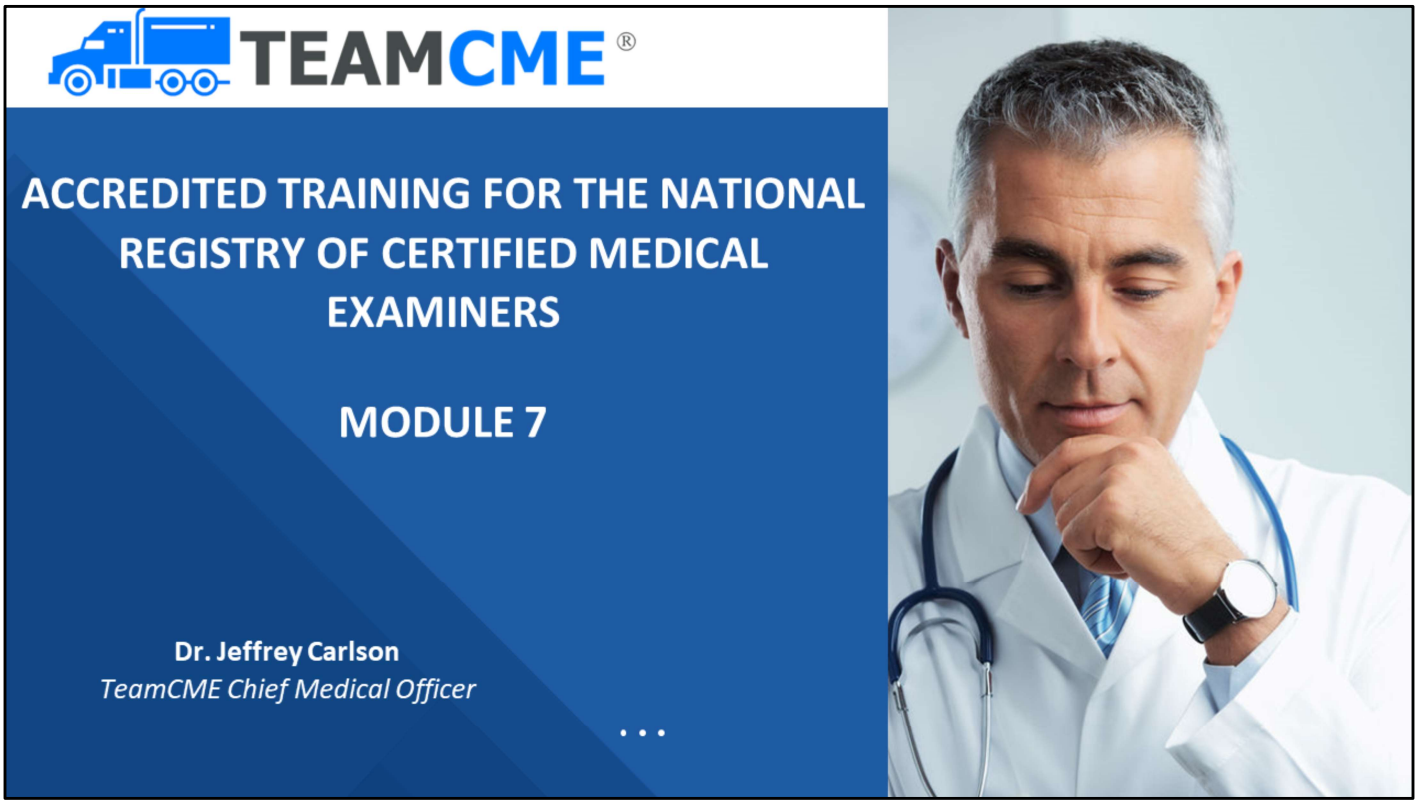



Welcome to the TeamCME accredited training for the national registry of certified medical examiners. This is Module 7.

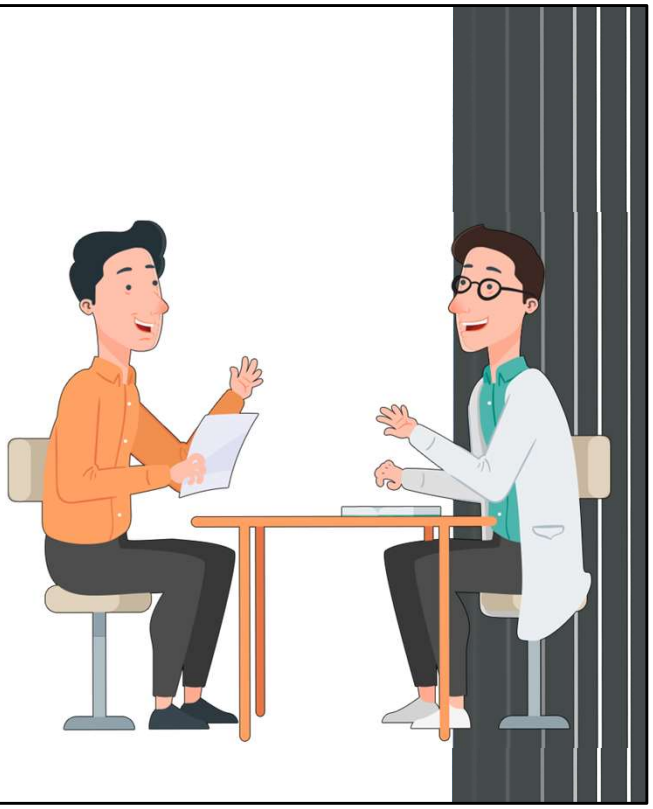
TEAMCME®

# NEUROLOGICAL CONDITIONS

## Neurological Exam

**Examine for:**

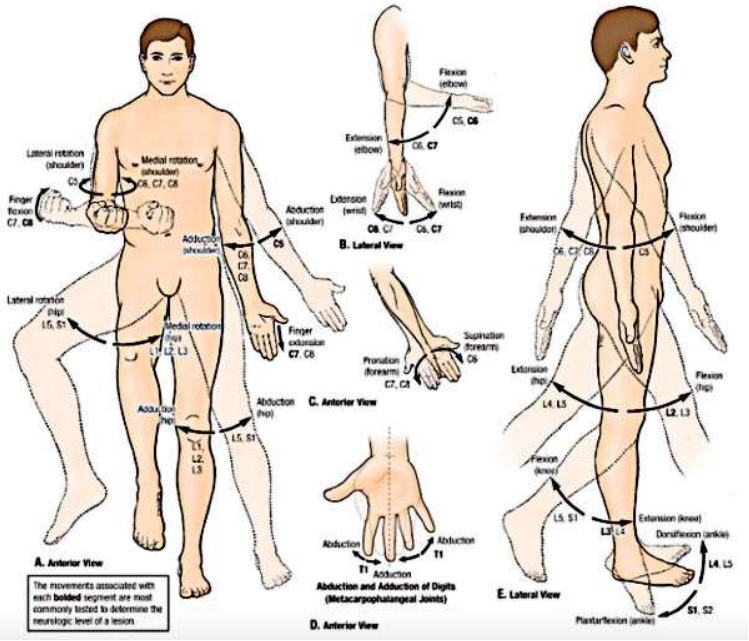
- Compromised equilibrium, coordination, speech pattern
- Asymmetrical deep tendon reflexes
- Abnormal patellar and Babinski reflexes
- Sensory abnormalities
- Position sense abnormalities
- Ataxia



During the examination, check for compromised equilibrium, coordination and speech pattern. Check the deep tendon reflexes, patellar and Babinski reflexes. Look for sensory abnormalities, loss of position sense, and the presence of ataxia.

TEAMCME®

## NERVE ROOTS & MYOTOMES




- **C5** – Deltoid; Abduction of the arm at the shoulder, Elbow flexion
- **C6** – Biceps; Flexion of the arm at the elbow, wrist extension
- **C7** – Triceps; Elbow extension
- **C8** – Small finger muscles; Finger flexion
- **T1** – Finger abduction
- **L2** – Hip flexion
- **L3** – Knee extension
- **L4** – Quadriceps; Extension of the leg at the knee, Ankle dorsiflexion
- **L5** – Tibialis anterior; Upward flexion of the foot at the ankle, great toe extension
- **S1** – Gastrocnemius; Ankle plantarflexion

On the NRCME test, there may be one or more questions you will need to know the nerve root that controls certain muscles or regions of the body. The question could be in regards to the findings of a deep tendon reflex, such as the patellar reflex, and want to know what part of the spine you would be concerned about. Or a question could mention either the spasticity or weakness of a specific muscle group. For example, if you noticed drop foot on exam, which part of the spine might be involved?


SEIZURES

## Seizures & Epilepsy: Non-Discretionary

The following drivers cannot be qualified:

- A driver who has a medical history of epilepsy or a seizure disorder, unless the driver is both off antiseizure medication and seizure free for 10 years or more
- A driver who has a current clinical diagnosis of epilepsy or a seizure disorder
- A driver who is taking antiseizure medication to prevent seizures

The following drivers cannot be qualified:

- A driver who has a medical history of epilepsy or a seizure disorder, unless the driver is both off antiseizure medication and seizure free for 10 years or more
- A driver who has a current clinical diagnosis of epilepsy or a seizure disorder
- A driver who is taking antiseizure medication to prevent seizures

## Single Unprovoked Seizure

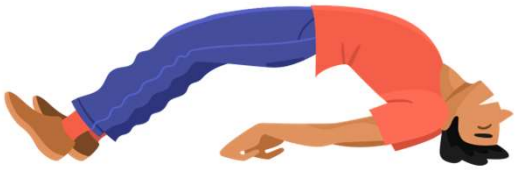
- Cause is unknown or no clear provoking trigger
- Risk of reoccurrence after five years is low

**Reoccurrence Risk Factors:**

- History of remote neurological insult (i.e., stroke)
- Abnormalities on an electroencephalogram (EEG)
- Focal structural lesion on neuroimaging
- A family history of epilepsy

**Waiting Period:** 5 years, seizure and anticonvulsant medication free

*A second unprovoked seizure, regardless of the elapsed time between seizures, may constitute a medical history or diagnosis of epilepsy.*



A single unprovoked seizure that occurs in the absence of an identifiable acute alteration of metabolic function or insult in brain structure, even though there may be a known or distant cause, has a higher risk of future seizures. Reoccurrence occurs 36% of the time within five years. After five years there is a significant drop in risk to only 2 to 3% per year. The waiting period for a driver who has had a single unprovoked seizure is five years seizure free and off anticonvulsant medication. Risk factors for seizure recurrence include a history of remote neurological insult (i.e., stroke), abnormalities on an electroencephalogram (EEG), focal structural lesion on neuroimaging, and a family history of epilepsy. A second unprovoked seizure, regardless of the elapsed time between seizures, may constitute a medical history or diagnosis of epilepsy.

## Single Provoked Seizure (known cause)

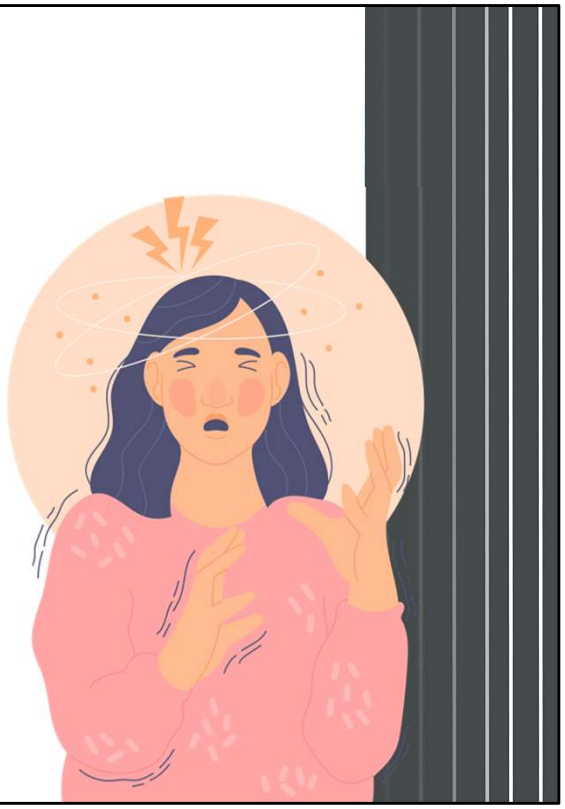
A provoked, non-epileptic seizure or loss of consciousness resulting from:

- A drug reaction
- Withdrawal from alcohol or illicit drug
- High temperature
- Acute infectious disease
- Dehydration
- Acute metabolic disturbance
  - ➢ Hypernatremia or hyponatremia, hypocalcemia, hypoglycemia, hypomagnesemia, hypokalemia, and hyperkalemia

*Certification should be deferred until fully recovered, no residual complication and not taking anti-seizure medication.*

**Certify If:**

- Driver has fully recovered
- No residual complications
- Anti-seizure medication is not required
- Seizure recurrence is unlikely



A single provoked seizure is the result of a known trigger such as from a drug reaction, a high temperature, an acute infection, dehydration, or an acute metabolic disturbance such as hypernatremia or hyponatremia, hypocalcemia, hypoglycemia, hypomagnesemia, hypokalemia, and hyperkalemia. The driver's certification should be deferred until they have fully recovered, have no residual complications and are not taking anti-seizure medication. The driver can be certified if they have a normal neurological exam, and no anti-seizure medication is required.

## Childhood Febrile Seizures

- Occur in children between ages 6 months and 5 years
- Fever often stemming from infection
- Unlikely to cause seizures or residual side effects in adulthood

**Certify If:**

Seizure history is limited to childhood febrile seizures

Childhood febrile seizures occur in children between ages 6 months and 5 years. Fever often stems from an infection. Childhood febrile seizures are unlikely to cause seizures or residual side effects in adulthood.

## Epilepsy

Epilepsy is characterized by seizures without warning

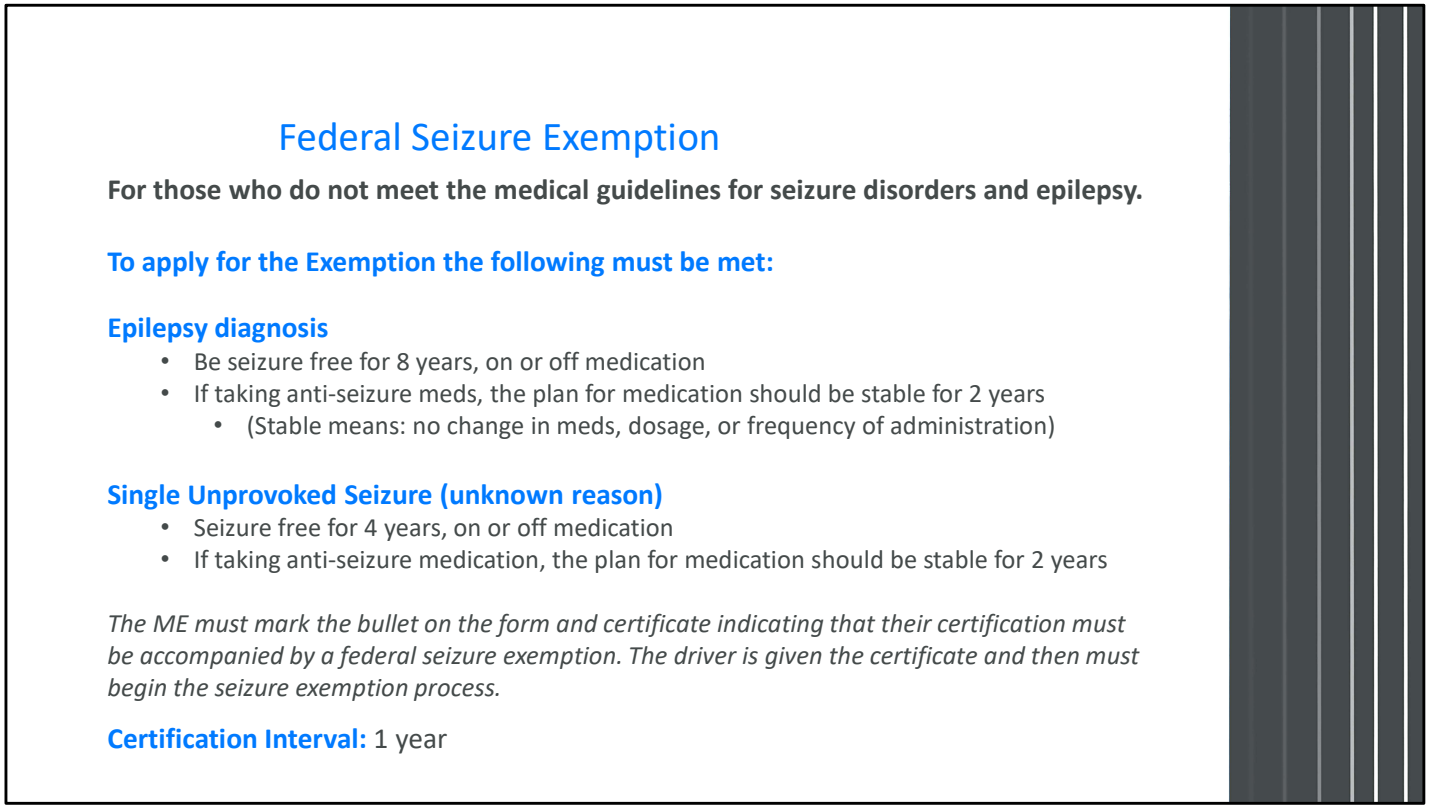
The following drivers *cannot be certified to drive*:

- Drivers with a current clinical diagnosis of epilepsy
- Drivers taking anti-seizure medication for treatment of seizures

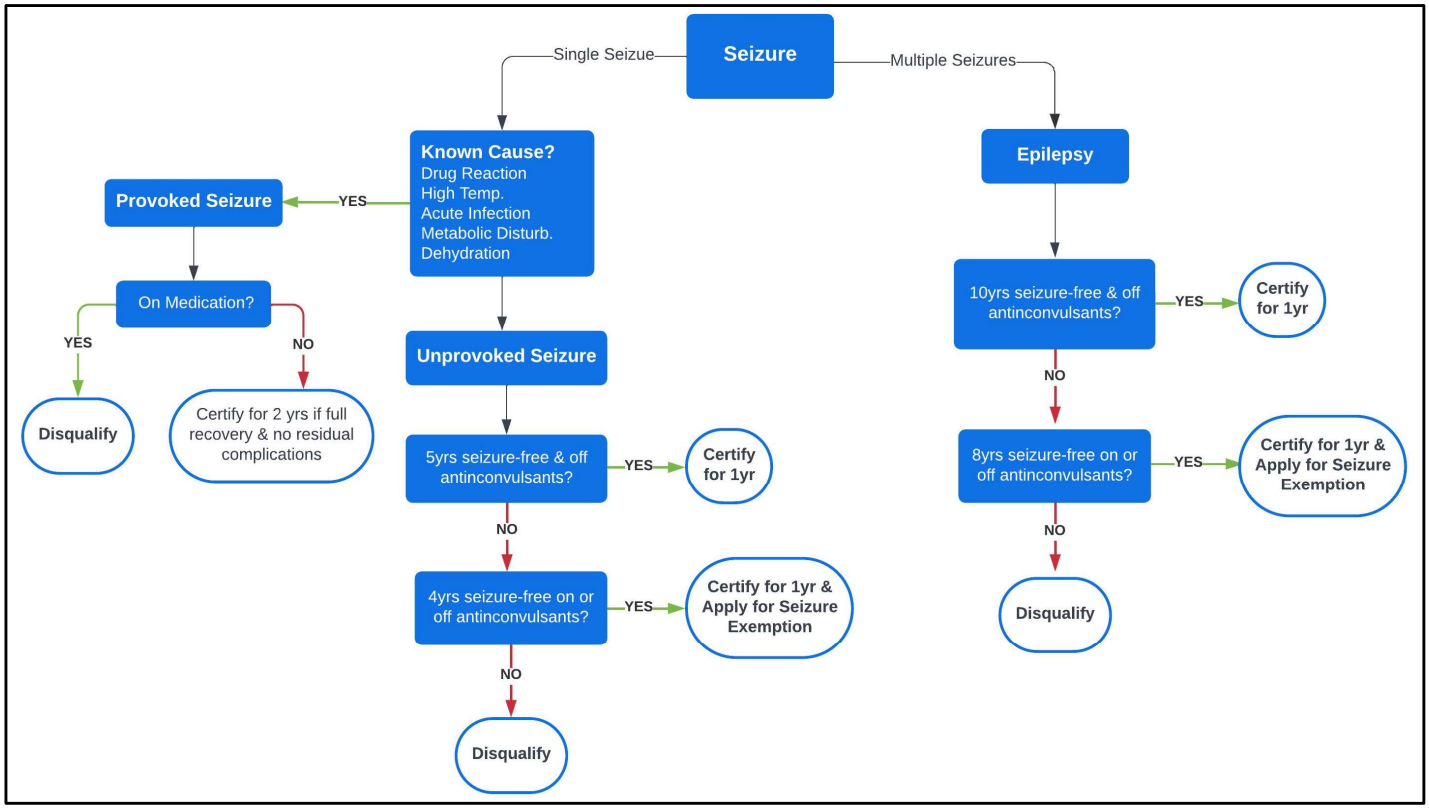
**Waiting Period:** 10 years off anticonvulsant medications & seizure free

Clearance from neurological specialist is prudent if choosing to certify a driver with established history of epilepsy

Seizures that occur without warning are characteristic of epilepsy. Drivers who have a diagnosis of epilepsy can be certified if they complete a 10-year seizure free waiting period while off anti-convulsant medications. It is prudent that the medical examiner obtain clearance from a neurological specialist prior to certifying the driver.




There is a Federal seizure and epilepsy disorder exemption for those who do not meet the medical guidelines for seizure disorders and epilepsy. Drivers with a history of epilepsy can apply for the exemption if they have been seizure free for eight years, on or off anti-seizure medication. If during that time they have been taking anti-seizure medication, the "plan" for that medication should be stable for two years. Stable means there's been no change in the medications, the dosage, or the frequency of administration. Drivers who have a history of a single unprovoked seizure, were there is no known reason or cause, can apply for the exemption if they have been seizure free for four years, on or off anti-seizure medication. If they are taking anti-seizure medication during the waiting period, the "plan" for that medication should be stable for a least two years using the same definition of stability as what was just discussed for epilepsy. *The ME must mark the bullet on the form and certificate indicating that their certification must be accompanied by a federal seizure exemption. The driver is given the certificate and then must begin the seizure exemption process. D*rivers applying for the exemption can be certified for 1 year.




Here is a flow chart that may help understand the regulations surrounding seizures. When an individual has a single seizure, it is deemed either a provoked or unprovoked seizure. If the cause of the seizure is known, it is considered a provoked seizure. When the cause has been treated and not likely to reoccur, and the individual is not taking anti-seizure medication, they can be certified for up to 2 years. If, however, they are taking an anti-seizure medication, this would indicate that they are still at risk for a subsequent seizure and the individual must be disqualified and would be treated the same as those with an unprovoked seizure. If the cause of the seizure is not known, the individual cannot be certified until they have been seizure free for at least 4 years, regardless of whether they have been taking anticonvulsant medication, at which time they can apply for a federal seizure exemption. However, if this same individual has been seizure free and off anticonvulsant medication for 5 years, they can be certified without the need for the federal seizure exemption. Going back to the top of the flowchart, when an individual has had multiple seizures, they are considered to have epilepsy and cannot be certified until they have been seizure free for at least 8 years, regardless of whether they have been taking anticonvulsant medication, at which time they can apply for a federal seizure exemption. However, if this same individual has been seizure free and off anticonvulsant medication for 10 years, they can be certified without the need for the federal seizure exemption.

**A driver reports a single unprovoked seizure from an unknown cause that occurred 1 year ago. Since that time, the driver has been seizure free, is under medical management, and was not prescribed anti-seizure (anti-convulsant) medication. What is the certification status of this driver?**

A. Disqualified for 1 additional year, then re-certified for 1 year
B. Disqualified for 1 additional year, then re-certified for 2 years
C. Disqualified for 4 additional years, then re-certified for 1 year
D. Disqualified for 4 additional years, then re-certified for 2 years

The correct answer is **C**. There is a 5-year waiting period for an unprovoked seizure during which time the driver must be seizure free and off anti-seizure medication. However, a driver can apply for the Federal Seizure Exemption program once they have been seizure free for 4 years, with or without the use of an anti-seizure medication. The recertification interval is 1 year.

A driver reports a single unprovoked seizure from an unknown cause that occurred 1 year ago. Since that time, the driver has been seizure free, is under medical management, and was not prescribed anti-seizure (anti-convulsant) medication. What is the certification status of this driver? A, Disqualified for 1 additional year, then re-certified for 1 year. B, Disqualified for 1 additional year, then re-certified for 2 years. C, Disqualified for 4 additional years, then re-certified for 1 year. Or D, Disqualified for 4 additional years, then re-certified for 2 years. The correct answer is **C**. There is a 5-year waiting period for an unprovoked seizure during which time the driver must be seizure free and off anti-seizure medication. However, a driver can apply for the Federal Seizure Exemption program once they have been seizure free for 4 years, with or without the use of an anti-seizure medication. The recertification interval is 1 year.

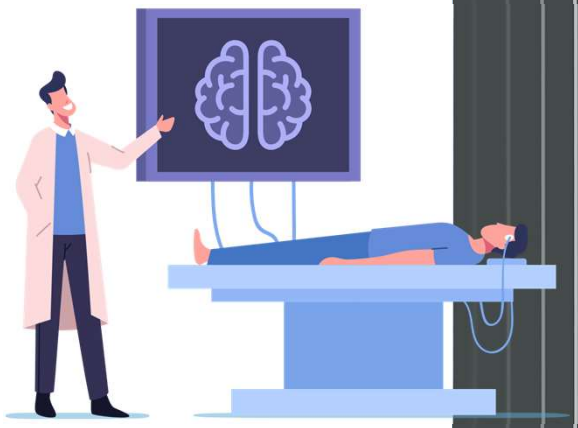
## Anticonvulsant (Anti-Seizure) Therapy

- Used for control or prevention of seizures
  - There is still a risk should medication be inadvertently missed
- Also prescribed for psychiatric, antimanic, mood-stabilizing, and for chronic pain

**Side Effects:**

- Depressed mood
- Cognitive deficits
- Decreased reflex responses
- Unsteadiness
- Sedation

*Small doses for chronic pain are less likely to have side effects that interfere with safe driving.*



Anticonvulsant medications used to control or prevent seizures still have a risk should a dose be inadvertently missed. These medications are also prescribed for treating other medical conditions such as chronic pain but still have the side effects of depressed mood, cognitive deficits, decreased reflex responses, unsteadiness, and sedation. When used for treatment of chronic pain, the dosage is usually much smaller. Thus, it is less likely that they will have severe side effects that will interfere with safe driving.

## Anticonvulsant Meds

**Barbiturates –** Phenobarbital (Luminal), Barbital (Veronal)
- Central nervous system depressants
- Treatment for Epilepsy
- Largely replaced by benzodiazepines
  - Significantly less dangerous in overdose

**Hydantoins (glycolylurea)–** Dilantin
- Treatment for epilepsy, anxiety, trigeminal neuralgia, mood disorders

**Carbamazepine's –** Tegretol, Carbatrol
- Anticonvulsant/mood stabilizing for epilepsy, bipolar disorder, trigeminal neuralgia, ADHD, schizophrenia, phantom limb syndrome, neuromyotonia, post-traumatic stress disorder

**Valproic Acids –** Depakote, Depakene, Depacon
- Anticonvulsant/mood-stabilizing for epilepsy, bipolar disorder, major depression, migraines, schizophrenia

**Others:** Topamax (Topiramate), Neurontin (Gabapentin), Lyrica (Pregabalin), Lamotrigine (Lamictal)

There are several categories, or classifications, of anticonvulsants such as barbiturates, which have mostly been replaced by the benzodiazepines. This slide also lists many other conditions that are treated by anticonvulsants such as bipolar disorders, depression, migraines, schizophrenia, trigeminal neuralgia, ADHD and PTSD.


HEADACHES,
VERTIGO,
DIZZINESS, &
MINIERE'S DISEASE

## Headaches

- Migraines
- Tension headaches
- Cluster headaches
- Cranial Neuralgias
- Post-traumatic head injury syndrome
- Headaches associated with toxic substances
  - Carbon monoxide
  - Nitroglycerine
- Atypical Facial Pain

*Chronic or recurring headaches can potentially interfere with a driver's ability to safely operate a CMV due to symptoms such as a visual distortion or disequilibrium associated with a migraine.*

Medications used for treatment may interfere with driving:

- Sumatriptan (Imitrex)
- Topiramate (Topamax) is an anticonvulsant

Although generally inconsequential, headaches may constitute a problem for commercial driving. Headaches that may interfere with safe driving include migraines, tension headaches, cluster headaches, cranial neuralgias, post-traumatic head injury syndrome, headaches from toxic substances such as carbon monoxide or nitroglycerine, and atypical facial pain. Chronic or recurring headaches can potentially interfere with a driver's ability to safely operate a CMV due to symptoms such as a visual distortion or disequilibrium associated with a migraine. Also, the medication used for treatment such as Sumatriptan and Topiramate may interfere with safe driving.

## Headaches

- *Incapacitating symptoms*, even if periodic or in early state of disease, *warrant disqualification when interfering with*:
  - Cognitive ability
  - Judgment
  - Attention
  - Concentration
  - Sensory or motor function
  - Coordination
  - Balance

Considerations:

- What is the frequency, severity, and duration of the headaches?
- What are the symptoms associated with the headaches?
  - Visual disturbances
  - Light or noise sensitivity
  - Loss of consciousness
- Has treatment been shown to be adequate, effective, safe, and stable?

Incapacitating symptoms, even if periodic or in the early stage of disease, may warrant disqualification when interfering with cognitive ability, judgment, attention, concentration, sensory or motor function, coordination, and balance. When making a qualification determination, the ME should consider the following: What is the frequency, severity, and duration of the headaches? What are the symptoms associated with the headaches? Are the symptoms, such as visual disturbances and light or noise sensitivity, likely to cause loss of consciousness or any loss of ability to control a CMV? Has treatment been shown to be adequate, effective, safe, and stable?

## Practice Scenario

**A 33-year-old female presents for her first DOT physical prior to starting her CDL school. She has a history of headaches which have been well-controlled with regular visits to her Chiropractor. Her PCP also prescribed her Zoloft for treatment and prevention of the headaches 8.5 months ago. The driver also admits to having a seizure 8 months ago. Her Chiropractor related that the seizure was possibly caused by the Zoloft, so she stopped taking it and has not had another seizure. She denies any prior history of seizure. There is no other significant medical history and no other medication use.**

- Physical exam:
  - Cranial nerves II-X all WNL
  - Normal mini-mental exam findings
  - The rest of the exam is WNL

**Should this driver be certified, disqualified, or placed in determination pending?**

**Does she need clearance from her PCP, her Chiropractor, or another medical professional? If so, which provider and why?**

A 33-year-old female presents for her first DOT physical prior to starting her CDL school. She has a history of headaches which have been well-controlled with regular visits to her Chiropractor. Her PCP also prescribed her Zoloft for treatment and prevention of the headaches 8.5 months ago. The driver also admits to having a seizure 8 months ago. Her Chiropractor related that the seizure was possibly caused by the Zoloft, so she stopped taking it and has not had another seizure. She denies any prior history of seizure. There is no other significant medical history and no other medication use.
Physical exam:
Cranial nerves II-X all WNL
Normal mini-mental exam findings
The rest of the exam is WNL

Should this driver be certified, disqualified, or placed in determination pending?

Does she need clearance from her PCP, her Chiropractor, or another medical professional? If so, which provider and why?

## Practice Scenario Answer

**The driver should be disqualified. A driver with a condition that may interfere with safe driving should not be certified or placed in determination pending.**

**There are multiple issues that must be resolved prior to certifying this driver.**

- The ME should obtain clearance from the Chiropractor that the treatment for the driver's headaches has been effective and adequate to allow for safe driving
- The driver must be evaluated by a Neurologist to verify the etiology and prognosis of the driver's seizure
  - Is Zoloft truly the cause of the seizure?
  - Is there risk of a future seizure?
  - Will the driver require anti-seizure medication?
- If Zoloft is not the cause of the seizure, the ME should obtain clearance from the PCP that the driver no longer needs to be on the medication

The driver should be disqualified. A driver with a condition that may interfere with safe driving should not be certified or placed in determination pending. There are multiple issues that must be resolved prior to certifying this driver. The ME should obtain clearance from the Chiropractor that the treatment for the driver's headaches has been effective and adequate to allow for safe driving. The driver must be evaluated by a Neurologist to verify the etiology and prognosis of the driver's seizure. Is Zoloft truly the cause of the seizure? Is there risk of a future seizure? Will the driver require anti-seizure medication? If Zoloft is not the cause of the seizure, the ME should obtain clearance from the PCP that the driver no longer needs to be on the medication.

## Practice Scenario Follow-up

**If Zoloft is the cause of the seizure and there is no future risk of seizure, what is the waiting period and the certification interval?**

**Answer:** This would be considered a single provoked seizure, and the driver can be certified for up to 2 years once it is verified that they are fully recovered, no residual complications and not taking anti-seizure medication.

**If it was determined that Zoloft is not the cause of the seizure, and there is no identifiable cause, what is the waiting period and certification interval?**

**Answer:** This would be considered a single unprovoked seizure. There is a mandatory 5-year waiting period, being seizure-free without the use of anti-seizure medication.

If Zoloft is the cause of the seizure and there is no future risk of seizure, what is the waiting period and the certification interval? **Answer:** This would be considered a single provoked seizure, and the driver can be certified for up to 2 years once it is verified that they are fully recovered, no residual complications and not taking anti-seizure medication. If it was determined that Zoloft is not the cause of the seizure, and there is no identifiable cause, what is the waiting period and certification interval? **Answer:** This would be considered a single unprovoked seizure. There is a mandatory 5-year waiting period, being seizure-free without the use of anti-seizure medication.

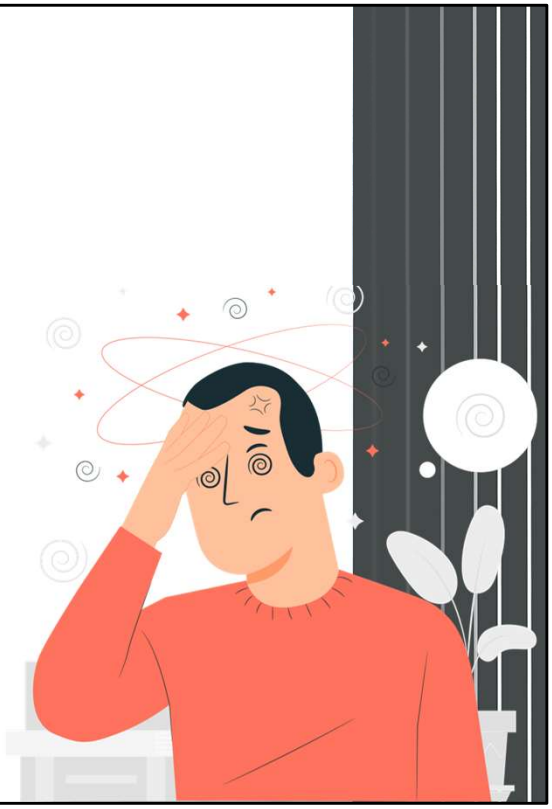
## VERTIGO & DIZZINESS

### Multiple conditions may affect equilibrium

**The ability to maintain balance and orientation while operating a CMV depends upon the following:**

- Sensory input from the peripheral nervous system (PNS)
  - Vestibular system
  - Visual system
  - Proprioception system
- Motor integration in the central nervous system (CNS)

Inappropriate interactions within these systems may produce an unsafe degree of vertigo or dizziness.



There are multiple conditions that may affect equilibrium. The ability to maintain balance and orientation while operating a CMV depends upon sensory input from the vestibular, visual, and proprioception systems within the peripheral nervous system (PNS) and the appropriate motor integration in the central nervous system (CNS). Inappropriate interactions within these systems may produce an unsafe degree of vertigo or dizziness.

## VERTIGO & DIZZINESS

**Vertigo and dizziness can affect:**

- Cognitive abilities
- Judgment
- Attention
- Concentration
- Sensory or motor function
- Coordination
- Balance

**Considerations:**

- What is the frequency, severity, and duration of the vertigo and dizziness episodes?
- Are the episodes likely to cause loss of consciousness or any loss of ability to control a CMV?
- Has treatment been shown to be adequate, effective, safe, and stable?

Vertigo and dizziness can affect cognitive abilities, judgment, attention, concentration, sensory or motor function, coordination, and balance. When making a physical qualification determination, the ME should consider the following: What is the frequency, severity, and duration of the vertigo and dizziness episodes? Are the episodes likely to cause loss of consciousness or any loss of ability to control a CMV? Has treatment been shown to be adequate, effective, safe, and stable?

## MENIERE'S DISEASE

Chronic disorder of the inner ear that can result in dizzy spells, vertigo, and hearing loss.

**Symptoms:**

- Recurring vertigo lasting 20 minutes to several hours
- Inner ear pressure
- Tinnitus (ringing, buzzing, whistling, or hissing sound)
- Hearing fluctuation
- May have long intervals without symptoms

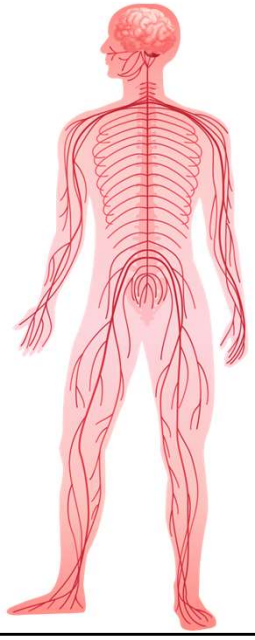
**Considerations:**

- What is the frequency, severity, and duration of the vertigo episodes?
- Are the vertigo episodes likely to cause loss of consciousness or any loss of ability to control a CMV?
- Has treatment been shown to be adequate, effective, safe, and stable?

Meniere's disease is a chronic disorder of the inner ear that can result in dizzy spells, vertigo, and hearing loss. Symptoms may include recurring vertigo lasting 20 minutes to several hours, inner ear pressure, tinnitus (ringing, buzzing, whistling, or hissing sound), and hearing fluctuation. Individuals may have long intervals without symptoms. When making a qualification determination, the medical examiner should consider the following: What is the frequency, severity, and duration of the vertigo episodes? Are the vertigo episodes likely to cause loss of consciousness or any loss of ability to control a CMV? Has treatment been shown to be adequate, effective, safe, and stable?


INFECTIONS &
TUMORS OF THE
CENTRAL NERVOUS
SYSTEM

## Infections of the Central Nervous System (CNS)



- Acute infections can cause seizure
- Some infections are mild and resolve without special treatment
- Other infections can be severe with long-term effects
- Some infections increase the likelihood of later seizures

*Drivers with a current infection of the CNS should not be certified until etiology is confirmed.*

Considerations:

- Was the infection accompanied by seizure?
  - How many seizures occurred?
  - When did they occur?
  - How frequently did they occur?
  - Is the driver taking antiseizure medication?
  - What is the likelihood of seizure recurrence?
- Has the underlying infection resolved and is the driver fully recovered from the infection?
- Are there any existing residual complications from the infection?
- Was treatment shown to be adequate, effective, safe, and stable?

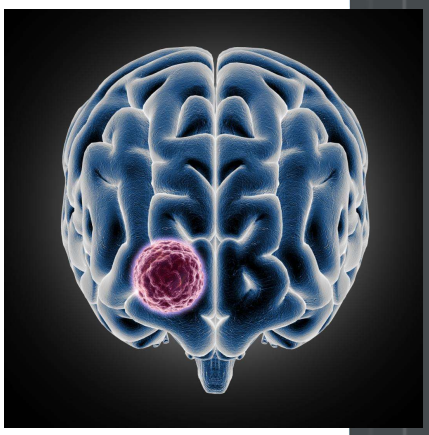
Acute infections of the central nervous system (CNS) can cause seizure and some infections increase the likelihood of later seizures. Some CNS infections can be mild and resolve without any special treatment, while others can be very severe with long-term effects. Drivers with a current infection of the CNS should not be certified until etiology is confirmed. When making a qualification determination, the ME should consider the following: Was the infection accompanied by seizure? If so, how many seizures occurred, when did they occur, how frequently did they occur, is the driver taking antiseizure medication, and what is the likelihood of seizure recurrence? Has the underlying infection resolved and is the driver fully recovered from the infection? Are there any existing residual complications from the infection? Was treatment shown to be adequate, effective, safe, and stable?

## Central Nervous System Tumors

CNS tumors cause either focal or generalized neurologic symptoms

- Seizures
- Changes in:
  - Vision
  - Hearing
  - Speech
  - Swallowing
  - Cognitive ability
  - Judgment
  - Sensory and motor functions

*Some benign tumors may be allowable with successful treatment*



Considerations:

- Has the etiology been confirmed?
- Is the nature and severity of the medical condition likely to cause loss of consciousness or any loss of ability to control a CMV?
- Has treatment been shown to be adequate, effective, safe, and stable?

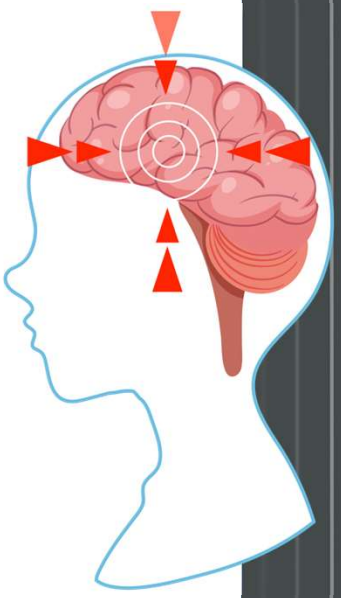
CNS tumors cause either focal or generalized neurologic symptoms. These may include seizures and cause changes in vision, hearing, speech, and swallowing. They can also affect cognitive ability, judgement, sensory and motor function. Drivers presenting with neurological signs or symptoms should be referred to a neurologist for a detailed evaluation of their neurological status. Some benign tumors may be allowable if there has been successful surgical treatment. When making a qualification determination, the ME should consider the following: Has the etiology been confirmed? Is the nature and severity of the medical condition likely to cause loss of consciousness or any loss of ability to control a CMV? Has treatment been shown to be adequate, effective, safe, and stable?


STATIC
NEUROLOGICAL
CONDITIONS

## Embolic/Thrombotic Stroke & Transient Ischemic Attack (TIA)

- Seizure risk is associated with the location of the lesions
  - *Cortical and subcortical* deficits (both being Cerebral) have an increased risk
  - *Cerebellum and brainstem* lesions are not at risk
- Cerebral infarctions can cause residual intellectual and/or physical impairment
- *Risk of recurrent event is highest during the first 7-9 months*
- Most will recover within 1 year
- Deficits that remain after one year are usually permanent
- Accompanied seizure may constitute a diagnosis of epilepsy
  - Indicates an increased risk of a future unprovoked seizure

*For the NRCME test, always consider a one year waiting period from the time of the stroke before the driver can be certified.*



For drivers that have had either a TIA or stroke, the risk of having a future seizure is increased when the stroke occurred in the cerebral cortical or subcortical areas. A TIA or stroke occurring in the cerebellum or brainstem does not have a risk of seizure. For drivers that have had an embolic or thrombotic stroke, most of the recovery will occur within one year. Deficits that are present after one year are generally considered to be permanent. A stroke that is accompanied by a seizure, called an early seizure, may constitute a diagnosis of epilepsy. The presence of an early seizure indicates an increased risk for a future unprovoked seizure. For the NRCME test, always consider a one year waiting period from the time of the stroke before the driver can be certified.

## Transient Ischemic Attack

- Usually lasting more than a few seconds but less than 20 minutes
- Symptoms can persist for 24 hours
- Individuals experience a full resolution of symptoms
- 1 in 3 individuals who have a TIA will eventually have a stroke
  - 50% occurring within a year of the TIA

A TIA is a focal loss of blood supply to a portion of the brain. It usually lasts more than a few seconds, but most are less than 20 minutes in length. Symptoms can persist for 24 hours. Individuals experience a full resolution of all symptoms. However, about 1 in 3 individuals who have a transient ischemic attack will eventually have a stroke, with about half occurring within a year after the transient ischemic attack.

## Embolic/Thrombotic Stroke & Transient Ischemic Attack (TIA)

The ME evaluates the status of the medical condition and determines if the driver is safe to operate a CMV

- The ME may consult with specialists and request additional evaluation to assist in making a physical qualification determination

Exam should include an assessment of:

- Cognitive abilities
- Judgement
- Attention
- Concentration
- Vision
- Physical strength and agility
- Reaction time

Considerations:

- Has the etiology been confirmed?
- Are there any neurological residuals?
- Are seizures present?
- Has a diagnosis of epilepsy been made?
- Is the nature and severity of the medical condition likely to cause loss of consciousness or any loss of ability to control a CMV?
- Has the driver has been evaluated and treated by a medical provider or neurologist?
- Has treatment been shown to be adequate, effective, safe, and stable?

The ME evaluates the status of the medical condition and determines if the driver is safe to operate a CMV. The ME may consult with specialists and request additional evaluation to assist in making a physical qualification determination. The exam should include an assessment of cognitive abilities, judgement, attention, concentration, vision, physical strength and agility, and reaction time. When making a qualification determination, the ME should consider the following: Has the etiology been confirmed? Are there any neurological residuals? Are seizures present? Has a diagnosis of epilepsy been made? Is the nature and severity of the medical condition likely to cause loss of consciousness or any loss of ability to control a CMV? Has the driver been evaluated and treated by a medical provider or neurologist? Has treatment been shown to be adequate, effective, safe, and stable?

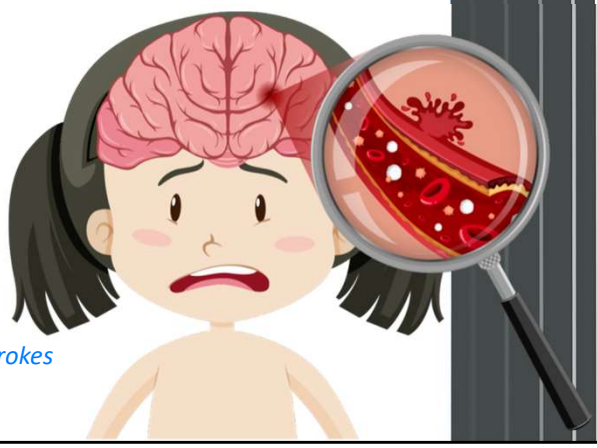
## Intracerebral and Subarachnoid Hemorrhage

Intracerebral Hemorrhage = bleeding into substance of the brain
Subarachnoid Hemorrhage = bleeding into the spaces of the brain

- May result from hypertension, trauma, aneurysms, neoplasms, AV malformations, vasculopathies
- Can cause deficits in
  - Cognitive abilities
  - Judgement
  - Attention
  - Physical skills

- Seizure risk is associated with the location of the lesions
  - *Cortical and subcortical hemorrhages* have an increased risk
  - *Cerebellum and brainstem hemorrhages* are not at risk

*The same qualification determination considerations apply as with strokes*



Intracerebral hemorrhage results from bleeding into the substance of the brain and subarachnoid hemorrhage reflects bleeding primarily into the spaces around the brain. Bleeding occurs as a result of a number of conditions including hypertension, hemorrhagic disorders, trauma, cerebral aneurysms, neoplasms, arteriovenous malformations, and vasculopathies. Hemorrhages can cause deficits in cognitive abilities, judgement, attention, and physical skills. Like with stroke, the risk of having a future seizure is increased when the hemorrhage occurs in the cerebral cortical or subcortical areas. Also, the ME should make the same considerations as with those of stroke when making a qualification determination.

**The driver has a history of a stroke 7 months earlier and presents a letter from his neurologist stating that he is cleared to return to work without restriction. The note indicates that the stroke was a cerebellar embolic stroke, and that the driver suffers no deficits in motor or cognitive abilities. All other aspects of the examination are within normal limits. The best next step is:**

A. Request an EEG
B. Temporarily disqualify the driver
C. Certify the driver for 1 year
D. Certify the driver for 2 years

The correct answer is **B**. For testing purposes, the best answer is to temporarily disqualify the driver as it is "best practice" for the driver to wait a year following a stroke. The reasoning is that the risk of having another stroke or other complications is greatest in the first year.

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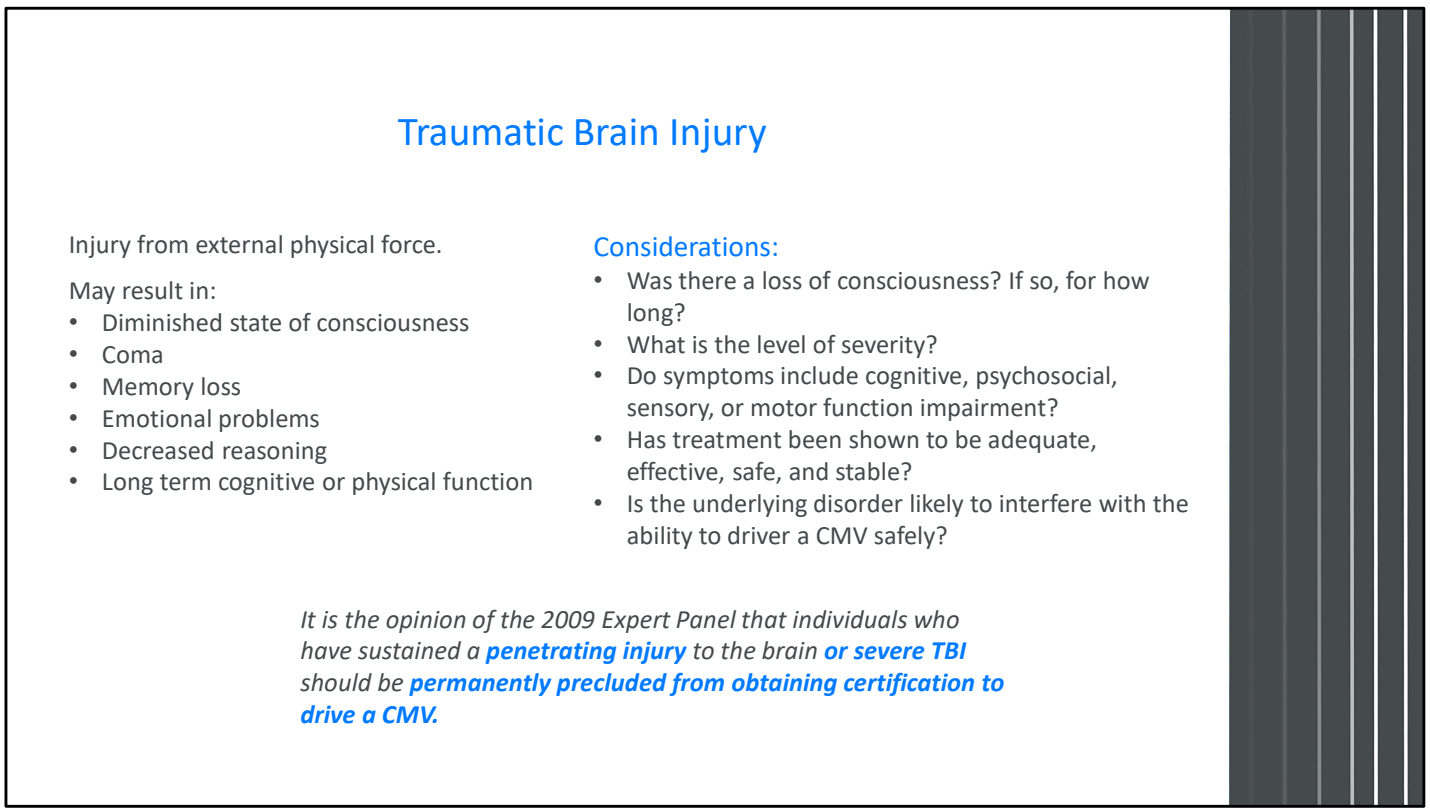


Traumatic brain or spinal cord injury is described as an injury resulting from an external physical force. The results of the injury may be a diminished state of consciousness, coma, memory loss, difficulty in speech, emotional problems, decreased cognitive ability, decrease reasoning ability, or physical dysfunction. The ME should consider the following when making a physical qualification determination. Was there a loss of consciousness? If so, for how long? What is the level of severity? Do symptoms include cognitive, psychosocial, sensory, or motor function impairment? Has treatment been shown to be adequate, effective, safe, and stable? And is the underlying disorder likely to interfere with the ability to driver a CMV safely? *It is the opinion of the 2009 Expert Panel that individuals who have sustained a* ***penetrating injury*** *to the brain* ***or severe TBI*** *should be* ***permanently precluded from obtaining certification to drive a CMV.***

## Practice Scenario

**57-year-old male states, "I had a bleed in my head that caused a little stroke about 8 months ago." Upon further inquiry, the ME discovers that he had a left-sided stroke due to an arteriovenous malformation (AVM) which resulted in a residual right-sided hemiplegia. No surgical repair of the AVM has been performed and the driver is not sure when or if any surgical procedure is to take place. He is still attending occupational and Physical Therapy. Driver has not yet returned to work.**

- Physical exam:
  - The patient walks with a limp, drags his right leg
  - Right, upper extremity hangs downward, being flaccid with a mild internal rotation at the shoulder
  - He has motor and sensory deficits consistent with right-sided hemiplegia
  - Some questions as to his recall ability (short-term) and attention span
  - The rest of the exam is WNL

**Should this driver be disqualified or certified to drive, and why?**

**If he completes occupational and physical therapy, does he apply for a skilled performance evaluation?**

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<u>Physical exam:</u>
The patient walks with a limp, drags his right leg. Right, upper extremity hangs downward, being flaccid with a mild internal rotation at the shoulder. He has motor and sensory deficits consistent with right-sided hemiplegia.
Some questions as to his recall ability (short-term) and attention span. The rest of the exam is WNL.

Should this driver be disqualified or certified to drive, and why? If he completes occupational and physical therapy, does he apply for a skilled performance evaluation?

## Practice Scenario Answer

- Driver has had a ruptured AVM that has not been surgically treated to prevent additional bleeding
- He has right sided hemiplegia
- He exhibits cognitive impairment during the history and PE

**The driver should be disqualified**

- If he completes Occupational and Physical Therapy, he will still not be able to certified. The cognitive impairments of an unrepaired AVM are disqualifying regardless of compensatory measures for hemiplegia
- An SPE may be required if AVM is surgically repaired, no cognitive deficits, OT and PT completed with satisfactory determination made (by therapist or ME), but it must be identified as a fixed deficit

The driver has a ruptured AVM that has not yet been surgically treated to prevent additional bleeding, has symptoms consistent with right side hemiplegia, and the medical examiner has concerns regarding cognitive impairment. The best outcome is this driver be disqualified. If the driver completes the occupational and physical therapy, he will still not be able to be certified. The cognitive impairment of an unrepaired AVM is disqualifying regardless of any compensatory measures for hemiplegia. An SPE may be required if there is a remaining fixed deficit in an extremity after the AVM is surgically repaired, there are no cognitive deficits, and the occupational and physical therapy is complete.


This concludes training module 7 of the TeamCME accredited training for the national registry of certified medical examiners.