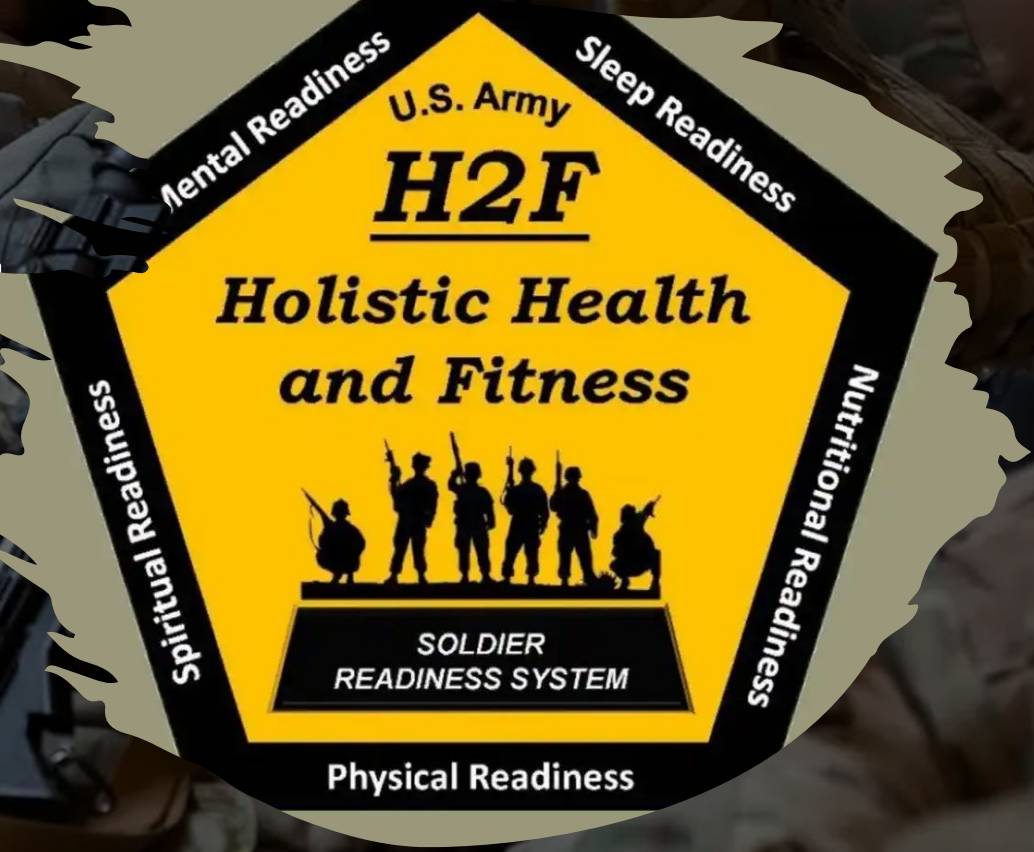
Sleep Readiness

Why the Army wants you to sleep as much as you can.

What is Sleep Readiness ?

“Soldiers should sleep as much as they can, whenever they can, as the situation allows. The vast majority of Soldiers require 7-8 hours of sleep per night to sustain performance; more sleep is better. Soldiers can maximize sleep and subsequent performance by timing sleep and caffeine use optimally. Finally, only sleep replaces lost sleep.”

(FM 7-22)



The Problem

NEUROPSYCHOPHARMACOLOGY REVIEWS OPEN

Sleep in the United States Military

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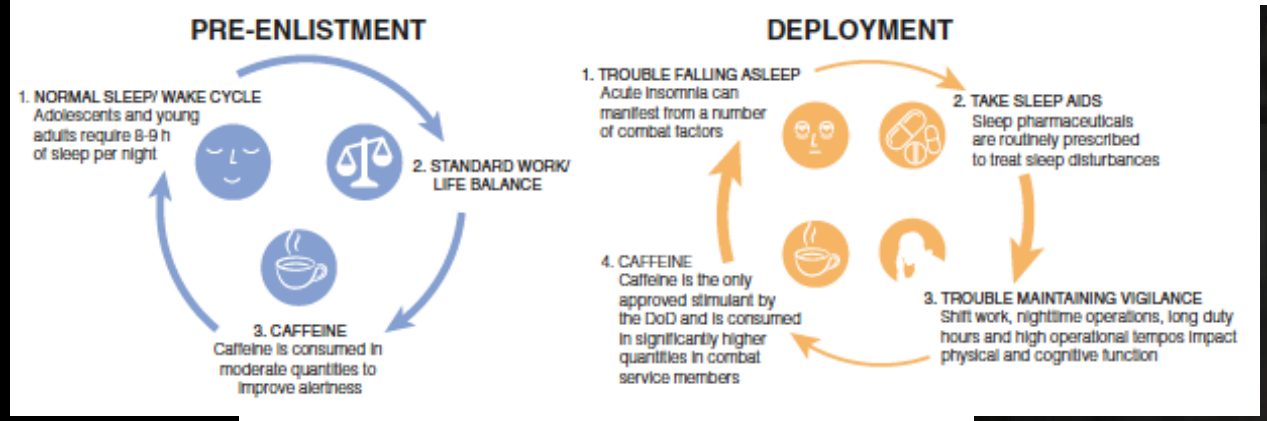
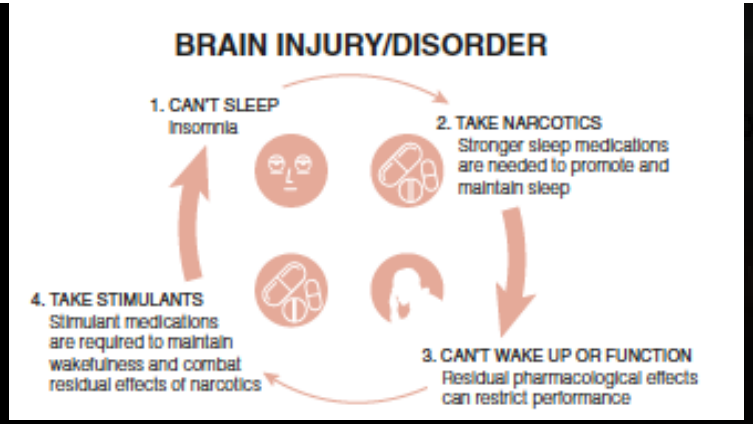
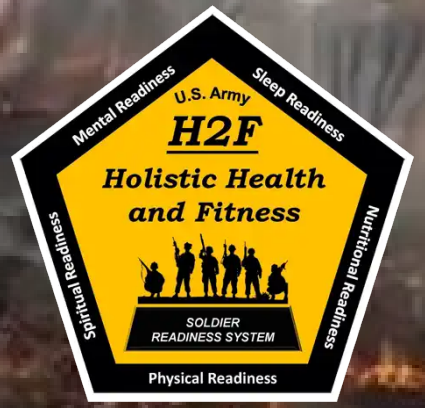
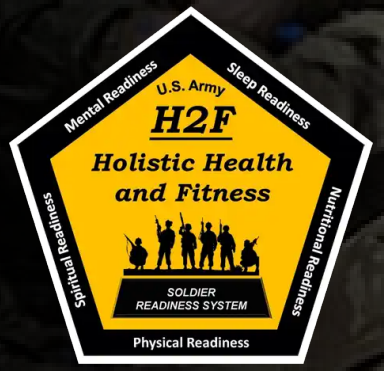








LOSS OF COMBAT EFFECTIVNESS
US Army Artillery Study

Time Asleep	7 hours	6 Hours	5 Hours	4 Hours
Combat Effectiveness	98%	50%	28%	15%

- Loss of sleep leads to loss of effectiveness on mission.
- These levels of effectiveness are when real mistakes are made. The kind that will lead to serious injury or death.

Sleep Readiness

The brain is the only organ or body part that requires sleep. Sleep is crucial for tissue repair and hormone synthesis to maintain peak performance mentally and physically. Sleep sustains brain and physical health, cognition, the immune system, and recovery after physical activity. This chapter provides tools and techniques for leaders and individuals exercising sleep readiness tactics, techniques, and procedures for a range of occupations and operational environments.

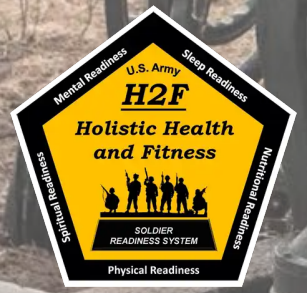
PRINCIPLES

There are three basic interrelated principles of sleep health: sleep duration, sleep timing, and sleep continuity. Of these, sleep duration is paramount because the health and functioning of the brain is primarily a direct function of the amount of sleep obtained—the more sleep obtained the better. Sleep timing is critical because the brain's internal clock strongly influences the ability to initiate and maintain sleep as well as maximize the amount of sleep obtained. The extent to which sleep is undisturbed by arousals and awakenings—sleep continuity—is important because this influences both the duration and the depth of sleep, with deeper sleep being more restorative. Ultimately, the promotion of sleep health in the operational environment entails optimizing each Soldier's sleep duration, timing, and continuity to the greatest extent possible, given existing mission constraints. See ATP 7-22.01 for H2F testing and ATP 7-22.02 for drills and exercises. See also ATP 6-22.5 for further discussion on the leader's role in sleep readiness.

SLEEP DURATION

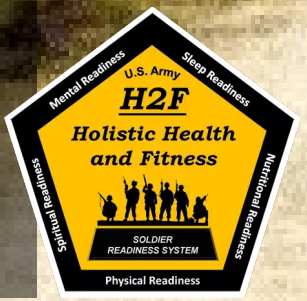
Cognitive ability and readiness vary as direct function of the amount of sleep obtained. The more sleep Soldiers get, the greater their mental acuity, with faster response times, fewer errors, and fewer lapses in attention. Also improved are judgment, problem-solving, situational awareness, mood, resilience, and general well-being—to name but a few key Soldier attributes.

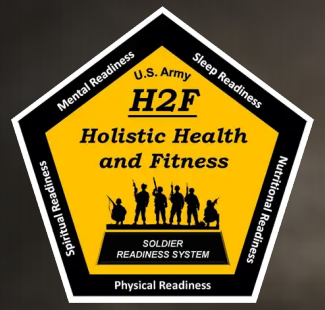
Soldiers and leaders frequently ask “what is the minimum amount of sleep needed to maintain military effectiveness?” There is no clear threshold amount of sleep below which effectiveness is compromised and above which effectiveness is sustained. Most Soldiers need 7 to 9 hours of sleep every 24 hours to maximize health and sustain performance. The relationship between sleep duration and cognitive readiness (and thus, military effectiveness) is best thought of as a continuum, with more sleep always producing improved performance. Considered this way, the question becomes: “How can the amount of sleep obtained by Soldiers be maximized, given the constraints imposed by the current mission?”



SLEEP TIMING

Human beings are diurnal, designed to be awake during the daytime and to sleep during the nighttime. A portion of the brain that serves as an internal clock—sensitive to the timing of sunrise in the morning and sunset in the evening—largely controls these sleep-wake tendencies. This sensitivity keeps the brain's clock synchronized with the outside world. During those hours that the brain's clock has learned are local daytime hours, the brain produces output that facilitates activity and wakefulness. During those hours that the brain's clock has learned are nighttime hours, it signals brain deactivation, thus promoting sleep. People who work at night might be less productive and less well-rested since they work when their brains promote sleep; and they try to sleep when their brains promote wakefulness. Likewise, this is what causes "jet lag." After rapidly crossing multiple time zones, the brain's internal clock is initially out of synch with the local day-night cycle, sending out signals to promote sleep during daylight hours and sending out signals to promote wakefulness during the nighttime hours. Normal sleep and alertness are typically not restored in the jet-lagged brain for several days—the time it takes for the brain's internal clock to resynchronize to the day-night cycle of the new, local time zone.



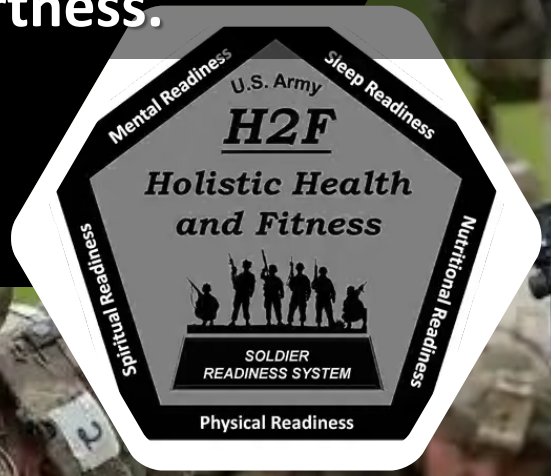


SLEEP TIMING cont…

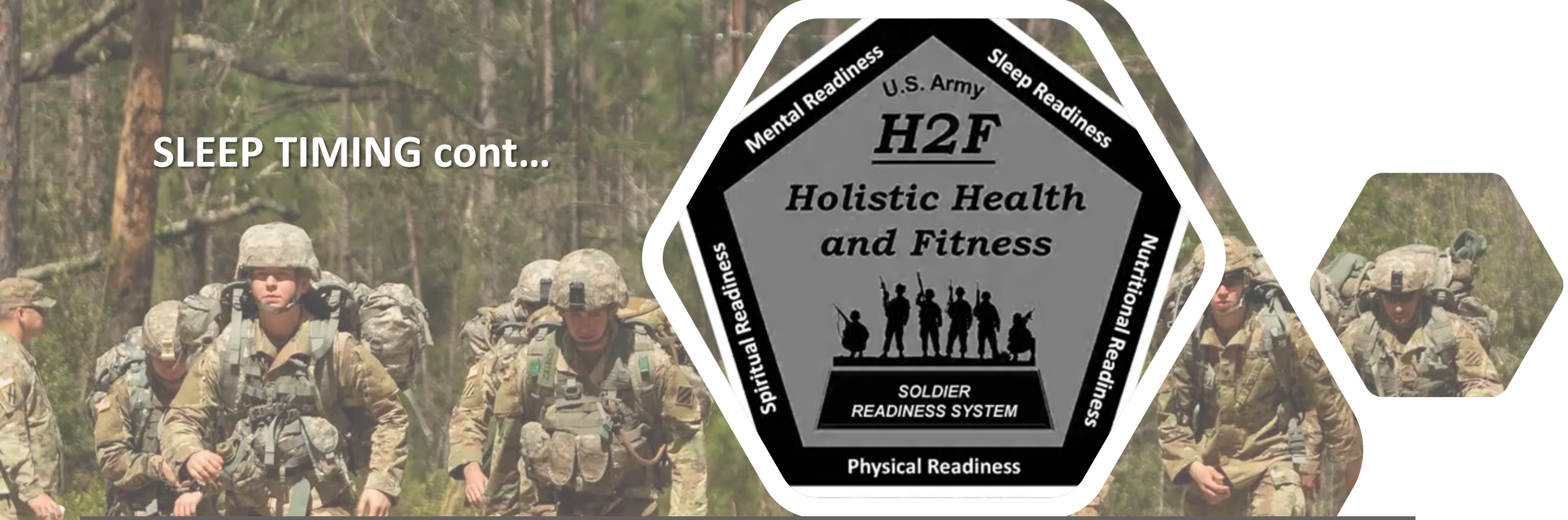
Maintaining a consistent sleep-wake schedule on both duty and non-duty days has the benefit of strengthening and reinforcing the internal wake- and sleep-promoting processes controlled by the brain's internal clock. These processes constitute the "circadian rhythm of alertness." Individuals who maintain consistent sleep-wake schedules (especially on arising at the same time each morning and experience their first exposure to daylight at the same time each day) derive the maximum benefits from the circadian rhythm of alertness, with well-consolidated sleep at night and optimum alertness during the daytime. A consistent and regimented schedule of sleep- and wake-related activities helps to lock in other biological systems associated with circadian rhythms. These include hormone release, digestion, muscle strength, and cardiovascular performance. Circadian rhythms act in tandem with the need to sleep which builds throughout a day. These rhythms optimize the process of falling asleep, staying asleep, and ensuring quality sleep.

SLEEP TIMING cont…

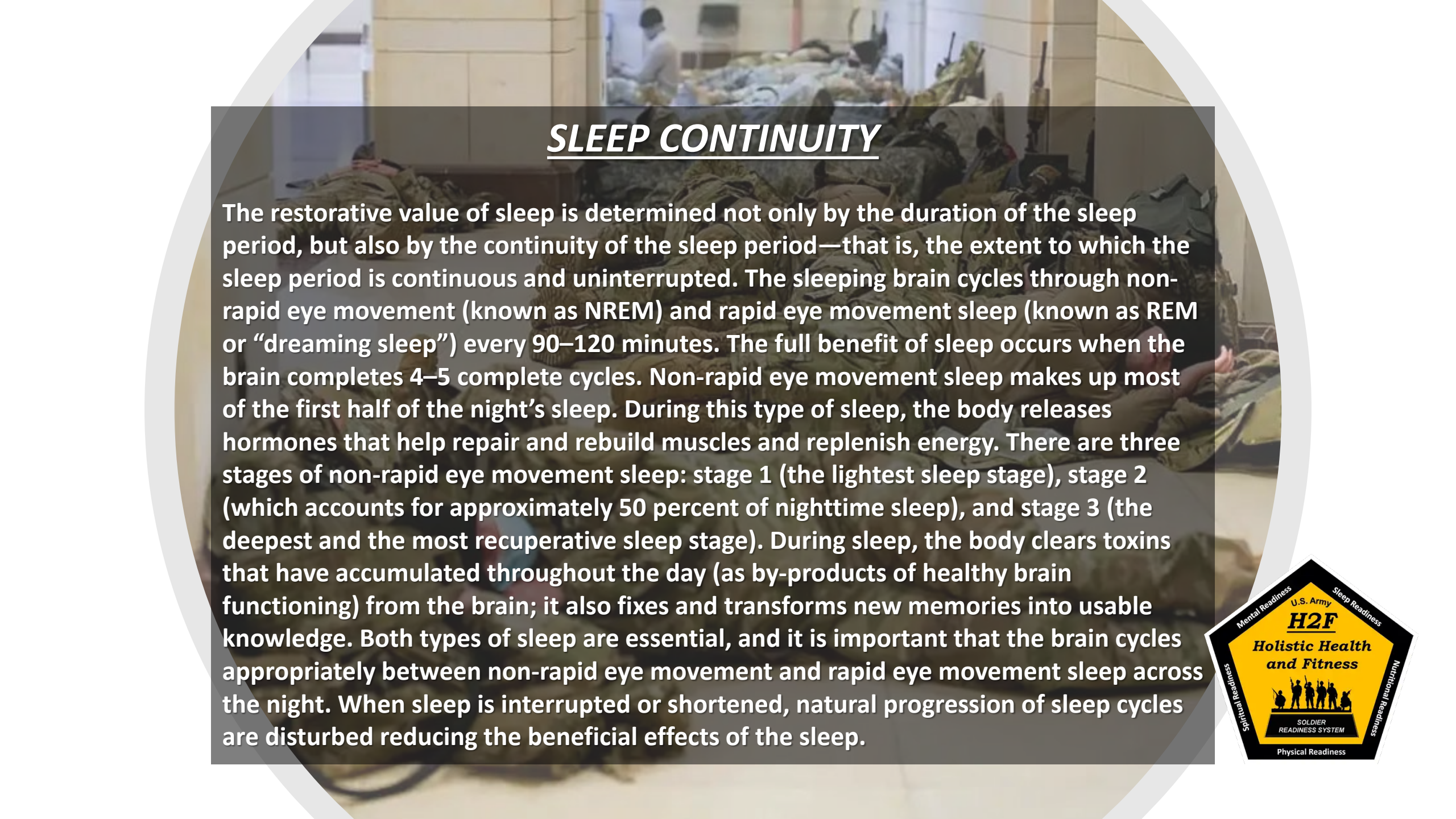
However, Soldiers can only achieve such benefits if they get adequate sleep (for most individuals, 7 to 9 hours of sleep per night) on a regular basis. If they get less sleep (for example, 6 hours per night during the duty week), then a "sleep debt" accrues. In such cases, it is better to sleep in on off-duty days and pay down the sleep debt, rather than sacrificing sleep to try to maintain a consistent sleep-wake schedule and strengthen the circadian rhythm of alertness.



SLEEP TIMING cont…



Although the circadian rhythm of alertness generally promotes a 24-hour cycle of daytime wakefulness and nighttime sleep, there is also a temporary afternoon “dip” in alertness. This dip becomes especially noticeable in individuals who have a significant sleep debt (for example, not regularly obtaining adequate sleep). For those able to take advantage of it, the afternoon dip provides an opportunity for obtaining good quality daytime sleep to help pay down any existing sleep debt. Soldiers can generally take these naps without significantly disrupting the circadian rhythm of alertness—provided that the naps are not so long or so frequent that they begin to impair the ability to initiate sleep at night.



SLEEP CONTINUITY

The restorative value of sleep is determined not only by the duration of the sleep period, but also by the continuity of the sleep period—that is, the extent to which the sleep period is continuous and uninterrupted. The sleeping brain cycles through non-rapid eye movement (known as NREM) and rapid eye movement sleep (known as REM or “dreaming sleep”) every 90–120 minutes. The full benefit of sleep occurs when the brain completes 4–5 complete cycles. Non-rapid eye movement sleep makes up most of the first half of the night’s sleep. During this type of sleep, the body releases hormones that help repair and rebuild muscles and replenish energy. There are three stages of non-rapid eye movement sleep: stage 1 (the lightest sleep stage), stage 2 (which accounts for approximately 50 percent of nighttime sleep), and stage 3 (the deepest and the most recuperative sleep stage). During sleep, the body clears toxins that have accumulated throughout the day (as by-products of healthy brain functioning) from the brain; it also fixes and transforms new memories into usable knowledge. Both types of sleep are essential, and it is important that the brain cycles appropriately between non-rapid eye movement and rapid eye movement sleep across the night. When sleep is interrupted or shortened, natural progression of sleep cycles are disturbed reducing the beneficial effects of the sleep.

SLEEP CONTINUITY cont…

Like the rest of the body (for example, muscles, skin, and liver), the brain has physiological needs for food, water, and oxygen—basic needs that must be met not only to ensure proper brain functioning, but to sustain life itself. However, unlike the rest of the body, the brain has one additional physiological need: sleep. The brain requires sleep to maintain normal function. Sleep is necessary to sustain not only alertness, but also higher order cognitive abilities such as judgment, decision making, and situational awareness. In short, sleep makes Soldiers better at being Soldiers.

The brain needs sleep to restore and repair itself, to work efficiently, to fix new memories, and to process new information appropriately. Sleep also clears away waste products from normal breakdown of chemicals that accumulate in the brain during wakefulness. Prioritizing sleep, and ensuring that opportunities for Soldier sleep are maximized in all operational environments, serves to optimize brain, psychological, and immunological health. In particular, sleeping properly before training improves attention, understanding, and learning. Sleeping properly after training improves the ability to both remember and appropriately utilize newly-acquired skills and information.

SLEEP CONTINUITY cont…

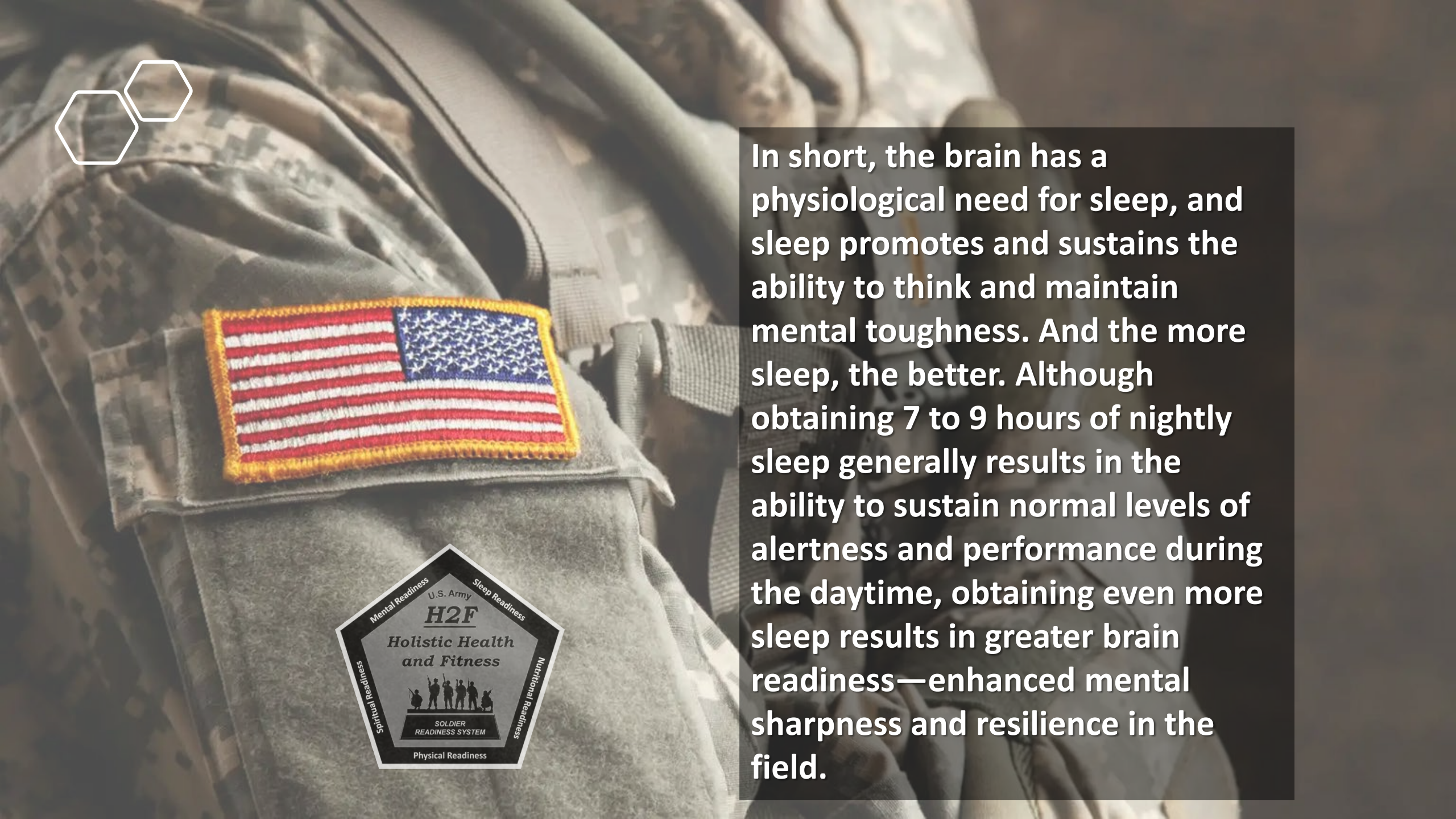
Although some Soldiers may require a little more or a little less sleep, for the vast majority of Soldiers a steady diet of 7–8 hours of sleep every 24 hours is needed to sustain normal levels of brain function and health indefinitely. Most Soldiers who regularly obtain less than 7–8 hours of sleep every 24 hours pay a price: they unwittingly but steadily accrue a significant sleep debt, characterized by increasingly suboptimal alertness, reduced mental sharpness, and an impaired ability to recover from stress. These Soldiers typically believe that they are fine and may perform most basic duties adequately. From an objective standpoint, their alertness and mental acuity is significantly (and invariably) impaired. As a rule of thumb, any Soldier who sleeps two or more hours longer on days off (versus duty days) carries a significant sleep debt.

SLEEP CONTINUITY cont…

Insufficient sleep degrades the brain's function. The more sleep the brain gets, the better it functions. The effects of inadequate sleep on brain function and performance are well-documented:

- Reduced ability to concentrate, impaired judgment, problem solving and decision making.
- Increased irritability and reduced mood.
- Reduced motivation level.
- Increased reaction time and slowed response time.
- Reduced ability to effectively cope with stress.
- Increased risk of physical injury.
- Increased time to recover from injury.

Insufficient sleep negatively affects not only cognitive performance, but emotional and social functioning. Adequate sleep promotes an optimistic outlook and social acuity, but failure to obtain adequate sleep on a regular basis (for example, being chronically sleep restricted) makes a person less resilient to stress and stress-related disorders including posttraumatic stress and depression



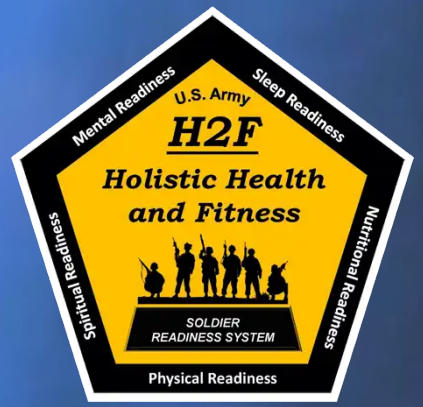
In short, the brain has a physiological need for sleep, and sleep promotes and sustains the ability to think and maintain mental toughness. And the more sleep, the better. Although obtaining 7 to 9 hours of nightly sleep generally results in the ability to sustain normal levels of alertness and performance during the daytime, obtaining even more sleep results in greater brain readiness—enhanced mental sharpness and resilience in the field.

PROMOTING HEALTHY SLEEP

Good sleep is essential for optimal performance and readiness. Factors to consider when optimizing sleep duration and continuity include: the sleep environment, a pre-sleep routine, and a sleep schedule that conforms as closely as possible to the brain's natural circadian rhythm of alertness

SLEEP ENVIRONMENT

Sleep duration and continuity are optimized in environments that are quiet, dark, and maintained at a comfortable ambient temperature. Some individuals believe that they sleep better with music or a television on, that they can sleep anywhere, and that ambient noise does not bother them. Research clearly shows that this is not the case. Soldiers do not get good sleep on a cot in the tactical operations center. Although sleepers are not aware of it, environmental sounds cause brief arousals—a momentary speeding of the brain's electro- encephalograph (known as EEG) activity during sleep—that effectively disrupt sleep continuity and reduce the restorative value of that sleep. Likewise, bright lights and excessively hot or cold environments can disrupt sleep continuity and reduce the restorative value of sleep.



PRE-SLEEP ROUTINE

Stress is incompatible with sleep. Pre-sleep routines that promote winding down—such as listening to soothing music, reading, or taking a warm shower or bath—30–60 minutes prior to bedtime tend to facilitate the transition to sleep. These routines will maximize sleep duration. Conversely, activities such as watching television, playing video games, chatting online, and similar interesting or engaging activities tend to arouse the brain and delay sleep onset. These activities reduce the amount of sleep obtained and should be avoided during the pre-sleep wind-down period. Tobacco product use is also antithetical to sleep. People smoke before sleep to wind down. The stimulant in nicotine tells the body to get active while it increases heart rate and alertness. Those experiencing significant stress often find relaxation techniques such as meditation and mindfulness exercises helpful.

SLEEP SCHEDULE

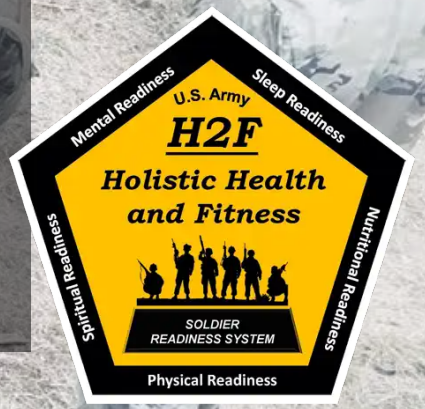
Adequate performance is best achieved by Soldiers who consistently get adequate sleep (7–8 hours) on a nighttime sleep-daytime wakefulness schedule aligned with the brain's natural circadian rhythm of alertness. Both sleep duration and sleep continuity are maximized on such schedules. However, military operations are often continuous (24-hours per day) and influenced by random and unpredictable events and requirements. Shift work is unavoidable for at least some deployed Soldiers, and sleep opportunities are sometimes unpredictable for virtually all deployed Soldiers. The following situations commonly contribute to sleep loss and decrements in waking performance:

- Shift work.
- Changing schedules.
- Social jet lag.

OVERALL STRATEGY

When mission requirements do not allow for adequate sleep, the goal becomes twofold: to optimize alertness and performance during waking periods to the extent possible and to maximize the ability of Soldiers to take advantage of any opportunities for sleep that do occur. Factors that determine the extent to which alertness and performance are impacted by sleep loss include:

- Individual differences in sensitivity and resistance to the effects of sleep loss.
- Individual sleep history—those who habitually sleep more tend to be more resistant to sleep loss.
- Length of continued wakefulness—the longer the period of sleep loss, the worse the performance.
- Time of day or night—the brain's circadian rhythm of alertness exacerbates the effects of sleep loss during the early morning hours, and partially mitigates the effects of sleep loss during the daytime or early evening hours.



Caffeine Limitations

Caffeine only temporarily helps restore alertness and performance. It does not replace sleep. Nor does it fully restore all the cognitive abilities decremented by sleep loss. In much the same way, caffeine can help keep a Soldier from falling asleep, but it does not improve that Soldier's judgment, coordination, or reaction time. Because it will interfere with the ability to initiate and/or maintain sleep, Soldiers should avoid caffeine, if consistent with mission requirements, for at least 6 hours prior to an anticipated sleep opportunity.

Sleep Environment

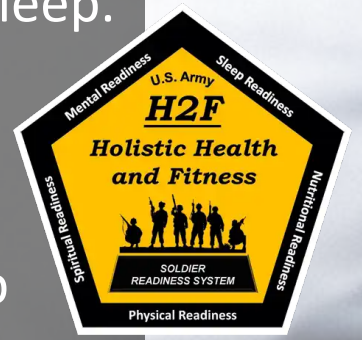
The importance of a sleep-friendly environment cannot be overstated. Living conditions and environments vary widely, but leaders can improve most sleep areas with a few simple steps.

Ambient Noise

Sleeping quarters should be located as far away from noisy areas (such as airfields, generators, and fueling stations) as possible. The effects of remaining uncontrollable, intermittent, random noises should be masked with a white noise generator. Finally, Soldiers can wear noise-dampening earplugs to effectively block noise and improve sleep.

Physical Comfort

Room temperature should be cool, ranging from 65–72 ºF. Sheets, bed, pillows, sleep surfaces (such as mattresses and cots), and sleeping clothes should be clean and comfortable. Mattresses should be requisitioned to fit the Soldier.



Light

Humans are not nocturnal. Soldiers are hardwired to be active during the day and to sleep at night. The brain's internal clock is very sensitive to light, and any amount of light that reaches the brain through the eyes at night can be harmful. Even dim lights emitted from electronics such as a smart phone, computer, or television can have a negative impact. This light confuses and resets the brain's internal clock, which can misinterpret such light exposures as either an early dawn or a late dusk. In either case, such exposures incrementally weaken the brain's circadian rhythm of alertness, negatively impacting both nighttime sleep and daytime alertness. Therefore, sleeping areas should be kept dark. Blackout curtains or blinds should cover all windows. Leaders need to strictly enforce the lights out policies. To improve Soldiers' ability to avoid unwanted light exposure and thus facilitate sleep, leaders should create separate sleep areas for each shift and encourage the use of comfortable sleep masks.

SLEEP PROBLEMS

11-74. When Soldiers experience persistent sleep problems despite generally good sleep habits and an adequate sleep environment, a more concerted effort to improve sleep is warranted. First, Soldiers must evaluate their sleep habits and sleep environment.

For those who persistently experience difficulty falling asleep, the following suggestions and techniques may prove helpful:

- Establish a very regular and relaxing pre-sleep routine.
- Practice self-regulation activities such as relaxation exercises and guided meditations. DOD and the Department of Veterans Affairs developed available applications, and the Human Performance Resources by CHAMPS (https://www.hprc-online.org/) has various self-regulation activities:
  - Visualization or guided imagery exercises.
  - Meditation or mindfulness exercises.
  - Mental focusing exercises.
- Use an app. There are hundreds of apps for sleep and relaxation, which may help Soldiers fall asleep and track sleep.

Health and Holistic Fitness section on Physical Readiness.