ACGME Six Competencies

Educational Program
The residency program must require its residents to obtain competencies in the 6 areas below to the level expected of a new practitioner. Toward this end, programs must define the specific knowledge, skills, and attitudes required and provide educational experiences as needed in order for their residents to demonstrate:

Patient Care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health

Medical Knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care

Practice-Based Learning and Improvement that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care

Interpersonal and Communication Skills that result in effective information exchange and teaming with patients, their families, and other health professionals

Professionalism, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population

Systems-Based Practice, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value

http://www.acgme.org
GOALS AND OBJECTIVES
NEUROPHYSIOLOGY PROGRAM & ITS COMPONENTS

Program
The clinical neurophysiology training program is designed to provide training in a broad area of clinical neurophysiology, with a focus in one or more clinical neurophysiology modality. The trainee should develop the expertise to evaluate and manage patients using techniques of clinical neurophysiology. The training should provide preparation for the American Board of Psychiatry and Neurology Subspecialty Certification in either Clinical Neurophysiology or Epilepsy. At the end of the training, the clinical neurophysiology residents should be ready for the independent practice of clinical neurophysiology.

A second year of fellowship training is provided for in-depth training in a focused area of clinical neurophysiology, specifically epilepsy monitoring and general electroencephalography.

In addition to gaining knowledge, the training program requires from residents competencies in the areas below, to the level expected of an independent clinical neurophysiology practitioner.

a. Patient care that is compassionate, appropriate, and effective for the treatment of neurological problems and the promotion of neurological health
b. Medical knowledge about established and evolving clinical neurophysiology sciences and tools, and the appropriate application of this knowledge to patient care
c. Practice-based learning and improvement that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care
d. Interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and other health professionals
e. Professionalism, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population
f. Systems-based practice, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

Required rotations:
1– Adult EEG Laboratory: 1-3 months
2– Pediatric EEG Laboratory: 1-4 months
3– Adult Epilepsy Monitoring Unit (EMU): 1-5 months
4– Pediatric EMU: 1-5 months
5– EMG Laboratory: 0-4 months
6– Intraoperative Neuromonitoring (IONM): 0-1 month

Experience in autonomic testing, and in clinical neurophysiology of movement disorders is encouraged during one of the above required rotations.

GOALS OF EACH ROTATION

EEG — Electroencephalography - Pediatric and Adult

Medical knowledge
- Become familiar with the technical aspects of performing EEG and evoked potential (EP) studies, including intra-operative EPs.
- Recognize normal EEG and EP patterns, including maturational changes.
- Recognize abnormal EEG (including ICU EEG) and EP patterns and their clinical significance.
- Develop expertise in the indications for EEG and EP studies and in the use of these studies for the diagnosis and management of relevant disorders in a systems-based practice.

Interpersonal and communication skills
- Become proficient in the generation of EEG and EP reports.
- After initial review of EEG studies, develop ability to take a concise epilepsy and general medical history, reinterpret the EEG or EP findings in the context of the history and effectively communicate the findings in the report.
- Communicate the findings directly to members of the health care team for critical clinical neurophysiology studies.
- Analyze EEG studies and communicate results effectively to the patients.
Professionalism
- Respect for privacy and confidentiality of all patient information.
- Develop and maintain an excellent work ethic.
- Timely and accurate documentation.

Epilepsy - Pediatric and Adult

Patient care
- The fellow must acquire the knowledge, attitude and skills to provide patient care for treatment of epilepsy and other paroxysmal disorders that imitate epilepsy, in a compassionate and effective manner.
- Become a patient advocate.

Medical Knowledge
- Become familiar with the technical aspects of long-term EEG monitoring, including sphenoidal electrode insertion.
- Recognize and localize epileptiform patterns on the EEG.
- Recognize and localize ictal discharges on EEG.
- Develop expertise in the analysis of the ictal semiology of various seizure types, and the relationship of clinical and electrographic seizure patterns.
- Develop expertise in the use of long-term epilepsy monitoring in the evaluation and treatment of epilepsy and other paroxysmal disorders.
- Become proficient in the indications for epilepsy surgery and in the presurgical evaluation process, including the intracarotid amobarbital procedure, and mapping of language functions with electrical stimulation.
- Become familiar with intracranial EEG, including depth and subdural recordings, and intraoperative electrocorticography.

Practice Based Learning and Improvement
- Become familiar with use of information technology to enhance patient care.
- Demonstrate interest and receptiveness to feedback and use the feedback to improve quality of care rendered to patients.
- Attend multidisciplinary epilepsy surgery conferences to learn the comprehensive aspects of epilepsy care.

Interpersonal and communication skills
- Become proficient in the generation of EMU reports.

• Develop ability to take a relevant epilepsy and general medical history, interpret the EEG findings in the context of the history and effectively communicate the findings in the report.
• Communicate the findings to members of the EMU team.
• Analyze EEG studies and communicate results effectively to the patients and their families.

Professionalism
- Respect for privacy and confidentiality of all patient information.
- Develop and maintain an excellent work ethic.
- Document findings and results in notes and reports in a timely and accurate manner.

Systems Based Practice
- Become familiar with the abilities and scope of practice of the many care providers working with our patients and become comfortable working in parallel to provide optimal patient care.
- Gain experience in cost-effective diagnosis and management of epilepsy and other paroxysmal disorders.
- Learn the comprehensive aspects of epilepsy care, in conjunction with nursing, social work, psychiatry, neuroradiology, neuropsychology and neurosurgery.

EMG — Electromyography

Patient Care
- Acquire the knowledge, attitude and skills to provide patient care for treatment of neuromuscular disorders in a compassionate and effective manner.
- Become a patient advocate.
- Communicate results effectively to the patients.

Medical Knowledge
- Become familiar with the technical aspects of EMG and NCS.
- Recognize normal EMG patterns; know normal NCS parameters.
- Identify abnormal EMG and NCS patterns and understand their clinical significance.
- Develop expertise in the indications for EMG and NCS and in the use of these studies for the diagnosis and management of relevant disorders in a systems-based practice.
- Perform and interpret EMG and NCS competently.


**Practice-Based Learning and Improvement**

- Become familiar with use of information technology to enhance patient care.
- Demonstrate interest and receptiveness to feedback and use feedback to improve quality of care rendered to patients with neuromuscular disorders.
- Attend multidisciplinary EMG conferences and multidisciplinary clinics to learn the comprehensive aspects of care of neuromuscular disorders.

**Interpersonal and Communication Skills**

- Take a complete and concise neuromuscular and general medical history and effectively communicate the history, presentation and care plan to the patient and members of the health care team.
- Develop and maintain a therapeutic relationship with patient by appreciating the need for ongoing communication throughout the process of diagnosis and treatment of the neuromuscular disorder.
- Learn how to communicate terminal diagnoses such as ALS in a compassionate manner.

**Professionalism**

- Develop respect for privacy/confidentiality of all patient information.
- Demonstrate compassion and sensitivity in an acute care setting with respect for patient diversity.
- Develop and maintain an excellent work ethic.
- Timely and accurate documentation of EMG and NCS reports and clinic notes.

**Systems-Based Practice**

- Become familiar with the abilities and scope of practice of the many care providers working with our patients; become comfortable working in parallel with these providers to provide optimal patient care.
- Gain experience in cost-effective diagnosis and management of neuromuscular disorders.

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**FELLOWSHIP PROGRAM DESCRIPTION**

**History**

The program has been in existence since 1990 but has been accredited by the ACGME since 1996. More than eighty fellows have graduated from the program to date. The program is currently approved for eight clinical neurophysiology fellow positions.

**Program Certifications**

The program was accredited by the Residency Review Committee in December 2012 for 5 years.

**Duration**

The only approved year is PGY5 (or PGY6 for pediatric neurologists). A non-ACGME approved PGY6 (PGY7 for pediatric neurologists) position is offered to neurologists who wish to receive in-depth training in a specific area of clinical neurophysiology such as epilepsy. A fellow who wants a second year of training in epilepsy will get involved in difficult epilepsy monitoring (example, with implanted electrodes), in cortical mapping, in intraoperative electrocorticography, and in other aspects of the pre-surgical evaluation. There will be greater independence and a greater involvement in the training of residents and nurses. A second year fellow is also expected to act as a mentor for junior fellows. In addition, there will be time dedicated to research.

**Prerequisite Training/Selection Criteria**

The candidate should have successfully completed a neurology residency in an accredited training program, and must be board-eligible in neurology. Candidates are chosen based on achievements during residency, on letters of recommendation and on the faculty interview response.

In compliance with federal law, including the provisions of title IX of the Education Amendments of 1972, Section 503 and 504 of the Rehabilitation Act of 1973, and the American Disability Act of 1990, Vanderbilt University does not discriminate on the basis of race, sex, religion, color, national or ethnic origin, age, disability, or military service in its administration of educational policies, programs, or activities; its admissions policies; scholarship and loan programs; athletic or other University-administered programs; or employment.

**Evaluation**

Every fellow is assigned a faculty mentor who provides guidance and support, acts as an advocate, and is responsible for sharing evaluations and developing plans for improvement. Fellows undergo the following evaluations (gme.mc.vanderbilt.edu/ni-authentication/) as follows:

1– End of rotation evaluation (short form): The evaluating attending(s) is/are identified based on greatest or longest interaction during the rotation.
2– Four-monthly evaluation (long form): This evaluation is given by all attendings who have participated in the training of fellows.

3– Multisource evaluations (or 360 º): Twice yearly, evaluations completed by patients (or family members), nurses, technologists, house staff are collected by the program director.

4– Self-evaluation: every fellow is expected to complete a self-evaluation form by mid-year.

All evaluations are based upon the ACGME Core Competencies and address patient care, fund of knowledge, skills in different aspects of clinical neurophysiology, practice based learning and improvement, interpersonal and communication skills, professionalism, and systems based practice, as well as performance in research projects.

The mentor meets with his/her assigned fellow to discuss their quarterly evaluations and propose a plan of action and to follow on research progress.

The program director meets quarterly with every fellow to discuss the collective evaluations. This meeting primarily aims at identifying deficiencies and initiate corrective actions if needed.

5– In addition, fellows are requested to complete an anonymous annual review of the faculty and program that is reviewed by the program director and chairman.

**Promotion**

At the end of the ACGME year of training, the program director and clinical neurophysiology faculty will decide who should be eligible to take the clinical neurophysiology board (American Board of Psychiatry and Neurology—Certification in the Subspecialty of Clinical Neurophysiology). Fellows who wish to expand their knowledge and expertise in a particular area of clinical neurophysiology may apply for a second year of training. Promotion to the next year of training is predicated upon satisfactory completion of all the educational goals outlined for the preceding year. A checklist with satisfied requirements for completion of training should be submitted by all fellows at the end of the first year of training.

**Dismissal**

In cases of academic deficiency, efforts will be made to correct the deficiency. All procedures are outlined in the House Staff Manual from informal counseling to filing a complaint/grievance. The Clinical Neurophysiology Fellowship Program expressly adopts the Vanderbilt University School of Graduate Medical Education’s policy in regard to duty hours/leaves of absence/moonlighting/grievance/fatigue and sleep deprivation/warning and probations/due process and appeal. This information can be found in the GME house staff manual or on the VMC website.

**TEACHING STAFF**

The following teaching staff is the most involved in the training:

**Adult Epilepsy Monitoring Unit / Adult EEG**
- **Bassel Abou-Khalil, MD**, Professor of Neurology, Director of Epilepsy Division
- **Amir Arain, MD**, Associate Professor of Neurology
- **Nabil Azar, MD**, Assistant Professor of Neurology, Director of Clinical Neurophysiology Training Program
- **Amar Bhatt, MD**, Assistant Professor of Neurology
- **Martin Gallagher, MD, PhD**, Associate Professor of Neurology
- **Kevin Haas, MD, PhD**, Assistant Professor of Neurology
- **Andre Lagrange, MD, PhD**, Associate Professor of Neurology
- **Robert Macdonald, MD, PhD**, Professor and Chair of Neurology
- **Michael McLean, MD, PhD**, Associate Professor of Neurology
- **Pradumna Singh, MD**, Assistant Professor of Neurology
- **Hasan Sonmezturk, MD**, Assistant Professor of Neurology
- **Nandakumar B. Vittal, MD**, Assistant Professor of Neurology

**Pediatric Epilepsy Monitoring Unit / Pediatric EEG**
- **Eric Pina-Garza, MD**, Associate Professor of Neurology, Director of Pediatric Neurology
- **Gregory Barnes, MD, PhD**, Assistant Professor of Neurology
- **Robert Carson, MD, PhD**, Assistant Professor of Neurology
- **Kevin Ess, MD, PhD**, Assistant Professor of Neurology
- **Cary Fu, MD**, Assistant Professor of Neurology
- **Kohila Velayudam, MD**, Assistant Professor of Neurology
- **Randy Williamson, MD**, Assistant Professor of Neurology

**EMG / Neuromuscular**
- **Peter Donofrio, MD**, Professor of Neurology and Director of Neuromuscular Division
- **Bryan Burnette, MD**, Assistant Professor of Neurology
- **Jane Howard, MD**, Assistant Professor of Neurology
- **Christopher Lee, MD, MPH**, Assistant Professor of Neurology
- **Jun Li, MD, PhD**, Associate Professor of Neurology
- **Amanda Peltier, MD, MS**, Assistant Professor of Neurology
FACILITIES

Adult Epilepsy Monitoring Unit (EMU)
The EMU was established in 1988 and underwent expansion and updating in April 2004. We have an eight-bed monitoring unit where most of the epilepsy inpatient training takes place. The EMU is located on 6-North, adjacent to the neurology inpatient service. It includes a clinical neurophysiology fellow reading room with 5 review stations. Patients with epilepsy who do not necessarily need monitoring could also be admitted to the neurology inpatient service. Patients with status epilepticus and patients who just had epilepsy surgery are admitted in the neuro-intensive care unit. There is a daily teaching conference to review the studies performed with the attending physician.

Pediatric Epilepsy Monitoring Unit (PEMU)
The PEMU started in September 2007 with 2 beds on 7C in the Vanderbilt Children’s Hospital (VCH). It has expanded to 4 beds in July 2008. Children can also undergo epilepsy monitoring in non-PEMU beds using portable equipment. The PEMU reading room is located on the 8th floor of VCH. It is equipped with 2 reading stations.

Adult EEG Laboratory
The adult EEG and evoked potential laboratories are located in the basement of the Vanderbilt Clinic (TVC). In TVC, there are 4 standard EEG rooms. In addition, there are 8 mobile EEG recording units for hospital recordings, as well as 11 mobile machines for ICU recordings. The EEG reading room is located in the basement of TVC. There are two EEG review stations. There is a daily reading conference to review the studies with an adult EEG attending.

Pediatric EEG Laboratory
The pediatric EEG laboratory and reading room are located on the 9th floor of the Doctor’s tower of Children’s Hospital. There are currently four standard EEG rooms. There is a satellite clinic (Williamson clinic) at which EEGs are performed and transferred electronically to the fellow’s reading room in the Doctor’s tower. There are currently two review stations in the reading room. There is a daily reading conference to review the studies with a pediatric EEG attending.

EMG Laboratory
The EMG laboratory is located in the basement of the Vanderbilt Clinic. There are currently four EMG rooms. The patient is staffed immediately after the study is completed.

IONM Laboratory
The IONM laboratory is located in the basement of the Vanderbilt Clinic. There are currently 2 review reading stations, each equipped with four large screens. Studies are daily supervised by attendings.

Sleep Disorders Laboratory
The Vanderbilt Sleep Disorders Laboratory is located in the Marriott Hotel at Vanderbilt University. The ten-bed facility is equipped for comprehensive evaluation of any sleep disorder and is staffed by physicians and technologists specializing in the different aspects of sleep studies. The sleep reading room is located in the basement of the Vanderbilt Clinic. There are four weekly reading conferences with sleep attendings.

The Vanderbilt Clinic
The fellows participate in the adult or pediatric epilepsy clinics one-half days a week (on average). The fellows rotating on EMG attend 3-4 neuromuscular clinics. Fellows also participate in drug study clinic.

EDUCATION PROGRAM - BASIC CURRICULUM

AAN recommended Curriculum
The fellowship curriculum aims to cover the AAN recommended curricula for clinical neurophysiology and for epilepsy (see next page).

www.aan.com/globals/axon/assets/2730.pdf - Epilepsy

www.aan.com/globals/axon/assets/2728.pdf - Clinical Neurophysiology

Clinical and Research Components (refer to conference schedule)
In addition to teaching at reading conferences in each of the laboratories, there are several educational activities: There is a weekly didactic
lecture in clinical neurophysiology covering all aspects, spanning the whole year. There is also another weekly informal conference in which clinical neurophysiology and epilepsy topics are discussed or interesting IONM cases are presented. In addition, fellows review one or two clinical neurophysiology textbooks for preparation of the ACNS board review. There is a twice monthly epilepsy surgery conference, once monthly clinical neurophysiology journal club, and once or twice monthly EEG teaching conference. In addition to the above, the fellows participate in the departmental lecture series. There is a basic science series every Tuesday at noon and there is a clinical series every Thursday at noon. The basic science series will include a series on basic neurophysiology and the clinical series will include a series on epilepsy, neuromuscular disorders, sleep disorders, and other relevant topics.

All the fellows are encouraged to pursue a clinical research project. Potential areas on research include clinical semiology of seizures, EEG features of seizures, epilepsy imaging, epilepsy medical and surgical therapy, overlap of sleep and epilepsy, as well as clinical genetics of epilepsy. In addition, fellows will participate in ongoing clinical trials.

**Fellows Patient Care Responsibilities**

Fellows will admit patients to the Epilepsy Monitoring Unit, write daily notes, and also write or dictate a discharge summary. Fellows will see patients in clinic, but all the activities will be supervised by an attending physician. Fellows will assist neurology residents rotating on EEG/epilepsy. However, all residents and fellows report directly to the attending, regardless of level of training.

**Procedural Requirements**

Fellows rotating in the EMU are involved in insertion of sphenoidal electrodes as well as in cortical electrical stimulation mapping. Fellows rotating on EMG are expected to perform nerve conduction studies as well as needle studies and repetitive electrical stimulation. Fellows are also required to attend or participate in several clinical neurophysiology/epilepsy procedures (including all EP modalities, intraoperative SSEP, Wada test, tilt-table test). A check-out procedure list that documents the dates of completion will be collected at the end of the academic year. A monthly procedure log that documents the number of interpreted studies will also be collected at the end of the academic year.

**Didactic Components**

There is a year long clinical neurophysiology course with weekly didactic lectures covering all aspects of neurophysiology (Wednesday noon). There is also another weekly conference in which clinical neurophysiology and epilepsy topics are presented in both didactic lectures and informal discussions (Tuesday at 11am). There is a weekly lecture on Thursday at 8am to discuss antiepileptic drugs. In addition to the above, the fellows are expected to attend the departmental lecture series. This includes Grand Rounds and the Summer Educational Series Friday at 8am, the Combined Conference one a month Friday at 7am, a basic science series every Tuesday at noon and a clinical Neurology series every Thursday at noon. The basic science series will include a series on basic neurophysiology and the clinical series will include a series on epilepsy, neuromuscular disorders, sleep disorders, and other relevant topics. Attendance will be verified with signatures and collected by the program coordinator. An minimum of 80% conference attendance is required for successful completion of training.

**In Service Examination**

The fellows take the in-service examination of the American Clinical Neurophysiology Society (ACNS); the cost is covered by the Fellowship. The exam is usually offered online in mid-February. It is mandatory to all the first-year Epilepsy and Clinical Neurophysiology fellows. The scores on this examination are not used for promotion but will help guide fellows to correct weaknesses. Fellows spending 4 or more months on EMG will be invited to take the AANEM in-service examination.

**SPECIFIC TRAINING PROGRAM ASPECTS**

**Adult Epilepsy Monitoring Unit**

During this rotation the Fellows are responsible for: evaluating all the patients admitted to the Epilepsy Unit, inserting sphenoidal electrodes, dictating or typing a comprehensive admission note, typing daily progress notes using WizOrder, typing discharge summaries, reading and reviewing all EEG-video studies. The fellows should review the EEG and seizures on a daily basis and enter comments (including clinical and EEG seizure description) on the EEG itself. A word report is created for each patient by the EMU secretary The EEG comments can be exported to that report. There should be a daily update to the report with the new findings of each day.

The attendings will usually start the reading conference and round at around 1 pm. The fellow will have reviewed all seizures and interictal EEG samples/detections up to 8 am that day, and will have prepared a daily summary including a description of clinical seizures, ictal EEG, and interictal EEG findings. The daily summaries have to be ready before 1 pm to be reviewed and corrected with the attending at the teach-
ing conference. Final reports should be completed the day after the end of a study. Fellows who have already reviewed EEGs and seizures up to 8 am will be encouraged to continue reviewing the EEG following that, rather than consider their work completed. On Friday or other days preceding holidays, the fellows will review their studies up to 2-5 pm, and update their reports accordingly. The fellow that picks a patient on the weekend should be responsible for the EMU report and discharge summary.

The fellows rotating in the EMU take after-hour and weekend call for the epilepsy unit patients. The Fellow on call will also be available for emergency EEG interpretation and urgent drug study patient questions. The call schedule will be prepared by the chief fellow two weeks before the beginning of the month. The EMU schedule is provided to the operator, the EMU staff, and the EMU attending. Any change in the call schedule should be reported to the chief fellow, EMU techs, operators, and attending. Pagers should be signed out (forwarded) to the fellow on call.

On weekends, the fellow on call will round with the attending on the EMU patients. The fellow on call will be responsible for generating the daily summaries on all patients that have not been finalized. The fellow on call will also be responsible for finalizing the reports on patients discharged after Friday pm (the regular fellow in charge will have already prepared a preliminary report). Calls will be divided evenly. Each fellow will have approximately 7-9 weeks of call.

There will usually be 3 fellows rotating on the EMU. There are usually 4 admissions on Mondays, 2 on Tuesdays, 2 on Wednesdays, 2 on Thursdays, 1-3 on Fridays, and 1 on Sundays. There are also occasionally unscheduled admissions and hospital transfers. A fellow will not usually be responsible for more than 4 simultaneous EMU patients, except on weekend call.

**Pediatric EMU**

During this rotation the Fellows are responsible for reading and reviewing all EEG-video studies. The fellows should review the EEG and seizures on a daily basis and enter comments (including clinical and EEG seizure description) on the EEG itself. A word report is created for each patient by the EMU secretary. The EEG comments can be exported to that report. There should be a daily update to the report with the new findings of each day. Although pediatric residents are responsible for admission, daily progress, and discharge notes, the fellows are encouraged to interview and examine the pediatric EMU patients and are expected to communicate daily with the pediatric neurology team. Fellows are also expected to review weekend EMU studies and relate the results to the pediatric neurology team.

**Adult and Pediatric EEG Laboratories**

During these rotations the fellow is responsible for reading all studies including standard EEG’s, short-term and portable EEG-video monitoring studies, evoked potentials, and ambulatory EEG studies. The adult EEG rotation will cover all patients aged 18 years or older. It will also include all evoked potential studies of any age. During the adult EEG rotation, time will be divided approximately evenly between routine inpatient/outpatient studies and ICU EEG monitoring. The pediatric EEG rotation will include all patients younger than 18 years of age. The studies are staffed with the appropriate attending at every site separately. Each day an attending is assigned separately for adult and pediatric EEGs. A third attending will staff ICU EEG, one week at a time.

The EEG reading conference will usually start at 2-3 pm (though it may start in the mornings for ICU EEG). All inpatient EEG studies (these are usually emergency studies) should be reviewed at the reading conference. The ambulatory EEG studies and long-term EEG-video monitoring studies should be reviewed within 24 hours of their termination and presented in the reading conference the day after they are completed. The EEG fellow may need to get involved in directing management of emergency EEG studies: an intravenous benzodiazepine administration may be considered in consultation with the referring service if electrographic status epilepticus is considered a possibility. Fellows rotating on EEG are expected to be available for interpreting urgent EEG studies until 5 PM. After 5 PM, the on call fellow will be responsible for urgent EEGs. The EEG and EMU attendings are available to help with interpretation.

The fellow will generate a report using the report icon in the NicVue program (or Natus for ICU EEG). The report uses a form with most fields having a drop down menu for rapid reporting of normal findings. Accuracy of information should be verified before reading conference.

The fellow should refer to a printed log (Excel spreadsheet) kept by the EEG lab staff, listing all procedures. This should be provided daily before reading conference. The fellow and the attending are responsible to complete the diagnosis code on the billing sheets for every completed EEG interpretation. EEGs that have been read will be sent to an archival folder.

The fellow should attend at least some of the outpatient EP monitoring studies to learn the technique and interpretation of these studies.

The EEG Fellow should help with the training of the Resident rotating on EEG. The Resident should be encouraged to review all the EEGs under the Fellow’s close supervision. The Fellow should have reviewed all the EEGs carefully prior to the attending teaching conference.
**Adult Epilepsy Clinic**

Fellows will have an Epilepsy Clinic in conjunction with one of the attendings, while on the adult EMU rotation (Tuesday pm or Wednesday pm). The Fellow will see one to three patients referred to the attending. Every new patient seen in clinic should have a clinic database form filled. Use the database form (physician version) to obtain the seizure history. Please fill out the form thoroughly. If a new patient brings in a completed patient version of the database, then only pages dealing with seizure history and antiepileptic drugs need to be filled out in the physician version. The patient’s version of the database should be reviewed with the patient to ascertain that it has the information requested. A general exam should be performed. A neurological examination should include mental status testing. The findings should be noted on the last page of the database (physician version).

After the evaluation, the patient should be discussed with the epilepsy attending who will then meet the patient, and perform a brief interview and examination if appropriate.

The fellow will type a clinic note (using the epilepsy template note) that stresses relevant history, impression, and plan (but includes past medical history, review of systems - 10 systems, family history, social history, and examination - 11 systems, for billing purposes). The fellow should review and sign the note electronically. The attending physician will later attest the signed note.

Be sure to discuss driving restrictions and other restrictions with patients as appropriate. Prescribe folic acid to women of child-bearing potential taking antiepileptic drugs. All patients should be asked to keep a diary of seizures and other events. Freely request release of information from outside physicians or hospitals when information is not fully available.

**Pediatric Epilepsy Clinic**

Fellows will participate in a weekly pediatric epilepsy clinic while on the pediatric EEG or EMU rotations. When on pediatric EEG, there will be a weekly abbreviated am clinic and when on the pediatric EMU a weekly abbreviated pm clinic with a pediatric epilepsy attending physician.

**Drug Study Clinic**

Each Fellow will participate in the drug study clinic. Adult fellows will participate in the adult drug study clinics and Pediatric fellows in the pediatric drug study clinics. During that clinic the fellow will attempt to follow the same patients consistently. There are usually several studies being conducted simultaneously. Certain principles apply to all studies. These include:

- All information in the study notebook should also be in the clinic chart.
- Keeping the written/dictated note simple will help avoid mismatch.
- When recording the exam findings always look at the exam of the previous visit.
- Use consistent terminology for exam abnormalities and adverse experiences (AEs).

Communicate with the study coordinator before seeing a patient so that he or she can relay any information available to them, then communicate again before discharging the patient. For return patients get an interval seizure and adverse experience history and examine the patient as required. When the patient enters a study, be very thorough in listing past medical illnesses and current medical problems to avoid these being listed later as adverse events. A dictated or typed note should be handled as with regular patients. Be sure to understand how the patient codes different seizures in the diary. Different patients may use different codes to describe the same seizure type, or the same code for different types.

Always refer to the baseline physical examination to provide consistent description of abnormalities and to look for any changes. The first exam should be very thorough and should identify all abnormalities. Be liberal in calling abnormalities at onset of study. In naming abnormalities use succinct and consistent terminology. Abnormalities that have always been present should not be discovered later in the study, after the study drug has been started.

At each visit look for follow-up on adverse experiences (AEs) that did not have an end date at the previous visit. Look at previous visit AE list, ask if AEs are persistent or have subsided (then provide end date). In the listing of AEs include any unfavorable event, any new exam abnormalities, and any symptoms not listed in the first visit as ongoing problems. Adverse events should be listed regardless of their perceived relationship to the study drug.

**Drug Study Call**

The Fellow on call in the epilepsy unit will take drug study patient calls. Almost always problems can be solved on the phone. Feel free to call the attending responsible for the drug study patient. Feel free to invite the patient to come to the drug study clinic the next Monday. Rarely patients have to be referred to the Emergency room. In such a case good communication with the neurology house officer on call is essential to avoid protocol deviations that force the patient out of the study unnecessarily.
EMG Laboratory
Fellows participate in EMG studies with a gradual increase in responsibility. In the first month, fellows do not do nerve conduction studies, but they perform needle EMG studies under direct supervision. The fellow responsibilities increase over time (usually 4-6 weeks), so that they eventually can perform nerve conduction studies and needle EMG on their own, with feedback from an EMG attending physician for completion of the study, interpreting the findings, and creating a report. Most EMG training occurs at Vanderbilt but fellows also go to the VA EMG lab.

Neuromuscular Clinic
Fellows participate in the neuromuscular, muscular dystrophy, and ALS clinics. Patients are seen initially by the fellow who obtains a history and performs an examination, then formulates an assessment and a treatment plan, which is discussed with a neuromuscular faculty member. EMG studies with a gradual increase in responsibility.

IONM laboratory
Fellows interested in IONM are offered a one-month block rotation in the IONM laboratory. Fellows will spend the first two weeks in the operating room learning the technical principles of IONM, under the direct supervision of certified technologists. Fellows spend the third and fourth week reading IONM studies, under the direct supervision of physicians. Fellows are expected to collect interesting IONM cases for presentation during the monthly IONM session.

Clinical Research Project
Every fellow is expected to do a clinical research project. The formulation of the project is developed with the help of the mentor/advisor. The planning of the project should ideally be done early in the year so that free time during rotations (particularly epilepsy rotation) can be used to complete the project, so that an abstract can be submitted and a paper can be written before the end of training.

PROCEDURE LOGGING AND DOCUMENTATION

Each fellow will keep a log of all studies/procedures performed, with diagnosis. The most common studies are EEG, EMG/NCS, EP, and IONM, but also included are observation and involvement with performing Wada tests, sphenoidal electrodes, intraoperative electrocorticography and invasive EEG, cortical mapping, SFEMG, tilt table testing, and QSART. This log will be used to verify that a sufficient experience has been acquired, and will also satisfy the ACGME requirements.

MEETINGS & CONFERENCES
(refer to conference schedule on page 24)

Attendance at scheduled meetings and conferences is required. All information regarding scheduled conferences, presentations and teaching sessions for any given month will be distributed via e-mail.

Quarterly Review Meeting
The Quarterly Review Meeting includes the fellows, program director and other faculty members. It is held every 3 months and involves discussion of any issue relevant to the Fellowship training program. This is held Thursday from 8:00-8:30 am. During this meeting, different aspects of the fellowship program progress are discussed and fellow questions and concerns are addressed.

AED and Neuromuscular Drug Conference
This is held every Thursday from 8:00-8:30 am. During each conference one fellow gives a powerpoint presentation regarding one drug followed by questions and a discussion.

Drug Study Meeting
This follows the quarterly review or AED drug conference every Thursday from 8:30-9:00 am. The Fellow should bring along notes of patients seen in the preceding drug study clinic for brief presentation (including visit number, date of the last visit, number of seizures, medication, and plan). At this meeting, we will also discuss various aspects of clinical trials, including study design, upcoming trials, experimental drug or device characteristics, etc.

Multidisciplinary Epilepsy Surgery Patient Conference
The Multidisciplinary Epilepsy Surgery Patient Conference is held the first and third Friday of every month at 12:30. The Fellow should present patients that they have previously evaluated in the EMU.

Journal Review Conference
The Journal Club is held the fourth Friday of every month at noon (or at 11:00 if there is MM&I conference at noon). At each conference five or six recent papers are presented. The papers can relate to clinical epilepsy, CNS clinical neurophysiology, or basic epilepsy/neurophysiology. Fellows should present one paper approximately every other month. Each presenter will rapidly present the following aspects of each paper:

- Context/background and questions asked by the paper
- How were questions answered (methods)
- What were the answers (key results)
What are the implications of the findings (if the paper is deficient, that could be expressed here). The presentation should take no more than 5 minutes, with 5 minutes left for questions and discussion.

EEG Teaching Conference
This is held on the fourth Thursday of the month at noon. The fellows on adult EEG and pediatric EEG should have a selection of 2-4 interesting EEGs to present to the division for discussion. Each EEG will have a faculty sponsor, specifically the faculty member who read the study with the Fellow. Even though the Fellow is responsible for the conference and for showing the EEG’s, the faculty sponsor will help guide the discussion, if possible. The fellow will assume the responsibility of choosing the EEGs and informing the attending. The two will decide on the angle of the discussion. EEGs with several levels of complexity will be presented. This will include:

- Straightforward abnormalities that need to be characterized or localized serve as good teaching material for the Fellows.
- Normal variants that the Fellows are asked to name.
- More complex abnormalities or patterns, perhaps ones associated with rare or uncommon diseases. In this case, we will ask the presenting Fellow to have reviewed/researched the medical records and be able to discuss the diagnosis and even to demonstrate imaging the imaging findings (for example, rhythmic epileptiform discharges and cortical dysplasia). Some clinical information will be presented, stopping short of the diagnosis.
- Finally, EEGs that are controversial may be presented. For example, instances where it is not clear whether the EEG is ictal or interictal or unusual findings that the EEG team was not able to clearly diagnose. In this instance, the audience will be formally consulted “what do you think is this unusual pattern that we have not been able to diagnose?” A specific segment is shown and every EEG will come with a specific question. However, additional segments may be requested by the audience to help explain the findings. At the presentation of each EEG, a specific question will be asked. Examples of such questions could be:
  - What are the nature and the localization of the following discharge?
  - Is this EEG finding normal or abnormal?
  - Is this EEG pattern epileptiform or non-epileptiform?
  - Is this EEG pattern ictal or interictal?

The Fellow who is organizing the conference may take the lead in asking other Fellows to answer a question or comment on the findings. If the EEG shown is in a complex category, the Fellow should indicate that and perhaps suggest that this complex EEG may be for faculty members to debate.

In order to avoid long periods of silence, if a Fellow does not know the answer to a question he or she was asked, the Fellow should ask for a consult. The attending asking the question will help keep the discussion moving by either answering the question or passing the question on to another Fellow.

Epilepsy Topics Conference
This conference will occur on Tuesday at 11am. The Epilepsy Topics Conference offers the Fellows and Faculty the opportunity to lecture and engage in scholarly discussion with the division, in an informal small group setting.

Clinical Neurophysiology Course
The Fellow is expected to participate in this course which occurs every Wednesday at noon. Each Fellow is responsible for preparing and giving one lecture over the academic year.

EMG/Neuromuscular Conference
This is held the first Monday of each month at 12 noon.

Sleep Conference
This is held the fourth Monday of every month.

Quality Improvement Conferences
The Epilepsy Surgery Outcomes conference is held at noon on the fifth Friday of the month. In addition, there is a Morbidity, Mortality, & Improvement conference that occurs four times in the year. Also, the EEG teaching conference also serves as a quality- and patient-care-improvement measure.

RESPONSIBILITIES AND VACATION
Supervision and Lines of Responsibility
For every rotation, there is always an attending that carries the final responsibility for the patient evaluation, patient care, and final clinical neurophysiology report of the patient. During a rotation the attending neurologist in charge may vary from week to week, day to day, or session to session.
# Weekly Conference Schedule

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
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<tr>
<td>7am - 8am</td>
<td>11am - 12pm</td>
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<tr>
<td>8am - 9am</td>
<td>Fellow Conference and ACNS In-service Review</td>
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<tr>
<td>12 pm - 1pm</td>
<td>Monthly conferences: Sleep, EMG, Practice Management</td>
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<tr>
<td>1pm - 130pm</td>
<td>Muscle Biopsy Conference</td>
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<table>
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<tr>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tr>
<td>Combined Conference (2nd Friday of month)</td>
<td>AED Review, Drug Study Patient Review, and Program Director Meeting</td>
<td>Grand Rounds</td>
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- **Clinical Neurophysiology Course**
  - 4th or 5th Thursday: EEG Teaching Conference
  - 1st & 3rd Friday: Epilepsy Surgery Conference (1230-2)
  - 4th Friday: Journal Club (11-12 or 12-1)
  - 5th Friday: Epilepsy Surgery Outcomes (12-1)
Fellows Supervisory Responsibilities

Fellows will intermittently supervise neurology residents rotating on EEG, EMU or EMG.

Neurology residents report directly to the attending and the clinical neurophysiology residents (fellows) assist the neurology resident because they are more senior and familiar with the system. Nonetheless, all report directly to the attending, regardless of level of training.

Cross Coverage

When a Fellow has to take time off from a clinical rotation, the fellow is expected to ask for coverage. Fellow clinics should be cancelled preferable 8 weeks in advance. Fellows should ask for coverage of his/her message basket and patient related messages.

Call Schedule and On Call Guidelines

Clinical Neurophysiology fellows will take home-call while rotating on the Adult EMU, Pediatric EEG, and ICU EEG services. The Fellow will be called first for problems that arise on the adult epilepsy unit. Call is taken by the week. On the adult side, call begins on Monday morning at 8 am and ends the following Monday morning at 8 am. On the pediatric side, call begins on Friday at 5 pm and ends the following Friday at 5 pm. Calls are evenly distributed among all fellows. All EEG and EMU studies can be accessed from home via computer.

If a fellow desires to exchange a call with another fellow, that fellow should initiate and complete such arrangements. The Chief Fellow should be notified of such exchanges (preferably via e-mail), so that an accurate record of calls can be maintained. The call schedule for the EMU is provided to the operator, the EMU staff, and the EMU attending. The Fellow can then call the attending responsible for the unit if advice is needed, or if the problem requires attending physician presence. Fellows on call should be available for emergency EEGs if needed and should accept drug study patient calls. Calls from other services (other than Neurosurgery) for emergent EEG studies (e.g. to rule out status epilepticus, to monitor burst suppression) must be evaluated by the resident on-call or by the fellow on-call for appropriateness of an emergent study, prior to calling the EEG technician. A full consultation should be performed by the Neurology Resident.

On weekends, the adult fellow on-call will round with the attending on the adult EMU patients. Both the adult and pediatric fellows on-call will be responsible for generating the daily summaries on all patients that have not been finalized, in addition to reading inpatient EEGs. The fellows on-call will also be responsible for finalizing the reports on patients discharged after Friday pm (the regular fellows from the weekdays will have already prepared a preliminary report).

Vacation

Every fellow is entitled to 120 hours of paid vacation (equivalent to 15 work days). Vacation blocks should not exceed 2 weeks in duration and should be spread throughout the academic year. A vacation request is required and can be granted only if no scheduling conflicts arise. Fellows should complete and sign the vacation/leave form 2 month before their expected absence. Vacation forms should be handed or emailed to the Chief Fellow. The form should include all coverage arrangements made. Call taken during EMG months requires approval from the Neumuscular Division 2 months in advance.

Each fellow is allotted 2 days to be utilized for job interviews, conferences, and Board exams. If more than 2 days are taken for these reasons, they will be deducted from vacation time. If a Fellow is attending a conference to present work done at Vanderbilt, the conference time will be in addition to the 2 days provided. The number of days taken will have to be cleared with the program director.

Vacation and schedule requests are not guaranteed, and may not be honored due to scheduling conflicts. Nevertheless, every effort will be made to accommodate these requests within the constraints of the scheduling process.

Vacations may not be taken during the first and last month of employment unless otherwise processed through the Chief Fellow and approved by the Program Director.

Cross Coverage

When a Fellow has to take time off from a clinical rotation, the fellow is expected to arrange for coverage and fill in the leave form. Coverage of clinical duties should be reported on the leave form. Cross coverage should also be obtained for drug study clinic and epilepsy clinic.
**Sick Leave Information**

In case of an unexpected absence (sickness, personal emergencies), the fellow must verbally notify the Chief Fellow or the Program Director as soon as possible. An appropriate coverage plan is arranged by the Chief Fellow.

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**EDUCATIONAL BENEFITS and TRAVEL POLICY**

The program provides paid membership in the American Epilepsy Society and the American Clinical Neurophysiology Society. Benefits of the membership include a subscription to the journals *Epilepsia* and *Journal of Clinical Neurophysiology*.

In addition, each first and second year fellow will be provided with $1,000 for educational purposes by the Department of Neurology. These funds may be used to support purchase of books related to the fellow’s education, or to support the fellow’s travel to national professional meetings. Funds are not to be used for other purposes including paying for society memberships, professional licenses, or board exams. The Department of Neurology will provide an additional $500 (beyond the $1,000) in educational support to any second year fellow who is first author on a scientific abstract accepted for a meeting. This additional funding must be used to support the fellow’s travel to attend the meeting and present his or her abstract.

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**BOARD CERTIFICATION**

The program strongly encourages fellows to sit for the American Board of Psychiatry and Neurology (ABPN) Specialty Certification in either Clinical Neurophysiology or Epilepsy. The program will provide a 3-day intensive review course within one month prior to the ABPN examination. Graduates of the program will have their registration fees reduced for that course. Two months prior to the ACNS in-service exam, textbook review sessions are presented by fellows as a preparation for that exam.