Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) Webinar

Using the Performance Triad for Optimal Traumatic Brain Injury Recovery

July 14, 2016
1-2:30 p.m. (ET)

Presenters:

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Chief, Office of Clinical Practice and Clinical Recommendations,
Clinical Affairs Division, DVBIC, Silver Spring, Maryland

1LT(P) Paul Rosbrook, M.S., R.D., L.D.
Chief, Outpatient Nutrition Clinic, Assistant Research Director, Nutrition Services Department,
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Moderator:

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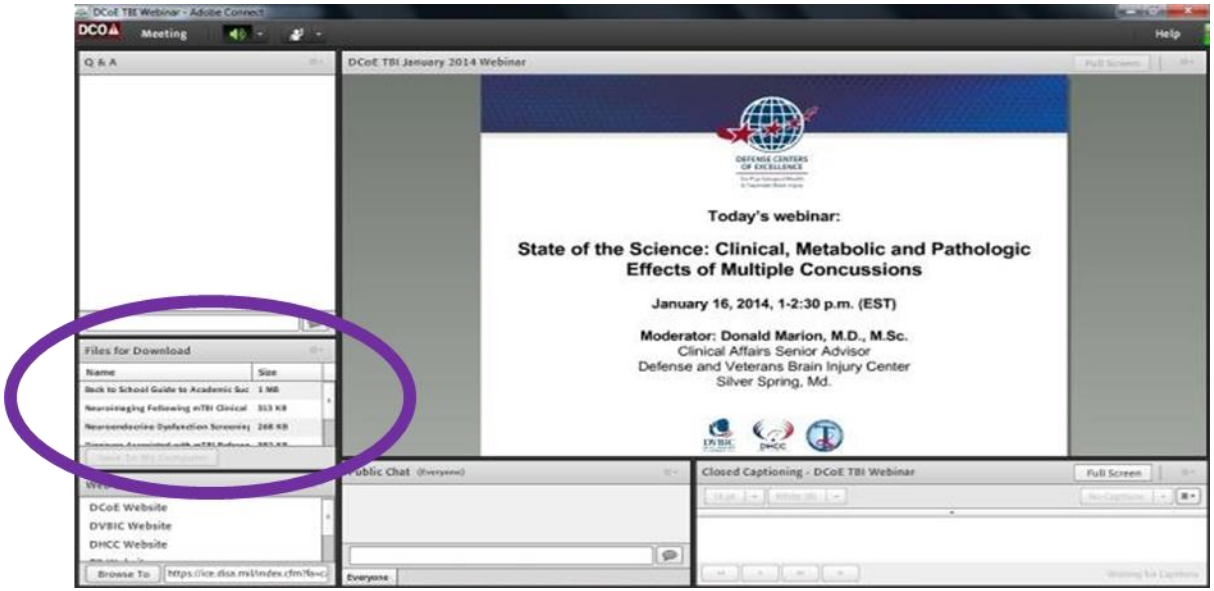
Contract support to DVBIC, Silver Spring, Maryland

Webinar Details

- Live closed captioning is available through Federal Relay Conference Captioning (see the "Closed Captioning" box)
- Webinar audio is not provided through Adobe Connect or Defense Collaboration Services
  - Dial: CONUS **888-455-0936**
  - International **773-799-3736**
  - Use participant pass code: **1825070**
- Question-and-answer (Q&A) session
- Submit questions via the Q&A box

Resources Available for Download

Today's presentation and resources are available for download in the "Files" box on the screen, or visit **dcoe.mil/webinars**



Continuing Education Details

- All who wish to obtain continuing education (CE) credit or certificate of attendance, and who meet eligibility requirements, must register by **3 p.m. (ET) July 14, 2016** to qualify for the receipt of credit.
- DCoE's awarding of CE credit is limited in scope to health care providers who actively provide psychological health and traumatic brain injury care to active-duty U.S. service members, reservists, National Guardsmen, military veterans and/or their families.
- The authority for training of contractors is at the discretion of the chief contracting official.
  - Currently, only those contractors with scope of work or with commensurate contract language are permitted in this training.

Continuing Education Accreditation
(continued)

- This continuing education activity is provided through collaboration between DCoE and Professional Education Services Group (PESG).
- Credit Designations include:
  - 1.5 AMA PRA Category 1 credits
  - 1.5 ACCME Non Physician CME credits
  - 1.5 ANCC Nursing contact hours
  - 1.5 CRCC
  - 1.5 APA Division 22 contact hours
  - 0.15 ASHA Intermediate level, Professional area
  - 1.5 CCM hours
  - 1.5 AANP contact hours
  - 1.5 AAPA Category 1 CME credit
  - 1.5 NASW contact hours
  - 1.5 ACPE contact hours
  - 1.5 Medical Coders contact hours

Continuing Education Accreditation
(continued)

Physicians

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Professional Education Services Group and the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCOE). Professional Education Services Group is accredited by the ACCME to provide continuing medical education for physicians. This activity has been approved for a maximum of 1.5 hours of AMA PRA Category 1 Credits™. Physicians should only claim credit to the extent of their participation.

Nurses

Nurse CE is provided for this program through collaboration between DCOE and Professional Education Services Group (PESG). Professional Education Services Group is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation (ANCC). This activity provides a maximum of 1.5 contact hours of nurse CE credit.

Psychologists

This activity is approved for up to 1.5 hours of continuing education. APA Division 22 (Rehabilitation Psychology) is approved by the American Psychological Association to sponsor continuing education for psychologists. APA Division 22 maintains responsibility for this program and its content.

Occupational Therapists

(ACCME Non Physician CME Credit) For the purpose of recertification, The National Board for Certification in Occupational Therapy (NBCOT) accepts certificates of participation for educational activities certified for AMA PRA Category 1 Credit ™ from organizations accredited by ACCME. Occupational Therapists may receive a maximum of 1.5 hours for completing this live program.

Continuing Education Accreditation (continued)

Physical Therapists

Physical Therapists will be provided a certificate of participation for educational activities certified for AMA PRA Category 1 Credit TM. Physical Therapists may receive a maximum of 1.5 hours for completing this live program.

Rehabilitation Counselors

The Commission on Rehabilitation Counselor Certification (CRCC) has pre-approved this activity for 1.5 clock hours of continuing education credit.

Speech-Language Professionals

This activity is approved for up to 0.15 ASHA CEUs (Intermediate level, Professional area)

Case Managers

This program has been pre-approved by The Commission for Case Manager Certification to provide continuing education credit to CCM® board certified case managers. The course is approved for up to 1.5 clock hours. PESG will also make available a General Participation Certificate to all other attendees completing the program evaluation.

Nurse Practitioners

Professional Education Services Group is accredited by the American Academy of Nurse Practitioners as an approved provider of nurse practitioner continuing education. Provider number: 031105. This course if offered for 1.5 contact hours (which includes 0 hours of pharmacology).

Continuing Education Accreditation
(continued)

Physician Assistants

This Program has been reviewed and is approved for a maximum of 1.5 hours of AAPA Category 1 CME credit by the Physician Assistant Review Panel. Physician Assistants should claim only those hours actually spent participating in the CME activity. This Program has been planned in accordance with AAPA's CME Standards for Live Programs and for Commercial Support of Live Programs.

Social Workers

This Program is approved by The National Association of Social Workers for 1.5 Social Work continuing education contact hours.

Pharmacists and Pharmacy Technicians

Professional Education Services Group is accredited by the Accreditation Council

for Pharmacy Education as a provider of continuing pharmacy education. This program will provide a maximum of 1.5 contact hours for participants attending all conference CPE activities. Conference registration fees cover the cost of CE credit. UAN # 0829-0000-16-199-L04-P/T

Medical Coders

Medical Coders will be provided a certificate of participation for educational activities certified for AMA PRA Category 1 Credit TM. Medical Coders may receive a maximum of 1.5 hours for completing this live program.

Other Professionals:

Other professionals participating in this activity may obtain a General Participation Certificate indicating participation and the number of hours of continuing education credit.

Questions and Chat

- Throughout the webinar, you are welcome to submit technical or content-related questions via the Q&A pod located on the screen. **Please do not submit technical or content-related questions via the chat pod**.
- The Q&A pod is monitored during the webinar; questions will be forwarded to presenters for response during the Q&A session.
- Participants may chat with one another during the webinar using the chat pod.
- The chat function will remain open 10 minutes after the conclusion of the webinar.

Webinar Overview

In 2013 Army Medicine launched the Performance Triad to maintain, restore and improve health through making informed choices. This holistic approach to health systems focuses on three key foundations that influence a person's health – sleep, activity and nutrition. Under the model of maintaining, restoring and improving health, the Performance Triad offers a proactive approach to wellness; this model can empower patients with mild traumatic brain injury (TBI) to actively engage in their recovery by integrating informed choices with the supportive care of their providers. The Army Ready and Resilient Campaign is an example of the Performance Triad approach.

Service members and veterans with a TBI often experience disruptions in sleep patterns and restrictions in both physical and cognitive activities during the recovery period. Dietary factors may influence recovery and should be carefully considered in patient management. Health care providers, therefore, should pay particular attention to sleep, exercise (or activity level) and nutrition in managing patients with mild TBIs. Providers can effectively apply the key components of the Performance Triad to optimize patient recovery.

Webinar Overview (continued)

This webinar will review the essential components of the Performance Triad and describe how clinicians can apply this model to enhance patient outcomes from TBI.

At the conclusion of this webinar, participants will be able to:

- Identify and explain the Army Performance Triad: Sleep, Activity and Nutrition
- Examine the unique benefits of the Performance Triad Model for implementing holistic models of recovery in TBI patients
- Describe available Defense and Veterans Brain Injury Center (DVBIC) resources to aid in the TBI recovery process as it pertains to the Army Performance Triad Model

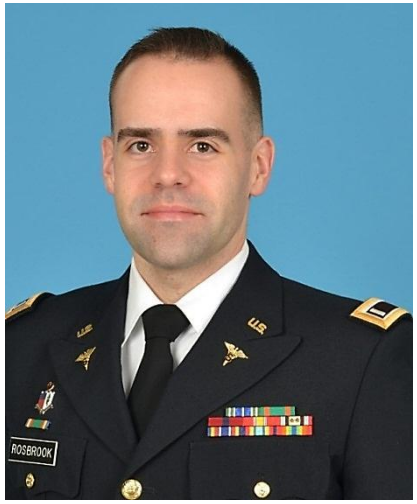
Gary McKinney, M.S., CBIS

- Health care program specialist, chief of Clinical Practice and Clinical Recommendations, Defense and Veterans Brain Injury Center (DVBIC)
- Certified Brain Injury Specialist
- Certified Personal Trainer
- Retired U. S. Army medic
- Member of the American College of Sports Medicine, Brain Injury Association of Maryland, Order of Military Medical Merit Association
- Primary areas of clinical interest are sports concussion and exercise physiology
- Education
  - M.S., Sports and Health Science, American Public/Military University
  - Doctorate student, Health Sciences, A.T. Still University

David Panakkal, M.D., COL, MC, USA (ret.)

- TBI subject matter expert at DVBIC
- Board Certified by the American Board of Psychiatry and Neurology
- Expertise in neuropsychiatry
- Operation Enduring Freedom Veteran (804th MED Brigade psychiatrist)
- Commander, 344th Combat Support Hospital, Fort Totten, New York
- Retired from U.S. Army and U.S. Department of State, U.S. Diplomatic Service
- Former clinical associate professor of psychiatry, Albany Medical College, Albany, New York
- Education
  - M.D., University of Kerala, India

1LT Paul Rosbrook, M.S., R.D., L.D.



- U.S. Army dietitian, currently chief of Outpatient Nutrition at Walter Reed National Military Medical Center
- Command Champion for Army Performance Triad, Fit for Performance and Ship Shape Weight management programs
- Assistant director for nutrition research, currently investigating biomarkers and body composition changes in beneficiaries attending weight management programs with and without mandatory exercise programs
- Education
  - M.S., Nutrition, Baylor University Graduate School, Waco, Texas

Polling Question

My primary discipline is

a. Primary care provider
b. Rehabilitation provider
c. Behavioral health provider
d. Nurse
e. Social worker/case manager
f. Dietician
g. Athletic trainer
h. Other

Performance Triad: Activity and TBI-specific Concerns

Gary McKinney, M.S., CBIS

Disclosure – Gary McKinney

- Mr. McKinney has no financial relationship to disclose.
- The views expressed in this presentation are those of the author and do not necessarily reflect the official policy or position of the Department of Defense, nor the U.S. Government.
- The description of programs in this presentation is for descriptive purposes only and not intended to promote any individual program.

Activity Topics

- Army Performance Triad
- Overview of concussion and TBI
- Returning to activity
- DVBIC Clinical Recommendations (CRs)

Army Performance Triad

- The Performance Triad is a comprehensive plan to improve readiness and increase resilience through public health initiatives and leadership engagement.

- The Triad is the foundation for Army Medicine's transformation to a System for Health, a partnership among soldiers, families, leaders, health teams and communities to promote readiness, resilience and responsibility.

(U.S. Army, 2016)

Army Performance Triad
(continued)

- The System for Health
  - MAINTAINS health through fitness and illness/injury prevention.
  - RESTORES health through patient-centered care.
  - IMPROVES health through informed choices in the Lifespace.

- The focus of the Performance Triad is on sleep, activity and nutrition – key actions that influence health in the Lifespace defined as the time that is not spent with a health care provider. As a result, the biggest impact on health is made by making better choices in our Lifespace.

(U.S. Army, 2016)

Army Performance Triad
(continued 2)

- Key messages of the Performance Triad
  - Get quality sleep.
  - Engage in activity.
  - Improve nutrition.

(U. S. Army, 2016)

Overview of Concussion

- Definition
  - Concussion is a mild brain injury (mTBI).
  - Complex pathophysiologic process affecting the brain, induced by traumatic biomechanical forces

Traumatic Brain Injury

- TBIs are classified as mild, moderate, severe or penetrating.

- Majority of the documented brain injuries (82.3 percent) in the Department of Defense (DoD) are mTBIs, also known as concussions. (Defense and Veterans Brain Injury Center, 2016)

Concussion Symptomatology

- Somatic (includes headache, fatigue)
- Cognitive
- Emotional
- Sleep
  - Includes sleep dysfunction, excessive daytime sleepiness

Returning to Activity

- Return to play/activity
  - Assessments
  - Leader responsibility
  - Patient education

Exercise

- Physical activity
  - Lifestyle
    - Active
    - Sedentary
- Types of activities
  - Anaerobic
  - Aerobic
  - Relaxation

Exercise (continued)

- Improve health
  - Lowers risk of health complications
  - Weight loss
  - Stress and depression management
- Ideas for increasing activity
  - Work
  - Around the home
  - Play
- How often and when to exercise

Unique Needs of TBI Patients

- Symptom performance
  - Physical
  - Cognitive
  - Vestibular
- Recovery
  - Acute (7-10 days)
  - Chronic-persistent (>10 days)
  - Multiple concussions
- Return to activity
  - Provider clearance
  - Limit activities

(McCrory et al., 2005)

DVBIC Clinical Recommendations (CR)

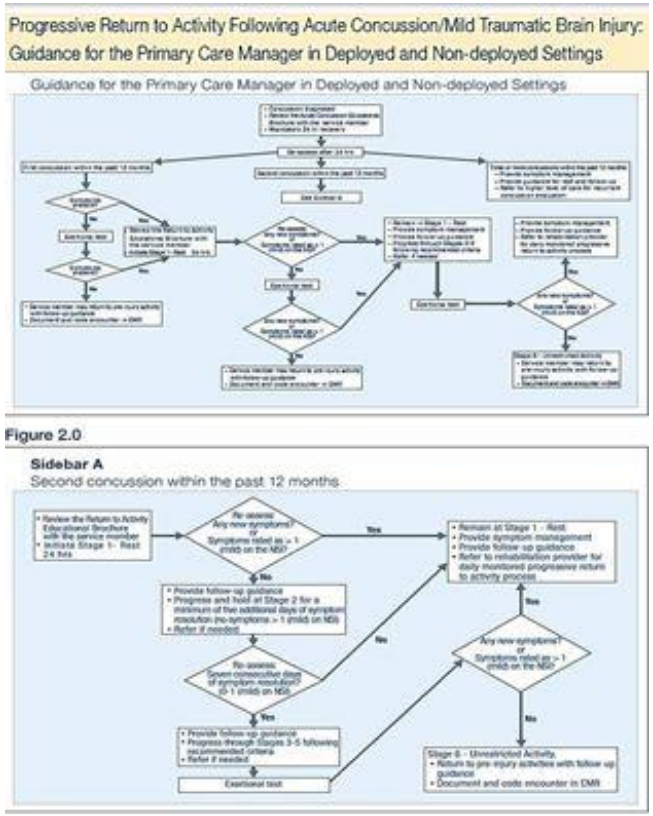
- Progressive Return to Activity (PRA) Following Acute Concussion/Mild TBI: Guidance for the Primary Care Manager in Deployed and Non-Deployed Settings

- Progressive Return to Activity (PRA) Following Acute Concussion/Mild TBI: Guidance for the Rehabilitation Provider in Deployed and Non-Deployed Settings

(DVBIC, 2016)

DVBIC PRA CRs

- Diagnosed and confirmed concussion
  - Provide mandatory 24-hour recovery period.
  - Review DVBIC Acute Concussion (mTBI) Educational Brochure.
  - Symptom management
  - Initiate PRA or refer to a rehabilitation provider.
    - Clinician-directed PRA process



(DVBIC, 2016)

DVBIC PRA CRs (continued)

- The PRA protocol measures three domains as parameters for ongoing evaluation
  - Physical Progression
    - Includes activities from extremely light physical exertion to resistance training with maximum exertion tolerated (e.g., heavy military job tasks)
  - Cognitive Progression
    - Includes activity with very low cognitive demand (e.g., leisure reading) to activities that require multi-tasking or complex problem-solving
  - Vestibular and Balance Progression
    - Includes activities with slow and limited range of head and body movement to activities that involve dynamic balancing and challenge greater vestibular needs (e.g., swimming with flip turns)

(DVBIC, 2016)

DVBIC PRA CRs (continued 2)

- Six-stage approach from Rest to Unrestricted Activity
- Progression is measured.
  - Physical
  - Cognitive
  - Vestibular
- Neurobehavioral Symptom Inventory (NSI)
- Resting heart rate (HR) and blood pressure (BP)

Rehabilitation Stages	Description
Stage 1	Rest
Stage 2	Light Routine Activity
Stage 3	Light Occupation-oriented Activity
Stage 4	Moderate Activity
Stage 5	Intensive Activity
Stage 6	Unrestricted Activity

(DVBIC, 2016)

DVBIC PRA CRs (continued 3)

- The following criteria apply at all stages and should be met for the SM to progress
  - No new symptoms
  - No symptoms above rating of 1 (mild) on NSI
  - Resting BP not to exceed **140/90 mm Hg**
  - Resting HR not to exceed **100 bpm**
- Activity to rest intervals must be followed as defined.
  - Example: Stage 3 (Light Occupational-oriented Activity) – Maximum of 60 minute physical activity periods followed by four hours of rest (1:4 ratio)

(DVBIC, 2016)

DVBIC PRA CRs (continued 4)

- If criteria for progression are met, advance to next stage.
- If criteria for progression are not met, return to prior stage for **24 hours.**
- If SM reports symptoms during activity, stop activity and rest.

(DVBIC, 2016)

TBI Activity Resources/Tools

- Army Performance Triad: Activity
  - http://armymedicine.mil/Pages/Activity.aspx
- DVBIC PRA CRs
- Centers for Disease Control and Prevention HEADS UP
  - Managing Return to Activities – Information for health care professionals http://www.cdc.gov/headsup/providers/return_to_activities.html
    - Return to Play
    - Return to Work
    - Return to School

(DVBIC, 2016)

Performance Triad: Nutrition and TBI-specific Concerns

1LT Paul Rosbrook, M.S., R.D., L.D.

Disclosure – 1LT(P) Rosbrook

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Nutrition Topics

- Acute phase TBI nutrition
- Recovery phase TBI nutrition
- The Performance Triad nutrition pillars
- Statistics on health and healthy eating in the Forces
- How poor sleep affects nutrition
- Stimulants/caffeine
- Supplementation

Nutrition in mTBI Recovery

- Acute phase
  - Nutrition needs increased during Day 0 to around Day 30.
    - Calories: 35-45kcal/kg = 2800-3600kcal/d for 80kg male
    - Protein: 2.0-2.5g/kg = 160-200g/d for 80kg male
    - Daily needs return to a normal baseline after acute inflammation, hypermetabolism, etc. subside.
    - May require monitoring of urea nitrogen
    - Patients can forget to eat/forget that they ate.
    - May experience constipation secondary to pain medications

(Escott-Stump, 2014)

Nutrition in mTBI Recovery (continued)

- Recovery phase
  - Nutrition needs can/will return close to baseline for long-term management.
    - Calories: 25-35kcal/kg depending on activity level
    - Protein: 0.8-1.2g/kg depending on activity level
    - Proper food consistency based on neurological function
    - Sustained proper hydration
    - Supplementation with Omega-3 fats, zinc, and Vitamin D?

The Question at Hand…

How can the Army Performance Triad aid in TBI recovery?

Image source: http://armymedicine.mil/Pages/performance-triad.aspx

The Performance Triad for TBI

- Nutrition pillars for the Performance Triad
  - Proper fueling for performance and recovery
  - Eight (8) daily servings of fruit/vegetables
  - Limit caffeine within six (6) hours of sleep.
  - Maintain proper body weight to reduce risk of injury.
  - Be smart with supplementation.

Image source: http://armymedicine.mil/Pages/performance-triad.aspx

(U.S. Army , 2016)

Excerpt from Performance Triad Materials

Fueling for Performance

Proper fueling is all about getting the right nutrients at the right time to maximize your training results. Nutrient timing before, during, and after workouts helps you perform at your best and makes a difference in how prepared you will be for your next mission.

DID YOU KNOW?

- Fueling before you exercise protects muscle tissue and increases energy levels during physical training. Research has shown that fueling before training improves overall performance by 25–50%.

- Being dehydrated can decrease performance by almost 30%. Hydrating before, during and after your workout can guarantee a great training session and will keep you from falling out.
- By fueling immediately after exercise, you can increase your muscles' energy stores and improve recovery by 50%.

- Eating fruits and vegetables can help with fluid replacement. Foods such as watermelon, grapes, celery and cucumbers are great for rehydration!

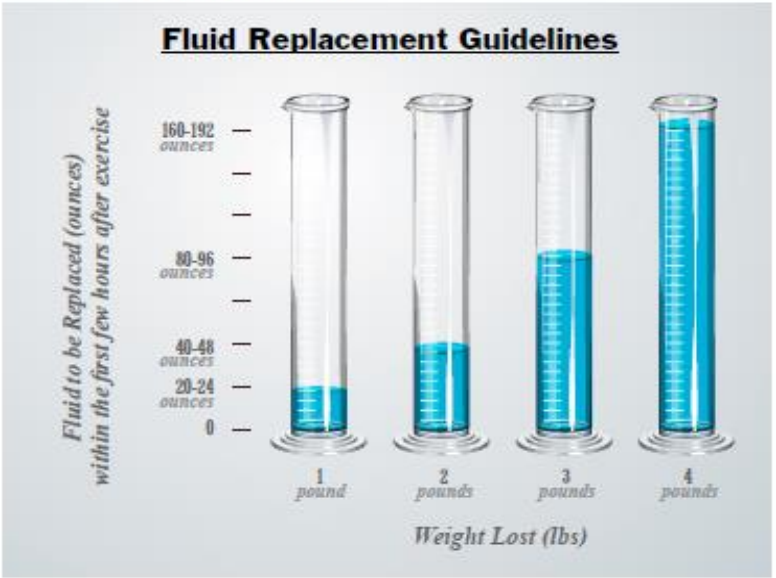
OPTIMAL FUELING

Your body is like a ***high performance*** *vehicle. It needs to be filled with high quality fuel and the right fluids to get maximum performance.*

In order to fully rehydrate after exercise and replace fluids lost:

1) Weigh yourself before and after exercise.
2) Calculate body weight lost in lbs.
3) Drink (or eat fruit) to replace fluid losses. Check out the Fluid Replacement Guidelines below.

Fluid Replacement Guidelines



(U.S. Army, 2016)

Start strong, stay strong, finish strong!

Plan your meals like you plan your workouts! Strategies for eating and hydrating before, during, and after physical training are essential.

START STRONG

Top off fluids and put fuel in your tank before you go!

Eating a small meal or snack and being well-hydrated before physical training:

- Maximizes performance
- Protects muscle tissue
- Increases endurance
- Helps control appetite

STAY STRONG

Replenish fluids and refill as needed.

FLUIDS + FUEL

Staying well-hydrated during exercise:

- Maximizes performance
- Reduces the risk for injury
- Maintains energy levels

For training sessions lasting more than 60 minutes, refueling with 10–20 grams of carbohydrates every 20–30 minutes:

- Sustains performance
- Protects muscle tissue
- Improves recovery

FINISH STRONG

Finish by refilling your tank and fluids.

The best way to end a workout and prepare for the next is to replace fluid loss and fuel shortly after training. Refueling with a 4:1 ratio of carbohydrates to protein and replacing fluid loss 30–60 minutes after exercise:

- Protects muscle tissue
- Improves energy levels after training
- Controls appetite

TARGETS

Expert: Weigh yourself before and after your workout sessions this week to determine your fluid needs.

Sharpshooter: **Recover right!** Refuel 30–60 minutes after strenuous exercise sessions this week.

Marksman: Eat a **power** snack before strenuous exercise sessions this week.

Your optimal **power** snack choice will depend on how soon you will be training.

START STRONG POWER SNACK

WHEN FUELING 2–4 HOURS BEFORE EXERCISE, TRY:
peanut butter and jelly sandwich + low-fat milk + water
deli sandwich + orange + water
pasta, chicken + small salad + water
yogurt, low-fat granola + berries + water

WHEN FUELING 1–2 HOURS BEFORE EXERCISE, TRY:
peanut butter and banana + water
yogurt and berries + water
½ turkey sandwich and apple + water
granola bar + low-fat milk + water

WHEN FUELING LESS THAN 1 HOUR BEFORE EXERCISE, TRY:
banana, yogurt
16 oz. sports drink
small granola bar + water

Always stay hydrated during your training sessions and fuel during longer training sessions.

STAY STRONG

WHEN TRAINING LESS THAN 1 HOUR, TRY:
water

WHEN TRAINING MORE THAN 1 HOUR, TRY:
banana + water
energy gel + water
12 oz. sports drink + water

Recovery starts immediately after you finish training. Recover right by drinking fluids immediately after training, followed by a meal or snack and additional fluids within 30–60 minutes.

FINISH STRONG

FOR RECOVERY SNACKS TRY:
hard boiled egg + banana + 12 oz. sports drink
12 oz. chocolate milk (dairy or soy)
graham crackers + banana + yogurt + water

FOR RECOVERY MEALS TRY:
oatmeal + banana + hard boiled egg + low-fat milk + water
rice or pasta + fish + orange + steamed vegetables + water
whole grain turkey sub w/vegetables + grapes + water

(U.S. Army, 2016)

Current DoD Eating Habits

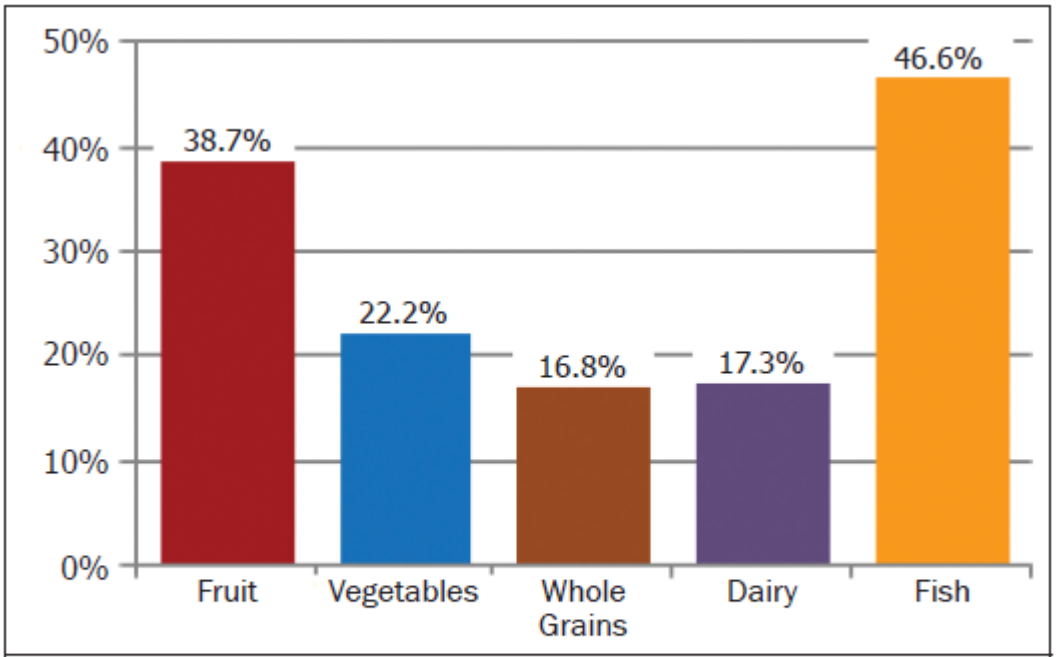


Figure 1. Percentages of Soldiers meeting US Dietary Guidelines by category. Overall, less than half met the dietary guidelines for fruit (2 servings/day), vegetables (2-3 servings/day), whole grains (3 servings/day), dairy (3 servings/day), and fish (2-3 servings/week).

(Purvis, Lentino, Jackson, Murphy, & Deuster, 2013)

Current DoD Eating Habits (continued)

- Key findings of 2013 Global Assessment Tool analysis vs. U.S. Department of Agriculture Dietary Guidelines for Americans
  - Those who scored highest in the Healthy Eating Score (HES)
    - Consumed breakfast 6+ days per week.
    - Ate a post-exercise recovery snack.
    - Lowest intake of both regular and diet sodas
    - Best odds of healthy anthropometric indices
    - Those who passed physical fitness test were two **(2) times** more likely to score high HES.
    - Good sleepers (7+ hours per night) were four **(4) times more likely** to score in the highest category than those who slept ≤6 hours per night.

(Purvis, Lentino, Jackson, Murphy, & Deuster, 2013)

Current DoD Eating Habits (continued 2)

Recommendations

- Consume
  - 2-3 servings fruit
  - 4-5 servings vegetables
  - 3 servings dairy/alternative
  - Lean protein when possible
    - Pork loin, chicken breast, flank steak, etc.
  - Most grains = whole grains (wild rice, oats, bran, quinoa…)
- Properly re-fuel/re-hydrate after training.
- Achieve 7-8 hours of restful sleep.

(Purvis, Lentino, Jackson, Murphy, & Deuster, 2013)

How Poor Sleep Affects Nutrition

- Those who chronically sleep ≤4 hours per night
  - Significant reduction in daily physical activity
  - Leptin (satiety) reduced 18%
  - Ghrelin (hunger) increased 28%
  - Glucose tolerance reduced 30%
  - More irregular meal patterns
  - Consume more energy-rich foods
  - Lower fruit/vegetable intake

Image course: U.S. Army

- Leptin levels directly correlate with sleep duration.

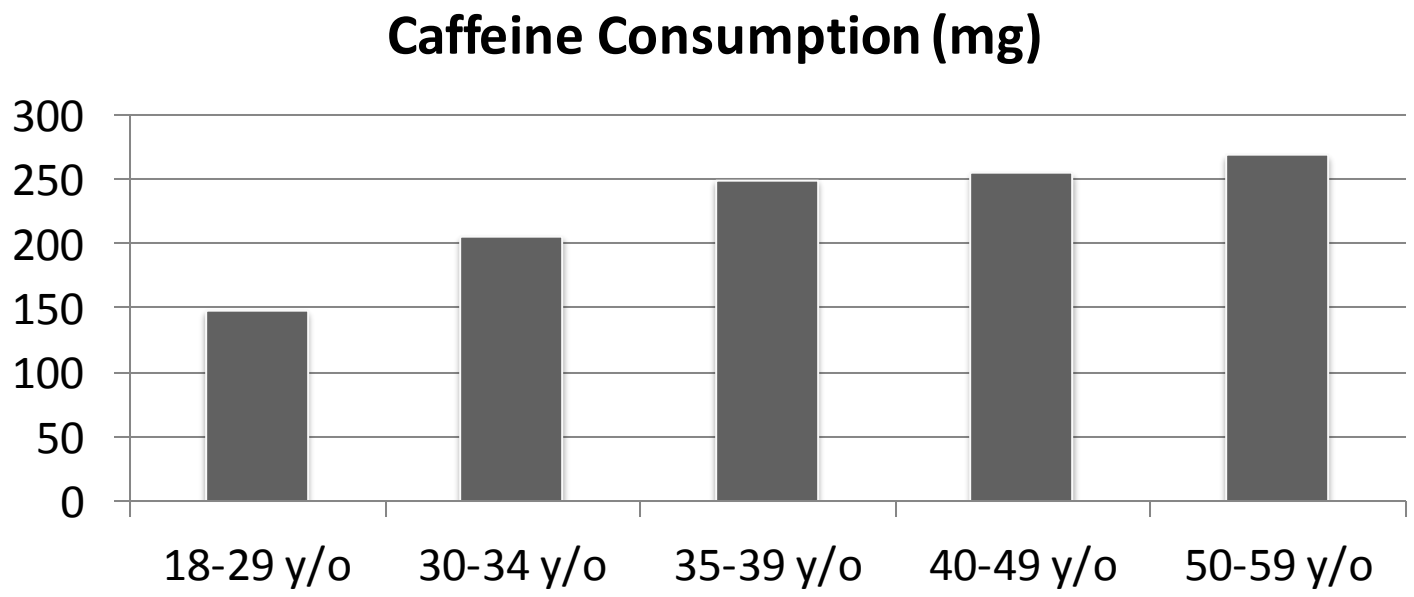
(Morselli, Leproult, Balbo, & Spiegel, 2010)

Stimulants/Caffeine

Image source: Freeimages.com

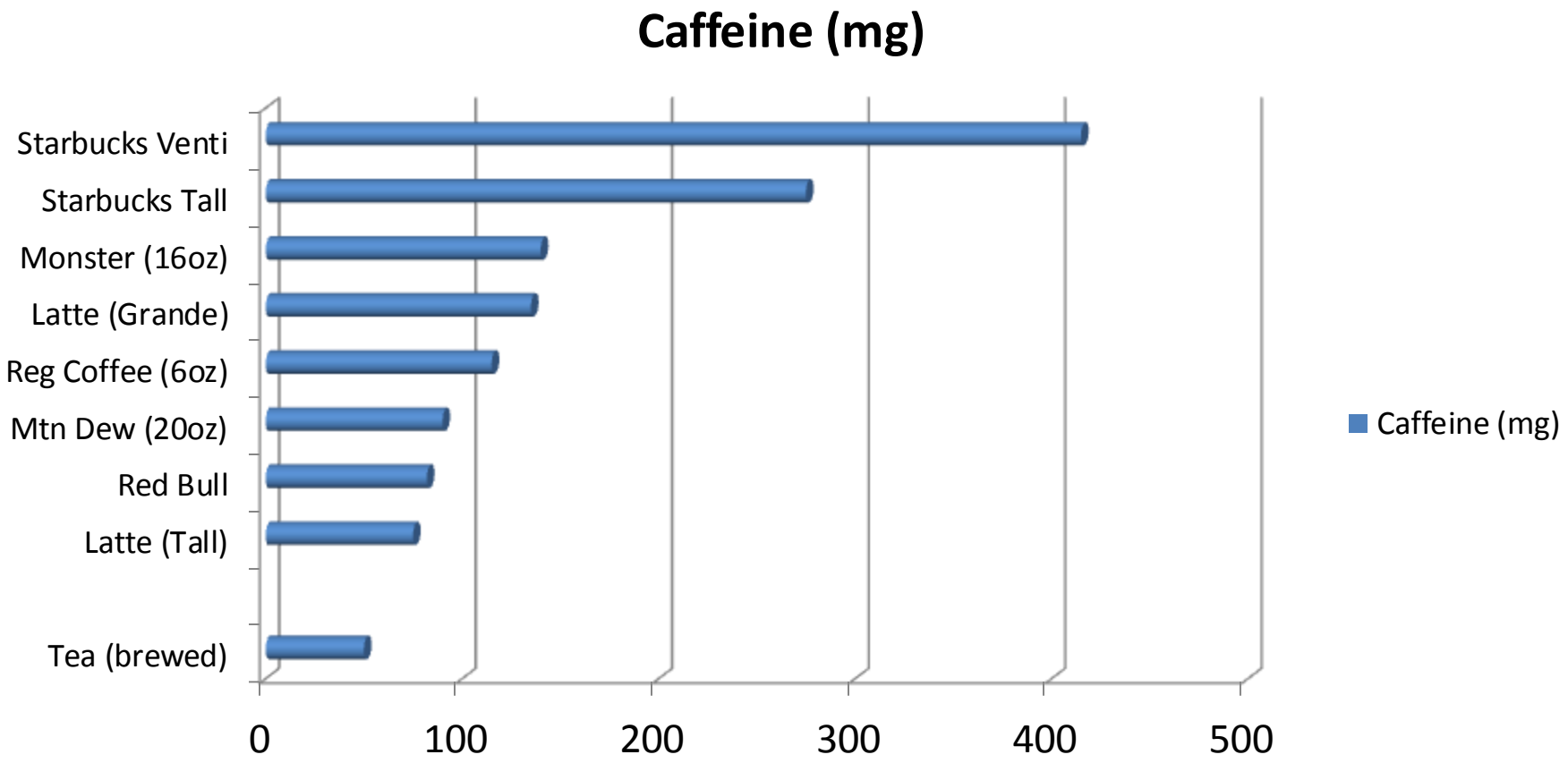
Stimulants/Caffeine Consumption and Age

- Data from National Health and Nutrition Examination Survey (NHANES)
- Question: Which age group consumes the most caffeine?



(Fulgoni, 2014)

Caffeine Content of Popular Drinks



Source: 1LT Paul Rosbrook

Stimulants/Caffeine

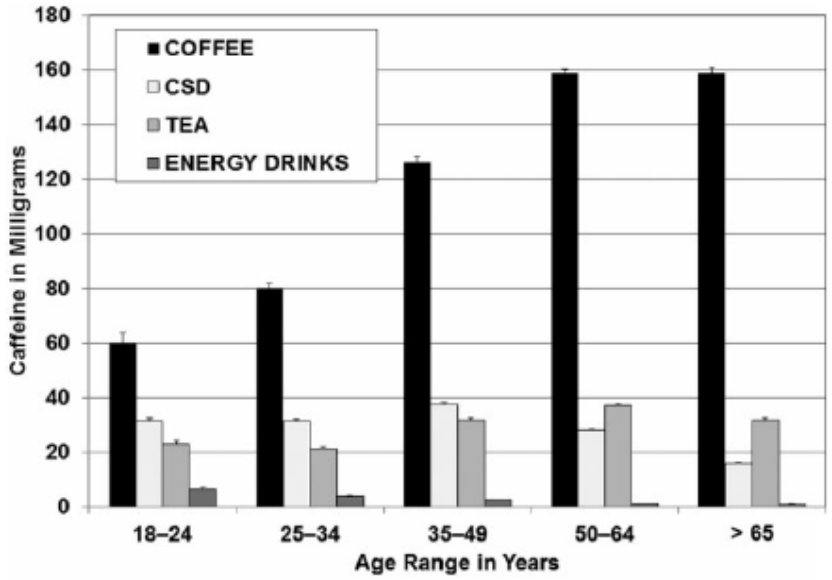


Figure 1 **Reported daily caffeine use as a function of age and caffeine formulation.** Adapted from Mitchell et al. (2014).[13]

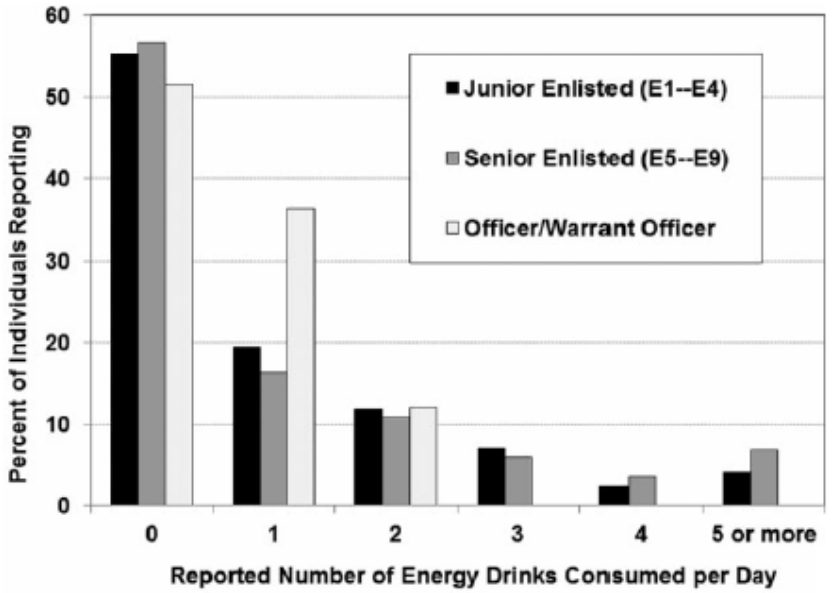


Figure 2 **Percentage of participants reporting daily energy drink use as a function of reported number of energy drinks consumed per day and military rank.** Adapted from Toblin et al. (2012).[14]

(Wesensten, 2014)

How Much is "Too Much" Caffeine?

- **Food and Drug Administration (FDA)**: 400mg/d "*not generally associated with negative side effects*."
- **World Health Organization (WHO)**: Chronic 500mg+ per day = "*overuse" or "caffeineism*." Below 500mg/d is fairly safe.
- **For those with hypertension**: Up to 300mg/d can be considered safe.

(Wesensten, 2014; Mesas, Leon-Muñoz, Rodriguez-Artalejo, & Lopez-Garcia, 2011)

The Big Picture

Q: To what extent is caffeine use linked to behavioral or health problems?

A: There presently is no evidence causally linking caffeine/energy drinks to behavioral or health issues.

HOWEVER

There is literature linking lack of sleep with behavioral and health issues.

(Wesensten, 2014)

Caffeine and Stimulants

Recommendations

- Look at the bigger picture
  - Is the patient experiencing a lack of recuperative sleep?
    - Which is causing more reliance on stimulants?
    - Caused by caffeine/stimulants close to bedtime?
    - Are they chronically using sleep aids?
  - Is their caffeine consumption 'adjustable?'
- Do not "demonize" caffeine – remain flexible as a provider.
- Most TBI patients can be safe up to 300-400mg/d caffeine.

(Purvis, Lentino, Jackson, Murphy, & Deuster, 2013)

Supplements for TBI Recovery

Image source: Freeimages.com

Supplements and Affect on TBI

Omega-3 Fatty Acids

- Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA)
  - Found in marine oils (fish, krill, squid)
  - Plant sources (walnuts, flax) contain ALA which is poorly converted to EPA. Marine EPA/DHA is most effective.
- May aid in maintaining/restoring cell membranes following TBI
- May reduce risk of ischemic stroke
- Recommendations: 1.0g-1.5g EPA/DHA per day
  - In line with American Heart Association guidelines

(Scrimgeour & Condlin, 2014)

Supplements and Affect on TBI (continued)

Vitamin D3

- Sourced via food (eggs, dairy) and skin exposure to UVB
- Vitamin D3 insufficiency and/or deficiency
  - Serum < 30nmol/L (defined by Endocrine Society)
  - Increasingly common across all populations
  - May increase risk of dementia, inflammatory damage and impairment following TBI
- Excellent adjuvant for progesterone TBI therapy
- **Recommendations: Maintain serum levels ≥ 35-40nmol/L.**
- **Intake: 1000-2000 IU/d via food and supplements**

(Scrimgeour & Condlin, 2014)

Performance Triad: Sleep and TBI-specific Concerns

David Panakkal, M.D.

Disclosure – Dr. Panakkal David

- Dr. David has no financial relationship to disclose.
- The views expressed in this presentation are those of the author and do not necessarily reflect the official policy or position of the Department of Defense, nor the U.S. Government.
- The description of programs in this presentation is for descriptive purposes only and not intended to promote any individual program.

Sleep Topics

- Sleep and TBI considerations
- Sleep disorders
- DVBIC Clinical Recommendation
- Army Performance Triad and sleep
- Pharmacologic and non-pharmacologic treatments for insomnia

Sleep and TBI Considerations

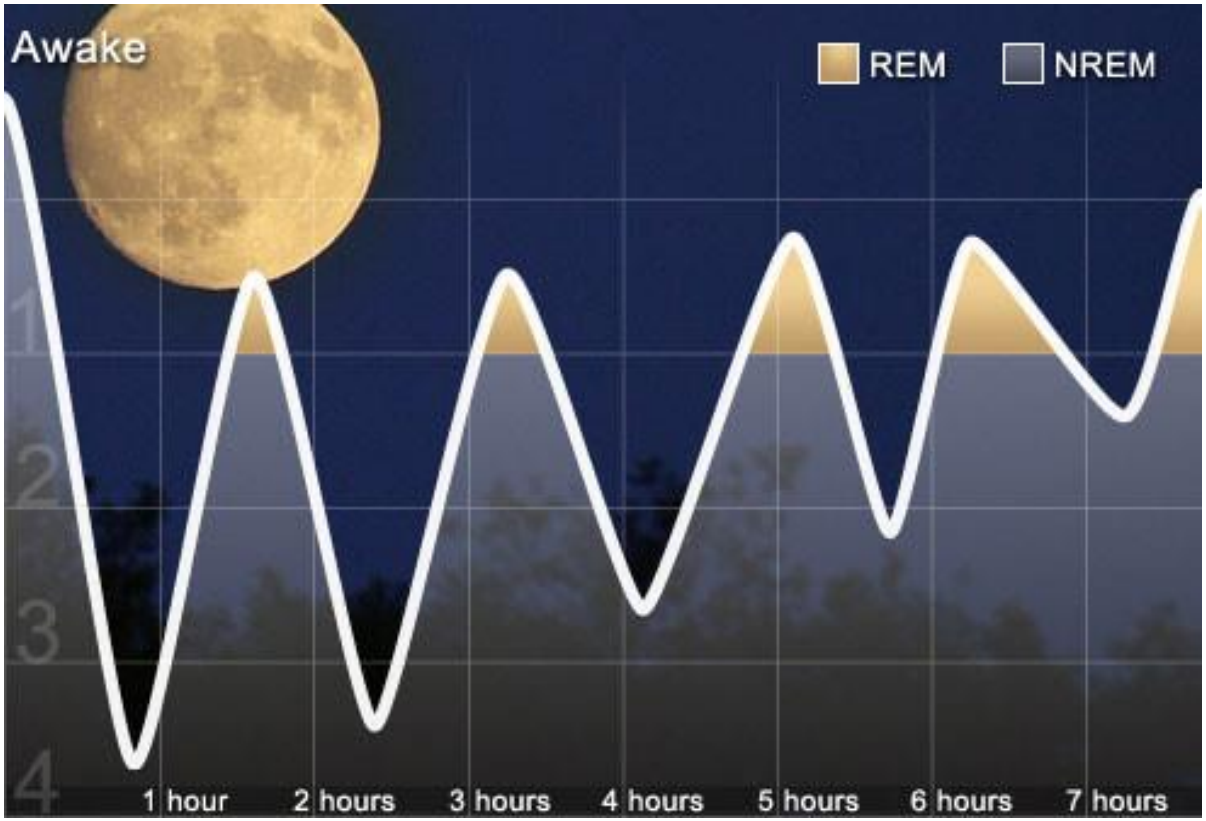
- In a 2012 meta-analysis of 21 studies by Mathias and Alvaro (2012) showed that 50% of people suffered from some form of sleep disturbance after a TBI.
- 15% of mTBI have postconcussive syndrome with headache, insomnia and fatigue that negatively influences recovery. (Vasterling et al., 2012)
- Overall, 50% of people suffered from some form of sleep disturbance after a TBI and 25-29% had a diagnosed sleep disorder (insomnia, hypersomnia, apnea). (Seelig et al., 2010)

Sleep and TBI Considerations (continued)

- In a 2008 DoD survey of 2,525 Operation Iraqi Freedom SMs, fatigue was reported by 92.9% compared to 25% who did not report any TBI injuries. (Hoge et al., 2008)
- These findings illustrate the significance for providers to routinely screen for sleep disorders in this population.

Normal Sleep Architecture

Rapid Eye Movement (REM) and non-REM Sleep



Source: http://www.webmd.com/sleep-disorders/ss/aws-slideshow-sleep-disorders-overview

Types of Sleep Disorders

- Insomnia disorder (3 months)
  - Acute/short term (<3 months)
  - Episodic (1 month to <3 months)/persistent (> 3 months); Recurrent - two or more episodes in one year
  - Chronic (>3 months)
- Circadian rhythm sleep wake disorders (CRSWD)
- Hypersomnolence disorder

Types of Sleep Disorders (continued)

- Narcolepsy
- Obstructive sleep apnea (OSA)
- Central apnea
- Parasomnias
  - Sleep walking/sleep terror/nightmare disorder/restless leg syndrome

Sleep Disorders in Concussion

- Four common sleep disorders following concussion
  - Short-term insomnia
  - Chronic insomnia
  - CRSWD (previously known as circadian rhythm sleep disorder)
  - OSA

Sleep Disorders in Concussion (continued)

- Prevalence
  - The prevalence rates of insomnia, CRSWD and OSA following mTBI are higher compared with other TBI severity levels and the general population.
  - Nearly all SM with combat-related TBI report a sleep disturbance initially.

(DVBIC, 2016)

Sleep Disorders in Concussion (continued 2)

- Effects
  - Negative impact on recovery from TBI (impedes restorative processes that occur during sleep)
  - Symptom exacerbation (pain, irritability and cognitive/memory dysfunction)
  - Functional deficits (e.g., social functioning, response to rehabilitation, return to work, etc.)

(DVBIC, 2016)

Insomnia Evaluation

- Bedtime
- Sleep latency (time to fall asleep after lights out)
- Number and duration of nocturnal awakenings
- Time of final morning awakening
- Rising time
- Number, time and duration of daytime naps
- Levels of sleepiness and fatigue as the day progresses
- Insomnia Severity Index (ISI) (U.S. Department of Veterans Affairs, 2016)

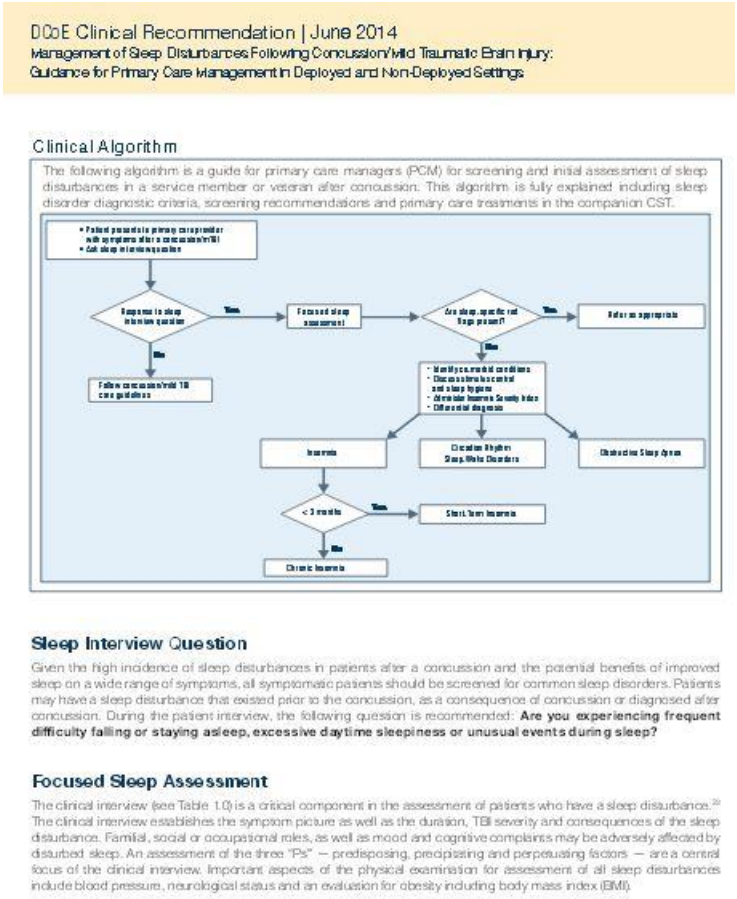
ISI and Sleep Diary

- ISI
  - Brief, validated, seven-item self-report questionnaire
  - Useful for the initial assessment of insomnia symptom severity
  - Useful for ongoing monitoring of treatment response
- Two-week sleep diary

(U.S. VA, 2016)

DVBIC Clinical Recommendation (CR)

Management of Sleep Disturbances Following Concussion/Mild TBI: Guidance for Primary Care Management in Deployed and Non-deployed Settings



DCoE Clinical Recommendation | June 2014

Management of Sleep Disturbances Following Concussion/Mild Traumatic Brain Injury: Guidance for Primary Care Management in Deployed and Non-Deployed Settings

Clinical Algorithm

The following algorithm is a guide for primary care managers (PCM) for screening and initial assessment of sleep disturbances in a service member or veteran after concussion. This algorithm is fully explained including sleep disorder diagnostic criteria, screening recommendations and primary care treatments in the companion CST.

Sleep Interview Question

Given the high incidence of sleep disturbances in patients after a concussion and the potential benefits of improved sleep on a wide range of symptoms, all symptomatic patients should be screened for common sleep disorders. Patients may have a sleep disturbance that existed prior to the concussion, as a consequence of concussion or diagnosed after concussion. During the patient interview, the following question is recommended: **Are you experiencing frequent difficulty falling or staying asleep, excessive daytime sleepiness or unusual events during sleep?**

Focused Sleep Assessment

The clinical interview (see Table 1.0) is a critical component in the assessment of patients who have a sleep disturbance.[20] The clinical interview establishes the symptom picture as well as the duration, TBI severity and consequences of the sleep disturbance. Familial, social or occupational roles, as well as mood and cognitive complaints may be adversely affected by disturbed sleep. An assessment of the three "Ps" — predisposing, precipitating and perpetuating factors — are a central focus of the clinical interview. Important aspects of the physical examination for assessment of all sleep disturbances include blood pressure, neurological status and an evaluation for obesity including body mass index (BMI).

(DVBIC, 2016)

DVBIC Sleep CR

- If a SM is diagnosed with a concussion and has sleep complaints
  - Complete a focused sleep assessment.
    - Rule out primary sleep disorders.
  - If sleep-specific red flags are present, refer to a sleep medicine specialist, emergency department or psychiatry (if risk for self-harm present).
  - Identify comorbid conditions (headache, pain, endocrine dysfunction, posttraumatic stress disorder, anxiety disorders, depression, substance use disorders).

(DVBIC, 2016)

DVBIC Sleep CR (continued)

- Discuss stimulus control and sleep hygiene.
- Administer the ISI.
- Complete differential diagnosis.
- Manage the sleep disorder accordingly.

(DVBIC, 2016)

DVBIC Guidance for All Four Sleep Disorders

- Diagnosis criteria
  - With codes
- Presentations
- Considerations
- Treatment recommendations
  - Pharmacologic
  - Non-pharmacologic
    - Including sleep hygiene
  - Assistive technologies

DVBIC Guidance for All Four Sleep Disorders (continued)

- Laboratory tests
- Self-report measures
- Common comorbid medical conditions
- Common comorbid psychological health conditions
- Medications and diet
- When and to whom to refer

Performance Triad:
Top 10 Sleep Habits for Adults

1. Keep a regular sleep schedule.
2. When possible, schedule 7-8 hours for sleep.
3. Avoid LED screens lights two (2) hours before bedtime.
   - No smart phones/tablets/computers
4. Stop caffeine at least six (6) hours before bedtime.
5. Do not drink alcohol before bed.
6. Get your exercise in by early evening.
7. Do not use over-the-counter medications without consulting your provider.

(U.S. Army, 2016)

Top 10 Sleep Habits

- Critical sleep hygiene habits for those experiencing sleep problems

8. Go to bed only when you are sleepy. Get out of bed if you can't sleep within 30 minutes.

9. Nap wisely (preferably in the late morning/early afternoon for 30-60 minutes)

10. Move the bedroom clock to where you cannot see it.

(U.S. Army, 2016)

Therapies for Insomnia

Technique	Goal	Method
Sleep hygiene education	Promote habits that help sleep; eliminate habits that interfere with sleep.	Promote habits that help sleep; eliminate habits that interfere with sleep.
Stimulus control therapy	Strengthen bed and bedroom as sleep stimuli.	If unable to fall asleep within 20 minutes, get out of bed. Repeat as necessary.
Sleep restriction	Improve sleep continuity by limiting time spent in bed.	Decrease time in bed to equal time actually asleep and increase as sleep efficiency improves.
Cognitive therapy	Dispel faulty beliefs that may perpetuate insomnia.	Talk therapy to dispel unrealistic and exaggerated notions about sleep
Relaxation therapies	Reduce arousal and decrease anxiety	Biofeedback; progressive muscle relaxation
Paradoxical intention	Relieve performance anxiety.	Patient is instructed to remain awake.
Cognitive-behavioral therapy	Combines sleep restriction, stimulus control and sleep hygiene education with cognitive therapy	Combines sleep restriction, stimulus control, and sleep hygiene education with cognitive therapy

(DVBIC, 2016)

First-line Non-pharmacologic Treatment

- Reassure.
- Educate.
- Implement stimulus control plus sleep hygiene.
- Follow weekly until resolution.
- Acupuncture.

Assistive Technology: CBT-i Coach

- Cognitive Behavioral Therapy for Insomnia (CBT-i) with a health provider
  - Key features of the app include:
    - Sleep diary to record daily sleep and track insomnia symptom changes
    - Ability to update a sleep prescription with provider recommendations
    - Tools and exercises for quieting your mind
    - Learn about sleep, the benefits of sleep hygiene and terms used in CBT-i.
    - Set reminder messages with tips, motivation and alarms to change sleep habits.

(National Center for Telehealth & Technology, 2016)

Pharmacologic Treatment for Short-term Insomnia Disorder

- Low dose, short duration non-benzodiazepine sedative hypnotics (choose agent with optimal half-life necessary) for no more than two (2) weeks
- Doxepine 3.5 mgs at bedtime
- Melatonin 3mg
- Do not use anticholinergic drugs (e.g., Benadryl)

Short-Term and Chronic Insomnia Pharmacological Treatment: FDA Guidance

- Non-benzodiazepine sedative-hypnotic drugs should be used with caution.
  - **Can interfere with cortical plasticity and are not FDA-approved for chronic insomnia or other persistent symptoms of concussion**
  - **Use of these drugs for longer than 30 days can lead to tolerance or dependence.**
- Benzodiazepines are contraindicated as their use may impede neuronal recovery.

(DVBIC, 2016)

Sleep Disorders in Deployed Settings

- Sleep disorder screening is recommended as a routine component of concussion management in the deployed setting.
- Use the Neurobehavioral Symptom Inventory (NSI) for assessment of continued symptoms 24 hours post-concussion. (DVBIC, 2014)
  - Pay close attention to how the SM rates *difficulty falling or staying asleep.*

(DVBIC, 2016)

Sleep Disturbances in Deployed Settings (continued)

- Reassurance, education and an optimal sleep environment are the cornerstones of insomnia management.
- Sleep hygiene and stimulus control instruction are recommended for short-term insomnia at seven (7) days post-concussion.
- SMs experiencing clinical signs and symptoms of CRSWD or OSA need to be evaluated for operational functionality and safety.

(DVBIC, 2016)

Clinical Support Tools

- Free apps (iOS/Android)
  - http://t2health.dcoe.mil/
- Epworth Sleepiness Scale
  - http://epworthsleepinessscale.com/epworth-sleepiness-scale.pdf
- STOP-BANG Questionnaire
  - http://www.stopbang.ca/osa/screening.php

New DoD Mobile App Helps Diffuse Nightmares for Better Sleep

(National Center for Telehealth & Technology, 2016)

Conclusion

- Sleep disorders are common after concussion.
  - SMs with physical, cognitive or behavioral/emotional symptoms following concussion should be screened.
- Insomnia is the most common sleep disorder following concussion.
  - Primary care diagnosis and management is facilitated by a focused sleep assessment.
  - Non-pharmacological measures are the foundation for care; include stimulus control and sleep hygiene.

Conclusion (continued)

- Referral to a sleep medicine specialist may be necessary or likely.
  - Especially for chronic insomnia (after initial management), CRSWD and OSA
- Sleep disorders can significantly exacerbate or impact other concussion symptoms.
- The DVBIC Management of Sleep Disturbances Following Concussion/mTBI Clinical Recommendation does not replace clinical judgment.

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Webinar Summary

- There is significant overlap between nutrition, activity and sleep health.
- Nutrition, physical fitness and sleep are significant areas of wellness that are affected by TBI which greatly impact a patient's ability to function as well as quality of life.
- Symptoms should be considered independently but managed holistically.
- The Army Performance Triad can be implemented into a TBI recovery model to maintain, restore and improve health in TBI patients.

Questions

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Next DCoE Traumatic Brain Injury Webinar

Animal-assisted Therapy:
An Alternate Treatment to Traumatic Brain Injury Rehabilitation

August 11, 2016; 1-2:30 p.m. (ET)

Next DCoE Psychological Health Webinar Theme:

Technological Updates in the Treatment of Mental Health Conditions

July 28, 2016; 1-2:30 p.m. (ET)

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2016 Summit State of the Science: Advances, Current Diagnostics and Treatments of Psychological Health and Traumatic Brain Injury in Military Health Care.

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