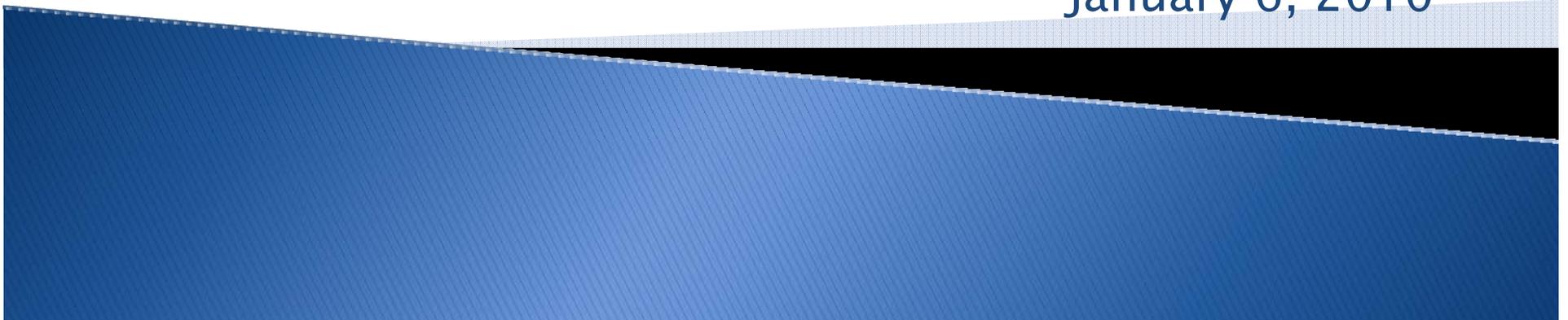


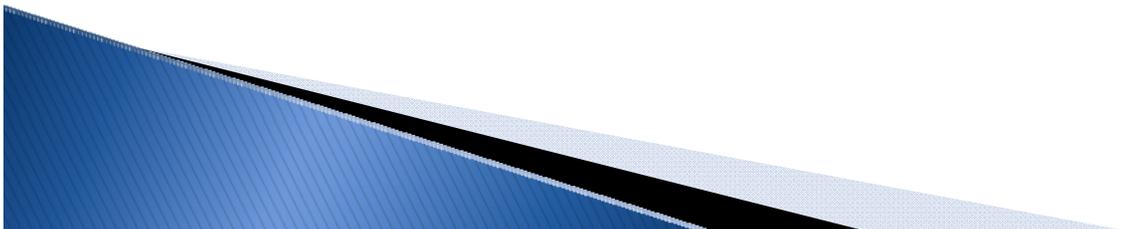
Opinions of the Expert Panel on Traumatic Brain Injury and Commercial Motor Vehicle Driver Safety

Presented to the
Federal Motor Carrier Safety Administration
and the
Medical Review Board
January 6, 2010



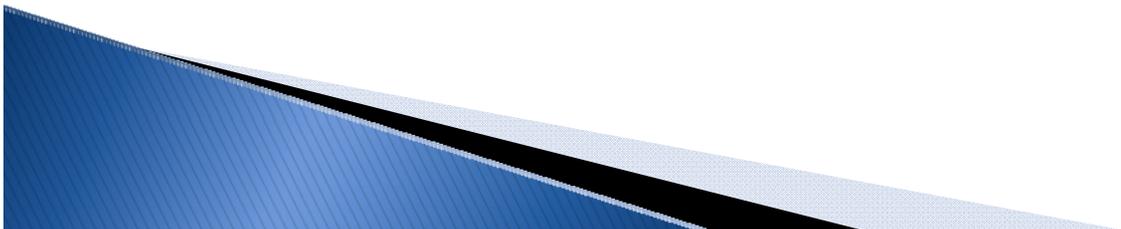
Panel Members

- ▶ **Natalie P. Hartenbaum, MD, MPH, FACOEM**
 - President and Chief Medical Officer of OccuMedix, Inc, Dresher, PA and faculty University of Pennsylvania
- ▶ **Jack Hasting, MD**
 - Certified Aviation Medical Examiner – Federal Aviation Administration, Tulsa, OK
- ▶ **Margit Bleecker, MD, PhD**
 - Director, Center for Occupational and Environmental Neurology, Baltimore, MD
- ▶ **Steven Mandel, MD, FAADEP**
 - Clinical Professor of Neurology, Thomas Jefferson University, Philadelphia, PA



Process

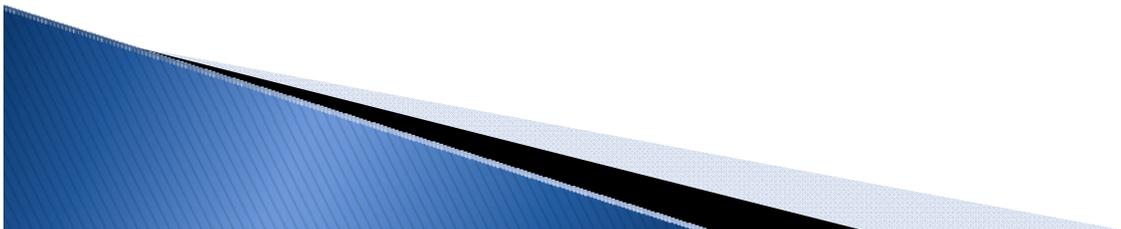
- ▶ Review existing standards and guidelines for medical examiners on certification and recertification of individuals with TBI
- ▶ Discuss finding of the Evidence Report and other sources
- ▶ Provide expert opinion regarding changes to the existing FMCSA guidelines
 - following the critical assessment of the available evidence



Key Question 1

What is the impact of traumatic brain injury on crash risk/driving performance?

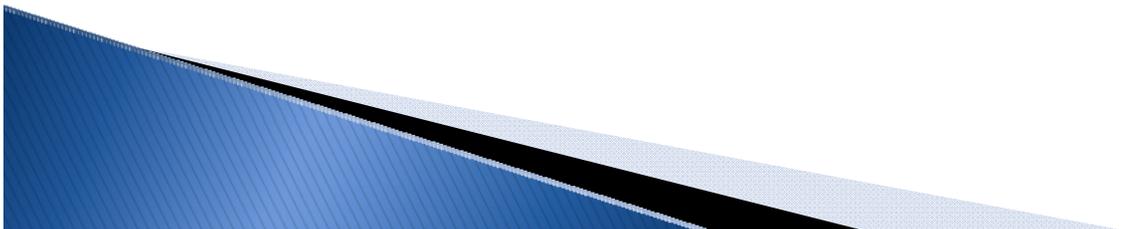
- ▶ Insufficient evidence to determine whether crash risk is elevated for drivers with TBI compared with uninjured controls.
 - Driving performance as measured by on-road driving tests and driving simulators was significantly impaired among individuals with TBI compared with uninjured controls.
 - (Strength of Evidence: Moderate)



Key Question 2

What factors associated with traumatic brain injury are predictive of increased crash risk or poor driving performance?

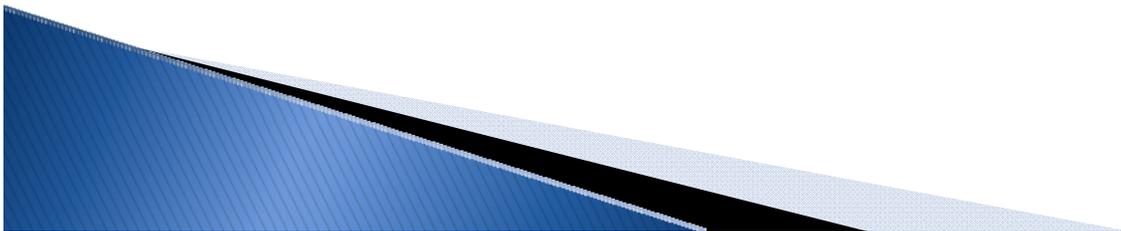
- ▶ **Insufficient evidence to determine whether any factors related to TBI can predict crash risk**
 - Current evidence suggests that cognitive function measured by certain neuropsychological tests may predict the outcome of driving performance measured by a road test for patients with TBI.
 - (Strength of Evidence: Moderate)



Key Question 3

What is the impact of rehabilitation programs on crash risk/driving performance among individuals with a traumatic brain injury?

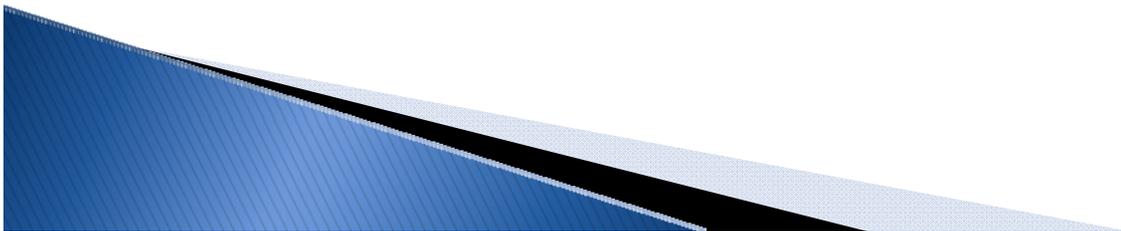
- ▶ **Insufficient evidence to determine the impact of rehabilitation programs on crash risk or driving performance among individuals with TBI**



Key Question 4

What is the likelihood of a future seizure among individuals with a traumatic brain injury who did not experience a seizure at the time of the injury?

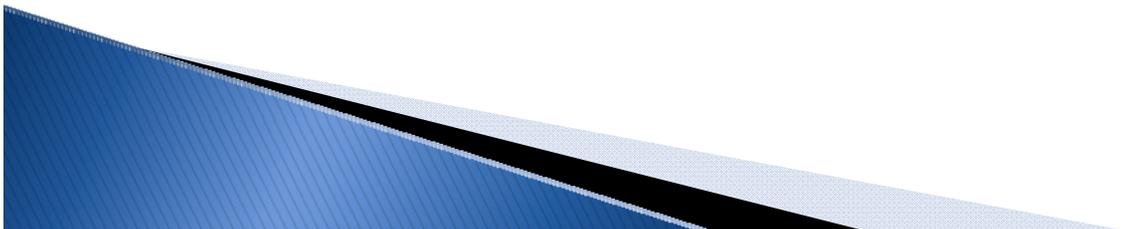
- ▶ Individuals with TBI who do not have a seizure in the first week post-injury still have a significant likelihood of experiencing late seizure(s)
 - (Strength of Evidence: Moderate)
 - Highest rate of late seizures was associated primarily with penetrating missile TBIs
 - (Strength of Evidence: Minimally Acceptable)



Key Question 4

What is the likelihood of a future seizure among individuals with a traumatic brain injury who did not experience a seizure at the time of the injury?

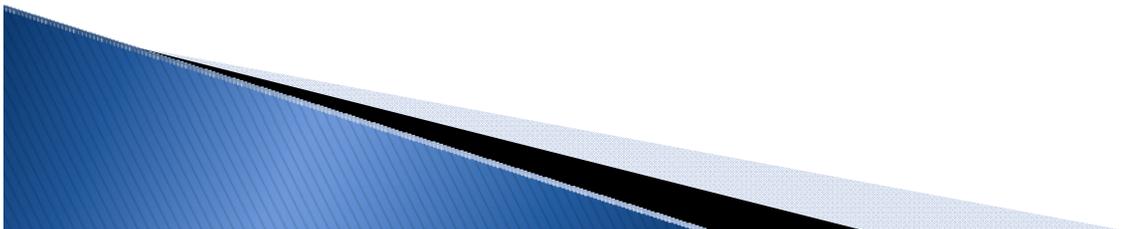
- ▶ In those with closed TBIs, severe TBI associated with higher frequencies of first-time late seizures than diagnoses of mild or moderate TBI.
 - (Strength of Evidence: Minimally Acceptable)
- ▶ Among adults with moderate or severe TBI who develop late seizures, $\geq 50\%$ experience their first late seizure within the first year
 - Rates fall substantially within the next two years and stabilize after the third year



Key Question 4

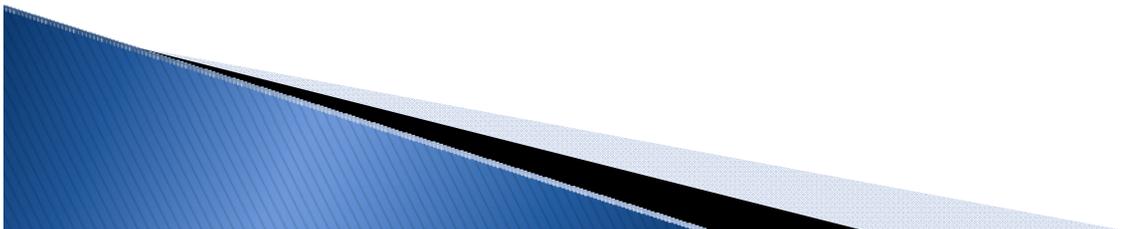
What is the likelihood of a future seizure among individuals with a traumatic brain injury who did not experience a seizure at the time of the injury?

- ▶ **Pattern for mild TBI less clear**
 - Rate of late seizure development does not appear much higher in the first year compared with subsequent years.
 - (Strength of Evidence: Minimally Acceptable)



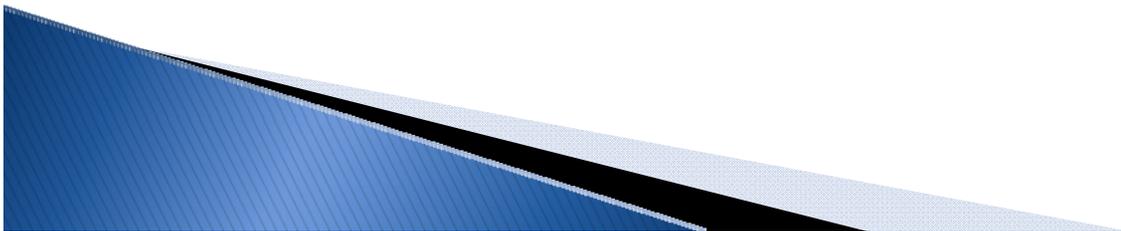
Classification of Severity of TBI

- ▶ Mild: 0–30 minutes of LOC/AOC,PTA
- ▶ Moderate: 30 minutes–24 hours LOC/AOC/PTA, or skull fracture AND 0–30 minutes of LOC/AOC,PTA
- ▶ Severe: > 24 hours of LOC/AOC, PTA
 - LOC – loss of consciousness
 - AOC – alteration of Consciousness
 - PTA – post-traumatic amnesia



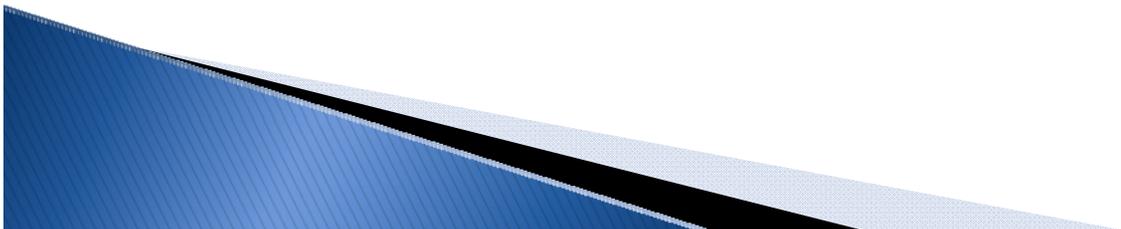
Opinion 1: Severe TBI and CMV Driver Certification

- ▶ Individuals who have sustained a penetrating injury to the brain or severe TBI (i.e., loss of consciousness \geq 24 hours) should be permanently precluded from obtaining certification to drive a CMV for the purposes of interstate commerce.



Opinion 1: Severe TBI and CMV Driver Certification – Justification

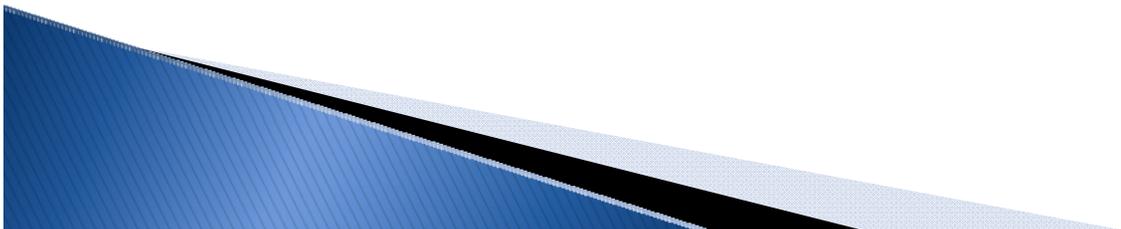
- ▶ TBIs often result in permanent or temporary impairments, particularly in cases of severe TBI
 - Cognitive, psychosocial, sensory, and motor functioning,
- ▶ These impairments may contribute to an increased likelihood of a motor vehicle crash
- ▶ Increased likelihood that an individual will experience a seizure following a TBI



Opinion 1: Severe TBI and CMV Driver Certification

Additional Comments

- ▶ *There may be a few exceptional cases of severe or penetrating TBI in which consideration might be possible*
 - *Specific characteristics of these individuals remain unclear and, therefore, the MEP refrains from providing guidance on this at this time.*

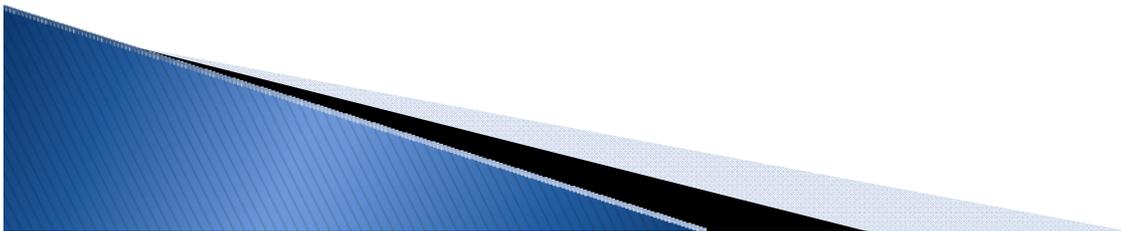


Opinion 1: Severe TBI and CMV Driver Certification Additional Comments

- ▶ *Seizure risk following surgical penetration of dura discussed*
 - *Assigning risk to seizures after craniotomy very difficult*
 - *Risk dependent on many factors*
 - *Type and location of the surgery*
 - *Underlying reason for the surgery*
 - *Outside scope of the Evidence Report*
 - *MEP recommends FMCSA investigate this issue and evaluate the risk of seizures associated with specific types of craniotomy and update guidance on this accordingly*
- 

Opinion 2: Moderate TBI and CMV Driver Certification

- ▶ Individuals with moderate TBI should be precluded from obtaining certification to drive a CMV for the purposes of interstate commerce for three years
- ▶ After 3 year wait, must then be cleared by treating provider (minimum qualifications of MD or DO)



Opinion 2: Moderate TBI and CMV Driver Certification

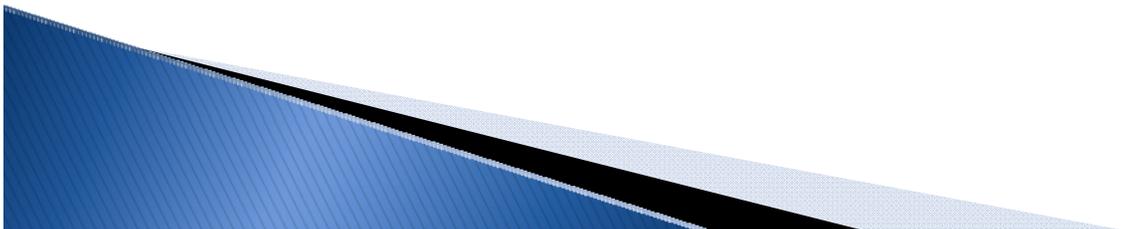
The treating provider should assess for the following symptoms of concern:

- ▶ Headaches;
- ▶ Irritability;
- ▶ Dizziness;
- ▶ Imbalance;
- ▶ Fatigue;
- ▶ Sleep disorders;
- ▶ Inattention;
- ▶ Decreased concentration and memory;
- ▶ Noise and light sensitivity;
- ▶ Thinking slowed;
- ▶ Difficulty recalling new material;
- ▶ Personality change;
- ▶ Difficulty starting or initiating things;
- ▶ Difficulty sequencing information;
- ▶ Impaired attention to details;
- ▶ Impaired ability to benefit from experience;
- ▶ Deficits in planning and carrying out activities.



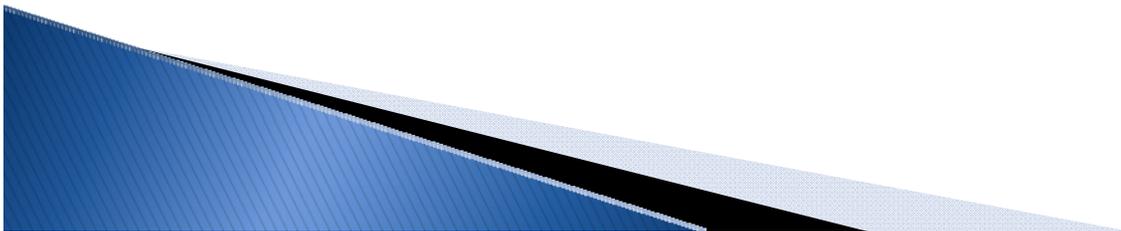
Opinion 2: Moderate TBI and CMV Driver Certification

- ▶ If seizure occurred during waiting period, follow current FMCSA Guidance for individuals with a seizure disorder
- ▶ If cleared by treating provider then evaluation by neurologist who is aware of the functional and cognitive requirements of operating a CMV



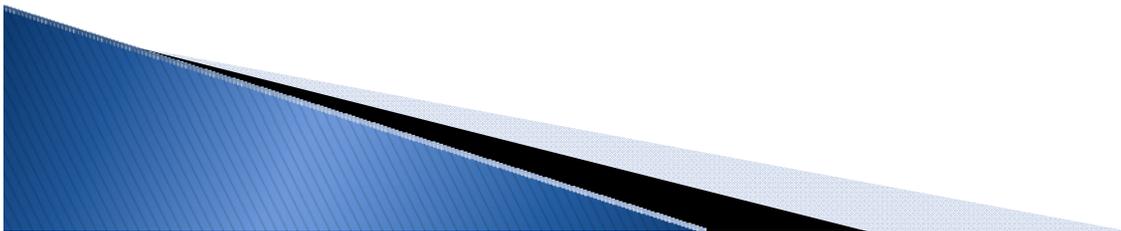
Opinion 2: Moderate TBI and CMV Driver Certification

- ▶ Additional evaluation by neurologist should;
 - Include complete neurological assessment
 - Assess motor speed and dexterity, cognitive function, and symptoms of depression through objective testing
 - Referral to a neuropsychologist, psychologist or other specialist as deemed appropriate based on the specific symptoms



Opinion 2: Moderate TBI and CMV Driver Certification

- ▶ Following cognitive domains should be assessed (suggested assessment tools listed):
 - Verbal memory and verbal learning
 - (Hopkins Verbal Learning Test);
 - Visual scanning, visual motor speed
 - (Trail Making Test A);
 - Cognitive flexibility, executive function
 - (Trail Making Test B);
 - Word fluency
 - (COWAT – Controlled Oral Word Association Test);



Opinion 2: Moderate TBI and CMV Driver Certification

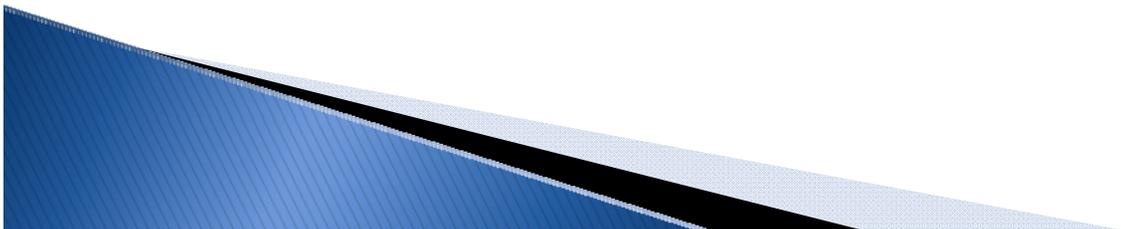
- ▶ Following cognitive domains should be assessed (suggested assessment tools listed)

cont.:

- Attention
 - (Digit Span forward);
- Working memory
 - (Digit Span backward);
- Visual scanning, visual motor speed, visual memory
 - (Symbol Digit Modalities);
- Motor speed and dexterity
 - (Grooved Pegboard Test);
- Delayed recall
 - (Hopkins Verbal Learning Test).

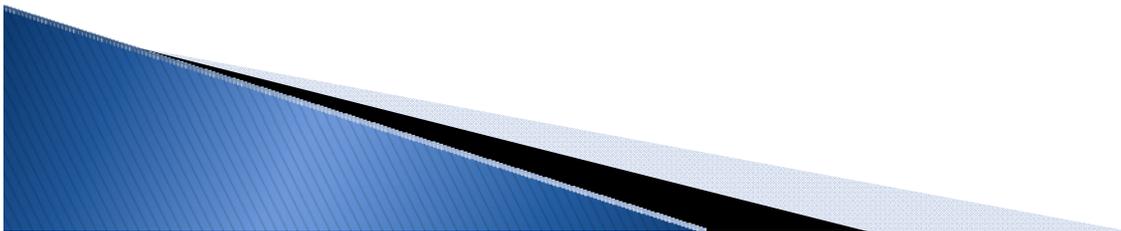
Opinion 2: Moderate TBI and CMV Driver Certification

- ▶ Neurologist and CDME should assess the effects of treatment, including medications, on functional and cognitive abilities
- ▶ Drivers with no or minimal abnormalities who are cleared should be re-certified every six months while under active treatment
 - Examiner should be MD/ DO
- ▶ Once no longer under active treatment annual recertification for three years and then as determined by the medical examiner



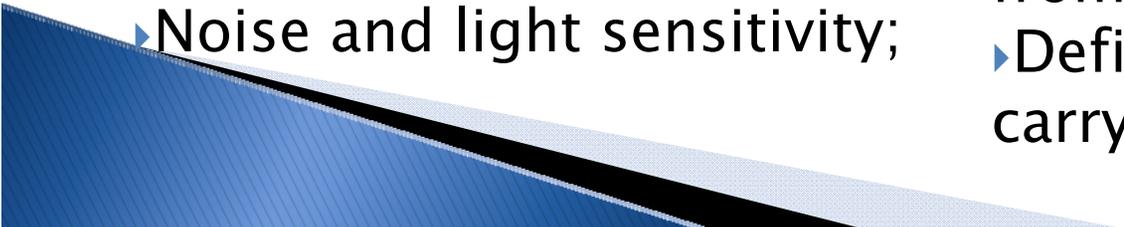
Opinion 3: Mild TBI and CMV Driver Certification

- ▶ Individuals with mild TBI can be deemed medically qualified if they are determined by their treating provider (minimum qualifications of MD/DO) to be clinically symptom free
- ▶ No LOC – 30 day waiting period
- ▶ LOC – 90 day waiting period to ensure remain symptom free



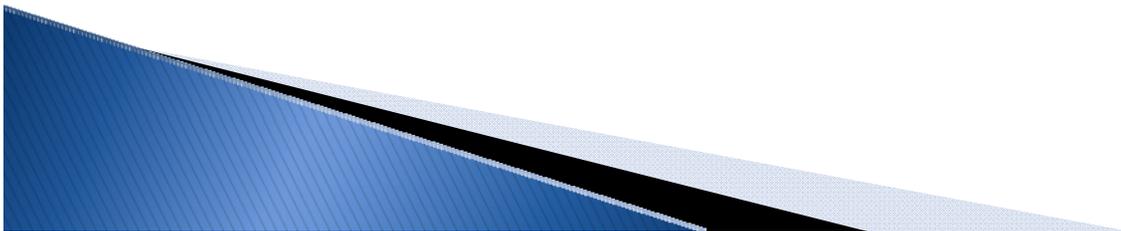
Opinion 3: Mild TBI and CMV Driver Certification

• Individuals with mild TBI should be free of the following symptoms of concern before they are qualified :

- ▶ Headaches;
 - ▶ Irritability;
 - ▶ Dizziness;
 - ▶ Imbalance;
 - ▶ Fatigue;
 - ▶ Sleep disorders;
 - ▶ Inattention;
 - ▶ Decreased concentration and memory;
 - ▶ Noise and light sensitivity;
 - ▶ Thinking slowed;
 - ▶ Difficulty recalling new material;
 - ▶ Personality change;
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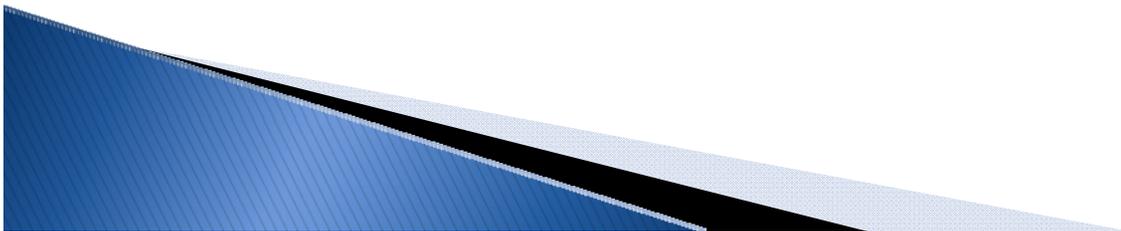
Opinion 3: Mild TBI and CMV Driver Certification

- ▶ Seizure free
- ▶ No evidence of intracranial blood if imaging was done
- ▶ Individuals, who have experienced a mild TBI and lost consciousness as a result of the TBI and/or are found to be symptomatic at the time of the exam, should be referred to a neurologist for additional evaluation
 - Evaluation should be the same as for those who have experienced a moderate TBI



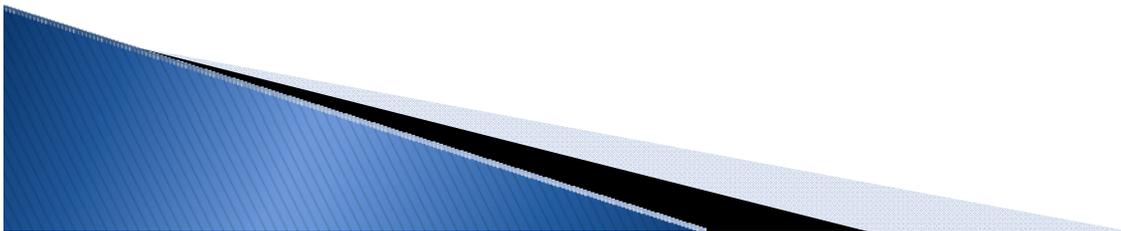
Opinion 3: Mild TBI and CMV Driver Certification – Justification

- ▶ Issues discussed earlier
- ▶ Waiting period as symptoms of concern following mild TBI may not be immediately
 - More severe the injury, greater risk of symptoms development
 - If loss of consciousness should have evaluation by specialist prior to returning to safety sensitive work



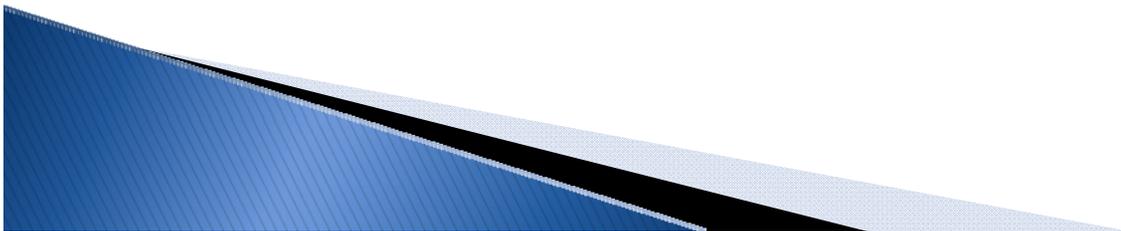
Opinion 4: Anti-Seizure Medication and CMV Driver Certification

- ▶ Individuals placed on anti-seizure medication following a single provoked seizure or are placed on anti-seizure medication prophylactically should not be medically qualified to drive a CMV until they meet the current FMCSA criteria for individuals taking anti-seizure medication



Opinion 5: Extremity Impairment and CMV Driver Certification

- ▶ Individuals who meet earlier criteria for certification after TBI and whose only residual deficit s impairment of an extremity may be eligible for a skill performance evaluation certificate and should be referred to apply for one if otherwise medically qualified



Opinion 6: TBI and CDME Qualifications

- ▶ It is the opinion of the MEP that due to the risk of seizures and neurological and cognitive dysfunction after a TBI, physicians (MD or DO) should perform the commercial driver medical examination on those individuals who have sustained a TBI

