



University of Central Florida

College *of* Medicine

# Neurology Clerkship Handbook for Students & Attending Physicians 2016-2017

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## **IMPORTANT NOTICE**

**The clerkship director reserves the right to modify, amend, delete, replace, or revise all policies, procedures, and scholarly content if needed to maintain or improve the academic integrity of the clerkship. When possible, such changes will be planned to minimize disruption to current students and preceptors, however, fairness and the academic soundness of the clerkship must take precedence. Any such changes will be communicated promptly to neurology clerkship students as well as attending preceptors.**

## Timeline & Important Dates

Week	Day	Activity Notes	Deadlines
1	M	6:00AM: Orientation & Neurovascular Session at COM 10:00AM: NIH Stroke Scale Inter-professional Education at FH	
	T		
	W		
	R		
	F		<b>Due to Webcourses at 11:59pm: NIH Stroke Scale completion Certification, Study Schedule (optional) and Group Arrangement</b>
2	M		
	T	3:00PM: Didactics	
	W		
	R		
	F		<b>Due to Webcourses at 11:59pm Due to Webcourses: H&amp;P #1, Group Project and Plans to perfect the Neuro Exam</b>
3	M		
	T	3:00PM: Didactics	
	W		
	R		
	F		<b>Due to Webcourses at 11:59pm:H&amp;P Peer Feedback, Mid-clerkship self-evaluation, group project and observed feedback form #1.</b>
4	M		
	T	Mid-clerkship meeting with Dr. Bellew/ Dr. Berman for Orlando Students 3:00PM: Didactics	
	W	Mid-clerkship meeting with Dr. Frontera for VA Bay Pines Students	
	R		
	F		<b>Due to Webcourses at 11:59pm: Due to Webcourses: Group Project</b>
5	M		
	T	3:00PM: Didactics	
	W		
	R		
	F		<b>Due to Webcourses at 11:59pm: H&amp;P #2, Group Project and observed feedback form</b>
6	M		
	T	3:00PM: Didactics	
	W		
	R		
	F	<b>AM: NBME Exam</b> PM: Longitudinal Session	<b>Due to Webcourses at 11:59pm: Due to Webcourses: Lifelong Learning</b>

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## 1. Introduction

Welcome to the third-year neurology clerkship. Neurology is a fast-evolving field that incorporates cutting-edge, high-tech interventions with proven, hands-on examination techniques that have been handed down for centuries. Patient care in neurology requires *both* high-tech and traditional methods to make diagnoses, choose rational treatment strategies, and optimize patient care.

Neurology has historically been regarded as a specialty in which diagnosis could be exquisitely precise but treatment was minimal or non-existent. This is no longer the case. While a good neurologic examination can still localize a lesion more accurately than any MRI scan, many treatments are now available for patients with diverse diagnoses. Treatment options are expected to increase dramatically during your career.

The purpose of the neurology clerkship is not to train neurologists (that is the goal of residency training). You will have a broad exposure to neurology as well as the overlapping fields of neurosurgery and interventional neuroradiology. **The goal of the neurology clerkship is to provide students with the fundamental skills required by all physicians to recognize, diagnose, and formulate an initial treatment plan for patients with common neurologic disorders.** As such, a principal objective of the clerkship is to help you refine your skills in taking a neurologic history and performing a thorough neurologic examination. Most of you will eventually practice in settings where acute neurologic consultation is initially available only by phone. The better historical and examination information you provide, the better your neurologic consultant will be able to advise you regarding immediate interventions for your patients.



## 1.1 Mandate & Rationale

### Why neurological disease is important

- Over 45 million patients visit a physician every year. Up to 10% present with potential neurologic symptoms.<sup>1</sup>
- Up to 20% of all hospital admissions are due to neurologic disease.<sup>2</sup>
- The incidence and prevalence of neurologic disease are increasing.<sup>3</sup>
- Annual deaths from epilepsy rival those from breast cancer.<sup>4</sup>
- Stroke is the #1 cause of disability in the US<sup>5</sup> and is the third leading cause of death.<sup>6</sup>
- Alzheimer's disease was the fifth most common cause of death in 2004, an increase of 33% over 2000, and rates of Alzheimer's disease are expected to at least quadruple by 2050.<sup>7</sup>

### Why neurology education is important

- While a neurology clerkship technically is not required by the LCME, over 80% of medical schools offer one.<sup>8</sup>
- A consensus opinion by professional organizations has addressed the content of the neurology-neuroscience curriculum.<sup>9</sup>
- The standard curriculum was extensively peer-reviewed at the national level prior to publication.<sup>7</sup>
- Neurology is widely viewed by practicing generalist physicians as the "hardest" specialty.<sup>10</sup>
- Neurology is the clinical area in which many practicing generalists feel least confident to diagnose and manage patients.<sup>9,11,12</sup>
- Most practicing generalists feel their undergraduate education in clinical neuroscience was weak.<sup>9, 10, 11</sup>

### How to improve neurology education

- In one survey, most practicing generalists attributed their weakness in neurology & neuroscience education to three main factors: (1) over-emphasis of basic neuroscience, (2) lack of time spent on clinical neuroanatomy, and (3) poor teaching.<sup>9</sup>
- Most generalists agreed that a firm foundation in basic clinical neuroanatomy would have benefitted their future practice.<sup>8, 9, 10, 11,13</sup>
- Most urged instructors to "stress the most basic and simple concepts" relevant to general practice.<sup>12</sup>
- Addressing these issues appears to improve knowledge and confidence in senior medical students.<sup>10, 11</sup>
- A broad generalist view of clinical neuroscience (rather than highly specialized knowledge) appears to be most appropriate level of education.<sup>11, 12</sup>

***For these reasons, a broad understanding of neuroanatomy, neurophysiology, and clinical neurology is important for all graduating medical students.***<sup>14</sup>

## 2. Sites, Personnel, & Contact Information

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<sup>1</sup> American Academy of Neurology, *Neurology Clerkship Core Curriculum Guidelines*, 2000 ([www.aan.com](http://www.aan.com)).

<sup>2</sup> Playford, ED et al. A survey of neurological disability at a district general hospital. *British Journal of Clinical Practice* 1994;48:304-306.

<sup>3</sup> MacDonald, BK et al. The incidence and lifetime prevalence of neurological disorders in a prospective community-based study in the UK. *Brain* 2000;123:665-676.

<sup>4</sup> Epilepsy Foundation, *Epilepsy: Just the Facts*. [www.epilepsyfoundation.org](http://www.epilepsyfoundation.org) (2010), and American Cancer Society, *Breast Cancer Facts & Figures, 2009-2010*, [www.acs.org](http://www.acs.org).

<sup>5</sup> American Stroke Association/American Heart Association, *Heart Disease and Stroke Statistics 2008 Update*. Chicago, IL: American Heart Association. Also available at [www.americanheart.org](http://www.americanheart.org).

<sup>6</sup> Centers for Disease Control and Prevention, *Stroke Facts and Statistics*. Available at [www.cdc.gov/stroke](http://www.cdc.gov/stroke), accessed 2 September 2008.

<sup>7</sup> Alzheimer's Association, *Alzheimer's Facts and Figures 2007*. Chicago, IL: Alzheimer's Association. Also available at [www.alz.org](http://www.alz.org).

<sup>8</sup> Griggs R & D Anderson. An important first step: a standard curriculum for the neurology clerkship. *Neurology* 2002;58:845-846.

<sup>9</sup> Gelb, DJ et al. The neurology clerkship core curriculum. *Neurology* 2002;58:849-852.

<sup>10</sup> Schon F, P Hart & C Fernandez. Is clinical neurology really so difficult? *Journal of Neurology, Neurosurgery, and Psychiatry* 2002;72:557-559.

<sup>11</sup> Flanagan E, C Walsh, & N Tubridy. "Neurophobia" – attitudes of medical students and doctors in Ireland to neurological teaching. *European Journal of Neurology* 2007;14:1109-1112.

<sup>12</sup> Ridsdale, L., R. Massey, & L. Clark. Preventing neurophobia in medical students, and so future doctors. *Practical Neurology* 2007;7:116-123.

<sup>13</sup> Nadarajah, R. et al. Establishing a generic training programme for future junior doctors: a role for neurosurgery within the framework of clinical neurosciences. *Annals of the Royal College of Surgeons of England* 2005;87:264-268.

<sup>14</sup> Charles PD et al. How much neurology should a medical student learn? A position statement of the AAN Undergraduate Education Subcommittee. *Academic Medicine* 1999;74:32-36



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<b><u>Bay Pines VA Healthcare System</u></b> 10000 Bay Pines BLVD, St. Petersburg, Florida 33708 (727) 398-6661, Main Line  Site Director: Dr. Alfred Frontera Program Support Assistant: Raymond Faulkner Bldg. 100, Room 5A-104 (727) 398-6661 ext: 5587 Arrival Time: 8am		
<b><u>Florida Hospital Neuroscience and ICU</u></b> Site Contact and Coordinator: Vanessa Wise, 407-303-7449 Email: <a href="mailto:Vanessa.Wise@ucf.edu">Vanessa.Wise@ucf.edu</a> Orlando Neurosurgery Clinic 1605 West Fairbanks Avenue Winter Park, FL 32789 407-975-0200, main line		
<b><u>Orlando VA Healthcare System</u></b> 5201 Raymond St, Orlando, FL 32803 Neurology Department-1st Floor of the Specialty Clinic 407-754-8298 Or Orlando VA-Lake Nona 13800 Veterans Way, Orlando, FL 32827 Arrival Time 8:00am		
<h2>Private Practice</h2>		
Jasna Kojic, MD <i>Peds Neuro Site Director</i> Ashraf El-Bohy, MD, PhD	<b><u>Child Neurology Center of Orlando</u></b> 6000 Turkey Lake Road, Suite 205 Orlando, FL 32819 407-649-1848- main line 407-393-6909 -backline 407-646-9442 - answering service Arrival time: 8am	jasnakojc@hotmail.com
Marc I. Sharfman, MD	<b><u>The Headache and Neurological Treatment Institute</u></b> 2137 W. State Road 434 Longwood, Fl. 32779 Office: 407-644-3737 ext 114	neurorlando@aol.com
Mark Klafter, MD	<b><u>Neurological Services Orlando, P.A.</u></b> 3849 Oak Water Circle Orlando, FL 32806 Office: 407 – 704-8532 Arrival time: 9am	<a href="mailto:Klafter862@aol.com">Klafter862@aol.com</a>

Yassar Chakfe, MD	<b><u>Orange County Neurology Clinic</u></b> 4248 Town Center Boulevard, Suite 2 Orlando, Florida 32837 Office number: (407) 251-6511	yassar@orangecountyneurologyclinic.com
Ira Goodman, MD	<b><u>The Compass Research Clinic</u></b> 100 W Gore Street SUITE 406 Orlando, FL 32806 Arrival time: 9am	Cell: 321-262-1311 (text is fine)
Carl Barr, MD Murtuza Kothawala, MD	<b><u>Florida Child Neurology</u></b> <b><u>T. Denny Sanford Pediatric Center</u></b> 615 E Princeton Street, Suite 225 Orlando, FL 32803 Office Phone: (407) 897-3544 Arrival time: 8am	Sandra Toro, Practice Manager Tel: (407) 897-3544 Ext.105
Bruce Hoffen, MD	<b><u>Florida NeuroHealth</u></b> 515 W. SR 434, Suite 205 Longwood, FL 32750 Office number: (407) 332-5141 Arrival time: 8:00am	
Dina Dahan, MD & Refaat El-Said, MD	<b><u>Comprehensive Neurology Clinic</u></b> 10967 Lake Underhill Rd Orlando, FL 32825 Office: 407-208-0708 Arrival time: 8:30am	<a href="mailto:refdina@yahoo.com">refdina@yahoo.com</a>
Ananthi Rathinam MD, Sheila Ramos Martínez MD Larah Lucero, PA-C	<b><u>Kids Neuro Care</u></b> 10931 Dylan Loren Circle Orlando, FL 32925 Office: 407-208-0708 Arrival Time: 8:00am	Eric Marcus, Office Manager <a href="mailto:emarcus38@gmail.com">emarcus38@gmail.com</a>
Sampathkumar "Sam" Shanmugham, MD Elias Gizaw, MD Nitesh Shekhadia, MD	<b><u>Florida Neurology, PA</u></b> 755 Stirling Center Pl. Lake Mary, FL 32746 Arrival time: 8:00am	Office Manager, Melanie (407) 333-1718 <a href="mailto:drsammd@outlook.com">drsammd@outlook.com</a>
Walter Morgan, MD Ricardo Villalobos, MD Tariq Irfan, MD	<b><u>Center for Neurological Health</u></b> 2400 N. Orange Blossom Trail, Suite 204 Kissimmee, FL 34744 Arrival time: 8:00am	Bee Martino, CMOM Email: <a href="mailto:Bianis.Martino@flhosp.org">Bianis.Martino@flhosp.org</a> (407) 944-3097
Prashant M. Desai, MD	<b><u>Neuro Pediatrics</u></b> 89 Douglas Avenue Suite 137 Altamonte Springs, FL 32714	Office Administrator: Darylann Office Phone: (407) 862-9988
Alicia Cabrera, MD	<b><u>Neurology of Central Florida</u></b> 106 Boston Avenue, Suite 204 Altamonte Springs, Florida 32701 Arrival time: 8:00am	Office Number: 407-790-4990
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### 3. Goals and Objectives

The overarching educational goal of the neurology clerkship is for students to learn how to take a complete neurologic history and perform a comprehensive neurologic examination. It is also desirable to develop additional skills in lesion localization, neurologic differential diagnosis, and development of initial diagnostic and treatment plans for common neurological conditions. These are basic skills shared by competent physicians regardless of specialty.

#### 3.1 Knowledge

##### 3.1.1 Neurology Clerkship Learning Objectives

1. Review basic sciences (anatomy, physiology, pathology) relevant to the diagnosis and management of common neurological conditions.
2. Develop and demonstrate the ability to acquire, record, and interpret clinical information about patients who present with common neurological symptoms.
3. Develop and demonstrate the ability to synthesize clinical data into a differential diagnosis and initial treatment plan for patients with common neurological problems.
4. For patients with common neurological conditions, apply evidence based principles to compare and contrast available treatment options with regard to efficacy, risk, benefit, and cost-effectiveness.
5. Develop and refine history-taking and examination skills pertinent for all patients, with a special emphasis on techniques for evaluating neurologic problems.
6. Develop and demonstrate professional comportment during interactions with patients, families, and other health professionals.
7. Develop and demonstrate basic competencies in dealing with neurological emergencies, including:
  - Acute ischemic stroke
  - Intracranial hemorrhage
  - Delirium
  - Status epilepticus
  - Myasthenic crisis
  - Neuromuscular respiratory failure
  - Acute central nervous system infections
  - Spinal cord compression
  - Increased intracranial pressure
  - Acute worst headache
8. Develop and demonstrate proficiency in eliciting historical elements of and performing examination techniques in evaluation of the common complaints, including:
  - Dizziness, vertigo, and syncope
  - Weakness
  - Headache
  - Sensory loss
  - Memory loss

- Altered mental status, loss of consciousness, cognitive impairment
- Back pain
- Hyperkinesia
- Hypokinesia
- Acute muscle weakness

9. Develop and demonstrate proficiency in evaluation the following common conditions, including:

- Stroke/TIA
- Seizure
- Migraine
- Dementia
- Neuropathy
- Myopathy
- Motor neuron disease
- Neuromuscular disease
- Dementia
- Delirium
- Demyelinating disease
- Movement disorders

### 3.1.2 Learning Resources

The clerkship coordinator will distribute several texts at the start of your rotation; they must be returned in good condition on the day of the NBME:

1. *Clinical Neurology* by Greenberg, Aimonoff & Simon (2011). This text reviews and builds upon neuroanatomy localization learned in your basic science course (a percentage of your Shelf and Step exams test this material specifically). This text also presents clinical material appropriate for a 3<sup>rd</sup>-year student to practice general medicine and perform well on a Shelf or Step exam.
2. *Case Files Neurology*
3. *Pre-test Neurology*
4. *Blueprints Neurology*. This text is often a good place to start, but unlike others in this series it does not cover the depth and breadth of clinical material a 3<sup>rd</sup>-year student should know to practice general medicine or perform well on a Shelf or Step exam.

Be professional to the students rotating after you and do not write in these texts. If you would like to write in a text, you must purchase your own copy.

**The importance of reading every day for the rest of your career cannot be overemphasized.** This is a habit you must develop to be an effective physician. **READ SOMETHING – ANYTHING – ABOUT YOUR PATIENTS EVERY DAY!** Reading about your patients will improve your knowledge, impress your attendings, and establish the basis for good patient care throughout your career. The following resources are helpful but this list is not exhaustive:

#### Accessibility Services:

The University of Central Florida's College of Medicine is committed to providing equitable access to learning opportunities for all students. **The overall technical/proficiency standards for the M.D. Program are listed in the student handbook.** This information is also available in alternate formats upon request. Students with disabilities who need accommodations must

contact Student Academic Support Services (SASS), which serves as the Office of Student Accessibility Services (AS) for the UCF College of Medicine in COM 205. Students seeking accommodations must register with the COM's Accessibility Services (AS) and make available all necessary and up-to-date documentation. Please note, accommodations are not provided retroactively. For an appointment to discuss your request, please contact the SASS Coordinator at extension 6-1394 (or 407-266-1394).

### Comprehensive Textbooks

Many of the following texts are available electronically via the College of Medicine library.

- *Harrison's Principles of Internal Medicine*. Many of the leading neurologists in the country provide excellent concise reviews in the chapters of Harrison's.
- *Neurology in Clinical Practice*. This is a favorite neurology textbook because it is so clearly written. Do not be intimidated by its expansive breadth.
- *Merritt's Neurology*. Especially concise to read about a patient whose diagnosis is known.
- *Adams and Victor's Principles of Neurology*. A standard in the field, and especially helpful when approaching a patient whose diagnosis is unknown.
- *Localization in Clinical Neurology*. This book is extremely helpful when learning to localize lesions. It is exhaustive, so do not try and memorize it but do use it as needed to improve your localization skills.
- *Practical Neurology*, by Jose Biller. The name says it all. Has both symptom-based and diagnosis-based sections.

### On-Line Resources

- *The New England Journal of Medicine* ([www.nejm.org](http://www.nejm.org)). You can search by content collection (Neurology/Neurosurgery) and also by topic. Limiting your search to "Review Articles" or "Case Records" may yield especially valuable articles for learning.
- *Neurology* ([www.neurology.org](http://www.neurology.org)). This is the official journal of the American Academy of Neurology and contains many seminal articles and reviews on pertinent topics.
- The American Academy of Neurology ([www.aan.org](http://www.aan.org)) is the largest professional organization of neurologists in North America. The website has many resources. In addition, expert panels often review important clinical topics that are summarized in practice recommendations. Check them out at <http://www.aan.com/go/practice/guidelines>.
- Dr. Alan Pestronk's neuromuscular disease web page is an excellent resource to learn more about disorders affecting the peripheral nervous system (<http://neuromuscular.wustl.edu/>).
- Remember PubMed! You can build a sophisticated search step-by-step using the "Advanced Search" feature at <http://www.ncbi.nlm.nih.gov/pubmed/advanced>. VERY user friendly.
- The National Institute of Neurological Disorders and Stroke (<http://www.ninds.nih.gov/>) has many resources for neurologic disease.

If you have trouble finding information, talk to the faculty or see one of the librarians. Scholarly articles that are not available through the UCF libraries' web sites can be obtained *free of charge to you* by asking in the library or by sending an email to [medlibrary@mail.ucf.edu](mailto:medlibrary@mail.ucf.edu).

### What to Avoid

Search engines like Google, Yahoo!, Bing, and others can help you discover helpful internet resources. They can also lead you to misinformation. Be wary. You are now becoming a professional, and as such, you bear substantial responsibility to make sure the information you bring to patient care and to your colleagues is scholarly, accurate, and complete. Do not embarrass yourself on rounds by citing Wikipedia as a source. If you aren't sure how to find something in the medical literature, ***ask***. Talk to one of the COM faculty or ask a librarian for assistance.

### 3.2 Skills, Attitudes and Behaviors

Students are expected to meet and exceed the following minimum standards:

- Be present and participate fully in all clerkship activities, including orientation, group meetings, and examinations.
- Make decisions, defend them, and understand the consequences of a poor decision; such self-reflection is how you improve your own understanding and practice.
- Give 100% effort while on the clerkship and expect the same from your classmates.
- Be current with all your patients and be prepared in advance with relevant reading. Search peer-reviewed literature and bring articles with you! Your team will appreciate it.
- Be present *and on time* every day unless you are ill or have a family emergency.
- You are expected to be respectful of your classmates, residents, faculty, and other staff at all times.
- You should ask residents and attendings to provide constructive criticism, so that you can improve throughout the clerkship. Formal mid-rotation feedback sessions are also scheduled.
- Remember that the patient is the focus of clinical care, not you.

### 3.3 Professionalism

The clerkship experience is not only about knowledge; it is also about inculcating the behaviors and attitudes that comprise the professional demeanor of the physician.<sup>15</sup> Toward this end, neurology preceptors will be asked to comment on the following professional attributes for each student.<sup>16</sup>

#### 3.3.1 Interpersonal skills

**Definition:** Includes demonstration of inquiry about family and support systems; understanding of cultural diversity in health care delivery; understanding social, psychological, and economic factors in health care delivery; accurately assessing patients' expectations and assumptions; and effectively engaging patients and families in verbal communication.

**Assessment:** The ability to develop rapport with patients, patient families, and other medical professionals.

#### 3.3.2 Professional behavior

**Definition:** Includes demonstration of respect, truthfulness and honesty; appropriate self-assessment; understanding patients' rights; recognizing and responding appropriately to conflicts between personal convictions and patients' choices of medical treatments; and sensitivity to cultural and ethnic diversity.

**Assessment:** Interaction with staff and patients will be continually assessed.

#### 3.3.3 Information management

**Definition:** Includes demonstration of oral case presentation skills, mastery of traditional organization of medical data, adequate medical record keeping, and accessing data and information systems.

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<sup>15</sup> For in-depth discussion, see Bellew G et al. Assessment of professionalism task force: final report to the UCF College of Medicine Curriculum Committee. Unpublished manuscript. 19 June 2009.

<sup>16</sup> Adapted, with permission, from a syllabus for the Senior Neurosurgery Clerkship Elective by Stephen Lewis, MD, FRCS, University of Florida (pers comm. 10 September 2008).

**Assessment:** Ongoing throughout the rotation. Oral case presentation skills will be assessed during rounds and in clinic. Medical record assessment will focus on case notes recorded by the student on assigned patients and will take into consideration organization, accuracy, and legibility.

## **4. Attendance Policies**

### **4.1 Overview: College Policies**

College of Medicine policies on attendance are outlined in the Student Handbook and on the College of Medicine web site. It is your responsibility to review and adhere to these policies, and ignorance of the policies is not an excuse for absence. Failure to comply may result in academic or disciplinary penalties. The handbook is available on-line at [http://www.med.ucf.edu/academics/student\\_affairs/resources.asp](http://www.med.ucf.edu/academics/student_affairs/resources.asp).

## 4.2 Unexpected Absences

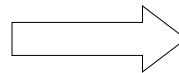
In brief, you should regard your duties on the neurology clerkship as you would your duties as a full-time, employed physician. Patients and other members of the health care team rely on your timely execution of patient care responsibilities. **Only illness or extenuating personal emergencies should be viewed as legitimate grounds for absence or tardiness.**

The key to handling unforeseen absences professionally is *communication*. If it is unavoidable that you be absent from or late for clerkship duties, you must inform all relevant parties as soon as possible. This should include a phone call to

your attending physician;  
your attending physician's clinical or office manager (if applicable);  
your supervising resident or intern (if applicable);  
the College of Medicine's Neurology Clerkship Coordinator;  
any others as specified in the College of Medicine Student Handbook.

### How Unexpected Absences Should Be Reported

As soon as student knows he/she will be absent from their scheduled clerkship, he/she should make at least TWO notifications.



Supervising preceptor  
• **Send BOTH email and call/text**



Clerkship Coordinator  
Celia Linton  
Email: [Celia.Linton@ucf.edu](mailto:Celia.Linton@ucf.edu)  
Office: 407-303-3662  
Cell: 407-461-7591

*\*As soon as possible after an unexpected absence has occurred, students should follow through with proper paperwork/documentation.*

1. In the event of absence from the clerkship without permission from the clerkship director, the student will lose 5 percentage points per unexcused absence from their final clerkship grade.
2. Additional remediation may be required at the clerkship director's discretion (e.g., the taking of extra call).



## 5. Grading Policies

### 5.1 Evaluation

Evaluation procedures are consonant with standards set by the College of Medicine, in particular the Curriculum Committee, the Clerkship Directors' Subcommittee, the Program Evaluation Subcommittee, and the Student Evaluation and Promotion Committee. In the neurology clerkship, the following general plan will apply.

### 5.2 Formative Feedback

Ongoing formative evaluation during the clerkship is essential to allow students to improve skills during the rotation. At minimum, daily feedback will occur through discussions with preceptors while helping to care for patients in the following areas:

- Cognitive skills
  - History taking
  - Neurologic examination
  - Understanding of ancillary testing & data
  - Formulation, differential diagnosis, and treatment plan
- Personal skills
  - Professionalism
  - Dress
  - Demeanor
  - Any other concerns

Preceptors should communicate any concerns to the clerkship director *immediately* for monitoring or remediation as appropriate.

The frequency and mechanisms of formative feedback delivery are shown in the table.

Frequency and Mechanism of Formative Feedback	
Frequency	Mechanism
Daily	Verbal feedback from attending physician preceptor One-on-one interaction with preceptors & other healthcare providers Aimed at “teachable moments” at the bedside and during clinical care
Weekly	Case discussions in didactic setting Observed History and Examination Checklist (if applicable for that week)
Mid-clerkship	Evaluation feedback summarized & discussed Formal review of patient log, adjustment of assignments as needed
End of Clerkship	Formative section of the final evaluation report

### 5.3 Summative Evaluation<sup>17</sup>

Current standards suggest summative assessment be based on a minimum of one comprehensive written examination, narrative observations by primary teaching faculty, and other observable performance-based measures.

<sup>17</sup> Pangaro, LN et al. Evaluation and Grading of Students. In: Fincher, R-M E (ed.), *Guidebook for Clerkship Directors*, 3<sup>rd</sup> ed. Omaha, NE: Alliance for Clinical Education, 2005, pp 133-250. Also available at [www.allianceforclinicaleducation.org](http://www.allianceforclinicaleducation.org).

Small- and large-group discussions will be administered throughout the third year in the Longitudinal Clerkship Curriculum (detailed in other documents). The clerkship curriculum will include clinical skills and case sessions during protected didactic days to refine neurological examination skills.

## 5.4 Grading Overview

The final neurology clerkship grade will be based on the following components:

- 55% - Preceptor evaluations (this grade will include professionalism)
- 20% - NBME subject exam, passing set at 5<sup>th</sup> national percentile
  - 75<sup>th</sup> national percentile or above is required to be eligible for an “A” in the clerkship.
  - If a student participates in the optional Lifelong Learning-Skill Development Team, the benchmark to be eligible for an “A” is 75<sup>th</sup> national percentile
  - If the optional Lifelong Learning-Skill Development Team achieves its shelf performance goal, the team members’ benchmark to be eligible for an “A” is 70<sup>th</sup> national percentile (specifically, the shelf performance goal is as follows:  
the average neurology shelf exam percentile for the team must be at least 10 percentile points higher than the average Step 1 percentile for the team)
- 5% - Two clinician-observed history and physicals – form must be turned in to the clerkship coordinator. (First one will equal 2% of final grade; second one will equal 3%.)
- 15% - H&P Write-ups – turned in to the clerkship coordinator.
  - First one is **due on Friday at noon, week 2** of the clerkship (4%)
  - You will be assigned one of your peer’s H&P’s to grade. Using the H&P grading rubric, you will provide feedback **due on Friday at noon, week 3** of the clerkship. The quality of your feedback will be graded (5%).
  - Second one is **due on Friday at noon, week 5** of the clerkship (6%)
- 5% - Peer assessments of contribution to group work

Attendance at all didactic sessions is expected. Unexcused absences may result in penalty or assignment of remedial work at the discretion of the Clerkship Director.

## 5.5 Details of Grading Components

**5.5.1. Preceptor evaluations** will be completed after a one-, two-, or four-week period with the preceptor (as indicated in the section on rotation schedules). Substantial weight is placed on the aggregate evaluation of students by preceptors since it is the day-to-day performance in practice that is the standard to which the student should aspire.

Preceptors will evaluate students on various dimensions of medical knowledge (including examination skills, ability to localize pathological processes, ability to generate a differential diagnosis, and ability to develop an initial plan for evaluation and treatment); humanism (including ability to establish rapport with patients, maintaining focus on patient comfort and dignity, integration of family into assessment and treatment plans); and professionalism (including communication skills, interactions with patients, families and medical staff, dress, timeliness in execution of duties, and record keeping). Rankings for these attributes will be assigned based on an eight-point Likert scale. A higher number and a lower number are found in some categories. A borderline final grade may be boosted by a higher ranking in a category, or by favorable narrative comments from precepting physicians.

**7, 8: exceeds expectations** (the highest rank representing outstanding or exceptional performance at a level higher than expected for level of training; should be reserved for truly unusual students whose knowledge, actions, compassion, or professionalism are uncommonly refined and consistently executed in an exceptional way);

**5, 6: above expectations** (representing substantially high-quality performance beyond that normally expected of students at this level of training; knowledge, skills, attitudes, or behaviors especially meriting commendation or comment);

**3, 4: meets expectations** (appropriate for level of training; no concerns or deficits that will not be rectified with further education or experience in the course of normal educational processes; the “average” performance for a student at this level);

**1, 2: below expectations** (consistently insufficient performance in a given domain that requires further evaluation and remediation; deficiencies in knowledge, skills, attitudes, or behaviors that should be addressed before promotion beyond current level; will trigger investigation by Clerkship Director and other academic or administrative staff at the college level; may result in failing grade and development of a remediation plan);

**0: Not observed** (will not influence grading evaluation; a simple statement that a given domain or behavior was not sufficiently observed by the preceptor to allow meaningful assessment).

**Attending preceptors please note: while completion of the checklists is necessary for assigning student grades, narrative comments are critical to thorough student evaluation. *Please provide narrative comments on each student, commenting on both strengths and weaknesses. Supportive narrative comments may be used to increase the final clerkship grade for students with a borderline final score.***

**5.5.2. The NBME Subject Examination in Neurology** will be used as an assessment of fundamental medical knowledge. This examination has excellent psychometric properties and statistical validity to assess student knowledge over a wide range of neurologic data (mean 74.5, standard deviation 8). The examination has been reviewed by members of the Neurology Clerkship Working Group at the UCF COM and is felt to be reliable and valid examination instrument. The trend nationally is to set the passing grade for the third-year neurology clerkship at about the 5<sup>th</sup> percentile (standard [z] score = -1.96, scaled score 56). Performance at or above this level is thought to represent a knowledge base sufficient for the non-specialist, third-year clinical clerk to proceed with training in other clinical disciplines. **A score of 75<sup>th</sup> national percentile or above is required to be eligible for an “A” in the clerkship – this benchmark may be lowered a little for optional participation in the Lifelong Learning-Skill Development Team.**

The NBME exam will be administered beginning at **8:00 AM on the last Friday of the clerkship at the College of Medicine**. Standard NBME timing will apply (i.e., 1.5 minutes per question). Students arriving late for the examination will not be given extra time for completion.

### **5.5.3. Preceptor-observed exam requirements**

The form will be available on Web Courses and it will be the student’s responsibility to ask two of his/her preceptors to observe him/her taking an H&P and provide written feedback on the form. These forms must be submitted to the clerkship coordinator by the end of week 5.

**5.5.4. Neurologic history and physicals** are stock in trade for students on the neurology clerkship. You are expected to perform one of these daily or every other day during all 6 weeks of the clerkship. Preceptors may have additional requirements, and these should take precedence for clinical care.

**Friday at 12 noon** during weeks 2 and 5 of the rotation, each student must submit an H&P write-up to the Clerkship Coordinator, Celia Linton. The H&P grading rubric should be used as a guide when crafting the H&Ps. The Clerkship Coordinator will forward a peer's H&P to each student for peer feedback, again the H&P rubric should be used as a guide.

**Friday at 12 noon** during week 3, each student must submit H&P#1 peer feedback to the Clerkship Coordinator. The quality of this feedback will be graded

### **5.5.5. Peer Evaluation**

Each student will participate in a group project researching some aspect of clinical neuroscience in detail and creating a summary document. Each student is required to submit a peer evaluations (through OASIS) for each of their fellow team members **by the final day of the clerkship**. Feedback judged to be thoughtful and professional will receive full credit (5 points towards the final grade).

## **5.6 Considerations for substandard performance**

A final grade shall be calculated with all the data collected on student performance at the end of each six-week rotation. The final responsibility for assignment of the clerkship grade rests with the clerkship director.

### **5.6.1 Special circumstances**

- Students with median preceptor evaluations "below expectations" ( $\leq 2$ ) will be dealt with separately as described in detail elsewhere in this document.
- Students who score less than the 5<sup>th</sup> percentile on the NBME subject exam in neurology, but who receive median preceptor evaluations greater than or equal to "meets expectations," will receive a T grade until the exam is retaken; details of these procedures are described elsewhere in this document.

**5.6.2 Minimum criteria for passing.** A student will receive a minimal passing grade (C) in the neurology clerkship provided all of the following criteria are met:

1. A score on the NBME Subject Examination in Neurology of  $\geq 56$  (5<sup>th</sup> percentile) **and**
2. A median combined score from preceptor evaluations of "meets expectations" **and**
3. Satisfactory completion of required written submissions.

**5.6.3 Minimum criteria for failure.** A student may receive a failing grade in the neurology clerkship if any of the following criteria are met:

1. Substantiated lapse of professionalism (explained below) **or**
2. Substantiated ratings of less than "meets expectations" from a preceptor **or**
3. Failure to complete (or unsatisfactory completion of) required components of the clerkship (including but not limited to required H&Ps, peer feedback, or documentation of patient types evaluated).

**5.6.4 Lapses of professionalism or low preceptor ratings.** Professional behavior (discussed elsewhere) is the *sine qua non* of being a physician. Any allegation of a lapse in professionalism in the neurology clerkship will be investigated by the clerkship director and members of the Neurology Clerkship Working Group. Such lapses may include, but are not limited to, cheating; plagiarism; or failure to fulfill patient care responsibilities. Likewise, any score of “below expectations” or less by any preceptor will be investigated by the clerkship director and the Neurology Clerkship Working Group. If the allegation of a lapse in professionalism is substantiated, or if the rating of “below expectations” or less is found to be accurate, either of these criteria alone (regardless of exam scores and other preceptor evaluations) may be grounds to receive a failing grade in the clerkship. The student will also be referred to the Student Evaluation and Promotions Committee for further consideration. An “incomplete” grade may be assigned, and remediation may be required. Further details are discussed in the next section.

#### **5.6.5 Details of remediation of borderline performance; T grade options.**

**Low NBME score, acceptable preceptor evaluations.** A student who receives ratings from preceptors at or above the “meets expectations” level, but who scores less than 5<sup>th</sup> percentile on the NBME Subject Examination in Neurology, may, at the discretion of the clerkship director, be assigned a T grade. The student may remediate the T grade by taking the examination a second time, the time frame to be determined in consultation with the clerkship director.

Since student preceptor ratings are assumed to be at least “meets expectations,” the remediated grade will be assigned based on repeat NBME performance alone. Inasmuch as the student must take a second administration of the NBME exam in order to meet minimum passing criteria, the maximum grade achievable upon remediation shall be that of “B.”

Performance on repeat administration of the NBME at or above the mean will result in assignment of a grade of “B.” NBME performance less than the mean but greater than minimum passing score (5<sup>th</sup> to 49<sup>th</sup> percentile) will result in assignment of a grade of “C.” Repeat performance less than the 5<sup>th</sup> percentile will be referred to the Student Evaluation and Performance Committee for further consideration.

**Acceptable NBME score, low preceptor evaluations.** Remediation of the student who achieves an acceptable passing score on the NBME, but who has preceptor evaluations at or below the “below expectations” level, will depend on the particulars of why low preceptor evaluations were assigned. Such particulars will be defined by investigation by the clerkship director. A serious breach of professional behavior – such as one that endangers patient safety or confidentiality, seriously disrupts the healthcare team, or results from frank dishonesty – may be determined to be unremediable and may result in assignment of a failing (“F”) grade. In cases where lapses are less serious – such as inability to take a complete medical history, inadequate neurologic examination, or insufficient knowledge base – the clerkship director, in consultation with appropriate COM faculty, will work to develop a plan for remediation. Part of that remediation plan will include an assessment method appropriate to the domain in which further training is required. If remediation is successfully executed, the maximum final grade assigned shall be that of “C.”

## Clinical Contact Experience & Documentation Requirements

### 6.1 Required Patient Types

According to national data, on average, about 80% of neurology students work up 1 outpatient in detail every day or every other day, and approximately 2/3 of students keep a case log.<sup>18</sup> A minimum number of contact experiences for specific types of patients has been determined based on published data, consensus of the UCF COM Neurology Clerkship Working Group, and local practice patterns.

Over the course of the **six-week rotation** each student should see a *minimum* of:

- 3 patients with a vascular disorder (e.g., TIA/stroke, intracranial hemorrhage)
- 3 patients with an episodic disorder (e.g., headache, seizure)
- 1 patient with a coma
- 2 patients with developmental or neurodegenerative disease (e.g., congenital, dementia, movement)
- 2 patients with spinal or peripheral neurologic disease (e.g., radiculopathy, neuropathy)
- 2 patients with a neoplastic, infectious, or immunologic disorder

In addition, students should see and/or assist in performance/interpretation of:

- |   |  |
|---|--|
| 1 lumbar puncture (LP Simulation meets requirement) | 1 CT (interpretation only)                 |
| 1 EMG/NCS study                                     | 1 MRI (interpretation only)                |
| 1 EEG   | 1 Cerebral Angiogram (interpretation only) |

***Students are ultimately responsible for using Oasis to track the types of patients and procedures they see during their rotation. Failure to complete this documentation may result in review by the Student Evaluation and Promotions Committee.***

The need for this stringency is that the College of Medicine is required by the LCME and best educational practices to demonstrate adequate diversity of exposure to various patient populations, especially in the early years of curriculum implementation. Students must take this mission seriously not only for their own education, but also for quality control in the college.

The clerkship coordinator will monitor patient logs in real time. **Students should also be attentive to their patient experiences and should contact the clerkship coordinator if they need additional exposure to a given type of patient.** Logs will be formally reviewed with the student during the mid-clerkship formative feedback meeting and in summative fashion at the end of the rotation. If a live patient experience is not possible for some given condition, students will, at the discretion of the clerkship director, use some combination of the following resources to round out their clinical knowledge:

- *Continuum/Quintessentials*, both high-quality, peer reviewed, clinical CME publications of the American Academy of Neurology;
- Literature review with directed readings and discussion with the clerkship director or other neurology faculty;
- Preparation and presentation to neurology faculty of a short oral or written summary on a given topic;
- Use of the resources in the COM Clinical Skills and Simulation Center which may include an encounter with a standardized patient; use of computer-based or mannequin simulation; or use of part-task trainers (e.g., lumbar puncture simulation model)

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<sup>18</sup> American Academy of Neurology, 2005 Clerkship Directors Survey, March 13, 2006.

## 7. Rotation Schedule

### 7.1 Rotation Sites

In the 2014-2015 academic year there will typically be 13 students per neurology clerkship rotation. Students will rotate among several sites. **The overarching goals of each experience are to enhance the student's ability to perform, document, and interpret a neurological examination; generate a differential diagnosis; and formulate initial evaluation and treatment plans for patients with common neurological complaints.** Each student's neurology experience will include the following components (not necessarily in this same order):

- A. General Neurology (4 weeks), mostly outpatient with some inpatient duties
  1. Orlando - Volunteer & Affiliate Faculty Practices
  2. St. Petersburg - Bay Pines VA Healthcare System
- B. Pediatric Neurology (1 week), mostly outpatient with some inpatient duties
- C. Comprehensive Stroke, Neuro ICU, and Neurosurgery (1 week), mostly inpatient with some outpatient duties

### 7.2 Daily & Weekly Schedule

Operational details of the daily and weekly schedule will be at the discretion of the attending physician. In general, students will work Monday through Friday. Students may be required to come in on weekends at the discretion of the attending. Students will be required to take in-house call with the Florida Hospital stroke service. Call at other sites will be home call. Important variations in the schedule are:

The first Monday morning of the rotation will be spent at Florida Hospital for Scrub and Gown training, orientation, and assignment of clinical sites.

Tuesday afternoons are reserved for didactics. All students will return to the College of Medicine or Bay Pines Video Conference room every week for didactics and case conferences.

The last Friday of the rotation is reserved for the NBME Subject Exam in Neurology in the morning and integration conference in the afternoon. Both will take place at the College of Medicine.

Students rotating through private offices will follow the schedule set by those physicians.

### 7.3 Duty Hours Restrictions

*The University of Central Florida College of Medicine will follow the duty hour guidelines set by the Accreditation Council for Graduate Medical Education (ACGME), ACGME 2011.*

1. *Duty hours are defined as all clinical and academic activities related to the education of the medical student i.e., patient care (both inpatient and outpatient), administrative duties relative to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled activities, such as didactic sessions, grand rounds and conferences. Duty hours do not include reading and preparation time spent away from the duty site.*

- a. Duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities.
  - b. ON AVERAGE over the duration of the clerkship adequate time for rest and personal activities will be provided and will consist of a 10-hour time period between all daily duty periods and after in-house call.
  - c. In-house call must occur no more frequently than every third night.
  - d. Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Students may be on site for up to 4 additional hours in order to participate in didactic activities.
  - e. Students must be provided with one day (24 consecutive hours) in seven, free from all educational and clinical responsibilities, averaged over a four-week period.
2. This policy will be published on the College of Medicine website, in the clerkship handbooks, and in the faculty and preceptor handbooks. This information will also be covered in the COM Clerkship Orientation.

**Oversight of this policy will be the responsibility of the Clerkship Director and the relevant Clerkship Site Director/s. Students are responsible for tracking and logging their duty hours in OASIS.** Faculty and students with concerns regarding possible duty hour violations should report those concerns directly to the Clerkship Director in a timely fashion. Failure to keep duty hour log up to date in OASIS may result in participation point penalization from final grade.

## **8. Learning Sessions (Including Didactics)**

### **8.1 Schedule**

All students will return to the College of Medicine or Bay Pines Video Conference room every Tuesday afternoon for structured learning sessions. **Students are expected to read IN ADVANCE in preparation for each week's sessions.**



## 9. Information for Attending Physicians & Supervising Residents

### 9.1 Overview

#### 9.1.1 Rotation schedule

Days: Typically Monday through Friday.

Exceptions:

- **Tuesday afternoons** are reserved for didactic sessions at College of Medicine.
- The **last Friday** of the rotation is reserved for NBME Subject Exam and Integrated Case Conference.

Attendance is mandatory except for personal emergencies or as arranged with the clerkship director and preceptor.

Hours, Weekends, and Night call: At discretion of attending – typically call is taken from home.

Maximum work hours per week: per ACGME duty hours policy (summarized in section 7.3).

#### 9.1.2 Grading

**Preceptor evaluations: 55%**

NBME subject exam: 20%

Peer evaluation: 5%

Two H&P write-ups : 15% (4% for the first, 5% for the quality of peer feedback, and 6% for the second)

Two preceptor-observed histories and exams: 5% (2% for the first and 3% for the second)

#### 9.1.3 Clerkship goals

The overarching goals of the clerkship are to

- (a) refine the neurologic examination;
- (b) localize lesions;
- (c) develop a reasonable differential diagnosis; and
- (d) outline an initial diagnostic and treatment plan.

We want students to meet these goals by examining patients with both acute *and* chronic neurologic problems in both the inpatient *and* outpatient settings.

### 9.2 Preceptor responsibilities

**9.2.1 General.** All attending physicians and residents are expected to provide:

- Daily supervision.
- Direct observation of basic skills.
- Teaching and guidance.
- Constructive feedback.
- Written assessment of student performance upon completion of the rotation.

**9.2.2 Specific responsibilities.** These goals can be met in different ways in different venues. At minimum, we request the following of attending preceptors:

- Allow each student to perform one complete neurologic history and examination and present that patient to the preceptor, on average once per day.
- Observe and complete one of the two required “Preceptor-Observed history and exam forms”
- Assign additional patient experiences that may include focused exams on follow-up patients.
- On inpatient services, allow students to follow one or more patients (depending on complexity). Exposure to neurologic critical care is highly desirable.
- Ensure student experiences are *hands-on*, with oral patient presentations to preceptors.
- Provide constructive feedback on physical exam, differential diagnosis, and treatment.
- Complete a final evaluation form for each student. (These will be available electronically or on paper as you prefer.)
- Attend one half-day workshop annually at College of Medicine to provide feedback on clerkship rotation and organization.
- Assign brief readings (preferably from recent primary literature) on interesting patient topics as you see fit.

**9.2.3 Giving feedback.** Ongoing formative feedback during the clerkship is essential to allow students to improve skills during the rotation. At minimum, the following categories should be evaluated:

- Cognitive skills
  - History taking
  - Neurologic examination
  - Understanding of ancillary testing & data
  - Formulation, differential diagnosis, and treatment plan
- Personal skills
  - Professionalism
  - Dress
  - Demeanor
  - Any other concerns

Preceptors should communicate any concerns to the clerkship director *immediately* for monitoring or remediation as appropriate.

**9.2.4 Documenting student performance.** **Thoughtful NARRATIVE COMMENTS are the most helpful reflection of student performance, and they greatly facilitate creation of an accurate summary evaluation to be used for the Dean’s Letter. PLEASE provide narrative comments on each student, addressing both strengths and weaknesses.**

### 9.2.5 Examples of an Outpatient Preceptor Routine

- Preparatory issues:
  - Meet with student each morning to review the schedule of patients;
  - Identify patients whom the student will evaluate independently (including the *specific educational focus* of the encounter);
  - Identify patients for whom the student will shadow the preceptor;
  - Discuss any questions from reading assignments or self-directed learning that student performed overnight.

- Patient encounter (several possible variations, preceptors are encouraged to use each of these techniques over the course of the rotation depending on the educational objective of the encounter):
  - Preceptor sees the patient and the student observes;
  - Student interviews and/or examines patient independently, presents patient to preceptor, student and preceptor then interview/examine patient together;
  - Student interviews and/or examines patient with preceptor observing.
- Preceptors are encouraged to fill out brief student evaluation forms *during or immediately after the patient encounter*.
- Short debriefing (immediately following encounter): student and preceptor reflect on patient encounter; follow up on questions and teaching points; identify plan for further self-directed learning.
- Daily debriefing (at end of day): more leisurely discussion of any remaining questions; review plans for self-directed learning; review next day's patient schedule, assign any pertinent preparatory reading based on anticipated patient encounters.

### 9.3 College of Medicine Policy on Student Mistreatment & Abuse

Medical students should report any incidents of mistreatment or abuse to the UCF College of Medicine Associate Dean for Students immediately. It is the policy of the UCF College of Medicine that mistreatment or abuse will not be tolerated. Anyone made aware of any such mistreatment or abuse should notify the COM Associate Dean for Students at 407-266-1353.

### 9.4 FERPA

**FERPA**, the Family Educational Rights and Privacy Act of 1974, as Amended, protects the privacy of student educational records. It gives students the right to review their educational records, the right to request amendment to records they believe to be inaccurate, and the right to limit disclosure from those records. An institution's failure to comply with FERPA could result in the withdrawal of federal funds by the Department of Education.

As a Faculty Member, you need to know the difference between **Directory Information** and **Personally Identifiable Information or Educational Records**:

Personally Identifiable Information or Educational Records **may not** be released to **anyone** but the student and only then with the proper identification.

*Parents and spouses must present the student's written and signed consent **before** the University may release Personally Identifiable Information or Educational Records to them.*

***(Please refer callers to the COM Registrar's Office 407-266-1397, UCF COM, Room 115F)***

#### **General Practices to Keep in Mind:**

- Please **do not** leave exams, papers, or any documents containing **any** portion of a student's Social Security Number, Personal Identification Number (PID), grade or grade point average outside your office door or in any area that is open-access.
- Please **do not** record attendance by passing around the UCF Class Roster, which may contain the student's PID.
- Please **do not** provide grades or other Personally Identifiable Information/Education Records to your students via telephone or email.

**DIRECTORY INFORMATION**

(May be disclosed, unless the student requests otherwise. *Please refer such requests to your department office or to the Registrar's Office.*);

- Name
- Current Mailing Address
- Telephone Number
- Date of Birth
- Major
- Dates of Attendance
- Enrollment Status (Full/Part-time)
- Degrees/Awards Received
- Participation in Officially Recognized Activities and Sports
- Athletes' Height/Weight

**PERSONALLY IDENTIFIABLE INFORMATION** (any data other than "Directory Information", **may not be disclosed**)

*Including, but not limited to:*

- Social Security Number
- Student ID - PID (PeopleSoft)
- ISO Number
- Residency Status
- Gender
- Religious Preference
- Race/Ethnicity
- Email Address

**EDUCATIONAL RECORDS**

*Including, but not limited to:*

- Grades/GPA
- Student's Class Schedule
- Test Scores
- Academic Standing
- Academic Transcripts

**FOR MORE FERPA INFORMATION:**

[www.registrar.ucf.edu/ferpa/staff/survey/Default.aspx](http://www.registrar.ucf.edu/ferpa/staff/survey/Default.aspx)

Or contact: Rel Larkin,  
Interim UCF COM Registrar  
407-266-1371  
[rel@ucf.edu](mailto:rel@ucf.edu)

**10. Appeals Process**

The process for appealing a grade in the clerkship is outlined in the College of Medicine Student Handbook at [http://www.med.ucf.edu/academics/student\\_affairs/resources.asp](http://www.med.ucf.edu/academics/student_affairs/resources.asp).

## Appendix 1: Variations of the Neurologic Examination<sup>19</sup>

### Screening Neurologic Examination

Abnormalities found on screening examination **must** prompt further detailed evaluation with some or all of the comprehensive examination.

General Appearance / Inspection (sitting)	
<b>Mental Status</b>	
Orientation to person, place and time (Date, month, and year, present location, city, state)	Note: speech pattern, assess for dysarthria, aphasia
<b>Cranial Nerves</b>	
Smell	Note: Not usually tested
Visual acuity; Visual fields; ophthalmoscopic exam of fundi	
Pupillary reactions	Check pupils for direct and consensual response
Test extra-ocular movements	Assess for ptosis
Corneal reflex and jaw movement	<b>Note: corneal reflex not performed on SPs</b>
Test sensation in each branch of trigeminal nerve	
Test motor strength of facial muscles (smiling, puff out cheeks, raise eyebrows, close eyes tightly)	
Test the sense of hearing (finger rub)	
Assess swallowing, rise of palate and gag reflex	<b>Note: gag reflex not performed on SPs</b>
Assess voice and speech	
Test the strength of the trapezius and / or sternocleidomastoid muscles	
Inspect protruded tongue (symmetry, deviation)	
<b>Motor System</b>	
Inspection: Note symmetry, distribution of abnormality (if any) and body position; assess for involuntary movement(s)	Note if any chorea, dystonia, fasciculations tics or tremors
Assess muscle bulk and tone(upper and lower extremities)	Note any muscle atrophy or hypertrophy and distribution (proximal vs distal); Assess muscle tone (hypotonia, spasticity, rigidity, “cog-wheel” rigidity)

<sup>19</sup> American Academy of Neurology, *Neurology Clerkship Core Curriculum Guidelines*, October, 2000. Available at: <http://www.aan.com/globals/axon/assets/2770.pdf>.

<b>Muscle Strength</b>	Use scale 0 -5 (See Bates, page 680-1); Test both sides and compare side to side
Abduction of the shoulders	
Flexion and extension of the elbow	
Extension of the wrist	
Abduction of fingers (“finger spread”)	Special testing: if weakness assess ulnar and median nerve
Hand grip	
Flexion and extension of the hips	
Flexion and extension of the knees	
Flexion and extension of the ankles	<i>Special testing:</i> 1. Great toe elevation 2. Inversion/eversion of ankles
<b>Coordination</b>	
Rapid alternating movements	1. Pronation/supination of 2. Toe tapping
Point-to-point movement	1. Finger to nose 2. Heel to shin
Gait	1. Tandem walk 2. Walk on toes and heels 3. Rise from seated position
Stance	1. Romberg test 2. Pronator drift
<b>Sensory System</b>	
Pain (differentiate sharp vs dull)	
Light touch (forearms, arms, thigh and lower leg)	
Position sense (proprioception) – toe and/or thumb (bilaterally)	
Discriminatory Sensations	<i>Special Testing:</i> 1. Stereognosis, graphesthesia 2. Two point discrimination 3. Point localization 4. Extinction
<b>Reflexes</b>	
Test deep tendon reflexes: Biceps, supinator/brachioradialis, triceps, patellar, Achilles, plantar and Hoffman’s	Grade 0-4 (See Bates page 696) Test for clonus
Cutaneous Stimulation reflexes	1. Abdominal wall reflexes 2. Plantar response reflex 3. Anal reflex ((Not performed on SPs)

## Comprehensive Neurologic Examination <sup>20</sup>

- A. Mental status exam
  - 1. Level of consciousness
  - 2. Language (expression, comprehension, repetition)
  - 3. Neglect
  - 4. Gnosis
  - 5. Memory
  - 6. Calculation
  - 7. Visuo-spatial processing
- B. Cranial nerve examination
  - 1. Cranial nerve I: describe how to test olfaction
  - 2. Cranial nerve II: visual acuity, visual fields
  - 3. Cranial nerves II – III: pupillary light reflex
  - 4. Cranial nerves III, IV, & VI: extraocular movements
  - 5. Cranial nerve V: facial sensation and jaw movement; understand trigeminal-supplied areas of intra-oral sensation
  - 6. Cranial nerve VII: facial expression; describe taste testing
  - 7. Cranial nerve VIII: screen hearing
  - 8. Cranial nerves IX, X, & XI: screen palatal, laryngeal, and shoulder movement; phonation; describe afferent & efferent limbs of gag reflex
  - 9. Cranial nerve XII: tongue movement
- C. Motor examination, assessing tone, strength, bulk, and abnormal movements. Comprehensive motor testing should include:
  - 1. Finger abduction/adduction
  - 2. Wrist flexion/extension
  - 3. Elbow flexion/extension
  - 4. Forearm rotation external/internal
  - 5. Shoulder abduction
  - 6. Hip flexion/extension
  - 7. Hip abduction/adduction
  - 8. Knee flexion/extension
  - 9. Ankle flexion/extension
  - 10. Ankle inversion/eversion
- D. Sensory examination: light touch, pin prick, vibration, joint position sense, Romberg's test.
- E. Coordination: rapid alternating movements, finger-to-nose, heel-to-shin.
- F. Deep tendon reflexes: brachioradialis, biceps, triceps, patellar, Achilles.
- G. Gait: casual, tandem.

## Examination of the Comatose Patient<sup>21</sup>

- A. Mental status
  - 1. Level of arousal
  - 2. Response to auditory stimuli (including voice)
  - 3. Response to visual stimuli
  - 4. Response to noxious stimuli (applied centrally and to each limb individually)
- B. Cranial nerves
  - 1. Response to visual threat
  - 2. Pupillary light reflex
  - 3. Oculocephalic ("doll's eyes") reflex
  - 4. Vestibulo-ocular (cold caloric) reflex
  - 5. Corneal reflex
  - 6. Gag reflex

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<sup>20</sup> For more detailed information, consult Campbell WW *DeJong's The Neurologic Examination*, 6<sup>th</sup> ed (2005). Available at UCF COM library website.

<sup>21</sup> For more details, see Wijdicks EFM, *The Clinical Practice of Critical Care Neurology*, 2<sup>nd</sup> ed. (2003), available electronically at the UCF COM library website. **See also** Posner JB, CB Saper, ND Schiff, F Plum. *Plum and Posner's Diagnosis of Stupor and Coma*, 4<sup>th</sup> ed. New York: Oxford University Press, 2007.

- C. Motor function
  - 1. Voluntary movements
  - 2. Reflex withdrawal
  - 3. Spontaneous involuntary movements
  - 4. Tone
- D. Reflexes: deep tendon reflexes (as above), plantar responses
- E. Sensation: response to noxious stimuli



## Appendix 2: Curriculum Outline

### Approaches to Curricular Content

There are three major areas of content for a clinical neurology curriculum:

**Content Area 1:** Review of clinical neuroanatomy;

**Content Area 2:** Performing a neurologic history and examination;

**Content Area 3:** Understanding major categories of neurological symptoms and diseases.

There are at least 4 ways to approach organization of such curricular content:

1. By the format of the standard neurological examination and dysfunction;
2. Based on common symptom complexes;
3. By major diagnostic categories of neurologic dysfunction;
4. By principles of anatomical and physiologic organization of neural systems.

Each of these approaches has advantages & disadvantages. For the most part, didactic sessions will focus on common neurological symptoms and diagnoses. However, students will be instructed on the advantages of being able to organize information in these various ways, and will be encouraged to develop proficiency in each approach.

## Curricular Content Required to Meet Clerkship Learning Objectives

*Note: the following database constitutes the minimum knowledge expected for graduating medical students. Some of this knowledge will be obtained during the pre-clinical portion of the curriculum, but should be reviewed during the clerkship (formally or by the student independently) to reinforce key concepts and to underscore clinical application of basic principles of neuroscience.*

### **CONTENT AREA I: REVIEW OF CLINICAL NEUROANATOMY**

- A. Understand basic anatomical and physiological principles of the components of the neuraxis (cerebral hemispheres, basal ganglia, cerebellum, brainstem, spinal cord, spinal nerve roots, plexi, peripheral nerves, neuromuscular junction, and muscle).
- B. Describe the major functions of the following structures of the central nervous system (CNS):
  1. Frontal lobe
  2. Parietal lobe
  3. Occipital lobe
  4. Temporal lobe
  5. Basal ganglia
  6. Thalamus
  7. Cerebellum
  8. Reticular activating system
  9. Brainstem function (as it relates to autonomic, motoric, and reflex functions present in the persistent vegetative state (PVS) and minimally conscious state (MCS))
  10. Spinal cord
- C. Describe the visual pathway (retina, optic disc, optic nerve, optic chiasm, optic tract, lateral geniculate bodies, optic radiations, and occipital cortex).
- D. Describe the relationship of the midbrain, pons and medulla to each other and:
  1. Localize each cranial nerve nucleus to one of these major brainstem regions, and
  2. Describe the location of the corticospinal tract in each of these major brainstem regions.
- E. Describe the vascular supply of the CNS.
  1. Anterior vs posterior circulation territories
  2. Typical distribution of anterior, middle, and posterior cerebral arteries
  3. Draw the circle of Willis.
  4. Note the origin of lenticulostriate arteries.
- F. Describe the ventricular system (including foramina) and its relationship to the subarachnoid space.
- G. Trace the origin, flow, and absorption of cerebrospinal fluid (CSF).
- H. Describe the anatomy of the spinal cord, with special emphasis on the following:
  1. Relationship of the spinal cord to the vertebral column, and locate the level at which the conus medullaris typically ends.
  2. Identify the following tracts, their functions, the cross sectional location of each, the longitudinal path of each, and levels of synapses and decussations:
    - a) Anterior spino-thalamic tract
    - b) Dorsal columns
    - c) Corticospinal tract
- I. Identify the following components of the peripheral nervous system (PNS):
  1. Afferent (sensory) root
  2. Efferent (motor) root
  3. Dorsal root ganglion
  4. Relationship of nerve roots to intervertebral foramen
- J. Review the brachial and lumbosacral plexi and discuss the major clinical functions of each of the following nerves:
  1. Radial nerve
  2. Median nerve
  3. Ulnar nerve
  4. Femoral nerve
  5. Sciatic nerve
    - a) Tibial nerve

b) Fibular nerve

- K. Describe the physiological basis of major reflexes, including:
  - 1. Biceps reflex
  - 2. Triceps reflex
  - 3. Brachioradialis reflex
  - 4. Patellar reflex
  - 5. Achilles reflex
- L. Describe the neuromuscular junction (NMJ) with special attention to:
  - 1. Physiology of pre-synaptic vesicle function and neurotransmitter release
  - 2. Physiology of post-synaptic neurotransmitter binding
- M. Review the autonomic nervous system (ANS)
  - 1. Describe the sympathetic nervous system including hypothalamus, intermediolateral cell columns, and sympathetic chain.
  - 2. Identify the parasympathetic (cranio-sacral outflow) distribution.
  - 3. Describe the effect of ANS dysfunction on bladder & bowel function, sexual function, and pupillary action.

## **CONTENT AREA II: NEUROLOGIC HISTORY AND EXAMINATION**

- A. Understand that the patient history is paramount in performing a good neurological examination.
- B. Establish the onset of the symptoms, noting progression, symptom character, and exacerbating or alleviating factors.
- C. Perform a standard neurologic review of symptoms with regard to personality, memory, headaches, pain, seizures, impairments of consciousness, vision, hearing, language, swallowing, coordination, gait, weakness, sensory disturbances, sphincter disturbance, and involuntary movements.
- D. Perform a neurologic examination, and understand when and how to apply a “screening examination” versus a “comprehensive examination.”

### **a. Screening examination**

- i. Mental status
  - 1. Level of consciousness
  - 2. Appropriateness of responses
  - 3. Orientation to time, date and place
- ii. Cranial nerves
  - 1. Visual acuity
  - 2. Pupillary light reflex
  - 3. Eye movements, facial strength.
- iii. Motor function
  - 1. Gait (casual & tandem)
  - 2. Coordination
  - 3. Strength
    - a. shoulder abduction
    - b. elbow flexion/extension
    - c. wrist flexion/extension
    - d. finger abduction
    - e. hip flexion
    - f. knee flexion
    - g. ankle dorsiflexion
- iv. Deep tendon reflexes
  - 1. Biceps
  - 2. Patellar
  - 3. Achilles
  - 4. Plantar responses
- v. Sensation
  - 1. Light touch
  - 2. Joint position at toes

- b. **Comprehensive examination** (abnormalities found on screening examination may prompt further detailed evaluation with some or all of the comprehensive examination)

- i. Mental status exam
  - 1. Level of consciousness
  - 2. Language (expression, comprehension, repetition)
  - 3. Neglect
  - 4. Gnosis
  - 5. Memory
  - 6. Calculation
  - 7. Visuo-spatial processing
- ii. Cranial nerve examination
  - 1. Cranial nerve I: describe how to test olfaction
  - 2. Cranial nerve II: visual acuity, visual fields
  - 3. Cranial nerves II – III: pupillary light reflex
  - 4. Cranial nerves III, IV, & VI: extraocular movements
  - 5. Cranial nerve V: facial sensation and jaw movement; understand trigeminal-supplied areas of intra-oral sensation
  - 6. Cranial nerve VII: facial expression; describe taste testing
  - 7. Cranial nerve VIII: screen hearing
  - 8. Cranial nerves IX, X, & XI: screen palatal, laryngeal, and shoulder movement; phonation; describe afferent & efferent limbs of gag reflex

9. Cranial nerve XII: tongue movement
- iii. Motor examination, assessing tone, strength, bulk, and abnormal movements. Comprehensive motor testing should include:
  1. Finger abduction/adduction
  2. Wrist flexion/extension
  3. Elbow flexion/extension
  4. Forearm rotation external/internal
  5. Shoulder abduction
  6. Hip flexion/extension
  7. Hip abduction/adduction
  8. Knee flexion/extension
  9. Ankle flexion/extension
  10. Ankle inversion/eversion
- iv. Sensory examination: light touch, pin prick, vibration, joint position sense, Romberg's test.
- v. Coordination: rapid alternating movements, finger-to-nose, heel-to-shin.
- vi. Deep tendon reflexes: brachioradialis, biceps, triceps, patellar, Achilles.
- vii. Gait: casual, tandem.

### CONTENT AREA III: NEUROLOGIC SYMPTOMS & DISEASES

#### **Part A: Content Organized by Common Neurological Symptoms**

*The student should demonstrate a systematic approach to the evaluation and differential diagnosis of patients with the following complaints:*

- A. Focal weakness
- B. Diffuse weakness
- C. Clumsiness
- D. Involuntary movements
- E. Gait disturbances
- F. Urinary or fecal incontinence
- G. Dizziness
- H. Vision loss
- I. Diplopia
- J. Dysarthria
- K. Dysphagia
- L. Acute mental status change
- M. Dementia
- N. Aphasia
- O. Headache
- P. Focal pain
  1. Facial pain
  2. Neck pain
  3. Low back pain
  4. Neuropathic pain
- Q. Numbness/paresthesias
- R. Transient or episodic focal symptoms
- S. Transient or episodic alteration of consciousness or awareness
- T. Sleep disorders
- U. Developmental disorders

#### **Part B: Content Organized by Major Categories of Neurological Disease**

*The student should demonstrate a knowledge of the following major diagnoses, being able to discuss salient diagnostic criteria (to ensure the diagnosis is correct), pathophysiology, symptoms, initial steps in management, and prognosis.*

- A. Potential emergencies
  - 1. Increased intracranial pressure
  - 2. Acutely altered mental status (including toxic-metabolic encephalopathy, post-ictal states, and stroke syndromes presenting as “confusion”)
  - 3. Intracranial hemorrhage (subarachnoid & parenchymal)
  - 4. CNS infection (meningitis & encephalitis)
  - 5. Status epilepticus
  - 6. Acute ischemic stroke
  - 7. Spinal cord or cauda equina compression
  - 8. Head trauma/concussion
  - 9. Acute respiratory distress of neurologic origin (including myasthenic crisis and acute inflammatory demyelinating polyradiculoneuropathy)
  - 10. Temporal arteritis
- B. Stroke
- C. Seizure
- D. Dementia (especially Alzheimer’s disease)
- E. Parkinson’s disease
- F. Essential tremor
- G. Multiple sclerosis
- H. Migraine
- I. Bell’s palsy
- J. Carpal tunnel syndrome
- K. Diabetic polyneuropathy
- L. Brain death

### **Part C: Content Organized by Neurological Organ Systems**

*The student should demonstrate knowledge of the major diagnoses by the following neurologic systems, including presentation of disorders, pathophysiology, formulation of appropriate differential diagnoses, a rational approach to initial evaluation, first steps in treatment, and prognosis.*

- A. Disorders of motor function: differentiate between disorders causing weakness, incoordination, and involuntary movements based on history and examination.
  - 1. For disorders of weakness, differentiate between upper motor neuron (UMN) and lower motor neuron (LMN) dysfunction.
    - a) Discuss pathophysiology of and examination findings of UMN syndromes of hemiparesis, paraparesis, and quadriparesis.
    - b) Differentiate between paresis & plegia.
    - c) Define spasticity & rigidity.
    - d) Differentiate between UMN and LMN facial weakness.
  - 2. For disorders of incoordination, discuss the clinical findings and pathophysiology of midline versus hemispheric cerebellar disorders. The student should be able to define “ataxia.”
  - 3. For involuntary movement disorders, differentiate among the following:
    - a) Resting vs action tremor
    - b) Rigidity vs spasticity
    - c) Asterixis
    - d) Dystonia
    - e) Myoclonus
    - f) Tics
  - 4. Discuss the clinical findings, ancillary studies, and treatment of the following:
    - a) Parkinson’s disease
    - b) Essential tremor
    - c) Tardive dyskinesia
- B. Disorders of sensation: differentiate between central and peripheral sensory disorders based on distribution of sensory abnormality, modalities affected, associated findings, and presence or absence of pain.
  - 1. For central sensory disorders, discuss and localize each of the following:

- a) Hemisensory loss
  - b) Sensory level
  - c) Brown-Séquard syndrome
  - d) Dissociated sensory loss
2. For peripheral sensory disorders, see below.
- C. Disorders of vision
1. Assess visual loss, localizing the following:
    - a) Monocular visual loss
    - b) Bitemporal visual field defect
    - c) Homonymous hemianopsia
  2. Assess diplopia
    - a) Describe the innervation and action of each of the extraocular muscles.
    - b) Describe the oculocephalic response in health and disease and its role in evaluation of the comatose patient.
    - c) Localize and name the most common cause of the following syndromes:
      - i. Internuclear ophthalmoplegia
      - ii. Third cranial nerve palsy (pupil-sparing vs non-pupil sparing)
      - iii. Fourth cranial nerve palsy
      - iv. Fluctuating or fatigueable ocular weakness sparing the pupil
  3. Recognize nystagmus and list common causes
  4. Assess pupillary abnormalities
    - a) Trace the sympathetic and parasympathetic pathways that supply the pupil.
    - b) Describe the components of Horner's syndrome.
    - c) Describe the pathophysiology & significance of an afferent pupillary defect.
- D. Episodic disorders
1. Discuss common historical and clinical features that help differentiate syncope and seizure; identify common causes of syncope.
  2. Seizure disorders
    - a) Outline the International Classification System for common types of seizures, differentiating among the following:
      - i. Generalized tonic-clonic seizure
      - ii. Absence seizure
      - iii. Complex partial seizure
      - iv. Simple partial seizure
      - v. Partial seizure with secondary generalization
    - b) Distinguish between seizure and epilepsy
    - c) List the common causes of seizures by age group
    - d) Describe post-ictal paralysis (Todd's phenomenon).
    - e) Discuss the routine evaluation of patients with new-onset seizures, risks and benefits of early anticonvulsant treatment, and appropriate lifestyle modifications during initial evaluation.
    - f) Discuss commonly used anticonvulsants and their major side effects.
    - g) Define status epilepticus and outline its emergent management.
- E. Cerebrovascular disease
1. List major risk factors for cerebrovascular disease and their attenuation by lifestyle modification and pharmacologic treatment.
  2. Define and discuss initial evaluation and management of the following:
    - a) Asymptomatic carotid bruit
    - b) Transient ischemic attack (TIA)
    - c) Ischemic infarction (artery-to-artery embolization, cardiac embolization, large-vessel thrombus)
    - d) Lacunar infarction
    - e) Hemorrhagic infarction
    - f) Parenchymal intracranial hemorrhage
    - g) Subarachnoid hemorrhage
    - h) Transient monocular visual loss (amaurosis fugax)
  3. Describe the major clinical features of ischemic infarction in the following cerebral arterial territories:
    - a) Anterior cerebral artery
    - b) Middle cerebral artery
    - c) Posterior cerebral artery

- d) Basilar artery
  - e) Vertebral artery
  - f) Lenticulostriate arteries
  - 4. Describe the emergent management of acute ischemic stroke, with special attention to:
    - a) Intravenous thrombolysis
    - b) Intra-arterial thrombolysis
    - c) Mechanical clot disruption
    - d) Anticoagulation
    - e) Other supportive measures in the acute peri-stroke period.
  - 5. Describe the emergent management of acute intracranial hemorrhage, with special attention to:
    - a) Most common sites and presentations for hypertensive intracranial hemorrhage
    - b) Indications for emergent surgical intervention
    - c) Clinical presentation of increased intracranial pressure
    - d) Typical presentation of subarachnoid hemorrhage
      - i. Initial diagnostic evaluation
      - ii. Immediate/emergent management
- F. Demyelinating disease
- 1. Describe common clinical findings in multiple sclerosis, including MRI and CSF examinations.
  - 2. Describe onset, diagnosis, and emergent management of acute inflammatory demyelinating polyradiculoneuropathy (Guillain-Barre disease).
- G. Head trauma
- 1. Define each of the following in terms of temporal profile and initial management:
    - a) Concussion
    - b) Diffuse axonal injury
    - c) Subdural hematoma
    - d) Epidural hematoma
  - 2. Understand and apply the Glasgow Coma Scale
- H. Dizziness and disorder of hearing
- 1. Evaluation of dizziness
    - a) Distinguish the various meanings of “dizziness,” define vertigo, and differentiate these from disequilibrium.
    - b) List common causes of these symptoms.
    - c) Describe the following components of a vestibular examination:
      - i. Nystagmus
      - ii. Dix-Hallpike maneuver
      - iii. Caloric stimulation
    - d) Identify salient features distinguishing among the following:
      - i. Benign paroxysmal positional vertigo
      - ii. Vestibular neuronitis
      - iii. Meniere’s disease
      - iv. Brainstem ischemia with vertigo
      - v. Acoustic neuroma
  - 2. Auditory symptoms
    - a) Define tinnitus, conductive hearing loss, and sensorineural hearing loss.
    - b) Give common causes for these symptoms.
    - c) Describe Weber & Rinne testing for conductive versus sensorineural hearing loss. (Not sure whether to include in final draft.)
- I. Disorders of higher cognitive function
- 1. Define and distinguish among the following, giving common causes for each condition:
    - a) Dementia
    - b) Delirium
    - c) Amnesia
    - d) Confabulation
    - e) Hallucination
  - 2. Differentiate an acute confusional state (delirium) and dementia
  - 3. Dementia
    - a) Give diagnostic criteria for dementia and describe at least one means of assessing each criterion.



- b) List common causes of dementia.
    - c) Describe the initial evaluation of dementia.
  - 4. Define and distinguish aphasia and dysarthria.
  - 5. Differentiate Broca's aphasia from Wernicke's aphasia
  - 6. Alterations in consciousness: define and distinguish among the following:
    - a) Consciousness
    - b) Coma
    - c) Brain death
    - d) Persistent vegetative state
    - e) Locked-in syndrome
  - 7. Discuss the minimal neurologic substrate for alertness & consciousness
- J. Assessment of the comatose patient
  - 1. List the first three things one must do when confronted with a comatose patient (ABCs).
  - 2. Discuss eliciting, localizing, and interpreting the following findings during neurologic examination of the comatose patient:
    - a) Motor
      - i. Decorticate vs decerebrate rigidity
      - ii. Conjugate deviation of eyes toward or away from hemiparesis
    - b) Respiratory abnormalities, including Cheyne-Stokes respiration
    - c) Pupillary abnormalities
      - i. Mid-position fixed
      - ii. Pinpoint
      - iii. Unilaterally fixed & dilated
    - d) Eye movements
      - i. Conjugate roving eye movements
      - ii. Intact vs absent oculocephalic responses
  - 3. Interpret the above exam findings with regard to hemispheric vs brainstem localization of causes of coma.
- K. Describe the diagnosis and management of increased intracranial pressure (ICP)
  - 1. List symptoms and signs of increased ICP
  - 2. List the effects of uncal herniation on level of consciousness, motor activity, and pupillary reactivity
  - 3. List some methods used to treat increased ICP.
  - 4. Distinguish between communicating and non-communicating hydrocephalus.
- L. Headaches and facial pain
  - 1. Compare and contrast clinical features of benign vs potentially serious causes of headache.
  - 2. Describe the clinical feature of the following recurrent headache disorders in terms of onset, evolution, location, character, duration, precipitants, and associated symptoms:
    - a) Migraine with and without aura
    - b) Tension type headache
    - c) Trigeminal neuralgia
  - 3. Describe the clinical features of the following causes of headache:
    - a) SAH
    - b) Meningitis
    - c) Increased ICP/mass
    - d) Temporal arteritis
    - e) ICH
  - 4. Discuss emergent and non-emergent indications as well as contraindications, risks, and benefits of the following diagnostic tests in patients with headache:
    - a) MRI or CT
    - b) LP
    - c) Erythrocyte sedimentation rate
    - d) Temporal artery biopsy
  - 5. Discuss typical CSF profiles of meningitis vs SAH.
  - 6. Discuss treatment for common headache disorders including symptomatic and prophylactic therapy.
- M. Neck and back pain
  - 1. Differentiate between musculoskeletal pain, radiculopathy, and spinal cord compression. List common causes of each.
  - 2. Discuss the significance of back pain in cancer patients.
- N. Brain tumors

1. Discuss the common clinical presentation of primary brain tumors in the following locations:
    - a) Cerebellopontine angle
    - b) Pituitary
    - c) Cerebral hemisphere
  2. Discuss metastatic tumors to the brain
    - a) List common sources of metastases
    - b) Differentiate from primary brain tumor by clinical features and neuroimaging.
  3. Discuss common primary brain tumors
- O. Neurologic infectious disease
1. Discuss common clinical presentation, CSF findings, and initial treatment for the following:
    - a) Acute bacterial meningitis (most common organisms in infants, children, & adults)
    - b) Acute viral meningitis
    - c) Encephalitis (including herpes simplex)
    - d) Brain abscess
  2. HIV and the nervous system
    - a) Discuss manifestations of HIV including:
      - i. Encephalopathy
      - ii. Myelopathy
      - iii. Neuropathy
    - b) Discuss opportunistic CNS infections associated with HIV infection
- P. Spinal cord disorders
1. Localize the lesions yielding the following findings on examination:
    - a) Unilateral UMN findings with ipsilateral decreased joint position sense and contralateral loss of pain and temperature sensation.
    - b) Dissociated sensory loss with weakness and areflexia in the arms.
    - c) Sensory level with paraparesis and bladder incontinence.
  2. Describe the usual clinical presentation of vitamin B12 deficiency.
  3. Understand the emergent management of acute spine trauma.
- Q. Peripheral nervous system (PNS) disorders
1. Contrast and compare the common LMN clinical syndromes of neuropathy, neuromuscular junction disorders, and myopathy in terms of symptoms such as sensory changes, reflex changes, muscle bulk, and muscle tone.
  2. Discuss symptoms, common examination findings, ancillary studies, and localization of each of the following:
    - a) Radiculopathy
    - b) Polyneuropathy
    - c) Carpal tunnel syndrome
  3. Discuss the time course, symptoms, laboratory findings, and treatment of acute inflammatory demyelinating polyneuropathy (AIDP; Guillain-Barre syndrome).
  4. Describe the pathogenesis, usual clinical presentation, evaluation, and therapy of myasthenia gravis.
- R. Alcohol related disorders
1. Define and discuss the following with regard to clinical symptoms, examination findings, differential diagnosis, and management:
    - a) Wernicke-Korsakoff syndrome (especially initial treatment with thiamine & glucose)
    - b) Alcohol withdrawal seizure (especially regarding anticonvulsant treatment)
    - c) Delirium tremens
    - d) Cerebellar degeneration
    - e) Peripheral neuropathy