

NS-3 Year

Educational Program Goals and Objectives

The NS-3 year will be devoted to increasing residents' cognitive and psychomotor skills in disciplines related to the practice of neurological surgery. Rotations include neuroradiology (1 month), neuropathology (1 month), vascular/cerebrovascular (3 months), and basic or clinical research (7 months). The goal is to provide the resident with a foundation of knowledge in supporting disciplines that will further his/her clinical skills, ability to critically evaluate research activities and publications, and foster an understanding of research technique. Residents will be expected to pass the ABNS written examination (for credit) during the NS-3 year in preparation to assuming Senior Resident duties at Methodist/Children's Hospitals during the NS-4 year. Global evaluation of resident performance will be performed by the neurosurgery faculty and support staff ("360 degree evaluation") following the neurosurgery research rotation. Evaluation of resident performance on non-neurosurgery rotations will be provided by faculty overseeing the residents in those rotations. Residents will evaluate faculty of non-neurosurgery rotations at the conclusion of those rotations and will complete a "self-assessment" and formal evaluation of the neurosurgery program and faculty (see Appendix for sample forms) annually.

Educational Goals and Objectives of Training Year NS-3

NEURORADIOLOGY

The NS-3 neuroradiology rotation will be one month but may be extended one additional month to run concurrently with neuropathology with the consent of the supervising faculty in these two programs. This rotation will provide the resident with knowledge regarding the indications, appropriate applications, and interpretation of a variety of diagnostic radiographic studies relevant to the evaluation and management of neurological disorders including cranial and spinal plain radiographs, CT, MRI, myelography, nuclear medicine studies, and arteriography. Residents will review and interpret these studies under the guidance of faculty neuroradiologists. The residents are encouraged during this rotation to write a clinical paper with the faculty in neuroradiology. As part of their neuroradiology training, residents will attend the AFIP Neuroradiology Course during the NS-3 year. Evaluation of resident performance will be provided by the supervising faculty at the conclusion of the rotation and by the ABNS written examination.

Patient Care

Goal: to develop residents' ability to combine medical knowledge and clinical judgment to promote diagnostic and decision-making skills.

Specific objectives:

- 1. Understand the indications for cranial plain films, CT, MRI, cisternography, radionuclide studies, and angiography for the diagnosis and evaluation of tumors, trauma, vascular disorders, and congenital abnormalities*
- 2. Interpret cranial plain radiographs, CT, MRI, and nuclear medicine studies in patients with hemorrhage, tumor, trauma, and congenital abnormalities*
- 3. Understand the indications for spinal plain films, CT, MRI, myelography, and angiography for the diagnosis and evaluation of tumors, trauma, vascular disorders, and congenital abnormalities*
- 4. Interpret spinal plain radiographs, CT, MRI, and myelography in patients with hemorrhage, tumor, trauma, and congenital abnormalities*

Assessment: observation by faculty

Medical Knowledge

Goal: demonstrate understanding of basic anatomy and physiology pertaining to normal and abnormal function of the nervous system as it relates to neurosurgical disorders

Specific objectives:

- 1. Describe the basic radiographic anatomy of cranium, spinal column, and cerebral vasculature*
- 2. Compare and contrast the radiographic characteristics of common types of intracranial hemorrhage*
- 3. Compare and contrast the radiographic characteristics of cranial/intracranial trauma, including traumatic hemorrhage (epidural, subdural), diffuse axonal injury, and skull fractures (basilar, linear, depressed) and infection*
- 4. Describe the typical radiographic characteristics of common spinal disorders (e.g., herniated disc, stenosis) including traumatic spine injury and infection*
- 5. Successfully take and pass the ABNS primary examination for credit*

Practice-Based Learning and Improvement

Goal: demonstrate an ability to learn and improve skills from self-evaluation and critical self-analysis

Specific objectives:

- 1. Participate in neuroradiology conferences, neurosurgery grand rounds, and morbidity and mortality conferences to identify areas of insufficient knowledge or skills related to neuroradiology; determine how to improve those areas*
- 2. Locate, appraise and assimilate evidence from scientific studies related to common neurosurgical problems and apply this information to patient care, with emphasis on indications and applications of radiographic studies in the evaluation and management of neurosurgical disorders*

Assessment: observation by faculty; annual self-assessment

Interpersonal and Communication Skills

Goal: to develop the resident's ability to work as a member of the healthcare team and to communicate effectively with medical colleagues

Specific objectives:

- 1. Communicate effectively with healthcare providers regarding the ordering and interpretation of radiographic studies*
- 2. Provide prompt and accurate communication with referring and collaborating physicians*
- 3. Participate meaningfully in multidisciplinary conferences focused on neuroradiology*

Assessment: observation by faculty; 360 degree evaluation by faculty and support staff

Professionalism

Goal: demonstrate a commitment to carrying our professional responsibilities and adhere to ethical principles.

Specific objectives:

- 1. Demonstrate respect and responsiveness to medical colleagues needs and questions regarding neuroradiology tests*

and interpretation

2. *Communicate/document expeditiously and accurately the results of radiographic studies*

Assessment: observation by faculty; 360 degree assessment by faculty and support staff

Systems-Based Practice

Goal: to understand the appropriate ordering of radiographic diagnostic studies with attention toward cost-effectiveness and appropriate healthcare utilization

Specific objectives:

1. *Demonstrate understanding of relative costs of various types of radiographic studies*
2. *Demonstrate understanding of the appropriate indications and applications with respect to costs in a manner that does not compromise quality of care*
3. *Understand appropriate documentation of services rendered*

Assessment: observation by faculty

NEUROPATHOLOGY

The NS-3 neuropathology rotation will be one month but may be extended one additional month to run concurrently with neuroradiology with the consent of the supervising faculty in these two programs. This rotation will provide the resident with knowledge regarding the histopathological studies used in neuropathology and histopathological characteristics of neurological disorders, including structural/anatomic/histological abnormalities of the skull, brain, spine, spinal cord, peripheral nerve, meninges and other supporting structures of the central nervous system, and muscle. Residents will review and interpret neuropathology studies under the guidance of faculty neuroradiologists. The residents are encouraged during this rotation to write a clinical paper with the faculty in neuroradiology. As part of neuropathology training, residents will attend the AFIP Neuropathology Course during the NS-3 year. Evaluation of resident performance will be provided by the supervising faculty at the conclusion of the rotation and by the ABNS written examination.

Patient Care

Goal: to establish an understanding of the normal histology and abnormal histopathological characteristics of disorders of the skull, brain, spine, spinal cord, peripheral nerve, meninges and other supporting structures of the central nervous system, and muscle to allow the resident to understand the pathophysiology of neurosurgical disorders to allow appropriate diagnostic and therapeutic intervention

Specific objectives:

1. *Describe the gross and microscopic topographical distribution of lesions in the brain and correlate neuropathologic lesions with neurologic dysfunction*
2. *Understand the classification schemes of brain tumors and neuro-degenerative diseases and the implications for patient therapy and prognosis*

Assessment: observation by faculty; ABNS written examination

Medical Knowledge

Goal: Establish a foundation of knowledge regarding the normal histology and abnormal histopathological characteristics

of disorders of the skull, brain, spine, spinal cord, peripheral nerve, meninges and other supporting structures of the central nervous system, and muscle

Specific objectives:

- 1. Describe the gross and microscopic features of neuropathologic lesions and develop an appropriate differential diagnosis*
- 2. Describe the abnormalities in a muscle biopsy and distinguish neurogenic from myopathic features*
- 3. Describe common neurohistopathological methods (stains, immunohistochemistry, electron microscopy)*

Assessment: observation by faculty; ABNS written examination

Practice-based Learning and Improvement

Goal: to improve the residents' skills in self-assessment and critical analysis of practice patterns and outcomes to improve patient care

Specific objectives:

- 1. Identify during the resident's annual self-assessment those areas of strengths and weakness in neuropathology and determine how to improve those aspects needing improvement*
- 2. Use constructive criticism to improve knowledge and skills at interpreting neuropathology specimens*
- 3. Participate in neuropathology and tumor board conferences actively to facilitate education of medical colleagues and students*

Assessment: observation by faculty; resident's annual self-assessment

Interpersonal and Communication Skills

Goal: to develop the resident's ability to work as a member of the healthcare team and to communicate effectively with medical colleagues

Specific objectives:

- 1. Communicate effectively with healthcare providers regarding the ordering and interpretation of neuropathology studies*
- 2. Provide prompt and accurate communication with referring and collaborating physicians*
- 3. Participate meaningfully in multidisciplinary conferences focused on neuropathology*

Assessment: observation by faculty; 360 degree evaluation by faculty and support staff

Professionalism

Goal: demonstrate a commitment to carrying our professional responsibilities and adhere to ethical principles.

Specific objectives:

- 1. Demonstrate respect and responsiveness to medical colleagues needs and questions regarding neuropathology tests*

and interpretation

2. *Communicate/document expeditiously and accurately the results of neuropathology studies*

Assessment: observation by faculty; 360 degree assessment by faculty and support staff

Systems-Based Practice

Goal: to understand the appropriate ordering of diagnostic studies with attention toward cost-effectiveness and appropriate healthcare utilization

Specific objectives:

1. *Demonstrate understanding of relative costs of various types of neuropathology studies*
2. *Demonstrate understanding of the appropriate indications and applications of the variety of neuropathology studies with respect to costs in a manner that does not compromise quality of care*
3. *Understand appropriate documentation of services rendered*

Assessment: observation by faculty

VASCULAR SURGERY

The NS-3 resident will participate in a three month vascular surgery rotation at Methodist Hospital. The purpose of this rotation is to provide the resident with a comprehensive understanding of vascular disorders, particularly carotid and vertebral occlusive disease, its evaluation, and management. During this time, the resident is expected to engage in a variety of inpatient activities related to vascular surgery, including interventional and non-interventional treatments, preoperative evaluation, surgical care, and postoperative management. Evaluation of resident performance will be provided at the conclusion of the rotation by the supervising faculty.

Patient Care

Goal: to learn how to evaluate, treat, and manage patients with vascular disease (especially carotid and vertebral occlusive disease) non-operatively and operatively, pre- and post-surgery

Specific objectives:

1. *Evaluate new and follow-up patients on the vascular service*
2. *Manage inpatients on the vascular service*
3. *Assist in general vascular procedures and carotid endarterectomy*
4. *Assist with central, peripheral, and cerebral angiography*

Assessment: observation by faculty

Medical Knowledge

Goal: to understand the epidemiology, presentation, evaluation and diagnosis, and operative and non-operative treatment of vascular disorders

Specific objectives:

1. *Describe the typical presentation of carotid and vertebral occlusive disease*

2. Describe the indications for surgical treatment of carotid and vertebral occlusive disease
3. Describe typical non-surgical treatments for occlusive cerebrovascular disease
4. Compare indications for operative and non-operative treatment of vascular disease

Practice-based Learning and Improvement

Goal: to improve the residents' skills in self-assessment and critical analysis of practice patterns and outcomes to improve patient care

Specific objectives:

1. Identify during the resident's annual self-assessment those areas of strengths and weakness in vascular surgery knowledge and skills and determine how to improve those aspects needing improvement
2. Participate in vascular surgery conferences actively to facilitate education of medical colleagues and students

Assessment: observation by faculty; resident's annual self-assessment

Interpersonal and Communication Skills

Goal: to develop the resident's ability to work as a member of the healthcare team and to communicate effectively with medical colleagues

Specific objectives:

1. Communicate effectively and respectfully with patients, families regarding the vascular disorders for which they are being treated
2. Provide consultative services in a prompt and courteous manner
3. Provide prompt and accurate communication with referring and collaborating physicians regarding mutual patients

Assessment: observation by faculty; 360 degree evaluation by faculty and support staff

Professionalism

Goal: demonstrate a commitment to carrying our professional responsibilities and adhere to ethical principles.

Specific objectives:

1. Demonstrate respect and responsiveness to medical colleagues and patients
2. Document/dictate in timely manner

Assessment: observation by faculty; 360 degree assessment by faculty and support staff

Systems-Based Practice

Goal: to understand the appropriate evaluation, diagnostic testing, and treatment of vascular abnormalities with attention toward cost-effectiveness and appropriate healthcare utilization

Specific objectives:

1. *Demonstrate understanding of relative costs of various costs of different treatment strategies*
2. *Demonstrate understanding of the roles of non-physician healthcare providers (e.g., social services, physical/occupational therapy) in the management of vascular abnormalities*
3. *Understand the impact of risk factors in vascular disease (e.g., cigarette smoking, diabetes) and use available resources (e.g., smoking cessation counselors, diabetes education specialists) to help reduce or eliminate risk factors*

Assessment: observation by faculty

RESEARCH EXPERIENCE

During the NS-3 year, residents will have 7 months dedicated to research. Projects involving laboratory research or clinical research at UNMC, other University of Nebraska campuses, or away from the UN campus may be available. Inter-departmental, collaborative research is supported. During the first three years of residency training, neurosurgery residents should consider their research interests and begin to explore research options. Residents will be expected to have identified a research project and mentor by Spring of the NS-2 year and take preliminary steps that will allow them to start their research project promptly at the beginning of the research rotation. Research projects should be discussed and approved with the Program Director for the purpose of ensuring that the project is appropriate and will provide a good research experience; this discussion should take place well before final arrangements for the research project are made to ensure the project is appropriate and that it can start and conclude in a timely manner. A wide variety of resources are available for support of resident research. These resources include those of the basic science faculty of the Section of Neurosurgery and the University of Nebraska College of Medicine in neuroanatomy, neurophysiology, neuropharmacology, neuropathology, and neuroradiology. Projects outside these domains may also be appropriate (e.g., epidemiologic studies). Reasonable financial support will be available for the resident.

During this rotation, residents should become knowledgeable about research design and development as well as statistical analysis as it relates to evaluation of research data. Knowledge in the methods of obtaining funding for research should also be obtained. Residents in this track should learn to critically evaluate clinical and bench research projects. Residents in the research rotation will learn to prepare clinical and bench research information for oral and printed presentation. Residents in the research year may help teach the basic neuroscience curriculum to the University of Nebraska medical students and rotating residents. Residents will be evaluated at the conclusion of their research rotation (see Appendix for sample form).

Patient Care

Goal: to understand how to apply bench and clinical research data in the care of patients

Specific objectives:

1. *Understand the role of clinical trials in care of patients*
2. *Understand inclusion and exclusion criterion for enrollment in clinical trials*

Assessment: observation by faculty/research mentor

Medical Knowledge

Goal: develop in-depth knowledge of research topic subject matter

Specific objectives:

1. *Demonstrate an advanced knowledge of anatomy, physiology, pharmacology, pathophysiology, and/or epidemiology pertaining to research topic*
2. *Demonstrate an advanced familiarity with the literature pertaining to the research topic*

3. *Demonstrate the ability to evaluate and synthesize hypotheses regarding scientific investigations*

Assessment: observation by faculty/research mentor

Practice-Based Learning and Improvement

Goal: learn to evaluate critically research goals and progress, use evaluation to improve the research design/implementation, educate others about research results

Specific objectives:

1. *Critically assess progress of the research project, revise and modify as needed to improve the process and outcome*
2. *Establish sound research problem-solving habits, including a familiarity with relevant research literature*
3. *Develop problem-solving skills applicable to design, implementation, analysis and reporting scientific research relevant to the clinical arena*
4. *Publish and/or present research findings*

Assessment: observation by faculty/research mentor

Interpersonal and Communication Skills

Goal: learn to communicate effectively with research staff; learn to disseminate research findings to peers and other appropriate audiences

Specific objectives:

1. *Demonstrate good communication skills with all members of the research team*
2. *Use communication and interpersonal skills to effectively participate in and lead research projects*
3. *Communicate research results effectively and persuasively in writing and speech*

Assessment: observation by faculty/research mentor

Professionalism

Goal: develop respect for the importance of activities of basic and clinical research personnel

Specific objectives:

1. *Demonstrate a commitment to academic and scientific integrity through honest and forth-right investigative activities and reporting of results*
2. *Participate meaningfully in ongoing professional development by submitting research for peer review to journals and national meetings*

Assessment: observation by faculty/research mentor

System-Based Practice

Goal: understand the role of basic and clinical research in the advancement of clinical practice

Specific objectives:

- 1. Become an integral component of a research team*
- 2. Explain the applicability of results of the research project to clinical care*

Assessment: observation by faculty/research mentor