTSD) diagnosis, and younger Soldiers are more likely to suffer from a substance use disorder (SUD).

Each edition of *Health of the Force* aims to further contextualize how the health and well-being of Soldiers relate to medical readiness. By gaining a robust understanding of the leading contributors to medical readiness at the unit and community level, Army leaders can effectively target programs and policies that positively impact medical readiness.

Engage, Explore, and Connect with *Health of the Force* Online

There’s more to the data with *Health of the Force* Online, including additional installation- and command-specific data. Delve deeper into what these data mean for your population. Read and share tools and supplemental information to bring insight and personal context to the report. Dynamically generate charts to visualize data, make comparisons, and develop a better understanding of the *Health of YOUR Force*. From the APHC Web site, follow the *Health of the Force* link to the CAC-enabled CarePoint platform: https://phc.amedd.army.mil/topics/campaigns/hof/
Demographics

Demographic factors can affect both health outcomes and individual health behaviors. For example, chronic disease manifestation and the propensity to become overweight or obese increase as a population ages. When reviewing population health data, it is important to consider how demographics influence population strengths and challenges.

Army AC population demographics differ significantly from the U.S. civilian population, and can vary greatly by command and installation. Army rates of illness and injury are informed by the underlying characteristics of age and sex. These demographics should be considered when exploring attributes that contribute to health risk, or when comparing subpopulations of interest.

Personnel Strength by Sex and Year, AC Soldiers, 2013–2017

According to DMDC (formerly known as Defense Manpower Data Center), the 2017 average monthly strength of the Army AC population was 465,000 Soldiers. Enlisted personnel accounted for 80% of AC strength.

![Personnel Strength by Sex and Year, AC Soldiers, 2013–2017]

Population Distribution by Sex and Age, AC Soldiers, 2017

The majority (85%) of AC Soldiers were men. In addition to being mostly male, the Army AC population is younger than the general population of employed U.S. civilians. Over 76% of AC Soldiers are under the age of 35 compared to the employed civilian population, where 37% are under 35. It is important to keep these differences in mind when comparing the overall health status of Soldiers to civilians.

![Population Distribution by Sex and Age, AC Soldiers, 2017]
MENTAL SKILLS TRAINING IMPROVES SOLDIER PHYSICAL FITNESS

Improving medical readiness requires training in both physical and behavioral skills. Similar to professional athletes, Soldiers must train both mind and body for optimal performance. At 2% to 3% annually, Army Physical Fitness Test (APFT) failure is a challenge to Soldier readiness (Sih & Negus, 2016). To address these failures, Army occupational therapy has designed an evidence-based program that teaches Soldiers to apply mental skills to improve performance. This mental skills training includes the use of mental imagery, positive self-talk, heart rate control, and goal setting during unit physical training (PT). Soldiers also learn the importance of these resilience skills for long-term health and wellness.

Mental imagery involves using all senses to vividly create an event in one’s mind, enhancing ability and reducing injury. Soldiers learn to develop a mental imagery script for each of the APFT events while focusing on a positive phrase for success. Positive self-talk, a skill used by elite athletes, improves confidence and ability (Van Raalte & Vincent, 2017).

Soldiers learn the benefits of slow, deep, diaphragmatic breathing for energy conservation, mental focus, and stress management. Heart rate control helps to slow the body’s “fight or flight” stress response which, over long exposure, has been linked to the development of chronic illness such as heart disease, diabetes, arthritis, and mood disorders. This skill is transferable to all aspects of Soldier life and has been found to decrease operational stress reactions (HeartMath Institute, 2018).

Goal setting creates a focal point for success and provides intrinsic motivation (Wilson & Brookfield, 2009). As part of their mental skills training, Soldiers learn the benefits of developing challenging short- and long-term goals for APFT improvement.

Research shows a statistically significant improvement in APFT scores following integration of mental skills training with unit PT (Meyer, 2018). Soldiers recognize the application of these resilience skills to other areas of their jobs. Nested in the Army Chief of Staff’s vision of “physically fit and mentally tough Soldiers,” this new occupational therapy program provides a mental fitness curriculum for readiness.
SPOTLIGHT

ARMY WELLNESS CENTERS SUPPORT HEALTH AND READINESS

ARMY WELLNESS CENTERS (AWC) APPLY BEST practices in workplace health promotion programming to improve Soldier readiness and Army community health. Designed to shift the focus from reactive, treatment-focused health care to a prevention-focused system for health, AWCs deliver an individual-level health education and coaching model that supports prevention by helping Soldiers and Army community members increase healthy behaviors, reduce disease risk factors, and optimize readiness and resiliency. The AWCs’ approach, supported by the Community Preventive Services Task Force, includes the health risk assessment, feedback from participants, and health education. Six evidence-informed core programs are standardized across a global network of 35 AWCs.

AWCs are monitored to assess both the achievement of performance benchmarks and model compliance. They are evaluated for program effectiveness and identification of areas for improvement. In the second quarter of Fiscal Year 2018 (FY18), AWCs served 18,000 clients and achieved a 97% client satisfaction rating. An FY14–15 AWC outcomes evaluation (Rivera et al., 2018) concluded that clients who engaged in at least one follow-up AWC assessment not only experienced improvements in cardiorespiratory fitness but also reductions in body fat, body mass index (BMI), blood pressure, and perceived stress. For example, nearly 70% of clients increased their level of cardiorespiratory fitness, and nearly 60% decreased their body fat and BMI. These results are particularly meaningful given research showing that increased levels of cardiorespiratory fitness and decreased levels of BMI are generally tied to better health- and injury-related outcomes (Verweij et al., 2011; Jones et al., 2017), both of which positively impact Soldier deployability and readiness.

AWCs are the community outreach arm of the Army Patient Centered Medical Home (PCMH) model and are often located apart from medical treatment facilities to help mitigate the perceived stigma associated with seeking medical care. Evaluation efforts that examined the collaboration between the AWC and PCMH suggest that ongoing collaboration could be improved by standardizing the referral process and increasing communication via huddle meeting representation (APHC(Prov), 2016a).

AWC services are available to Army community members at no cost. For more information or to schedule an appointment, contact your local AWC.

ARMY WELLNESS CENTER REFERRAL CONSIDERATIONS

Non-Soldiers
- BMI ≥ 30 kg/m²
- Ready to change their exercise and nutritional habits; interested in support

Soldiers
- 2-mile run times > 15:30 minutes (males) or 19:00 minutes (females)
- Not meeting AR 600–9 (DA, 2006) height for weight standards
- Ready to change their exercise and nutritional habits; interested in support
LOCAL ACTION

Fort Sill Health Readiness Center Improves Medical Readiness

In February 2017, Fort Sill opened a Health Readiness Center in response to the Senior Commander’s directive to address a medical non-readiness rate of 11% through the Commander’s Ready and Resilient Council (CR2C) Improvement Plan. The Fort Sill Health and Readiness Council spearheaded the initiative to locate nutrition care, public health nursing, case management, Periodic Health Assessments (PHAs), AWCs, and medical readiness reviews in one center. At Fort Sill, Soldiers process through the Health Readiness Center as part of their personal readiness requirements. Since the Center’s implementation, PHA compliance has increased to 97% (a 19% increase), the number of Soldiers receiving MRC3 or MRC4 designations has decreased by 48% and 82%, respectively, and deployability has increased to 92%. In addition, Fort Sill referrals to available prevention services have increased by 82% since the Health Readiness Center was established. Coordinated approaches to addressing medical readiness reduce gaps in services, increase referral rates to preventive health services, and prevent duplication of efforts.

LOCAL ACTION

U.S. Army Garrison Benelux Reduces Medical Readiness Classification 4 Rates

During a Commander’s Readiness Forum, it was identified that 12% of U.S. Army Garrison (USAG) Benelux Soldiers were in an MRC4 status and, therefore, were not medically ready. The USAG Benelux CR2C and Medical Treatment Facility (MTF) formed a working group to plan and implement an initiative to reduce MRC4 rates. The program incorporated readiness checks into every outpatient appointment to rapidly refer Soldiers to programs and resources that address readiness deficiencies. Additionally, primary care providers sent reminders to Soldiers via a secure messaging system. As a result, USAG Benelux MRC4 rates have dropped significantly to under 2%. Building medical readiness into the way organizations conduct daily operations ensures that readiness is a priority for the entire installation.
Health Metrics

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

Injury

Injury is a significant contributor to the Army’s healthcare burden, impacting medical readiness and Soldier health. Over 1 million medical encounters and roughly 10 million days of limited duty occur annually as a result of injuries and injury-related musculoskeletal conditions, affecting over half of Soldiers each year.

Injuries reported here are defined as any 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, 2017a). A comprehensive re-classification of injury diagnosis codes was necessitated by the Military Health System’s transition to the ICD-10-CM medical coding system in October 2015. Following the transition to ICD-10-CM, the rates of injury diagnoses are higher than those reported previously. Revised 2016 rates under the new definition are shown for comparison (top of next page).

There were 1,821 new injuries per 1,000 person-years.
Incidence ranged from 1,308 to 2,963 per 1,000 person-years across Army installations.

Incidence of Injury by Sex and Age, AC Soldiers, 2017

Among AC Soldiers, approximately 1,821 new injuries were diagnosed per 1,000 person-years in 2017. The high rate reflects multiple injuries among affected Soldiers. Injury rates were higher among women and older Soldiers.
Incidence of Injuries per 1,000 Person-Years, AC Soldiers, 2016–2017

The incidence of all new injuries and new overuse injuries decreased slightly in 2017, compared to 2016.

- Cumulative micro-traumatic musculoskeletal “overuse” injuries
- All injuries

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate per 1,000 Person-Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1,320</td>
</tr>
<tr>
<td>2017</td>
<td>1,288</td>
</tr>
<tr>
<td></td>
<td>1,868</td>
</tr>
<tr>
<td></td>
<td>1,821</td>
</tr>
</tbody>
</table>

OVERUSE INJURIES

71% of all injuries were cumulative micro-traumatic musculoskeletal “overuse” injuries.

Proportion Injured by Sex and Age, AC Soldiers, 2017

Overall, 56% of Soldiers had a new injury in 2017.

Injuries affected 69% of Soldiers age 45 and older, compared to 54% of Soldiers under age 25. Sixty-six percent of women had a diagnosed injury in 2017, compared to 54% of men. For both men and women across all age groups, cumulative micro-traumatic musculoskeletal “overuse” injuries, commonly attributed to military physical training, accounted for the majority of injuries.

<table>
<thead>
<tr>
<th>Age:</th>
<th>Total</th>
<th>&lt;25</th>
<th>25–34</th>
<th>35–44</th>
<th>45+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>13</td>
<td>56</td>
<td>12</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Men</td>
<td>13</td>
<td>49</td>
<td>46</td>
<td>46</td>
<td>39</td>
</tr>
</tbody>
</table>

Only 7% of injury encounters were cause-coded in medical records.

Clinical diagnoses can include optional supplementary codes, known as cause codes, that provide information about injury circumstances, including the mechanisms, exposures, activities, and places associated with injury. Providers’ use of these codes is valuable for understanding common injury scenarios and assisting commanders in making informed decisions about prevention strategies.
LOCAL ACTION

U.S. Army Hawaii 25th Infantry Division Addresses Injury Prevention

The CR2C strategically manages, monitors, and implements health improvement plans across medical, garrison, and mission operations. Using CR2C processes, the U.S. Army Hawaii Physical Health Working Group spearheaded an initiative to reduce injuries, reduce rates of MRC3 designations, and improve physical training methods. Physical therapists trained the 3rd Battalion, 7th Field Artillery Regiment 25th Infantry Division Soldiers in evidenced-based approaches to physical reconditioning. As a result, the number of Soldiers on profile due to musculoskeletal injuries decreased by 72%. Due to the success of the program, it is now being applied to other 25th Infantry Division units.

“Continuing to build upon and follow a systematic, public health approach to injury prevention will enable continued progress toward reducing the negative impact injuries place on Soldiers, their Families, commanders, and the Army medical system.”

—LTG Eric Shoomaker
former Surgeon General of the Army
SOLDIERS MUST STRIVE TO ATTAIN HIGH levels of physical fitness to complete the mission effectively. Strength training is an increasingly popular way to improve muscle mass and optimize body composition. However, the military medical community has reported a notable increase in surgeries for torn or ruptured pectoralis major muscles (PMM)/tendons (PMT) (Salazar et al., 2018; Antosh et al., 2009; White et al., 2007). Injuries to the “pecs” primarily occur while bench pressing heavy weights, when a sudden imbalance puts unexpected strain on one side.

Injuries that require surgery result in months of limited movement and lost work, permanent loss of strength, and/or reassignment of work duties (Pochini et al., 2014; Merlin et al., 2017). Partial PMM/PMT tears not requiring surgery still restrict lifting for days or weeks. Reports thus far have focused on surgical cases, so the full extent of the military PMM/PMT injury problem is not yet known.

Increase in PMM/PMT injuries is linked to the growing interest in weight-lifting activities. Many military-owned or -operated facilities (even in deployment settings) provide bench press equipment. The use of other makeshift items (e.g., cinderblocks, sand-filled jugs) has also been reported. Most surgical cases are men who were bench pressing heavy weights (over 175 pounds, but especially over 250 pounds) at the time of their injury.

To reduce risk, don’t use anabolic steroids, replace traditional bench pressing with less risky exercises (e.g., push-ups or resistance bands to work similar muscles), or—

- Seek instruction from a certified trainer for best form.
- Use proper equipment (balanced weights, weight locks, bar rack).
- Use a trained spotter capable of catching the weight bar to prevent imbalance.
- Avoid muscle failure (reduce weights, limit the number of repetitions and sets).
Behavioral Health

The stressors of military life can strongly influence the psychological well-being of Soldiers and their Families. Particularly when unrecognized and untreated, behavioral health (BH) diagnoses can lead to lack of medical readiness, early discharge from the Army, and suicidal behavior. In 2017, 15% of Soldiers had a diagnosis of one or more BH conditions, which include adjustment disorder, mood disorders, anxiety disorders, posttraumatic stress disorder (PTSD), substance use disorder (SUD), personality disorder, and psychosis.

Overall, 15% of Soldiers had a behavioral health disorder.
Prevalence ranged from 8.9% to 21% across Army installations.

Prevalence of Behavioral Health Disorders by Sex and Age, AC Soldiers, 2017

BH disorder rates were higher among female Soldiers (23%) than male Soldiers (14%). Older Soldiers were more likely to have PTSD than younger Soldiers (under 35 years old) (7.0% and 1.6%, respectively). Younger Soldiers were more likely to have a SUD than older Soldiers (4.0% and 1.8%, respectively).
Prevalence of Behavioral Health Disorders by Sex and Condition, AC Soldiers, 2017

For both male and female Soldiers, the most common BH disorder was adjustment disorder. The proportion of female Soldiers who received a diagnosis of adjustment disorder, anxiety disorders (excluding PTSD), or mood disorders was twice that of male Soldiers (14% and 7.0%, respectively). SUD was the only BH condition for which the proportion of male Soldiers exceeded that of female Soldiers (3.6% and 2.6%, respectively).

Prevalence of Behavioral Health Disorder by Condition, AC Soldiers, 2013-2017

The proportion of AC Soldiers with a diagnosed BH disorder has slowly declined in the last 5 years from a high of 17% in 2013 to 15% in 2017. With the exception of SUD, the prevalence of all BH disorders has also decreased. Despite these reductions in diagnoses, Army Medicine continues to strive to bring more Soldiers into care to improve the readiness and well-being of the Force.

Less than 1% of AC Soldiers were diagnosed with a personality disorder or psychosis.
POSTTRAUMATIC STRESS DISORDER AND PHYSICAL HEALTH INTERRELATIONSHIP

POSTTRAUMATIC STRESS DISORDER is one of the most common BH conditions to occur after exposure to traumatic events, including combat, assault, rape, accidents, natural disasters, and other life-threatening experiences. It is estimated that 5% to 20% of Soldiers who have deployed to combat zones such as Iraq or Afghanistan developed symptoms of PTSD and may benefit from treatment (Kok et al., 2012). PTSD and other BH disorders pose risk for several adverse outcomes such as medical non-readiness, alcohol and substance misuse, and risky behaviors.

The reactions associated with PTSD are based on survival instincts that do not turn off after the trauma or threat has passed. For example, when faced with a dangerous situation, it is normal to become hyperalert. If this condition continues for a prolonged period after the threat is over, however, and interferes with daily functions, it may become a symptom of PTSD. Similarly, anger can help when it is necessary to fight for survival, but when anger persists and interferes with relationships or work, it may be a symptom.

Common PTSD symptoms include intrusive thoughts, flashbacks, nightmares, emotional withdrawal, avoidance behaviors, guilt, low mood, and reactivity to triggering events, such as crowds or loud noises. An important aspect of PTSD is that the common reactions health professionals label as PTSD symptoms (e.g., hyperalertness) can be advantageous in certain ways in the occupational military context (e.g., hypervigilance equates to situational awareness in a combat zone).

As a result of long-term activation of the body’s usually self-limited stress response, PTSD is associated with potentially persistent changes in the way the body responds to stress. This overall heightened physical and mental stress response can impact Soldier readiness by affecting their sleep, cognitive performance, and all categories of physical health. To cope, Soldiers may further compound problems such as persistent disturbance of sleep through “self-medication” with alcohol or other substances, which only worsens the quality of sleep and can interfere with successful recovery.

<table>
<thead>
<tr>
<th>Some PTSD Symptoms Are Based in Survival Instincts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival Instinct</td>
</tr>
<tr>
<td>Situational awareness, rapid reflexes</td>
</tr>
<tr>
<td>Intense mission preparation, rigorous training</td>
</tr>
<tr>
<td>Adrenaline, focus, and intensity to accomplish critical missions</td>
</tr>
<tr>
<td>Emotional control in combat</td>
</tr>
<tr>
<td>Unit cohesion, unit is family</td>
</tr>
</tbody>
</table>

5%–20% of Soldiers who have deployed to combat zones such as Iraq or Afghanistan developed symptoms of PTSD.
Joint Base Langley-Eustis Reduces Behavioral Health No-Show Rates

Following the loss of a Soldier by suicide after he failed to keep a BH appointment, the Joint Base Langley-Eustis (JBLE) community coordinated an effort to reduce the no-show rates for healthcare appointments. Recognizing that access to care and attending appointments are critical to personal readiness, a working group implemented an email and telephone call appointment reminder system for both Soldiers and commanders. **By helping to ensure Soldiers are released for scheduled healthcare appointments, commanders are supporting Soldiers in getting the care they need when they need it,** thus demonstrating the importance of BH care as a key factor in personal readiness. Since implementation of the JBLE program, the no-show rates for BH appointments have decreased by 1.7%, and those for substance abuse counseling appointments have decreased by 3.3%. These observed reductions in no-show rates are expected to improve further as the appointment reminder system continues to be implemented.

### PTSD Can be Associated with Global Physical Health Effects

<table>
<thead>
<tr>
<th>Physical Symptoms Scale</th>
<th>Soldiers Post-Iraq With PTSD (N=468) (%)</th>
<th>Soldiers Post-Iraq No PTSD (N=2,347) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score &gt; 15 (severe)</td>
<td>34</td>
<td>5.2</td>
</tr>
<tr>
<td>Tired, low energy</td>
<td>75</td>
<td>28</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>71</td>
<td>26</td>
</tr>
<tr>
<td>Pain in arms, legs, joints</td>
<td>50</td>
<td>26</td>
</tr>
<tr>
<td>Back pain</td>
<td>40</td>
<td>22</td>
</tr>
<tr>
<td>Headaches</td>
<td>32</td>
<td>9.9</td>
</tr>
<tr>
<td>Nausea / indigestion/ irritable bowel syndrome</td>
<td>25</td>
<td>8.8</td>
</tr>
</tbody>
</table>
SPOTLIGHT

IMPROVING SOLDIER READINESS BY OPTIMIZING BEHAVIORAL HEALTH TREATMENT EFFECTIVENESS

THE ARMY BH SERVICE LINE SUPPORTS Soldier readiness and Family health through a cycle of patient-centered, data-informed, healthcare delivery and leadership support. Patient-reported data are collected to inform individual patient care and increase overall treatment effectiveness at the clinic, MTF, region, and U.S. Army Medical Command (MEDCOM) levels. This cycle of care benefits patients by improving treatment outcomes, ensuring the provider and patient are working together toward mutually agreed-upon goals, and allowing them to identify when the current treatment plan needs to be adjusted to ensure treatment is maximally effective.

The Data-Informed Cycle of Care and Leadership Support

1. **Patients:** Via the Behavioral Health Data Portal (BHDP), patients share vital information with their treatment team by completing symptom and history questionnaires at intake and before each BH specialty clinic appointment.

2. **Providers:** Individual providers enhance face-to-face meetings with patients by reviewing the patient’s self-reported information in the BHDP. This information includes the patient’s current and longitudinal record of symptoms, history, and significant events. Providers work with patients to develop an individually-tailored treatment plan informed by patient-reported data to monitor progress over time.

3. **BH Service Line:** To inform BH leadership to optimally develop and mold BH clinical services, BHDP and other medical data are aggregated, and population-focused outcome and clinical driver metrics (e.g., rate of use of evidence-based treatments) are compiled. These process improvement data are reported back to the MTFs as well as the supporting leadership at their respective Regional Army Public Health Commands and MEDCOM.

4. **MEDCOM/Office of The Surgeon General (MEDCOM/OTSG):** To encourage and support the most effective practices, MEDCOM uses budgetary incentives to encourage MTFs to improve outcomes through evidence-based clinical practice and data-informed treatment. In addition, MEDCOM/OTSG refines policies to support process changes that further drive improved outcomes.

5. **MTF BH Leadership:** Installation Directors of Psychological Health are empowered with patient-centered data, informed policy, and budgetary support, all of which enable providers to optimally care for their patients.
EMBEDDED BEHAVIORAL HEALTH PROMOTES UNIT READINESS

EMBEDDED BEHAVIORAL HEALTH (EBH) IS one of the most innovative transformations to occur in the delivery of military BH care and has been validated as a best practice of military medicine. Research studies (DiBenigno, 2017; Kochan et al., 2016; APHC, 2017b) have demonstrated that use of the EBH model results in statistically significant improvements in mission readiness, increased outpatient BH care and leader-provided collaboration, and decreased need for acute inpatient psychiatric care.

The EBH team serves as the Soldiers’ single point of entry into BH care and is typically located within walking distance of where they live and work. Each battalion is assigned a BH provider, ensuring continuity of care for Soldiers and providing leaders with an easily accessible subject matter expert.

Leaders and BH providers can build working relationships that promote individual and unit readiness through enhanced access to care, early intervention, and responsive consultation.

This relationship between the BH provider and key battalion personnel overcomes the stigma commonly associated with seeking BH care in the military. In addition, the unit-aligned BH provider is able to maintain visibility on mission readiness and BH trends in the formation, specifically tailoring BH treatment and education options to that battalion’s Soldiers. In the EBH model, unit-aligned BH providers meet with key battalion personnel (medical providers, commanders, chaplains, etc.) on a regular basis to discuss the readiness and BH needs of their units.

In one example from an infantry regiment, the leadership was able to voice concerns about the morale, motivation, risk-taking, and future plans of Soldiers facing disciplinary problems and/or potential administrative discharge. The EBH team then developed a weekly therapy group to address coping skills, decision making, relationships, and occupational planning for this potentially vulnerable population. In addition to gaining valuable skills, participants benefitted from the social support and contributions of the group. The battalion commander’s participation demonstrated leader support for BH care and reinforced unit cohesion. Because of this group’s success, similar therapy groups have been implemented for multiple cohorts.

Due to the documented, reproducible, and sustainable benefits of this model of care, unit-aligned providers and dedicated command consultation time have been integrated into the current operating model for all Soldier outpatient BH care.
Substance Use

Substance use disorder (SUD) includes the misuse of alcohol, cannabis, cocaine, hallucinogens, opioids, sedatives, or stimulants. According to the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-5®), a diagnosis of SUD 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 potentially impact family, friends, and the Army community as a whole. Drug and alcohol overdose is the leading method of attempted suicide among Soldiers (APHC, 2017c). The Army continues to adapt treatment and prevention efforts to accommodate the unique characteristics of military life and culture. Overall, more than 18,000 Soldiers were diagnosed with a SUD in 2017.

Overall, 3.5% of Soldiers had a substance use disorder diagnosis. Prevalence ranged from 1.2% to 5.9% across Army installations.

**Prevalence of Substance Use Disorder by Sex and Age, AC Soldiers, 2017**

Soldiers under the age of 25 had a greater proportion of SUDs than any other age group. Male Soldiers experienced higher rates of SUD diagnosis than female Soldiers in all age categories.
**Proportion of Illicit-Positive Drug Tests by Drug Type, AC Soldiers, 2017**

Cannabis was the most common substance found in urinalysis testing in 2017, accounting for 56% of positive results, followed by cocaine (17%), amphetamines (15%), and opioids (8.5%).

**Proportion Enrolled in Formal Treatment by Substance, AC Soldiers, 2013–2017**

During 2017, 74% of Soldier enrollments in formal treatment resulted from alcohol-related referrals, followed by cannabis (17%), and cocaine (3.2%). Enrollment for cannabis has increased by 7% since 2013.

_Soldiers may have been enrolled in formal treatment for more than one substance or for a substance not included in this analysis._
STIGMA HAS LONG BEEN A FACTOR THAT impacts a Soldier’s willingness to seek treatment for BH and substance misuse issues. Soldiers often believe that seeking care will cause others to lose confidence in their abilities, threaten their career advancement and security clearances, and cause removal from their units (DOD, 2007). In the recent Policy for Voluntary Alcohol-Related Behavioral Health Care (pending publication), the OTSG aims to fight this stigma and change the culture to one that encourages Soldiers to seek help earlier, ultimately increasing the health and readiness of the Force. According to this policy, Soldiers will be able to voluntarily seek alcohol-related BH care without fear that discontinuing their care will serve as a basis for administrative separation. Those who receive voluntary alcohol-related care will be treated in the same manner as Soldiers who seek voluntary BH care, meaning neither requires command notification unless there is a risk to safety, judgement, or of occupational impairment.

Studies on Operation Enduring Freedom and Operation Iraqi Freedom Veterans have shown the comorbidity of SUDs and other BH disorders is as high as 93%. The co-occurrence of PTSD and SUDs can be as high as 63% (Larson et al., 2012). Studies have also shown an increase in Veteran suicide risk among those with a SUD (Seal et al., 2011). Soldiers who frequently drink excessively and engage in risky behaviors, have memory problems, or make poor decisions are encouraged to self-refer to their local BH clinic for a SUD evaluation.

Soldiers who do not receive timely SUD treatment have a higher likelihood of negative outcomes such as indiscipline events, relationship problems, and health consequences. Untreated alcohol abuse is connected to rates of sexual assault, domestic abuse, and suicide. The new policy provides a pathway for Soldiers to obtain necessary health care without fear of career repercussions. Distinguishing mandatory treatment from voluntary care in this way will encourage Soldiers to seek help earlier and will positively impact Force readiness.
These synthetic cannabinoids are created to mimic the effects of THC, but the resulting high is unpredictable and can be life-threatening.

In January 2018, the APHC learned that dozens of Service members in North Carolina arrived at local MTFs with a range of symptoms including extreme disorientation, anxiety, unconsciousness, headache, rapid heart rate, nausea/vomiting, high blood pressure, and seizures. An investigation found the Service members had vaped e-juices labeled as containing CBD oil. Toxicology results showed the products contained a synthetic cannabinoid nearly 300 times more potent than THC (WHO, 2017). The APHC coordinated a tri-Service response effort, in collaboration with the Centers for Disease Control and Prevention (CDC) and state health departments. This effort developed and disseminated public and clinical health risk communications and established surveillance systems to track future cases.

Soldiers who vape cannabis or synthetic cannabinoid products may be self-medicating due to underlying physical or BH conditions (Metrik et al., 2018). Leaders should encourage the use of BH care among Soldiers and ensure all are aware of the available resources from which they can seek help for substance misuse.

**Vape products marketed as containing CBD and/or THC are not regulated, are often mislabeled (Bonn-Miller et al., 2017), and could contain dangerous chemical additives or highly potent synthetic cannabinoids (CDC, 2018a, 2018b).**
Sleep Disorders

High-quality sleep is critical to Soldier readiness and mission success. A good night’s sleep can help increase productivity and decrease the risk of accidents, errors, and injuries. Sleep disorders that can impair readiness and function, including sleep apnea, insomnia, hypersomnia, circadian rhythm sleep disorder, and narcolepsy were assessed in *Health of the Force*.

Overall, 12% of Soldiers had a sleep disorder. Prevalence ranged from 5.8% to 21% across Army installations.

**Prevalence of Sleep Disorders by Sex and Age, AC Soldiers, 2017**

In 2017, approximately 12% of Soldiers had a sleep disorder. The prevalence of sleep disorders increased with age and was more common among men than women. The percentage of Soldiers diagnosed with a sleep disorder has remained relatively constant over the past 5 years.

*Sleep apnea was the most frequently diagnosed sleep disorder in 2017,* accounting for 43% of all sleep disorder diagnoses. The majority of these diagnoses were for obstructive sleep apnea, a disorder that is linked to overweight/obesity. The percentage of men diagnosed with sleep apnea was over 2.5 times greater than that of women. Insomnia accounted for 29% of sleep disorder diagnoses. In contrast to sleep apnea, the percentage of women diagnosed with insomnia was over 1.5 times greater than that of men.
ARMY DENTISTRY HAS A VALUABLE OPPORTUNITY TO SUPPORT ARMY MEDICINE IN THE TREATMENT OF OBSTRUCTIVE SLEEP APNEA (OSA) (OTSG/MEDCOM, 2018). POSITIVE AIRWAY PRESSURE (PAP) DEVICES ARE THE GOLD STANDARD TREATMENT FOR THIS SLEEP DISORDER. HOWEVER, SOME SOLDIERS MAY NOT TOLERATE THESE DEVICES WELL, AND THEY ARE INCONVENIENT IN COMBAT SETTINGS DUE TO THEIR SIZE, MAINTENANCE REQUIREMENTS, AND NEED FOR RELIABLE ELECTRICITY. CONSEQUENTLY, SOME SOLDIERS’ OSA MAY REMAIN UNTREATED, LEADING TO POOR SLEEP QUALITY. ORAL APPLIANCE THERAPY (OAT) IS THE PRIMARY DEVICE ALTERNATIVE TO PAP. OAT APPLIANCES, WHICH ARE DELIVERED BY QUALIFIED DENTAL SLEEP MEDICINE (DSM) PROVIDERS, HOLD THE JAW FORWARD AND PREVENT COLLAPSE OF THE UPPER AIRWAY, THEREBY PREVENTING OSA. UNLIKE PAP DEVICES, OAT APPLIANCES ARE SMALL AND CAN BE USED IN ANY ENVIRONMENT. THEY ARE EFFECTIVE, WELL TOLERATED, EASILY ADJUSTED, AND CAN FIT INSIDE A SOLDIER’S UNIFORM POCKET. THROUGH OAT, ARMY DSM PROVIDERS CAN ENHANCE MISSION PERFORMANCE, ADVANCE DEPLOYMENT READINESS, AND IMPROVE THE HEALTH OF THE FORCE (OTSG/MEDCOM, 2018; PHILLIPS ET AL., 2013; RAMAR ET AL., 2015; SUTHERLAND ET AL., 2015).
Health Metrics | Obesity

Obesity

The high prevalence of obesity in the U.S. poses a serious challenge to recruiting and retaining healthy Soldiers. Obesity is a leading factor in preventable death and increases a person’s risk of hypertension, type 2 diabetes, stroke, and injuries, compared to someone with a healthy weight. Obesity can have a serious impact on a Soldier’s performance, quality of life, and mental and physical well-being.

Obesity is determined by calculating Body Mass Index (BMI), a ratio of weight to height. The CDC defines obesity as a BMI of at least 30 kg/m² (weight in kilograms divided by height in meters squared) or greater and overweight as a BMI between 25 and 30. However, Army studies have demonstrated that up to 20% of Soldiers with BMIs between 25 and 28 are not “overweight” due to excess body fat but rather have increased muscle mass. The Army Body Composition Program, AR 600-9, takes this into account and also adjusts height/weight standards for age and sex (e.g., a 40-year old male Soldier can have a BMI of 27.5 and be in compliance).

Medical providers in both the DOD and civilian sector rarely use diagnosis codes to document overweight and obesity in medical records. BMI provides a means to monitor Soldiers’ body composition, as height and weight are routinely captured during healthcare visits.

Overall, 17% of Soldiers were classified as obese.
Prevalence ranged from 8.3% to 25% across Army installations.

Prevalence of Obesity by Sex and Age, AC Soldiers, 2017

The prevalence of obesity increases with age. In all age groups, men are more likely to be obese than women. The increased prevalence of obesity in older Soldiers is of particular concern, as carrying excess weight further increases risks for a number of chronic conditions.
Weight Classifications by BMI Category, AC Soldiers, 2017

In 2017, more than a third of AC Soldiers were obese or classified into the high overweight category; less than 1% were determined to be underweight.

Prevalence of Obesity, AC Soldiers, 2015–17

The prevalence of obesity in the Army has remained constant over the last 3 years. In contrast, obesity in the general U.S. working population is increasing (BRFSS, 2017).

1 U.S. working adults 18-64 years of age, age and sex adjusted to the Army population.

26% of working U.S. adults 18–64 years of age were classified as obese in 2017 after adjusting the crude rate (31%) to the Army age and sex distribution.

Source: BRFSS, 2017
LOCAL ACTION

U.S. Army Alaska Targets Obesity and Physical Readiness

The U.S. Army Alaska (USARAK) CR2C partnered with the 1st Stryker Brigade to implement an initiative to restore physical fitness, prevent weight gain, and reduce re-injury rates. The 1st Stryker Brigade Physical Therapist and the Brigade Support Battalion (BSB) spearheaded an Injured Reserve Physical Training (IRPT) program to provide training to select fitness leaders and conduct segregated profile physical training based on Field Manual 7-22 (DA, 2012) and the MEDCOM guide Building the Soldier Athlete: Injury Prevention and Performance Optimization (MEDCOM, undated). Following program completion, the unit demonstrated a 5% re-injury rate and a 96% first-time APFT pass rate. From April 2017 to June 2018, medical evaluation board rates declined from 16% to 5% and are now the lowest in the Brigade. In addition to experiencing reduced rates of permanent disability, Soldiers within the BSB seek care for injuries less often, down to 12% from 20%. Currently, the IRPT program is fully implemented within the 1st Stryker Brigade Combat Team and the 4th Brigade Combat Team (Airborne), 25th Infantry Division, and continues to be implemented throughout USARAK.
SPO T L I G H T

IMPROVE AEROBIC FITNESS AND BODY COMPOSITION TO REDUCE INJURY RISK

SEVERAL STUDIES HAVE SHOWN THAT BOTH poor aerobic fitness (as measured by APFT 2-mile run times) and a BMI that is too high or too low are risk factors for injuries which can negatively affect medical readiness (Jones & Hauschild, 2015). While it is logical that those who are more aerobically fit can perform tasks for longer durations with less fatigue and recovery time (Knapik, 2015), the relationship between BMI and injury risk is less straightforward.

In a population of over 180,000 Soldiers in Initial Entry Training during FY10 through FY13, the highest injury rates were seen among Soldiers with the lowest BMIs and slowest run times (Jones et al., 2017). Soldiers in all BMI categories with the slowest run times had higher risks of injury. These results are comparable to another recent study of Soldiers in an operational brigade (Rappole et al., 2017).

When the population run times and BMI values were binned into five equal groups (quintiles, Q1–Q5), Initial Entry Soldiers with the lowest BMIs (Q1) and the slowest run times (Q1) were at approximately three times greater risk of injury compared to those who had an average BMI and a fast run time. This was true of injury incidence rates for both male and female Soldiers (see figures). Soldiers with the fastest run times and average BMI (Q3–Q4) had the lowest injury risk. The protective effect of a higher BMI, compared to a low BMI, is likely related to additional lean body mass (muscle) (Grier et al., 2015).

Recognizing the relationship of aerobic fitness and body composition to injury is critical to reducing injury risk. While the least aerobically fit Army trainees experience the highest risk of injury, those with the lowest BMI are also at increased injury risk. Understanding these trends has implications for recruitment and retention fitness standards. Those Soldiers with modifiable risk factors of high BMI, low BMI, and/or slow APFT run time performance should visit their installation’s Army Wellness Center for information about optimizing body composition and physical fitness to reduce injury risk.

**Injury Incidence Stratified by BMI and Run Times, Initial Entry Training, Female Soldiers, 2010–2013 (n=42,000)**

**Injury Incidence Stratified by BMI and Run Times, Initial Entry Training, Male Soldiers, 2010–2013 (n=140,000)**
Tobacco Use

Using tobacco products negatively impacts Soldier readiness by impairing physical fitness and by increasing illness, absenteeism, premature death, and healthcare costs (DA, 2015). The Periodic Health Assessment (PHA), completed annually by Soldiers, contains several self-reported tobacco-related questions (DOD, 2016b). Because the PHA is conducted as part of a physical exam which determines an individual’s ability to deploy, many Soldiers may not report their tobacco usage to avoid potential negative attention. In addition, nicotine is known to increase alertness, and some Soldiers believe tobacco use enhances their ability to survive in austere environments. Data on vaping, e-cigarettes, or other alternative methods of consuming nicotine are currently being captured on the PHA.

Overall, 23% of Soldiers reported tobacco use. Prevalence ranged from 8.3% to 31% across Army installations.

Prevalence of Tobacco Use by Sex and Age, AC Soldiers, 2017

Regardless of sex, the majority of smokers are 34 years of age or younger. Across the age groups, the prevalence of tobacco use among male Soldiers was more than double that of female Soldiers.
Prevalence of Tobacco Use, AC Soldiers, 2013–2017

Tobacco use has decreased by nearly 7.0% since 2013; however, the increasing popularity of vaping and e-cigarettes may have impacted the observed decline in smoking tobacco use. Among the tobacco use categories assessed, the largest number of Soldiers reported smoking. The prevalence of Soldiers who reported smokeless (chewing or dipping) use remained the same over this timeframe. The general U.S. population rates for tobacco use are higher than the Army rates in 2017. The reported use of smokeless tobacco in the Army (11%) is higher than the national rate (8.6%) (BRFSS, 2017).

### Any tobacco use, 2013–2017

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</tbody>
</table>

**Source:** BRFSS, 2017
Heat Illness

Heat illness refers to a group of disorders 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 can have operational and readiness impacts for the Army. Heat illness represents a set of conditions that exist along a continuum of symptoms and illness severity that includes heat exhaustion and heat stroke, which are reportable medical events that should be reported through the Disease Reporting System, internet (DRSi).

Incident Cases of Heat Illness by Month*, AC Soldiers, 2017

Although heat exhaustion and heat stroke were reported year-round, the number of incident cases of heat illness was highest during the warmer months (May through September). In 2017, 1,869 incident cases of heat illness were reported in DRSi and the Military Health System Management Analysis and Reporting Tool (M2). Of total incident cases, the majority (80%) were heat exhaustion, and the remaining 20% were heat stroke.

*Months not shown had <20 cases for heat exhaustion and/or heat stroke.
Incidence of Heat Illness by Rank, AC Soldiers, 2017

Groups with the highest frequency of heat exhaustion in 2017 were junior enlisted (76%), male (79%), and under the age of 25 (69%). The same groups had the highest frequency of heat strokes: junior enlisted (57%), male (86%), and under the age of 25 (55%).

Incidence of Heat Illness Hospitalizations, AC Soldiers, 2014–2017

The number of reported heat illness cases has increased over the past 4 years. Increased awareness of heat illness risks and local program efforts may have contributed to the increase. From 2016-2017, the number of heat exhaustion cases increased by less than 1% while there was a 20% increase in heat stroke cases. In 2017, 3.6% of heat exhaustion patients and 30% of heat stroke patients were hospitalized.
LOCAL ACTION

Fort Benning Strives for Excellence in Preventing Heat-Related Illnesses

Fort Benning, Georgia, reports the highest number of heat-related illnesses (HRIs) among all Training and Doctrine Command (TRADOC) installations, yet an HRI death has not occurred there in over a year. This success is due to a collaborative effort by Fort Benning leaders and subject matter experts to establish the Heat Center at Fort Benning and implement best practices for the prevention and treatment of HRIs, such as heat stroke and low sodium blood levels (hyponatremia). Fort Benning has created a “chain of survival” for HRIs by developing and implementing clinical standard operating procedures, referred to as The Benning Protocols, from point of injury through treatment and disposition. These protocols, along with recent updates on HRIs, are reviewed by medical and non-medical leaders at the annual heat forum.

The Martin Army Community Hospital Department of Emergency Medicine partnered with the U.S. Army Research Institute of Environmental Medicine and the U.S. Army Maneuver Center of Excellence on a June 2018 research project targeted at identifying Soldiers at highest risk for heat stroke under real-time training conditions. Through use of these data, the Heat Center aims to be a cutting-edge, sustainable organization dedicated to saving Soldiers’ lives, advancing medicine, and improving Soldier readiness at Fort Benning by mitigating HRIs.

Both Soldiers and leaders can take steps to mitigate the impact of heat illnesses. Soldiers can ensure they get adequate sleep, hydration, and nutrition prior to training. Leaders can use risk management guidelines when planning for training in the heat, including consideration of Soldier acclimatization. Leaders should ensure personnel are trained on prevention, recognition, and basic treatment of heat illness. Guidance for preventing heat illness can be found at: https://phc.amedd.army.mil/topics/discond/hipss/Pages/heatillnessalert.aspx
Hearing readiness is an essential component of medical readiness, as hearing directly impacts communication abilities that influence lethality and survivability in all environments. **Good hearing preserves awareness and improves communication responses that are crucial to success on the battlefield.** The Defense Occupational and Environmental Health Readiness System - Hearing Conservation (DOEHRS-HC) is a Military Health System (MHS) information system designed to support personal auditory readiness and prevent significant hearing loss through the early detection of hearing changes. The Army Hearing Program (AHP) uses DOEHRS-HC to monitor the hearing ability of military and DA Civilian personnel.

**Prevalence of New Significant Threshold Shifts, AC Soldiers, 2013–2017**

Hearing injuries/impairment decreased from 2013 to 2017. In 2017, 3.7% of monitored AC Soldiers experienced a significant threshold shift (STS), or decreased hearing, in one or both ears when compared to a baseline hearing test. This prevalence is approaching the AHP goal of 3%.

![Prevalence of New Significant Threshold Shifts, AC Soldiers, 2013–2017](chart)

**Source:** DOEHRS-HC Data Repository

**Prevalence of Hearing Profiles, AC Soldiers, 2013–2017**

The prevalence of hearing-related medical profiles among AC Soldiers continues to decline. The percentage of AC Soldiers with a ≥H-3 hearing profile (indicative of moderate hearing impairment and requiring a fitness-for-duty hearing readiness evaluation) has fallen from 1.3% in 2013 to 0.85% in 2017. Soldiers with an H-2 hearing profile (clinically significant hearing loss) have decreased from 3.7% in 2013 to 2.9% in 2017.

![Prevalence of Hearing Profiles, AC Soldiers, 2013–2017](chart)

**Source:** DOEHRS-HC Data Repository
Percent Not Hearing Ready (HRC 4), AC Soldiers, 2017

In calendar year 2017, Soldiers who are not hearing ready, that is, those with Hearing Readiness Classification 4 (HRC 4), decreased to 6.2%. This proportion is near the AHP goal of 6%. HRC 4 Soldiers are either overdue for their annual hearing test or require a follow-up hearing test(s) to identify their true hearing ability.

Soldiers and Army Civilians are exposed to hearing hazards in their workplaces daily, potentially degrading survivability, lethality, safety, and communications. Of the ten most commonly identified hazards in the DOEHRS-Industrial Hygiene (DOEHRS-IH) database, seven can negatively impact hearing either through physical noise or metabolic disruption by chemical hazards. Examples of chemical hazards include carbon monoxide, lead, diesel fuel, stoddard solvent, toluene, and xylene.

Noise- or chemical-induced hearing loss is preventable. Protection of the hearing of workers is accomplished through a multidisciplinary team focused on prevention. This team consists of industrial hygienists, occupational health nurses and physicians, and audiologists. Collectively, this team is responsible for workplace hazard assessments, for providing individualized medical screening and surveillance based upon these assessments, for identifying and implementing exposure controls, and for providing worker education.

Look for future health indicators in Health of the Force to highlight the role occupational health plays in protecting Soldier readiness and preserving long-term Army health.
Sexually Transmitted Infections

Chlamydia is the most commonly reported sexually transmitted infection (STI) both in the U.S. and the Army. Civilian and military public health agencies use reported chlamydia infections as an indicator of overall STI burden. **Infection rates also provide a measure of risk behavior and help to identify vulnerable populations.** Since STIs, including chlamydia, do not always produce recognizable symptoms, people are often unaware that they have an infection, thereby increasing the risk of their spreading it to others. Left untreated, STIs may lead to severe health complications. Women are disproportionately affected and may experience pelvic inflammatory disease, ectopic pregnancy, and infertility. These complications can impact Soldier medical readiness and well-being. The CDC and U.S. Preventive Services Task Force (USPSTF) recommend that pregnant women, sexually active women under 25 years old, and women or men with risk factors be screened annually for chlamydia and gonorrhea (USPSTF, 2018).

**Incidence of Reported Chlamydia Infection by Sex and Age, AC Soldiers, 2017**

Reported chlamydia rates among women were more than three times the rates reported among men. Rates were **highest among women under 25 years of age** (a group targeted for annual screening), with 110 infections per 1,000 person-years reported.
Incidence of Reported Chlamydia Infection by Sex, AC Soldiers, 2013–2017

A steady rise in reported chlamydia infections has occurred over the past 5 years, most notably among women. Overall rates reported for 2017 were 34% higher than in 2013. This increase is consistent with national rising rates.

Percent of AC Females under Age 25 Screened for Chlamydia, AC Soldiers, 2013–2017

On average, 84% of female Soldiers under 25 years of age were screened for chlamydia in 2017 in accordance with USPSTF guidelines. Screening has improved from the 73% compliance rate observed in 2013; however, there is considerable variability by installation, with compliance rates ranging from 70% to 97%. Overall, Army screening rates are markedly higher than those observed nationally, where 2016 screening rates ranged from 40% to 54% (NCQA, 2018).
SEXUALLY TRANSMITTED INFECTIONS ON THE RISE

SEXUALLY TRANSMITTED INFECTIONS (STIs) HAVE SURGED IN THE U.S., WITH rates of reportable infections reaching record highs in 2017. From 2016 to 2017, the CDC reported increases of 6.9%, 19%, and 11% for chlamydia, gonorrhea, and syphilis, respectively (CDC, 2017a). Army STI rates often exceed those reported in the general population, and are also rising. This excess is not surprising given that the Army is skewed towards younger groups who are at higher risk, and Soldiers have greater access to medical screening, which increases the likelihood of detection.

Incidence of Reported STIs, AC Soldiers, 2013–2017

The rate of reported syphilis infection has increased by nearly 70% from 2013–2017.

Army STIs by the Numbers (2017)

**Chlamydia**

10,242 cases

**Gonorrhea**

1,680 cases

**Syphilis**

180 cases
In 2017, rates of reported chlamydia among AC Soldiers increased by 11% compared to 2016. Similar increases in reported rates among AC Soldiers were observed for gonorrhea (14%) and syphilis (7.8%) in 2017 compared to the previous year. The increase in gonorrhea is alarming given limited treatment options and the spread of antibiotic-resistant strains. Rates of syphilis, although relatively low compared to other STIs, are also increasing.

Soldiers and healthcare providers should be aware that certain groups may be at elevated risk for different STIs. For example, the CDC reports that in 2017, over half (58%) of all syphilis cases were in men who have sex with men (MSM). Approximately one half (46%) of MSM diagnosed with syphilis in the U.S. are also co-infected with Human Immunodeficiency Virus (HIV) (CDC, 2017a). In general, men under age 29 were more likely to be infected with syphilis, a trend also observed in the Army.

Most STIs do not cause symptoms that prompt one to seek treatment and practice prevention. Therefore, **many infections go undetected, and reported rates are conservative.** Left untreated, STIs can pose a significant health threat, progressing to reproductive health complications such as pelvic inflammatory disease, infertility, ectopic pregnancy, pre-term birth, and infant death. Additionally, other vaccine-preventable STIs such as human papilloma-virus (HPV) can progress to cervical and other forms of cancer. Hepatitis B (also vaccine-preventable) can lead to debilitating conditions such as liver failure, cirrhosis, and liver cancer. These complications negatively impact Soldier health, well-being, and readiness.

To protect yourself and to prevent the spread of STIs, the CDC recommends several effective strategies to reduce risk, including correct and consistent use of latex condoms, abstinence, mutual monogamy, reduction in the number of sex partners, and vaccination against HPV and hepatitis B. Annual screening for chlamydia and gonorrhea is also recommended for sexually active women under 25 years of age and others at high risk of infection. Syphilis, hepatitis B, and HIV testing are recommended for pregnant women at their first prenatal visits and for others at high risk for infection (USPSTF, 2016).
Chronic Disease

Chronic diseases hinder military medical readiness by decreasing a Soldier’s ability to fulfill physically demanding mission requirements or to deploy to remote locations where healthcare resources are limited. The chronic diseases assessed in *Health of the Force* include cardiovascular disease, hypertension, cancer, asthma, arthritis, chronic obstructive pulmonary disease (COPD), and diabetes. Many chronic diseases can be prevented and managed in part by adopting healthy lifestyle choices such as maintaining a healthy weight, exercising regularly, and avoiding tobacco use.

Due to the FY16 transition to ICD-10-CM, diagnosis coding was re-evaluated to identify chronic disease groups for several conditions. For example, the group of joint diseases commonly known as arthritis has been more broadly defined than in the past and now includes degenerative arthritis, inflammatory arthritis, infectious arthritis, and metabolic arthritis. The expansion of disease definitions resulted in higher percentages of chronic disease conditions than those reported using previous case definitions; therefore, annual trends were refreshed to reflect the new definitions.

Overall, 19% of Soldiers had a chronic disease.
Prevalence ranged from 12% to 38% across Army installations.

**Prevalence of Chronic Disease by Sex and Age, AC Soldiers, 2017**

The prevalence of chronic disease increases with age. Women had a higher prevalence of chronic disease than men across all age groups. Among AC Soldiers in 2017, 22% of women and 19% of men had at least one chronic disease.
Prevalence of Chronic Disease by Disease Category, 2013–2017

In 2017, 19% of AC Soldiers had a chronic disease. The prevalence of AC Soldiers with any chronic disease has been decreasing since 2014. The most prevalent chronic disease was arthritis (9.0%), followed by cardiovascular disease (6.4%). Hypertension (high blood pressure), although a contributor to cardiovascular disease, was analyzed separately to characterize its distinct burden.

![Graph showing prevalence of chronic diseases by year](image)

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<td>22</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Arthritis (%)</td>
<td>8.5</td>
<td>9.0</td>
<td>9.3</td>
<td>9.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Cardiovascular (%)</td>
<td>7.8</td>
<td>8.0</td>
<td>7.8</td>
<td>7.2</td>
<td>6.4</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>7.3</td>
<td>7.2</td>
<td>6.9</td>
<td>6.4</td>
<td>5.7</td>
</tr>
<tr>
<td>Asthma (%)</td>
<td>3.1</td>
<td>3.0</td>
<td>2.9</td>
<td>2.8</td>
<td>2.6</td>
</tr>
<tr>
<td>COPD (%)</td>
<td>2.2</td>
<td>2.1</td>
<td>1.9</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Diabetes (%)</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Cancer (%)</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Sum of disease categories is greater than the overall chronic disease prevalence as Soldiers may have more than one condition.

Half of all Americans live with at least one chronic disease, like heart disease, cancer, stroke, or diabetes. These and other chronic diseases are the leading causes of death and disability in America, and they are also a leading driver of healthcare costs (CDC, 2018c).
SPOTLIGHT

ARMY SURGEON GENERAL RECOMMENDS THE IMMEDIATE REMOVAL OF INDOOR TANNING DEVICES

EXPOSURE TO ULTRAVIOLET (UV) RADIATION from the sun and artificial sources increases a person’s long-term risk for health problems to the skin and eyes. Although reducing natural sunlight exposure can be challenging, UV exposure from indoor tanning (such as tanning beds/booths and sunlamps) is entirely avoidable. The American Academy of Dermatology, the CDC, the U.S. Surgeon General, and the World Health Organization (WHO) all recognize indoor tanning as a significant skin cancer risk (DHHS, 2014; WHO, 2018).

In the U.S., up to 400,000 annual skin cancer cases may be related to indoor tanning (WHO, 2018). Almost 70% of tanning bed users are young Caucasian women. Women under 30 are six times more likely to develop melanoma if they use indoor tanning (AAD, 2018). Because young people are especially at risk (DHHS, 2014), some states prohibit indoor tanning by persons under 18 years of age (NCSL, 2017).

In the Army, just over 3,200 new skin cancers were diagnosed in a recent 10-year period (Lee et al, 2016a, 2016b). Although it is unknown if these new cancer diagnoses were related to indoor tanning, it is well understood that the negative health impacts of indoor tanning far outweigh any perceived benefit.

The Army Surgeon General identified that indoor tanning is a detriment to health, wellness, and readiness and has recommended immediate removal of indoor tanning devices from Army installations (DOD, 1999; OTSG, 2017). In FY19, a prohibition of indoor tanning will be implemented in accordance with Army Regulation (AR) 40-5 (DA, 2000) and DA Pam 40-11 (DA, 2005). This prohibition affirms the Army’s commitment to preserve the health of Soldiers, Civilians, and their Families.

Indoor tanning users are at increased risk for melanoma and non-melanoma skin cancers like this squamous cell carcinoma (Wehner et al., 2012).

400,000 annual skin cancer cases may be related to indoor tanning in the U.S.
WHERE WE LIVE, WORK, AND PLAY GREATLY impacts all aspects of our lives, including our health. The U.S. Army Installation Management Command (IMCOM) is leading the Healthy Army Communities (HAC) commitment to better understand and shape community environments that support active living through the promotion of readiness and resilience.

HAC is dedicated to redesigning Army communities by first working with installation Master Planners to promote public health through the planning process. The integration at the planning level follows several private-sector recommendations on incorporating health and bringing a public health perspective to municipal planning (Beck, 2010; Ricklin & Kushner, 2013). Similar to the installation environment, municipalities can create environments and provide opportunities for residents to choose healthier behaviors and live healthier lifestyles (Beck, 2010). In several case studies around the country, municipalities have been successful in promoting more physical activity and active living through built environment changes (e.g., more parks, connected trails, sheltered bus stops for public transit) by working through policy, utilizing public health champions, and capitalizing on the advocacy of local coalitions (Ricklin & Kushner, 2013).

Starting in August 2017, the APHC partnered with IMCOM Master Planners to integrate the HAC mission into two Area Development Plan (ADP) workshops. The APHC added a “healthy community” planning component to an existing exercise. The ADP workshop participants were excited to discuss healthy community planning, and these conversations heavily influenced all proposed projects. The results of these two case studies include the integration of projects that prioritized changes to the built environment, such as creating more green space, improving sidewalks and trails, and cultivating infrastructure for multimodal transportation options (e.g., buses, cars, bicycles, and walking). These changes will positively affect the Total Army by providing more opportunities for active living and encouraging community members to make healthier choices.

The APHC and IMCOM plan to continue their collaborations to improve overall installation planning. As installation infrastructure changes to meet mission needs, careful consideration of installation environments during the planning process can support and prioritize the health of Army communities.

For more information on IMCOM’s work with installation communities, visit: https://home.army.mil/imcom
Environmental Health Indicators
This year marks the 25th anniversary of the groundbreaking study that revealed the link between air pollution and mortality risk (Dockery, et al., 1993). This research ushered in three decades of science documenting the many ways that air pollution affects human health. A growing body of evidence implicates air pollution in a range of health conditions including cardiovascular and respiratory disease, 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).

Although the U.S. continues to have good air quality relative to most of the world, pockets of elevated air pollution persist in densely populated regions and places with concentrated industrial activity. Further, the effects of climate change have begun to exacerbate the frequency and intensity of natural events which can trigger hazardous levels of air pollution. In 2017, wildfires in western states produced harmful levels of fine particulate matter (PM$_{2.5}$) that billowed from Canada to Mexico, and Hurricane Harvey caused Houston area industries to emit a typical year’s worth of toxic air contaminants – 8 million pounds – in only a few weeks (Olsen, 2018).

Outside the U.S., 95% of the world’s population lives in places that fail to meet World Health Organization guidelines for healthy air (Health Effects Institute, 2018). Areas most at risk include countries in the Middle East, South Asia, East Asia, North Africa, and West Africa. The primary offending pollutant is PM$_{2.5}$, created by sources such as coal-fired power and industrial plants, solid fuel burning for residential heat, open burning of land and waste, and vehicular activity.

### Poor Air Quality

Days when air pollution near Army installations was at levels deemed unhealthy for some or all of the general public:

<table>
<thead>
<tr>
<th>Army range: 0–123 days/year</th>
<th>U.S.-based installation</th>
<th>Installation outside the U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation in area with &lt;5 days/year</td>
<td>Installation in area with 5–20 days/year</td>
<td>Installation in area with &gt;20 days/year</td>
</tr>
</tbody>
</table>
Air Quality at U.S. Army Garrisons in South Korea, 2015–2017

What’s Happening at Army Installations?
As in prior years, the majority of poor air quality days at U.S. Army installations were due to ground level ozone, which is elevated seasonally between May and September. Exceptions occurred at Joint Base Lewis-McChord (JBLM) and Fort Wainwright, both of which experienced high levels of PM\(_{2.5}\) and Fort Bliss, which experienced high levels of both ozone and PM\(_{2.5}\). At JBLM, high PM\(_{2.5}\) levels occurred most often during July and August due to drifting smoke from British Columbia wildfires. At Fort Wainwright, PM\(_{2.5}\) levels were high in winter months due to wood-burning stoves and fireplaces.

This year, for the first time, *Health of the Force* includes air quality data for 10 Army installations outside the U.S. Most poor air quality days at these locations were due to PM\(_{2.5}\) although ozone was a contributing factor at nearly every location. Installations in South Korea experienced the worst air quality in terms of both frequency and magnitude. As shown in the chart, it is not unusual for U.S. Army installations in South Korea to experience more than 100 poor air quality days per year.

Where to Find Air Quality Information?
The Environmental Protection Agency’s (EPA) AirNow Web site provides real-time data on air pollution levels in the U.S., along with behavior management guidance based on the pollutant level and affected population. Air pollution information for locations outside the U.S. is available on the Air Pollution in World: Real-time Air Quality Index Visual Map. This Web site acquires open source real-time air pollution data published by international environmental authorities and converts it to the EPA Air Quality Index (AQI) format, including the index value and color. Users can obtain an AQI value for a location of interest and match it to the associated health precautions at the EPA AQI Web site.
Environmental Health Indicators

Drinking Water Quality

The Safe Drinking Water Act (SDWA) protects drinking water supplies by requiring the EPA to set limits on the amounts of chemical, biological, and physical impurities permitted in drinking water. Some of these limits, known as health-based standards, are designed to protect the health and well-being of human consumers who rely on safe sources of drinking water. Health-based standards protect against acute health concerns such as hemorrhagic diarrhea, caused by E. coli; or methemoglobinemia (“blue baby syndrome”), caused by elevated levels of nitrate or nitrite. Health-based standards also protect against chronic health concerns such as cancer and birth defects.

In FY17, Army water systems reported three health-based drinking water violations, compared to five in FY16. All were violations of standards protecting against non-acute health effects. USAG West Point reported a repeat violation related to elevated total trihalomethanes (THMs) which occur when chlorine used as a drinking water disinfectant reacts with naturally occurring organic matter in water. USAG Japan received a total coliform violation at Sagami General Depot. Total coliform bacteria are an indicator of the possible presence of pathogenic bacteria. USAG Wiesbaden violated action levels for lead and copper at Wiesbaden Family Housing areas and Clay Kaserne. Corrective actions were implemented for these three installation water systems, and the violations were resolved. Violations of these health-based standards ranged from 3 to 90 days’ duration.

Poor Water Quality

Violations of health-based drinking water standards at an Army installation:

- Green: Installation with no violation of health-based drinking water standards
- Yellow: Installation with violation of health-based standards for non-acute effects
- Red: Installation with violation of health-based standards for acute effects
- Gray: Installation with no data available

☐ U.S.-based installation
☐ Installation outside the U.S.
Over the last four years (FY14–FY17), two types of recurring violations have predominated at Army water systems. The most commonly violated standard was the Stage 2 Disinfectants and Disinfection Byproducts Rule, followed by the Total Coliform Rule (TCR). Although the TCR had been one of the most frequently violated national standards, FY17 violations were significantly lower than in FY16. Army experienced a similar decrease in the proportion of annual TCR violations from 6.0% to 0.06%. Reductions may be due to recent revisions to the TCR, which changed how violations are assessed.

These recent Army water system violations align with trends occurring in CWS serving the U.S. In general, failures in water treatment and/or distribution system operational practices are likely contributing factors for the most frequently occurring health-based violations. Understanding the causes and effects of these violations is a priority for Army water system managers to improve potable water quality for consumers.

Consumers can learn about the quality of their drinking water at the EPA’s Safe Drinking Water Information System (SDWIS). The site provides information such as system classification and violation history.
Community water systems (CWS) add fluoride to drinking water to prevent tooth decay and maintain oral health for the benefit of all consumers. Water fluoridation has been a major factor in decreasing the prevalence and severity of dental caries and has been touted as one of the 10 great public health achievements of the 20th century (CDC, 1999). The fluoridation of CWS is one of the oral health objectives in Healthy People 2020 (HP2020) and is recognized as one of the most cost-effective measures to improve oral health. A 2016 study showed that fluoridation saves communities an average of $32 per person per year by averting treatment for tooth decay (O’Connell et al., 2016).

**Optimal Fluoridation**

The U.S. Public Health Service’s (PHS) recommendation for fluoride concentration in drinking water is a non-enforceable, evidence-based guideline (DHHS, 2015). For water systems that fluoridate, PHS and the CDC recommend an optimal fluoride concentration of 0.7 milligrams/liter (mg/L). This is the lowest level capable of preventing tooth decay while reducing the risk of dental fluorosis, i.e., a primarily cosmetic condition of the tooth caused by ingestion of excess fluoride during tooth development.

**Installation-based Assessment**

The Office of the Assistant Chief of Staff for Installation Management (ACSIM) surveyed all IMCOM installations to determine how many provided optimally fluoridated drinking water in FY17. A subset of those installations is tracked in this report. Of tracked installations, 50% provided water to their consumers at the optimal fluoridation level, 45% provided water that was less than optimally fluoridated, and 4.8% either did not report or were not monitored. None of the surveyed installations provided water that exceeded the Safe Drinking Water Act maximum contaminant level (MCL) for fluoride (4 mg/L) (EPA, 2018b).

**Water Fluoridation**

**Average fluoride concentration in drinking water at an Army installation:**

<table>
<thead>
<tr>
<th>Army range: &lt;0.25–1.6 mg/L</th>
<th>U.S.-based installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7–2.0 mg/L</td>
<td>Installation outside the U.S.</td>
</tr>
<tr>
<td>&lt;0.7 mg/L or 2.0–4.0 mg/L</td>
<td>Installation with no data available</td>
</tr>
<tr>
<td>&gt;4.0 mg/L</td>
<td></td>
</tr>
</tbody>
</table>
The CDC’s My Water’s Fluoride Web site provides consumers with online access to their drinking water fluoridation status. Additionally, the Army Community Resource Guides Web site has links to installation-specific Consumer Confidence Reports (CCRs). CWS issue CCRs annually to provide information such as fluoride levels and regulatory compliance status.

“Water fluoridation is the best method for delivering fluoride to all members of the community, regardless of age, education, income level, or access to routine dental care. Fluoride’s effectiveness in preventing tooth decay extends throughout one’s life, resulting in fewer – and less severe – cavities. In fact, every generation born over the past 70 years has enjoyed better dental health than the one before it. That’s the very essence of the American promise.”

—Vivek H. Murthy, MD, MBA
Former United States Surgeon General
The U.S. is the world’s leading trash generator, producing 262 million tons of waste per year, with over half of it going to landfills (EPA, 2018a). The problem is not simply a question of running out of landfill space; health risks arise from downstream exposures to waste-derived pollutants. When incinerated or landfilled, discarded materials containing toxic chemicals create second-order health impacts via air pollution or tainted drinking water sources. Improperly disposed wastes can increase the incidence of illnesses such as diarrhea, and when burned, waste can be responsible for a six-fold increase in respiratory infections (Simmons, 2016). When waste-derived contaminants exceed regulatory levels in drinking water, the long-term negative effects can range from organ damage to increased cancer risk (EPA, 2017).

Reducing generation and increasing diversion of waste are critical factors in the management of health risks resulting from improper disposal of solid waste. Diversion tactics such as recycling, reuse, composting, mulching, and donation facilitate mission sustainability, health and well-being, and community relationships. **Solid waste diversion benefits community health by eliminating exposure to preventable hazards.** The solid waste diversion rate helps to gauge waste and hazard reduction by quantifying efforts such as recycling and composting.

### Solid Waste Diversion Rate

**Percent of non-hazardous solid waste diverted to recycling, reuse, composting, mulching, or donation at an Army installation:**

 Army range: 0–100%

- [ ] U.S.-based installation
- [ ] Installation outside the U.S.

- Installation with Solid Waste Diversion Rate ≥50%
- Installation with Solid Waste Diversion Rate 25–49%
- Installation with Solid Waste Diversion Rate <25%
- Installation with no data available
As the Army’s system of record for waste generation and diversion data, the ACSIM internet-based Solid Waste Annual Report (SWARWeb) contains the data from which the solid waste diversion rate is derived.

The overall DOD FY17 diversion rate was 43%, down 1% from FY16 (DOD, 2018). This may be due to slumping recycling markets, and more recently, the Defense Logistics Agency’s (DLA) decision to halt reimbursements for Qualified Recycling Program-eligible scrap (DLA, 2017), thereby eliminating the economic incentive for many installations to recycle.

Although the Army FY17 solid waste diversion rate falls short of the DOD diversion goal of 50% (DOD, 2016a), it is well within reach of this DOD measure of merit. This target could be achieved with increased emphasis on diversion, innovative solutions, and smarter refuse/recycling contracting to provide incentives for increased diversion, and/or to allow installations to receive economic benefits from the sale of recyclables.
Environmental Health Indicators

Mosquito-borne Disease

Diseases transmitted by the bites of infected mosquito vectors present a threat to our Soldiers, Department of the Army (DA) Civilians, and their Families. Regional risks vary throughout the year depending on the weather and can change from year to year as alterations in weather patterns affect local mosquito populations. In 2018, the CDC reported that the number of cases of disease from mosquito, tick, and flea bites in the U.S. more than tripled from 2004 to 2016 and that this trend is expected to continue into the foreseeable future (CDC, 2018d). While some of this increase may be attributable to increased pathogen testing, the data confirm that there are more diseases resulting from mosquito bites than was previously known.

The majority of mosquito-borne diseases have no vaccines or treatments, so bite avoidance is the best method of prevention. Mosquito-borne pathogens often circulate in mosquito populations long before human cases occur. Because of this, robust surveillance at the installation level serves as an early warning system for possible mosquito-borne disease threats.

Two risk indices were calculated from the 2017 mosquito collection data: day-biting mosquito contact risk and West Nile virus (WNV) transmission risk. The day-biting mosquito risk estimates the potential for day-biting mosquito vectors to be encountered on an installation. These mosquitoes are potential vectors of dengue, chikungunya, Zika, or yellow fever viruses. The WNV transmission risk estimates the threat of WNV transmission on an installation. Installations lacking these data either do not submit mosquitoes to their supporting Public Health Command Region for disease testing or do not conduct mosquito surveillance.

Mosquito-borne Disease Risk

- **Risk of coming into contact with a day-biting mosquito at an Army installation:**
  - Low-Risk Installation
  - Moderate-Risk Installation
  - High-Risk Installation
  - Installation with no data available

- **Risk of West Nile virus transmission at an Army installation:**
  - Low-Risk Installation
  - Moderate-Risk Installation
  - High-Risk Installation
  - Installation with no data available

- U.S.-based installation
- Installation outside the U.S.
Mosquito species exhibit different behaviors which cause them to prefer different environments and bite at various times throughout the day and night. Removing all standing water from an area and ensuring that window screens are intact will provide protection in the direct vicinity, including indoors. Following the DOD Insect Repellent System remains the best mitigation strategy; this includes the wearing of a permethrin-treated uniform and applying repellent to any exposed skin. When off duty and outdoors, apply sunscreen before repellents to ensure the effectiveness of both. These steps, combined with proper clothing (long-sleeved shirts and long pants), can help combat the risk of mosquito-borne diseases.
Tick-borne Disease

Tick-borne diseases account for more than 75% of reported vector-borne disease in the U.S., and reports of tick-borne disease have doubled in the last 13 years (Rosenberg et al., 2018). Lyme disease accounts for more than 80% of tick-borne disease, with an estimated 300,000 new cases annually (Rosenberg et al., 2018; Eisen et al., 2017; CDC, 2017b). It is a threat to Army readiness, with primary risk occurring during garrison training exercises or outdoor recreational activities. In the U.S., only two species of ticks are associated with human cases of Lyme disease: the blacklegged tick (*Ixodes scapularis*, also called the deer tick) on the east coast, and the Western blacklegged tick (*Ixodes pacificus*) on the west coast. In Europe and Asia, the predominant Lyme vector is the sheep tick (*Ixodes ricinus*).

In nature, ticks transmit the bacteria responsible for Lyme disease to animal reservoirs, such as white-footed mice, squirrels, and chipmunks. Standardized periodic field surveillance for ticks can inform risk mitigation in Army training areas. Additionally, post-exposure data collected through the DOD Human Tick Test Kit Program (HTTKP) can identify blood-fed ticks submitted by DOD personnel. A Lyme Disease Risk Index was developed by combining HTTKP data with CDC data on vector tick prevalence and/or reported human case data. Since the HTTKP only supports installations in the U.S., tick-borne disease risk could only be evaluated for U.S.-based installations.

Lyme Disease Risk

Risk of coming into contact with a tick infected with the agent of Lyme disease at an Army installation:

- **Low-Risk Installation**
- **Moderate-Risk Installation**
- **High-Risk Installation**
- **Installation with no data available**

U.S.-based installation

Installation outside the U.S.
Lyme disease risk is geographically dependent. Over 95% of U.S. cases are reported from just 14 states in the Northeast, mid-Atlantic, and upper Midwest (Adams et al., 2016; CDC, 2016). In addition, the blacklegged/deer tick is currently undergoing a range expansion (Eisen & Eisen, 2018) which underscores the need to develop robust field surveillance activities at the installation level, utilizing Public Health Command Regions for tick identification and pathogen testing.

If someone is bitten by a tick, the local MTF should submit the tick to the HTTKP to identify the species, learn whether it was infected with Lyme or another tick-borne disease, and assist the APHC with monitoring the locations where disease-carrying ticks are found.
BED BUGS: CAN YOU SLEEP TIGHT?

ONCE NEARLY ERADICATED IN THE UNITED States, bed bugs have made an aggressive comeback, with 1 in 5 Americans reporting either a personal bed bug infestation or knowledge of someone who has encountered bed bugs (NPMA, 2011). This resurgence is due, in part, to changes in the way pesticides are used in the U.S. Periodic pesticide spraying has been replaced with well-hidden bait traps to control ants and/or cockroaches in most public domiciles. This practice eliminates both the pesticide barrier and predators of the occasional hitchhiking bed bugs. The elusive behavior of bed bugs allows them to spread, often unnoticed, in high-trafficked areas such as hotels, offices, and daycare facilities. While not historically known to spread diseases to humans, bed bugs are capable of harboring more than 40 human disease-causing pathogens, and their feces can be a source of disease transmission (Blakely et al., 2018). Bed bug bites can cause allergic reactions and dermatitis of varying severity.

Ineffective identification and treatment of a bed bug infestation can lead to expensive professional remediation and loss of personal property (CDC, 2010). An Army installation recently learned this lesson when an employee inadvertently carried bed bugs from home to the office, thereby initiating an infestation, which necessitated 3 days of administrative leave for 4,000 employees and cost approximately $1.5 million in control efforts.

Bed Bug (Cimex lectularius)

The appearance of flat, red welts on your arms and legs in zigzag lines or clusters are telltale signs of bed bugs. Bed bugs will also leave reddish-brown blood stains or small brown ovals of molted skin on the mattress. Proper identification of bed bugs and their signs of destruction can help to prevent widespread infestations.

The appearance of flat, red welts on your arms and legs in zigzag lines or clusters are telltale signs of bed bugs. Bed bugs will also leave reddish-brown blood stains or small brown ovals of molted skin on the mattress. Steps can be taken to prevent the spread of bed bugs. When you travel, store luggage on luggage racks instead of directly on the hotel floor to limit bed bugs’ access to your belongings, and always wash clothing after returning from a trip. Thoroughly inspect used upholstered or fabric items (furniture, throw pillows, etc.) upon purchase to prevent unwanted visitors from going home with you. Bed bug monitors can be placed under the feet of a bed frame to prevent bed bugs from reaching the mattress; these also serve as a passive surveillance tool. Upon discovery of bed bugs, timely communication with Garrison Preventive Medicine (PM) Services and the Installation Pest Management Coordinator will limit health impacts, property damage, and unnecessary expenditures.

Americans reported either a personal bed bug infestation or knowledge of someone who has encountered bed bugs.
1. Behind artwork and mirrors
2. Behind wall fixtures
3. Behind headboards
4. Inside and underneath furniture
5. Mattress seams and foundations
6. Draperies and upholsteries
7. Seams of adjoining furniture
8. Baseboards and carpet seams
FOODBORNE ILLNESS IS A PREVENTABLE CAUSE of morbidity and mortality worldwide, causing 48 million illnesses annually in the U.S. (Scallan et al., 2011). Soldiers are at risk for foodborne illness, and outbreaks among large military populations can reduce operational readiness. Foodborne infections from pathogens such as Campylobacter, E. coli O157:H7, and L. monocytogenes can result in serious long-term after-effects that impact individual readiness (Batz et al., 2013). Symptoms of foodborne illness include vomiting, diarrhea, abdominal pain, fever, and weakness. In a recent survey, Mullaney et al. (2019) found that Soldiers who experienced these symptoms did so twice yearly and missed an average of 3 work days, resulting in the equivalent of $900 million in wages.

The DOD’s robust food protection program ensures safe food for all beneficiaries. Army Veterinary Corps officers and food inspection specialists inspect more than 300 installations and 2,000 commercial food establishments worldwide. Although many inspection activities are performed in garrison, some functions are unique to an operational environment. Program elements common to both environments include installation food vulnerability assessments, subsistence recalls, refrigeration failure response, and Operational Ration inspections. A table outlining the food protection program and Veterinary Services (VS) support is available on Health of the Force Online.

The Medical Detachment Veterinary Service Support (MDVSS) Food Procurement and Laboratory Team provides both field confirmatory microbiological analysis and presumptive chemical laboratory analysis of food and bottled water. Within the MDVSS, multiple veterinary service support teams (VSSTs) provide food protection and food and water laboratory analysis. To maximize these capabilities, each VSST can be divided into two food inspection teams.

Leaders can play a role in reducing their Soldiers’ risk of foodborne illness. A pre-deployment Food and Water Risk Assessment should be requested when no DOD-approved food sources are available in the theater of operations during exercises outside the continental United States and short-term training events. When a special event is held in garrison, a Special Event Vulnerability Assessment (JCS, 2015) should be requested to ensure food protection procedures are followed. Leaders can also disseminate free VS educational resources on handling food safely outside of duty hours (e.g., tailgating, brownbag lunches, and farmers’ markets). Education and proactive planning are key to preventing foodborne illness so Soldiers can stay in the fight.
With changes in global threats, the science of warfare is increasing at an exponential rate. In addition to new explosives used in insensitive munitions, pyrotechnics, smoke generators, lead-free primers, and gun and rocket propellants, the APHC Toxicology Directorate evaluates other materials entering the Army/DOD supply chain. These include a diverse array of chemicals such as cleaners, lubricants, organic coatings, inorganic surface finishing processes, sealants, degreasers, and fire-extinguishing agents.

All of these items are being developed in order to preserve or improve battlefield performance of materials and equipment, while ensuring the safety of the Soldiers and workers. Additional goals include minimizing environmental impacts during manufacture, end use, and range sustainment. Testing the toxicology of these new materials and ensuring Soldiers can use them without injury is vital to ensuring medical readiness and mission success.

The APHC is working with research, testing, demonstration, and acquisition entities to ensure these new substances can be fielded safely through the development of toxicity data at multiple points in the research and development process. This collaborative, phased approach (ASTM, 2016) between toxicologists and weapon system developers has led to the optimization of performance while addressing environmental, occupational, safety, and health concerns early in the development phase and at multiple points during the weapon system development and fielding. As a result of these efforts, the lifetime program expenses associated with fielding new materials is reduced by decreasing the likelihood of both short- and long-term health and/or environmental impacts that could require costly Soldier and Soldier for Life health care, disruption of training and testing activities, range clean-up, and high disposal/demilitarization costs.
Performance Triad

Sleep, activity, and nutrition (SAN) forms the foundation of optimal physical, behavioral, and emotional health and is the focus of the Performance Triad (P3) campaign. Working toward established SAN targets and understanding the interrelationships between SAN elements are both critical for maximizing Soldier performance. Neglect of any single SAN domain can lead to suboptimal performance and, in some cases, injury. To address SAN deficiencies, Leaders and Soldiers need information about the targets they fail to meet.

The Global Assessment Tool (GAT) is a survey designed to assess an individual’s behaviors with regard to SAN, among other domains. Soldiers are required to complete the GAT per AR 350-53 (DA, 2014). The data presented here represent the proportions of Soldier GAT respondents meeting expert-defined targets.
Sleep, Activity, and Nutrition

Sleep
The CDC and the National Sleep Foundation (NSF) both recommend adults attain 7 or more hours of sleep per night (CDC, 2017c; NSF, 2018). In 2017, most AC Soldiers reported getting 6 or more hours of sleep per night on both duty and non-duty nights.

Estimated Hours of Sleep by Duty Status, AC Soldiers, 2017
Most Soldiers reported sleeping 6 to 7 hours per night, regardless of duty status. However, nearly 1 in 3 reported getting less than 6 hours of sleep on weeknights/duty nights. Soldiers also reported getting more sleep on weekend/non-duty nights compared to weeknights/duty nights.

Percent Meeting Weeknight/Duty Night Sleep Target by Sex and Age, AC Soldiers, 2017
Regardless of sex or age, approximately 1 in 3 AC Soldiers attained the target amount of 7 or more hours of sleep on weeknights/duty nights.

Percent Meeting Weekend/Non-Duty Night Sleep Target by Sex and Age, AC Soldiers, 2017
Nearly 3 out of 4 AC Soldiers met the sleep target on weekends/non-duty nights. The trend of increased hours of sleep on non-duty nights was similar across sex and age groups.
Activity
The CDC recommends two activity targets (CDC, 2018e): engaging in 2 or more days of resistance training per week, and adequate aerobic activity. Adequate aerobic activity can be attained in 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.

Percent Meeting Resistance Training Target by Sex and Age, AC Soldiers, 2017

More than 4 out of 5 Soldiers engaged in resistance training on 2 or more days per week. Target attainment varied by sex and age groups, with 85% of men under age 35 reporting adequate resistance training while 65% of women over age 45 met the target.

Percent Meeting Aerobic Activity Target by Sex and Age, AC Soldiers, 2017

Approximately 90% of Soldiers attained adequate aerobic activity in 2017. Women met the target less frequently than their male counterparts across all age categories.
Nutrition targets are based on U.S. Department of Agriculture MyPlate recommendations (USDA, 2018). The GAT, which defines a serving slightly differently than the MyPlate recommendations, asks Soldiers to report the approximate servings of fruits and vegetables they consume each week. Nutrition targets are defined as eating two or more servings of fruits and two or more servings of vegetables per day. On average, Soldiers reported consuming more servings of vegetables than fruits.

### Estimated Fruit and Vegetable Consumption per Week, AC Soldiers, 2017

Most Soldiers reported fruit consumption ranging from a few servings per week to a few servings per day. Vegetable consumption was higher; more Soldiers reported consuming multiple servings per day.

#### Percent Meeting Fruit Consumption Target by Sex and Age, AC Soldiers, 2017

More than 1 in 3 Soldiers reported eating 2 or more servings of fruits per day. A higher proportion of women met the fruit target than men across all age categories.

#### Percent Meeting Vegetable Consumption Target by Sex and Age, AC Soldiers, 2017

Nearly half of Soldiers reported meeting the target of eating 2 or more servings of vegetables per day. Similar to the reported fruit consumption, a higher proportion of women met the vegetable target than men.
Performance Triad | Sleep/Activity/Nutrition

Summary
Army leadership can prioritize weekday sleep for all Soldiers and emphasize focused intervention for increasing resistance training among female Soldiers. Male Soldiers would benefit from consuming additional fruits and vegetables. Combined, these tactics will enable Soldiers to achieve optimal performance and readiness goals.

Percent Meeting SAN Targets, AC Soldiers, 2017:

- 38% attained 7 or more hours of sleep on weeknights/duty nights.
- 72% attained 7 or more hours of sleep on weekends/non-duty nights.
- 83% engaged in resistance training 2 or more days per week.
- 90% achieved adequate moderate and/or vigorous aerobic activity targets.
- 37% ate 2 or more servings of fruits per day.
- 45% ate 2 or more servings of vegetables per day.
COMPANY NORMS AND SOLDIER PERCEPTIONS OF THEIR SURROUNDINGS INFLUENCE SLEEP, ACTIVITY, AND NUTRITION

What We Know

Evidence suggests that surroundings affect not only the ability to access resources, but to engage in recommended health behaviors such as SAN. Recent P3 program evaluation activities sought to understand which behaviors Soldiers engaged in and what they noticed about the environment around them. According to these program evaluation data, fewer than one in ten Soldiers is meeting sleep and nutrition targets, and most do not believe that their environment (e.g., unit or installation) supports healthy sleep or nutrition. Conversely, around 80% of Soldiers are meeting activity targets and believe that their installation encourages physical activity (Army Analytics Group, 2017).

We are now trying to understand how Soldiers’ perceptions of their environments (“It seems my unit is eating healthy”) as well as the actual environments, that is, the “norms” of their companies (“My peers are actually eating healthy”), affect their behavior. An understanding of these factors can help target intervention strategies to boost sleep and nutrition behaviors.

What We Found Out

To address this, Soldier perceptions and calculated company-level norms data from P3 program evaluations were compared to self-reported behavior data.

Activity data indicate that what is actually happening in the unit is linked to Soldiers’ individual activity behavior; this finding makes sense since physical training (PT) is often undertaken as a unit. Continuing the tradition of group PT may maintain Soldiers’ individual activity behaviors.

For sleep, the opposite correlation is true—Soldiers’ individual perceptions of their surroundings, not what their unit was actually doing, were linked to sleep behavior. Company-level leadership can work to enhance perceptions of a positive sleep environment (e.g., promote and emphasize the importance of sleep in communications, encourage the use of good mattresses and blackout curtains).

When nutrition data were compared to behavior data, both Soldiers’ individual perceptions of their nutrition environment and company nutrition norms were linked to healthier eating. The combination of enhancing perceptions of a healthy eating environment and company nutrition norms are important for nutrition behaviors.

What We Don’t Know

Sleep, activity, and nutrition are the foundation of health and readiness. Taken together, the evaluation findings suggest that efforts to improve health behaviors should focus on changes that impact both the individual perceptions of Soldiers as well as their actual company environments.

1 Sleep targets for the evaluation reported here included 8 hours or more per night of weekday/duty night sleep, 8 hours or more per night of weekend/non-duty night sleep, and no consumption of caffeine within 6 hours of bedtime.
HAVING A THOROUGH, CURRENT SNAPSHOT of a community’s health helps Army decision-makers identify priority Soldier health and readiness issues. A community health assessment (CHA) identifies a community’s key health issues and needs through systematic data collection and analysis (CDC, 2018f) and is now a requirement of Army Installation PM Departments in preparation for Army Public Health Accreditation (MEDCOM, 2018).

Existing assessments and information sources inform a comprehensive CHA and help installation partners come together via the CR2C and working groups to learn about the installation community’s health, identify factors that affect health, understand issues important to the community members, and identify community assets.

The results of at least these two assessments should be presented in a CHA report that is reviewed once a year to ensure it is current; it should be updated at least every 5 years. Other sources that may inform the comprehensive CHA include data from the following:

- **Health of the Force reports**
- **Local Public Health System Assessment**
- **Forces of Change Assessment**
- **Assessments and surveys sponsored by other Departments or Commands (e.g., Survey of Health-Related Behaviors, ACSIM-sponsored Soldier needs assessment)**
- **Army Family Action Plan feedback**
- **Commanders’ town hall meetings**
- **Local sensing sessions**
- **Neighboring local and state public health departments**

Combined, these sources help installations create a more complete picture of the installation community health than has previously been available.

A comprehensive CHA is used to develop an installation community health improvement plan that outlines how installation partners, with significant input from the CR2C and the PM Departments, will take action to address priority issues to improve the health, readiness, and resilience of the Total Army.

To complete a comprehensive CHA, installation partners should use one of the following:

- **Community Health Status Assessment (CHSA) tool.** The assessment is conducted every 3 years through the installation’s Army Public Health Nursing section.

- **Community Strengths and Themes Assessment (CSTA) tool.** The CR2C Facilitator coordinates this assessment every 2 years across the installation community.
SPOTLIGHT

COMMUNITY STRENGTHS AND THEMES ASSESSMENT INFORMS COMMUNITY HEALTH PLANNING

CURRENT ARMY REGULATIONS DIRECT installations to assess communities for health risk factors and needs (DA, 2000; DA, 2015). The APHC developed a standardized Community Strengths and Themes Assessment (CSTA) (APHC(Prov), 2016b) to capture community members’ perceptions of their quality of life, health, safety, and satisfaction within the environment of an Army installation. In addition to other assessments, the CSTA assists in the identification of priorities for the CR2C and working groups.

FORT RUCKER

Leaders at Fort Rucker, Alabama, have used the CSTA since 2016 and will conduct the assessment biennially to identify pressing health concerns facing Soldiers, Civilians, Families, and Soldiers for Life. Recent survey processes identified work/life balance, lack of community connectedness, and healthy nutritional choices as key concerns facing the installation (APHC(Prov), 2016c). As a result, the Fort Rucker Garrison Commander directed the CR2C to implement action plans that address decreasing stigma for those seeking counseling for stress management, increasing social resiliency-based activities to engage underrepresented community members (i.e., single parents, non-traditional families, foreign flight students, and other military branches), and implanting robust nutritional campaigns and partnerships to increase healthy food choices and behaviors.

U.S. ARMY VICENZA

Since 2014, leaders have successfully used the CSTA to drive community health planning. The most recent assessment results identified community concerns surrounding employment issues, drug and alcohol abuse, and nutrition (APHC(Prov), 2016d). Each of the working groups is actively developing action plans to address these community issues. To ensure community members link their survey responses to actions taken, the CR2C coordinates public messaging about results and initiatives implemented by the installation. Vicenza credits its local Public Affairs Officer for successfully messaging the results of the CSTA and communicating actions the CR2C is taking to support community health and readiness.

As a result of the CSTA process, collaboration has improved across medical, garrison, and mission operations. Army communities have become more engaged in providing feedback, and the public health planning process addresses the chief health and readiness concerns identified by community members.
Installation Health Index

The Health of the Force team conducts comparative analyses of health metrics with the intent of revealing actionable interpretations and discerning when populations achieve desired outcomes. Computations such as the Installation Health Index (IHI) and metric rankings aim to motivate discussions about successes and challenges that can be leveraged across the Force. Leaders may use these tools to help guide targeted health program and policy efforts.

Indices are used to gauge the overall health of populations. They help inform community health needs and offer an evidence-based tool for comparing a range of health metrics across communities. To facilitate comparisons of overall installation health, the IHI was used to score each installation relative to the Army average. The IHI consists of two components: a composite Z-score and a percentile score derived from the Z-score.

How should IHI be interpreted?

<table>
<thead>
<tr>
<th>Z-score</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard deviation (SD) is the average distance each installation is from the Army average for a particular metric or set of metrics</td>
<td>Reflects where an installation's Z-score falls on a normal distribution curve; values are from 0% to 100%</td>
</tr>
<tr>
<td>Reflects the installation's number of standard deviations from the Army average for the compiled IHI metrics</td>
<td>Highest percentile for a given metric is assigned a value of 100%; other installation percentiles are computed relative to the highest percentile value</td>
</tr>
<tr>
<td>Positive scores indicate the IHI or overall health is above the Army average</td>
<td>Higher percentiles indicate better overall health status</td>
</tr>
</tbody>
</table>

The IHI comprises eight metrics, standardized to the Army average using Z-score. The weights for each metric are shown below. See the Methods Appendix for more information on the IHI.

- Injury (20%)
- Behavioral health (15%)
- Obesity (BMI) (15%)
- Sleep disorders (15%)
- Chronic disease (15%)
- Tobacco use (10%)
- Sexually transmitted infections (chlamydia) (5%)
- Air quality (5%)

Crude unadjusted values for each medical metric are provided throughout the report, and are accompanied by age and sex adjusted values in the installation profiles. The crude values provide the clearest understanding of the burden a medical condition imposes on a population, while the adjusted value controls for potential biases due to demographic differences in the populations being compared. The adjusted values were used in IHI scoring to enable more valid comparisons across installations.

The assessment revealed that the majority of installations scored within one standard deviation of the Army average, indicating similar overall health status. Red, amber, and green color coding has been added to the IHI score on each Installation Profile page to emphasize those installations that scored better or worse than the Army average.
The ranking order is based on adjusted, unrounded rates.

COLOR CODE KEY:
- **GREEN** = Better than the Army average by 1 or more SD
- **AMBER** = Worse than the Army average by 1 or more SD
- **RED** = Worse than the Army average by 2 or more SD
- **NO COLOR ADDED** = About the same as the Army average
Rankings have proven effective in stimulating community interest and driving health improvement. With this knowledge, leaders can target specific health conditions or behaviors in their populations with appropriate healthcare and health education resources. Detailed installation rankings for injury, obesity, tobacco, and chronic disease metrics are provided for AC populations assigned to installations with an average of at least 1,000 Soldiers. Rankings data were adjusted by age and sex to those of the overall Army population to allow for a more accurate comparison of health outcomes throughout the Force. Installations outside of the U.S. were ranked separately from U.S.-based installations due to inherent differences which may have biased their comparison with U.S.-based installations.

Certain metrics, such as behavioral health and sexually transmitted infections, are not ranked because higher percentages may reflect greater access to care rather than elevated adverse health outcomes. However, as important determinants of medical readiness, behavioral health and sexually transmitted infections were included as part of the IHI. Identifying concerns early and encouraging Soldiers to seek treatment are the primary goals of Army Medicine and lead to better clinical outcomes.

Where installation rankings are tied, the rank order is not significant. Red, amber, and green color coding contextualizes health status compared to the Army average.

The ranking order is based on adjusted, unrounded rates.

COLOR CODE KEY:
- **GREEN** = Better than the Army average by more than 1 SD
- **AMBER** = Worse than the Army average by more than 1 SD
- **RED** = Worse than the Army average by more than 2 SD
- **NO COLOR ADDED** = About the same as the Army average
### Injury

Incidence of Injuries per 1,000 person-years, AC Soldiers, 2017

- JB Myer-Henderson Hall: 1,292
- Fort Carson: 1,821
- Fort Riley: 2,677
- Presidio of Monterey: 1,292
- Fort Wainwright: 1,821
- Fort Stewart: 2,677
- Fort Polk: 1,292
- Fort Bliss: 1,821
- USAG West Point: 1,292
- JB Elmendorf-Richardson: 1,821
- Hawaii: 2,677
- JB San Antonio: 1,292
- Fort Rucker: 1,821
- Fort Knox: 2,677
- Fort Belvoir: 1,292
- Fort Gordon: 1,821
- Fort Campbell: 2,677
- Fort Meade: 1,292
- Fort Hood: 1,821
- Fort Huachuca: 2,677
- Fort Irwin: 1,292
- Fort Lee: 1,821
- Fort Sill: 2,677
- Fort Benning: 1,292
- Fort Leavenworth: 1,821
- JB LANGLEY-EUSTIS: 2,677
- Fort Leonard Wood: 1,292
- Fort Jackson: 1,821

**Army Average (1,821)**

### Chronic Disease

Chronic Disease Prevalence, AC Soldiers, 2017

- Fort Bragg: 16%
- Fort Campbell: 19%
- Fort Wainwright: 27%
- JB Myer-Henderson Hall: 16%
- Fort Bliss: 19%
- JB Elmendorf-Richardson: 27%
- Fort Jackson: 16%
- Fort Drum: 19%
- Fort Riley: 27%
- Fort Benning: 16%
- Hawaii: 19%
- Fort Leonard Wood: 27%
- Fort Rucker: 16%
- Fort Hood: 19%
- Presidio of Monterey: 27%
- Fort Gordon: 16%
- USAG West Point: 19%
- Fort Sill: 27%
- Fort Stewart: 16%
- Fort Irwin: 19%
- Fort Huachuca: 27%
- Fort Lee: 16%
- Fort Polk: 19%
- Fort Meade: 27%
- JB San Antonio: 16%
- JB LANGLEY-EUSTIS: 19%
- Fort Knox: 27%
- Fort Leavenworth: 16%
- Fort Belvoir: 19%

**Army Average (19%)**
### Installation Health Index

#### Obesity

Obesity Prevalence, AC Soldiers, 2017

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>USAG West Point</td>
<td>14%</td>
</tr>
<tr>
<td>Presidio of Monterey</td>
<td>17%</td>
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<tr>
<td>Fort Huachuca</td>
<td>25%</td>
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<tr>
<td>Fort Jackson</td>
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<td>JB Myer-Henderson Hall</td>
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<td>Fort Carson</td>
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<td>JB Elmendorf-Richardson</td>
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<td>Hawaii</td>
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<td>Fort Wainwright</td>
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<td>Fort Bliss</td>
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<tr>
<td>JB San Antonio</td>
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<td>Fort Riley</td>
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<td>Fort Lee</td>
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<td>Fort Knox</td>
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<td>Fort Bragg</td>
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<td>Fort Irwin</td>
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<td>Fort Campbell</td>
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<td>Fort Stewart</td>
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<tr>
<td>Fort Sill</td>
<td>Army Average (17%)</td>
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<td>Fort Polk</td>
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<tr>
<td>Fort Hood</td>
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<td>Fort Leavenworth</td>
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<td>Fort Belvoir</td>
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<td>Fort Meade</td>
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<td>JB Langley-Eustis</td>
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<td>Fort Gordon</td>
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<tr>
<td>USAG Vicenza</td>
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<td>USAG Bavaria</td>
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<tr>
<td>USAG Red Cloud</td>
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<tr>
<td>USAG Stuttgart</td>
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<td>USAG Yongsan</td>
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<tr>
<td>USAG Wiesbaden</td>
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<tr>
<td>USAG Humphreys</td>
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<td>USAG Daegu</td>
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<td>USAG Wiesbaden</td>
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<tr>
<td>USAG Rheinland-Pfalz</td>
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<tr>
<td>Japan</td>
<td></td>
</tr>
</tbody>
</table>

#### Tobacco Use

Tobacco Use Prevalence, AC Soldiers, 2017

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>USAG West Point</td>
<td>10%</td>
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<tr>
<td>JB San Antonio</td>
<td>23%</td>
</tr>
<tr>
<td>Presidio of Monterey</td>
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<td>Fort Knox</td>
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<td>Fort Rucker</td>
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<td>Fort Jackson</td>
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<td>Fort Belvoir</td>
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<td>Hawaii</td>
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<td>Fort Leavenworth</td>
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<td>JB Myer-Henderson Hall</td>
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<td>Fort Lee</td>
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<td>JB Langley-Eustis</td>
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<td>Fort Bliss</td>
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<td>Fort Bragg</td>
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<td>Fort Leonard Wood</td>
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<td>Fort Stewart</td>
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<tr>
<td>Fort Sill</td>
<td>Army Average (23%)</td>
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<td>Fort Polk</td>
<td></td>
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<tr>
<td>JB Elmendorf-Richardson</td>
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<td>Fort Carson</td>
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<td>Fort Polk</td>
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<td>Japan</td>
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<tr>
<td>USAG Stuttgart</td>
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<td>USAG Yongsan</td>
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<td>USAG Wiesbaden</td>
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<td>USAG Rheinland-Pfalz</td>
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<td>USAG Humphreys</td>
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<td>USAG Bavaria</td>
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<td>USAG Red Cloud</td>
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SPOTLIGHT

ARMY PUBLIC HEALTH ACCREDITATION: EVIDENCE OF PUBLIC HEALTH ENTERPRISE PERFORMANCE IMPROVEMENT

Army Medicine recognizes the importance of accreditations and certifications in the provision of their services to assure integrity and quality. The decision to explore an accreditation program for Army PM departments was borne out of a movement towards public health department accreditation in civilian public health departments. The Fort Riley (Kansas) Department of Public Health (DPH) was the first among the Services to pursue national accreditation.

In FY18, the MEDCOM Chief of Staff approved the Army Public Health Performance Improvement and Accreditation (PI&A) Initiative (MEDCOM, 2018a). Twenty-eight Army PM departments were directed to improve performance in alignment with nationally-recognized public health standards and to apply for public health accreditation by the end of FY25.

This initiative is intended to ensure the quality and effectiveness of Army PM departments by meeting nationally-recognized public health standards; signaling that Army public health delivers services on par with private sector counterparts; and filling the gap in non-healthcare accreditation designation.

“The PI&A Initiative] showed us that there is a lot more to public health than the little things we were doing, like ergonomic surveys or water buffalo inspections...it showed us that there is a lot more...”

—Fort Riley Department of Public Health Staff Member

Results from an APHC-led case study of the Fort Riley DPH’s accreditation pursuit revealed that staff and partners observed several positive outcomes throughout the accreditation process, including—

• Increased team cohesion.
• Increased collaboration with partners.
• Increased awareness of DPH in the community.
• Increased DPH staff awareness of public health practice.
• Changes to DPH processes through an emphasis on quality improvement.
• Improved communication within DPH and with partners.
• Improved DPH staff knowledge and professional development.

The DPH staff identified lessons learned and made process change recommendations for other Army PM departments that pursue public health accreditation. The MEDCOM Deputy Chief of Staff for Public Health/Director, APHC is working to apply those lessons learned to the PI&A Initiative and share resources with all Army PM departments via subject matter expertise and consultation.

For more information, a CAC-enabled Toolkit is available at https://eaphc.amedd.army.mil/PHPIT/SitePages/Home.aspx.
Footnotes for Installation Profile Pages

1. Crude values reflect rates for each metric, unadjusted by age and sex to the Army population distribution.

2. Adjusted values reflect rates for each metric adjusted by age and sex to the Army population distribution.

3. Range of crude values for the 40 Army installations included in the report.

4. The Z-score reflects collective SD from the Army average for eight Health of the Force metrics (injury, behavioral health, sleep disorders, chronic disease, obesity, tobacco use, STIs: chlamydia, and air quality). Positive values reflect better overall health status. See IHI description on page 72.

5. Environmental Health Indicator color coding (green, amber, and red) indicates metric status in the affected community. Green denotes the desired condition.

6. Data are not displayed (ND) when <20 cases were reported or when reporting compliance was estimated to be <50%.
### Fort Belvoir

Demographics: Approximately 3,300 AC Soldiers
46% under 35 years old, 24% female

Main Healthcare Facility: Fort Belvoir Community Hospital

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value(^1)</th>
<th>Adjusted Value(^2)</th>
<th>Average</th>
<th>Range(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>2,142</td>
<td>1,895</td>
<td>1,821</td>
<td>1,308–2,963</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>21</td>
<td>21</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.8</td>
<td>4.2</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>21</td>
<td>17</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>24</td>
<td>21</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>15</td>
<td>20</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>17</td>
<td>30</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>38</td>
<td>27</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score\(^4\): <20\(^{th}\) percentile | Z-score: -1.3

#### ENVIROMENTAL HEALTH INDICATORS\(^5\)

- Poor air quality: 1 day/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.60 mg/L
- Solid waste diversion rate: 55%
- Day-biting mosquito contact risk: High
- West Nile virus transmission risk: Moderate
- Lyme disease risk: High

#### PERFORMANCE TRIAD MEASURES

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>43%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>74%</td>
<td>72%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>77%</td>
<td>83%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>86%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>36%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>48%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
### Fort Benning

**Demographics:** Approximately 19,000 AC Soldiers  
85% under 35 years old, 6.6% female  
**Main Healthcare Facility:** Martin Army Community Hospital

### Installation Health Index Score

| Installation Health Index Score | 50–59th percentile | Z-score: -0.1 |

### Performance Triad Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>37%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>67%</td>
<td>72%</td>
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<tr>
<td>2+ days per week of resistance training</td>
<td>84%</td>
<td>83%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>89%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>47%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>53%</td>
<td>45%</td>
</tr>
</tbody>
</table>

### Environmental Health Indicators

- **Poor air quality:** 0 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.75 mg/L
- **Solid waste diversion rate:** 23%
- **Day-biting mosquito contact risk:** Low
- **West Nile virus transmission risk:** Moderate
- **Lyme disease risk:** Moderate

Footnotes 1-6: See page 78.
## Fort Bliss

**Demographics:** Approximately 25,000 AC Soldiers  
80% under 35 years old, 14% female  
**Main Healthcare Facility:** William Beaumont Army Medical Center

### Installation Health Index Score
- **50–59th percentile | Z-score: -0.3**

### Installation Health Indicators

#### Poor air quality:
- **24 days/year**

#### Poor water quality:
- **0 days/year**

#### Water fluoridation:
- **0.80 mg/L**

#### Solid waste diversion rate:
- **48%**

#### Day-biting mosquito contact risk:
- **High**

#### West Nile virus transmission risk:
- **High**

#### Lyme disease risk:
- **Low**

### Performance Triad Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>39%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>71%</td>
<td>72%</td>
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<tr>
<td>2+ days per week of resistance training</td>
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<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>34%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>42%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
Fort Bragg

Demographics: Approximately 45,000 AC Soldiers
78% under 35 years old, 12% female
Main Healthcare Facility: Womack Army Medical Center

**HEALTH METRICS**

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,553</td>
<td>1,587</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>10</td>
<td>11</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.2</td>
<td>3.2</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>9.5</td>
<td>10</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>16</td>
<td>16</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.35 mg/L
- Solid waste diversion rate: 27%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: Low
- Lyme disease risk: Moderate

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 39% for Installation, 38% for Army
- 7+ hours of sleep (weekend or non-duty night): 75% for Installation, 72% for Army
- 2+ days per week of resistance training: 85% for Installation, 83% for Army
- 150+ minutes per week of aerobic activity: 90% for Installation, 90% for Army
- 2+ servings of fruits per day: 36% for Installation, 37% for Army
- 2+ servings of vegetables per day: 46% for Installation, 45% for Army

Installation Health Index Score: ≥90th percentile | Z-score: 0.6

Footnotes 1-6: See page 78.
# Fort Campbell

**Demographics:** Approximately 27,000 AC Soldiers  
84% under 35 years old, 12% female  

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

## Installation Health Index Score

| HEALTH METRICS                                    | Crude Value | Adjusted Value | Average | 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>1,827</td>
<td>1,925</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.2</td>
<td>2.9</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>19</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>27</td>
<td>27</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>ND</td>
<td>ND</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>17</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**Installation Health Index Score:** 60–69th percentile  
Z-score: -0.1

### Environmental Health Indicators

- **Poor air quality:** 0 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.37 mg/L
- **Solid waste diversion rate:** 41%
- **Day-biting mosquito contact risk:** Moderate
- **West Nile virus transmission risk:** Moderate
- **Lyme disease risk:** Moderate

### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night): 43%  
  Army: 38%
- 7+ hours of sleep (weekend or non-duty night): 74%  
  Army: 72%
- 2+ days per week of resistance training: 85%  
  Army: 83%
- 150+ minutes per week of aerobic activity: 91%  
  Army: 90%
- 2+ servings of fruits per day: 33%  
  Army: 37%
- 2+ servings of vegetables per day: 42%  
  Army: 45%

Footnotes 1-6: See page 78.
Fort Carson

Demographics: Approximately 24,000 AC Soldiers
83% under 35 years old, 14% female
Main Healthcare Facility: Evans Army Community Hospital

### Installation Health Index Score: 80–89th percentile | Z-score: 0.4

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,395</td>
<td>1,470</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>14</td>
<td>15</td>
<td>8.9–21</td>
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<tr>
<td>Substance use disorder (%)</td>
<td>3.6</td>
<td>3.4</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>14</td>
<td>15</td>
<td>17</td>
<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
<td>26</td>
<td>26</td>
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<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>34</td>
<td>30</td>
<td>23</td>
<td>14–62</td>
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<tr>
<td>Chronic disease (%)</td>
<td>15</td>
<td>17</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night)  
  - Installation: 40%  
  - Army: 38%
- 7+ hours of sleep (weekend or non-duty night)  
  - Installation: 72%  
  - Army: 72%
- 2+ days per week of resistance training  
  - Installation: 83%  
  - Army: 83%
- 150+ minutes per week of aerobic activity  
  - Installation: 90%  
  - Army: 90%
- 2+ servings of fruits per day  
  - Installation: 33%  
  - Army: 37%
- 2+ servings of vegetables per day  
  - Installation: 40%  
  - Army: 45%

### Environmental Health Indicators

- Poor air quality: 3 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.57 mg/L
- Solid waste diversion rate: 42%
- Day-biting mosquito contact risk: Low
- West Nile virus transmission risk: High
- Lyme disease risk: Low

Footnotes 1-6: See page 78.
### Fort Drum

**Demographics:** Approximately 15,000 AC Soldiers
- 84% under 35 years old, 12% female

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

---

### Health Metrics

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,654</td>
<td>1,792</td>
<td>1,821</td>
<td>1,308–2,963</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.2</td>
<td>3.7</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>19</td>
<td>22</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>27</td>
<td>27</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>25</td>
<td>22</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>15</td>
<td>19</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**Installation Health Index Score:** 40–49th percentile | Z-score: -0.3

---

### 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:** 55%
- **Day-biting mosquito contact risk:** Low
- **West Nile virus transmission risk:** Low
- **Lyme disease risk:** High

### Performance Triad Measures

- **7+ hours of sleep (weeknight/duty night):** 40%
- **7+ hours of sleep (weekend or non-duty night):** 75%
- **2+ days per week of resistance training:** 84%
- **150+ minutes per week of aerobic activity:** 90%
- **2+ servings of fruits per day:** 32%
- **2+ servings of vegetables per day:** 40%

---

Footnotes 1-6: See page 78.
## Fort Gordon

**Demographics:** Approximately 9,000 AC Soldiers  
74% under 35 years old, 20% female  

**Main Healthcare Facility:** Dwight D. Eisenhower Army Medical Center

### Installation Health Index Score

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Average</th>
<th>Range³</th>
</tr>
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<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,942</td>
<td>1,898</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>18</td>
<td>17</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.0</td>
<td>3.0</td>
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<td>1.2–5.9</td>
</tr>
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<td>Sleep disorder (%)</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>5.8–21</td>
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<tr>
<td>Obesity (%)</td>
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<td>25</td>
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<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
<td>16</td>
<td>17</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>16</td>
<td>14</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>21</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score: **30–39th percentile** | **Z-score: -0.5**

---

### ENVIRONMENTAL HEALTH INDICATORS

- **Poor air quality:** 1 day/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.74 mg/L
- **Solid waste diversion rate:** 26%
- **Day-biting mosquito contact risk:** Moderate
- **West Nile virus transmission risk:** Low
- **Lyme disease risk:** Low

### PERFORMANCE TRIAD MEASURES

- **7+ hours of sleep (weeknight/duty night):** 35% (Installation), 38% (Army)
- **7+ hours of sleep (weekend or non-duty night):** 75% (Installation), 72% (Army)
- **2+ days per week of resistance training:** 80% (Installation), 83% (Army)
- **150+ minutes per week of aerobic activity:** 89% (Installation), 90% (Army)
- **2+ servings of fruits per day:** 38% (Installation), 37% (Army)
- **2+ servings of vegetables per day:** 48% (Installation), 45% (Army)

Footnotes 1-6: See page 78.
## Fort Hood

**Demographics:** Approximately 32,000 AC Soldiers  
80% under 35 years old, 16% female  

**Main Healthcare Facility:** Carl R. Darnall Army Medical Center

### Installation Health Index Score:

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,935</td>
<td>1,994</td>
<td>1,821</td>
<td>1,308–2,963</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>21</td>
<td>21</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>5.9</td>
<td>5.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>15</td>
<td>17</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>20</td>
<td>17</td>
<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
<td>23</td>
<td>24</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>36</td>
<td>31</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>18</td>
<td>20</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**Installation Health Index Score**: <20<sup>th</sup> percentile | Z-score: -1.1

### Environmental Health Indicators

- **Poor air quality:** 5 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.24 mg/L
- **Solid waste diversion rate:** 55%
- **Day-biting mosquito contact risk:** High
- **West Nile virus transmission risk:** Moderate
- **Lyme disease risk:** Low

### Performance Triad Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>35%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
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<td></td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>82%</td>
<td>83%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>89%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>33%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>41%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
Fort Huachuca

Demographics: Approximately 3,800 AC Soldiers
76% under 35 years old, 16% female

Main Healthcare Facility: Raymond W. Bliss Army Health Clinic

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value(^1)</th>
<th>Adjusted Value(^2)</th>
<th>Average</th>
<th>Range(^3)</th>
</tr>
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<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
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<td>2,101</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.5</td>
<td>2.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>13</td>
<td>15</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>17</td>
<td>17</td>
<td>23</td>
<td>8.3–31</td>
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<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>17</td>
<td>16</td>
<td>23</td>
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</tr>
<tr>
<td>Chronic disease (%)</td>
<td>19</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score\(^4\): 70–79\(^{th}\) percentile | Z-score: 0.2

- **ENVIRONMENTAL HEALTH INDICATORS\(^5\)**
  - Poor air quality: **1 day/year**
  - Poor water quality: **0 days/year**
  - Water fluoridation: **0.73 mg/L**
  - Solid waste diversion rate: **0%**
  - Day-biting mosquito contact risk: **Moderate**
  - West Nile virus transmission risk: **High**
  - Lyme disease risk: **Low**

- **PERFORMANCE TRIAD MEASURES**
  - 7+ hours of sleep (weeknight/duty night):
    - Installation: 38%
    - Army: 38%
  - 7+ hours of sleep (weekend or non-duty night):
    - Installation: 79%
    - Army: 72%
  - 2+ days per week of resistance training:
    - Installation: 83%
    - Army: 83%
  - 150+ minutes per week of aerobic activity:
    - Installation: 92%
    - Army: 90%
  - 2+ servings of fruits per day:
    - Installation: 42%
    - Army: 37%
  - 2+ servings of vegetables per day:
    - Installation: 48%
    - Army: 45%

Footnotes 1-6: See page 78.
## Fort Irwin

### Demographics:
- Approximately 3,900 AC Soldiers
- 75% under 35 years old, 14% female
- **Main Healthcare Facility:** Weed Army Community Hospital

### Installation Health Index Score:
- Installation: <20th percentile
- Army: Z-score: -0.9

### Installation Profiles

#### HEALTH METRICS

| Metric                                      | Crude Value | Adjusted Value | Average | 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>2,102</td>
<td>2,107</td>
<td>1,821</td>
<td>1,308–2,963</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>18</td>
<td>18</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>5.4</td>
<td>5.2</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>15</td>
<td>15</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>19</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>27</td>
<td>27</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>ND</td>
<td>ND</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>21</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

### PERFORMANCE TRIAD MEASURES

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>39%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>71%</td>
<td>72%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>80%</td>
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<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>88%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>33%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>40%</td>
<td>45%</td>
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### ENVIRONMENTAL HEALTH INDICATORS

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor air quality: 10 days/year</td>
<td></td>
</tr>
<tr>
<td>Poor water quality: 0 days/year</td>
<td></td>
</tr>
<tr>
<td>Water fluoridation: 1.60 mg/L</td>
<td></td>
</tr>
<tr>
<td>Solid waste diversion rate: 29%</td>
<td></td>
</tr>
<tr>
<td>Day-biting mosquito contact risk: No Data</td>
<td></td>
</tr>
<tr>
<td>West Nile virus transmission risk: No Data</td>
<td></td>
</tr>
<tr>
<td>Lyme disease risk: Moderate</td>
<td></td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
Fort Jackson

Demographics: Approximately 9,200 AC Soldiers
85% under 35 years old, 26% female
Main Healthcare Facility: Moncrief Army Health Clinic

---

**HEALTH METRICS**

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Average</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>2,963</td>
<td>2,677</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.2</td>
<td>1.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>5.8</td>
<td>10</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>10</td>
<td>15</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>18</td>
<td>19</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>22</td>
<td>15</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>12</td>
<td>18</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS⁴**

- Poor air quality: 2 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.63 mg/L
- Solid waste diversion rate: 39%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: Low
- Lyme disease risk: Moderate

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 26% (Installation), 38% (Army)
- 7+ hours of sleep (weekend or non-duty night): 54% (Installation), 72% (Army)
- 2+ days per week of resistance training: 82% (Installation), 83% (Army)
- 150+ minutes per week of aerobic activity: 93% (Installation), 90% (Army)
- 2+ servings of fruits per day: 59% (Installation), 37% (Army)
- 2+ servings of vegetables per day: 62% (Installation), 45% (Army)

**Installation Health Index Score⁴:** 50–59th percentile | Z-score: -0.2

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Footnotes 1-6: See page 78.
Fort Knox

Demographics: Approximately 4,500 AC Soldiers
66% under 35 years old, 21% female
Main Healthcare Facility: Ireland Army Community Hospital

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
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<td>1,872</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>15</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.2</td>
<td>2.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>18</td>
<td>14</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>22</td>
<td>18</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>14</td>
<td>15</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>15</td>
<td>15</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>31</td>
<td>24</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score: 40–49th percentile | Z-score: -0.4

<table>
<thead>
<tr>
<th>ENVIRONMENTAL HEALTH INDICATORS</th>
<th>PERFORMANCE TRIAD MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor air quality: 0 days/year</td>
<td>7+ hours of sleep (weeknight/duty night)</td>
</tr>
<tr>
<td>Poor water quality: 0 days/year</td>
<td>7+ hours of sleep (weekend or non-duty night)</td>
</tr>
<tr>
<td>Water fluoridation: 0.75 mg/L</td>
<td>2+ days per week of resistance training</td>
</tr>
<tr>
<td>Solid waste diversion rate: 31%</td>
<td>150+ minutes per week of aerobic activity</td>
</tr>
<tr>
<td>Day-biting mosquito contact risk: Moderate</td>
<td>2+ servings of fruits per day</td>
</tr>
<tr>
<td>West Nile virus transmission risk: Low</td>
<td>2+ servings of vegetables per day</td>
</tr>
<tr>
<td>Lyme disease risk: Low</td>
<td></td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
## Fort Leavenworth

**Demographics:** Approximately 3,200 AC Soldiers  
52% under 35 years old, 16% female  
**Main Healthcare Facility:** Munson Army Health Center

### Installation Health Index Score:
- **<20th percentile**  
- **Z-score:** -1.1

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
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<td>2,249</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>17</td>
<td>19</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.6</td>
<td>3.9</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>15</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>24</td>
<td>21</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>18</td>
<td>20</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>16</td>
<td>25</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>34</td>
<td>25</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

### Environmental Health Indicators
- **Poor air quality:** 0 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.53 mg/L
- **Solid waste diversion rate:** 35%
- **Day-biting mosquito contact risk:** Moderate
- **West Nile virus transmission risk:** Moderate
- **Lyme disease risk:** Low

### Performance Triad Measures
- **7+ hours of sleep (weeknight/duty night):** 48% (Installation) 38% (Army)
- **7+ hours of sleep (weekend or non-duty night):** 76% (Installation) 72% (Army)
- **2+ days per week of resistance training:** 81% (Installation) 83% (Army)
- **150+ minutes per week of aerobic activity:** 88% (Installation) 90% (Army)
- **2+ servings of fruits per day:** 38% (Installation) 37% (Army)
- **2+ servings of vegetables per day:** 50% (Installation) 45% (Army)

Footnotes 1-6: See page 78.
Fort Lee

Demographics: Approximately 7,800 AC Soldiers
79% under 35 years old, 23% female
Main Healthcare Facility: Kenner Army Health Clinic

ENVIRONMENTAL HEALTH INDICATORS
- Poor air quality: No Data
- Poor water quality: 0 days/year
- Water fluoridation: 0.79 mg/L
- Solid waste diversion rate: 50%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: Low
- Lyme disease risk: Moderate

PERFORMANCE TRIAD MEASURES
- 7+ hours of sleep (weeknight/duty night): 34% (Installation) 38% (Army)
- 7+ hours of sleep (weekend or non-duty night): 74% (Installation) 72% (Army)
- 2+ days per week of resistance training: 81% (Installation) 83% (Army)
- 150+ minutes per week of aerobic activity: 91% (Installation) 90% (Army)
- 2+ servings of fruits per day: 40% (Installation) 37% (Army)
- 2+ servings of vegetables per day: 44% (Installation) 45% (Army)

Footnotes 1-6: See page 78.
Fort Leonard Wood

Demographics: Approximately 9,500 AC Soldiers
84% under 35 years old, 19% female

Main Healthcare Facility: General Leonard Wood Army Community Hospital

## Installation Health Index Score

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>2,550</td>
<td>2,453</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>15</td>
<td>16</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.3</td>
<td>2.4</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.6</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>12</td>
<td>16</td>
<td>17</td>
<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
<td>24</td>
<td>24</td>
<td>23</td>
<td>8.3–31</td>
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<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>15</td>
<td>12</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>19</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score: 30–39th percentile | Z-score: -0.4

### Environmental Health Indicators

- **Poor air quality:** No Data
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.94 mg/L
- **Solid waste diversion rate:** 50%
- **Day-biting mosquito contact risk:** Moderate
- **West Nile virus transmission risk:** Low
- **Lyme disease risk:** Moderate

### Performance Triad Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>37%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>70%</td>
<td>72%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>83%</td>
<td>83%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>92%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>47%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>54%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
Fort Meade

Demographics: Approximately 4,100 AC Soldiers
61% under 35 years old, 19% female
Main Healthcare Facility: Kimbrough Ambulatory Care Center

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range³</th>
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<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>2,049</td>
<td>1,976</td>
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<td>17</td>
<td>18</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.0</td>
<td>2.7</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>16</td>
<td>14</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
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<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
<td>14</td>
<td>16</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>16</td>
<td>22</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>29</td>
<td>22</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score⁴: 20–29th percentile  |  Z-score: -0.8

Environmental Health Indicators⁵

- Poor air quality: 6 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.66 mg/L
- Solid waste diversion rate: 10%
- Day-biting mosquito contact risk: High
- West Nile virus transmission risk: Low
- Lyme disease risk: High

Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night): 44% 38%
- 7+ hours of sleep (weekend or non-duty night): 77% 72%
- 2+ days per week of resistance training: 82% 83%
- 150+ minutes per week of aerobic activity: 89% 90%
- 2+ servings of fruits per day: 36% 37%
- 2+ servings of vegetables per day: 48% 45%

Footnotes 1-6: See page 78.
Fort Polk

Demographics: Approximately 7,800 AC Soldiers
81% under 35 years old, 11% female
Main Healthcare Facility: Bayne-Jones Army Community Hospital

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Average</th>
<th>Range³</th>
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<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
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<td>17</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.9</td>
<td>4.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>12</td>
<td>14</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>20</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>31</td>
<td>30</td>
<td>23</td>
<td>8.3–31</td>
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<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>27</td>
<td>25</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score⁴: 20-29th percentile | Z-score: -0.7

ENVIRONMENTAL HEALTH INDICATORS⁵

- Poor air quality: No Data
- Poor water quality: 0 days/year
- Water fluoridation: 0.70 mg/L
- Solid waste diversion rate: 52%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: High
- Lyme disease risk: Moderate

PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 39% 38%
- 7+ hours of sleep (weekend or non-duty night): 74% 72%
- 2+ days per week of resistance training: 83% 83%
- 150+ minutes per week of aerobic activity: 90% 90%
- 2+ servings of fruits per day: 31% 37%
- 2+ servings of vegetables per day: 39% 45%

Footnotes 1-6: See page 78.
### Fort Riley

**Demographics:** Approximately 15,000 AC Soldiers
- 84% under 35 years old, 13% female

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

---

#### HEALTH METRICS

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Average</th>
<th>Range³</th>
</tr>
</thead>
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<tr>
<td>Injury (rate per 1,000)</td>
<td>1,485</td>
<td>1,585</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>16</td>
<td>16</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>5.2</td>
<td>4.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
<td>18</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>27</td>
<td>27</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>24</td>
<td>21</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>15</td>
<td>19</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**Installation Health Index Score⁴:** 60–69⁰ percentile  | Z-score: 0.0

---

#### ENVIRONMENTAL HEALTH INDICATORS⁵

- Poor air quality: No Data
- Poor water quality: 0 days/year
- Water fluoridation: 0.65 mg/L
- Solid waste diversion rate: 68%
- Day-biting mosquito contact risk: Low
- West Nile virus transmission risk: Moderate
- Lyme disease risk: Moderate

---

#### PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night) 38% 38%
- 7+ hours of sleep (weekend or non-duty night) 74% 72%
- 2+ days per week of resistance training 84% 83%
- 150+ minutes per week of aerobic activity 91% 90%
- 2+ servings of fruits per day 33% 37%
- 2+ servings of vegetables per day 41% 45%

---

Footnotes 1-6: See page 78.
## Fort Rucker

**Demographics:** Approximately 3,500 AC Soldiers  
69% under 35 years old, 12% female  
**Main Healthcare Facility:** Lyster Army Health Center

### Installation Health Index Score

- **80–89th percentile**  
- **Z-score:** 0.4

### Installation Profiles

**Environment Health Indicators**

1. **Poor air quality:** No Data  
2. **Poor water quality:** 0 days/year  
3. **Water fluoridation:** 0.58 mg/L  
4. **Solid waste diversion rate:** 60%  
5. **Day-biting mosquito contact risk:** Moderate  
6. **West Nile virus transmission risk:** Low  
7. **Lyme disease risk:** Moderate

### Performance Triad Measures

- 7+ hours of sleep (weeknight/duty night)  
  - Installation: 53%  
  - Army: 38%
- 7+ hours of sleep (weekend or non-duty night)  
  - Installation: 78%  
  - Army: 72%
- 2+ days per week of resistance training  
  - Installation: 82%  
  - Army: 83%
- 150+ minutes per week of aerobic activity  
  - Installation: 89%  
  - Army: 90%
- 2+ servings of fruits per day  
  - Installation: 36%  
  - Army: 37%
- 2+ servings of vegetables per day  
  - Installation: 49%  
  - Army: 45%

Footnotes 1-6: See page 78.
Fort Sill

Demographics: Approximately 11,000 AC Soldiers
83% under 35 years old, 17% female
Main Healthcare Facility: Reynolds Army Community Hospital

### HEALTH METRICS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>2,124</td>
<td>2,236</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>19</td>
<td>20</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.6</td>
<td>3.5</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>13</td>
<td>16</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>20</td>
<td>17</td>
<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
<td>25</td>
<td>25</td>
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<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>18</td>
<td>15</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>16</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score: <20th percentile | Z-score: -1.1

### ENVIRONMENTAL HEALTH INDICATORS

- Poor air quality: 1 day/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.70 mg/L
- Solid waste diversion rate: 53%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: Low
- Lyme disease risk: Low

### PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 36% (Installation) 38% (Army)
- 7+ hours of sleep (weekend or non-duty night): 73% (Installation) 72% (Army)
- 2+ days per week of resistance training: 83% (Installation) 83% (Army)
- 150+ minutes per week of aerobic activity: 91% (Installation) 90% (Army)
- 2+ servings of fruits per day: 37% (Installation) 37% (Army)
- 2+ servings of vegetables per day: 46% (Installation) 45% (Army)

Footnotes 1-6: See page 78.
### Fort Stewart

**Demographics:** Approximately 20,000 AC Soldiers  
82% under 35 years old, 15% female  

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

#### Installation Health Index Score: 30–39th percentile  
**Z-score:** -0.4

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
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<td>1,720</td>
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<td>19</td>
<td>15</td>
<td>8.9–21</td>
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<tr>
<td>Substance use disorder (%)</td>
<td>4.5</td>
<td>4.2</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
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<tr>
<td>Obesity (%)</td>
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<td>17</td>
<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
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<td>25</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>27</td>
<td>23</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>19</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

#### Performance Triad Measures

- **7+ hours of sleep (weeknight/duty night):**
  - Installation: 36%
  - Army: 38%

- **7+ hours of sleep (weekend or non-duty night):**
  - Installation: 72%
  - Army: 72%

- **2+ days per week of resistance training:**
  - Installation: 84%
  - Army: 83%

- **150+ minutes per week of aerobic activity:**
  - Installation: 90%
  - Army: 90%

- **2+ servings of fruits per day:**
  - Installation: 32%
  - Army: 37%

- **2+ servings of vegetables per day:**
  - Installation: 39%
  - Army: 45%

#### Environmental Health Indicators

- Poor air quality: No Data
- Poor water quality: 0 days/year
- Water fluoridation: 0.92 mg/L
- Solid waste diversion rate: 58%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: Low
- Lyme disease risk: Moderate
Fort Wainwright

Demographics: Approximately 7,400 AC Soldiers
87% under 35 years old, 9.8% female
Main Healthcare Facility: Bassett Army Community Hospital

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Average</th>
<th>Range³</th>
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</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,492</td>
<td>1,610</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.2</td>
<td>3.6</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>8.2</td>
<td>10</td>
<td>12</td>
<td>5.8–21</td>
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<tr>
<td>Obesity (%)</td>
<td>15</td>
<td>17</td>
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<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
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<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
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<td>14–62</td>
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<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>18</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score⁴: 70–79th percentile | Z-score: 0.0

ENVIRONMENTAL HEALTH INDICATORS⁵

- Poor air quality: 45 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.33 mg/L
- Solid waste diversion rate: 0%
- Day-biting mosquito contact risk: No Data
- West Nile virus transmission risk: No Data
- Lyme disease risk: Low

PERFORMANCE TRIAD MEASURES

- 7+ hours of sleep (weeknight/duty night): 36% Installation, 38% Army
- 7+ hours of sleep (weekend or non-duty night): 73% Installation, 72% Army
- 2+ days per week of resistance training: 83% Installation, 83% Army
- 150+ minutes per week of aerobic activity: 89% Installation, 90% Army
- 2+ servings of fruits per day: 30% Installation, 37% Army
- 2+ servings of vegetables per day: 39% Installation, 45% Army

Footnotes 1-6: See page 78.
Hawaii

Demographics: Approximately 20,000 AC Soldiers
76% under 35 years old, 18% female

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

**Installation Health Index Score**: 60–69th percentile | Z-score: 0.0

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,784</td>
<td>1,775</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>16</td>
<td>15</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.5</td>
<td>3.6</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>19</td>
<td>20</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>31</td>
<td>32</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL HEALTH INDICATORS**

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.75 mg/L
- Solid waste diversion rate: 31%
- Day-biting mosquito contact risk: Moderate
- West Nile virus transmission risk: Low
- Lyme disease risk: Low

**PERFORMANCE TRIAD MEASURES**

- 7+ hours of sleep (weeknight/duty night): 40% (Installation), 38% (Army)
- 7+ hours of sleep (weekend or non-duty night): 72% (Installation), 72% (Army)
- 2+ days per week of resistance training: 82% (Installation), 83% (Army)
- 150+ minutes per week of aerobic activity: 90% (Installation), 90% (Army)
- 2+ servings of fruits per day: 35% (Installation), 37% (Army)
- 2+ servings of vegetables per day: 42% (Installation), 45% (Army)

Footnotes 1-6: See page 78.
### JB Elmendorf-Richardson

**Demographics:** Approximately 4,200 AC Soldiers  
86% under 35 years old, 10% female  
**Main Healthcare Facility:** Joint Base Elmendorf-Richardson Health and Wellness Center

---

#### Installation Health Metrics

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,627</td>
<td>1,768</td>
<td>1,821</td>
<td>1,308–2,963</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>8.9</td>
<td>9.7</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.5</td>
<td>2.2</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>7.9</td>
<td>9.3</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>13</td>
<td>16</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>27</td>
<td>26</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>29</td>
<td>26</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>14</td>
<td>18</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

**Installation Health Index Score:** ≥90th percentile | Z-score: 0.5

---

#### Performance Triad Measures

- **7+ hours of sleep (weeknight/duty night):** 38%  
- **7+ hours of sleep (weekend or non-duty night):** 76%  
- **2+ days per week of resistance training:** 88%  
- **150+ minutes per week of aerobic activity:** 91%  
- **2+ servings of fruits per day:** 35%  
- **2+ servings of vegetables per day:** 44%

---

**Environmental Health Indicators**

- Poor air quality: 1 day/year  
- Poor water quality: 0 days/year  
- Water fluoridation: 0.27 mg/L  
- Solid waste diversion rate: No Data  
- Day-biting mosquito contact risk: No Data  
- West Nile virus transmission risk: No Data  
- Lyme disease risk: Low

---

Footnotes 1-6: See page 78.
### JB Langley-Eustis

**Demographics:** Approximately 4,900 AC Soldiers  
69% under 35 years old, 15% female  
**Main Healthcare Facility:** McDonald Army Health Clinic

#### Installation Profiles

![Virginia](image)

**Installation Health Index Score:** <20th percentile | **Z-score:** -1.1

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value¹</th>
<th>Adjusted Value²</th>
<th>Average</th>
<th>Range³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>2,330</td>
<td>2,283</td>
<td>1,821</td>
<td>1,308–2,963</td>
</tr>
<tr>
<td>Behavioral health (%)</td>
<td>19</td>
<td>19</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>3.6</td>
<td>3.7</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>14</td>
<td>13</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>23</td>
<td>23</td>
<td>17</td>
<td>8.3–25</td>
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<tr>
<td>Tobacco use (%)</td>
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<td>23</td>
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<td>8.3–31</td>
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<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
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<td>23</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>25</td>
<td>23</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

#### Performance Triad Measures

- **7+ hours of sleep (weeknight/duty night):** 40% (Installation) | 38% (Army)
- **7+ hours of sleep (weekend or non-duty night):** 72% (Installation) | 72% (Army)
- **2+ days per week of resistance training:** 81% (Installation) | 83% (Army)
- **150+ minutes per week of aerobic activity:** 90% (Installation) | 90% (Army)
- **2+ servings of fruits per day:** 36% (Installation) | 37% (Army)
- **2+ servings of vegetables per day:** 44% (Installation) | 45% (Army)

#### Environmental Health Indicators

- Poor air quality: 0 days/year
- Poor water quality: 0 days/year
- Water fluoridation: 0.87 mg/L
- Solid waste diversion rate: No Data
- Day-biting mosquito contact risk: No Data
- West Nile virus transmission risk: No Data
- Lyme disease risk: High

*Footnotes 1-6: See page 78.*
### JB Myer-Henderson Hall

**Demographics:** Approximately 2,000 AC Soldiers
77% under 35 years old, 11% female

**Main Healthcare Facility:** Andrew Rader Army Health Clinic

### Installation Health Index Score

- **Score:** 4
- **Percentile:** 80–89th
- **Z-score:** 0.5

### Installation Health Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,442</td>
<td>1,462</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
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<td>16</td>
<td>16</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>5.0</td>
<td>4.2</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>9.0</td>
<td>10</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>16</td>
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<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
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<td>21</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>31</td>
<td>34</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

### Performance Triad Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Installation</th>
<th>Army</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/duty night)</td>
<td>39%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend or non-duty night)</td>
<td>78%</td>
<td>72%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>85%</td>
<td>83%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>38%</td>
<td>37%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>48%</td>
<td>45%</td>
</tr>
</tbody>
</table>

### Environmental Health Indicators

- **Poor air quality:** 1 day/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.70 mg/L
- **Solid waste diversion rate:** 100%
- **Day-biting mosquito contact risk:** High
- **West Nile virus transmission risk:** Low
- **Lyme disease risk:** High

Footnotes 1-6: See page 78.
# Installation Profiles | U.S.

## JB San Antonio

**Demographics:** Approximately 8,300 AC Soldiers
- 60% under 35 years old, 28% female

**Main Healthcare Facility:** San Antonio Military Medical Center

### Installation Health Index Score: **40–49th percentile** | **Z-score:** **-0.3**

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
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<td>1,826</td>
<td>1,821</td>
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<td>21</td>
<td>18</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.7</td>
<td>1.9</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>18</td>
<td>15</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>10</td>
<td>11</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>15</td>
<td>15</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>29</td>
<td>23</td>
<td>19</td>
<td>12–38</td>
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</table>

### PERFORMANCE TRIAD MEASURES

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

### ENVIRONMENTAL HEALTH INDICATORS

- **Poor air quality:** 6 days/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.24 mg/L
- **Solid waste diversion rate:** No Data
- **Day-biting mosquito contact risk:** High
- **West Nile virus transmission risk:** Moderate
- **Lyme disease risk:** Moderate

Footnotes 1-6: See page 78.
### Presidio of Monterey

**Demographics:** Approximately 1,000 AC Soldiers 77% under 35 years old, 24% female  
**Main Healthcare Facility:** Presidio of Monterey Army Health Clinic

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,661</td>
<td>1,593</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<td>Behavioral health (%)</td>
<td>19</td>
<td>19</td>
<td>15</td>
<td>8.9–21</td>
<td></td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.5</td>
<td>2.9</td>
<td>3.5</td>
<td>1.2–5.9</td>
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</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>11</td>
<td>11</td>
<td>12</td>
<td>5.8–21</td>
<td></td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>14</td>
<td>14</td>
<td>17</td>
<td>8.3–25</td>
<td></td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>13</td>
<td>14</td>
<td>23</td>
<td>8.3–31</td>
<td></td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>ND⁶</td>
<td>ND⁶</td>
<td>23</td>
<td>14–62</td>
<td></td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>21</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
<td></td>
</tr>
</tbody>
</table>

Installation Health Index Score⁴: **70–79th percentile** | **Z-score: 0.4**

#### ENVIRONMENTAL HEALTH INDICATORS⁵

- **Poor air quality:** 1 day/year
- **Poor water quality:** 0 days/year
- **Water fluoridation:** 0.21 mg/L
- **Solid waste diversion rate:** 42%
- **Day-biting mosquito contact risk:** No Data
- **West Nile virus transmission risk:** No Data
- **Lyme disease risk:** Moderate

#### PERFORMANCE TRIAD MEASURES

- **7+ hours of sleep (weeknight/duty night)** 47% 38%
- **7+ hours of sleep (weekend or non-duty night)** 86% 72%
- **2+ days per week of resistance training** 83% 83%
- **150+ minutes per week of aerobic activity** 93% 90%
- **2+ servings of fruits per day** 48% 37%
- **2+ servings of vegetables per day** 64% 45%

Footnotes 1-6: See page 78.
USAG West Point

Demographics: Approximately 1,500 AC Soldiers
58% under 35 years old, 19% female
Main Healthcare Facility: Keller Army Community Hospital

<table>
<thead>
<tr>
<th>HEALTH METRICS</th>
<th>Crude Value</th>
<th>Adjusted Value</th>
<th>Average</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,794</td>
<td>1,763</td>
<td>1,821</td>
<td>1,308–2,963</td>
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<tr>
<td>Behavioral health (%)</td>
<td>10</td>
<td>9.4</td>
<td>15</td>
<td>8.9–21</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>1.4</td>
<td>1.4</td>
<td>3.5</td>
<td>1.2–5.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>7.8</td>
<td>12</td>
<td>5.8–21</td>
</tr>
<tr>
<td>Obesity (%)</td>
<td>8.3</td>
<td>14</td>
<td>17</td>
<td>8.3–25</td>
</tr>
<tr>
<td>Tobacco use (%)</td>
<td>8.3</td>
<td>10</td>
<td>23</td>
<td>8.3–31</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>ND⁶</td>
<td>ND⁶</td>
<td>23</td>
<td>14–62</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>25</td>
<td>21</td>
<td>19</td>
<td>12–38</td>
</tr>
</tbody>
</table>

Installation Health Index Score: ≥90th percentile | Z-score: 1.0

- Environme ntal Health Indicators
  - Poor air quality: 0 days/year
  - Poor water quality: 90 days/year
  - Water fluoridation: 0.59 mg/L
  - Solid waste diversion rate: 29%
  - Day-biting mosquito contact risk: Low
  - West Nile virus transmission risk: Low
  - Lyme disease risk: High

- Performance Triad Measures
  - 7+ hours of sleep (weeknight/duty night): 49% (Installation) 38% (Army)
  - 7+ hours of sleep (weekend or non-duty night): 81% (Installation) 72% (Army)
  - 2+ days per week of resistance training: 77% (Installation) 83% (Army)
  - 150+ minutes per week of aerobic activity: 88% (Installation) 90% (Army)
  - 2+ servings of fruits per day: 43% (Installation) 37% (Army)
  - 2+ servings of vegetables per day: 45% (Installation) 45% (Army)

Footnotes 1-6: See page 78.
Installations Outside the United States

Army-Europe

Army-Pacific
Army-Europe

**INSTALLATION POPULATION STATISTICS**

<table>
<thead>
<tr>
<th>Installation</th>
<th>Approximate Population</th>
<th>% Under 35</th>
<th>% Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>USAG Bavaria</td>
<td>9,300</td>
<td>83</td>
<td>10</td>
</tr>
<tr>
<td>USAG Rheinland-Pfalz</td>
<td>6,300</td>
<td>71</td>
<td>22</td>
</tr>
<tr>
<td>USAG Stuttgart</td>
<td>1,800</td>
<td>56</td>
<td>9.6</td>
</tr>
<tr>
<td>USAG Vicenza</td>
<td>3,400</td>
<td>78</td>
<td>9.7</td>
</tr>
<tr>
<td>USAG Wiesbaden</td>
<td>1,400</td>
<td>68</td>
<td>17</td>
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### Health Metrics

<table>
<thead>
<tr>
<th>Health Metric</th>
<th>USAG Bavaria</th>
<th>USAG Rheinland Pfalz</th>
<th>USAG Stuttgart</th>
<th>USAG Vicenza</th>
<th>USAG Wiesbaden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,597</td>
<td>1,682</td>
<td>1,767</td>
<td>1,659</td>
<td>1,615</td>
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<td>Behavioral health (%)</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>4.9</td>
<td>4.4</td>
<td>3.6</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>10</td>
<td>11</td>
<td>16</td>
<td>12</td>
<td>14</td>
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<tr>
<td>Obesity (%)</td>
<td>14</td>
<td>15</td>
<td>19</td>
<td>21</td>
<td>14</td>
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<tr>
<td>Tobacco use (%)</td>
<td>28</td>
<td>27</td>
<td>19</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>25</td>
<td>24</td>
<td>29</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Chronic disease (%)</td>
<td>15</td>
<td>18</td>
<td>24</td>
<td>27</td>
<td>15</td>
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</table>

### Installation Health Index Score

<table>
<thead>
<tr>
<th>Percentile</th>
<th>40–49&lt;sup&gt;th&lt;/sup&gt;</th>
<th>&lt;20&lt;sup&gt;th&lt;/sup&gt;</th>
<th>60–69&lt;sup&gt;th&lt;/sup&gt;</th>
<th>80–89&lt;sup&gt;th&lt;/sup&gt;</th>
<th>&lt;20&lt;sup&gt;th&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-score</td>
<td>0.2</td>
<td>-0.6</td>
<td>0.2</td>
<td>0.5</td>
<td>-0.5</td>
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### Environmental Health Indicators

<table>
<thead>
<tr>
<th>Environmental Indicator</th>
<th>USAG Bavaria</th>
<th>USAG Rheinland Pfalz</th>
<th>USAG Stuttgart</th>
<th>USAG Vicenza</th>
<th>USAG Wiesbaden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor air quality</td>
<td>3 days/year</td>
<td>15 days/year</td>
<td>11 days/year</td>
<td>133 days/year</td>
<td>14 days/year</td>
</tr>
<tr>
<td>Poor water quality</td>
<td>0 days/year</td>
<td>0 days/year</td>
<td>0 days/year</td>
<td>0 days/year</td>
<td>3 days/year</td>
</tr>
<tr>
<td>Water fluoridation</td>
<td>0.82 mg/L</td>
<td>0.80 mg/L</td>
<td>0.83 mg/L</td>
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<td>No Data</td>
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<tr>
<td>Solid waste diversion rate</td>
<td>No Data</td>
<td>No Data</td>
<td>54%</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td>Day-biting mosquito contact risk</td>
<td>No Data</td>
<td>Low</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>West Nile virus transmission risk</td>
<td>No Data</td>
<td>Low</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Lyme disease risk</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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### Performance Triad Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>USAG Bavaria</th>
<th>USAG Rheinland Pfalz</th>
<th>USAG Stuttgart</th>
<th>USAG Vicenza</th>
<th>USAG Wiesbaden</th>
</tr>
</thead>
<tbody>
<tr>
<td>7+ hours of sleep (weeknight/ duty night)</td>
<td>36%</td>
<td>36%</td>
<td>42%</td>
<td>37%</td>
<td>38%</td>
</tr>
<tr>
<td>7+ hours of sleep (weekend / non-duty night)</td>
<td>72%</td>
<td>73%</td>
<td>75%</td>
<td>77%</td>
<td>73%</td>
</tr>
<tr>
<td>2+ days per week of resistance training</td>
<td>83%</td>
<td>80%</td>
<td>81%</td>
<td>86%</td>
<td>80%</td>
</tr>
<tr>
<td>150+ minutes per week of aerobic activity</td>
<td>90%</td>
<td>87%</td>
<td>89%</td>
<td>92%</td>
<td>87%</td>
</tr>
<tr>
<td>2+ servings of fruits per day</td>
<td>32%</td>
<td>34%</td>
<td>37%</td>
<td>35%</td>
<td>33%</td>
</tr>
<tr>
<td>2+ servings of vegetables per day</td>
<td>40%</td>
<td>42%</td>
<td>45%</td>
<td>44%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Footnotes 1-6: See page 78.
Army-Pacific

INSTALLATION POPULATION STATISTICS

<table>
<thead>
<tr>
<th>Approximate population</th>
<th>Japan</th>
<th>USAG Daegu</th>
<th>USAG Humphreys</th>
<th>USAG Red Cloud</th>
<th>USAG Yongsan</th>
</tr>
</thead>
<tbody>
<tr>
<td>%Under 35</td>
<td>71</td>
<td>69</td>
<td>79</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>%Female</td>
<td>14</td>
<td>22</td>
<td>15</td>
<td>14</td>
<td>17</td>
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Installation Profiles | Outside the U.S.
<table>
<thead>
<tr>
<th>Health Metrics</th>
<th>Japan</th>
<th>USAG Daegu</th>
<th>USAG Humphreys</th>
<th>USAG Red Cloud</th>
<th>USAG Yongsan</th>
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</thead>
<tbody>
<tr>
<td>Injury (rate per 1,000)</td>
<td>1,308</td>
<td>1,292</td>
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<td>1,587</td>
<td>1,341</td>
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<td>Behavioral health (%)</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Substance use disorder (%)</td>
<td>2.2</td>
<td>2.5</td>
<td>3.8</td>
<td>3.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Sleep disorder (%)</td>
<td>7.2</td>
<td>7.0</td>
<td>11</td>
<td>9.4</td>
<td>8.7</td>
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<td>23</td>
<td>22</td>
<td>16</td>
<td>16</td>
<td>16</td>
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<tr>
<td>Tobacco use (%)</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>STIs: Chlamydia infection (rate per 1,000)</td>
<td>ND⁶</td>
<td>ND⁶</td>
<td>47</td>
<td>39</td>
<td>62</td>
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<tr>
<td>Chronic disease (%)</td>
<td>18</td>
<td>17</td>
<td>21</td>
<td>15</td>
<td>16</td>
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**Installation Health Index Score**

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<th>Percentile</th>
<th>≥90th</th>
<th>20–29th</th>
<th>50–59th</th>
<th>70–79th</th>
<th>30–39th</th>
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<tbody>
<tr>
<td>Z-score</td>
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<td>-0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
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</table>

**Environmental Health Indicators**

<table>
<thead>
<tr>
<th>Poor air quality</th>
<th>10 days/year</th>
<th>51 days/year</th>
<th>123 days/year</th>
<th>112 days/year</th>
<th>72 days/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor water quality</td>
<td>5 days/year</td>
<td>0 days/year</td>
<td>0 days/year</td>
<td>0 days/year</td>
<td>0 days/year</td>
</tr>
<tr>
<td>Water fluoridation</td>
<td>0.54 mg/L</td>
<td>0.70 mg/L</td>
<td>&lt;0.25 mg/L</td>
<td>&lt;0.25 mg/L</td>
<td>0.82 mg/L</td>
</tr>
<tr>
<td>Solid waste diversion rate</td>
<td>40%</td>
<td>68%</td>
<td>68%</td>
<td>54%</td>
<td>76%</td>
</tr>
<tr>
<td>Day-biting mosquito contact risk</td>
<td>No Data</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>West Nile virus transmission risk</td>
<td>No Data</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Lyme disease risk</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
</tbody>
</table>

**Performance Triad Measures**

- 7+ hours of sleep (weeknight/ duty night): 38%, 37%, 40%, 36%, 41%
- 7+ hours of sleep (weekend / non-duty night): 73%, 73%, 75%, 73%, 74%
- 2+ days per week of resistance training: 85%, 83%, 83%, 85%, 82%
- 150+ minutes per week of aerobic activity: 91%, 92%, 90%, 91%, 88%
- 2+ servings of fruits per day: 33%, 31%, 33%, 30%, 33%
- 2+ servings of vegetables per day: 41%, 40%, 40%, 37%, 41%

Footnotes 1-6: See page 78.
Appendices

APPENDICES

• Methods
• Acknowledgments
• References
• Acronyms and Abbreviations
• Index
METHODS

I. Methodological and Data Updates

The 2018 edition of Health of the Force includes several methodological and data updates which prevent direct comparison to prior reports. Changes that affected more than one metric are provided below, and metric-specific changes are included in the subsequent methods sections.

- Injury, obesity, tobacco use, and chronic disease metrics along with the overall IHI were selected for the purpose of ranking installations. These metrics are presented in a new section of the report; results for installations inside and outside the U.S. are presented separately.

- Selected health metric data are presented as range charts showing the distribution across Army installations.

- Two installations were excluded from the 2018 edition: Joint Base Lewis-McChord (JBLM) and Aberdeen Proving Ground (APG). JBLM was excluded due to its transition to Military Health System (MHS) Genesis. When the system was released in 2017, JBLM medical data became inaccessible. These data are included in prior years’ reporting and trend analysis; population statistics that were unaffected by the MHS Genesis implementation are reported as part of the Army Active Component (AC) community demographics. APG was dropped from installation reporting because it did not meet the required population threshold of 1,000 AC Soldiers (as determined by person-time, or the amount of time spent on an installation).

- When available, trend charts were included that provide historical Army-wide estimates using the updated methodology. Trends are now reported over 5 years (2013–2017). New injury case definitions were implemented to reflect an injury taxonomy which more appropriately accounted for the increased granularity in diagnoses available with the conversion to International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes. As with chronic conditions, this resulted in a greater capture of injury diagnoses and higher rates. However, the new taxonomy did not adequately translate to retrospective ICD-9-CM coding, which limited trend analysis to calendar years 2016 and 2017.

- All ICD-based case definitions were updated to better reflect the transition from ICD-9-CM to ICD-10-CM diagnosis coding. Updated case definitions affected all Installation Health Index (IHI) metrics with the exception of obesity, tobacco use, sexually transmitted infections (chlamydia), and air quality, none of which are ICD-dependent.

- The sentinel metrics comprising the IHI were revised and reweighted to better reflect the outcomes associated with Soldier readiness and

<table>
<thead>
<tr>
<th>2018 Health of the Force IHI Metric</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury</td>
<td>20</td>
</tr>
<tr>
<td>Behavioral health</td>
<td>15</td>
</tr>
<tr>
<td>Obesity</td>
<td>15</td>
</tr>
<tr>
<td>Sleep disorders</td>
<td>15</td>
</tr>
<tr>
<td>Chronic disease</td>
<td>15</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>10</td>
</tr>
<tr>
<td>Sexually transmitted infections (chlamydia)</td>
<td>5</td>
</tr>
<tr>
<td>Air quality</td>
<td>5</td>
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</tbody>
</table>
health issues. Metrics were weighted based on the prevalence of the condition or factor and the potential health, readiness and mission impacts. Specifically, weighting for chronic disease metrics was reduced while weighting was increased for metrics that would have greater immediate readiness impact and near-term healthcare implications. Since the behavioral health metric captures substance use outcomes, an independent substance use disorder (SUD) metric was removed from the IHI. An air quality metric was added due to its potential to impact both acute and chronic health issues, and to maintain consistency with relevant national population health indices. Weights were assigned to the IHI as described in the table.

- In order to control for potential biases, data were adjusted by sex and age prior to compiling the metric estimates for the IHI computation and before four metrics (injury, obesity, tobacco use, and chronic disease) were ranked by installation. Data from the 2015 AC Army population distribution were selected as the optimal standard population for the adjustments based on a detailed U.S. Army Public Health Center (APHC) assessment examining the impact of using various Army and national standards to compare metrics between populations (Watkins et al., 2018). This is a change from prior reports in which the adjustment was made using data from the same reporting year. The transition to a single 2015 standard is important for comparability of metrics across published studies and among organizations. The 2015 Army age distribution was also used as the standard when comparing tobacco and obesity metrics between the AC Army and U.S. populations.

II. Installation Selection

Installation summaries are provided for installations and Joint bases with Army medical treatment facilities (MTFs) and a minimum average population of 1,000 AC Soldiers. A Soldier’s contribution to the AC population denominator was proportional to the number of days of the year that Soldier was on active duty. A Soldier on active duty for an entire year contributed one person-year to the denominator (population). Two different Soldiers on active duty for 6 months together contributed one person-year to the population count. In this way, an average population count was determined by only counting the time a Soldier contributed to the AC cohort.

Estimates from selected U.S.-based installations and installations outside the U.S. were considered in the reported installation ranges for each evaluated metric. With the exception of JBLM, for which there were incomplete medical data, information pertaining to AC Soldiers from excluded installations was also incorporated in the overall Army estimates.

Installations outside the U.S. were segregated for the purposes of installation ranking for key metrics due to inherent differences which could have biased their comparison with U.S.-based installations. For example, Soldiers stationed outside the U.S. are more likely to meet deployment medical standards to qualify for assignment outside the U.S. There are also unique differences in healthcare delivery given that installations located outside the U.S. may be more likely to outsource care.

III. Health Metrics

Health 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, the
APHC selected metrics using specific criteria: 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/frequency of data captured, and 5) strength of supporting evidence (DHHS, 2018). Installation estimates were adjusted by sex and age prior to ranking and IHI computation (estimates not shown). Metrics and supporting health outcomes included in the report are described below; metrics included in the IHI computation are designated with an asterisk.

1. Injury*

The overall incidence of injury and musculoskeletal conditions resulting from injury were evaluated for AC Soldiers and trainees, excluding cadets (for whom complete data were unavailable). Data were derived from records maintained in the Defense Medical Surveillance System (DMSS). Installation assignment was determined by the Soldier’s unit ZIP code at the time of injury.

The transition to the ICD-10-CM clinical coding system caused increased granularity and a higher number of injury diagnosis codes (CDC, 2017d). This necessitated the development of a comprehensive taxonomy of injuries which systematically defined injury and categorized injury diagnoses by precipitating energy type and body region for increased consistency, transparency, and ease of analyses (APHC 2017a). Rates of injury diagnoses are higher in the 2018 report than have been reported in previous versions. ICD-10-CM diagnoses do not adequately translate to retrospective ICD-9-CM codes; therefore, 2016 injury data were re-analyzed using the new method and were provided for comparison with 2017 data.

New or incident injuries were identified based on ICD-10-CM codes in the Soldier’s medical records (direct MTF-based care as well as purchased care covered by TRICARE claims) using the new military-relevant case definitions (APHC, 2017a). Injury is now 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 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).

Only unique medical visits with injury diagnoses codes included in the case definition were counted; follow-up visits less than 60 days apart were excluded. Rates per 1,000 Soldiers were computed based on Soldier person-time; time deployed was excluded to account for missed cases not identified during deployment. All encounters with a documented “war” or “battle”-related cause of injuries were excluded from the analysis. The prevalence of Soldiers injured during the calendar year was also evaluated for the Army as a whole, including examinations of age and sex differences.

2. Behavioral Health*

Medical data were extracted from the DMSS by the selection of ICD-9-CM and ICD-10-CM codes in the Soldier’s medical records (direct MTF-based care as well as purchased care covered by TRICARE claims). The prevalence of seven diagnosed behavioral health disorders of interest (adjustment disorders, mood disorders, anxiety, posttraumatic stress disorder (PTSD), substance use disorders, personality disorders, and psychoses) among AC Soldiers and trainees (excluding cadets) was evaluated. Soldiers with one or more of the selected conditions were identified for the analysis. Installation assignment was determined by the Soldier’s unit ZIP code with results reported for the last assigned unit.

* Metrics that were included in the IHI computation are designated with an asterisk.
Case definitions established by the APHC and Armed Forces Health Surveillance Branch (AFHSB) were applied for the seven disorders of interest. Behavioral health case definitions were revisited to validate ICD-10-CM codes. The prevalence rule was changed from a lifetime prevalence rule to one with an 11-month look-back period. This more accurately reflects the percent of Soldiers with current diagnoses. The shorter look-back resulted in a rate drop compared to prior years.

**Substance use disorders:** The prevalence of substance use disorders, a subcomponent of the behavioral health disorder measure, was evaluated for AC Soldiers and trainees (excluding cadets). As with the broader behavioral health disorder metric, diagnoses were extracted from the DMSS. Installation assignment was determined by the Soldier’s last assigned unit ZIP code. Soldiers were assigned to a substance abuse category based on ICD-9-CM or ICD-10-CM codes in the Soldier’s medical records (direct MTF-based care as well as purchased care covered by TRICARE claims). These disorders are now reported only in aggregate rather than by individual substance type.

**Drug testing:** Drug testing results among AC Soldiers were furnished by the Army Resiliency Directorate (ARD). Results were provided for cannabis, opioids, amphetamines, cocaine, and other illicit drugs included in the screening panel. The drug testing population included randomly screened Soldiers, randomly screened units, and Soldiers specifically referred for testing.

**Army Substance Abuse Program (ASAP) referrals/enrollment:** ASAP enrollments and illicit-positive Soldier data were obtained from the ARD. Enrolled Soldiers were defined as the number of Soldiers enrolled in ASAP per calendar year. ASAP enrollments include those for driving under the influence, illicit-positive drug screen, and self-referrals for drug or alcohol concerns. Illicit-positive Soldiers were defined as the number of distinct Soldiers that were illicit-positive. The data were reported by cause for ASAP enrollment and for illicit-positive substance found on Soldier testing.

### 3. Sleep Disorders*

The prevalence of seven sleep disorders (insomnia, hypersomnia, circadian rhythm sleep disorder, sleep apnea, narcolepsy and cataplexy, parasomnia, and sleep related movement disorders) was evaluated for AC Soldiers and trainees (excluding cadets). Sleep disorder data were obtained from the DMSS. Soldiers were assigned to a disease category if their medical records contained an ICD-9-CM or ICD-10-CM code indicating a sleep disorder. Installation assignment was determined by the Soldier’s unit ZIP code, with estimates mapped to the Soldier’s last recorded installation.

### 4. Obesity*

BMI was calculated from height and weight measurements recorded during outpatient medical encounters for AC Soldiers, trainees, and some cadets. Height and weight data were obtained from the Clinical Data Repository Vitals module of the ambulatory encounter record in the Military Health System Data Repository (capturing approximately 85% of AC Soldiers). Data were furnished by the Patient Administration Systems and Biostatistics Activity. Cases were assigned to the following weight categories:

- Obese: BMI ≥30
- Low Overweight: BMI>25 and <27.5
- High Overweight: BMI≥27.5 and <30
- Normal weight: BMI ≥18.5 and <25
- Underweight: BMI <18.5
Height and weight data were drawn from the medical record to calculate BMI because these data were more complete than similar data in physical fitness test records. When compared by sex and age, BMI estimates calculated from the medical record are generally within 1% of BMI estimates from physical fitness test records. The BMI averages reported in *Health of the Force* accurately estimate population statistics, but may not be appropriate for smaller units and are not intended for individual Soldier assessment.

BMI was not calculated for females who had a pregnancy-related diagnosis code in their ambulatory record or who were assigned a pregnancy-related Medicare Severity Diagnosis Related Group code in their inpatient record in 2017.

Prevalence estimates are specific to the outpatient population for which data were available; installation assignment was based on the last assigned unit ZIP code.

Estimates for the U.S. civilian working population, aged 18–64 years, were compared to the Army AC population by adjusting national estimates to the 2015 Army AC age and sex distribution, which was selected as the standard for all metric adjustments in the report (Watkins et al, 2018). Readily available survey data from the Behavioral Risk Factor Surveillance System (BRFSS) were used for the analysis. BRFSS is widely used for similar regional comparisons of health metrics.

5. Tobacco Use*

Due to current deterioration of dental clinic data, the data source for reporting tobacco use changed in this report. Data were obtained from the Periodic Health Assessment (PHA) survey, which collects self-reported information on the respondent’s current smoking and smokeless tobacco use. Installation assignment was determined by the Soldier’s last assigned unit ZIP code at the time of PHA completion. Unit ZIP codes were extracted from DMSS and paired with PHA tobacco use data.

Estimates for the U.S. civilian population, aged 18–64 years, were compared to the Army AC population by adjusting national estimates to the 2015 Army AC age and sex distribution, which was selected as the standard for all metric adjustments in the report (Watkins et al, 2018). Readily available survey data from the BRFSS were used for the analysis. BRFSS is widely used for similar regional comparisons of tobacco use and other health metrics. The 2017 BRFSS data were chosen for comparison over other national sources based on the larger sample size (over 450,000) and because the survey methodology was more consistent with that of the PHA.

6. Heat Illness

Heat illnesses were reported based on ICD-9-CM and ICD-10-CM code data received from the Disease Reporting System, internet (DRSi) and the Military Health System Management Analysis and Reporting Tool (M2). Heat illnesses were identified using standard case definitions established by the AFHSB. AFHSB case definitions for heat illnesses include heat stroke and heat exhaustion. The current definition no longer includes other effects of heat and light. Per the AFHSB case definition, Soldiers were considered an incident case only once per calendar year.

7. Hearing

Percent significant threshold shift (STS) and projected hearing profile data were assessed from Defense Occupational and Environmental Health Readiness System - Hearing Conservation (DOEHRS-HC). Auditory readiness outcomes for “Percent Not Hearing Ready” were based on Medical
Protection System (MEDPROS) data for Soldiers who were overdue for annual hearing testing, due for follow-up hearing testing, or for whom follow-up hearing testing was not completed within the required timeframe. DOEHRS-HC hearing test results provide additional context to the diagnosed hearing injury rates recorded in DMSS. DOEHRS-HC data were mapped based on the ZIP code of the installation where the hearing test was performed; MEDPROS data were mapped to the Soldier’s unit identification code.

8. Sexually Transmitted Infections (Chlamydia)*

The incidence of reported chlamydia infections was evaluated for non-deployed AC Soldiers and trainees (excluding cadets). Installation assignment was based on the location of the MTF reporting the infection. New or incident infections were identified from case reports submitted through the DRSi using case definitions published by the AFHSB. Only unique case reports were counted; follow-up reports less than 30 days apart were excluded. Rates per 1,000 Soldiers were computed based on Soldier person-time extracted from the DMSS; time deployed was excluded to account for missed cases not identified during deployment.

Chlamydia rates for installations with fewer than 20 cases were not reported and were excluded from IHI computation since small case counts limit the reliability of the estimates. While estimates were provided for all other installations with more than 20 identified cases, estimates for installations with a reporting compliance of less than 50% were considered overly conservative and were excluded from the ranking and IHI computation. Reporting compliance was determined by the Navy and Marine Corps Public Health Center, which manages the DRSi.

Chlamydia screening: Data extracted from the Military Health System Population Health Portal in Carepoint were used to examine annual chlamydia screening among MHS enrolled female AC Soldiers under age 25. The screening estimates contextualize the reported rates and identify areas for improvement.

9. Chronic Disease*

Chronic disease case definitions were re-evaluated to account for the more detailed ICD-10-CM codes. Some case definitions were also broadened which substantially increased case capture for some categories of chronic disease, especially arthritis. The prevalence of six chronic conditions of interest (asthma, arthritis, chronic obstructive pulmonary disease (COPD), cancer, diabetes, and cardiovascular conditions, including hypertension) among AC Soldiers and trainees (excluding cadets) was evaluated. Conditions identified at any point in the surveillance window were flagged as a prevalent case. Installation assignment was determined by the Soldier’s unit ZIP code with results reported for the last assigned unit per calendar year.

Soldiers with one or more of the selected conditions were identified for the analysis, and Army-level trends were provided for each diagnostic subset. Medical encounter data were extracted from the DMSS. Soldiers were assigned to a disease category based on ICD-9-CM and ICD-10-CM codes in the Soldier’s medical records (direct MTF-based care as well as purchased care covered by TRICARE claims).
IV. Performance Triad

Revised 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 revised reporting method allows for interpretation of SAN metrics in terms of these standards, leading to enhanced ability to compare with other groups and facilitating actionable changes targeting areas for improvement.

P3 measures were obtained in aggregate from the ARD in coordination with the Army Analytics Group. Estimates were derived from relevant survey items collected within the Physical Domain of the Global Assessment Tool (GAT). Soldiers are required to complete the GAT annually per Army Regulation (AR) 350–53 (DA, 2014). Data were only reported when at least 40 responses were available per stratum (e.g., installation, sex, and age group) as an aggregated summary statistic. In 2017, 66% of AC Soldiers completed the GAT.

1. Sleep
Sleep targets were based on CDC and NSF guidelines. Targets include the percentage of Soldiers reporting 7 or more hours of sleep per night on average for (a) weeknights/duty nights and (b) weekends/non-duty nights. Hours of sleep were reported separately because research indicates significant differences in behavior between these two duty statuses. Sleep metrics were based on GAT survey questions assessing self-reported average hours of sleep per 24-hour period during weeknights/duty nights and self-reported average hours of sleep per 24-hour period during weekends/days off.

2. Activity
Activity targets were similarly based on CDC recommendations. The first activity target included in this report is the percentage of Soldiers meeting the resistance training recommendation of 2 or more days per week. Data for this metric were derived from a GAT survey question asking Soldiers to report the average number of days per week in which they participated in resistance training in the last 30 days. The second activity target relates to aerobic exercise; the target 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 are derived from a series of GAT questions asking about the average number of days per week in which the Soldier 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 activity levels.
Appendices

3. Nutrition

Nutrition targets were based on the U.S. Department of Agriculture (USDA) MyPlate recommendations* shown below.

<table>
<thead>
<tr>
<th>Age</th>
<th>Fruits</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19–30 years old</td>
<td>2 cups</td>
<td>2.5 cups</td>
</tr>
<tr>
<td>31–50 years old</td>
<td>1.5 cups</td>
<td>2.5 cups</td>
</tr>
<tr>
<td>51+ years old</td>
<td>1.5 cups</td>
<td>2 cups</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19–30 years old</td>
<td>2 cups</td>
<td>3 cups</td>
</tr>
<tr>
<td>31–50 years old</td>
<td>2 cups</td>
<td>3 cups</td>
</tr>
<tr>
<td>51+ years old</td>
<td>2 cups</td>
<td>2.5 cups</td>
</tr>
</tbody>
</table>

* These amounts are appropriate for individuals who get less than 30 minutes per day of moderate physical activity, beyond normal daily activities. Those who are more physically active may be able to consume more while staying within calorie needs.

Targets for fruit and vegetable consumption were analyzed as the percentage of Soldiers eating 2 or more servings of fruits and vegetables per day. The data for these metrics are based on GAT survey questions asking Soldiers to report the average number of fruit and vegetable servings they consumed per day, over the last 30 days. Due to differences in how servings of fruits and vegetables are quantified and how consumption frequencies are listed, both MyPlate and GAT servings are described in the table below.

<table>
<thead>
<tr>
<th>GAT</th>
<th>MyPlate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruits</strong></td>
<td><strong>Vegetables</strong></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>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>
</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>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>
</tr>
</tbody>
</table>

V. Environmental Health Indicators (EHIs)

1. Air Quality*

The metric for air quality is the number of days in a calendar year when ambient air pollution near an Army installation violates a short-term (≤24 hours) U.S. National Ambient Air Quality Standard (NAAQS). For U.S. installations, the number of poor air quality days was obtained from Air Quality Index (AQI) Reports and Daily Data summaries on the Environmental Protection Agency (EPA) Air Data Web site. The AQI is a location-specific, daily numerical index derived from air pollution measurements obtained at State- and Federally-operated air monitoring stations throughout the U.S. An AQI score greater than 100 denotes a poor air quality day during which local air pollution levels violated a short-term NAAQS and the air quality is considered unhealthy for some or all of the general public. Poor air quality days for a U.S. Army installation were calculated as the sum of all days in a calendar year when the local AQI score was greater than 100. Air monitoring data were not available from State or Federal regulatory authorities in the airsheds where the following U.S. Army

* Air quality is included in the IHI computation.
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 because the lack of an air monitoring station was deemed indicative of low risk/need.

For installations outside the U.S., poor air quality days were determined by converting local air monitoring data representative of the installation airshed 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 host nation environmental authorities in Germany, South Korea, Japan, and the Air Quality e-Reporting database at the European Environment Agency.

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 municipal authorities on days when air quality is degraded. The desired status is fewer poor air quality days. Thresholds were based on the average 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: 5–20 poor air quality days per year
- Red: >20 poor air quality days per year

2. Drinking Water Quality

The metric for drinking water quality is whether an Army population has been exposed to drinking water from the installation’s potable water system that failed to meet a health-based standard promulgated under the Safe Drinking Water Act (SDWA). Data on violations of health-based drinking water standards in the potable water systems serving Army installations were obtained from the semi-annual data calls for Army environmental data issued by Office of the Assistant Chief of Staff for Installation Management (ACSIM). If there was uncertainty in these data, details of the violation were verified by discussion with garrison environmental staff. Additional references used to verify the occurrence of drinking water violations included the EPA Safe Drinking Water Information System (SDWIS) 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 by a water purveyor for the purpose of informing consumers about their local drinking water quality.

Green, amber, and red thresholds were established for the purpose of creating awareness of water quality status in the affected community. No violation of any health-based drinking water standard is the desired status.

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

The metric for water fluoridation is the annual average concentration of fluoride in the potable water provided to an Army installation. This concentration is compared to the CDC-recommended optimal fluoride concentration of 0.7 mg/L, the SDWA Secondary Standard for fluoride of 2.0 mg/L, and the maximum contaminant level (MCL) of 4.0 mg/L. Data on fluoride concentration in potable water systems serving Army installations were obtained from a data call issued by ACSIM. Installations that treat their own potable water evaluate fluoride levels at least annually and compile this information in reports submitted to the responsible water regulatory authority. At installations that purchase potable water, fluoride data were obtained from the annual CCR for the community water system(s) (CWS) serving 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 <0.7 mg/L or >2.0–4.0 mg/L
- **Red:** Any fluoride concentration >4.0 mg/L

4. Solid Waste Diversion

The metric for solid waste is the percentage of an installation’s nonhazardous solid waste diverted from a disposal facility by means such as recycling, composting, mulching, and donating. It is calculated as the mass of diverted waste divided by the mass of the total waste stream (before diversion). This rate is compared to the Department of Defense (DOD) solid waste diversion rate goal of 50% specified in Department of Defense Instruction (DODI) 4715.23 (DOD, 2016a).

Installation solid waste diversion rate data were obtained from the ACSIM Solid Waste Annual Reporting system database known as SWARWeb. This database is located on the ACSIM internet portal under the Installation Management Applications Resource Center. SWARWeb tracks solid waste collection, disposal, and recycling efforts at installation and Command/HQ levels. Installation solid waste managers report their facility’s tonnage for waste, recycling, and other diversion efforts to the database semiannually. SWARWeb calculates the diversion rates and economic benefits as required by the DOD Solid Waste Measures of Merit. For quality assurance, reports for specific installations were reviewed to verify data integrity, spot anomalies, and analyze waste generation details. The solid waste diversion rate excludes waste generated from privatized housing and from construction and demolition activities.

Green, amber, and red thresholds have been established for the purpose of creating awareness of solid waste management practices and tracking conformance with the solid waste diversion rate goal established in DODI 4715.23. A diversion rate ≥ 50% is the desired status.

- **Green:** ≥50% solid waste diversion rate
- **Amber:** 25–49% solid waste diversion rate
- **Red:** <25% solid waste diversion rate
5. Mosquito-borne Disease

The metrics for mosquito-borne disease are two indices reflecting the risk of vector contact or disease transmission from mosquitoes (*Aedes aegypti* and *Aedes albopictus*, *Culex* spp.) at an Army installation. The metrics include (a) risk of contact with day-biting mosquitoes on an Army installation and (b) risk of West Nile virus (WNV) transmission on an Army installation.

The metrics reflect a combination of county/state mosquito surveillance reports from public health authorities and scientific literature, as well as data from mosquito trapping and pathogen identification at Army installations. Indices ranging from 0 to 7 indicate the risk of contact with a Zika, dengue, or chikungunya-competent mosquito vector (day-biting mosquito), or risk of WNV transmission at each Army installation. An index score of 0 to 2 represents negligible or low risk. A score of 3 to 4 represents a moderate risk and suggests that the mosquito species may be present, but disease transmission may be low or underreported. A score of 5 to 7 represents a high risk of endemic mosquito vector presence and potential disease transmission on an installation.

The criteria used to compute the index scores are presented below.

<table>
<thead>
<tr>
<th>Mosquito-borne Disease Criteria</th>
<th>Day-Biting Mosquito Contact Risk</th>
<th>WNV Transmission Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vector reported in county/state public health records [0=present; 1=not present]</td>
<td>0 or 1</td>
<td>N/A</td>
</tr>
<tr>
<td>Installation located in the CDC reported vector range [0=present; 1=not present]</td>
<td>0 or 1</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Vectors reported in county data where the installation is located [0=not present; 1=present 1 year; 2=present 2 years; 3=present 3 or more years]</td>
<td>0 to 3</td>
<td>N/A</td>
</tr>
<tr>
<td>Vectors reported on the installation(^1) [0=neither <em>Ae. aegypti</em> or <em>Ae. albopictus</em> present; 1=either <em>Ae. aegypti</em> or <em>Ae. albopictus</em> present; 2=both <em>Ae. aegypti</em> and <em>Ae. albopictus</em> present]</td>
<td>0 to 2</td>
<td>N/A</td>
</tr>
<tr>
<td>WNV-positive mosquito from installation [0=present; 1=not present]</td>
<td>N/A</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Incidence of neuroinvasive WNV in the state where the installation is located [Cases per 100,000 people: 0=no cases; 1=0.01–0.24 cases; 2=0.25–0.49 cases; 3=0.5–0.99 cases; 4=1.0 cases or more]</td>
<td>N/A</td>
<td>0 to 4</td>
</tr>
</tbody>
</table>

\(^1\) Potential WNV vectors were present at every installation for which surveillance data were available. As a result, vector presence was not used as a discriminating value.

N/A = Not Applicable
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., *Ixodes scapularis* or *Ixodes pacificus*) that is infected with the agent of Lyme disease at an Army installation. The metric reflects a combination of county/state Lyme vector surveillance reports from public health authorities and scientific literature, and data from human ticks submitted and evaluated through the DOD Human Tick Test Kit Program (HTTKP). Ticks are voluntarily submitted to the HTTKP after being found attached to (biting) Active Duty, Reserve or Retired personnel, DOD Civilians, and Family members from all branches of military service. For each Army installation, an index ranging from 0 to 5 indicates the risk of coming into 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.

The criteria used to compute the index scores are presented below.

<table>
<thead>
<tr>
<th>Tick-borne Disease Criteria</th>
<th>Lyme Disease Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation is in the CDC-predicted range for either Lyme vector tick species (<em>I. scapularis</em> or <em>I. pacificus</em>), as published by Eisen et al., 2016. [0=neither <em>I. scapularis</em> or <em>I. pacificus</em> present; 1=either <em>I. scapularis</em> or <em>I. pacificus</em> present; 2=both <em>I. scapularis</em> and <em>I. pacificus</em> present]</td>
<td>0 to 2</td>
</tr>
<tr>
<td>The CDC has documented cases of Lyme disease within the last 10 years from within the county where the installation is located (CDC, 2017e). [0=false; 1=true]</td>
<td>0 or 1</td>
</tr>
<tr>
<td>Human-biting ticks submitted to the HTTKP within the last 10 years were identified as Lyme vector ticks [0=false; 1=true]</td>
<td>0 or 1</td>
</tr>
<tr>
<td>The Lyme vector ticks submitted to the HTTKP were positive for Lyme disease pathogen [0=false; 1=true]</td>
<td>0 or 1</td>
</tr>
</tbody>
</table>

6. Installation Health Index

Health indices are widely used to gauge the overall health of populations. They offer an evidence-based tool for comparing a broad range of metrics across communities and can help inform community health needs assessments. Such indices are also useful for ranking, which has proven effective in both stimulating community interest and driving health improvement. However, because aggregate indices may hide influential factors, healthcare decision makers should review individual measures that comprise the index in order to identify and effectively target key outcomes or behaviors that are the most significant health and readiness detractors for each installation.

The core metrics included in this report were prioritized for the AC Soldier population 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, supporting evidence, and the importance to Army leadership.

In generating an IHI, the eight selected metrics (injury, behavioral health, obesity, sleep disorders, chronic disease, tobacco use, chlamydia, and air quality) were individually standardized to the Army
average using Z-scores. These scores reflect the number of standard deviations (amount of variation in data values for a given metric) the installation is from the Army average. Metric values above the Army average have positive Z-scores, while values below the Army average have negative Z-scores. Estimates found to be 2 or more standard deviations above or below the average are typically considered to reflect statistically significant deviations with a 95% confidence level (95% level of confidence that the true value lies in this interval).

**Normally Distributed Data Curve**

![Graph showing a normal distribution with average, standard deviations, and Z-scores](image)

The IHI represents pooled Z-scores or standard deviations from the Army average value for the included metrics. With the exception of air quality data, metrics were adjusted by age and sex prior to standardization to allow more valid comparisons. Z-scores were then weighted as previously described to prioritize readiness detractors (Injury 20%, Behavioral health 15%, Sleep disorders 15%, Obesity 15%, Chronic disease 15%, Tobacco use 10%, Sexually transmitted infections (chlamydia) 5%, and Air quality 5%). When estimates were unavailable for an IHI measure, available metric weights were adjusted to compensate for the loss of data. This occurred with the chlamydia metric, for example, and the corresponding 5% weight was reallocated across the remaining 7 IHI metrics.

Air quality data, which were not normally distributed, varied widely by geographic location, particularly for installations outside the U.S. where poor air quality days were extremely elevated. The data from these installations skewed the Army average to the high end and exceeded the values reported by the majority of U.S.-based installations, thus producing artificially low Z-scores for most U.S. installations. In addition, these scores did not correspond with meaningful risk parameters. To remove the impact of these data outliers, installations outside the U.S. were excluded from the Army average computation, and the minimum and maximum allowed Z-scores were set at -4.0 and 4.0, respectively, to further alleviate the impact of these data extremes on the overall IHI compilation.

IHI scores were converted to percentiles for ease of interpretation based on the Z-score conversion. Higher percentiles reflect more favorable health status. The computed percentiles were adjusted to reflect percentages from the maximum observed value or best ranking installation. For example, if the highest observed percentile for a given metric or IHI was 87%, that installation was considered to be at 100%, and all other installation percentiles were computed relative to this maximum achievable value.
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VII. Installation Profile Summaries

The installation profile summary pages report manpower, and age and sex distributions. These estimates were derived from the DMSS, which uses DMDC rosters to generate person-time estimates for AC Soldiers and trainees (excluding cadets) assigned to a given installation as determined by unit ZIP codes.

Person-time 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 thinking of their population size in this way. The person-time values in the installation profile summaries are rounded and provided as approximations.

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 profile summary and report.

VIII. Data Limitations

- Methodology and data source changes from 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.

- Higher estimates for a health outcome or metric may not be indicative of a problem but rather may reflect a greater emphasis on detection and treatment.

- Composite measures or indices may mask important differences seen at the individual metric level. It is important to examine the sub-components for which more targeted prevention programs can be developed.

- Medical data for cadets were not available from the DMSS; therefore, U.S. Army Garrison (USAG) West Point estimates using DMSS-derived data are limited to permanent party AC Soldiers.

- Metrics based on ICD-9-CM or ICD-10-CM codes entered in patient medical records are subject to coding errors. Estimates may also be conservative given that individuals may not seek care or may choose to seek care outside the MHS or the TRICARE claims network.

- Measures based on self-reported data (GAT and PHA) are limited to a subset of the population (i.e., survey respondents) and may be prone to biases. Obesity estimates are likewise based on a subset of outpatients with recorded height and weight measurements.

- The chlamydia measure relies on reporting compliance. Estimates are conservative given the high proportion of asymptomatic infections that are undetected.

- GAT data used for the P3 measures were aggregated strata, and counts below 40 were not reported. Thus, age and sex adjustments for the installations were not possible.

- The Air Quality EHI relies on outdoor ambient air monitoring data 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 the installation 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 DOD HTTKP for identification and pathogen testing. Robustness of the risk estimate is dependent upon installation populations submitting human ticks to the HTTKP for analysis.

**Suggested citation**

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<tbody>
<tr>
<td>AC</td>
<td>Active Component</td>
</tr>
<tr>
<td>ACSIM</td>
<td>Assistant Chief of Staff for Installation Management</td>
</tr>
<tr>
<td>ADP</td>
<td>Area Development Plan</td>
</tr>
<tr>
<td>AFHSB</td>
<td>Armed Forces Health Surveillance Branch</td>
</tr>
<tr>
<td>AHP</td>
<td>Army Hearing Program</td>
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<tr>
<td>AMEDD</td>
<td>U.S. Army Medical Department</td>
</tr>
<tr>
<td>APA</td>
<td>American Psychiatric Association</td>
</tr>
<tr>
<td>APFT</td>
<td>Army Physical Fitness Test</td>
</tr>
<tr>
<td>APG</td>
<td>Aberdeen Proving Ground</td>
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<tr>
<td>APHC</td>
<td>U.S. Army Public Health Center</td>
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<tr>
<td>APHC (Prov)</td>
<td>U.S. Army Public Health Center (Provisional)</td>
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<tr>
<td>AQI</td>
<td>Air Quality Index</td>
</tr>
<tr>
<td>AR</td>
<td>Army Regulation</td>
</tr>
<tr>
<td>ARD</td>
<td>Army Resiliency Directorate</td>
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<tr>
<td>ASAP</td>
<td>Army Substance Abuse Program</td>
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<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
</tr>
<tr>
<td>AWC</td>
<td>Army Wellness Center</td>
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<tr>
<td>BH</td>
<td>Behavioral Health</td>
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<tr>
<td>BHDP</td>
<td>Behavioral Health Data Portal</td>
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<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>BRFSS</td>
<td>Behavioral Risk Factor Surveillance System</td>
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<tr>
<td>BSB</td>
<td>Brigade Support Battalion</td>
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<tr>
<td>CBD</td>
<td>Cannabidiol</td>
</tr>
<tr>
<td>CCR</td>
<td>Consumer Confidence Report</td>
</tr>
<tr>
<td>CDC</td>
<td>U.S. Centers for Disease Control and Prevention</td>
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<tr>
<td>CHA</td>
<td>Community Health Assessment</td>
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<tr>
<td>CHSA</td>
<td>Community Health Status Assessment</td>
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<tr>
<td>CMS</td>
<td>Command Management System</td>
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<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
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<tr>
<td>CR2C</td>
<td>Commander’s Ready and Resilient Council</td>
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<tr>
<td>CSA</td>
<td>Chief of Staff of the Army</td>
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<tr>
<td>CSTA</td>
<td>Community Strengths and Themes Assessment</td>
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<td>CWS</td>
<td>Community Water System</td>
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<tr>
<td>CY</td>
<td>Calendar Year</td>
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<tr>
<td>DA</td>
<td>Department of the Army</td>
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<td>DA Pam</td>
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<td>Defense Health Agency</td>
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<tr>
<td>DMSS</td>
<td>Defense Medical Surveillance System</td>
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<tr>
<td>DMDC</td>
<td>formerly Defense Manpower Data Center</td>
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<tr>
<td>DOD</td>
<td>Department of Defense</td>
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<tr>
<td>DODI</td>
<td>Department of Defense Instruction</td>
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<tr>
<td>DOEHR</td>
<td>Defense Occupational and Environmental Health Readiness System</td>
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<tr>
<td>DOEHR-HR</td>
<td>Defense Occupational and Environmental Health Readiness System-Hearing Readiness</td>
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<td>Department of Public Health</td>
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<tr>
<td>DPW</td>
<td>Department of Public Works</td>
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<tr>
<td>DRSi</td>
<td>Disease Reporting System, internet</td>
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<tr>
<td>DSM</td>
<td>Dental Sleep Medicine</td>
</tr>
<tr>
<td>EBH</td>
<td>Embedded Behavioral Health</td>
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<td>EHI</td>
<td>Environmental Health Indicator(s)</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>FM</td>
<td>Field Manual</td>
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<td>FY</td>
<td>Fiscal Year</td>
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<tr>
<td>GAT</td>
<td>Global Assessment Tool</td>
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<tr>
<td>HAC</td>
<td>Healthy Army Communities</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>HP2020</td>
<td>Healthy People 2020</td>
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<tr>
<td>HPV</td>
<td>Human Papillomavirus</td>
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<tr>
<td>HQDA</td>
<td>Headquarters, Department of the Army</td>
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<tr>
<td>HRC</td>
<td>Hearing Readiness Classification</td>
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<tr>
<td>HRI</td>
<td>Heat-related Illness</td>
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<tr>
<td>HTTKP</td>
<td>Human Tick Test Kit Program</td>
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<tr>
<td>ICD-10-CM</td>
<td>International Classification of Diseases, Tenth Revision, Clinical Modification</td>
</tr>
</tbody>
</table>
IHI – Installation Health Index
IMCOM – U.S. Army Installation Management Command
IRPT – Injured Reserve Physical Training
JBLE – Joint Base Langley-Eustis
JBLM – Joint Base Lewis-McChord
JCS – Joint Chiefs of Staff
MCL – Maximum Contaminant Level
MDVSS – Medical Detachment Veterinary Service Support
MEDCOM – U.S. Army Medical Command
MEDPROS – Medical Protection System
mg/L – milligrams per liter
MHS – Military Health System
MRC – Medical Readiness Classification
MSM – Men who have sex with men
MTF – Medical Treatment Facility
NAAQS – U.S. National Ambient Air Quality Standard
NCI – National Cancer Institute
NCQA – National Committee for Quality Assurance
NCSL – National Conference of State Legislatures
NIDA – National Institute on Drug Abuse
NPMA – National Pest Management Association
NSF – National Sleep Foundation
OAT – Oral Appliance Therapy
OSA – Obstructive Sleep Apnea
OTSG – Office of The Surgeon General
P3 – Performance Triad
PAP – Positive Airway Pressure
PCMH – Patient Centered Medical Home
PHA – Periodic Health Assessment
PHS – U.S. Public Health Service
PI&A – Performance Improvement and Accreditation
PM – Preventive Medicine
PM\(_{2.5}\) – Fine particulate matter
PMM – Pectoralis Major Muscles
PMT – Pectoralis Major Tendons
PT – Physical Training
PTSD – Posttraumatic Stress Disorder
PWS – Public Water System(s)
SAN – Sleep, Activity, and Nutrition
SD – Standard Deviation
SDWA – Safe Drinking Water Act
SDWIS – Safe Drinking Water Information System
STI – Sexually Transmitted Infection
STS – Significant Threshold Shift
SUD – Substance Use Disorder
SWARWeb – Solid Waste Annual Reporting for the Web
TCR – Total Coliform Rule
THC – delta-9-tetrahydrocannabinol
THM – trihalomethanes
TRADOC – U.S. Army Training and Doctrine Command
USAG – U.S. Army Garrison
USARAK – U.S. Army Alaska
USDA – U.S. Department of Agriculture
USPSTF – U.S. Preventive Services Task Force
UV – Ultraviolet
VSST – Veterinary Service Support Team
WHO – World Health Organization
WNV – West Nile Virus
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