UNIVERSITY OF MINNESOTA

Graduate Medical Education
2013-2014
Fellowship Policy Manual

CLINICAL NEUROPHYSIOLOGY FELLOWSHIP

Sponsored by
Department of Neurology
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Please refer to the Institution Policy Manual located on the GME website at [http://www.med.umn.edu/gme/instpolicyman/home.html](http://www.med.umn.edu/gme/instpolicyman/home.html) for University of Minnesota Graduate Medical Education specific policies. "Should policies in the Program Manual or Fellowship Addenda conflict with the Institution Manual, the Institution Manual takes precedence."

There is extensive information about resources for residents and fellows on the GME website at [http://www.med.umn.edu/gme/residents/home.html](http://www.med.umn.edu/gme/residents/home.html)
Clinical Neurophysiology Fellowship Program

OVERVIEW

Clinical neurophysiology (CNP) is an area of medicine in which selected neurological disorders involving central, peripheral, and autonomic nervous systems and muscles are assessed, monitored, and treated using a combination of clinical evaluation and electrophysiological testing. This subspecialty requires a detailed knowledge of the normal physiology of the nervous system; the altered, abnormal electrophysiology; and the disease states involved.

This is a one-year ACGME-accredited fellowship, with training at the University of Minnesota and affiliated hospitals:

- University of Minnesota Medical Center, Fairview (UMMC)
- Hennepin County Medical Center (HCMC)
- Minneapolis VA Health Care System (MVAHCS)
- Minnesota Epilepsy Group (MEG) which includes training at their private practice as well as inpatient coverage at: United Hospital, and/or St. Paul Children’s Hospital

that provides in-depth training in the testing, diagnosis, and management of patients with neuromuscular diseases, epilepsy and sleep disorders, with emphasis on the performance, analysis and interpretation of electrodiagnostic techniques.

Fellows who successfully complete this program are expected to sit for the sub-specialty board examination in Clinical Neurophysiology (American Board of Psychiatry and Neurology) within three years of graduation from this program, as well as sit for the EMG boards (American Board of Electrodiagnostic Medicine) and EEG boards (American Board of Clinical Neurophysiology).

This fellowship offers intensive training in all areas of clinical neurophysiology, and provides fellows with the opportunity to concentrate in selected disciplines (EMG/neuromuscular, EEG/Epilepsy, or a blended combination of all areas). The training experiences and required rotations differ for the areas of concentration.

ACGME COMPETENCIES

(The ACGME competencies are tied to all Goals and Objectives in the various CNP fellowship training tracks and rotations defined below.)

**Patient Care (PC)**- Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

**Medical Knowledge (MK)**- Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care.

**Practice-based Learning and Improvement (PBLI)**- Fellows are expected to develop skills and habits to be able to meet the following goals:

- systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement; and,
• locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems.

Interpersonal and Communication Skills (ICS) - Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.

Professionalism (Prof) - Fellows must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.

Systems-based Practice (SBP) - Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

OVERALL PROGRAM GOALS

The overall goals of Clinical Neurophysiology (CNP) fellowship program are: (ACGME competencies that apply are specified in parentheses)

• Acquire and demonstrate skills necessary to evaluate and treat common and unusual patient problems in epilepsy and sleep disorders (PC, MK)
• Independently interpret EEGs, PSGs, and EPs in all age groups in an accurate and safe manner (PC, MK, PBLI)
• Design epilepsy-monitoring protocols for patients undergoing surgical epilepsy evaluation and spell characterization (PC, MK, PBLI)
• Develop the understanding of the principles, indications, contraindications, risk, cost and expected outcome of the various treatments (PC, MK, SBP)
• Continue development of appropriate communication skills with patients, families, peers and health care personnel (PC, CS, Prof)
• Develop skills in life-long learning and in critical analysis, synthesis and reassessment of knowledge, skills and professionalism (PC, Prof, PBLI)
• Ensure that fellows develop independent clinical expertise in evaluating patients with epilepsy and determining their most appropriate management strategy (PC, MK, CS, PBLI)
• Develop independent interpretation skills of intraoperative neurophysiological techniques including electrocorticography, intraoperative EEG and EP (PC, MK, PBLI, SBP)
• Develop independent clinical expertise in evaluating patients with various sleep disorders and their most appropriate management strategy (PC, CS, MK, PBLI)
• Develop an understanding of neuromuscular disease and the role of EMG in their diagnosis (PC, MK, PBLI)
• Develop skills that will enable independent clinical research (PC, MK, PBLI)

AVAILABLE TRAINING TRACKS

1. EMG/Neuromuscular track: Training in peripheral electrophysiology focuses on nerve conduction studies and needle electromyography, with additional training provided in single fiber EMG, quantitative MUP analysis, motor unit number estimate (MUNE) techniques, near nerve, autonomic testing, and botulinum toxin injections. Fellows attend various neuromuscular and ALS clinics, in which they develop expertise in the longitudinal care of patients with neuromuscular disorders. Fellows choosing this training concentration spend 10 months with the neuromuscular faculty at University of Minnesota Medical Center, Hennepin County Medical Center, and/or the Minneapolis VA Health Care system. The remaining two months are spent taking EEG or sleep.

2. EEG/ Epilepsy track: Training in central electrophysiology encompasses electroencephalography, evoked potential studies, surgical monitoring, ambulatory EEG monitoring, inpatient video-EEG
monitoring and the programming of vagal nerve stimulators. Fellows participate in the various epilepsy clinics offered within UMMC, MVAHCS, HCMC, or MEG/United systems. Fellows choosing this training concentration spend 10 months with the epilepsy faculty at University of Minnesota Medical Center, the Minneapolis VA Health Care system, and/or the Minnesota Epilepsy Group/United clinics. Invasive monitoring and an active surgical epilepsy program are available in this facility. The remaining two months are spent taking EMG or sleep electives.

3. The EMG/EEG blended track combines elements of both the electroencephalography and electromyography training; and also includes two months of electives, which can be in sleep, or additional EEG, EMG, or IOM training.

All trainees take the Orientation/BootCamp sessions part-time during their first two months.

Orientation/Boot Camp

Trainees from all training tracks take Orientation/BootCamp sessions part-time during their first month, since it serves as an introduction to clinical neurophysiology and the basic science foundations. Orientation comprises a set of lectures, demonstrations, and practice sessions. As part of Boot Camp each fellow will receive a copy of the proposed annual block schedule, and discuss with the Program Director their choices for elective rotations, before the block schedule is finalized. Each fellow also receives a copy of the fellowship Program Manual, and must sign a Receipt for same that will remain in their fellowship file.

Learning Objectives: Upon completion of these sessions, fellows are expected to:

- Understand nerve and muscle physiology (MK, PC)
- Understand circuit elements and circuits (MK, PC)
- Demonstrate familiarity with the major types of neurophysiologic equipment (PC, SBP)
- Understand the basic principles of EEG (MK, PC)
- Recognize Normal EEG’s (PC, MK, PBLI)
- Perform basic EEG monitoring (PC, MK)
- Understand the basic principles of NCS and EMG (PC, MK, PBLI)
- Understand the basic principles of EP (PC, MK)
- Understand the important elements in standard test results reports (MK, PC, CS)
- Present clinical cases/results to referring physicians/providers in a concise and effective manner (PC, MK, CS)

1. EMG/Neuromuscular Track

CNP fellows participating in the EMG/Neuromuscular track will spend three to four months at each of three hospital training sites: UMMC, MVAHCS, and HCMC. 80% of their time will be spent concentrating on neuromuscular related training, and the remaining 20% will be spent on electives.

a. University of Minnesota Medical Center Learning Objectives: Upon completion of the UMMC rotation fellows are expected to:

- Understand the peripheral nervous system neuroanatomy (MK, PC)
- Understand the indications for and limitations of electrodagnostic testing (PC, MK, PBLI, SBP)
- Perform and interpret nerve conduction studies (PC, MK)
- Perform and interpret nerve conduction studies and needle electromyography (PC, MK, PBLI)
- Perform patient evaluation and develop treatment plans for patient with epilepsy (PC, MK)
- Conduct appropriate evaluation of patients with neuromuscular diseases/symptoms (PC, MK, CS)
• Formulate and implement appropriate treatment plans for patients with neuromuscular diseases (PC, MK, CS)
• Perform and interpret autonomic testing and understand the role of these tests in the evaluation and management of patients with autonomic symptoms (PC, MK)
• Effectively communicate complex and difficult diagnoses and information to patients and their families (PC, CS)
• Understand the role of hospice and palliative medicine in the care of patients with degenerative and terminal conditions (PC, MK, SBP)
• Work effectively with members of a multi-specialty and multi-disciplinary treatment team (PC, SBP, Prof)
• Communicate effectively in written and verbal communications with referring providers (PC, MK, SBP, CS)

b. HCMC Rotation Learning Objectives: HCMC is a level-one trauma center with a busy emergency department. There is a national ALS center, a neuromuscular clinic, an EMG Laboratory and an epilepsy program. The Minnesota Regional Sleep Disorders Center is housed in HCMC. The clinical experience at HCMC is divided between the clinical neurophysiology (EMG, EGG, sleep) laboratories and outpatient clinics. Fellows see a mixture of patients referred to the EMG laboratory and are involved in the interpretation of electroencephalograms performed on a wide range of patients drawn from both the inpatient and outpatient settings. The distinguishing features of the HCMC rotation are fellow participation in the sleep disorders clinic at the Minnesota Regional Sleep Disorder Center and the nationally recognized ALS Center. The Sleep Disorders clinic performs approximately 1000 polysomnograms yearly and logs several thousand patient visits annually, and is continually staffed by clinical neurophysiology faculty. CNP fellows gain experience with interpretation of polysomnograms, and multiple sleep latency tests, as well as seeing patients with a wide spectrum of sleep disorders.

Upon completion of the HCMC rotation, the CNP fellow is expected to:

• Understand the basics of nerve and muscle histopathology (MK, PC, PBLI)
• Perform and interpret nerve conduction studies and needle electromyography (PC, MK, PBLI)
• Become proficient in the reading of electroencephalograms and understand their significance as they pertain to patient management (PC, MK, PBLI)
• Evaluate and formulate management strategies for patients with neuromuscular disease (PC, MK)
• Understand the presenting symptoms and diagnostic testing of amyotrophic lateral sclerosis (PC, MK, PBLI)
• Understand the major principles of sleep disorder management (PC, MK, PBLI, SBP)
• Conduct an appropriate history and physical exam for patients with sleep issues and problems (PC, MK, CS)
• Score, analyze and interpret nocturnal polysomnography, MSLT, and CPAP/BiPAP recordings
• Identify artifacts during polysomnography (PC, MK)
• Identify and rectify equipment failure during polysomnography recording (PC, SBP)
• Understand role of genetic counselors in the treatment and management of degenerative neuromuscular diseases. (PC, MK, SBP)
• Effectively communicate difficult news and prognoses to patients and families with degenerative neuromuscular disease (PC, CS, MK)
• Effectively and sensitively, plan with patients and families symptom management and palliative treatment in cases of non-curable, progressive conditions. (PC, CS, SBP, MK)
• Work effectively with technical staff in performance of polysomnography (PC, Prof, SBP)

c. MVAHCS rotation learning objectives: Fellows spend four months working in the MVAHCS epilepsy and neuromuscular disease subspecialty clinics and in EMG and EEG training.

At the end of the MVAHCS rotation, the fellow is expected to:
2. EEG/Epilepsy Track

In this track, CNP fellows will spend 10 months working at either: a) Minnesota Epilepsy Group (MEG) / St. Paul Children’s Hospital or b) University of Minnesota Medical Center (UMMC). The remaining two months are spent on electives.

a. **Minnesota Epilepsy Group Learning Objectives:** The Minnesota Epilepsy Group at United Hospital/St. Paul Children’s hospital houses an active pediatric epilepsy program with inpatient and outpatient pediatric epilepsy services. The areas of focus are epilepsy surgery evaluations, medical management of complex epilepsy patients, and involvement with investigational therapies for epilepsy management. Clinical experience is divided between the clinical neurophysiology laboratory, the outpatient clinics, and the inpatient service. Emphasis will be placed on learning techniques of invasive monitoring and electrocorticography.

**Months 1-3 of training:** Upon completion of the first three months, fellows are expected to:

- Perform and interpret routine EEGs (MK, PC, PBLI)
- Understand the principles of long term monitoring video EEGs (MK, PC)
- Perform and interpret ambulatory EEGs (MK, PC)
- Conduct an evaluation of a new patient (MK, PC, CS)
- Formulate and dictate an organized report and communicate the results to referring physicians (MK, PC, CS, SBP).
- Effectively work with members of the clinical team to provide efficient patient care (PC, Prof, SBP)

**Months 4-7 of training:** Upon completion of months 4-7 fellows are expected to:

- Perform a thorough and appropriate work up of new patients (PC, MK, SBP)
- Perform and interpret long term monitoring video EEG’s (MK, PC)
- Understand the principles of intraoperative evoked potential recordings (PC, MK)
- Evaluate and formulate management strategies for patients with epilepsy (PC, MK, PBLI)
- Understand the principles of reading intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings, and understand their significance as they pertain to patient management (PC, MK, PBLI)
- Effectively obtain patient history, perform physical examination and tests, and formulate an opinion about neurologic localization, etiologic differential diagnosis and a management plan (MK, PC, PBLI)
- Formulate and dictate an organized report and communicate the results to referring physicians (PC, MK, CS, SBP)
- Provide effective ongoing care of patients with epilepsy in the clinic setting (PC, MK, CS, SBP)
- Provide clinical consultations on complex, hospitalized epilepsy patients (PC, MK, SBP)
- Read intra-operative electrocorticography, subdural electrode array recordings, and intracranial depth electrode recordings, and understand their significance as they pertain to patient management (PC, MK, PBLI)
- Understand the use of ancillary tests used in surgical epilepsy evaluations, such as MRI, PET, SPECT, fMRI, MEG (magnetoencephalography), and neuropsychological testing (PC, MK, PBLI, SBP)
- Understand the role of investigational treatment options, including new medications and deep brain stimulation in the treatment of patients (MK, PC, PBLI)
- Understand the role of less invasive alternatives to intracranial EEG monitoring and new therapeutic avenues for patients who are not candidates for surgical resection (PC, MK, PBLI)

**Months 8-10 of training:** Upon completion of months, 8-10 fellows are expected to:

- Formulate complex diagnoses of seizures, epilepsy and related conditions (PC, MK, PBLI)
- Provide effective care ongoing care for epilepsy patients including those with intractable epilepsy (PC, MK, CS, SBP, PBLI)
- Perform and interpret intra-operative evoked potential recordings (PC, MK)
- Display proficiency in the reading of intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings (PC, MK, PBLI)
- Appropriately use the results of intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings in patient management (PC, MK, PBLI)
- Review available clinical trials of investigational treatment options and direct and advise patients as appropriate (PC, MK, PBLI, Prof)
- Understand the role of less invasive alternatives to intracranial EEG monitoring and new therapeutic avenues for patients who are not candidates for surgical resection.

b. **UMMC Epilepsy Center Learning Objectives:**
One of the CNP fellows on the EEG/Epilepsy track (track 2) will spend 10 months working within the Comprehensive Epilepsy Center at the University of Minnesota Medical Center. The remaining two months are spent in EMG and sleep. The comprehensive epilepsy center provides multidisciplinary care for epilepsy and seizure disorders. CNP fellows work as part of a team including neurologists, neurosurgeons, neuropsychologists, neuropharmacologists, neuroradiologists, psychiatrists, epilepsy nurses, speech therapists and social workers. The overall educational goals of this rotation are to develop in fellows a current understanding of the role of clinical neurophysiology in the comprehensive care of patients, provide extensive clinical/technical experience in the performance of clinical neurophysiological examinations, and to provide training in the clinical evaluation and management of patients with epilepsy.

**Months 1-3 of training:** Upon completion of the first three months, fellows are expected to:

- Perform and interpret routine EEGs (MK, PC, PBLI)
- Understand the principles of long term monitoring video EEGs (MK, PC)
- Perform and interpret ambulatory EEGs (MK, PC)
- Conduct an evaluation of a new patient (MK, PC, CS)
- Formulate and dictate an organized report and communicate the results to referring physicians (MK, PC, CS, SBP)
- Effectively work with members of the clinical team to provide efficient patient care (PC, Prof, SBP)

**Months 4-7 of training:** Upon completion of months 4-6, fellows are expected to:

- Perform a through and appropriate work up of new patients (PC, MK, SBP)
- Perform and interpret long term monitoring video EEG’s (MK, PC)
- Understand the principles of intraoperative evoked potential recordings (PC, MK)
- Evaluate and formulate management strategies for patients with epilepsy (PC, MK, PBLI)
- Understand the principles of reading intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings, and understand their significance as they pertain to patient management (PC, MK, PBLI)
- Effectively obtain patient history, perform physical examination and tests, and formulate an opinion about neurologic localization, etiologic differential diagnosis and a management plan (MK, PC, PBLI)
- Formulate and dictate an organized report and communicate the results to referring physicians (PC, MK, CS, SBP)
- Provide effective ongoing care of patients with epilepsy in the clinic setting (PC, MK, CS, SBP)
- Provide clinical consultations on complex, hospitalized epilepsy patients (PC, MK, SBP)
- Read intra-operative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings, and understand their significance as they pertain to patient management (PC, MK, PBLI)
- Understanding the use of ancillary tests used in surgical epilepsy evaluations, such as MRI, PET, SPECT, fMRI and neuropsychological testing (PC, MK, PBLI, SBP)
- Understand the role of investigational treatment options, including new medications and deep brain stimulation in the treatment of patients (MK, PC, PBLI)
- Understand the role of less invasive alternatives to intracranial EEG monitoring and new therapeutic avenues for patients who are not candidates for surgical resection (PC, MK, PBLI)

Months 8-10 of training: Upon completion of months 8-10, fellows are expected to:

- Formulate complex diagnoses of seizures, epilepsy and related conditions (PC, MK, PBLI)
- Provide effective ongoing care for epilepsy patients including those with intractable epilepsy (PC, MK, CS, SBP, PBLI)
- Perform and interpret intra-operative evoked potential recordings (PC, MK)
- Display proficiency in the reading of intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings (PC, MK, PBLI)
- Appropriately use the results of intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings in patient management (PC, MK, PBLI)
- Review available clinical trials of investigational treatment options, direct, and advise patients as appropriate (PC, MK, PBLI, Prof)
- Understand the role of less invasive alternatives to intracranial EEG monitoring and new therapeutic avenues for patients who are not candidates for surgical resection (PC, MK, PBLI)

3. EEG/EMG Blended track

Fellows rotate through the core teaching facilities, spending three to four months each at University of Minnesota Medical Center (UMMC), Hennepin County Medical Center (HCMC) and the Minneapolis VA Health Care System (MVAHCS) for a total of 11 months. Busy EMG and EEG services, along with associated clinics, are housed in each facility. Fellows may take an elective as their 12th month of training.

a. University of Minnesota Medical Center Learning Objectives: Upon completion of the UMMC rotation fellows are expected to:

- Understand the peripheral nervous system neuroanatomy (MK, PC)
- Understand the indications for and limitations of electrodiagnostic testing (PC, MK, PBLI, SBP)
- Perform and interpret nerve conduction studies (PC, MK)
Perform and interpret nerve conduction studies and needle electromyography (PC, MK, PBLI)
Perform patient evaluation and develop treatment plans for patient with epilepsy (PC, MK)
Conduct appropriate evaluation of patients with neuromuscular diseases/symptoms (PC, MK, CS)
Formulate and implement appropriate treatment plans for patients with neuromuscular diseases (PC, MK, CS)
Perform and interpret autonomic testing and understand the role of these tests in the evaluation and management of patients with autonomic symptoms (PC, MK)
Understand the uses and limitations of intraoperative monitoring during surgical procedures (PC, MK)
Effectively communicate complex and difficult diagnoses and information to patients and their families (PC, CS)
Understand the role of hospice and palliative medicine in the care of patients with degenerative and terminal conditions (PC, MK, SBP)
Work effectively with members of a multi-specialty and multi-disciplinary treatment team (PC, SBP, Prof)
Communicate effectively in written and verbal communications with referring providers (PC, MK, SBP, CS)

b. HCMC Learning Objectives: HCMC is a level-one trauma center with a busy emergency department. There is a national ALS center, a neuromuscular clinic, an EMG laboratory and an epilepsy program. The Minnesota Regional Sleep Disorders Center is housed in HCMC. The clinical experience at HCMC is divided between the clinical neurophysiology (EMG, EGG, sleep) laboratories and outpatient clinics. Fellows see a mixture of patients referred to the EMG laboratory and are involved in the interpretation of electroencephalograms performed on a wide range of patients drawn from both the inpatient and outpatient settings. The distinguishing features of the HCMC rotation are fellow participation in the sleep disorders clinic at the Minnesota Regional Sleep Disorder Center and the nationally recognized ALS Center. The Sleep Disorders clinic performs approximately 1000 polysomnograms yearly and logs several thousand patient visits annually, and is continually staffed by clinical neurophysiology faculty. CNP fellows gain experience with interpretation of polysomnograms, and multiple sleep latency tests, as well as seeing patients with a wide spectrum of sleep disorders.

Upon completion of the HCMC rotation, the CNP fellow is expected to:

Understand the basics of nerve and muscle histopathology (MK, PC, PBLI)
Perform and interpret nerve conduction studies and needle electromyography (PC, MK, PBLI)
Become proficient in the reading of electroencephalograms and understand their significance as they pertain to patient management (PC, MK, PBLI)
Evaluate and formulate management strategies for patients with neuromuscular disease (PC, MK)
Understand the presenting symptoms and diagnostic testing of amyotrophic lateral sclerosis (PC, MK, PBLI)
Understand the major principles of sleep disorder management (PC, MK, PBLI, SBP)
Conduct an appropriate history and physical exam for patients with sleep issues and problems (PC, MK, CS)
Score, analyze and interpret nocturnal polysomnography, MSLT, and CPAP/BiPAP recordings
Identify artifacts during polysomnography (PC, MK)
Identify and rectify equipment failure during polysomnography recording (PC, SBP)
Understand role of genetic counselors in the treatment and management of degenerative neuromuscular diseases. (PC, MK, SBP)
Effectively communicate difficult news and prognoses to patients and families with degenerative neuromuscular disease (PC, CS, MK)
• Effectively and sensitively, plan with patients and families symptom management and palliative treatment in cases of non-curable, progressive conditions. (PC, CS, SBP, MK)
• Work effectively with technical staff in performance of polysomnography (PC, Prof, SBP)

c. **MVAHCS Learning Objectives:** Fellows spend four months working in the MVAHCS epilepsy and neuromuscular disease subspecialty clinics and in EMG and EEG training.

At the end of the MVAHCS rotation, the fellow is expected to:

• Perform and interpret nerve conduction studies (MK, PC)
• Perform and interpret needle electromyography (MK, PC)
• Evaluate and formulate management strategies for patients with neuromuscular disease (PC, MK)
• Become proficient in the reading of electroencephalograms and understand their significance as they pertain to patient management (PC, MK)
• Understand issues that present in the longitudinal care of patients with neuromuscular disease (MK, PC, SBP)
• Perform and interpret autonomic testing and understand the role of these tests in the evaluation and management of patients with autonomic symptoms (PC, MK, PBLI)
• Provide effective consultation to referring providers within the VA system (PC, MK, Prof, SBP)
• Perform and interpret routine EEGs (MK, PC, PBLI)
• Understand the principles of long term monitoring video EEGs (MK, PC)
• Perform and interpret ambulatory EEGs (MK, PC)
• Conduct an evaluation of a new patient (MK, PC, CS)
• Formulate and dictate an organized report and communicate the results to referring physicians (MK, PC, CS, SBP)
• Effectively work with members of the clinical team to provide efficient patient care (PC, Prof, SBP)

4. **Electives**  Trainees from all tracks will work with the PD during the first month of training to define their elective interests. This will allow the Program Coordinator sufficient time to organize the schedule and any paperwork needed to support the elective. Fellows in the EEG and EMG 80% tracks must take two months of clinical neurophysiology topics other than the area of their specialization. Fellows in the Blended track select topics of interest to them. The available electives are:

a. **Sleep Elective Learning Objectives** – available at HCMC or UMMC sites.
• Score, analyze and interpret nocturnal polysomnography, MSLT, and CPAP/BiPAP recordings
• Identify artifacts during polysomnography (PC, MK)
• Identify and rectify equipment failure during polysomnography recording (PC, SBP)
• Conduct an evaluation of a new patient (MK, PC, CS)
• Formulate and dictate an organized report and communicate the results to referring physicians (MK, PC, CS, SBP)
• Effectively work with members of the clinical team to provide efficient patient care (PC, Prof, SBP).

b. **EEG Elective Learning Objectives**– available at UMMC, MEG, or MVHCS sites.
• Perform a thorough and appropriate work up of new patients (PC, MK, SBP)
• Perform and interpret long term monitoring video EEG’s (MK, PC)
• Understand the principles of intraoperative evoked potential recordings (PC, MK)
• Evaluate and formulate management strategies for patients with epilepsy (PC, MK, PBLI)
• Understand the principles of reading intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings, and understand their significance as they pertain to patient management (PC, MK, PBLI)
• Effectively obtain patient history, perform physical examination and tests, and formulate an opinion about neurologic localization, etiologic differential diagnosis and a management plan (MK, PC, PBLI)
• Formulate and dictate an organized report and communicate the results to referring physicians (PC, MK, CS, SBP)
• Provide effective ongoing care of patients with epilepsy in the clinic setting (PC, MK, CS, SBP).

c. EMG Elective Learning Objectives—available at UMMC, HCMC, or MVHCS sites.
• Understand the peripheral nervous system neuroanatomy (MK, PC)
• Understand the indications for and limitations of electrodiagnostic testing (PC, MK, PBLI, SBP)
• Perform and interpret nerve conduction studies (PC, MK)
• Perform and interpret nerve conduction studies and needle electromyography (PC, MK, PBLI)
• Perform patient evaluation and develop treatment plans for patient with epilepsy (PC, MK)
• Conduct appropriate evaluation of patients with neuromuscular diseases/symptoms (PC, MK, CS)
• Formulate and implement appropriate treatment plans for patients with neuromuscular diseases (PC, MK, CS)
• Perform and interpret autonomic testing and understand the role of these tests in the evaluation and management of patients with autonomic symptoms (PC, MK)
• Effectively communicate complex and difficult diagnoses and information to patients and their families (PC, CS)
• Understand the role of hospice and palliative medicine in the care of patients with degenerative and terminal conditions (PC, MK, SBP)
• Work effectively with members of a multi-specialty and multi-disciplinary treatment team (PC, SBP, Prof)
• Communicate effectively in written and verbal communications with referring providers (PC, MK, SBP, CS).

d. Intra-operative Monitoring (IOM) Elective Learning Objectives—An IOM intensive EEG rotation is available at UMMC or MEG.
• Understand the principles of intraoperative evoked potential recordings (PC, MK)
• Understand the principles of corticography (PC, MK)
• Understand the principles of depth electrode intra carotid amobarbital testing (PC, MK)
• Understand the principles of cortical mapping in surgical planning (PC< MK)
• Understand the principles of reading intraoperative electrocorticography, subdural electrode array recordings and intracranial depth electrode recordings, and understand their significance as they pertain to patient management (PC, MK, PBLI)
• Effectively obtain patient history, perform physical examination and tests, and formulate an opinion about neurologic localization, etiologic differential diagnosis and a management plan (MK, PC, PBLI)
• Formulate and dictate an organized report and communicate the results to referring physicians (PC, MK, CS, SBP)
GME ORIENTATION

All incoming residents and fellows who have never completed a residency or fellowship at the University of Minnesota are required to attend one of our GME Orientation sessions, which are usually held on July 1st or 2nd.

If you are unable to attend GME Orientation, please contact your Program Coordinator for make-up requirements.

In addition to attending GME Orientation, incoming residents and fellows must also complete REQUIRED online pre-orientation training requirements for compliance purposes. Please see the GME web page on Orientation for module details.

Also see the section for CNP Orientation Boot Camp, for fellowship-specific training.

LIFE SUPPORT CERTIFICATION

Upon entering an accredited GME training program, such as the CNP fellowship, all trainees who have direct contact with patients must be certified in Basic Life Support (BLS). Certification is typically valid for two years. Once the initial certification expires, the trainee must take a recertification class. For those trainees required by the hospital to have BLS or any other life saving certification will be recertified at the teaching hospital’s expense. Contact your fellowship coordinator or tnelson1@fairview.org to get scheduled for training or re-training.

SECURITY/SAFETY

Security and personal safety measures are provided to trainees at all locations, including but not limited to parking facilities, on-call quarters, hospital and institutional grounds, and related clinical facilities (e.g. medical office buildings).

Contact Information:
University of Minnesota Medical Center Security Office: 612-273-4544
University of Minnesota Security Monitor Program: 612-624-WALK

VA Medical Center Security Office: 612-467-2007 / office located on the first floor, in room 1U-162

Hennepin County Security Office 612-873-2359 / office located at RL150

PATIENT CARE

The CNP fellowship is primarily an outpatient clinic experience, with most experiences taking place in the outpatient Neurology clinic setting or the EEG/EMG lab setting. CNP fellows do not have their own continuity clinic throughout the academic year, but instead attend the clinics at the site where they are rotating each month.

CNP fellows have a small number of inpatient experiences: when consults are requested, when patients are undergoing video EEG monitoring, and for intraoperative monitoring during invasive procedures.

MEDICAL RECORDS AND REFERENCE MATERIALS

As part of the onboarding process at each site, every CNP fellow receives logon instructions for accessing that hospital’s electronic medical records system, and information about what reference materials are
available in print in the clinic area. All CNP fellows also have access to electronic medical literature databases with search capabilities through the University of Minnesota’s Biomedical Library.

LABORATORY/PATHOLOGY/RADIOLOGY SERVICES

Inpatient clinical support services are available on a 24-hour basis at University of Minnesota Medical Center, Hennepin County Medical Center, and the Minneapolis VA Health Care System, to meet reasonable and expected demands, including intravenous services, phlebotomy services, messenger/transporter services, Inpatient Radiology services including laboratory and radiologic information retrieval systems allow prompt access to results.

PROCEDURE LOG

The Clinical Neurophysiology fellow is responsible for maintaining a personal log of their procedures and case types, as stipulated by the Program Director. The log is not recorded centrally, and protected patient information is stripped from the log. It is intended primarily as a count of the various case and procedure types, giving the fellow an accurate idea of how many procedures they have performed, which in turn will form part of the final semi-annual evaluation report that the Program Director prepares at the end of the program.

ONCALL SCHEDULES

CNP fellows do not take call.

ONCALL ROOMS

Call rooms are available for those few occasions when a fellow decides to stay at the hospital:

- **UMMC** – on 4th floor of Mayo building, next to C-496 exercise room
  Call 626-6330 for reservations; check-in time 2:00 pm to 7:00 am
- **HCMC** – walk-in available at R5.302, door code 2354.
  Reserve through Cindy Farr, 873-2595 x4 when need is known in advance.

There is an exercise room is located in C-496 Mayo which is accessible 24 hours a day, 7 days a week. The space, which includes a computer and small kitchenette for trainees’ use, is located adjacent to the Mayo Building call rooms and is accessed with a security code which can be provided by your program coordinator. Locker rooms are located directly across the hall from the exercise room and are accessible with this same code.

The exercise equipment has been provided by the UMMC-Fairview Medical Executive Committee. If you have any questions please call 612-273-7482.

SUPERVISION

During the first month of fellowship, each fellow will have direct supervision and coaching, with the faculty physically present with the fellow and patient.

As the fellow demonstrates an increasing level of competence with the various tasks, tests, and patient care, faculty supervision will transition to Indirect Supervision, with the faculty readily available and on campus. Faculty are encouraged to review procedures/encounters with the fellow on a regular basis and provide feedback after care is delivered.
Each institution has specific requirements listing situations in which a trainee must contact the supervising physician immediately. Examples of these situations are:

In outpatient neurology clinic, or the EEG/EMG lab:
- When patients are behaviorally disordered or threatening
- When there is need for a CODE team activation

When on consults in the inpatient service:
- Unexpected transfer to ICU or higher level of care
- Unanticipated intubation or ventilator support
- Change in CODE status
- Major neurologic change
- Major medical problem (e.g. cardiac arrest, a CODE, new or rapidly worsening respiratory distress, PE)
- Clinical intervention due to medication or treatment errors
- Development of any new clinical problem requiring an invasive procedure or operation for treatment
- Patient, family, or clinical staff request for attending notification.

GRADED RESPONSIBILITY

Each patient will have an identifiable, credentialed and privileged faculty who is ultimately responsible for that patient’s care. That faculty will supervise and oversee the actions of the fellow.

At each site, the fellow will demonstrate to the faculty their level of competence in the various tasks. During the first months of fellowship, faculty will delegate and supervise specific assignments.

As increased competence is demonstrated, the faculty will delegate to the fellow progressive authority and responsibility, conditional independence, and a supervisory role in patient care.

At the same time, faculty will inform each fellow of the limits of his/her scope of authority, and the circumstances under which he/she is permitted to act with conditional independence.

Faculty always has the final responsibility for the care of the patient. In the event that a fellow may be unable to perform his/her patient care duties, the faculty will take over.

CONFERENCES

The following conferences are required:

Boot Camp didactic lectures, on various dates during first two months of the academic year
Weekly EEG/Epilepsy surgery conference, Mondays, 2:30 pm, room 12-109 PWB, UofM
Weekly neuromuscular conference, Fridays, 8:00 am, room 12-109 PWB, UofM

And when the content is relevant to CNP:
Friday Resident School didactics, 2:00 pm Fridays, room 12-109 PWB
Neurology Grand Rounds, noon Fridays, room 12-109 PWB, UofM

Optional conferences include:
Muscular Dystrophy Seminar Series, twice monthly, 9:00 am Fridays, various locations
Clinical Neuroscience Joint Conference, 7:30 am Tuesdays, room 12-109 PWB, UofM
Residency Case Conference, 1:00 pm Fridays, room 12-109 PWB
TEXTBOOK AND REFERENCE LIST

Fellows will each borrow a copy of Clinical Neurophysiology, Third Edition, 2009, editors Jasper Daube and Devon Rubin, from the fellowship coordinator.

There are numerous standard texts and other resources available in each lab; as well as many online resources, including access to Up To Date through the University of Minnesota Biomedical Library and via Fairview Health Services.

DUTY HOURS

All residents and fellows at the University of Minnesota must record their duty hours using the web-based New Innovations RMS system found at: https://www.new-innov.com/Login/Login.aspx?Hospital=MMCGME

Duty hours should be logged frequently, and at least weekly. Record all patient care, administrative, and vacation/sick time. All hours worked and all moonlighting hours must be reported. Moonlighting hours count towards the 80 hours per week maximum allowed.

The combined total of hours worked should not exceed 80 hrs per week. Fellows are expected to have at least 8 hours off every day; 10 hours off preferred. Fellows must also have at least 1 day per week free of all educational duties, as averaged over a four week period.

The program coordinator and program director are constantly vigilant to assure that frequency and intensity of hours worked does not adversely impact the fellows’ educational experience.

Your program coordinator can answer questions about what activity codes to use, why duty hours are submitted, how they are used, etc.

MOONLIGHTING

Fellows interested in moonlighting must discuss it with the Program Director. If moonlighting is approved, a letter will be written formally approving moonlighting. No moonlighting can be performed without an approval letter.

All moonlighting hours must be reported via the RMS duty hours, and will be counted towards the 80 hour per week duty hour limit defined by the ACGME. If you will be moonlighting, please consult with your fellowship coordinator regarding what activity code to use in RMS.

MONITORING OF TRAINEE WELL-BEING

The CNP Program Director and teaching staff are sensitive to the need for timely provision of confidential counseling and psychological support services to fellows. Training situations that consistently produce undesirable stress on fellows or residents are evaluated and modified.

Trainees and faculty are educated to recognize the signs of fatigue and sleep deprivation, alertness management, and fatigue mitigation processes. While not likely to be needed in this fellowship, when
necessary the program will adopt fatigue mitigation processes to manage potential negative effects of fatigue on patient care and learning. Also refer to the Moonlighting section and the Call Room section.

Details about the support resources available to all residents/fellows can be found on the Graduate Medical Education web site http://www.med.umn.edu/gme/residents/home.html. These include:
- Needle Sticks and Blood Borne Pathogen Exposure Mgmt instructions,
- a Dispute Resolution Process,
- Well-Being Tools,
- a Resident Assistance Program (RAP) at 651-430-3383, and an on-site consultant (Marilyn Becker, Ph.D., L.P. at 612-626-7196),
- among others.

EVALUATION

Fellows and supervising faculty share informal regular discussion and feedback during the course of Clinical Neurophysiologic procedures.

A quarterly formal evaluation of the Clinical Neurophysiology fellow is completed by the faculty, in conjunction with the staff with whom they have worked in that quarter.

On a quarterly basis, fellows are asked to evaluate the fellowship faculty.

There is a semi-annual “360-degree” assessment of the trainees is made by the Clinical Neurophysiology technical and administrative staff, as well as patients.

Information from the quarterly faculty evaluations, the 360 evaluations, conference attendance, research project status, and the breadth of categories in the fellow procedure log all are discussed during a semi-annual meeting with the Program Director.

The Program Director is responsible for a written, final evaluation for each Clinical Neurophysiology fellow completing the Clinical Neurophysiology Program that comments upon scope of training achieved by that trainee during their year of fellowship. Particular emphasis is placed on performance during their final period of training, commentary on the numbers of procedures performed, and commentary on their ability to perform Clinical Neurophysiologic procedures in a competent way in the context of independent practice.

Rotations are evaluated by fellows on a quarterly basis, again using the New Innovations web-based RMS system.

Annually, fellows and faculty are invited to complete confidential written evaluations of the program itself. These are also scheduled and completed through the New Innovations RMS system. Anonymous, aggregated information from all rotation and program evaluations are used in an ACGME required annual, formal, fellowship evaluation meeting.

IN-TRAINING EXAMS

All fellows, regardless of their selected training track, take two inservice examinations:


BOARD EXAMINATIONS

It is the program’s expectation that all graduates of this CNP fellowship will take the ABPN Clinical Neurophysiology board examination within 3 years of graduation.

American Academy of Neurology

The Department of Neurology shares with the American Academy of Neurology the name and training level of each residents/fellow in our programs.

RESEARCH

Fellows are required to execute at least one research project during this year-long program. By the fourth month of the fellowship year, fellows are expected to identify their projects and to select faculty mentors.

Fellows formally present their projects at an educational symposium that takes place close to graduation, in late May/early June each year.

TEACHING

CNP fellows assist in teaching neurology to medical students and neurology residents. This will include module presentations for the neurology clerkship, presentations at the case conference, and others.

ADMINISTRATION

“Please refer to the Institution Policy Manual located on the GME website at http://www.med.umn.edu/gme/instpolicyman/home.html for University of Minnesota Graduate Medical Education specific policies. Should policies in the Program Manual or Fellowship Addenda conflict with the Institution Manual, the Institution Manual takes precedence.”

Contacts:

Program Director       John Tulloch, MD       tullo001@umn.edu
Fellowship Coord       Pat Bulgerin       612-625-9110       bulge006@umn.edu

Site Contacts:

HCMC: Katie Dolan, Education Coordinator 612-873-2595  katie.dolan@hcmcd.org
    Ezgi Tiryaki, MD (HCMC Site Director)       tirya001@umn.edu
Pay Dates:

The University of Minnesota pays employees on a biweekly pay period basis, with each pay period starting on a Monday and ending on a Sunday. Employees are paid every other Wednesday, 10 days after the end of the pay period.

You will receive your paychecks one of two ways: a paper paycheck or Direct Deposit. Paper checks are mailed to your home address. Direct Deposit notices can be viewed the day before the Wednesday availability of the deposit.

Whether you receive a paper paycheck or Direct Deposit, you can view your pay statements online.

1. Visit the Office of Human Resources Employee Self-Service page at http://hrss.umn.edu/
2. Click on the “Pay Statement” link under Self-Service Actions.
3. Login using your x.500 username and password.
4. Follow the user-friendly instructions.

Holidays:

The Department of Neurology fellowships follow the University of Minnesota Twin Cities staff holiday schedule, which differs from the medical student and residency schedule, and can be found at:
http://www1.umn.edu/ohr/benefits/leaves/holiday/tcroc/index.html

Insurance:

The Office of Student Health Benefits administers all insurance benefits available to residents and fellows in the Medical School. Visit their website at http://www.shb.umn.edu/twincities/residents-fellows-interns/m-residents-fellows-health-plan.htm for details, forms, and rates.

Absences:

There is a form to complete and submit to the fellowship coordinator for program director approval IN ADVANCE of any weekday absence for out-of-town conferences, vacation, parental leave, job interviews, etc.

Fellows are entitled to 15 business days (3 weeks) of vacation per academic year. Vacations should be planned well in advance and coordinated with the faculty and clinic where you rotate. No more than two weeks of vacation may be taken at one time.
Fellows are entitled to 5 business days (1 week) of sick leave per academic year. Please remember to contact your fellowship coordinator, your clinic, and the faculty that is expecting to work with you, if you must call in sick.

Parental leave, academic leave, and other types of specific leave needs are defined and detailed further on the GME website, in the Resident and Fellow Resources section.