

# Operationalizing Fatigue Management



**HERE IT'S NOT A GAME**



## Strategies in Garrison and Sustained Operations



"The views expressed in this publication are those of the author and do not necessarily reflect the official policy of the Department of Defense, Department of Army, U.S. Army Medical Department, or the U.S. Government."

---

# MULTI-DOMAIN BATTLE & READINESS

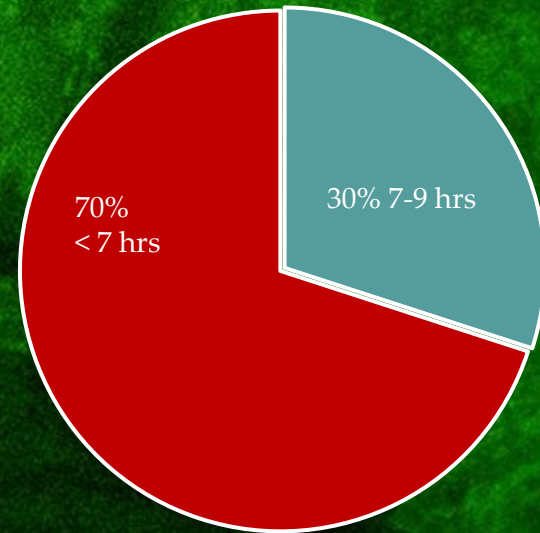
- MDO
  - Must be able to be agile, adaptive, resilient
  - Requires Soldiers to adapt to a range of adversaries
  - Will be dispersed and employed at the lowest practical level
  - Able to rapidly think and act in information rich/dense environment
- Readiness
  - Performance
  - Health and wellbeing
  - Teamwork and leadership



# SLEEP

**Sleep** is vital for health, performance, and well-being. It sustains the brain's capabilities for success on and off the battlefield. With quality sleep, Soldiers can excel mentally and physically.

Sleep in Military



Soldiers' sleep is different (not as good) as compared to civilians

# BENEFITS OF SLEEP IN MILITARY OPERATIONAL SETTING

- Team is more resilient
- Team and individuals performs better (gunnery and marksmanship)
- Team leader sleep sets the tone and impacts the environment
  - Low frustration tolerance, irritable, poor to no sleep      Negative impact
  - Tolerant, even tempered, positive relationship      Positive impact
- Maintains cognitive, emotional, and physical performance
- Ameliorates or reduces the risk for mental health problems, risk taking behaviors, moral decision making, injuries, motivation



# STRATEGIES

- BEFORE periods of restricted sleep
  - **Leader and Soldier Education**
    - Educate line leaders on the importance of sleep and changes needed to increase sleep
    - Educate Soldiers and leaders on ways to improve sleep and sleep environment
    - Practice mindfulness, progressive muscle relaxation, yoga
  - **Sleep banking:** Increase time in bed and opportunity for sleep
  - **Modify schedule or battle rhythm to support increased opportunity for sleep**
    - Adjust Staff Duty start time;
    - Reverse cycle PT
    - Hard release time at end of day
    - Late duty report time
    - Order MORE rations or caffeine gum
  - **Deliberate Sleep Plan:**
    - PCC/PCI must include sleep in the plan!—priorities for sleep; sleep work plan



# Sleep Banking

---

When leaders anticipate periods of insufficient sleep, promote sleep banking to mitigate deficits

Increase hours of sleep, in anticipation of continuous operations or when you won't get enough sleep

- Up to two weeks in advance
- Go to bed earlier
- Get sleep prior to staff duty

Results in:

- ✓ Improved effectiveness
- ✓ Decline slower
- ✓ Recover better and faster



# STRATEGIES



- During period of restricted sleep
  - Understand how to use the 90-minute rule
  - Ensure 24 hours duty is really only 24 hours
  - Identify ways—policy, guidance—of ameliorating the impact of 24 hours of duty
    - Drivers and staff duty personnel sleep bank before mission or take tactical naps to optimize cognitive function during times of restricted sleep
    - Alternating naps schedule—yes sleep while on duty (one person at a time)
    - Someone to pick up or drop off Soldiers conducting 24-hour duty
    - 24 hours off (recovery)—if Soldier is really up for 24 hours, will need more time for recovery especially if no sleep banking occurred
  - End Staff Duty/CQ at 1100
  - Conduct true Risk Management Assessment
  - What/who are your priority for sleep? What is your sleep plan? What is your work/rest plan/cycle?



# STRATEGIES IN GARRISON

- After periods of restricted sleep
  - Ensure recovery not just of equipment but of people
    - sleep of drivers; most accidents occur within a mile of home
    - Give time or lower tempo for readjustment back to regular schedule
    - Shifting from night to day shift or vice versa results in decrease performance and increase risk for injuries
  - Who are your high-risk individuals and how do you ameliorate the risk?
    - Family or marriage crisis
    - Behavioral health disorders
    - Behavioral problem (may or may not be BH issues—(partying, binge drinking because return from FTX, disruptive in barracks)
    - Other general misconduct



# SHIFT WORK

- Keep shifts for at least 30 days; longer is better
- Move shift rotation forward in time to aid adjustment to new shift
- Build in breaks and coordinate meal-times so shift workers can eat without sacrificing sleep time
- Wear sunglasses to reduce light exposure when leaving morning shift
- Do not schedule meetings during time off from work especially for evening and swing shifts
- Ensure shift length allows Soldiers time to take care of life

# SHIFT WORK

- Shifts should be no more than 10 hours (8 is better)
- Working Shifts or changing mission hours:
  - When switching from night to day-time operations or from day to night educate Soldiers and how to do this well to optimize their sleep
  - Ensure recovery sleep when Soldiers have had insufficient sleep for several days to weeks to prevent the development of insomnia and other metabolic disorders
  - Ensure all commanders and staff, up and down the chain get sleep as they tend to be the most deprived and that they refuel according to physical and mental demands of the mission.

# STRATEGIES IN OPERATIONAL ENVIRONMENT

- Before
  - **PCC/PCI:** Have a deliberate sleep plan to manage the sleep of Soldiers with priority of sleep according to role; Establish a plan prior to operations and adjust; practice implementing
  - Establish lights out policy
  - Ensure Sleep area is situated to optimize SLANT
  - SLANT- Setting the environment for success by ensuring the best sleep possible
    - S-sleep surface
    - L-light
    - A-air quality
    - N-noise
    - T-temperature
  - House Soldiers on the same shift in same tent/location to reduce daytime disruption



# STRATEGIES IN OPERATIONAL ENVIRONMENT

- During:
  - Prioritize those who need to sleep according to mission/work demand
  - Tactical Naps
  - Managed caffeine dosage
  - Sleep when able or opportunity presents itself
  - Short bouts of activity to boost alertness, relieves tension and stress
  - Stay hydrated and eat with a goal of nutrient timing for performance



# Caffeine

## Sports Nutrition Info

- Endurance is enhanced by caffeine use
  - 200mg of Caffeine
  - Reduce the perception of pain/fatigue
  - Will not hinder hydration status
- **Safe Sources of Caffeine**
  - Coffee....60-120mg per cup
  - Mio Energy.....85mg per 8oz
  - Crystal Lite Energy....150mg per packet
  - Jolt Gum....70mg per piece
  - Stay Alert Gum....100mg per piece



# Caffeine

Sustained Ops (no sleep):	200 mg @ 0000
	200 mg again @ 0400 and 0800 h, if needed
	Use during daytime (1200, 1600) <b>*only if needed</b>
Night Ops with Daytime Sleep:	200 mg @ start of night shift
	200 mg again 4 hours later
	Last dose: at least 6 hrs away from sleep period**
Restricted Sleep (6 or fewer hrs of sleep):	200 mg upon awakening
	200 mg again 4 hours later
	Last dose: at least 6 hrs away from sleep period** **If possible, depending on the mission
Physical/Mental Performance	Decreases with 800mg or more per day



# Sleep Debt and Recovery

---

- Cumulative effect of insufficient sleep
- Characterized by mental, emotional, and physical fatigue
- Reduces alertness and performance
- Adversely impacts high level cognitive functions (impaired judgment, alertness, mood, reaction time)
- Increase hours of sleep following episodes of insufficient sleep.
- Aim for 4 days of 8 or more hours of sleep





# SLEEP IS A RESOURCE

- Consider sleep a resource; essential for the brain to function
  - Just like fuel
  - Just like cleaning weapons

# Conclusion

## Tactical Fatigue Management Strategies are effective and a win for the Army

- Sleep banking in anticipation of periods of insufficient sleep mitigates the deficits common to such situations. It also improves Soldiers' ability to recover from insufficient sleep thereby improving their effectiveness
- Reverse PT, for a discrete period of time, allows Soldiers to obtain more hours sleep because this is aligned with the circadian rhythm. The result is improved mood, morale, motivation, cognitive functioning, and reduced stress
- Include in PCC/PCI: Have a sleep plan, establish priority for sleep

## Requires:

- Leadership that supports innovation and are responsible for implementing deliberate sleep management strategies
- Commander's emphasis on sleep management that is equal to their emphasis of physical fitness

# QUICK EXERCISE IN SLEEP READINESS

Slept: 4 hours  
 Awake: 8hrs  
 Time now: 1100  
 BAC Equiv: ??

Sleep Card for Individuals Who Sleep Appx. 4 Hours Daily													
		Time of Day / Current Time (hh)											
		01	03	05	07	09	11	13	15	17	19	21	23
Hours Awake	0	0.03	0.05	0.07	0.07	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.03
	2	0.04	0.06	0.07	0.08	0.07	0.07	0.06	0.05	0.04	0.03	0.03	0.03
	4	0.04	0.06	0.08	0.08	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03
	6	0.04	0.06	0.08	0.08	0.08	0.07	0.06	0.06	0.05	0.04	0.04	0.03
	8	0.05	0.07	0.08	0.09	0.08	0.08	0.07	0.06	0.05	0.04	0.04	0.04
	10	0.05	0.07	0.09	0.09	0.09	0.08	0.07	0.06	0.05	0.04	0.04	0.04
	12	0.05	0.07	0.09	0.09	0.09	0.08	0.07	0.06	0.05	0.05	0.04	0.04
	14	0.05	0.07	0.09	0.10	0.09	0.08	0.08	0.07	0.06	0.05	0.04	0.04
	16	0.05	0.08	0.09	0.10	0.09	0.09	0.08	0.07	0.06	0.05	0.05	0.05
	18	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05
	20	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.05	0.05
	22	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05
	24	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.08	0.07	0.06	0.05	0.05
	26	0.06	0.09	0.10	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.05
	28	0.06	0.09	0.10	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.06
	30	0.07	0.09	0.11	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.06
	32	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.06	0.06	0.06
	34	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.06	0.06	0.06
	36	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.06
	38	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.06
40	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.09	0.08	0.07	0.06	0.06	
42	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.09	0.08	0.07	0.06	0.06	
44	0.07	0.09	0.11	0.11	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	
46	0.07	0.10	0.11	0.11	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	
48	0.07	0.10	0.11	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.06	0.06	

Sleep Card for Individuals Who Sleep Appx. 6 Hours Daily

		Time of Day / Current Time (hh)											
		01	03	05	07	09	11	13	15	17	19	21	23
Hours Awake	0	0.01	0.03	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.01	0.01	0.01
	2	0.02	0.03	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.01	0.01
	4	0.02	0.04	0.05	0.05	0.05	0.04	0.04	0.03	0.02	0.02	0.02	0.02
	6	0.03	0.04	0.06	0.06	0.06	0.05	0.04	0.03	0.03	0.02	0.02	0.02
	8	0.03	0.05	0.06	0.07	0.06	0.05	0.05	0.04	0.03	0.03	0.02	0.02
	10	0.03	0.05	0.07	0.07	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.03
	12	0.04	0.05	0.07	0.07	0.07	0.06	0.05	0.05	0.04	0.03	0.03	0.03
	14	0.04	0.06	0.08	0.08	0.07	0.07	0.06	0.05	0.04	0.04	0.03	0.03
	16	0.04	0.06	0.08	0.08	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03
	18	0.04	0.06	0.08	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.04	0.04
	20	0.05	0.07	0.09	0.09	0.08	0.08	0.07	0.06	0.05	0.04	0.04	0.04
	22	0.05	0.07	0.09	0.09	0.09	0.08	0.07	0.06	0.05	0.05	0.04	0.04
	24	0.05	0.07	0.09	0.09	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.04
	26	0.05	0.08	0.09	0.10	0.09	0.09	0.08	0.07	0.06	0.05	0.05	0.05
	28	0.06	0.08	0.09	0.10	0.09	0.09	0.08	0.07	0.06	0.05	0.05	0.05
	30	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05
	32	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.05	0.05
	34	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.08	0.07	0.06	0.05	0.05
	36	0.06	0.09	0.10	0.10	0.10	0.09	0.09	0.08	0.07	0.06	0.05	0.05
	38	0.06	0.09	0.10	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.05
40	0.07	0.09	0.10	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.06	
42	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.06	0.06	0.06	
44	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.06	0.06	0.06	
46	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.06	
48	0.07	0.09	0.11	0.11	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.06	

Slept: 6 hours  
 Awake: 8hrs  
 Time now: 1100  
 BAC Equiv: ??

QUESTIONS ?

---

BACK UP SLIDES

---

# WEARABLES

- The best wearable is the one that Soldiers will wear and use
- There are websites to help leaders/shift managers such as
  - 2BAAlert <https://2b-alert-web.bhsai.org/>
  - FAST

# TWO EXAMPLES

- 3-66 Armor use of fatigue management strategies during gunnery
- 1-26 Infantry use of fatigue management strategies during JRTC



# C CO, 3-66 AR BN

- Educated platoon on the importance of sleep and to keep sleep logs
- Sleep bank prior to gunnery; Reverse PT schedule starting at 1600
- Duty day began at 0900
- Gunnery scores increased from 759 to 919
  - 3 teams achieved Distinction and 1 team achieved Superior
- Leaders reported: Harder for them as not synched with rest of battalion; Soldiers executed faster and more efficiently; Understood directions better.
- Soldiers reported: More motivated, less stressed; took longer to become fatigued and able to eat healthy breakfast



Soldiers increased Sleep hours from an average of 5.7 to 8.9 hours. With 2 Soldiers getting 12 hours and 1 getting 10 hours during sleep banking

# 1-26 INFANTRY BN

- Selected sleep as their challenge for JRTC rotation
- Practiced sleep management plans according role and responsibilities and continued it while in the box
- Educated Soldiers and leader emphasized the importance of sleep on operations
- Allowed sleeping when tasks were accomplished, even on ranges
- During RSOI, mandated lights out/on and restricted use of screens after 2200 to maximize sleep banking
- Results:
  - Lowest total number of incidents and lowest number of safety incidents of all battalions during JRTC
  - One of the best performances at JRTC
  - Soldiers reported feeling the most rested and the most motivated. They felt less stressed, had higher morale, and tended to take longer to fatigue compared to previous experiences



# A Workout Gives you a Quick Boost

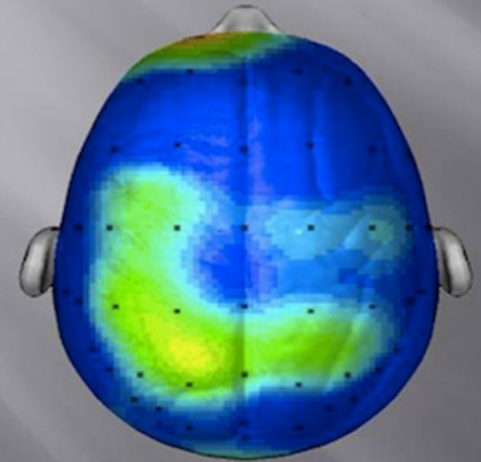
Use targeted exercise to give you mental edge!

---

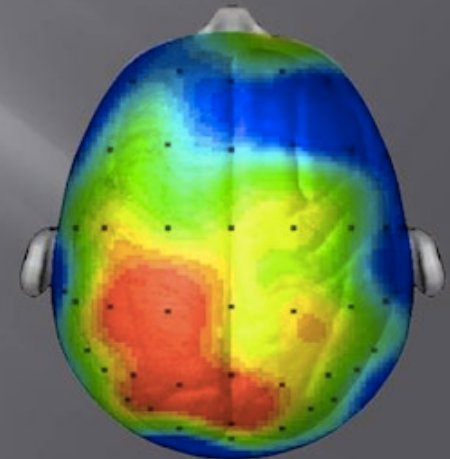
- Short bouts of exercise:
  - Improve memory & attention
  - Improve reaction time & coordination
  - Relieve tension and stress
  - Effects are maintained for 1–3 hours
- Example application: mid-shift exercise breaks for TOC operations

*“In order for man to succeed in life, God provided him with two means, education and physical activity. Not separately, one for the soul and the other for the body, but for the two together. With these two means, man can attain perfection.” —Plato*

BRAIN AFTER SITTING QUIETLY



BRAIN AFTER 20 MINUTE WALK



# NUTRIENT TIMING FOR PERFORMANCE

First.....start every day with Breakfast!

Why? Good for the Body and the Brain!

Then....eat every 3-5 hours throughout the day

Protein for muscular recovery

Replenish energy stores used during activity

The brain only uses carbohydrates for fuel

You need to properly fuel it for peak efficiency!

Prevents energy slumps and

Fatigue,“hangries”

Poor nutrition choices

Reduced physical and mental performance





# Using Your MRE Tactically

<http://hprc-online.org/comrad/>

Component	Use during training
Entrée: Main Protein Source	Recovery (after exhausting activity)
Crackers, tortillas, side breads, fruits: Great source of carbohydrates	60 minutes before activity or during ruck, in between activity
Snack brownie, jelly or sugar snacks Energy to keep you moving	During long ruck or immediately after activity
Snack nuts: Great afternoon snack	During land navigation or foot march for sustained fuel
Beverage coffee, tea, cappuccino Sources of caffeine	Before or during a longer activity; plan ahead and consume 45 min before need
Beverage base sugar free Keep yourself hydrated	Add to canteen, <u>mix ½ salt packet with it</u> and use during ruck
Cheese spread or peanut butter Protein Source in between meals	Add to tortilla, have for a pre-event meal

A Hot Environment can increase a Soldiers energy **needs by 10%**

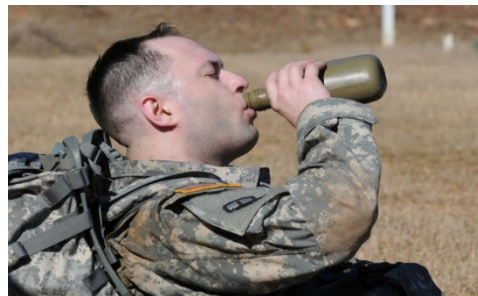
MRE x 1	Daily Needs
1,300-1,400 Calories	3,500 Calories
30-55 g Protein	120 g Protein
140-170 g Carbohydrates	440 g Carbohydrates
55-60 g Fat	130 g Fat
1,400-2,000 mg Sodium	3,000-5,000 mg Sodium

# Action Plan to Combat Dehydration

- **Drink early and often**
  - Drink before you are thirsty
  - Drink at regular intervals
- **Choose Cool/Cold Beverages**
  - They reduce core temperature
  - Soldiers consume more fluids
  - Dump hot or warm water out of camelbacks or canteens and refill from Water Buffalos obtain cold/cool fluids



- **Flavored**
  - Flavored **non-calorie** beverages are best if undergoing activity **less than 90 minutes**



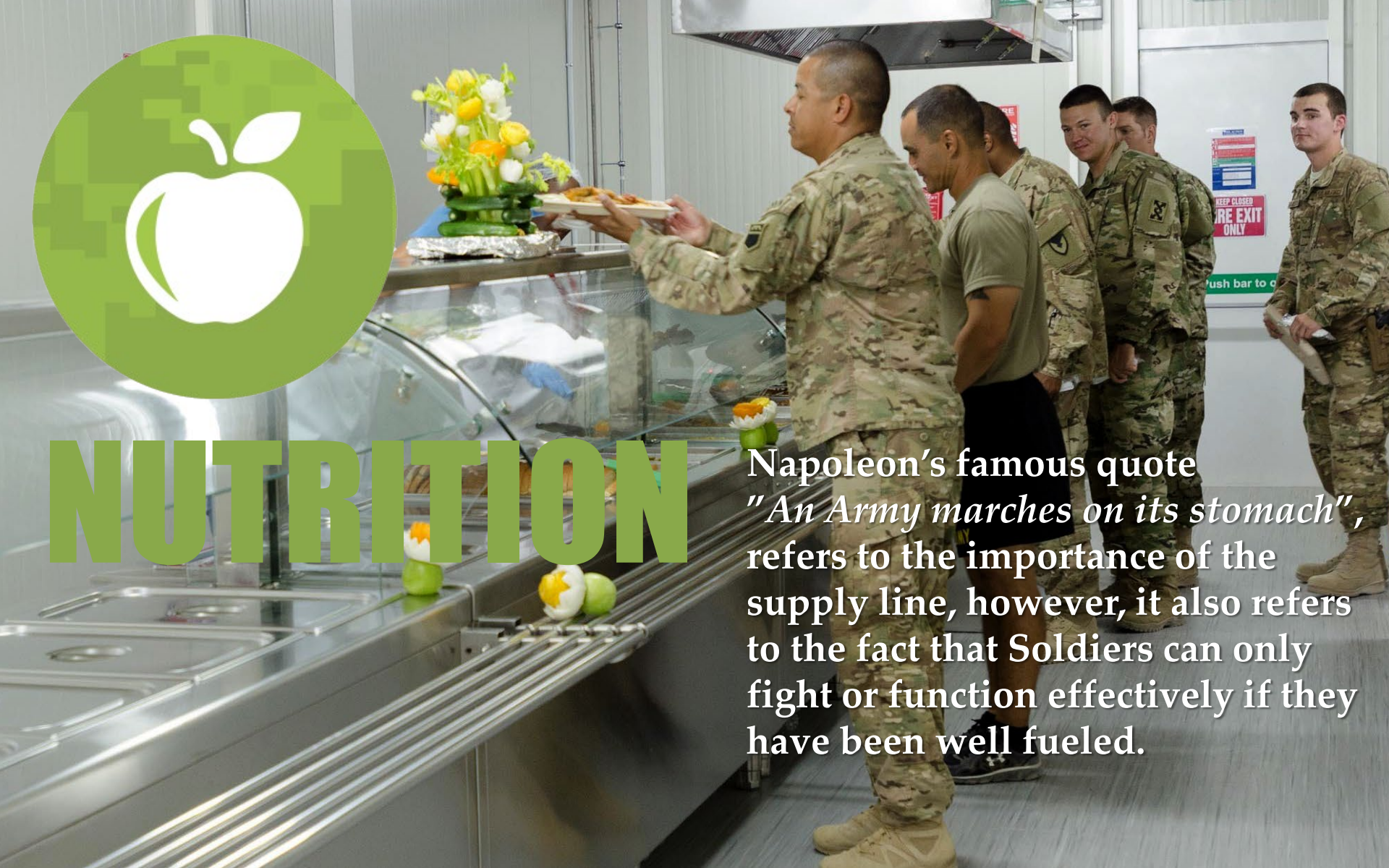
Dehydration  
fatigue and  
performance  
and combat

- **Contain Sodium\***
  - Activity **greater than 90 minutes** should plan to include beverages that **contain electrolytes and carbohydrates**.
  - Sodium can help maintain your drive to drink
  - Ensure to **SALT** your food (MRE) in Heat **Category 3 and 4**



# NUTRITION

Napoleon's famous quote "*An Army marches on its stomach*", refers to the importance of the supply line, however, it also refers to the fact that Soldiers can only fight or function effectively if they have been well fueled.



# Hydration Status and Your Performance

## You can assess your hydration status

How frequently do you urinate?

Aim for every 2 to 3 hours

What is the intensity of your urination?

Aim for a steady solid flow

What color is your urine?

Aim to drink  $\frac{1}{4}$  to  $\frac{1}{2}$  of your Canteen **per hour** depending on Environmental Conditions



Hydrated



Seek Medical Attention



Dehydration of 2% results in fatigue and impaired performance during training and combat operations

Rehydrate with at least **16oz or  $\frac{1}{2}$  canteen** of fluid **per pound** of lost body weight after activity.