

**Epilepsy Monitoring Unit**  
**University of Virginia**  
**Nurse Orientation Manual**  
**2016**

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## **New Epilepsy Monitoring Unit (EMU) Nurse Orientation/Education Requirements**

- I. Every new EMU Nurse will read the Primer of Epilepsy Diagnosis and Treatment manual and the EMU Nurse Orientation Manual, including the following documents:
  - a. Unit-based policies and procedures including:
    - i. “Policies and Procedures for Ictal/Interictal SPECT
    - ii. “Procedures for Use of Wii System for EMU Patients”
    - iii. “Procedures for Non-Formulary Controlled Medications for Epilepsy Monitoring Unit Patients”
    - iv. “Procedures after Diagnosis of Nonepileptic Spells (NES)”
    - v. “Guidelines for Intracranial Monitoring in the Epilepsy Monitoring Unit”

\*Every new EMU nurse will sign a form saying that he/she read and understood all the materials included in the manual
- II. Hands-on training of a new EMU nurse will consist of Clinician IIs working no less than three 12-hour shifts with the EMU Coordinator and Clinician Is working no less than four 12-hour shifts with the EMU Coordinator. During that time, the epilepsy portion of the nurse’s Orientation Competency Assessment and Evaluation (OCAE) form must be completed\*.

\*More time may be granted for orientation as deemed necessary by the EMU Coordinator
- III. The following classes must be attended by the new EMU nurse in order to be able to care for patients in the EMU:
  - a. 1 hour “Epilepsy Competency” class (taught by Bryan Anderson), in which EEG equipment is reviewed
  - b. 2 hour “Epilepsy” class (taught by the EMU Coordinator as part of the Neuro Core Curriculum)
  - c. 1 hour “Initial Radiation Safety Training” class (CBL)\*

\*Only required for nurses working day shift.
- IV. In order to complete the new EMU nurse Orientation, the EMU nurse must be able to do the following (as stated in OCAE form):
  - a. Demonstrate the ability to properly admit a new patient, including properly setting up a room for an EMU patient
  - b. Demonstrate the ability to properly discharge a patient
  - c. Demonstrate the ability to recognize ictal events and respond appropriately (i.e. maintain patient safety and/or perform proper ictal testing)
  - d. Demonstrate the ability to trouble shoot the recording system both in the patient’s room and in the equipment room
  - e. Demonstrate the ability to switch a patient’s recording at the patch panel
  - f. Explain the difference of equipment plug-in expectation for continuous EMU and portable EEG system monitoring
  - g. Demonstrate RN to MT HOC and communication with every EEG equipment plug-in

## **EMU Nurse Continuing Education**

- I. Shift managers and PCA/Ts: Annual competency of the following must be demonstrated to the EMU Nurse Coordinator
  - a. Ensure that the correct patient is recording on the EEG
  - b. Properly identifying EEG monitoring equipment
  - c. The ability to confirm the patient is on camera and focused
  - d. The ability to recognize ictal events and properly test the patient
  - e. Properly identifying push buttons and nurse alarm events
  - f. Properly identifying parts of the recording system by name and describing their functions
  - g. Rebooting a recording system (both at the Monitor Technician station and in the equipment room)
  - h. Switching patients at the patch panel
- II. If a physician identifies an error in identifying an ictal event and/or testing a patient, the EMU Nurse Coordinator will review the event with that individual and provide education.
- III. Quarterly in-services are offered in the EMU. EMU nurses must attend at least 1 out of the 4 annual in-services.

## EMU Nurse Responsibilities – Admissions

- I. Prior to a patient arriving to the EMU, the EMU nurse must do the following to ensure that the EMU room is ready for a patient:
  - a. Ensure that both oxygen and suction equipment is present at the bedside and that both the oxygen and suction equipment is functioning
  - b. Ensure that an age-appropriate Ambu bag is present at the bedside
  - c. Place blue seizure pads on the bed/crib
  - d. Place green/purple linens (found in the cabinet outside of room 6146) on the bed/crib
  - e. Zero the bed

\*Please note that if a patient's room assignment changes before he/she arrives to the floor and the EEG technician has already started a recording for that patient, the aura amplifier from the original room assignment must be moved to the new room. Otherwise, the patient's recording will not work.

- II. Once the patient arrives to the unit, the EMU nurse must do the following:
  - a. Connect the patient's headbox to the aura amplifier in the patient's room, ensuring that the silver latch on the headbox slides over once the headbox is connected to the Aura amplifier, locking the headbox in place. If the headbox has already been connected to the aura amplifier PCA/T assigned to the patient, the EMU nurse will check that the headbox has been properly connected. For an example of a headbox not properly connected to an aura amplifier, see the "Epilepsy Competency 2013" presentation.
  - b. Obtain a baseline set of vital signs and height and weight for the patient, or ensure that this has been done by the PCA/T assigned to the patient. For infants/toddlers in cribs, a scale can be borrowed from the 7<sup>th</sup> floor in order to obtain an accurate weight.
  - c. Orient the patient to the EMU room by discussing the following:
    - i. The patient's room number and room telephone number
    - ii. The position of the camera and the fact that the patient must remain on camera at all times as well as the fact that the patient is being observed 24/7 by a Monitor Technician. Include in the discussion about the position of the camera the fact that the camera cannot see inside the bathroom and. Therefore, someone must stand outside the bathroom anytime the patient goes in there (either a family member who is comfortable doing this or a staff member)
    - iii. The location of the patient's push button and when it is appropriate to push the button. Also discuss the fact that when the push button is used, a Monitor Technician will call into the room to ask why the push button was activated and to ensure that the push button was not activated accidentally. When the Monitor Technician calls into the room, whoever activated the push button should describe what is going on with the patient.

- iv. Any patient activities that would interfere with the EEG recording by creating artifact, including the following:
  - Gum chewing
  - Using electronic devices that are plugged into an outlet. Please note that electronic devices are okay to use as long as they are not plugged in while the patient is using them
- v. The fact that the patient will not be allowed to shower while on continuous video EEG monitoring
- vi. Use of the dayroom
- d. Provide the patient with the following education forms and document in the Patient Education section of EPIC:
  - i. “Continuous Video-EEG Monitoring on 6Central: Instructions for Patients”
  - ii. “Welcome Letter: 6 Central Epilepsy Monitoring Unit”
- e. Determine who the patient’s care partner(s) will be, document in EPIC, and provide the care partner(s) with an information packet about the care partner program at UVA. Discuss nutrition options with any care partners that plan on staying at the patient’s bedside (i.e. guest meal trays, use of the unit nourishment room, and/or the hospital cafeteria).

\*Please note that only one care partner is allowed to stay at the bedside overnight. Having two care partners at the bedside overnight requires permission from the unit manager and if approved, only one cot/recliner may be used in the room to ensure staff access to emergency equipment in the event of an emergency.
- f. Ensure that all home medications are either locked in security box in security envelope or are taken back home by family member. Explain to patient that it is important that all medications be administered by nurse.
- g. Review medications (especially timing of medications). Discuss with the patient the fact that all antiepileptic drugs scheduled between 0800 and 1000 will be held until the EMU physicians round/decide whether any changes will be made to the AED regimen. If the EMU resident decides that a home-supplied medication needs to be used, please follow procedures listed either in the UVA policy on home-supplied medications (for non-controlled substances) or the “Procedures for Non-Formulary Controlled Medications for Epilepsy Monitoring Unit Patients” (for controlled substances).
- h. Assess the patient for risk of falling. If patient is a fall risk, provide yellow identifiers and order any equipment that may help decrease injury as a result of falling (i.e. floor pads). Discuss with the patient that he/she cannot ambulate unaccompanied at any time because of his/her risk of falling.
- i. Ensure that the patient has IV access. All EMU patients, especially those who are being weaned off AEDs should have peripheral IV access at all times.
- j. All EMU patients should have both IV Ativan and Midazolam (IM for adults and IN for peds) for treatment of prolonged seizures lasting >3mins.

- k. Determine what kind of spells/seizures the patient has by discussing the spells/seizures with the patient and/or care partners and reading the H&P
  - l. Communicate information about the patient's spells/seizures to the Monitor Technician and/or print the patient's H&P and give it to the Monitor Technician
  - m. For school-aged children, notify the appropriate teacher on the 7<sup>th</sup> floor that the patient has been admitted. Teacher contact information can be found in the Epilepsy Monitoring Room on the bulletin board
- II. Differences in the admission process between scalp EEG monitored patients and intracranial monitored patients exist. Therefore, the EMU nurse should reference the "Guidelines for Intracranial Monitoring in the Epilepsy Monitoring Unit" when intracranial monitored patients are being admitted to the EMU.



## EMU Nurse Responsibilities – Discharges

- I. On the day of discharge, the EMU nurse should coordinate the following:
  - a. Once the patient has been notified of the discharge for the day, the EMU nurse should help the patient arrange transportation home. If the patient needs a Medicaid cab, the unit's Case Manager should be notified of the likely discharge and he/she should coordinate transportation for the patient.
  - b. Once the patient's EEG is reviewed, the EMU team will speak with the patient
  - c. Once the EMU team has confirmed discharge, an EEG Technician will come remove the EEG leads, once he/she is notified by a physician to do so\*  
\*If applicable, the EMU nurse can remove the EEG leads from the patient's head using collodion remover, taking extreme precautions to ensure that the remover does not come in contact with the patient's eyes.
  - d. Despite having the EEG leads removed, the patient still needs to remain on camera at all times until he/she is discharged. They may shower, however someone must stand outside the bathroom at all times.
  - e. Return all home meds from security box back to patient (Give security envelope tracking slip to patient).
  - f. If the patient is being discharged on a new antiepileptic drug, the EMU nurse should ensure that the patient will be able to obtain this drug from their pharmacy. Newer AEDs, like Lacosamide, can be difficult for patient's to obtain and sometimes it is easier for patients to have prescriptions for new AEDs filled at Barringer pharmacy.
  - g. Discharge instructions should be reviewed with the patient and patient education related to the patient's discharge diagnosis should be provided and documented in EPIC (i.e. the "Nonepileptic Spells" handout should be provided to all EMU patients diagnosed with nonepileptic spells).
  - h. When the patient is officially discharged and is physically leaving the EMU, the EMU nurse should notify the Monitor Technician so that he/she can document the actual discharge time on the "EMU Seizure Tracking Form".
- II. For patients being diagnosed with Nonepileptic spells, the EMU nurse should refer to the "Procedures After Diagnosis of Nonepileptic Spells (NES)" to be familiar with what needs to happen for the patient prior to discharge
- III. Differences in the discharge process between scalp EEG monitored patients and intracranial monitored patients exist. Therefore, the EMU nurse should reference the "Guidelines for Intracranial Monitoring in the Epilepsy Monitoring Unit" when intracranial monitored patients are being discharged from the EMU.

## EMU Nurse Responsibilities – Daily Care of EMU Patients

- I. In addition to the standard nursing expectations for caring for patients on 6 Central, the EMU nurse will do the following:
  - a. Hold all morning antiepileptic drugs scheduled between 0800 and 1000 until the Epilepsy team has rounded and discussed their plan of whether or not to change the patient's AED regimen
  - b. Utilize seizure rescue medications as needed
  - c. Ensure that emergency equipment is present at the bedside and functioning (including oxygen, suction, and an age-appropriate Ambu bag) and that there are blue seizure pads on the patient's bed
  - d. Perform a head/forehead skin check to check for signs of erythema or irritation. Differentiate between a patient complaint of HA and pain from an EEG lead.
  - e. Ensure that there are no sharp objects or clutter around the bed in order to prevent fractures, lacerations, and/or bruises if the patient falls
  - f. Assist the patient in attempting to trigger seizures including doing the following:
    - i. Encourage the patient to visit the dayroom and/or use the exercise bike or Nintendo Wii. Patients who are at risk of falling should not ambulate unaccompanied in the dayroom. Prior to moving a patient to/from the dayroom, the EMU nurse must notify the Monitor Technician.
    - ii. Sleep deprive the patient if the Epilepsy team has decided to do so. The EMU nurse must notify the Monitor Technician that a patient is being sleep deprived once the team decides that it is necessary.
      1. If a patient is being sleep deprived in an effort to reverse their day/night cycle (as is sometimes done when the patient has seizures out of sleep and needs an ictal SPECT), the patient can sleep until 1800, but then must remain awake until 0600 the next morning. At that point, the patient should be allowed to sleep for as long as they can.
      2. If a patient is being sleep deprived in an effort to stress their body to trigger a seizure, the patient must stay awake from the time they are told they are being sleep deprived until 0600 the next morning. At that point they can take a nap, but must not sleep longer than 2-3 hours. Allowing them to sleep longer than 2-3 hours will simply reverse their day/night cycles
  - g. Ensure that the patient is wearing the EEG equipment pack at all times (excluding infants who are not yet crawling/walking)
  - h. Night shift: Ensure bed alarms are on "exit" after 2100 and that all doors are kept open to allow better auditory recognition of seizures.
- II. EMU nurse should reference the "Guidelines for Intracranial Monitoring in the Epilepsy Monitoring Unit" when intracranial monitored patients are being monitored in the EMU.

## EMU Nurse Responsibilities – Event Response

In order to ensure that a nurse responds to all EMU events immediately, the EMU nurse should never leave the unit and/or use the restroom without arranging for another nurse to cover him/her.

The EMU nurse's response to a patient's event will vary depending on what kind of spells/seizures the patient has, but monitoring the amount of time a spell/seizure lasts is required of the EMU nurse for all events. Ensuring patient safety should always be the EMU nurse's number one concern during a spell or seizure. Once a patient's safety during his/her spell/seizure is established, the EMU nurse's next priority should be performing an ictal exam on the patient.

- I. All ictal exams should consist of asking the patient to do the following:
  - a. "Tell me your name"
  - b. "Raise your arms"
  - c. "Remember the color \_\_\_\_"

\*The patient should continually be asked to do a. and b. until he/she is able to successfully do both. The color should only be announced once.

At this time, once the patient is post-ictal, the nurse should ask the patient to do the following:

- d. "What color did I ask you to remember?"
    - e. An assessment of the patient's spell: "Why did you push the button, what were you feeling, etc?"
- II. Other parts of an ictal exam should be based on the patient's symptoms and/or the likely cause of the spells/seizures and may include the following:
  - a. If a patient complains of feeling dizzy or lightheaded, a set of vital signs and/or blood glucose measurement should be obtained
  - b. If a patient complains of feeling numbness or tingling, the EMU nurse should ask questions including what parts of the body are involved and/or whether the numbness or tingling is getting worse or better with time
  - c. If a patient complains of visual changes, the EMU nurse should ask the patient to look at objects around the room and name them
- III. Once the patient's spell/seizure has ended, the EMU nurse should do the following:
  - a. If the patient was not back to his/her baseline when the EMU nurse left the room, the EMU nurse should return to assess the patient every 5 minutes until he/she appears to return to baseline. If the patient does not return to baseline after 15 minutes and/or the patient's care partner states that he/she is concerned about the patient's post-ictal period, the EMU resident should be notified immediately.

- b. The EMU nurse should communicate with the Monitor Technician what the event looked like so that he/she can document the event details on the “EMU Seizure Tracking Form”
  - c. Document the seizure in EPIC
- IV. During a generalized tonic-clonic seizure, or convulsion, the EMU nurse should follow the steps listed on the patient education handout “First Aid for Seizures (Adults)”, which includes the following:
- a. Turn the patient on his/her side
  - b. Prevent injury by moving away any objects that might injure the person during their seizure. Cushion head
  - c. Do not restrain patient
  - d. Administer oxygen and suction sides of mouth as appropriate
  - e. Uncover patient/loosen clothing
  - f. Time seizure
  - g. Remain with patient until return to baseline

### **Seizure Exacerbation Protocol**

1. Call the EMU resident immediately for:

>1 GTC within 24 hours

>3 Complex partial seizures within 24 hours

Seizure lasting >3 minutes

Call EMU resident first, then if no answer after 5 minutes, call neurology resident AND EMU fellow

2. Administer appropriate rescue medication

A verbal order must be given before any rescue medication is administered. IV Ativan should always be the first line treatment. In the event that a patient does not have an IV or the IV is not functioning, Midazolam should be used (IM for adults and IN for peds).

- V. Post ictal

Never restrain a post-ictal patient. It is common for some patients to become confused, agitated and/or exhibit wandering behaviors. While keeping the patient’s safety in mind, nurses and PCA/Ts should never hold a patient down. Doing so can lead to increased agitation and can compromise the safety of that patient.

## **Antiepileptic Drug Withdrawal Policy**

We do not routinely reduce AEDs prior to admission.

We counsel all patients prior to admission that AEDs may be reduced or stopped during the admission.

All patients with AED reduction have an IV placed and a benzodiazepine rescue protocol ordered.

We require 24 hours after restarting AEDs before discharge.

We usually do not withdraw barbiturates and benzodiazepines.

Whether AEDs are tapered is determined on an individual patient basis. AEDs are not usually withdrawn for patients having frequent seizures at baseline.

Rate of AED withdrawal is determined by preadmission seizure frequency, severity, patient and drug characteristics, but AEDs are often tapered by 1/3 or 1/2 on day 1, another 1/3 on day 2, and stopped on day 3.

Reduction is modified as needed if seizure clusters, more prolonged, or more intense seizures occur.

## GUIDELINES FOR THE TREATMENT OF STATUS EPILEPTICUS

These guidelines have been developed to ensure the safety and rapid treatment of patients who are developing status epilepticus. For the purpose of these guidelines, **status epilepticus** will be defined as seizures occurring in close succession without recovery to the baseline level of consciousness or, alternatively, continuous motor seizure activity lasting 10 minutes or more.

In general, these guidelines will not apply to non-convulsive prolonged confusional states, although in selected instances these guidelines may also be applied if it is deemed appropriate by the responsible physician.

Convulsions lasting longer than 20 to 30 minutes may induce brain damage. Prolonged status epilepticus can lead to coma or death. Therefore, status epilepticus will be treated as a medical emergency.

1. When the patient is assessed to be in status epilepticus, it is the responsibility of the nursing staff to:
  - a. STAT page the neurology resident on call and the epilepsy unit resident
  - b. Have equipment and supplies ready to start an IV
  - c. Start the IV. STAT page the IV team if IV access is difficult.
  - d. Attach the EKG leads from the Lifepak to the patient.
  - e. Monitor the patient's vital signs frequently.
  - f. Protect the patient from serious physical injury, aspiration, suffocation, or falls.
2. It is the responsibility of the physician to:
  - a. Start the IV if the nursing staff is unable to get adequate venous access.
  - b. Monitor the patient's cardiac rhythm and respiratory status.
  - c. Establish an adequate airway, if necessary, by intubating the patient during an interictal or postictal phase.
3. The total IV dose will be chosen on admission using the following guidelines:

**(The patient should be closely observed for signs of respiratory depression throughout status epilepticus and especially during drug administration.)**

### A. DIAZEPAM (Valium) IV:

#### Pediatric:

0.1-0.5mg/kg body weight

#### **Max. rate of administration:**

5mg/min

#### Adult:

0.15-0.25mg/kg (or 5-15mg)

#### **Max. rate of administration:**

5mg/min

OR

**LORAZEPAM (Ativan) IV:**

**Pediatric:**

0.05-0.1mg/kg body weight

(Range total dose 1-4mg)

**Max. rate of administration:**

2mg/min

**Adult:**

0.1mg/kg body weight

(Range total dose 4-8mg)

**Max. rate of administration:**

2mg/min IV push

**B. FOSPHENYTOIN (Cerebryx) IV:**

**Pediatric:** (Up to 20kg body weight)

20mg P.E./kg body weight

**Recommended Rate of administration:**

100mg/min

**No faster than:**

150mg/min slow IV push

Flush with Normal Saline

**Adult:**

20mg P.E./kg body weight

**Max. rate of administration:**

100mg/min slow IV push

**No faster than:**

150mg/min slow IV push

Flush with Normal Saline

Patients at risk for developing cardiopulmonary toxic manifestations (e.g. hypotensive individuals, those with preexisting compromised cardiac or pulmonary function), patients with a history of liver dysfunction, and patients >65 years old should receive fosphenytoin (Cerebryx) at a rate not to exceed 100mg/min. Fosphenytoin has less potential for cardiac side effects than phenytoin; however, **fosphenytoin still has the potential to result in severe hypotension. Excessive dosage and/or rate of administration may result in cardiac and respiratory arrest.**

Blood pressure and heart rate will be monitored at the beginning of the infusion and every 10 minutes during the infusion.

All patients receiving IV fosphenytoin (Cerebryx) will have continuous EKG monitoring during administration. If hypotension or bradycardia occur, slow the infusion rate.

Systolic/diastolic blood pressure changes of +/- 20 mmHG; stop infusion.

Pulse changes of +/- 20 beats per minute; stop infusion.

If redness or other signs of infiltration occurs at the infusion site, stop the infusion.

**C. MIDAZOLAM (Versed) IV:**

**Pediatric:** (up to 20 kg body weight)

0.2mg/kg IV push or IM

**Max. rate of administration:**

Total dose over 2 minutes

**Adult:**

0.2mg/kg (5-15mg) slow IV push

**Max. rate of administration:**

5mg/min

4. The physician will determine if transfer to the NNICU is indicated. Nursing staff will assist in the transfer by notifying the NNICU staff and physically assisting in the transfer.
5. If the patient clears after being transported to the NNICU and there has been an adequate period of observation, they may return to the EMU. Alternatively, the patient may be admitted to the NNICU for continued treatment or observation.



## **EMU Nurse Responsibilities – Troubleshooting EEG Equipment**

EEG Technologists' work hours are 0630-2300 daily. From 2330 to 0630, or during other times when an EEG tech is not available, EMU nurses are expected to assist with the following EEG duties:

- I. Remove EEG electrodes for unexpected discharges or procedures
- II. Gel ground and/or reference or other relevant electrodes after EEG hours if the Monitor Technician observes that the EEG recording does not look good. For an example of an EEG recording with a bad ground and/or reference electrode, see Bryan Anderson's "Epilepsy Competency 2013" presentation.
- III. Switch the patch panel to the appropriate designated area if the patient is moving to another room
- IV. Reboot a system when needed (rebooting instructions are posted on the side of the IT rack in the equipment room).
- V. Change patient cables or push button cables if either are believed to not be functioning.

## Policies and Procedures for Ictal/Interictal SPECT

1. The order for an ictal or interictal SPECT is to be entered into EPIC by the resident no later than 0900 for the same day scan, or before 1600 for the next day scan.
2. A nuclear medicine staff member will call the floor to confirm the order and to determine when the patient typically seizes (in an attempt to have the medication available during that time).
3. The resident or attending physician is responsible for explaining the procedure to the patient.
4. The resident or attending physician is responsible for ascertaining if the patient will require sedation while in the scanner.
5. If the patient is a woman of child-bearing age, the resident is also responsible for asking the patient if there is any chance she might be pregnant. If the answer is no, the physician must document this. If the answer is yes, a serum HCG must be ordered to ensure the patient is not pregnant.
6. The nurse who is to administer the injection must have completed the New-Hire Radiation Safety course taught by the Radiation Safety Officer or a designee, as well as yearly mandatory retraining. Records of this education are kept by the Radiation Safety Officer.
7. The patient's nurse is responsible for inserting a peripheral IV line if the patient does not have one. In addition, the extension tubing should be attached to patient (see "Ictal/Interictal SPECT Preparation" below).
8. A blue pad should be placed under the patient's arm where the IV is located.
9. The patient's nurse is also responsible for giving the patient the "*What is a SPECT scan*" patient education handout (PE 04017 on the patient education repository) and documenting this under Education-Epilepsy in Epic.
10. A nuclear medicine staff member will deliver the radioactive tracer to the unit (typically by 0900 if the order was entered in EPIC the previous business day) and will notify the nurse that the tracer has arrived. The solution will arrive in a lead case with a syringe that is lead coated. It should remain in that case until the time of administration. The dosimetry ring and gloves must be worn whenever handling the case or syringe.
11. The nursing staff should alert the monitor technician to notify him/her as soon as any signs of seizure activity appear.
12. The nurse caring for the patient scheduled to receive the injection must remain on the unit and be readily available at all times until the patient is injected. If the nurse must leave the unit, he/she must arrange for another nurse who is qualified to do the injection to cover for him/her. The nurse should notify the monitor technician which nurse will be covering for him/her and report back when returning to the unit. **TIMING IS CRITICAL!** The injection must be performed within 45 seconds of the seizure onset. The closer to the onset of the seizure you inject, the better the scan.
13. At the first sign of seizure, the nurse must:
  - a. Obtain the radioactive tracer from the epilepsy monitoring room
  - b. Rush to the bedside
  - c. Ascertain the spell is beginning and that the spell is typical for the patient.
  - d. Inject the tracer. As you begin to inject, speak loudly and say "push" in order to note the exact time of the injection.

- e. Flush with attached 10cc normal saline.
  - f. Re-cap all syringes and place in lead box
  - g. Flush with 20cc normal saline.
  - h. Gather blue pad, return to EMU, place gloves and syringes in lead box, and place all materials in yellow hazard box.
  - i. If the patient is on isolation precautions, place the entire lead carrying box as well as the lead syringe in a clear plastic bag before placing it in the cardboard box lined with a radiation contamination bag, in order to ensure proper cleaning of the lead box and syringe before use for the next patient.
  - j. The monitor technician should make note of the injection time and seizure onset and completion time on the nuclear medicine form entitled “Inpatient Brain SPECT Worksheet”.
  - k. Either the monitor tech or the nurse performing the injection should notify a staff member in the Nuclear Medicine department that the patient has been injected by calling 3-3372 and documenting on the “Inpatient Brain SPECT Worksheet” the name of the person notified of the injection as well as what time he/she was notified. If there is no answer at 3-3372, please use the number 4-9368 instead. The Nuclear Medicine staff member will arrange for transportation to take the patient to nuclear medicine (typically a SPECT scan is done by 1600).
  - l. The nurse that performed the injection must also sign this form.
  - m. The Environmental Health and Safety department must be notified that the dose has been administered and whether it was an ictal or interictal injection. They will come to the EMU to check the nurse and the patient’s bed for any spillage of radioactive material and the dose of radiation and the trash box with them to the Nuclear Medicine Department. The nurse can also be checked for spillage by any other qualified person, including any monitor technician that has been trained to do so by the Radiation Safety Officer.
14. The nuclear medicine form entitled “Inpatient Brain SPECT Worksheet” will be sent to the Medical Records department by the nuclear medicine staff member performing the SPECT scan in order to ensure that this form is scanned into the patient’s medical record.
15. The nurse performing the injection should write a progress note in the patient’s chart describing the event and noting the time of injection.
16. Radioactive tracers are only stable for a limited amount of time. Neurolite is stable for 6 hours after radiolabelling while Ceretec is only stable for 6 hours after radiolabelling if stored in a refrigerator and 4 hours if not refrigerated. If the patient has not had a spell by the expiration time, an interictal injection can be performed (an injection that is done when the patient has not had a seizure). If this should occur, you should inject the patient in the same manner described above and follow the same steps for notifying the Nuclear Medicine and Environmental Health and Safety departments.
17. Should radioactive contamination occur at any point during the injection on the skin or clothes of the nurse performing the injection or in the environment surrounding the patient, not including the absorbent pad placed under the patient’s arm with the IV in it or on the patient directly, please do the following:
- a. Ask the monitor technician to call the Environmental Health and Safety and Nuclear Medicine departments immediately to notify them that a contamination has occurred.

- b. Do not leave the room where the contamination occurred until the Radiation Safety Officer arrives in order to prevent spreading contamination outside of the patient's room.
  - c. Cover the contamination with an absorbent pad.
  - d. Wait for the Radiation Safety Officer to arrive to provide further instructions.
  - e. A Quality Report may be requested by the Environment Health and Safety department.
18. Should radioactive contamination occur at any point during the injection on the patient directly or on the absorbent pad placed under the patient's arm with the IV in it during the injection, please do the following:
- a. Ask the monitor technician to call the Environmental Health and Safety and Nuclear Medicine departments immediately to notify them that a spill has occurred.
  - b. Gloves should be worn at all times for the following steps:
    - i. Have someone bring a yellow contamination bag to the patient's room.
    - ii. Place all contaminated materials in the yellow contamination bag.
    - iii. Place the yellow contamination bag in the cardboard box lined with another yellow contamination bag.

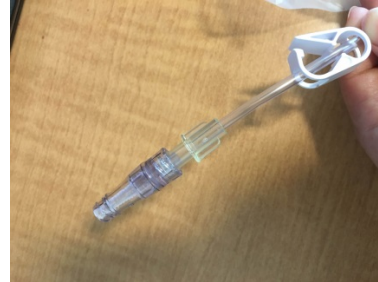
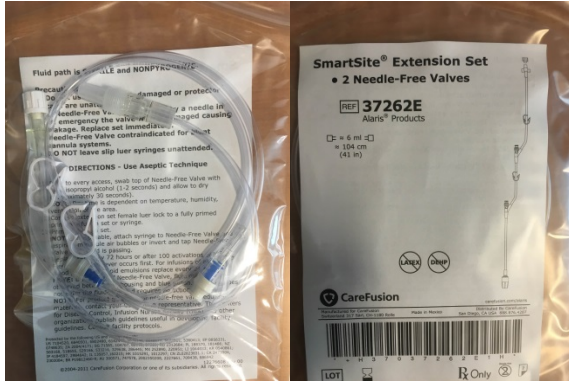
ADDENDUM: If Ceretec is the radioactive tracer being used, please note the following changes to the Ictal/Interictal SPECT Policies and Procedures:

1. If Ceretec is the radioactive tracer being used, a nuclear medicine staff member will also speak with the patient's nurse to ensure the patient is not currently taking an SSRI since methylene blue has the possibility of causing a life-threatening serotonin syndrome when given to patients taking SSRIs. \*Please note that per the package insert for Cymbalta "the risk of administering methylene blue by non-intravenous routes (such as oral tablets or by local injection) or in intravenous doses much lower than 1 mg/kg with Cymbalta is unclear. The clinician should, nevertheless, be aware of the possibility of emergent symptoms of serotonin syndrome with such use".
2. If the patient is on a SSRI, the nurse will contact the ordering physician to determine whether the SSRI should be held while the patient is being given the injection.
3. If Ceretec is the radioactive tracer being used, the nurse should inform the patient that their urine may be discolored due to the presence of methylene blue in the injection.
4. If Ceretec is the radioactive tracer being used, the nuclear medicine staff member who is delivering the dose should place the dose in the refrigerator and ensure that the refrigerator temperature is within an acceptable range. He/she will document the refrigerator temperature in the "Refrigerator Temperature Log" located in the Nuclear Medicine department. If the refrigerator temperature is not within an acceptable range when checked by the nuclear medicine staff member, the expiration time for Ceretec will be changed to ensure the dose is used within 4 hours (rather than the standard 6 hours).

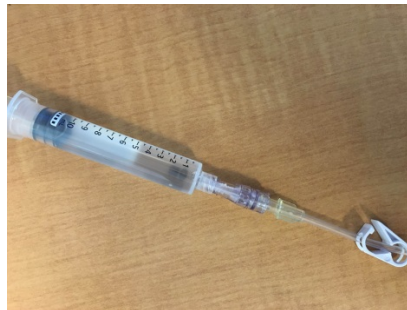
Created: 03/12/13 Revised: 05/10/16

## Ictal/Interictal SPECT Preparation

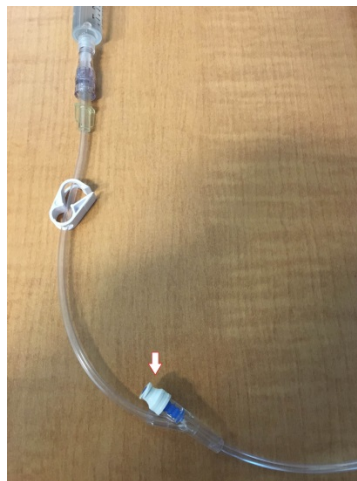
1. At start of day shift, obtain IV extension tubing, attach cap to end, and flush/prime with NS.



2. Attach 10ml NS syringe to tubing and attach other end to patient.



3. When injecting tracer, inject through top port and flush immediately with pre-attached syringe. Flush twice more with 2 10mL syringes.



## **Procedures for Use of Wii System for EMU Patients (Including Patients on Isolation Precautions)**

1. Patient's nurse will be alerted that the patient wants to use the Wii (if the patient is experiencing diarrhea, he/she **CANNOT** use the Wii).
2. The staff member bringing the Wii to the patient must fill in the first five columns of the "Wii Equipment Sign In/Sign Out" form located on the cart. (Please note that only one game can be removed from the security box at a time. If the patient wishes to switch games, the form must be filled out again in order to ensure the original game is returned to the security box).
3. The staff member can remove the security box key from the HUC desk
4. Equipment can only be removed from the security box while the cart is outside of an isolation room. The security box cannot be opened while the cart is inside the isolation room.
5. Prior to bringing the Wii system into the patient's room, the cart and controllers must be thoroughly cleaned with the Super Sani-Cloth Wipes (and allowed to dry for two minutes before bringing into the patient's room).
6. A clean sheet is to be placed over the patient's bed and bedside table (and any other surfaces the controllers might rest on while in the patient's room).
7. The patient's hands are to be cleaned with hand sanitizer before and after touching the Wii controllers.
8. The controller strap must be worn by the patient around his/her wrist **AT ALL TIMES** to prevent injury from accidentally letting go of the controller.
9. After patient use, the cart and controllers must be thoroughly cleaned with Super Sani-Cloth Wipes.
10. After patient use, the cloth straps of the controllers must be removed from the controllers and saturated with CaviCide solution. A clean set of controller straps (found in the security box attached to the Wii cart) can be applied to the controllers while the saturated straps are air drying.
11. If the cloth controller straps are stained or soiled with blood or bodily fluids, they must be thrown away and replaced.
12. The staff member returning the Wii to the epilepsy monitoring room must fill in the last three columns of the "Wii Equipment Sign In/Sign Out" form located on the cart and return the security box key to the HUC desk.
13. Meghan Cronk, EMU Nurse Coordinator, will be monitoring the Wii usage and cleaning. Any person not abiding by the policy and procedure will not be allowed to use the Wii System for his/her patients.

Created: 04/18/13 Revised: 07/09/13, 08/07/13

### Wii Equipment Sign In/Sign Out

<b>Date</b>	<b>Staff Member Taking Wii to Patient</b>	<b>Time System Brought to Patient and Key Removed from HUC Desk</b>	<b>Wii System Disinfected Before Use (Yes/No)</b>	<b>Equipment Taken Out of Security Box (Controller 1 and/or 2 and Name of Game)</b>	<b>Wii System Disinfected After Use (Yes/No)</b>	<b>Equipment Returned to Security Box (Controller 1 and/or 2 and Name of Game)</b>	<b>Time System Returned to Epilepsy Monitoring Room and Key Returned to HUC Desk</b>

## **Procedures for Non-Formulary Controlled Medications for Epilepsy Monitoring Unit Patients**

1. Patient is admitted to the inpatient Epilepsy Monitoring Unit on a non-formulary controlled medication
2. If the non-formulary controlled medication is an AED or a stimulant and is clinically relevant to the EMU admission, as determined by the EMU resident, such as in the case of characterization of behavioral spells the following must occur:
  - a. The resident will enter the order for a non-formulary medication in EPIC.
  - b. Once the medication is approved for use, the following must occur:
    - i. The “Patient Acknowledgement of Responsibility for Use of Non-UVA Medications” form must be completed and signed by both the physician and the patient/guardian (in HUC desk).
    - ii. In front of the patient, the nurse and shift manager will count the medication and document the count on the appropriate controlled substance sheet (red or black).
    - iii. Both the nurse and shift manager will sign the controlled substance sheet.
    - iv. A nurse or shift manager will bring the medication, the signed controlled substance sheet and the “Patient Acknowledgement of Responsibility for Use of Non-UVA Medications” form to the pharmacy where another count will take place between the nurse/shift manager and a pharmacy supervisor or the pharmacy narcotic technician. Both personnel performing this count will again sign the controlled substance sheet with the count.
    - v. Pharmacy staff will store the controlled substance sheet and medication in the pharmacy narcotic vault. The “Patient Acknowledgement of Responsibility for Use of Non-UVA Medications” form will be returned to the nurse along with a completed medication identification form signed by the pharmacist, both to be placed in the bedside chart.
    - vi. The pharmacy staff will document on the controlled substance sheet every time a dose is administered to a 6 Central staff member to be brought up to the patient.
    - vii. The dose given to the 6 Central staff member should have a printed label on it to allow the bedside nurse to scan the medication when administering it to the patient.
3. The patient’s medication will be secured in the inpatient pharmacy in a vault and each dose must be picked up by a staff member with a UVA identification badge. Each dose will have to be picked up in this manner until the patient is discharged.
4. When the medication no longer needs to be stored in pharmacy due to discharge, the following should occur.
  - a. A nurse will pick up remaining medication from pharmacy.



- b. Nurse and pharmacy supervisor or pharmacy narcotic technician will perform a count of the medication and document on the controlled substance sheet.
  - c. When nurse returns to the floor, he/she will perform a final count in front of the patient with the shift manager and both the nurse and the shift manager will sign the controlled substance sheet.
5. If there are questions about this procedure, please contact Kathleen Bledsoe (PIC 3259) or Michelle McCarthy (PIC 2587) to discuss the matter further.

## Procedure after Diagnosis of Nonepileptic Spells (NES)

1. The EMU team reviews a patient's spell and determines that it is a psychogenic nonepileptic spell (nonepileptic spell or NES).
2. On the day of discharge, the EMU team explains to the patient that they have NES and that Dr. Donna Broshek and/or his colleagues will be by to explain what this means before the patient is discharged.
3. If the patient is being discharged on Monday-Friday, the resident will do the following:
  - a. Enter an order in EPIC for "Inpatient consult to Neuropsychology" (under reason for consult, the resident should write "Diagnosis of nonepileptic spells").
  - b. E-mail Irene Wing ([IEW6R@hscmail.mcc.virginia.edu](mailto:IEW6R@hscmail.mcc.virginia.edu))
  - c. Page Dr. Broshek at 4163
4. Neuropsych will come to EMU to evaluate the patient.
5. Neuropsych will make recommendations for services and create an action plan for the patient. If he feels the patient would benefit from seeing the Psychiatry team prior to discharge, he will make the EMU team aware and an order for an inpatient Psychiatry consult will be placed in EPIC.
6. If the patient is being discharged on Saturday, Sunday, or a holiday, the resident should enter an order in EPIC or "Inpatient consult to Psychiatry" only and bypass the neuropsychology consult. Under reason for consult, the resident should write "Diagnosis of nonepileptic spells." \*Please note, an order should only be placed after the EMU resident has had a discussion with the Psychiatry Consult resident regarding how long it will take them to see the patient. If this cannot be done within a reasonable time frame, substantially delaying the patient's discharge as a result, and the EMU team feel the patient is safe to be discharged, an outpatient appointment with Dr. Broshek should be made and the patient can be discharged.
7. Dr. Broshek will communicate proposed action plan for the patient to the unit's social worker.
8. The unit's social worker will see the patient prior to discharge and do the following:
  - a. Make follow-up appointments for the patient based on neuropsych's recommendations.
  - b. Send a cover letter and review article about NES to the providers with whom follow-up appointments have been made (patient consent must be obtained prior to doing this).
9. The resident should make a follow-up appointment for the patient to see the LIP that referred him/her to the EMU 2-3 months after discharge (this enables the referring LIP to ask the patient if they followed through with the action plan created for them when they were discharged from the EMU).

10. In addition to discharge instructions, the discharging nurse will provide the patient with the following handout: “Nonepileptic Spells (NES) or Pseudoseizures” from the Patient Education Repository (PE 04055).

11. It is NOT intended that this procedure provides therapy for the patient. It is intended to reaffirm the diagnosis to the patient, obtain a relevant psychosocial history, and direct the patient to appropriate long-term psychiatric intervention.

## **Guidelines for Intracranial Monitoring in the Epilepsy Monitoring Unit**

These guidelines are provided to ensure a safe and successful seizure monitoring with intracranial electrodes.

Patients with electrodes in the head (intracranial electrodes) have undergone a major surgical procedure, and the cost of the electrodes range from \$5,000 to \$10,000 depending on the type and number. The success of these recordings depends on these electrodes' working, but they are extremely fragile. The wires are thin and easily cut or broken, and one of the weakest points is where the electrodes are connected to the EEG cables. Any tension at the connection can break the connection and make the electrodes useless. Broken connections have happened. Because we don't know which of the electrodes will point to where the seizures start, we need to be sure that all are working.

The major purpose of these guidelines is to make sure that the electrode wires are protected. In these guidelines one of the main goals is to prevent any tension on the electrode wires and the connections to the EEG cables. The cables to the EEG must be firmly attached to the head bandage so that the connections and electrode wires are under no strain. **AT NO TIME SHOULD THE CONNECTIONS BE ALLOWED TO HANG FREELY AND UNSUPPORTED**

### General guidelines

- After electrode placement in the operating room, the patient will be monitored overnight in the NNICU
- Neurosurgery is the patient's primary team while they are admitted to the EMU and Epilepsy is the consulting team
- In order to prevent falls caused by sudden onset of seizures, the patient must not ambulate unaccompanied at any time. If left alone in the room, he/she must remain either sitting in the chair or in bed
- To ensure lead integrity, the monitor pack must be worn by the patient at all times, including while lying in bed

### Neurosurgery expectations (residents, PAs, or NPs)

- Prior to transferring the patient to the EMU, neurosurgery will make sure the patient has had the necessary imaging while in the NNICU (MRI and/or CT scan)
- Neurosurgery will consult the EEG fellow prior to making any changes to the patient's antiepileptic drugs. Epilepsy team members may enter orders for ICM patients if requested to do so by the Neurosurgery team
- Dressing changes are always to be done by a member of the Neurosurgery team, as it is the time for them to assess the incision

- When dressing changes are done, a tension loop must be made with the wires to prevent displacement of the electrodes. Scissors should not be used to remove the old bandage in order to prevent accidentally cutting an electrode wire
- As soon as a date/time for surgery after monitoring is decided on, a Neurosurgery team member must notify the Epilepsy fellow so they can notify the EEG techs

#### EEG technician expectations

- On the day of transfer to the EMU, the EEG techs will connect the electrodes to the monitoring system. If the patient is transferred to the EMU after 1600, the techs will connect the electrodes to the monitoring system the next day
- When the EEG tech connects the electrodes to the monitoring system, the equipment pack must be strapped to the patient. If the patient refuses to wear the equipment pack, the EEG tech must notify the Epilepsy fellow
- The EEG tech will perform daily push button tests. During the push button tests, the EEG tech will also check equipment integrity. If there are any issues with the integrity of the equipment, the EEG tech must notify the Epilepsy fellow
- If the patient wants to go to the dayroom, the EEG tech and the patient's nurse will coordinate a time to move him/her since the base station in the dayroom is insufficient for monitoring intracranial patients

#### Nursing expectations

- Antiepileptic drugs scheduled to be given between 0800 and 1000 will be held until the Epilepsy team decides if any changes will be made
- If a nurse feels ativan is necessary (either because of seizure length or frequency), the Epilepsy fellow is to be contacted prior to administering it to the patient. Contact Dr. Elias (PIC 2062) if the Epilepsy fellow does not respond. ICU staff will make this decision while the patient is in the ICU
- When a nurse performs neurological checks on the patient every 4 hours, he/she will also check that the patient is wearing the equipment pack. If the patient is not wearing the pack, the nurse will apply the pack to the patient. If there is not enough equipment to apply the pack to the patient (i.e. not enough straps or incorrect sized straps), the nurse will notify the EEG tech. If the patient refuses to wear the pack, the nurse will notify the Epilepsy fellow
- On the day of surgery after monitoring, if the OR sends for the patient before an EEG tech is available in the hospital, the nurse will disconnect the patient by unclipping the black wires that plug into the green equipment pack. When report is called to the OR/SAS, the nurse must be made aware of the fact that the equipment is not to be thrown away and that it should stay with the patient at all times and return to the unit with the patient

#### Epilepsy fellow expectations

- When the patient is transferred to the EMU, the epilepsy fellow will ensure the patient has all the necessary imaging done (MRI and/or CT scan), prior to him/her being connected to the monitoring system
- The Epilepsy fellow will communicate medication changes daily to both Neurosurgery and the EMU nursing staff
- When the Epilepsy team rounds on the patient, the Epilepsy fellow will verify the integrity of the patient's dressing and EEG equipment. If the patient is not wearing the equipment pack, the Epilepsy fellow will ask an EEG tech to apply the pack to the patient. If the dressing needs to be changed and/or does not appear to have a tension loop, the Epilepsy fellow will ask Neurosurgery to change the dressing and/or ensure there is a tension loop
- As soon as the Epilepsy fellow is notified by Neurosurgery of a date/time for surgery after monitoring, he/she must inform the EEG techs and nursing staff of the date/time

#### Monitor Technicians

- If the patient is not wearing his/her equipment pack and or is ambulating without someone in the room, notify the nurse immediately and document his/her response on the "EMU tracking sheet"
- If the patient starts picking/pulling at the head dressing or at the EEG leads or if head dressing comes off, **immediately call nurse**. This can lead to many complications or become a medical emergency. Document the response on the sheet.

