

**Clinical Practice Guidelines
for the
MANAGEMENT AND REHABILITATION
OF POST-ACUTE MILD TRAUMATIC
BRAIN INJURY**

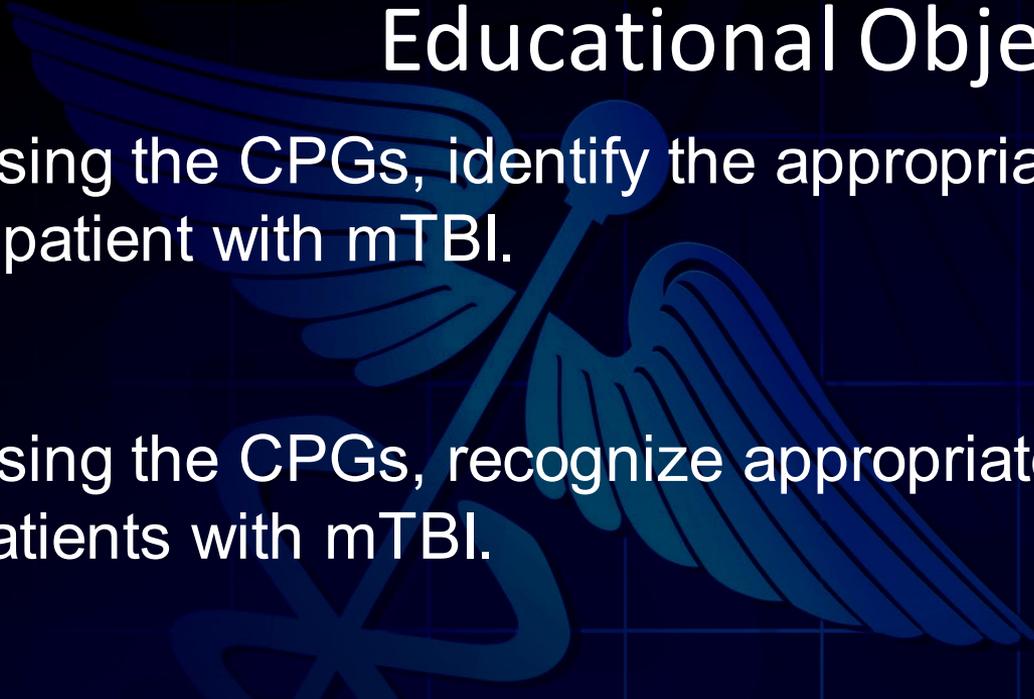
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Educational Objectives

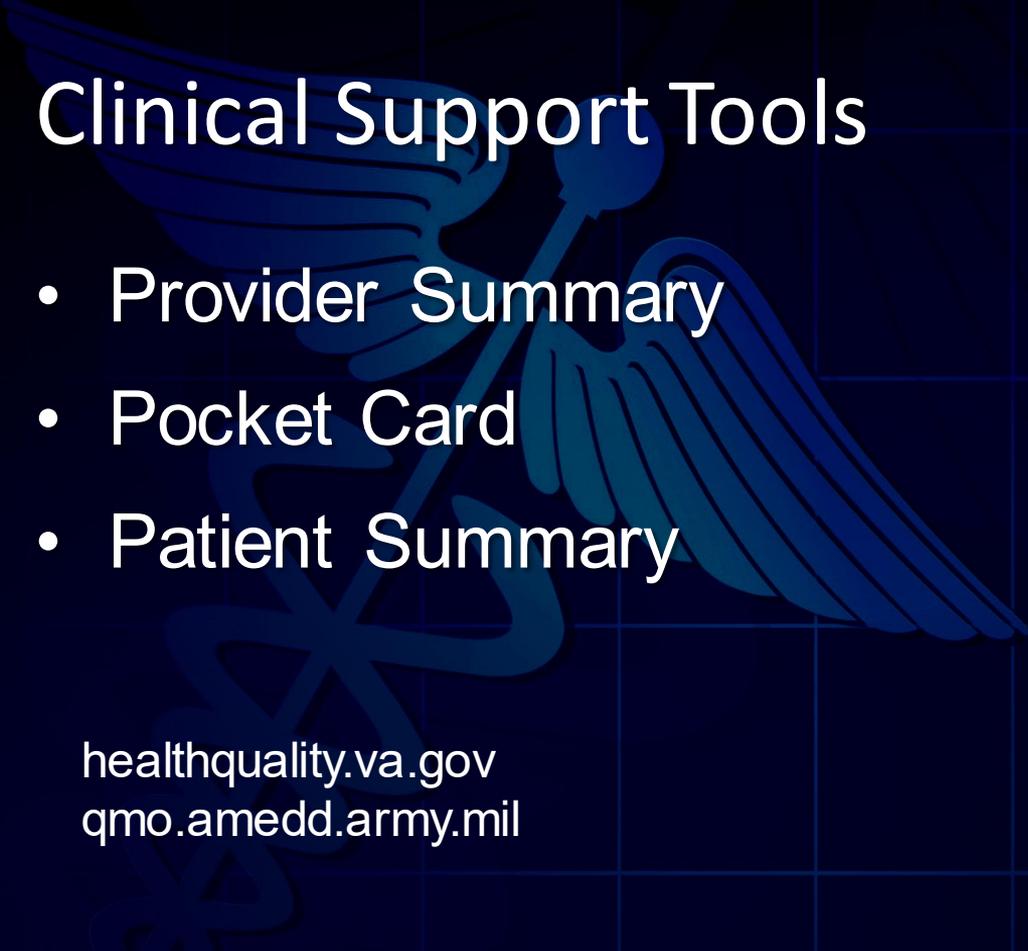


- Using the CPGs, identify the appropriate setting for managing a patient with mTBI.
- Using the CPGs, recognize appropriate assessments for patients with mTBI.
- Using the CPGs, identify evidence-based interventions that have rehabilitative benefits for patients with mTBI and have persistent symptoms.

Key Changes from 2016 CPGs

- Algorithms
- Increased specificity of recommendations
 - Assessment
 - Recovery prognostication
 - Symptom management
- Expanded review of CIH

Clinical Support Tools



- Provider Summary
- Pocket Card
- Patient Summary

healthquality.va.gov
qmo.amedd.army.mil

Provider Summary

VA/DoD Clinical Practice Guidelines

**Management and Rehabilitation of
Post-Acute Mild Traumatic
Brain Injury**



VA/DoD Evidence-Based Practice

Provider Summary

Version 3.0 | 2021

Pocket Card

VA/DoD CLINICAL PRACTICE GUIDELINES

The Management and Rehabilitation of Post-Acute Mild Traumatic Brain Injury

Module A: Initial Presentation (<7 Days Post-Injury)

June 2021

1 Person exposed to an external force to the head resulting in any of the following:

- Alteration or loss of consciousness
- Post-traumatic amnesia

2 Urgent/emergent conditions identified? (see Sidebar 1)

3 Refer for emergency evaluation and treatment

4 Evaluate for severity of TBI based on history (see Sidebar 2)

5 Is the severity moderate or severe TBI?

6 Consult with a clinician with TBI experience

7 Diagnosis of mTBI: Are symptoms present? (see Sidebar 3)

8 Is person currently deployed on military or combat operation?

9 Follow DoD policy guidance for management of mTBI in the deployed setting

10 Go to Module B, Box 12

11

- Provide education on mTBI and secondary injury prevention (see Appendix J: Additional Educational Materials and Resources)
- Provide information on safe and structured return to normal and full activity and duties
- Monitor and support recovery

Sidebar 1: Potential Indicators for Immediate Referral

- Declining level of consciousness
- Declining neurological exam/focal neurological symptoms
- Pupillary asymmetry
- Seizures
- Repeated vomiting
- Motor or sensory deficits
- Double vision
- Worsening headache
- Slurred speech
- Marked change in behavior or orientation

Access to the full guideline and additional resources is available at the following link:
<https://www.healthquality.va.gov/guidelines/Rehab/mtrbi/>

Abbreviations: CPG: clinical practice guideline; DoD: Department of Defense; mTBI: mild traumatic brain injury; NSI: Neurobehavioral Symptom Inventory; PTSD: posttraumatic stress disorder; RPOD: Rivermead Post-Concussion Questionnaire; SUD: substance use disorder; TBI: traumatic brain injury; VA: Department of Veterans Affairs

Sidebar 2: Classification of TBI Severity*

Criteria	Mild	Moderate	Severe
Structural imaging (see Recommendation 4)	Normal ^b	Normal or abnormal	Normal or abnormal
Loss of Consciousness	0-30 min	>30 min and <24 hours	>24 hours
Alteration of consciousness/mental state ^c	up to 24 hours	>24 hours; severity based on other criteria	
Post-traumatic amnesia	0-1 day	>1 and <7 days	>7 days
Glasgow Coma Scale (best available score in first 24 hours) ^d	13-15	9-12	<9

^a If patient meets criteria in more than one category of severity, the higher severity level is assigned.

^b No clinically relevant findings.

^c Alteration of mental status must be immediately related to the trauma to the head; typical symptoms would be: looking and feeling dazed and uncertain of what is happening, confusion, difficulty thinking clearly or responding appropriately to mental status questions, and/or being unable to describe events immediately before or after the injury event.

^d In April 2015, the DoD released a memorandum recommending against the use of Glasgow Coma Scale scores to diagnose TBI (see the memorandum for additional information: <https://www.health.mil/Reference-Center/Policies/2015/04/06/Traumatic-Brain-Injury-Updated-Definition-and-Reporting>)

Sidebar 3: Possible Post-Concussion Symptoms^{a,b}

Physical Symptoms	Cognitive Symptoms	Behavior/Emotional Symptoms
<ul style="list-style-type: none"> • Headache • Dizziness/vertigo • Balance problems • Nausea • Fatigue • Sleep disturbance • Visual disturbance • Sensitivity to light • Hearing difficulties/loss • Tinnitus • Sensitivity to noise 	<ul style="list-style-type: none"> • Problems with: <ul style="list-style-type: none"> • Attention • Concentration • Memory • Speed of processing • Judgment • Executive functions • Speech and language • Visual-spatial function 	<ul style="list-style-type: none"> • Depression • Anxiety • Agitation • Irritability • Impulsivity • Aggression

^a Symptoms that may develop within 30 days post-injury.

^b Symptoms can be monitored with instruments such as the NSI or RPOC.

Patient Summary



VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT AND REHABILITATION OF POST-ACUTE MILD TRAUMATIC BRAIN INJURY

Department of Veterans Affairs
Department of Defense

Patient Summary

I. What is concussion/mild traumatic brain injury?

A traumatic brain injury (TBI) is a head injury caused by a blow or jolt to the head that disrupts the normal function of the brain. TBI can be mild, moderate, or severe. A concussion, also known as a mild TBI (mTBI), is the most common type of TBI.

If you experienced a concussion, you will have had at least one of the following [\(1, 2\)](#)

- Forgetting the events before or after the injury
- Confusion, disorientation, or slowed thinking right after the injury
- Loss of consciousness up to, but not longer than 30 minutes

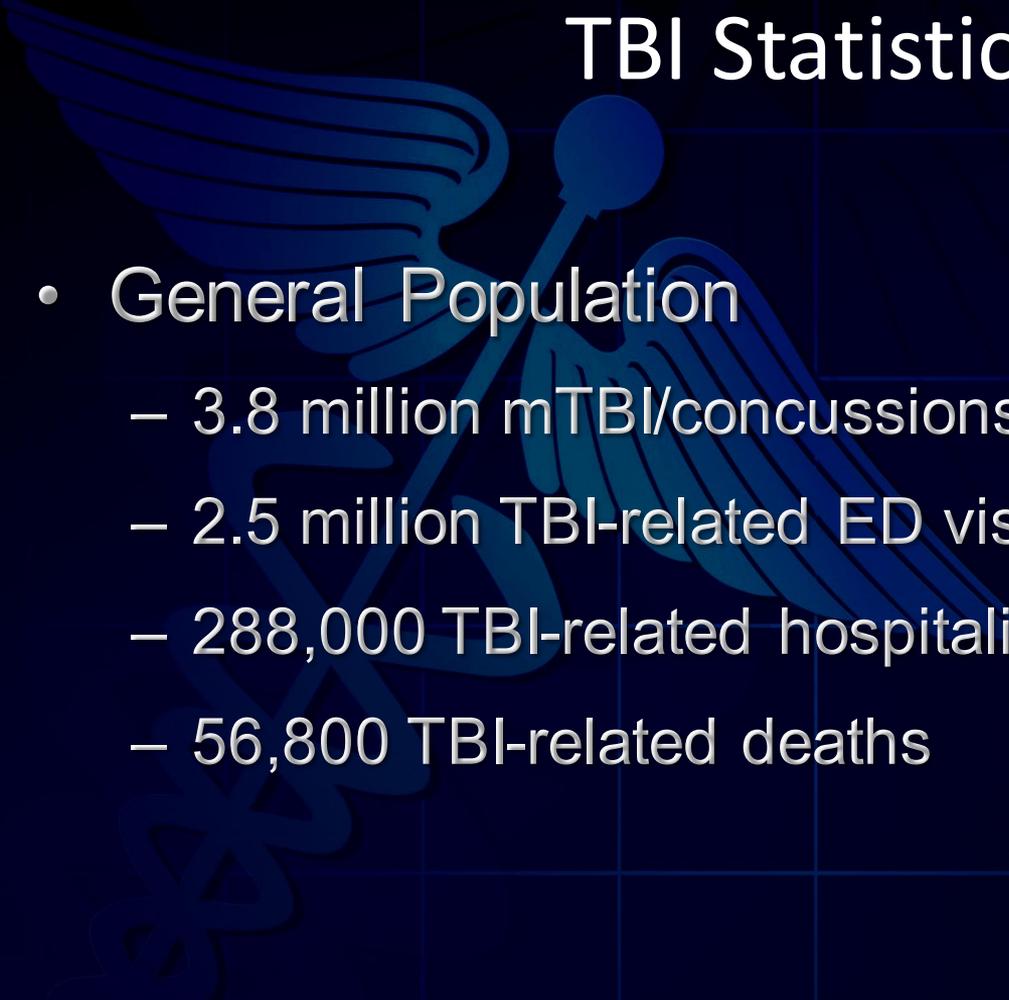
II. What symptoms should I watch for?

You may have experienced one or more of the following symptoms in the days that followed the injury:

- Headache
- Unsteadiness
- Vision problems/blurring
- Disorientation/confusion
- Difficulty with concentration/attention
- Irritability/agitation

If any of the above symptoms change or worsen contact your health care provider immediately. If you develop new symptoms, such as seizures, vomiting, worsening vision, or slurred speech, go to the closest emergency room.

TBI Statistics

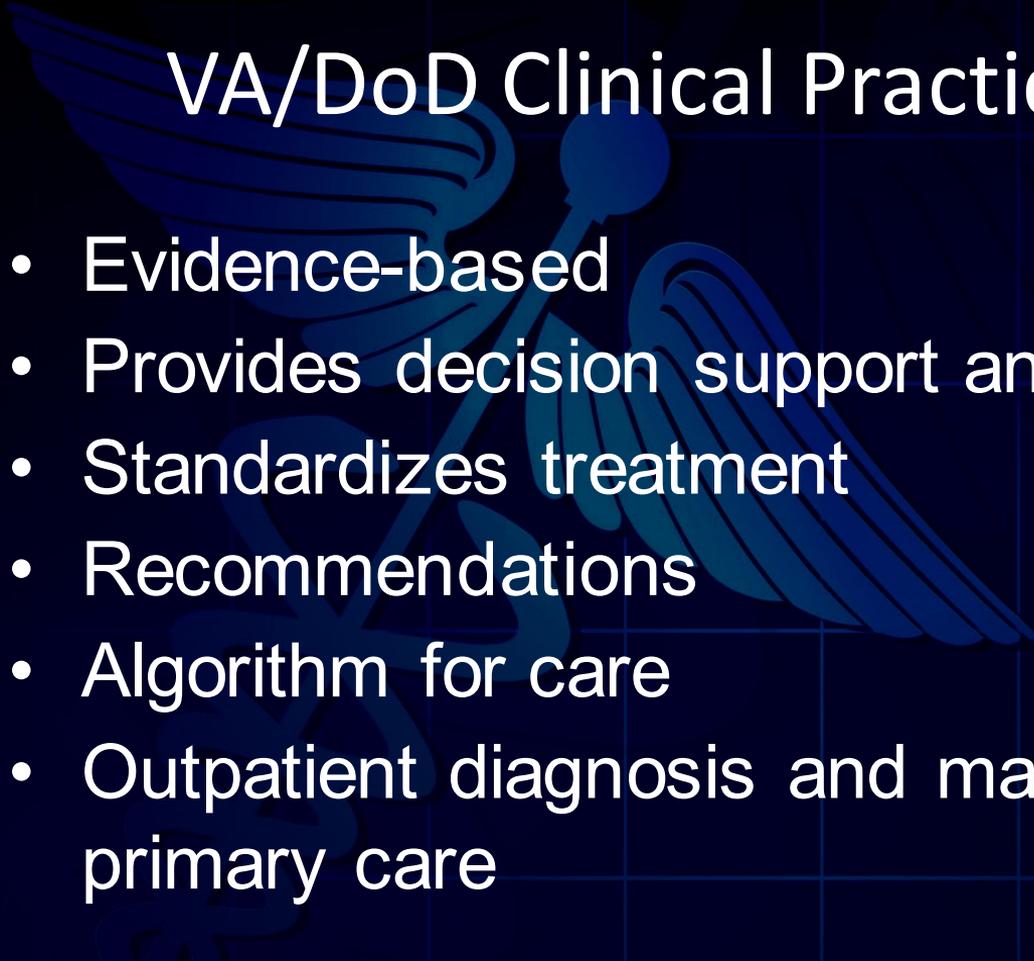


- General Population
 - 3.8 million mTBI/concussions annually
 - 2.5 million TBI-related ED visits
 - 288,000 TBI-related hospitalizations
 - 56,800 TBI-related deaths

mTBI Statistics

- TBICoE reported 282,268 first lifetime mTBI between 2007-2020
- VA identified that 267,404 OIF/OEF/OND veterans screened positive for mTBI and had active symptoms

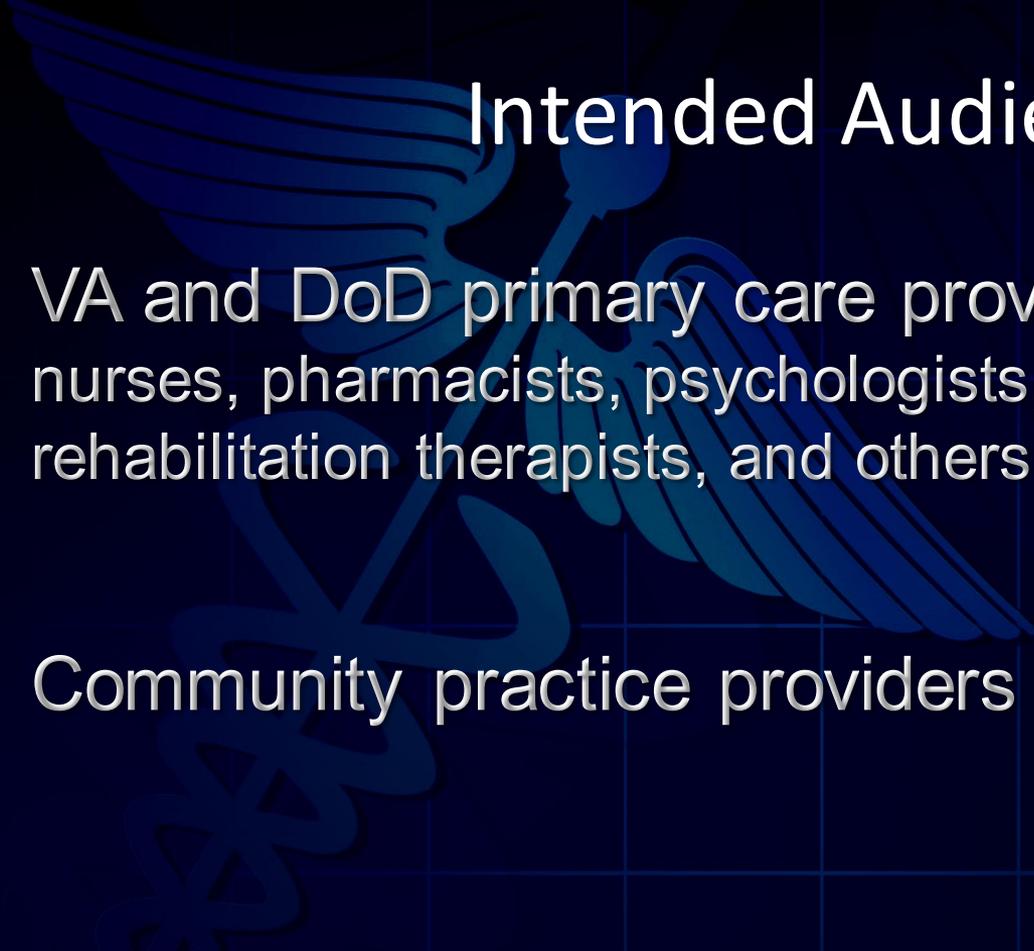
VA/DoD Clinical Practice Guideline



- Evidence-based
- Provides decision support and other tools
- Standardizes treatment
- Recommendations
- Algorithm for care
- Outpatient diagnosis and management in primary care

Scope of the 2021 CPGs

- Post-acute phase = >7 days post-injury
- Eligible for care in the VA and DoD healthcare systems regardless of where care is received
- Adult population



Intended Audience

- VA and DoD primary care providers: physicians, nurses, pharmacists, psychologists, social workers, rehabilitation therapists, and others involved in care.
- Community practice providers

Diagnosis and classification

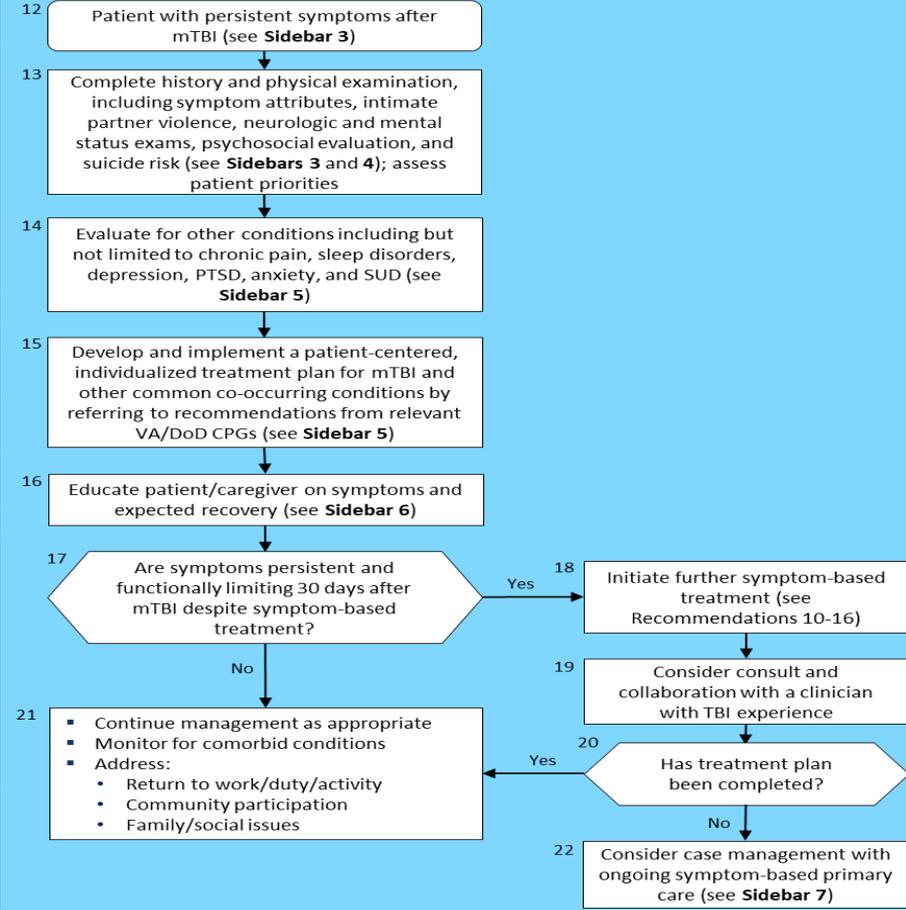
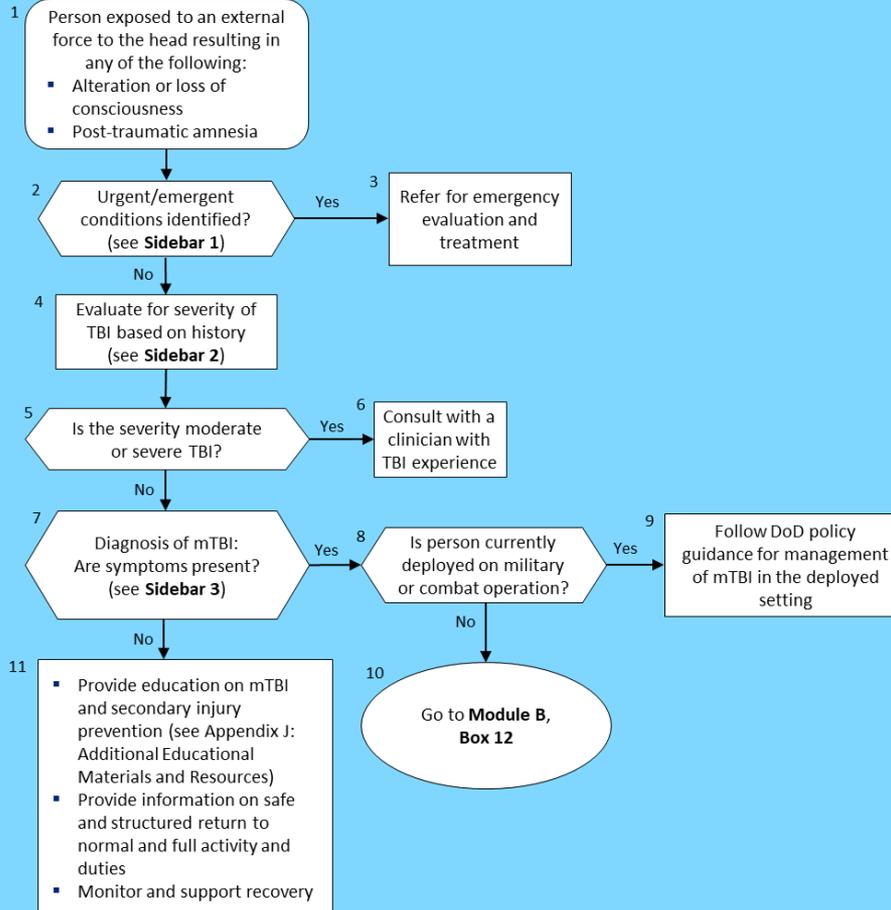
Classification of TBI Severity

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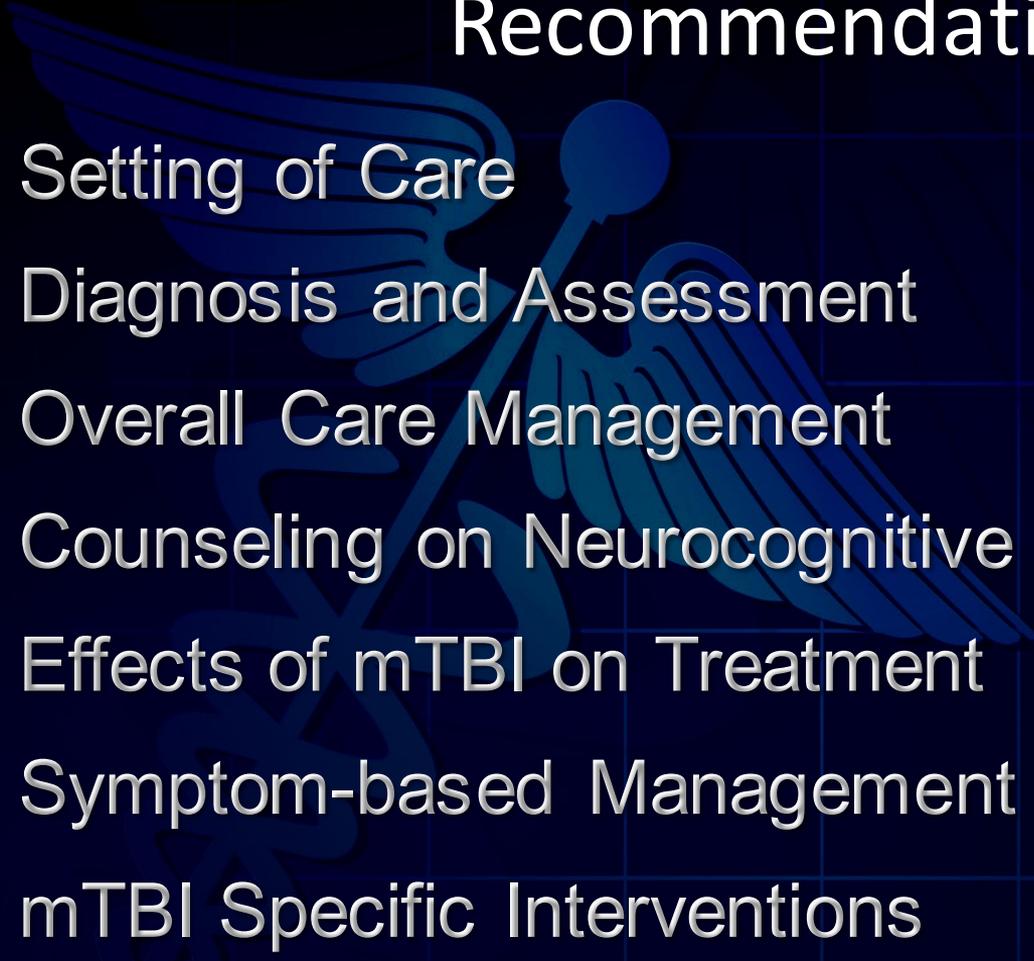
2021 mTBI CPG Recommendations

- 19 Recommendations
- 2 Algorithms
 - Initial Presentation (> 7 Days Post-injury)
 - Management of Symptoms Persisting > 7 Days After mTBI

Algorithms



Recommendations



- Setting of Care
- Diagnosis and Assessment
- Overall Care Management
- Counseling on Neurocognitive Decline
- Effects of mTBI on Treatment
- Symptom-based Management
- mTBI Specific Interventions

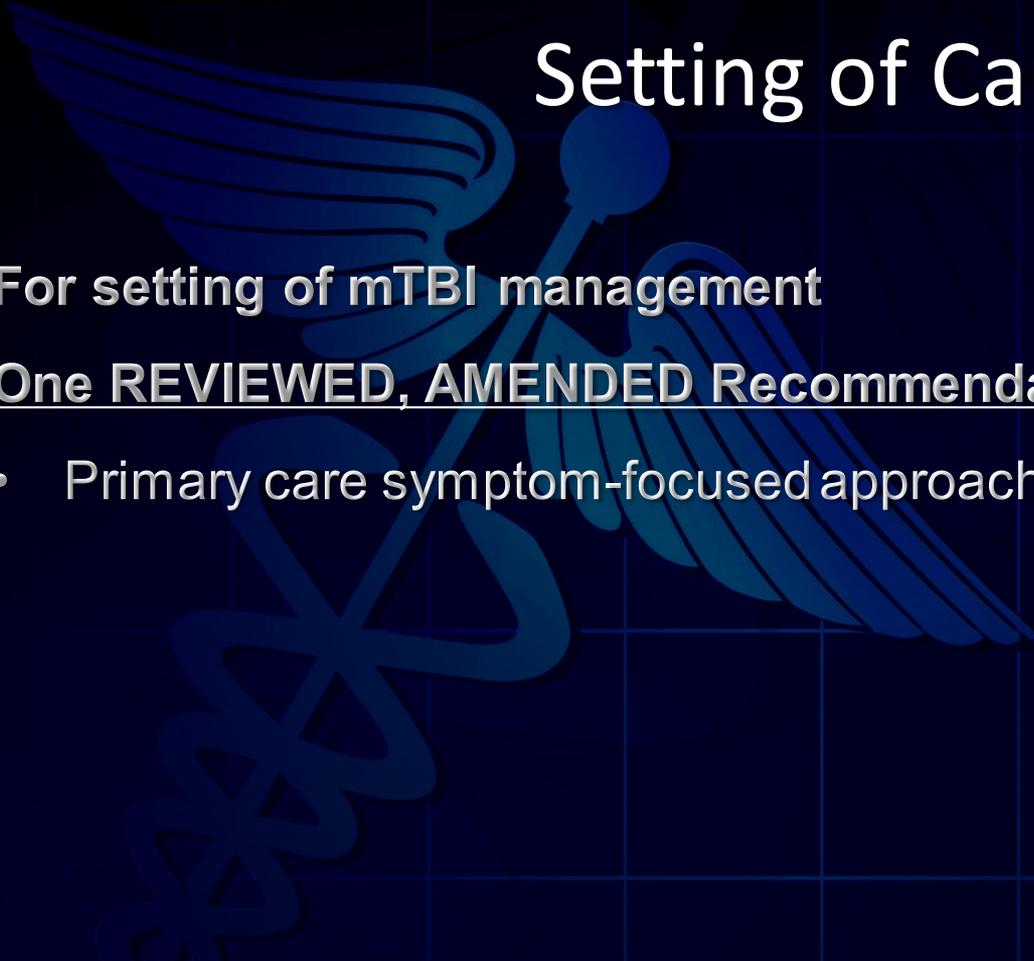
Diagnosis and Assessment

For Initial assessment and management

Four REVIEWED, AMENDED/NOT CHANGED Recommendations

- Suggest *against* for the diagnosis of mTBI:
 - Neuro-imaging, laboratory, & physiologic testing
 - Computerized post-concussive screening batteries
- Suggest *against* neuropsychological testing during first 30 days after mTBI
- Recommend symptom-specific assessment for new symptoms developing >30 days after mTBI

Setting of Care

A large, stylized blue caduceus logo is positioned in the background, centered behind the text. It features a central staff with two snakes entwined around it, and a pair of wings extending from the top. The logo is semi-transparent and serves as a decorative element.

For setting of mTBI management

One REVIEWED, AMENDED Recommendation

- Primary care symptom-focused approach

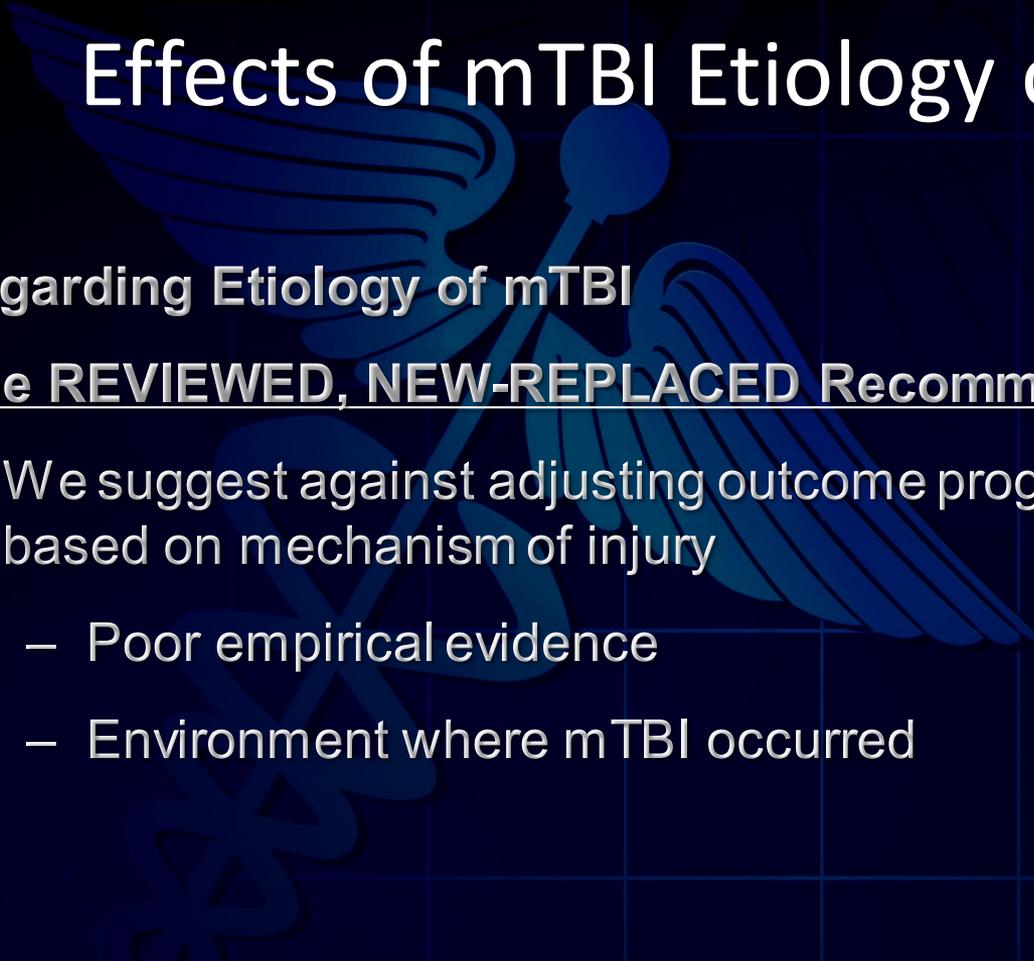
Overall Care Management

For overall approach to mTBI management

Two REVIEWED, AMENDED/NEW-REPLACED Recommendations

- Evidence supports a symptom-focused approach
- Evidence was inconclusive to state specialized treatment programs:
 - Decrease morbidity
 - Improve function
 - Improve return to work

Effects of mTBI Etiology on Treatment



Regarding Etiology of mTBI

One REVIEWED, NEW-REPLACED Recommendation

- We suggest against adjusting outcome prognosis and treatment strategy based on mechanism of injury
 - Poor empirical evidence
 - Environment where mTBI occurred

Counseling about Future Neurocognitive Decline

Two REVIEWED, NEW-ADDED RECOMMENDATIONS

- Insufficient evidence to state that single or repeated mTBI increases risk
- Insufficient evidence to state that demographic, injury-related clinical and management factors increase risk

Symptom-based Treatments

For Behavioral Health Conditions

One REVIEWED, NEW-REPLACED Recommendations

- Evaluate the same whether they have had mTBI or not.
- Manage according to existing VA/DoD CPGs for PTSD, MDD SUD, Risk for Suicide, etc.

Symptom-based Treatments

For COGNITIVE Symptoms

One REVIEWED, AMENDED Recommendation

- Refer for a short trial of clinician directed cognitive rehabilitation services.

One REVIEWED, NEW-ADDED Recommendation

- Suggest against the use of self-administered computer training programs.

Symptom-based Treatments

For Vestibular and Proprioceptive Symptoms

One Reviewed, New-replaced Recommendation

- Refer for trial of vestibular and proprioceptive therapeutic exercise for symptoms of dizziness and imbalance.

Symptom-based Treatments

For Visual Symptoms and Tinnitus

Two REVIEWED, AMENDED Recommendations

- Insufficient evidence to suggest for or against any particular treatment modality.

For Exertion-induced symptoms/symptom clusters

One REVIEWED, NEW-REPLACED Recommendation

- Insufficient evidence to suggest for or against any particular treatment modality.

mTBI Interventions

Using Complementary and Integrative Health

One REVIEWED, NEW-ADDED Recommendation

- Insufficient evidence to suggest for or against any particular treatment modality.

Using Hyperbaric Oxygen (HBOT) and/or repetitive Transcranial Magnetic Stimulation (rTMS)

Two REVIEWED, NEW-ADDED Recommendations

- Recommend (HBOT)/Suggest (rTMS) against use.



CASE STUDY PATIENT

History: Injury

- A 29-year-old service member comes into primary care clinic with complaints of headache and insomnia 3 weeks after experiencing a 10-foot fall from a ropes course. He comes in for relatively persistent posterior headaches. He notes sleeping ~3-4 hours nightly. He is having some difficulty with his day-to-day military duties and has been asked to seek care.
- He reports remembering beginning the obstacle course and then next recalling being back in his home on base. He does not recall a fall but does have aching in his neck and shoulders. Fellow SM's noted that he lost his grip on the rope of a climbing wall, fell to the ground and got up in ~15 seconds saying, "I'm all right." He reportedly completed the remainder of the obstacle course. He did not seek any medical care and has resumed his normal activities.

History: Symptoms and Prior Issues

- PMH is significant for chronic knee pain, a h/o of an OEF blast-related TBI 10 years earlier with PTSD that resolved with counseling. He was on no scheduled medications but has begun using some of his knee pain medications (Percocet, NSAID, Tylenol) for his headaches daily. He had previously used EtOH socially but has noted an increase to daily usage to reduce his headaches. He reports that he vapes (tobacco) daily.
- Today, he notes that the headaches are persistent but vary in intensity, are primarily bi-occipital in location, and are occasionally associated with seeing flashes of light. He also admits to some intermittent dizziness with exertion at work, irritability with his spouse and intermittent memory difficulties (getting lost driving).

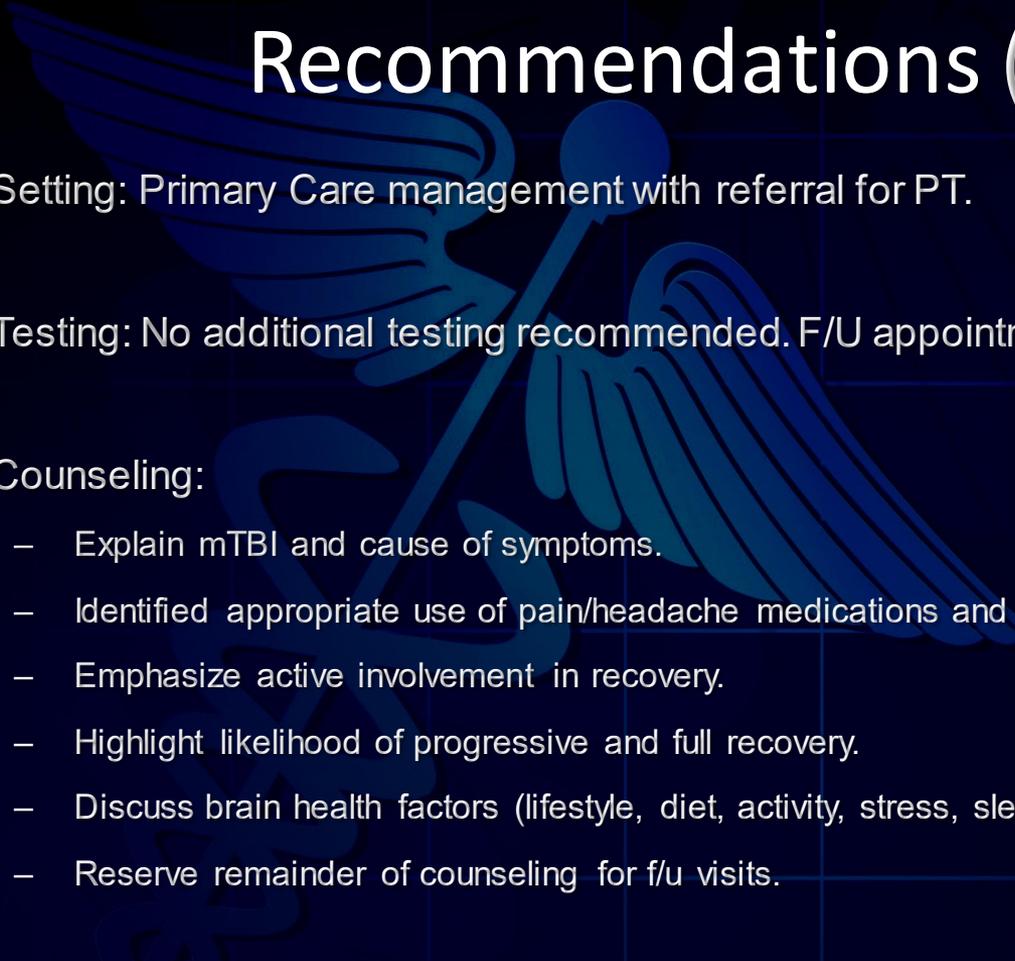
Examination

- General: Normal organ system examination. H/A bi-occipital pain VAS 4/10.
- Neurologic: Alert, O x 4. Fluent speech. Intact naming. Able to follow 3-step commands well. Normal attention and STM at 0, 1 and 5 minutes. Recalls 8 numbers forward and 6 number backward. Serial 7's x 8. Spells WORLD front/back. Intact abstract thinking. Intact judgment.
- Motor/Balance: Intact gross and fine motor, but mild past pointing with bilateral UE's FTN, associated with worsened bifrontal headaches and dizziness. Mild post-cervico-occipital pain and stiffness. Mild abnormalities on Berg Balance Study with eyes closed. Worsened symptoms with eye tracking testing.
- Function: Able to perform all home and community ADLs and mobility without assistance. Able to perform all military duties but limited endurance after 3-4 hours with worsened H/A, dizziness, memory deficits and irritability.

Recommendations (Overview)

- Assessment: This individual sustained a mild TBI that went undiagnosed. He has mild, persistent symptoms that are common for concussion. His history and examination are c/w musculoskeletal insult (headache pain), cervico-occulo-vestibular difficulties (dizziness, eye tracking), somatic complaints (insomnia) and neurobehavioral difficulties (irritability).
- Red flags are 1) delayed access to care, 2) persistent symptoms, 3) medication misuse, and 4) EtOH usage.
- Yellow flags are 1) prior mTBI, and 2) h/o PTSD.
- Plan: Education, Sleep Hygiene, PT for neck care/vestibular care, Identify graded approaches to work completion

Recommendations (Specifics)



- Setting: Primary Care management with referral for PT.
- Testing: No additional testing recommended. F/U appointment in 2-3 weeks.
- Counseling:
 - Explain mTBI and cause of symptoms.
 - Identified appropriate use of pain/headache medications and modalities.
 - Emphasize active involvement in recovery.
 - Highlight likelihood of progressive and full recovery.
 - Discuss brain health factors (lifestyle, diet, activity, stress, sleep, productivity).
 - Reserve remainder of counseling for f/u visits.

Recommendations (Applying the CPGs)

1.	We suggest a primary care (as opposed to specialty care), symptom-focused approach in the evaluation and management of the majority of patients with symptoms attributed to mild traumatic brain injury.
2.	There is insufficient evidence to recommend for or against specialized treatment programs to improve morbidity, function, and return to work in patients with persistent symptoms attributed to mild traumatic brain injury.
3.	For patients with new symptoms that develop more than 30 days after mild traumatic brain injury, we suggest a symptom-specific evaluation for non-mild traumatic brain injury etiologies.
4.	We suggest against using the following tests to establish the diagnosis of mild traumatic brain injury or direct the care of patients with symptoms attributed to mild traumatic brain injury: a. Neuroimaging b. Serum biomarkers c. Electroencephalogram
5.	We suggest against using computerized post-concussive screening batteries* or comprehensive neuropsychological testing for routine diagnosis and care of patients with symptoms attributed to mild traumatic brain injury.
6.	We suggest against performing comprehensive neuropsychological/cognitive testing during the first 30 days following mild traumatic brain injury.
13.	We suggest that patients with persistent symptoms of dizziness and imbalance attributed to mild traumatic brain injury be offered a trial of specific vestibular rehabilitation and proprioceptive therapeutic exercise.

Recommendations (Follow-Up)

- Progress: Individual began PT and initiated HEP. At 3 weeks, he had a decrease in headaches with scheduled acetaminophen, local heat and improved sleep. He also noted improved dizziness and memory. He noted improved irritability but increasing anxiety symptoms.
- Testing: Repeat general examination. No additional testing recommended. F/U in 4-6 weeks
- Setting: Primary Care management with referral to mental health counselor.
- Counseling:
 - Explain linkage between this mTBI and anxiety/PTSD symptoms.
 - Discuss brain health factors (lifestyle, diet, activity, stress, sleep, productivity).

Recommendations (Applying the CPGs)

10.	We suggest that patients with symptoms attributed to mild traumatic brain injury who present with memory, attention, or executive function problems despite appropriate management of other contributing factors (e.g., sleep, pain, behavioral health, headache, disequilibrium) should be referred for an evaluation and a short trial of clinician-directed cognitive rehabilitation services.
11.	We suggest against the use of self-administered computer training programs for the cognitive rehabilitation of patients with symptoms attributed to mTBI.
12.	We suggest that patients with symptoms attributed to mild traumatic brain injury who present with behavioral health conditions, including posttraumatic stress disorder, substance use disorders, and mood disorders, be evaluated and managed the same whether they have had mild traumatic brain injury or not, according to the relevant existing VA/DoD clinical practice guidelines.

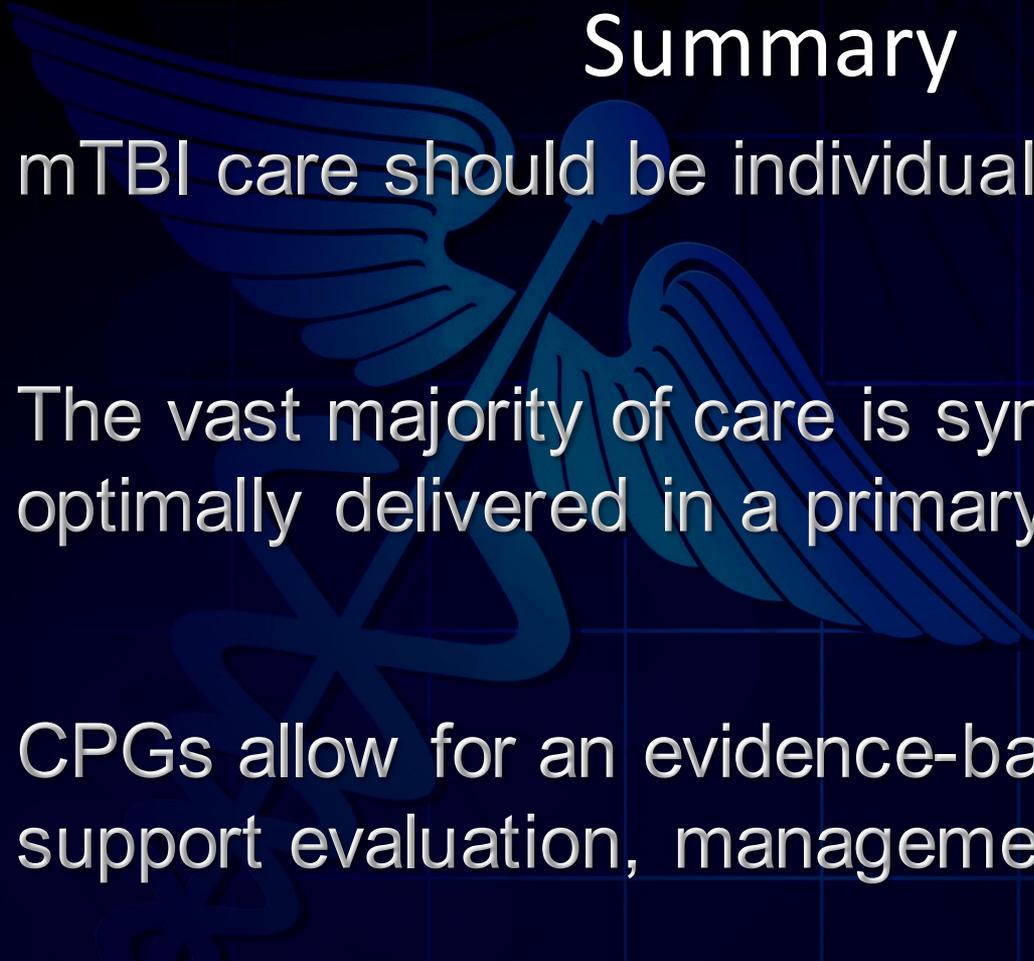
Recommendations (Follow-Up)

- Progress: Individual completed PT and graduated to self-exercises with good success. He has rare headaches that are controlled with non-pharmacologic care. His behavioral issues are improved, and he is seeing a counselor ~1x/month. He has returned to full work. He has questions regarding additional treatments for his injury, because he is concerned about long-term worsening.
- Testing: No additional testing recommended. F/U in 12 weeks
- Setting: Primary Care management with no additional referrals
- Counseling:
 - Provide overview of long-term issues and role of a range of other treatments.
 - Discuss brain health factors (lifestyle, diet, activity, stress, sleep, productivity).

Recommendations (Applying the CPGs)

7.	When counseling patients about the long-term effects of mTBI, there is insufficient evidence to state that single or repeated mTBI increases their risk of future neurocognitive decline.
9.	When counseling patients about the long-term effects of mTBI, there is insufficient evidence that demographic, injury-related clinical, and management factors increase the risk of future neurocognitive decline in patients with symptoms attributed to single or repeated mild traumatic brain injury.
9.	We suggest against adjusting outcome prognosis and treatment strategy based on mechanism of injury.
17.	There is insufficient evidence to recommend for or against the use of any of the following interventions for the treatment of patients with symptoms attributed to mild traumatic brain injury: Acupuncture Tai chi Meditation Mindfulness Yoga Massage Chiropractic therapy Cranial electrotherapy stimulation (CES) Sensory deprivation tanks
18.	We recommend against the use of hyperbaric oxygen therapy for the treatment of patients with symptoms attributed to mild traumatic brain injury.
19.	We suggest against the use of repetitive transcranial magnetic stimulation for the treatment of patients with symptoms attributed to mild traumatic brain injury.

Summary



- mTBI care should be individualized and integrative.
- The vast majority of care is symptom-based and optimally delivered in a primary care setting.
- CPGs allow for an evidence-based structure to support evaluation, management and counseling.

Questions

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