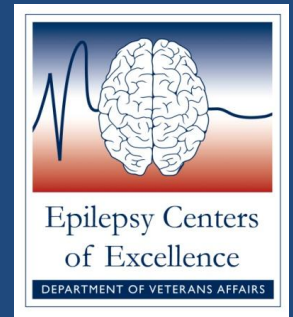


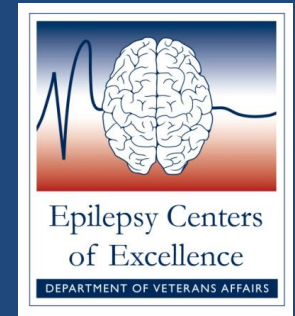
# **Safety in the Epilepsy Monitoring Unit**



# Learning Objectives

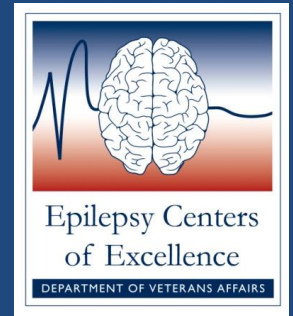
- Discuss what VEM is and its risks and benefits
- Explain different seizure types
- Describe the optimal EMU environment for patient safety
- Discuss what to do when a patient is having a seizure
- Discuss a post-seizure assessment

# What is video EEG monitoring (VEM)?



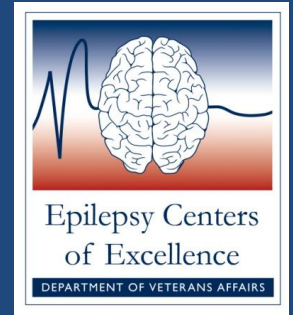
- Continuous video EEG recording of a patient with disabling events to evaluate for change in electrical brain activity during those events
- Monitoring is done in an inpatient unit over a period of days

# Why do we need video EEG monitoring (VEM)?



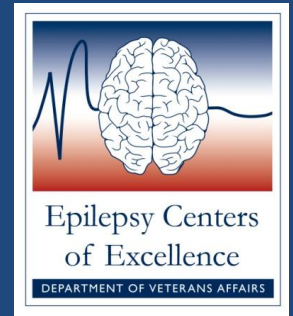
- Essential diagnostic tool, especially when a standard EEG is not clear in localizing where in the brain the patient's seizures initiate
- Gold standard in providing a diagnosis of psychogenic non-epileptic seizures (PNES)
- Identify and characterizes seizures
- Helps determine the appropriate treatment for the patient

# Risks of VEM



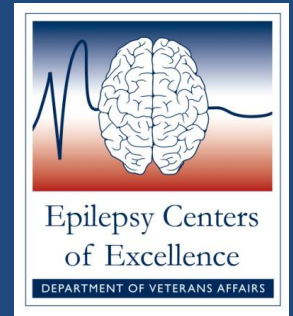
- Morbidity during VEM
  - 9% (n = 44) of 507 patients who underwent VEM had 53 adverse events
  - These included postictal psychosis, panic attacks, status epilepticus, falls with minor injuries, falls with fractures, a fall with an epidural hematoma, and fractures without falls

# Benefits of VEM



- Study by Lee et al. (2009) concluded:
  - Changes in diagnosis – 41%
  - Management change – 40%
- Benefits of VEM outweigh the risks
  - However, risks emphasize the need for diligent nursing care to ensure safety

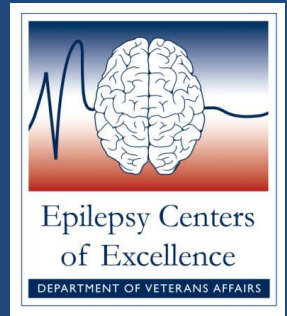
# Seizure Classification



In 2010 the International League Against Epilepsy updated the classification of seizures. The 3 categories of seizures are now:

- Focal seizures
  - With and without impaired awareness
- Generalized seizures
- Psychogenic non-epileptic seizures

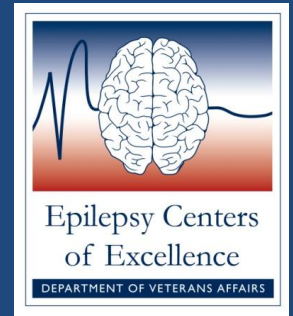
# Seizure Classification



<b>Current Terms (April 2010)</b>	<b>Previous Terms</b>
Focal	- Simple Partial, Focal Motor
Focal with impaired awareness	- Complex Partial, Psychomotor Temporal Lobe
Generalized	- Tonic Clonic, Grand Mal - Petit Mal, Absence

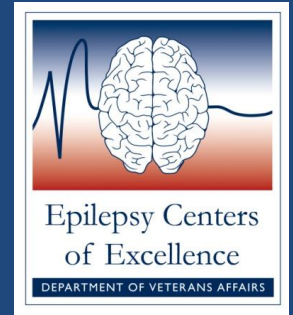


# Focal seizures

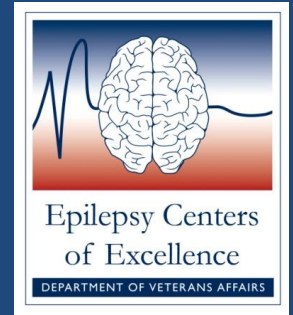


- Without impaired awareness
  - Seizure begins in one part of the brain
  - Can involve sensory, motor, autonomic, or psychic phenomena
  - Patient remains alert and oriented

# Focal seizures



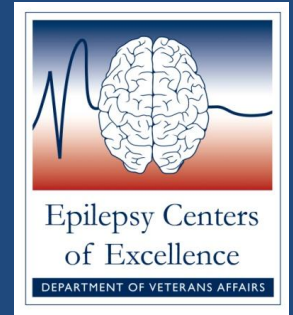
- With impaired awareness
  - Formerly called complex partial seizures
  - Seizure begins in one part of brain but can evolve into a bilateral tonic clonic seizure



# Generalized Seizures

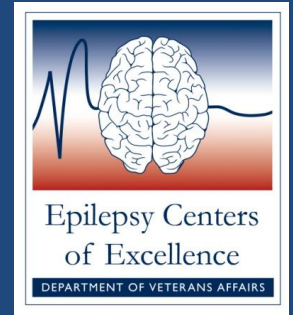
- Seizure begins in both sides of the brain
- Categorized into several major types:
  - Generalized tonic clonic
  - Tonic
  - Myoclonic
  - Absence
  - Atonic

# Psychogenic Non-epileptic seizures



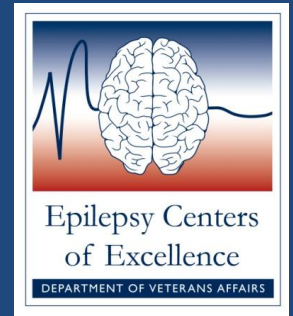
- Patients experience events that resemble a seizure but the events are not caused by abnormal electric discharges in the brain
- Most likely psychological in origin
- Important to diagnosis PNES in order to treat the patient appropriately

# Goal of VEM



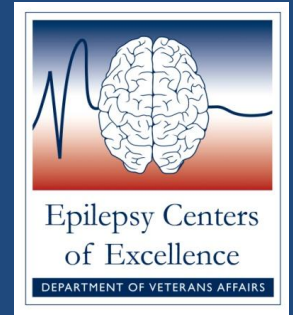
- Capture patient's typical disabling events
- Provoke the disabling events by tapering anti-epileptic medications in a controlled environment
- Patients may also be subjected to sleep deprivation, hyperventilation, or photic stimulation to provoke seizures

# EMU Environment: Patient Room



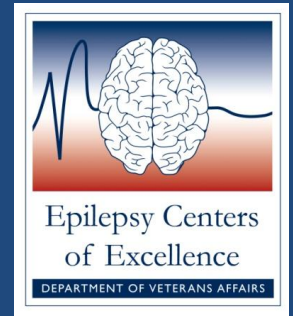
- Room is clear of clutter
- Nurse light and alarm within patient reach
- Low bed height
- Bed rails padded
- Suction canister with yankauer suction tip
- Oxygen ready with new nasal cannula
- OOB with assistance
- Saline lock PIV
- Bed rails up when in bed
- Nonskid footwear
- Patient in full view of camera when in bed
- Posted description above the bed of what to do if patient has seizures

# EMU Environment: Bathroom



- Bathrooms are high risk area for falls
- Outswing design of doors
- Curtain instead of door
- Padded sink edges and toilet seats
- Use of assistive rails
- “Bird baths”
  - Bath at the bedside with warm washcloth and soap or wipes

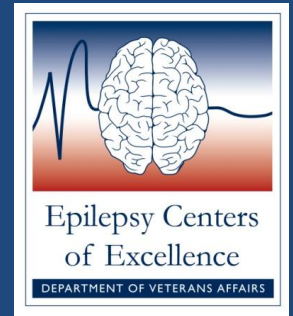
# Clinical Roles in the EMU



- EMU nurse
  - Obtains admission history
  - Ensures patient safety during EMU stay and during seizures
  - Performs and documents patient neuro assessments after seizures



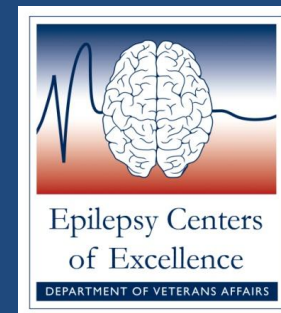
# Clinical Roles in the EMU



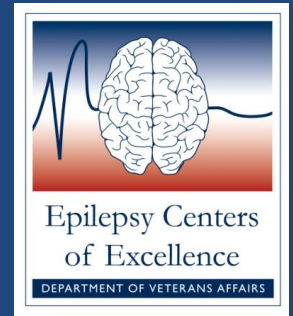
- EEG technologist
  - Monitors EEG recording for correct reading
  - Ensures that EEG equipment is working correctly
  - Communicates with nursing staff about possible seizure events on EEG

# Clinical Roles in the EMU

- Neurologist
  - Interprets EEG
  - Determines treatment plan with input of EMU team

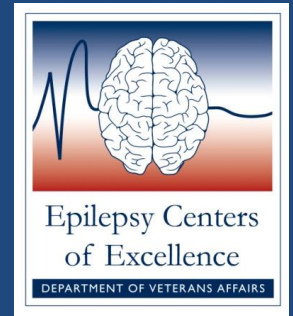


# What to do during an event



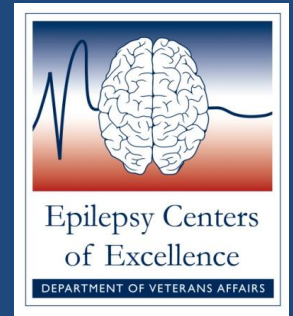
- Press the seizure alarm button as soon as possible in order to mark the event on the EEG
- Press the nurse call button to alert staff
- Note the time when seizure began
- Avoid standing between the patient and camera
- Remove sheets off of patient
- Verbalize any activity that is not easily seen on camera
- Start patient seizure assessment

# What to do during a tonic clonic seizure



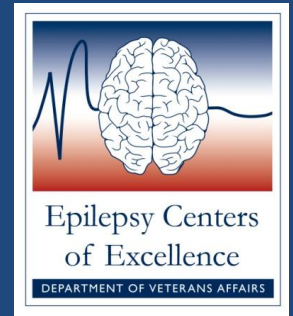
- Patients having a generalized seizure are at high risk for injury
- Roll patient to their side to protect their airway
- Administer oxygen by protocol
- Do not place anything in the patient's mouth when they are actively seizing
- Suction any secretions from mouth after seizure has stopped
- Notify the MD

# Seizure Response and Rescue Medications



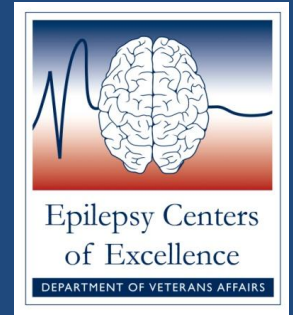
- The best seizure response happens when the EMU is prepared and has protocols in place
- MD available in house
- Rescue medication readily available
- PRN IV benzodiazepine order in place

# Seizure Response and Rescue Medications



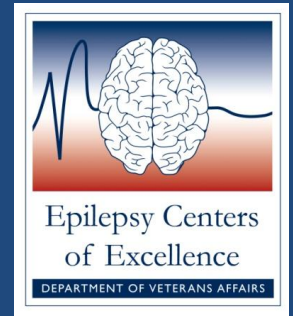
- Outline of a competent protocol:
  - Customized orders
  - Treatment parameters
  - When to call physician
  - 24 hour limit on IV benzodiazepines
  - Ward capabilities and limitations

# Intracranial Electrode Safety



- Voluntary restraints or one-to one sitter
- Ambulation with assistance
  - In some EMUs, no ambulation is allowed
- Bedpan use only
- Secure extra wiring to avoid falls
- Monitor for signs of infection
- Frequent neurological checks

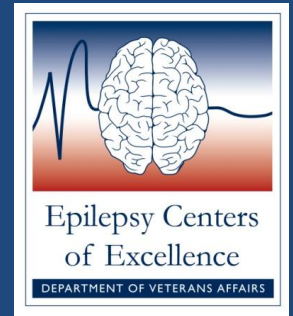
# Patient Seizure Assessment



- Ask if the patient is ok
- Ask an orientation question
  - For example, “where are you right now?”
- Ask a memory question
  - “Please repeat the phrase black cat.”
  - Ask the patient to remember the phrase after the seizure is over
- Ask the person to do a motor command
  - “Please hold up 3 fingers.”
  - Be sure to repeat the motor command on the other side of the body for comparison of 2 sides

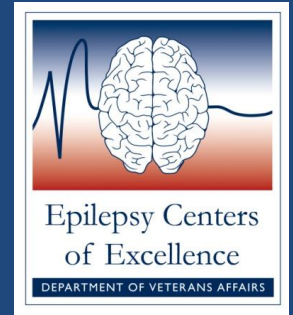


# Patient Seizure Assessment



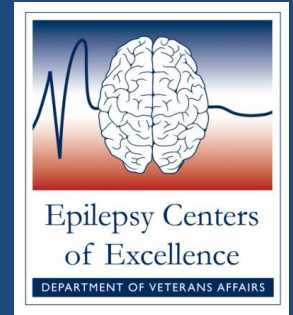
- These questions are repeated by protocol (usually every 15 minutes) until the patient returns to baseline

# Documentation of Seizure



- Even though the EEG and video are recording the seizure, nothing substitutes for an eyewitness account of the seizure

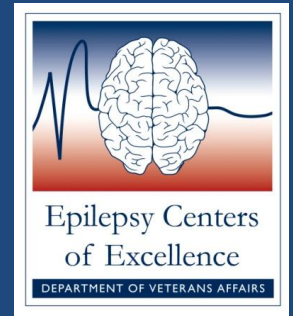
# Documentation of Seizure



- Use standardized “Seizure Assessment” note in CPRS
  - Date/time of seizure
  - Aura, if any
  - Description of seizure and postictal phase
  - Duration of seizure

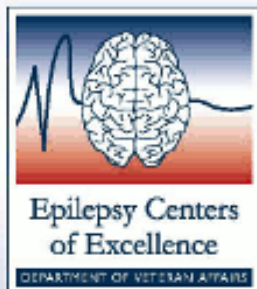
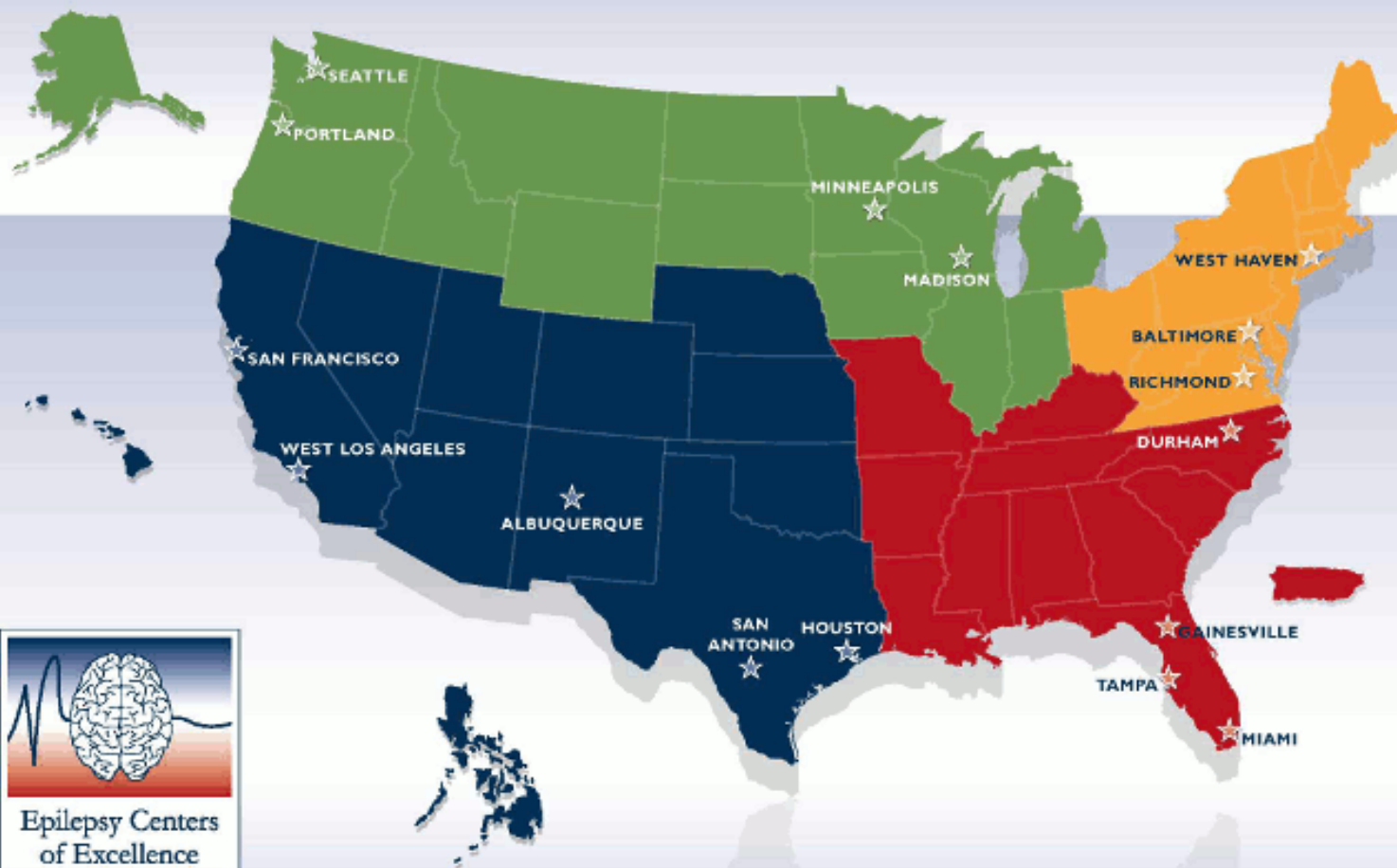
# Takeaway Points

- Safety first!
- Reassure patient
- Accurate documentation of seizure

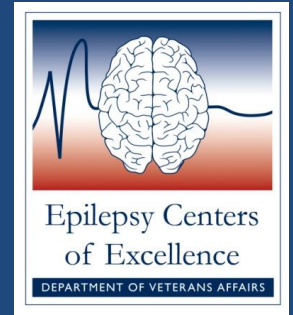


# EPILEPSY CENTERS OF EXCELLENCE REGIONAL MAP

## DEPARTMENT OF VETERAN AFFAIRS



# References



- Dobesberger, J., Walser, G., Unterberger, I., Seppi, K., Kuchukhidze, G., Larch, J., & ... Trinka, E. (2011). Video-EEG monitoring: safety and adverse events in 507 consecutive patients. *Epilepsia*, 52(3), 443-452. doi:10.1111/j.1528-1167.2010.02782.x.
- Faminu, Olujimi. (March 2012). Safety in the Epilepsy Monitoring Unit. West LA VAMC – Epilepsy Center of Excellence
- Lee, Y., Lee, M., Chen, I., Tsai, Y., Sung, C., Hsieh, H., & ... Wu, T. (2009). Long-term video-EEG monitoring for paroxysmal events. *Chang Gung Medical Journal*, 32(3), 305-312.