Northwestern Medicine®

CLINICAL GUIDELINE

Subject: **NEUROSCIENCE NURSING**	Page **1 of 10**	Guideline # **NMH CCG 08.0002** Version: **3.0**
Title: **CARE OF THE PATIENT IN THE EPILEPSY MONITORING UNIT (EMU)**	Revision of: **06/04/2012**	Effective Date: **12/04/2018**
		Removal Date:

SCOPE: Applies to entities indicated below as well as their subsidiaries and affiliates

☒ **NM – Northwestern Memorial Hospital**	☐ **NM – Lake Forest Hospital**
☐ **NM – Northwestern Medical Group**	☐ **NM – Central DuPage Hospital**
☐ **NM – Regional Medical Group**	☐ **NM – Delnor Hospital**
☐ **NM – Kishwaukee Hospital**	☐ **NM – Valley West Hospital**
☐ **NM – Marianjoy Rehabilitation**	☐ **NM – Kishwaukee Physician Group**
☐ **NM – Marianjoy Medical Group**	☐ **NM – Home Health & Hospice**
☐ **NM – Centegra Physician Care**	
☐ **NM – Huntley/McHenry/Woodstock Hospitals**	
☐ **NM – Other **See "Persons Affected Section below****	

I. PURPOSE:

A. This procedural guideline will address safety, indication for admissions, specific care issues, interventions, and guidelines for education of staff in the care of patients receiving continuous video electroencephalogram (EEG) telemetry monitoring.

B. Patients admitted to the Epilepsy Monitoring Unit (EMU) will be continuously video EEG/ telemetry monitored to record epileptic or non-epileptic seizures. Many of these patients will have their seizure medications reduced or discontinued for a period of 3 to 5 days or longer in order to record seizures. Specific interventions to maintain safety, detailed seizure testing, and accurate documentation are required in order to correlate clinical findings with EEG data to make a definitive diagnosis.

II. SCOPE/PERSONS/AREAS AFFECTED:

This guideline applies to staff and patients in NSICU and 10W and 10E

III. PROCEDURAL AND THERAPEUTIC GUIDELINES:

A. Pre-Admission

1. A case review is conducted prior to the elective admission. Participants include: attending epileptologist, referring physician, and appropriate staff (e.g., residents, nurses, neurophysiology technicians) involved in the patient's plan of care.
2. Standard admission orders include: indications for video/EEG monitoring, specific criteria for seizure intervention, and chain of command for medical management accountability, as documented in the medical record.
3. The final medical responsibility shall lie with attending epileptologist.

4. An epileptologist's order is necessary for elective admission of video telemetry recording.

B. **Admission**

1. Patients will be pre-scheduled for admission to the EMU. Information on scheduled admissions will be provided to the practice manager, clinical coordinator and neurophysiology technicians the week prior to admission.
2. Patients will be admitted directly to the room upon immediate arrival. This is important since many patients are asked to withhold morning medication on the day of admission.
3. The general neurology resident is notified of the admission. The neurology resident will write admitting orders.
4. The neurophysiology technician is notified (pager 5-7603) as soon as the patient arrives, and arranges for EEG electrode placement and begins the Video-EEG monitoring.
    a. Technicians' responsibilities include:
        i. Greet patient at beginning of shift, introduce self, check patient's level of awareness, interview for events/episodes, and obtain admission paperwork.
        ii. Apply and reapply electrodes as needed.
        iii. Review EEG data.
        iv. Update neurophysiology report, as needed.
        v. Notify the nurse immediately of patient's clinical seizure activity.
5. A description of the patient's typical seizures should be documented by the neurophysiology technician on the neurophysiology report, and by the general neurology resident in the admission note.
6. A printout summarizing the patient's pertinent history and findings will be available. Nursing and technical staff assigned to patients should review this information. In particular, staff should be aware of:
    a. Reason for monitoring, either diagnostic or pre-surgical,
    b. Home antiepileptic medications and daily medication orders, and
    c. History of prolonged seizures/status epilepticus.
7. The nurse provides patient and caregiver education regarding:
    a. Safety interventions
        i. Seizure detection alarm,
        ii. Nurse call button for assistance with non-seizure related issues, and
        iii. Side rails must be padded and up at all times.
    b. Activity and mobility needs
        i. Patient must be accompanied by someone at all times whenever out of bed.
        ii. Encourage patient to read, watch TV or other activity brought from home.
        iii. Encourage family members or others to stay with patient, when possible.
8. Ensure the patient's image is centered in the middle of the viewing screen while monitored. Adjust as necessary and try to reduce glare on screen by closing the window blinds.

9. Nurses will document all seizure activity in the patient's medical record, including date, time, seizure description and specific interventions. Family members who witnessed the event should be interviewed for additional details.
10. Patients with sphenoidal leads should have insertion sites checked for signs of infection at least twice a day.

C. **Obstetric Patient Admission**

1. The EMU admission order set should be modified for the obstetric (OB) patient. Routine chest x-ray is not indicated. Benzodiazepine order should be discussed with the attending physician.
2. Admitting neurology resident will notify the high-risk OB resident (pager 5-5334) of the patient's admission, and request a high-risk OB consultation.
3. The 10 West Neurosciences clinical coordinator or charge nurse will notify the antepartum clinical coordinator or charge nurse (telephone 2-0907) of the admission. The antepartum clinical coordinator/charge nurse will deliver a fetal heart tones monitor to the EMU. The monitor will remain in the EMU for the duration of the patient's admission.
4. The antepartum clinical coordinator/charge nurse will designate an appropriately trained nurse to monitor fetal heart tones according to the following protocol:
   a. If the patient is 12 to 20 weeks pregnant, fetal heart tones are assessed once each day.
   b. If the patient is greater than 20 weeks pregnant, fetal heart tones are assessed every 12 hours (once per shift).
5. If the patient has a seizure, standard seizure precautions should be taken. The patient should be turned on her left side, when possible.
6. If the patient has a seizure, the EMU nurse or 10 West clinical coordinator/charge nurse will notify the Labor and Delivery (L & D) charge nurse (telephone 2-0807). The L & D charge nurse or a designated L & D nurse will conduct a non-stress test (NST) on the patient as soon as possible. This will be repeated after subsequent seizures unless the OB consult or neurologist orders that it is not necessary.
7. If the patient has a seizure, the neurology resident notifies the high-risk OB resident (pager 5-5334) and the attending neurologist.

D. **Invasive Monitoring**

1. Patients will be admitted to ambulatory surgery to have craniotomy for placement of cranial electrodes.
2. Postoperatively, patients are admitted to the Neuro Spine Intensive Care Unit (NSICU) for 24 hours.
3. Patient will have postoperative brain imaging (MRI or CT) prior to transfer from the NSICU.
4. Standard EMU admission guidelines are initiated upon arrival in the EMU.
5. Standard post-operative craniotomy nursing care should be followed.

IV. SAFETY REQUIREMENTS:

A. **All patients in the EMU will have;**

1. Padded side rails that are up at all times while patient is in the bed.
2. Intravenous (IV) access.
3. Suction at bedside.
4. Oxygen at bedside.
5. Pajama tops and bottoms.
6. Rescue medications readily available (e.g. lorazapam, Diastat®).

B. **Alarms**

1. Monitor alarms at the video EEG review station must be on and audible. Technical staff should check volume at the beginning of the shift.
2. Patient seizure detection push button and nurse call button must be within reach of the patient at all times.

C. **Activity**

1. Patient activity is limited to out of bed only with assistance.
2. Daily supervised ambulation is provided.
3. Patients shall be directly supervised when not in view of the video camera (e.g., bathroom use).

D. **Staffing**

1. Staff should constantly monitor patients for seizures as long as patients are off prescribed medications.
2. The neurophysiology technician must notify the nursing staff when leaving the unit.
3. The nurse must notify the technician when leaving the unit, and provide the name of the nurse covering that assignment.
4. The nurse must respond immediately to the seizure alarm to assure patient safety, assist with testing and administer rescue medication when necessary.
5. The technician must respond immediately to the seizure alarm to assure patient safety, test the patient and support the nursing staff.

V. BEDSIDE INTERVENTIONS FOR SEIZURE ACTIVITY:

1. Stand to the side of the bed closest to the door. Do not obstruct camera view.
2. Press the seizure alarm push button, unless already activated. Get additional help via nurse call system if necessary.
3. Remove top sheet and/or blanket to view the patient's entire body during videotaping (e.g., pull bedding from top or bottom of bed).
4. At the onset of a partial seizure (including auras) or non-epileptic seizure, instruct patient to do the following:
    a. Give patient a word or short phrase to recall such as "red cow".
    b. Have patient follow commands, such as "raise right arm". Do not cue patient, just give commands and see if he/she is able to follow.
    c. For further details, see "seizure testing chart" available in each room.
    d. Continue the above assessment until the patient returns to baseline or seizures progress into a generalized convulsion (see IV. 5. below).

e. Notify general neurology service if the patient has three (3) partial seizures in eight (8) hours, or two (2) discrete seizures without regaining consciousness between them, or does not return to baseline after a partial seizure within 15 minutes.

f. The nurse should also notify the epileptologist whenever lorazepam was given to the patient.

g. If the patient's seizure evolves into a generalized convulsion, establish safety measures (e.g., head protection, airway).

5. If the patient has a generalized convulsion, the nurse should institute the following:
   a. Initiate safety measures (e.g., establish airway).
   b. For convulsions longer than three (3) minutes, administer medication (e.g., lorazepam) as directed in the standard admission orders.
   c. Page the general neurology service as soon as the situation allows.
   d. Notify the epileptologist on call of any generalized seizure event.
6. Conduct postictal testing, to be done by either the technician or the nurse:
   a. Determine orientation to person, year and place.
   b. Do not go to the next question until the patient has answered the previous one.
   c. Ask orientation questions:
      i. Tell me your name.
      ii. What year is this?
      iii. Where are you?
   d. Test strength by asking the patient to hold both arms up.
   e. Engage patient to respond verbally to test postictal speech ability.
   f. Do not leave the patient until all orientation questions are answered at the patient's baseline. This will determine when it is safe to leave the patient.
7. Nursing staff will document a description of all seizure activity and measures taken in the patient's medical record.

VI. DISCHARGE

Determination to discharge the patient will be made by the attending epileptologist. The epileptologist or neurophysiology fellow will then instruct the neurophysiology technician to remove all electrodes and discontinue monitoring. After the electrodes are removed, the neurology resident will enter the patient's discharge orders.

VII. EDUCATION:

A. Nursing staff caring for patients will complete the Neuro Core Curriculum during their orientation period, which includes seizure semiology and nursing care guidelines.

B. EMU care guideline updates will be provided throughout the year via in-services, staff meetings, and annual competency testing.

VIII. GUIDELINE UPDATE SCHEDULE:

Every three years or more often, as appropriate

IX. REFERENCES:

A. NMH Patient Care Policy, 5.09PC: Use of Restraints, as of 17.MAR.2009

B. American Association of Neuroscience Nurses (2009). Care of the Patient with Seizures, second edition. AANN Clinical Practice Guideline Series, Glenview, IL.

C. American Epilepsy Society (2004). Is there an indication for a standard response time to seizures in an epilepsy monitoring unit? Abstract 1.116 accessed at http://www.aesnet.org on 8/18/2009.

D. American Epilepsy Society (2004). Epilepsy monitoring units: How much staff training is necessary? Abstract 1.125 accessed at http://www.aesnet.org on 8/18/2009.

E. American Epilepsy Society (2004). Seizure activation maneuvers in epilepsy monitoring units. Abstract 2.204 accessed at http://www.aesnet.org on 8/18/2009.

F. American Epilepsy Society (2005). Safety of acute antiseizure medication withdrawal for phase I monitoring in an epilepsy monitoring unit. Abstract 1.048 accessed at http://www.aesnet.org on 8/18/2009.Sahoo, S. & Klein, P. (2005). Maternal complex partial seizure associated with fetal distress. *Archives of Neurology, 62*, 1304-1305.

G. Socol, Michael L. (2011). Vice Chairman and Chief of Obstetrics. Northwestern Memorial Hospital, Department of Maternal-Fetal Medicine, Chicago, IL.

H. Foundation. (2014). A revised definition of epilepsy. Retrieved April 26, 2019, from https://www.epilepsy.com/article/2014/4/revised-definition-epilepsy (Level VII).

I. Trinka, E. and others. (2015). A definition and classification of status epilepticus–Report of the ILAE Task Force on Classification of Status Epilepticus. Epilepsia, 56(10), 1515-1523 doi:10.1111/epi.13121 (Level VII)

X. APPENDICES:

APPENDIX A*: PULSE OXIMETRY MONITORING IN THE EMU*

APPENDIX B: *PULSE OXIMETRY DOWNTIME PROCEDURES*

APPENDIX C: *EMU INPATIENT FLOW*

XI. APPROVAL:

Responsible Parties:	Jillian Bergner Director, Neuro/Ortho Nursing
Reviewer:	Neuro Ortho Multidisciplinary Care Team
Approval Party:	Edward Manno MD Medical Director, NTC Electronic approval: 12/04/2018

XII. REVIEW HISTORY:

Written: 08/01/2009
Revised: 11/10/2011 – Guideline number changed from 8.01.001 CCG v1.0 to NMH CCG 08.0002 v1.0
Revised: 04/24/2012
Revised: 10/26/2018

APPENDIX A: PULSE OXIMETRY MONITORING IN THE EMU

I. PROCEDURE AND MANAGEMENT GUIDELINES:

A. Admission to EMU

1. Admit patient to continuous pulse oximetry monitoring system.
2. Document baseline oxygen saturation level.
3. Set up both a primary notification (RN assigned to patient) and secondary notification (RN team member) pager for notification of patient desaturation.

B. Interventions for patient experiencing desaturation (oximetry reading of less than 88% equal to /or greater than 10 seconds):

1. Check the pulse oximetry probe for fit and accuracy of reading.
2. Assess for seizure activity
   a. Apply oxygen via facemask at 8 to 10 L/minute. Suction as needed. Assess need for supplemental oxygen following seizure activity if saturation level returns to baseline.
   b. Follow NMH CCG 08.0002: Care of the Patient in Epilepsy Monitoring Unit (EMU) guideline section IV: Intervention for Seizure Activity.
3. Call the Neurology service or Rapid Response, as appropriate, if saturation level does not return to baseline.

II. REFERENCES:

A. (2012). *Lippincott's Nursing Procedures and Skills.* Nashville: Lippincott, Williams and Wilkins.

B. Seyal, M., Pascual, F., Lee, CY., Li, CS., & Bateman, L. (2011). Seizure related cardiac repolarization abnormalitites are associated with ictal hypoxemia. *Epilepsia,* 52(11), 2105-2111

C. Bateman, L., Li, CS., & Seyal, M. (2008). Ictal hyposemia in localization related epilepsy analysis of incidence, severity and risk factors. *Brain, 131({t12),* 3239 – 3245.

APPENDIX: A
Pulse Oximetry Monitoring in the EMU

Jillian Bergner
Director, Neuro.Ortho Nursing

Effective Date: 12/04/2018

REVIEW HISTORY:
Written: 04/24/2012
Revised: 10/26/2018

APPENDIX B: PULSE OXIMETRY DOWNTIME PROCEDURES

I. GENERAL:

A. When a Masimo unit-based oximetry (Patient Safety Net) outage is identified, clinical staff will contact Biomedical Engineering for all system related issues.

B. Biomedical Engineering will assess issues; coordinate resolution with the clinical information systems team as appropriate. The vendor will be engaged, communication will be initiated with the end-user until a resolution is provided.

II. IMMEDIATE RESPONSE:

A. The individual in charge (Clinical Coordinator or Charge Nurse) of the department or clinical area affected by the Masimo unit-based pulse oximetry (Patient Safety Net) disruption will assess and triage the monitoring needs of the patients from that area.

B. Those patients on the Pulse Oximetry Monitoring in EMU protocol are placed on Dash monitors if available. If portable monitoring is not available, patients are to have close observation and nursing care.

APPENDIX: B
Pulse Oximetry Downtime Procedures

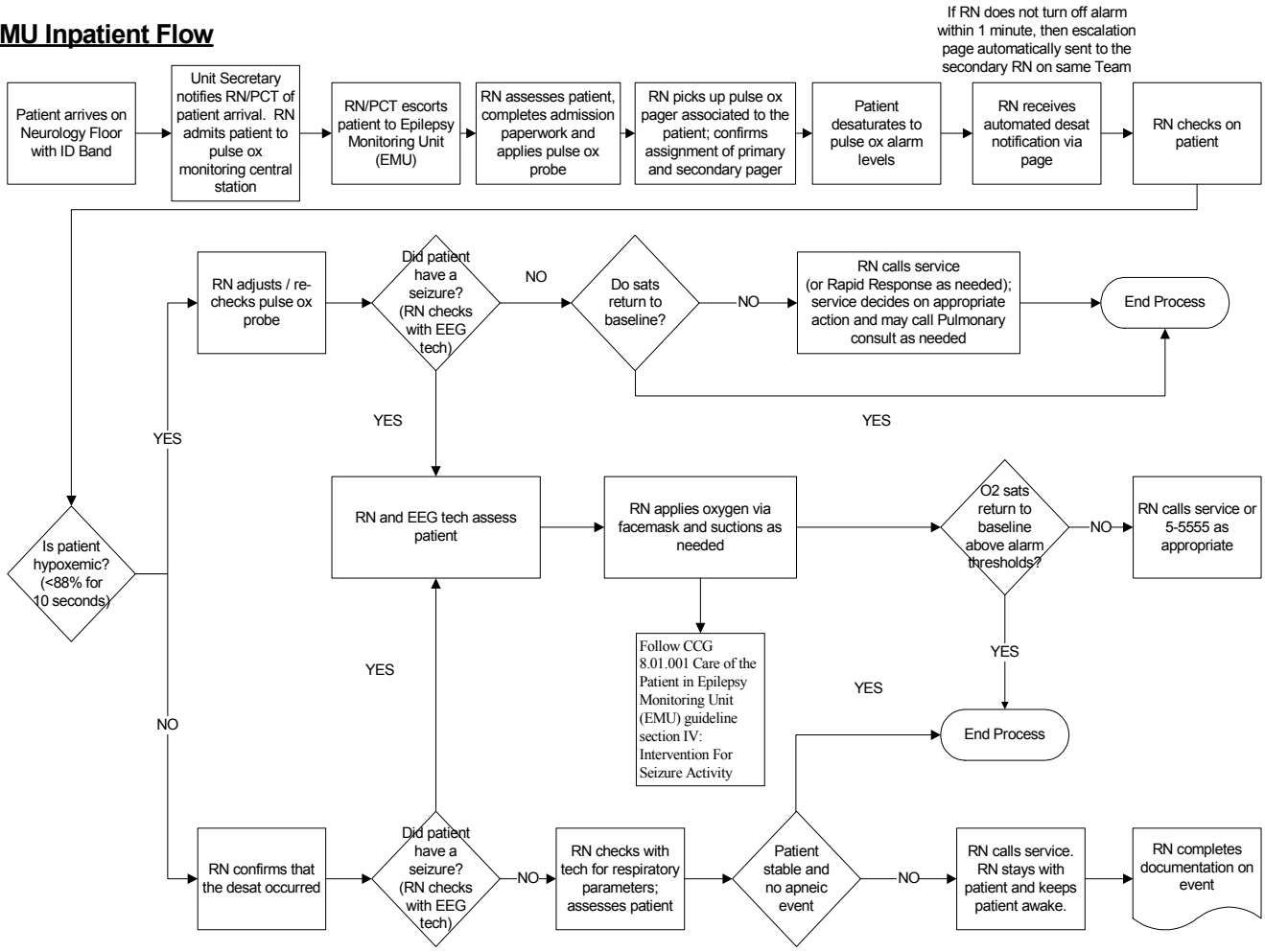
Scott Kuhrau
Sr. Clinical Engineer
Biomedical Engineering

Effective Date: 12/04/2018

REVIEW HISTORY:
Written: 04/24/2012
Revised: 10/26/2018

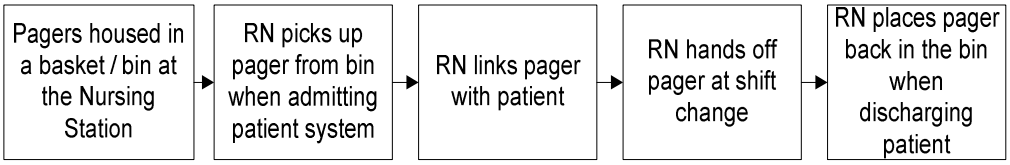
APPENDIX C: EMU INPATIENT FLOW

EMU Inpatient Flow



Equipment Flow

Pulse Ox Pagers



Note: Secondary RN / CC carrying the unit escalation pager to follow the same flow