

**Neurology Elective**  
Inova Fairfax Medical Campus  
Internal Medicine Residency Program  
PGY-3 Level Elective

**Course Director:** Dr. Benjamin Jiang

**1. Educational Purpose and Goals**

- a. To understand the anatomic and physiologic basis of clinical neurology and become familiar with presenting features, diagnosis, and treatment of common neurologic disorders
- b. To practice the art of localizing neurologic lesions
- c. To recognize and manage neurologic emergencies
- d. To develop differential diagnosis and understand principles of ordering and interpreting neurologic tests in both central and peripheral nervous system disorders.
- e. To become familiar with and gain experience common procedures such as lumbar puncture and electromyography.
- f. To understand the vital role of multidisciplinary care that includes the internal medicine provider in the setting of neurologic disease and gain experience in coordination of care between teams. Members of the multidisciplinary team may include physical therapy, occupational therapy, speech therapy, stroke response nurse, neurosurgeons and neuro-radiologists.
- g. To develop management plan for patients with neurologic disease (both central and peripheral nervous system disorders).
- h. Demonstrate the ability to manage the care and complications of patients with chronic neurologic disease.

**2. Principal Teaching/Learning Methods**

- a. *Supervised patient care:* On the neurology service, residents will encounter patients in the hospital setting as well as work up patients in the outpatient setting. Residents will perform initial neurology consultations when requested by the attending. The resident will formulate a hypothesis and a treatment plan and present it to the attending. Both the resident and attending will examine the patient and discuss the plan of care after synthesizing all data. Residents will continue to follow patients after the initial consultation. In the clinic setting, residents will see patients who present for initial evaluation as well as follow patients with chronic neurological problems under the supervision of neurology faculty. They will also get exposure to office-based procedures in neurology such as EMGs.
- b. *Didactics/Small group sessions*
  - i. Noon conference neurology lecture series
  - ii. Faculty will provide lectures and bedside teaching core neurology topics

- iii. Neurology departmental sessions (optional but encouraged based on interest):
  - 1. Cerebrovascular Case Conference (CVIR) – weekly on Tuesdays at 12p
  - 2. Trauma/Neuroradiology Case Conference – 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> Tuesdays at 3p
  - 3. Neuro-Ortho-Spine Case Conference – 2<sup>nd</sup> Tuesday at 4p
  - 4. Neuro Tumor Board case conference – weekly on Tuesdays at 4p
- c. *Independent reading* – all residents are expected to read about patients they see in the hospital and the clinic (suggested resources below).

### **3. Educational Content**

- a. Patient/Disease mix – Inpatients at Inova Fairfax Hospital who are over 18 years old provide an ethnically diverse patient population with a broad array of common and rare diseases. Residents will see inpatients as well as critically ill patients in a neurosurgical ICU with acute ischemic strokes, hemorrhagic strokes, subarachnoid hemorrhage, status epilepticus, coma/encephalopathy/delirium, CNS infection, neuromuscular disease with respiratory involvement, cord compression, movement disorders, headache/back pain, disorders of the special senses, epilepsy, dementia, CNS neoplasms, demyelinating disease, degenerative CNS diseases, spinal cord diseases, and neuromuscular disorders. Some of these patients will be seen as part of follow up in clinic. In the clinic setting, residents will see patients with chronic neurological conditions such as Parkinson’s disease, Alzheimer’s disease as well as be involved in work up of patients presenting for initial consultation to a neurologist. Residents will also learn indications for electroencephalography, various types of cranial imaging, angiography, and lumbar puncture. Residents will have the option of individualizing the rotation to add half-day to one day with neuro-radiologist, physical medicine and rehab team or the EEG lab.
- b. Learning venues
  - i. Inova Fairfax Hospital
  - ii. Inova Outpatient Neurology Clinic - ICPH
  - iii. Inova EEG/EMG lab (available on Mon/Thurs only)
  - iv. Inova Fairfax Hospital Department of Neuroradiology
- c. Structure – The rotation will be three- to four-weeks long, and time will be spent on the neurology inpatient wards as well as in the clinic setting. Residents will typically spend two weeks with the general neurology service and two weeks with the stroke team. Residents will not be on call for these services, although they may be on disaster call for the program during this elective. There are no weekend duties. Residents will continue to attend their continuity clinic during this rotation. The educational coordinator will orient the resident to the rotation at the

beginning of the block and will review the specific schedule at that time. The inpatient neurology team will be composed of an attending, resident, medical student, and a nurse practitioner. There will always be at least 4.5 hours of teaching attending rounds per week, and usually these will be integrated with work rounds. Residents will never work more than 14 hours in a day and typically will work for approximately 10 hours per day, five days per week.

#### **4. Principal Educational Materials**

- a. At the beginning of the rotation, the educational director will provide materials, including this curriculum, and a resource list.

#### **5. Methods of Evaluation**

- a. At the end of the rotation, a core faculty neurologist will complete a web-based (MedHub) evaluation and review it with the resident.
  - i. Attending neurologist schedule can be accessed here for assignment:  
<https://app.qgenda.com/Link/view?linkKey=7e86d927-a031-4dbe-bdb7-6a7d60dc91af&landingPageId=fdf17f57-ec18-454e-b1b2-6c0781770d05>
- b. The residents will also evaluate faculty and the rotation in an anonymous fashion (summarized annually in a composite form).
- c. In-training exam scores for self-assessment
- d. A nurse practitioner from the neurology team will be chosen to evaluate the resident (360 degree component) if applicable
- e. Lectures as well as daily patient presentations will be evaluated by the supervising faculty and will be included with final resident evaluation.

#### **6. Resource List**

- a. Harrison's Principles of Internal Medicine, Cardinal Manifestations of Disease, Section 3 – "Nervous System Dysfunction and Part Fourteen – "Neurologic Disorders."
- b. American Stroke Association website for guidelines – Early Management of Adults with Ischemic Stroke; Management of Spontaneous Intracerebral Hemorrhage in Adults
- c. Neurology for the Non-Neurologist, Wigbert C. Wiederholt
- d. Clinical Neurology Made Ridiculously Simple, Stephen Goldberg
- e. Goetz: Textbook of Clinical Neurology ([for online reference](#))
- f. Scientific Rationale for the Inclusion and Exclusion Criteria for Intravenous Alteplase in Acute Ischemic Stroke (2015). *Stroke*. 2016; 47: 581-641.
- g. Risk–Benefit Profile of Long-Term Dual- Versus Single-Antiplatelet Therapy Among Patients With Ischemic Stroke: A Systematic Review and Meta-analysis. *Ann Intern Med*. 2013; 159(7):463-470

- h. Annals of Internal Medicine – In the Clinic Series: Migraine (2013). *Ann Intern Med.* 2013;159(9):ITC5-1
- i. Annals of Internal Medicine – In the Clinic Series: Transient Ischemic Attack (2011). *Ann Intern Med.* 2011;154(1):ITC1-1.
- j. American Academy of Neurology Practice Guidelines/patient information on multiple topics

### Learning Venues

- 1. Supervised patient care/Attending rounds
- 2. Small group and Didactic sessions
- 3. Session with neuroradiology attending
- 4. Lecture to neurology team
- 5. Independent reading
- 6. Hopkins modules

### Methods of Evaluation

- A. Attending evaluation
- B. Nurse practitioner evaluation
- C. Direct observation with feedback
- D. Lecture evaluation
- E. Hopkins modules and ITE scores (for self-assessment)

<b>Competency: Patient Care</b>	<b>Learning Venues</b>	<b>Evaluation methods</b>
Work with the attending neurologist and provide effective consultations to services that request them.	1	AC
Improve neurologic examination skills. Correlate the examination of patients during consultation with the results from diagnostic tests.	1,2,3,5,6	ACE
Effectively evaluate and manage patients with acute neurologic illness.	1,2,3,5,6	ACE
Judiciously order cranial imaging.	1,2,3,5,6	ACE
<b>Competency: Medical Knowledge</b>	<b>Learning Venues</b>	<b>Evaluation Methods</b>
Articulate the pathophysiology, evaluation and management of acute ischemic strokes, hemorrhagic strokes, subarachnoid hemorrhage, status epilepticus, coma/encephalopathy/delirium, CNS infection, neuromuscular disease with respiratory involvement, cord compression, movement disorders, headache/back pain, disorders of the special senses, epilepsy,	1-6	ACDE

dementia, CNS neoplasms, demyelinating disease, degenerative CNS diseases, spinal cord diseases, and neuromuscular disorders.		
<b>Competency: Interpersonal and Communication Skills</b>	<b>Learning Venues</b>	<b>Evaluation Methods</b>
Interact in an effective way with physicians and nurses participating in the care of patients requiring neurology consultation and care	1	ABC
Be able to explain rationale of diagnostic and therapeutic choices (interventional radiologic procedures, lumbar puncture, thrombolytic therapy, etc.) to patients and families	1,2,3,5,6	ACE
Show understanding of differing patient preferences in diagnostic evaluation and management of neurologic disorders	1	AC
Be able to explain prognosis for functional recovery to patients and families for ischemic stroke, intracranial hemorrhage and nontraumatic coma	1,2,5,6	AC

<b>Competency: Professionalism</b>	<b>Learning Venues</b>	<b>Evaluation Methods</b>
Treat team members, primary care givers, and patients with respect	1	ABC
Actively engage in the academic process	1-6	ACDE
Attend and participate in all scheduled conferences	2,3	ACD
<b>Competency: Practice Based Learning</b>	<b>Learning Venues</b>	<b>Evaluation Methods</b>
Identify limitations of medical knowledge in evaluation and management of patients with neurologic disorders and use the medical literature, colleagues, ancillary staff, and attendings to address these gaps	1-6	ACDE
<b>Competency: Systems-Based Practice</b>	<b>Learning Venues</b>	<b>Evaluation Methods</b>
Understand the necessity for efficient coordination of care when treating a patient with an acute ischemic or hemorrhagic stroke (neurology, neuroradiology, neurointerventional radiology, physical/occupational/speech therapy	1,2,4,5,6	ACE

