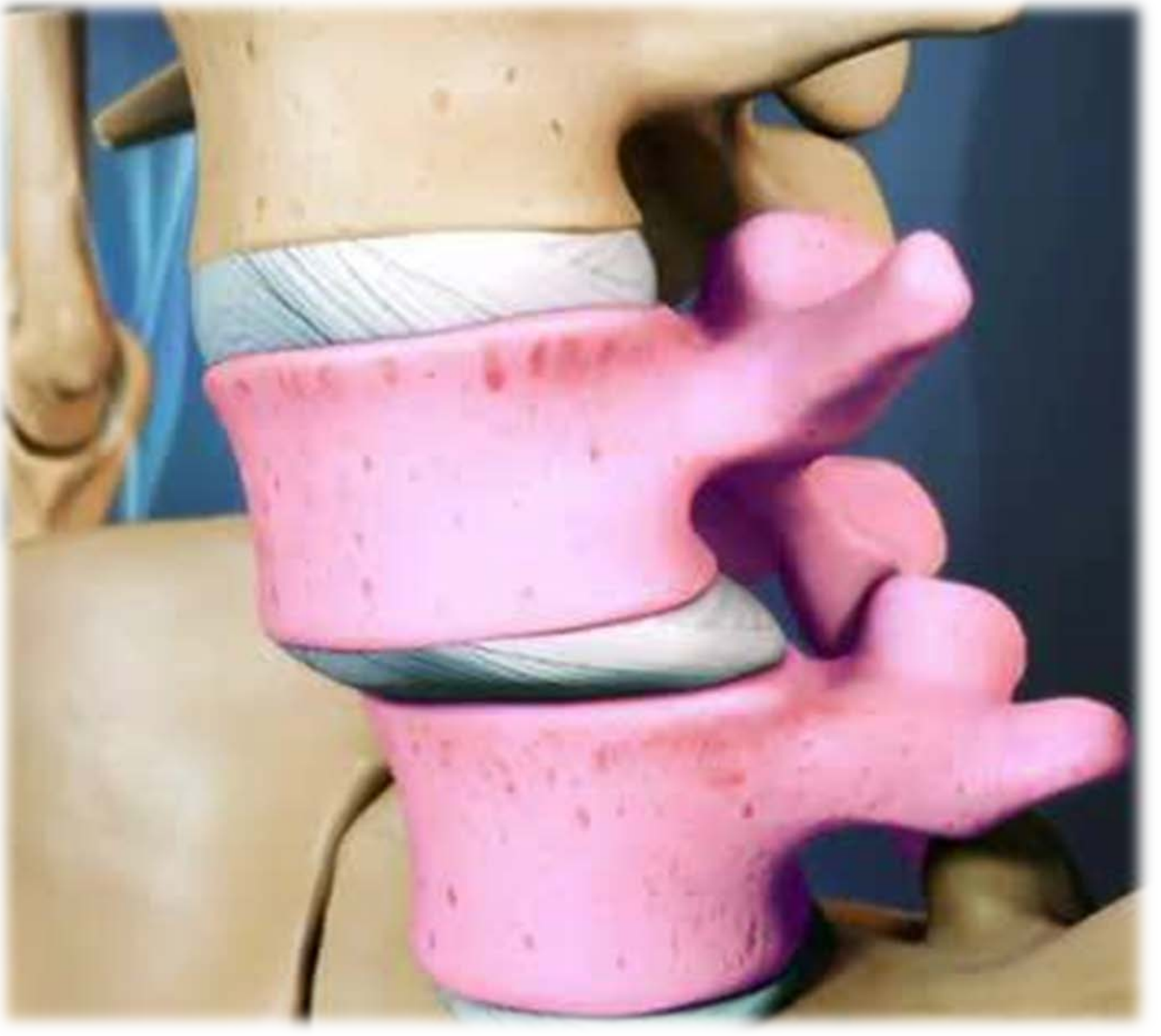
Last Revised June 29, 2018

West Virginia University.
SCHOOL OF MEDICINE
DEPARTMENT OF NEUROSURGERY

Handbook 2018-2019



A physician is obligated to consider more than a diseased organ, more even than the whole man - he must view the man in his world.

— Harvey Cushing —

AZ QUOTES

TABLE OF CONTENTS

West Virginia University Health Sciences Center
Department of Neurosurgery Resident Manual

Overview of Neurosurgical Training Program

The mission of the clinical training program is excellence in patient care, scholarship, and neurosurgical education. Program goals have been established to assure this mission is successfully executed. Residents first establish fundamental clinical and surgical skills. As training progresses, increasing neurosurgical expertise, both clinical and scholarly, is acquired. Upon completion of the neurosurgery residency training program, each graduate is highly skilled in managing the full spectrum of neurosurgical disease, and has developed the scholarly tools needed to contribute to the peer-reviewed literature. The resident is required to publish 6 PubMed indexed articles in a national or international publication in order to matriculate from the program (with pro-rated numbers required for residents currently in the program).

The WVU Neurosurgical Residency is a 7 year (84 months) program. There are 63 months of core clinical neurosurgery of which the last 12 months are the chief residency. The entire curriculum is divided into six-month rotations. In the internship, there is a six-month rotation in general care and a six-month rotation in neurocritical care. Longitudinal clinical experiences in anesthesia, neurology, pain medicine, pathology, and radiation oncology are distributed across this year. Beginning in PGY2, the resident begins to rotate on the clinical neurosurgery services. At times, Drs. Serrano and Qaiser may function independently as a separate service with a dedicated resident when the resident curriculum schedule dictates such. The fourth year is the academic year, and is devoted to scholarly pursuit. Academic pursuit may include graduate classes. The fifth year holds a clinical elective rotation and a rotation running the pediatric service. The PGY7 year is chief residency. The chief resident takes overall responsibility for the entire service. In summary, there are 12 months of internship, 24 months of clinical junior residency, a year of academic work, another 24 months of clinical senior rotations, and a final 12 months of clinical neurosurgery serving as chief resident.

Neuro-critical care experience is emphasized throughout the training, as well as extensive exposure to subspecialty services including neurovascular, neuro-oncology, epilepsy surgery, spinal neurosurgery, stereotactic radiosurgery, neurotrauma, functional neurosurgery and pediatric neurosurgery. Conferences are protected from clinical commitments and include morbidity and mortality conference, case conference, tumor board, asynchronous learning and board review, and journal club. Subspecialty conferences such as Epilepsy Conference or Spine Conference are encouraged. The anatomic dissection lab is available for scholarly work or preparation for operative cases. Preparation of scientific manuscripts, review articles, book chapters and abstracts, as well as presentation skills and leadership/administrative skills are fostered within a structured mentored environment in a multidisciplinary fashion.

Overall Program Goals, Objectives, and Graduation Requirements

The overall goal of the residency program is to develop in our graduating residents a proficiency level appropriate for a new and independent practitioner in the six core competencies as outlined by the ACGME. We follow the standards put forth by the Neurosurgery RRC of the ACGME in the milestones project. We consider graduation to be consistent with Level 4 across all of these milestones. These guidelines can be seen at **ACGME Neurosurgery Milestones.** (https://www.acgme.org/Portals/0/PDFs/Milestones/NeurologicalSurgeryMilestones.pdf) These milestones reflect:

- Patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
- Medical knowledge about the established and evolving biomedical, clinical and cognate sciences and the application of this knowledge to patient care.
- Practice based learning and improvement, which involves investigation and evaluation of patient care, the appraisal and assimilation of scientific evidence, followed by improvement in patient care.

- Interpersonal and communication skills resulting in effective information exchange with patients, their families, and other health professionals.
- Professionalism manifested through a commitment to carry out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patientpopulation.
- Systems-based practice as manifested by actions that demonstrate an awareness of and responsiveness to the larger context in systems of healthcare and the ability to effectively mobilize system resources to provide care that is of optimum value.

Each rotation is designed with these overall goals in mind. In order to direct progress, goals and objectives have been formulated for each rotation and approved by the PEC. Unique aspects of each rotation are outlined in this handbook, and the specific goals and objectives for each rotation are delineated in the appendix. Our assessment tools are designed to demonstrate progress towards these objectives by directly mapping to the milestones requirements using a common format.

Residents are responsible for reviewing all general and specific goals and objectives prior to beginning each rotation.

Professionalism

In keeping with the Common Program Requirements effective 7/1/2013, our GME programs wish to ensure:

1. Patients receive safe, quality care in the teaching setting now.
2. Graduating residents provide safe, high quality patient care in the unsupervised practice of medicine in the future.
3. Residents learn professionalism and altruism in a humanistic, quality, learning environment.

To that end, we recognize that patient safety, quality care, and excellent learning environments are about much more than duty hours. Therefore, we wish to underscore any policies which address all aspects of the learning environment, not just duty hours. These include:

1. Professionalism, including accepting responsibility for patientsafety
2. Alertness management
3. Proper supervision
4. Transitions of care
5. Clinical responsibilities
6. Communication and teamwork
7. Health Care Disparities

Residents must take personal responsibility for and faculty must model behaviors that promote:

1. Assurance for fitness of duty
2. Assurance of the safety and welfare of patients entrusted in theircare
3. Management of their time before, during, and after clinical assignments
4. Recognition of impairment, including illness and fatigue, in self andpeers
5. Honest and accurate reporting of duty hours, patient outcomes, and clinical experience data

The institution further supports an environment of safety and professionalism by:

1. Providing and monitoring a standard Transitions Policy as defined at **Handoffs and Transitions of Care Policy** (http://medicine.hsc.wvu.edu/media/2589/handoffsandtransitionsofcare7-25-13.pdf). This policy is also available on the **SOLE GME website** (https://sole.hsc.wvu.edu/).
2. Providing and monitoring a standard policy for Duty Hours executed in E-value and defined formally on the GME website.
3. Providing and monitoring a standard Supervision Policy as defined by the **2013 ACGME policy Supervision Policy** (http://medicine.hsc.wvu.edu/media/2572/supervision-policy-nl.pdf).
   A Supervision option is provided at the **Mistreatment Button** that will allow immediate anonymous reporting of inadequate supervision directly to the DIO.
   (http://medicine.hsc.wvu.edu/gme/mistreatment-form/)

4. Providing and monitoring a standard master scheduling policy and process that is congruent across both E-value and hospital resources.
5. Adopting an institution-wide policy that all residents and faculty must inform patients of their role in the patient's care.
6. Providing and monitoring a policy on **Alertness Management and Fatigue Mitigation** strategy that includes (http://medicine.hsc.wvu.edu/media/2597/alertnessmanagementpolicy1-15-16.pdf):
    a. Online modules for faculty and residents on signs of fatigue.
    b. Fatigue mitigation, and alertness management including back up call schedules and promotion of strategic napping.
7. Assurance of available and adequate sleeping quarters whenneeded.
8. Requiring that programs define what situations or conditions require communication with the attending physician.

Process for implementing the Professionalism Policy

The program and institution will assure effective implementation of the Professionalism Policy by the following:

1. Program presentations of this and other policies at program and departmental meetings.
2. Core Modules for faculty and residents on Professionalism, Duty Hours, Fatigue Recognition and Mitigation, Alertness Management, and Substance Abuse and Impairment.
3. Institutional Fitness for Duty and Drug Free Workplacepolicies.
4. Institutional Duty Hours Policy, which adopts ACGME Duty HoursLanguage.
5. Language added specifically to the Resident Manual and the Resident Contract regarding Duty Hours Policies and the responsibility for and consequences of not reporting Duty Hours accurately.
6. Comprehensive Moonlighting Policy incorporating ACGME requirements. Orientation presentations on Professionalism, Transitions, Fatigue Recognition and Mitigation, and Alertness Management.

Monitoring Implementation of the Policy on Professionalism

The program and institution will monitor implementation and effectiveness of the Professionalism Policy by the following evaluations of residents and faculty including:

1. Daily rounding and observation of the resident in the patient caresetting.
2. Evaluation of the residents' ability to communicate and interact with other members of the health care team by faculty, nurses, patients where applicable, and other members of the team.
3. Semi-annual competency based evaluation of theresidents.
4. Semi-annual Milestone reporting to the ACGME.
5. By the institution via the Annual Program Evaluation (APE) and Special Program Review process.
6. By successful completion of modules for faculty and residents on Professionalism, Impairment, Duty Hours, Fatigue Recognition and Mitigation, Alertness Management, and others.
7. Program and Institutional monitoring of duty hours and procedure logging as well as duty hour violations in E-Value.

Resident Selection Process

1. Applications will be accepted via ERAS.

2. Applicants will be invited for interview based on a review of the following factors:
    a. performance on standardized tests,
    b. medical school performance,
    c. letters of recommendation,
    d. personal statement,
    e. extra-curricular activities,
    f. research activities.

3. Applicants will be ranked on the basis of the preceding factors in combination with a subjective evaluation of the interview by the faculty.

4. Residents will be accepted via the National Residency MatchingProgram.

5. If the program does not fill through the usual matching process, the position will be filled outside the match from available applicants. The most qualified individuals based on the above factors may be invited for interview.

6. Further information can be found in the institutional document **Criteria for the Selection of Candidates. (**http://medicine.hsc.wvu.edu/media/2577/criteria-for-selection-of-candidates-5-2008-nl.pdf)

Table of Contents

Duties of the Residents in Each Year

Duties of the residents in the WVU Neurosurgical Residency program are structured to provide a graduated experience and involvement in neurosurgical patient management and preoperative, intraoperative, and postoperative patient care, foster a learning environment to develop the resident as a neuroscientist, and mentor the resident to mature as a thoughtful, caring, and compassionate physician.

The WVU Department of Neurosurgery residency training program adheres to the Milestones Evaluation Standard as described by the Neurosurgery RRC of the ACGME, and the Matrix Curriculum as put forth by the Society of Neurological Surgeons.

The standard rotation schedule for neurosurgery rotations is depicted below. Note that variations will occur based on individual circumstances and personnel changes.

Curriculum

Year	Rotation	Duration
PGY-1	General Care & Clinical Neuroscience	6 months
	Neurocritical Care	6 months
PGY-2	Neurosurgery - Junior	6 months
	Neurosurgery - Junior	6 months
PGY-3	Neurosurgery - Junior Peds	3 months
	Neurosurgery - Junior	9 months
PGY-4	Academic Rotation	12 months
PGY-5	Pediatric Neurosurgery	3 months
	Neurosurgery - Senior	9 months
PGY-6	Neurosurgery - Senior	12 months
PGY-7	Chief Resident & Subspecialty	12 months

Oral Examinations

Knowledge Milestones are evaluated primarily by oral examination by subspecialty faculty, though in-conference evaluation and topical performance on the written board examination will also be taken into account. The resident should schedule time with the appropriate faculty if they feel that their knowledge is greater than reflected in the CCC evaluation of the milestones. On a regular basis, oral examinations will be performed during the Wednesday conference block. Feedback may be given during oral examination, and post-test formative evaluation will be given to guide further study. Residents are strongly encouraged to schedule one-on-one oral examinations with individual faculty in any area the CCC has rated them behind the expected performance for a resident of their PGY year in order to document sufficient progress.

Clinical Competency Committee (CCC)

The Clinical Competency Committee serves at the invitation of the Program Director and forms the highest departmental authority in the evaluation of each resident in terms of attainment of milestones for reporting to the ACGME, and makes recommendations to the Program Director for advancement or remediation or dismissal.

All faculty are invited for participation in the CCC.

Program Evaluation Committee (PEC)

The Program Evaluation Committee is the guidance committee which makes recommendations to the Program Director for determination or modification of the curriculum, policy, and procedures of the training program. The PEC meets at least yearly to review all program data and create action plans for program improvement. The Program Director, at the recommendation of the PEC, has authority to modify the contents of this manual at any time to respond to real or potential deficiencies in the program, as determined by the PEC. When this occurs, all residents will be notified of new policy by departmental email.

Current members of the PEC are all faculty and one resident representative.

Table of Contents

PGY 1—First Year Neurosurgery Resident

The PGY1 year is divided into two six-month rotations. One rotation will be in General Care and Clinical Neurosciences, and will incorporate experiences in endovascular intervention, radiation oncology and gamma knife. The second block will be in Neurocritical Care, and will incorporate training in anesthesia and pathology. Both rotations will incorporate longitudinal outpatient care experiences spanning the entire year in the Neurology clinics and Pain clinic. The intern is integrated into the Neurosurgical Inpatient Service throughout the year. **The USMLE Step 3 exam must be taken in this year.**

PGY 2-3—Second and Third Year Neurosurgery Resident

The PGY-2 and 3 years are spent on the general neurosurgery service at Ruby Memorial Hospital. The resident will serve as the junior resident on each service twice, and take a leadership role in the primary management of the inpatient service. The resident will participate in clinic every week working directly with faculty in a rotation as determined by the chief resident. This experience will allow the resident to acquire the ability to prepare treatment plans for patients presenting in a non-urgent environment and follow the patient from first visit through surgery and recovery. The resident will begin to develop the skills of neurosurgical patient management by following the patient through the course of their treatment with more involvement in surgical care as neurosurgical patient care skills develop. In addition, the 3rd year resident is expected to design an independent research curriculum for their PGY4 year (see below).

PGY 2-3 — Clinical and Academic Duties

Hospital patients are generally in the ICU or on the post-op surgical floor although some patients, including most consultation patients, are on other floors. The census generally runs from 25-40 patients. Residents make early morning rounds, evaluating and examining all patients, reviewing charts and studies, and planning dispositions. Rounds may be made with the attending in the morning, or later in the day, depending on the operative schedule and meetings, emergencies, and other factors at the direction of the attending. The residents and medical students are fully integrated into the outpatient clinics. Patients are first seen by a resident and/or medical student. The attending then sees the patient and the case is discussed with the resident. The resident will create the consultation or post op note but it will be read, corrected, and signed by the attending. When other duties permit, the junior resident is expected to report to the operating room whenever possible. The resident is allowed increasing involvement in the operation as surgical skills improve. Following the operation details are discussed and critiqued and recommendations for improvement made. On Wednesday, all residents not on vacation attend the didactic block. When possible, the resident is encouraged to attend any others of the multiple conferences at the Health Science Center. **The PGY2 resident must obtain a WV License prior to matriculating to PGY3. ECFMG residents must obtain WV License prior to matriculating to PGY4.**

PGY4—Fourth Year Neurosurgery Resident

The fourth year of training is spent in pursuit of neurosurgical scholarship, often in a laboratory in the Center for Neuroscience or a departmental faculty member. We also encourage enfolded clinical experiences in pediatric neurosurgery, skull base surgery, or neuro interventional surgery in combination with the elective time in PGY5. The resident is expected to develop a plan well in advance with the program director. Clinical duties are limited, though call coverage is expected to maintain clinical skills through this period. This academic year is an opportunity for the resident to fine-tune their skills in academic pursuit including research design, conduct, and ethics, as well as academic professional communication skills. The content of the investigation is largely determined by the interests of the resident, but must be of high quality as determined by the program director.

Graduation Requirement
It is required prior to graduation that every resident will have at minimum 6 PubMed indexed, peer reviewed papers in print (roughly one per year, prorated for current residents).

PGY5—Fifth Year Neurosurgery Resident

In the fifth year, the resident returns to the RMH service as a senior resident, spending 3 months running a pediatric neurosurgery service, and the other 9 months on the neurosurgery service. In this year, rather than assisting in the attending clinics, the resident will begin to run a continuity clinic of their own, which will continue weekly until graduation. The resident has more autonomy in the operating room under the direction of the neurosurgical staff. Managerial skills are developed and implemented during this year. Medical student and junior resident teaching are encouraged through daily rounds and conference lectures, and the resident will receive dedicated didactic training to better fulfill these roles.

PGY6—Sixth Year Neurosurgery Resident

In the sixth year, the resident takes a leadership role on the RHM service in preparation for chief residency. When the chief resident is unavailable to take chief call, the PGY-6 will fill this role. The resident is expected to begin to assist or perform the most complex level of operative cases.

PGY7—Seventh Year Neurosurgery Resident

At the conclusion of the PGY-6 year, the resident is amply prepared for the true chief residency. The chief resident is fully responsible for coordination of all patient care at RMH, resident manpower decisions, complication review, and the conference and call schedules.

Clinical and Academic Duties (NS7)

The NS7 year, the resident is responsible for the day-to-day running of the neurosurgical service under the supervision of the faculty. He/she is expected to discuss and plan patient management including surgical operations with the attendings, take leading roles in patient evaluation, planning of treatment, surgical procedures, and postoperative care. He/she is responsible for supervising resident assignments to the clinic and operating room, reviewing call and vacation schedules, and supervising the junior residents and medical students. He/she provides overall supervision for

conferences including data collection for morbidity and mortality conferences, works with the junior residents to assure compliance with case log recording and monitoring of duty hours, and works with the Chairman of Neurosurgery and the Program Director to provide an academic learning experience. He/she communicates with Chief Residents in other medical and surgical specialties to coordinate consultations, manage multitrauma or other cases requiring team management. At this level, the resident is responsible to be fully familiar with billing and coding, medical liability and patient safety issues, governmental regulatory concerns and practice development. It is anticipated that the finishing resident will be fully qualified to practice the highest level of neurosurgery.

Table of Contents

Criteria for Yearly Advancement

There are several areas where a resident must demonstrate accomplishments and proficiency to advance to the next level of training or be considered qualified to practice neurosurgery at the highest level. These are as follows: proficiency in the 6 Competencies, satisfying graduate medical requirements, satisfying ACGME Milestone requirements, successful completion of the written neurosurgical board exams for the appropriate year of training, Quality Improvement and Patient Safety (QI/PS) research project involvement, and scholarly activity (presentations and manuscript preparation).

Graduation Requirement:
The Resident must pass the written board exam when taken for self-assessment BEFORE being allowed to take the exam for credit. This effectively means that the exam must be passed for practice in the PGY3 year in order to take it for credit during the PGY4 year (exceptions will be considered by the CCC on a case-by-case basis).

The resident is strongly recommended to achieve the 50th percentile on the written board exam during the PGY4 year to avoid a direct CCC review of their performance.

Oral examinations by the faculty will be incorporated into the CCC evaluations for each rotation. Poor performance on oral examinations may be cause for remediation, failure to advance, or dismissal. The practice of an excellent standard of medical care in each area of the six competencies is regularly evaluated through the biannual evaluation process as well as in regular clinical mentoring. Milestone evaluations are reported to the ACGME biannually. By participating with the American Board of Neurological Surgery (ABNS) examinations, the Residency Review Committee for Neurological Surgery (RRC) and the Accreditation Council for Graduate Medical Education (ACGME) oversight, the residents are assessed compared to national standards for neurosurgery. The WVU School of Medicine requires the completion of Core Curriculum Modules for resident advancement to the next year of training. Duty hours and operative case logs must be up to date daily, and medical documentation must be timely.

Scholarly Activity Requirement

It is required prior to graduation that every resident will have at minimum, 6 PubMed indexed, peer reviewed papers in print (roughly one per year, excepting the chief year and prorated for residents who started prior to the institution of this requirement). Only residents who have made significant contribution to a research project will be listed as authors. Residents are encouraged to work together to carry research project to completion, however roles and authorship are to be decided and should be made clear at the beginning of collaboration. Any authorship disputes will be handled by the faculty mentor for the research. Presentation of research at national meetings is encouraged and the same authorship standards apply. The resident who plans to present the research should submit the research for consideration.

Quality Improvement (QI) Project Requirements

QI projects are a required part of the residency curriculum.

Conferences

The conferences occur during a block of time protected from elective clinical activity. Punctual attendance is required by all residents and medical students on the service. Designated faculty are assigned to oversee each conference. All faculty members are encouraged to attend all conferences and are required to attend selected conferences. Vacation days, days off, and emergent patient care issues are the only excused absences. All residents with the exception of the chief resident must be present for the entire conferenceperiod.

Resident Core Curriculum Conference: All residents, medical students and designated faculty will attend. Lectures are given that cover the knowledge base requirements of the Neurosurgery Residency Core Curriculum. These are repeated every 3 years. Residents are assigned topics for presentation and are expected to present a thorough review of the literature in a formal power point presentation.

SNS LECTURE SERIES

Topic	Category
Rhoton Anatomy	Anatomy
Cardiopulmonary Issues in the NICU (MI, Afib, CHF, Stunned Myocardium, PA Catheters)	
Fluid and Electrolytes, CSW, SIADH, Nutrition and Renal/Endocrine Issues in the ICU	Critical Care
Hematologic and Coagulation Issues in the NICU (DVT/PE, transfusion, platelet issues)	Critical Care
Pharmacology of vasoactive, anticonvulsants, diuretics, ionotropes	Critical Care
Pre-Operative Evaluation for Epilepsy	Epilepsy
DBS for Parkinsons, Tremor, Other	Functional
Parkinson's Disease, Parkinsons-like Syndromes (Diagnosis/Medical Management)	Functional
Epilepsy (syndromes, natural history, medical management, EEG)	Epilepsy
Facial Pain syndromes (Tic, Atypical, Glossopharyngeal neuralgia, hemifacial spasm, medical and surgical management)	Functional
Other movement disorders (benign essential tremor, dystonia, OCD)	Functional
Pain and Analgesia and other pain syndromes (failed back, cancer, sympathetic mediated, post-herpetic, phantom limb)	Functional
Stereotactic techniques (Frame based, frameless, applications)	Functional
Surgical management of epilepsy (presurgical workup, resection, outcomes)	Functional
History of Neurosurgery	History
Infections: meningitis, encephalitis, abscess, empyema, post op infections	Infections
Ataxias with review of cerebellar/vestibular pathology	Neurology
"Coma and altered consciousness" and brain death	Neurology
Dementia (AD, Picks, Frontotemporal, Multi-Infarct...)	Neurology
EMG/NCS	Neurology
Headache Syndromes	Neurology
Multiple Sclerosis and Variants	Neurology
Spinal Muscular Atrophy, Muscular Dystrophies, ALS	Neurology
Systemic Approach to neuromuscular disorders (Motor neuron, axon, myelin, muscle, NMJ)	Neurology
Autonomic Nervous System	Neuroscience

CSF, CBF, BBB physiology	Neuroscience
Motor system/cortical/brainstem/cerebellar control	Neuroscience
Nerve Biology I, membrane potential/ion channels	Neuroscience
Nerve Biology II, Synaptic transmission	Neuroscience
Somatic Sensory System	Neuroscience
Special Sense: Vision	Neuroscience
Special Sense: hearing, balance, smell, taste	Neuroscience
Chemotherapy (principles, apoptosis, anti-angiogenic, antiproliferative agents	Oncology
CNS Cysts (colloid, dermoid, epidermoid, arachnoid, pineal)	Oncology
CPA tumors	Oncology
Meningiomas	Oncology
Metastatic Disease	Oncology
Neurocutaneous syndromes (NF, VHL, Tuberous sclerosis, Sturge-Weber)	Oncology
Pineal Region tumors	Oncology
Primary Neoplasms I (astrocytomas, and oligodendrogliomas)	Oncology
Primary Neoplasms II (JPA, PXA, SGCA, ganglioglioma, DNET)	Oncology
Primary Neoplasms III (ependymoma, choroid plexus tumors, primary central neuroblastoma, intraventricular tumors)	Oncology
Radiation Therapy (radiation biology, fractionated, conformal)	Oncology
Radiosurgery (principles, planning, gamma knife	Oncology
Sellar/Suprasellar Tumors (Pituitary tumors, hormone syndromes, Dex Supp test, craniopharyngiomas, rathke's)	Oncology
Skull Base Approaches (Craniofascial, OX, Transtemporal, Far-Lateral)	Oncology
Skull Base Tumors and Orbital Tumors (Chordoma, chondrosarc, orbital tumors, glomus tumors)	Oncology
Tumor biology, epidemiology, genetics, risk factors, WHO grading	Oncology
Acute management of SAH and Seizures	Critical Care
Adult and Pediatric Head Trauma (CHI, GCS, herniation syndromes, ICP monitoring, decompressive craniectomy	Trauma
Spine Trauma: Evaluation and management	Spine
Ventriculostomy/ICP monitor placement	Critical Care
Surgeon Scientist	PBLI
Cortical Mapping	Pediatric
Craniosynostosis (plagiocephaly, non-syndromic, syndromic)	Pediatric
Embryology	Pediatric
Hydrocephalus I (pathophys, SVS, pseudotumor, adult and NPH)	Pediatric
Hydrocephalus II (Shunt techniques, ETV techniques, managing infection	Pediatric
Spasticity and movement disorders in children	Pediatric
Pediatric Tumors (posterior fossa)	Pediatric
Pediatric Tumors (Supratentorial)	Pediatric
Pediatric Vascular (AVM, Moya moya, VoG malformations)	Pediatric
Congenital I (spina bifida, CP, spasticity/movement disorders)	Pediatric
Congenital II (chiari malformation, syrinx)	Pediatric
Brachial Plexus and peripheral nerve injury, or lumbo-sacral plexus (types, classification, regeneration, treatment)	Peripheral nerve
Peripheral entrapment syndromes (radial, ulnar, median, peroneal, tibial, suprascapular)	Peripheral nerve
Spinal Anatomy (bone, ligamentous, craniocervical junction, vascular, spinal cord)	Spine
Biomechanics (criteria for instability, white and panjabi, denis, tumor)	Spine

Bone healing (normal bone physiology, allograft vs autograft, BMP, bone growth stimulators)	Spine
Degenerative Spinal Disease I (cervical radic, myelopathy, OPLL, ACDF, laminectomy vs laminoplasty, treatment algorithm, thoracic disc disease, approaches)	Spine
Degenerative Spinal Disease II (lumbosacral radic, DDD, spondy, discectomy, interbody fusion, evaluation, algorithm)	Spine
Spinal Infections (Diskitis, osteo, post op infections)	Spine
Oncology I (primary bone tumors, classification, treatment, metastatic disease, management algorithm)	Spine
Oncology II (intramedullary, intradural extramedullary, surgical treatment, xrt)	Spine
Other Spinal Disorders (RA, AS, DISH, osteoporosis, compression fx, vertebroplasty, kyphoplasty	Spine
Spinal cord injury (imaging, management, steroids, stem cells, rehab)	Spine
Spinal Trauma I (cervical, halo, braces, traction, fracture types, operative positioning)	Spine
Spinal Trauma II (thoracolumbar bracing, fractures, operative approaches)	Spine
Aneurysms I (unruptured, natural history, ISUIA, treatment)	Vascular
Aneurysms II (ruptured intracranial, SAH, hunt/hess, HCP, vasospasm, treatment	Vascular
AVMS (natural history, Spetzler-Martin, surgery, radiosurgery, embo, management principles	Vascular
Cerebrovascular anatomy and surgical approaches and Clipping techniques	Vascular
Evidence-based treatments for acute ischemic stroke	Vascular
Intracerebral hemorrhage	Vascular
Other malformations (cavernous, venous angiomas, dAVFs, moya moya)	Vascular
Spinal Vascular Malformations (natural history, grading, surgery, endovascular)	Vascular

M&M/Complications: Morbidity and Mortality Conference covering the cases of the previous month is held each month. This conference is held to discuss in detail surgical cases that have had associated deaths or complications. It is the responsibility of the chief resident to lead accurate data on all surgical cases, including deaths and complications, performed on the service the month prior. Each case presentation should include:

- detailed history and physical examination of the patient
- details of the hospital course
- details of the decision process made in the care of the patient
- literature review relevant to the case
- alternative treatments
- options/suggestions to avoid complications or death in the future.
- consideration of whether the case warrants a root cause analysis

This is to be presented in a power point format. The chief resident should be able to answer questions on any of the cases included in the statistics. All residents on the service are required to attend and participate in the discussions. Psychosocial complications will also be considered in this venue alongside medical and surgical complications. All button pushes or patient complaints will automatically be included in the case list for the month's M&M. On an average of once per quarter the chief resident will select an outcome for root cause analysis and will assign individual tasks for analysis to more junior residents.

Journal Club: Several recent meritorious journal articles are presented and reviewed in depth by a resident, and should be placed in context using classically quoted articles on that topic. Teaching articles for faculty development, as well as "landmark papers" may be included. Designated faculty and all residents are required to attend. An analysis of the quality of the article should be presented critically by the resident. Faculty in attendance will judge both the quality of the choice of article and the analysis and presentation of the article on a standardized form which will be collected by the Program Manager.

Neurosurgery Case Conference: In preparation for the oral boards, interesting cases chosen by the chief resident, are presented for discussion. Differential diagnosis and management options are discussed in detail to formulate a

treatment plan. The residents and students are asked to present their plans for treatment with explanations for their choices. This plan is then discussed and critiqued by the faculty and other residents.

Asynchronous Learning Greenberg Review and Board Preparation. Under the direction of Dr. Sedney, the asynchronous learning curriculum is a series of didactic topics with assigned internet-based material that the residents are expected to review in advance, with self-directed learning. A small group discussion then holds them accountable for their grasp of the material. The PGY4 also leads a more traditional review course for the junior residents in preparation for the written ABNS examination and the PGY5 will lead discussion of Greenberg Review.

Table of Contents

Didactic Summary:

Wednesday Didactics:
7 am: Case conference/mini presentations
7:30: Departmental Conference
Preceptors: all faculty
8:30: Written Board Review/APD Hour/Wellness
Preceptor: Sedney
9:30: Greenberg Review
Preceptor: Sedney

Asynchronous:
Weekly 1 hour assignments with work due Wednesday prior to conference.

Journal Club:
One article presented by each resident, from assigned journals/landmark paper. Please see article in SOLE folder for format/instructions if needed.
Preceptors: all faculty

Saturday Operative Skills Labs:
One every 3 months in the subjects of Cervical Spine, Thoracolumbar Spine, Microsurgery, and Skull Base.
Preceptor: Marsh

Miscellaneous Conferences (attendance optional/as available):
Spine Indications Conference: Friday 6:30AM at Ortho Spine Conference Room
Tumor Board
Epilepsy Conference
Craniofacial

Evaluations

Purpose
The program recognizes the need to provide a structure by which performance related to the training program will be assessed and consideration given for promotion to the next level of training. Evaluation will be provided in accordance with Graduate Medical Education Committee policy and ACGME common program requirements.

Note: This policy addresses performance relating to academic program requirements and does not supersede other institutional or legal requirements that must be met by the resident to remain in a training program.

Policy
Residents will receive written evaluation, goals and objectives from their faculty for each year and/or major rotation of their training program. All residents participating in training will be provided, at a minimum, a semi-annual formal evaluation developed by the faculty. Residents shall be allowed to review semi-annual evaluations contained in

permanent records and other evaluations as determined by program policy.

The formal written evaluation shall:

1. Address each of the six ACGME core competencies.
2. Include scoring and rating criteria that seek to minimize subjective assessment of performance.
3. Include language indicating satisfactory performance, advancement to the next level of training (if applicable) or provide specific actions and performance requirements by the resident to return to a level of satisfactory performance or advancement to the next level oftraining.
4. Be signed and dated by the resident and ProgramDirector.
5. Become a part of the permanent record file for theresident.

In addition, each resident will meet near the midpoint of each rotation with an assigned faculty advisor according to PGY year for an informal progress evaluation to assess strengths and weaknesses in performance, so that adjustments can be made over the remainder of the rotation. Each meeting with the advisor will address multiple domains on a standardized form as determined by the PEC.

Milestones

The milestones are designed only for use in evaluation of resident physicians in the context of their participation in ACGME accredited residency or fellowship programs. The milestones provide a framework for the assessment of the development of the resident physician in key dimensions of the elements of physician competency in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competency, nor are they designed to be relevant in any other context.

For more information about The Neurological Surgery Milestone Project, please go to: http://www.acgme.org/Portals/0/PDFs/Milestones/NeurologicalSurgeryMilestones2.0.pdf?ver=2018-06-14-104857-233

Mentorship of Residents

Each resident will have a faculty advisor assigned by resident year. This faculty member will track the resident's progress through the year and will meet with the resident to perform the mid-cycle formative evaluation. The review will contain, but not be limited to, the following elements:

1. Clinic volume and mix
2. Operative Skill progression and case numbers by category
3. Humanism, Professionalism, and Communication
4. Progress on scholarly projects
5. Contribution to QI projects
6. Boards preparation

In addition, each faculty member will have a specific emphasis for the year, based upon personal interest/strengths and the needs/emphasis of each specific year of residency. The rotation is designed to have each resident develop a mentorship relationship with each faculty member.

Mandatory focus by year:

PGY	Resident	Faculty Mentor
7 - Chief	Rahul Singh	Voelker
6	Walid Radwan	Brandmeir
5	Gene Katsevman	Voelker
4	Cletus Cheyuo	Sedney
4	Ryan Turner	Cifarelli

PGY	Resident	Faculty Mentor
3	Azeem Rehman	Serrano
2	Jesse Lawrence	Marsh
1	David Arsanious	Sedney

Departmental Policies and Procedures

Effective Transitions

The transitions policy is created in recognition that multiple studies have shown that transitions of care create the most risk of medical errors (ACGME teleconference July 14, 2010.) In addition to the below specific policies, promotion of patient safety is further ensured by:

1. Provision of complete and accurate call schedules on the hospital intranet On Call.
2. Presence of a backup call schedule for those cases where a resident is unable to complete their duties.
3. The ability of residents to freely, and without fear of retribution, report their inability to carry out their clinical responsibilities due to fatigue or other causes.

Policy and Process

Residents receive educational material on Transitions during orientation as a core module.

In any instance where care of a patient is transferred to another member of the health care team (including service hand-offs or between services) an adequate transition must be used. Although transitions may require additional reporting than required in this policy, a minimum standard for transitions must include the following information:

1. Demographics
   a. Name
   b. Medical Record Number
   c. Unit/room number
   d. Age
   e. Attending physician – Phone numbers of coveringphysician
   f. Gender
   g. Allergies
   h. Admit date
2. History and Problem List
   a. Primary diagnosis(es)
   b. Chronic problems (pertinent to thisadmission/shift)
3. Current condition/status
4. System based
   a. Pertinent Medications and Treatments
   b. Oral and IV medications
   c. IV fluids
   d. Blood products
   e. Oxygen
   f. Respiratory therapy interventions
5. Pertinent lab data
6. To do list: Check x-ray, labs, wean treatments, etc., *including rationale*
7. Contingency Planning – What may go wrong and what todo
8. **ANTICIPATE** what will happen to your patient.

Example: *"If seizes > 5 minutes, give Ativan 0.05mg/kg. If still seizes, load with 5mg/kg of fosphenytoin."*

9. Difficult family or psychosocial situations
10. Code status, especially recent changes or familydiscussions

Handoffs should be completed in person. Occasionally, circumstances may require a phone call, but must always be completed with direct verbal communication between the two responsible providers. Whenever possible, additional members of the team, including staff, patients, families, and physician extenders, should also be included.

Table of Contents

How Monitored:
The process and effectiveness of the handoff system is monitored by direct supervision and by evaluation of modeled handoffs in the conference environment. Contributions of the handoff process to outcomes will be considered at the monthly Morbidity and Mortality Conference. The PEC will ultimately evaluate the effectiveness of the system in the Annual Program Evaluation (APE) on a yearly basis, and the sponsoring institution will evaluate by the Internal Review process. The institution and program will monitor this by periodic sampling of transitions.

In addition, please note the institutional policy regarding the Professionalism Standard for Interruption of Patient Care.
http://medicine.hsc.wvu.edu/media/2575/residentprofessionalismstandardforinterruptionofpatientcare2011revised11- 11-11.pdf

A. If a resident is aware of any conflict that may arise during the course of any upcoming procedure or patient care activity, whether such a procedure or activity is scheduled or emergent, that resident must inform the attending physician and/or Residency Program Director in advance to allow the physician or service to determine whether patient safety will allow for reasonable accommodations. It may be necessary to alter a resident's rotation schedule if breaks cannot be reasonably accommodated.

B. In surgical settings and other patient care activities, residents may not scrub out of surgical procedures, leave the operatory or any patient care setting for any non-emergent reason (e.g. medical conditions, breast feeding, or child or adult care). While emergencies will sometimes arise, in the event of an unforeseen emergency, residents must appropriately notify the attending physician of the emergency and seek the necessary permission to be excused only when and if the circumstances warrant. In absolutely no instance should a resident scrub out of surgery or leave the operatory without first informing the attending physician and obtaining permission to exit. Residents are expected to be compliant with current duty hour standards and program duty hour policies and procedures.

Consequences for failure to comply will be at the discretion of the Residency Program Director.

Table of Contents

Policy on Alertness Management /Fatigue Mitigation Strategies

Policy and Process

Residents and faculty are educated about alertness management and fatigue mitigation strategies on line via SOLE GME for Residents ("Fundamentals of Fatigue Prevention"), and in departmental conferences. Alertness management and fatigue mitigation strategies include:

1. Warning Signs
    a. Falling asleep at Conference/Rounds
    b. Restless, Irritable w/ Staff, Colleagues, Family
    c. Rechecking your work constantly
    d. Difficulty Focusing on Care of the Patient
    e. Feeling "like you just don't care"
    f. Never drive while drowsy

2. Sleep Strategies for House Staff
    a. Pre-call Residents
        1. Don't start call with a sleep deficit – get 7-9 hours of sleep
        2. Avoid heavy meals and/or exercise within 3 hours of sleep
        3. Avoid stimulants to keep you awake
        4. Avoid ETOH to help you sleep

    b. On-Call Residents
        1. Tell Chief/PD/Faculty if too sleepy to work
        2. Nap whenever you can (> 30 min or < 20 min)
        3. BEST Circadian Window 2PM-5PM & 2AM-5AM
        4. AVOID heavy meals
        5. Strategic consumption of coffee (t ½ 3-7 hours)
        6. Know your own alertness/sleep pattern

    c. Post-call Residents
        1. Lowest alertness 6AM –11AM after being up all night
        2. Full recovery from sleep deficit takes 2 nights
        3. Take 20 min. nap or coffee 30 min before driving

A backup call schedule will clarify who will assume clinical duties in the event a resident must be relieved for fatigue.

How Monitored:

The institution and program monitor successful completion of the on line modules. Residents are encouraged to discuss any issues related to fatigue and alertness with supervisory residents, chief residents, and the program administration. Supervisory residents will monitor lower level residents during any in house call periods for signs of fatigue. Adequate facilities for sleep during day and night periods are available in the hospital, and residents are required to notify Chief Residents and program administration if those facilities are not available as needed or properly maintained. At all transition periods, supervisory residents and faculty will monitor lower level residents for signs of fatigue during the hand off. The institution will monitor implementation of this indirectly via monitoring of duty hours violations in E-value, the Annual Resident Survey (administered by the institution to all residents and as part of the annual review of programs) and monitoring of accurate timely reporting of hours to the program coordinator and program director to ensure residents do not exceed work hour limits.
http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

Policy Ensuring Residents Have Adequate Rest

In order to ensure residents have adequate rest between duty periods and after on –call sessions we adopt the following policies:

1. Our Duty Hours Policy contains the following relevant language:

    a. According to the Neurosurgery Review Committee, residents must be prepared to enter the unsupervised practice of medicine and care for patients over irregular or extended periods. This preparation must occur within the context of the 80-hour, maximum duty period length, and one-day-off-in seven standards. While it is desirable that residents in their final years of education have eight hours free of duty between scheduled duty periods, there may be circumstances [as defined by the Review Committee] when these residents must stay on duty to care for their patients or return to the hospital with fewer than eight hours free of duty. Circumstances or return-to-hospital activities with fewer than eight hours away from the hospital by residents in their final years of education must be reported to the program manager and the program director for monitoring.

    All of the above criteria are in the context of the other duty hours requirements.

2. All employees must abide by the Fit for Duty Policy. This describes the expectations for employees to report to work fit and safe to work. It further defines unsafe/impaired behaviors, and the requirement for self or supervisor referral to the Faculty Staff Assistance Program (FASP) (http://www.hsc.wvu.edu/fsap/) and what steps are taken thereafter.
   A resident physician who is suspected of being impaired for any reason is immediately subject to drug screening.

Refusal of drug screening is grounds for immediate suspension and/or termination with referral to the Faculty and Staff Assistance Program (FSAP) and/or the West Virginia Medical Professional Health Assistance Program.

3. Residents must take personal responsibility for and faculty must model behaviors that promote:
    a. Assurance for fitness of duty.
    b. Assurance of the safety and welfare of patients entrusted in theircare.
    c. Management of their time before, during and after clinical assignments.
    d. Recognition of impairment (e.g. illness or fatigue) in self andpeers.
    e. Honest and accurate reporting of duty hours, patient outcomes, and clinical experience data.
    f. Adequate sleep facilities are in place at each institution and our alertness management / fatigue mitigation policy and process encourages good sleep hygiene as well as recommending such strategies and pre-call strategies, strategic napping and post-callnaps.
    g. Faculty will model behaviors that encourage fitness for duty as noted above, and our Supervision Policy requires faculty to observe for signs of fatigue especially during transitions.

Use of Strategic Napping

Strategic napping is utilized while on call to ensure that residents are able to avoid fatigue. Residents are encouraged to nap overnight especially between the hours of 10 PM through 8 AM to avoid excessive fatigue. The effectiveness of this process will be monitored by faculty responsible for patient care that the resident is involved in on the following day. Difficulties must be reported to the program director for review.

Case Logging Policy

Residents are expected to log ALL operative cases and procedures in every setting, including bedside, pain clinic, Gamma Knife, interventional radiology, ICU, etc. Case logs are expected to be kept up to date at least weekly and are reviewed at each formal evaluation. Meal cards may be turned off for delinquent logging practices.

Graduation Requirement:
All case minimums are required to be met by the 6th month of the PGY7 year. If minimums are not met, specific rotations will be crafted for the final 6 months of the chief year to meet minimum requirements.

Table of Contents

Supervision and Progressive Responsibility Policy

SUPERVISION OF RESIDENTS

Purpose:
To ensure that residents are provided adequate and appropriate levels of supervision during the course of the educational training experience and to ensure that patient care continues to be delivered in a safe manner.
http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

Policy and Procedure:
All program faculty members supervising residents must have a faculty or clinical faculty appointment in the School of Medicine or be specifically approved as supervisor by the Program Director. Faculty schedules will be structured to provide residents with continuous supervision and consultation.

Residents must be supervised by faculty members in a manner promoting progressively increasing responsibility for each resident according to their level of education, ability and experience. Residents are provided information addressing the method(s) to access a supervisor in a timely and efficient manner at all times while on duty.

The program provides additional information addressing the type and level of supervision for each post-graduate year in the program that is consistent with ACGME program requirements and, specifically, for supervision of residents engaged in performing invasive procedures.

1. To provide patients with quality care and house officers with a meaningful learning experience, a supervising attending physician must be clearly identified for each patient admitted to or consulted by the neurosurgical service. It is the responsibility of the house officer to notify an attending physician that a consultation or admission has been initiated on his/her service, based on the call schedule and back-up mechanisms established in the department.

2. The supervising attending physician is ultimately responsible for all recommendations rendered and care delivered by house officers, paramedical personnel and other trainees on the neurosurgical service.

3. Supervision shall be readily available to all house officers on duty. Supervision should first be from the attending listed for that patient. If this physician is not immediately available, the on-call attending will be the supervising attending. A comprehensive call list of house officers and attending physicians is disseminated to all switchboard operators, hospital call centers, clinical care areas and all covering house officers on a monthly basis. The Department of Neurosurgery keeps separate call schedules for the pediatric neurosurgical service (patients under 21 years old) and the adult neurosurgical service (patients over 21). In the unlikely event that either of these physicians were not immediately available, the other service will act as a backup call attending.

4. Supervision shall be conducted to ensure that patients receive quality care and house officers assume progressively increased responsibility in accordance with their ability and experience, based on curriculum objectives for the respective level oftraining.

5. Levels of supervision include attending physician demonstrating a procedure, assisting with the procedure, present physically in the area where intervention is performed, attending available by telephone, senior house officer or other supervisor present physically or available by telephone. The attending physician in charge of a respective procedure shall determine the level of supervision for a particular house officer and the specific invasiveprocedure.

6. The responsible attending physician may delegate supervision of more junior house officer to a more senior resident as appropriate. These determinations shall be consistent with the individual house officer's knowledge base and skills, the complexity of the case and procedure, and the house officer's prior evaluations regarding levels of performance per the residency program core curriculum objectives for each level of training.

7. House officers must request help when the need for assistance is perceived, and responsible attending physicians must respond personally when such help is requested. When a patient's attending physician is not available, a previously designated physician or the attending on call shall assume all coverage responsibilities for the patients.

8. The Chief Resident shall relay to the Department Chair and the Program Director any incident where another house staff did not notify a responsible faculty member, a responsible faculty member was not responsive, or any other breach of supervision as outlined in thispolicy.

Policy and Process:
Several of the essential elements of supervision are contained in the Policy of Professionalism detailed elsewhere in this document. The specific policies for supervision are as follows.

Faculty Responsibilities for Supervision and Graded Responsibility
Residents must be supervised in such a way that they assume progressive responsibility as they progress in their educational program. Progressive responsibility is determined in a number of ways including:

1. Faculty determine what level of autonomy each resident may have that ensures growth of the resident and patient safety.

2. The Program Director and Chief Resident assess each resident's level of competence in frequent personal observation and semi-annual review of eachresident.
3. Where applicable, progressive responsibility is based on specific milestones
4. Completion of the SNS Boot Camp

The expected components of supervision include:

1. Defining educational objectives.
2. Faculty assessment of the skill level of the resident by direct observation.
3. The faculty defines the course of progressive responsibility allowed, starting with close supervision and progressing to increased independence as the skill is mastered.
4. Documentation of supervision by the involved supervising faculty must be customized to the setting based on guidelines for best practice and regulations from the ACGME, JACHO and other regulatory bodies. Documentation should generally include but not be limited to:
    a. progress notes in the chart written by or signed by the faculty
    b. addendum to resident's notes where needed
    c. counter-signature of notes by faculty
    d. a medical record entry indicating the name of the supervisory faculty.
5. In addition to close observation, faculty are encouraged to give frequent formative feedback and required to give formal summative written feedback that is competency based and includes evaluation of both professionalism and effectiveness of transitions.

The levels of supervision are defined as follows:

- **Direct Supervision by Faculty** - faculty is physically present with the resident being supervised.
- **Direct Supervision by Senior Resident** is same as above but resident is the direct supervisor.
- **Indirect with Direct Supervision IMMEDIATELY Available** – Faculty – the supervising physician is physically present within the hospital or other site of patient care and is immediately available to provide Direct Supervision.
- **Indirect with Direct Supervision IMMEDIATELY Available** – Resident - same but direct supervisor is resident.
- **Indirect with Direct Supervision Available** - the supervising physician is not physically present within the hospital or other site of patient care, but is immediately available by means of telephonic and/or electronic modalities, and is available to provide Direct Supervision.
- **Oversight** The supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered.
- **Retaliatory supervision will not be tolerated.**

Inpatient Services

PGY Level	*Direct by Faculty*	*Direct by Senior Residents*	*Indirect but immediately available - faculty*	*Indirect but immediately available - residents*	*Indirect available*	*Oversight*
I	**X**	**X**				
II	**X**	**X**	**X**	**X**		
III - VII	**X**	**X**	**X**	**X**	**X**	**X**

Intensive Care Units

Skill Level	*Direct by Faculty*	*Direct by senior residents*	*Indirect but immediately available - faculty*	*Indirect but immediately available - residents*	*Indirect available*	*Oversight*
I	**X**	**X**				
II	**X**	**X**	**X**	**X**		
III - VII	**X**	**X**	**X**	**X**	**X**	**X**

Ambulatory Settings

PGY	*Direct by Faculty*	*Direct by senior residents*	*Indirect but immediately available - faculty*	*Indirect but immediately available - residents*	*Indirect available*	*Oversight*
I	**X**	**X**				
II	**X**	**X**	**X**	**X**		
III - VII	**X**	**X**	**X**	**X**	**X**	**X**

Operating Rooms:

PGY	*Direct by Faculty*	*Direct by senior residents*	*Indirect but immediately available - faculty*	*Indirect but immediately available - residents*	*Indirect available*	*Oversight*
I	**X**	**X**	**X**			
II	**X**	**X**	**X**			
III - VII	**X**	**X**	**X**			

Table of Contents

Neurosurgical Bedside Procedure:

_____
Resident

(to be signed off by senior/chief resident or staff)

Lumbar Puncture

MRN	Date	Initial

Lumbar Drain

MRN	Date	Initial

EVD

MRN	Date	Initial

Camino

MRN	Date	Initial

Subdural Drain/SEPS

MRN	Date	Initial

Notes:

PGY 1 residents must be supervised by either faculty or more senior residents in the hospital setting until a set number of procedures are achieved. Incoming residents are required to complete 5 each of the listed bedside procedures while observed by the senior or chief prior to doing said procedures independently.

How Monitored:
The institution will monitor implementation of the policies through Annual Review of Programs and Internal Reviews. Furthermore the institution monitors supervision through a series of questions in the Annual Resident Survey. The program will monitor this through feedback from residents and monitoring by the Chief Resident and Program Director. Supervision will be assessed annually in the APE. In accordance with AGME policy in rare instances, the CCC may judge milestone progress such that the PGY resident may be advanced to a higher degree of responsibility, though the hours rules would still be in full effect.

Table of Contents

Policy on Mandatory Notification of Faculty

How monitored
The Chief Resident and faculty will monitor by checking for proper implementation on daily rounds. The Program Director and the Program Manager will solicit reports from faculty on lack of appropriate use of the policy.

Continuity of Care when a Resident is Unable to Perform Duties
If a resident is unable to perform, the faculty responsible for patient care assumes responsibility for continuity of care. The effectiveness of this policy will be reported to and reviewed by the program director, and any cases will be reviewed at the monthly morbidity and mortality conference to ensure optimal patient care, and at the annual Program Evaluation to determine any needed changes in policy.

Guidelines for Resident Mandatory Communication with Attending
The following situations require mandatory direct communication with the faculty responsible for patient care, both during routine working hours, and after hours and weekends. "Faculty responsible for patient care" means the staff of record for the patient, except in events when the faculty is physically out of town or can't be contacted, in which case the on call faculty should be notified. The staff of record should also be notified as soon as is feasible:

1. Death
2. DNR or other end of life decision
3. Suicide attempt
4. Violence requiring physical restraints
5. Emergency surgery
6. Acute drastic change in course
7. Unanticipated invasive or diagnostic procedure
8. Pregnancy
9. Transfer of care to another medical or surgical service, including transfer to ICU
10. Any serious adverse event
11. Any complex decision making process that the resident does not feel adequately qualified to undertake without immediate input from faculty

Any lapse in this process will be reported to the program director, who will monitor the reporting process and review monthly.

Moonlighting

Purpose
To ensure that professional activities falling outside the course and scope of the training program are consistent with policies and guidelines set forth by the Accrediting Council for Graduate Medical Education (ACGME) and Graduate Medical Education Committee. Moonlighting is defined as any professional activity not considered an integral part or required rotation of the curriculum for a postgraduate training program, irrespective of remuneration.

Policy
Moonlighting **is <u>not permitted</u>** at any time during Neurosurgery Residency.

Policy on residents staying longer than 24+4

Policy and Process
PGY 1 residents' duty periods may be no longer than 16 hours and there are no exceptions allowed unless under IRB approved ACGME studies. Upper level residents are not allowed to stay longer than 24 hours with 4 hours for transitions. In those rare and extenuating cases where a resident absolutely must remain after 24+4 the resident must contact the Program Director for a specific exemption. If that is permitted verbally then the resident must communicate by email with the Program Director telling:

1. the patient identifying information for which they are remaining,
2. the specific reason they must remain longer than 24+4,
3. assurance that **<u>all</u>** other patient care matters have been assigned to other members of the team,
4. assurance that the resident will not be involved in any other matter than that for which the exemption is allowed and
5. assurance that the resident will notify the program director when they are complete and leaving.

In the event that the Program Director does not hear from the resident in a reasonable time (four hours), the Program Director or designee will locate the resident in person and assess the need for any further attendance by the resident. Residents caught in violation of this policy or who abuse this rare privilege will be subject to disciplinary action for unprofessional behavior.

How Monitored:
The program director will directly monitor each of these cases. It is anticipated these requests will be infrequent at most. The Program Director will collect and review the written requests on a regular basis on each case and all cases in aggregate. The institution will monitor numbers and types of exceptions of this during annual reviews of programs and Internal Reviews.

<u>Table of Contents</u>

Resident Schedules

Vacations

Each resident will accrue 15 hours of vacation per month in every academic year. Vacations are assigned.

If there are questions or concerns from any of the resident staff they are welcome to contact the Program Director at any time. https://medicine.hsc.wvu.edu/media/2587/leavepolicytemplate7-1-11.pdf

Meetings

Residents may attend conferences if they have had an abstract accepted as an oral presentation. Poster presentations will be considered by the Program Director on a case by case basis. The Department will pay for reasonable travel expenses. No more than one resident may leave the clinical service at a given time.

Rotations

Resident rotations are designed to optimize the educational experience of each individual resident, to allow progression per curriculum objectives and to satisfy the requirements of the ACGME in Neurological Surgery.

On all neurosurgical rotations, all residents are required to participate in the call schedule unless on vacation.

The rotation schedules are generally available in advance. Residents will be notified at the earliest possible time if necessary changes are made in the schedule. All residents should feel free to contact the Program Director with questions or other concerns regarding the rotations. The rotation schedule cannot be changed without the knowledge and consent of the Program Director.

International Rotations are not currently permitted by the Neurosurgery Residency.

https://medicine.hsc.wvu.edu/media/2588/internationalrotationpolicy7-2014.pdf

Surgical House Staff

Surgical interns and house staff assigned to the neurosurgical service shall be integrated under the oversight of neurosurgery residents. They shall assist in clinical and call activities, although the priority of assignment to surgical procedures shall be for neurosurgery residents.

Call Schedules

The call schedule for each hospital is primarily the responsibility of the PGY 5 resident. Problems with, and changes in the schedule must be approved by the Chief Resident. Patient care and educational objectives must be monitored, and if long weekends are too great a burden for a given resident, this option will no longer be allowed for that resident. On-call rooms are available for resident use. Resident work hours should be monitored by the chief resident on an on-going basis, with the aim of modifying call policies and manpower decisions to insure continued full compliance with the ACGME requirements.

Maternity/Paternity Leave

The West Virginia University Department of Neurosurgery complies with all federal and GME policies regarding maternity/paternity leave. Leaves of absence may potentially extend training.

Table of Contents

Meals

Meal assistance is available via the meal cards. Questions regarding the policy should be directed to the Program Manager. If policy is not followed or requested information is not provided, the Program Manager may freeze the meal card account until policy is followed.

Email

Departmental email is an official form of departmental communication. Residents are required to check email daily and respond to departmental messages within **24 hours**.

Pagers

WVU provides digital pagers for the residents. Residents will usually retain the same pager number for the duration of their training. Extra batteries are available from the secretarial staff in the neurosurgery offices. If a pager is lost or stolen please contact the Program Manager immediately for replacement. In this situation, the resident may be held responsible for the replacement cost.

Table of Contents

ACGME Clinical and Educational Work Hours Policy

The institution through GMEC supports the spirit and letter of the **ACGME Duty Hour Requirements** as set forth in the Common Program Requirements and related documents July 1, 2003 and subsequent modifications, most recently in July 2015. The institution supports the physical and emotional wellbeing of the resident as a necessity for professional and personal development and to ensure patient safety. The institution will develop and implement policies and procedures through GMEC to assure the specific ACGME policies relating to work hours are successfully implemented and monitored. As previously stated, these policies may be summarized as:

Maximum Hours of Work Per Week

Work hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities and all moonlighting*.

* - *The Neurosurgery Residency does not permit moonlighting.*

Mandatory Time Free of Duty

Residents must be scheduled for a minimum of one day free of duty every week (when averaged over four weeks). At-home call cannot be assigned on these free days.

Maximum Duty Period Length

Duty periods may be scheduled to a maximum of 24 hours of continuous duty in the hospital. We encourage residents to use alertness management strategies in the context of patient care responsibilities. Strategic napping, especially after 16 hours of continuous duty and between the hours of 10:00 p.m. and 8:00 a.m., is strongly suggested.

It is essential for patient safety and resident education that effective transitions in care occur. Residents may be allowed to remain on-site in order to accomplish these tasks; however, this period of time must be no longer than an additional four hours.

Residents must not be assigned additional clinical responsibilities after 24 hours of continuous in-house duty.

In unusual circumstances, residents, on their own initiative, may remain beyond their scheduled period of duty to continue to provide care to a single patient. Justifications for such extensions of duty are limited to reasons of required continuity for a severely ill or unstable patient, academic importance of the events transpiring, or humanistic attention to the needs of a patient or family.

Under those circumstances, the resident must:

- Appropriately hand over the care of all other patients to the team responsible for their continuing care; and,
- Document the reasons for remaining to care for the patient in question and submit that documentation in every circumstance to the programdirector.
- The program director must review each submission of additional service, and track both individual resident and program-wide episodes of additionalduty.

Minimum Time Off between Scheduled Duty Periods

PGY-2 residents, as defined by the Neurosurgery Review Committee, should have 10 hours free of duty, between scheduled duty periods. They must have at least 14 hours free of duty after 24 hours of in-house duty.

Residents in the final years of education, PGY-3 and above, as defined by the Neurosurgery Review Committee, must be prepared to enter the unsupervised practice of medicine and care for patients over irregular or extended periods.

This preparation must occur within the context of the 80-hour, maximum duty period length, and one-day-off-in seven standards. While it is desirable that residents in their final years of education have eight hours free of duty between scheduled duty periods, there may be circumstances [as defined by the Review Committee] when these residents must stay on duty to care for their patients or return to the hospital with fewer than eight hours free of duty.

Circumstances or return-to-hospital activities with fewer than eight hours away from the hospital by residents in their final years of education will be monitored by the program director.

Maximum In-House On-Call Frequency

PGY-2 residents and above must be scheduled for in-house call no more frequently than every-third-night (when averaged over a four-week period).

At-Home Call

Time spent in the hospital by residents on at-home call must count towards the 80-hours maximum weekly hour limit. The frequency of at-home call is not subject to the every-third-night limitation, but must satisfy the requirement for one-day-in-seven free of duty, when averaged over four weeks.

At-home call must not be as frequent or taxing as to preclude rest or reasonable personal time for each resident.

Residents are permitted to return to the hospital while on at-home call to care for new or established patients. Each episode of this type of care, while it must be included in the 80-hour weekly maximum, will not initiate a new “off-duty period”.

Moonlighting

Moonlighting is not permitted at any time during neurosurgical residency.

Duty Hour Logging Policy

Residents are required to log all duty hours in E-value daily. This includes at home clinical duties such as answering pages and charting. Those who fail to log duty hours or log erroneous duty hours are subject to disciplinary action.

The institution as well as each program is required to monitor and document compliance with these requirements for all trainees. This policy applies to any site where trainees rotate, even in elective situations.

Table of Contents

Disciplinary Policy and Procedures

The Neurosurgery Department adheres to the Academic Discipline and Dismissal Bylaws, which can be found at http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

Within this document can be found bylaws regarding:

- Academic Grievance
- Harassment
- Guidelines for Appropriate Use of the Internet http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

PRELIMINARY INTERVENTION

Substandard disciplinary and/or academic performance is determined by the Program Director with the assistance of the faculty and particularly the CCC. Corrective action for minor academic deficiencies or disciplinary offenses which do not warrant remediation as defined below, shall be determined and administered by the Program Director under this guidance. Corrective action may include oral or written counseling or any other action deemed appropriate by the Department under the circumstances. Corrective action for such minor deficiencies and/or offenses are not subject to appeal.

PROBATION and REMEDIATION

House Officers may be placed on probation for issuance of a warning or reprimand; or for imposition of a remedial program. Remediation refers to an attempt to correct deficiencies which, if left uncorrected, may lead to a non-reappointment or disciplinary action. In the event a House Officer's performance, at any time, is determined by the Program Director to require remediation, the Program Director shall notify the House Officer in writing of the need for remediation. A remediation plan will be developed that outlines the terms of remediation and the length of the remediation process. Failure of the House Officer to comply with the remediation plan may result in termination or non-renewal of the House Officer's appointment.

A House Officer who is dissatisfied with a departmental decision to issue a warning or reprimand, impose a remedial program, or impose probation may appeal that decision to the Department Head informally by meeting with the Department Head and discussing the basis of the House Officer's dissatisfaction within five (5) working days of receiving notice of the departmental action. The decision of the Department Head shall be final, subject to appeal according to grievance policy of the university.

CONDITIONS FOR REAPPOINTMENT

Programs will provide notice in writing of the intent to non-renew or non-promote residents 4 months prior to the end of the current contract, except in the case when the cause for non-promotion/non-reappointment occurred within the final 4 months, or when the decision is made in the context of an in-process probation or remediation. In such cases house officers will be notified in writing with as much notice as possible.

TERMINATION, NON-REAPPOINTMENT, AND OTHER ADVERSE ACTION

A House Officer may be dismissed or other adverse action may be taken for cause, including but not limited to: i) unsatisfactory academic or clinical performance; ii) failure to comply with the policies, rules, and regulations of the House Officer Program or University or other facilities where the House Officer is trained; iii) revocation, expiration or suspension of license; iv) violation of federal and/or state laws, regulations, or ordinances; v) acts of moral turpitude; vi) insubordination; vii) conduct that is detrimental to patient care; and viii) unprofessional conduct.

The Program Director may take any of the following adverse actions:

i) issue a warning or reprimand;
ii) impose terms of remediation or a requirement for additional training, consultation or treatment;
iii) institute, continue, or modify an existing summary suspension of a House Officer'sappointment;
iv) terminate, limit or suspend a House Officer's appointment orprivileges;
v) non-renewal of a House Officer's appointment; vi) dismiss a House Officer from the Program;
vi) or any other action that the Program Director deems is appropriate under the circumstances.

Table of Contents

DUE PROCESS

All communication regarding due process will occur by either official campus email, certified letter, or hand delivery. Dismissals, non-reappointments, non-promotion or other adverse actions including probation which could significantly jeopardize a House Officer's intended career development are subject to appeal as delineated in the **GME Bylaws, XXV. Employment Grievance Procedure** (page 32).

Employment Grievance Procedure for Non-Academic Issues: Resident is encouraged to seek resolution of non-academic employment-related grievances relating to Resident's appointment or responsibilities, including any differences between Resident and WVUH, or WVU School of Medicine with respect to the interpretation of, application of, or compliance with the provision of the agreement, in accordance with the grievance procedures set forth on the WVU website. Forms and procedures are available from the Human Resources Department.

http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

SUMMARY SUSPENSIONS

The Program Director, or designee, or the Department Head, or designee, shall have the authority to summarily suspend, without prior notice, all or any portion of the House Officer's appointment and/or privileges granted by University or any other House Officer training facility, whenever it is in good faith determined that the continued appointment of the House Officer places the safety of patients or personnel in jeopardy or to prevent imminent or further disruption of University or other training facility operations.

Except in those cases where suspension occurs as part of other appealable disciplinary actions, within two (2) working days of the imposition of the summary suspension, written reason(s) for the House Officer's summary suspension shall be delivered to the House Officer, the department chair, and the DIO. In those other appealable cases the due process as described in the WVU grievance policy. The House Officer will have five (5) working days upon receipt of the written reasons to present written evidence in support of the House Officer's challenge to the summary suspension. A House Officer, who fails to submit a written response within the five (5) day deadline, waives his/her right to appeal the suspension.

The Department may retain the services of the House Officer or suspend the House Officer without pay during the appeal process. Suspension with or without pay will not exceed 90 days, except under unusual circumstances.

OTHER GRIEVANCE PROCEDURES

Grievances other than those departmental actions described above or discrimination should be directed to the Program Director for review, investigation, and/or possible resolution. Complaints alleging violations of the sexual harassment policy should be directed to the appropriate supervisor or the Program Director.
http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

Resident complaints and grievances related to the work environment or issues related to the program or faculty that are not addressed satisfactorily at the program or departmental level should be directed to the DIO. For those cases that the resident feels can't be addressed directly to the program he/she should contact the office of the DIO.

Closure and Reduction

In the event a decision is made that the program must decrease in size or close, the Chair and PD will inform the DIO, GMEC, and the residents as soon as possible following the decision. Closure will preferentially be structured to allow enrolled residents to complete the program, and where this is impossible, the Chair and PD will work to assist residents to enroll in another accredited program to continue their education.

Practitioner Health Committee

The purpose of the Practitioner Health Committee is to serve as the primary resource in the management of impaired Practitioners. Policies can be found in Appendix One of the GME Bylaws:

http://medicine.hsc.wvu.edu/media/2598/gmebylawsrevised1-15-16.pdf

WVU Medicine Resident Physician Manual

Further information can be found at: http://medicine.hsc.wvu.edu/media/2569/2016residentphysicianmanual.pdf

Patient Safety Net

The PSN is utilized to report patient safety events and near misses.

1. Access CONNECT http://connect.wvuhealthcare.com/
2. On the left hand menu, choose "Safety Reports"
3. Chose Patient Safety Net (PSN)
4. Choose "This web-based reporting tool" link

Mistreatment/Supervision and Professionalism Button

1. Access the Office of GME website:http://medicine.hsc.wvu.edu/gme/
2. Scroll down to find either Mistreatment or Professionalism
3. Click on relevant button to submit report

Policy on Resident Interactions with Vendor Representatives

The purpose of this policy is to establish guidelines for interactions with industry representatives for residents in graduate medical education programs sponsored by the West Virginia University School of Medicine. Interactions with industry occur in a variety of contexts, including marketing of new pharmaceutical products, medical devices, and research equipment as well as on-site training of newly purchased devices. Many aspects of these interactions are positive and important for promoting the educational, clinical and research missions of the institution. However, these interactions must be ethical and cannot create conflicts of interest that could endanger patient safety, data integrity, and the integrity of our education and trainingprograms.

https://medicine.hsc.wvu.edu/media/3009/medical-student-interactions-with-vendors.pdf

West Virginia University School of Medicine GME International Rotation Policy

In order for a resident physician enrolled in any graduate medical education training program sponsored by the West Virginia University School of Medicine to obtain permission to complete an International Health Rotation for academic credit, this approval process must be followed:

https://medicine.hsc.wvu.edu/media/2588/internationalrotationpolicy7-2014.pdf

Table of Contents

Resident Spending Guidelines

Purpose:
We recognize that expenditures for professional development, both expected and unexpected, arise along the course of residency training, and funds are available for professional development. Guidelines for professional development spending, including surgical loupes, is described in the departmental Guidelines for Resident Professional Development Funds, which can be obtained from the program manager.

Policy:
Educational Fund
Each resident will be given a limit in the amount of $1,500 with which to have book(s) *of their selection* purchased for them each year. The process for having the book(s) purchased will be as follows:

1) Residents will identify the books and email the residency program manager with the following information (title of book; author of book; edition of book; ISBN (if available) as well as any other pertinent information).
2) The program manager will place the order.
3) The program manager will notify residents once their books have arrived.

Additional texts and online educational tools will be purchased according to departmental guidelines by year utilizing these funds. Similarly, educational courses at which a resident is not presenting may be supported by professional development funds.

The educational fund may be used for neurosurgical books and learning materials (including courses, CME materials including online lectures) and all expenditures must be approved by the program director or APD, who have the discretion to deny any request. Certain required educational expenditures will be taken from the book fund including the required reading texts and didactic courses from the intern year, books being utilized in the weekly conference activities, and the "General" question bank board prep questions from SANS. Non-educational materials and professional expenses are, in general, not appropriate for the use of the educational fund.

Lab Coats
The hospital will fund the purchase of up to 2 lab coats every other year. The hospital provides a cleaning service. Drop lab coats in the linen closet, basement level of HSC. The process for having the lab coat(s) purchased will be as follows:

1) Residents will email the program manager with the size of the lab coatneeded.
2) The program manager will place the order for the lab coat.
3) The program manager will notify the residents once their lab coat has arrived.

Licensure
Payment of licensure will be covered by the department.

Travel
The department will support the travel costs for residents, (provided all state travel regulations are followed) who are either invited to present a paper at a meeting or to teach a course. In addition, the department will support the travel costs to one national meeting in the Continental United States at which the resident is not presenting as an educational experience from professional development funds. The resident is encouraged to go to this meeting early in their academic career. For all program funded trips, the resident should make an appointment with the program coordinator to make travel arrangements at least 4 weeks prior to the date of travel.

Any other requests or deviations from the department's guidelines must go through the program director and department head for approval.

Table of Contents

Neuro Critical Care (PGY 1 Residents)

Rotation Directors: Matthew Smith, MD, Cara Sedney, MD

Evaluators: Matthew Smith, MD, Richard Vaglienti, MD, Kimberly Gyure, MD, Daniel Sizemore, MD

Description: This rotation is supervised by adult neurocritical care, neurology, pain, pathology, anesthesia, and neurosurgery faculty. Residents will be involved directly in the evaluation and care of patients with neurological illnesses and injuries in the ICUs. In addition, they will participate in outpatient neurology and pain clinics several afternoons a week.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication Skills	Professionalism	System-Based Practice
Develop a thorough neurological examination in patients with different abilities to cooperate	*	*		*	*	
Develop differential diagnoses and evaluation of common diseases in critical care including but not limited to: subarachnoid hemorrhage, intracranial hemorrhage, stroke, critical care weakness, and loss of consciousness.	*	*	*			
Develop knowledge required to recognize and respond appropriately to common neurologic emergencies such as stroke, seizure, and coma	*	*	*			
Develop skills to perform a consultation in the emergency room, or from another service which appropriately addresses the concerns of the consulting service and serves the patient well	*	*	*	*	*	*
Develop technical skills including lumbar puncture, vascular access, and intubation.	*	*	*	*		
Understand the common infectious diseases that affect the nervous system: meningitis, encephalitis, and brain abscess. Know the microbes and therapies. Know the diagnostic tests available to assist in making the diagnosis.	*	*	*			*
Develop skills to negotiate as an advocate for the patient, including with end-of-life care issues	*	*	*			*
Obtain a complete history utilizing information from patients and family	*	*		*	*	
Develop skills in presenting patients to more senior residents and faculty in a concise, thoughtful manner			*	*	*	
Assume responsibility for patients on a daily basis, recognizing and responding to changes in condition	*	*	*	*	*	
Provide transition of care, transmitting important information to members of the team in oral and electronic format	*	*	*	*	*	*

Develop skill with the PACS system to review common radiologic studies including but not limited to chest x-ray, CT head, MRI head.	*	*	*		*	
Develop understanding of the uses, limitations, and interpretation of commonly ordered ancillary and laboratory studies	*	*	*			
Develop approach to acute stroke intervention with appropriate and state-of-the-art treatments	*	*	*			*
Demonstrate a working knowledge of the NIH Stroke Scale, Glasgow Coma Score, Hunt Hess, modified Fisher, and other disease specific scales.	*	*	*			*
Develop a knowledge of the epilepsies, anticonvulsants, their usages and common side effects, and approach to status epilepticus including recognition, management and prognostic factors	*	*	*			*
Develop skill in utilizing computerized medical records			*	*	*	*
Maintain up-to-date medical records	*		*	*	*	*
Demonstrate patient-centered and culturally competent medical care, with ethical behavior, integrity, honesty, & compassion	*			*	*	
Develop the ability to be a part of a multidisciplinary team	*	*	*	*	*	*
Develop skills to translate basic science knowledge to care of patients	*	*	*			
Respect patient confidentiality				*	*	
Develop ability to critically evaluate medical literature		*	*			
Answer pages in a timely manner	*		*	*	*	
Attend scheduled conferences and participate in discussions		*	*	*	*	
Recognize limitations in knowledge & skills		*	*		*	
Review his/her professional conduct & remediate as appropriate in a self-directed fashion					*	
Be able to select, describe, and interpret selective nerve root blocks, epidural steroid injections, medial branch blocks, peripheral nerve blocks, and trigger point injections.	*	*				*
Name diagnoses treatable with neuromodulatory interventions for pain and describe appropriate selection.	*	*				
Provide appropriate pain counseling depending on planned intervention.		*		*	*	
Describe indications, risks, cost, and likely results for use of anticonvulsants, NSAIDS, antidepressants, and opioids specifically by agent.		*				*
Evaluate and medically manage general outpatient neurologic complaints including movement disorders, epilepsy, myopathy, stroke, and other common complaints.	*	*				*

Describe and select neuropsychiatric tests in clinical scenarios relevant to the neurosurgical patient.	*	*				

Key References:

1. *The Practice of Emergency and Critical Care Neurology*, by Eelco Wijdicks
2. *Handbook of Neurosurgery*, by Mark S. Greenberg
3. *Atlas of Image-Guided Spinal Procedures*, by Michael Bruce Furman

Table of Contents

Junior Resident, Blue Team (PGY 2 & 3 Residents)

Rotation Director: David Cohen, MD

Primary Evaluators: Charles Rosen, MD, PhD; Sanjay Bhatia, MBBS; David Cohen, MD; Christopher Cifarelli, MD, PhD

Description: This rotation is supervised by the primary neurosurgery faculty. Residents will be involved directly in the evaluation and care of general neurosurgery patients, with special emphasis on neurovascular, neurosurgical oncology, and skull base patients.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Prepare and Present the Blue Team Morbidity and Mortality Conference, with demonstration of appropriate understanding of the causes of the complications as well as relevant prevention strategies	*	*	*	*		*
Brain Tumor						
Perform a history and physical examination in patients with brain or spinal cord tumors	2					
Provide routine peri-operative care for patients with brain or spinal cord tumors	2					
Initiate the work-up of a patient with a brain or spinal cord tumor	2					
Recognize signs of and initiates work-up for neurological deterioration	2					
Explain risks and benefits of neurosurgical procedures for brain and spinal cord tumors	2					
Interpret diagnostic studies	2					
Assist with routine procedures (e.g., resection of non-eloquent glioma or metastasis, stereotactic biopsy)	2					
Assist with routine procedures (e.g., resection of non-eloquent glioma or metastasis, stereotactic biopsy)	2					
Recognize and initiate work-up of complications (e.g., hematoma, infection, seizure, hydrocephalus)	2					

Formulate a work-up and treatment plan for patients with brain, skull base, or spinal cord tumors	3					
Independently perform routine procedures	3					
Perform complex procedures with assistance (e.g., resection of eloquent glioma, ventricular or posterior fossa tumor)	3					
Manage complications with assistance	3					
Correlate neurological deficits with tumor location		2				
Correlate radiographic tumor location with ventricular, cranial nerve and vascular anatomy		2				
Describe the pathophysiology of mass lesions and obstructive hydrocephalus		2				
Describe acute symptomatic medical therapy for neoplastic mass lesions (e.g., steroids, ventricular drainage)		2				
Describe the use of radiation and chemotherapy for brain and spinal cord tumors		2				
List indications for biopsy or resection of brain and spinal cord tumors		2				
Categorize brain and spinal cord tumors by age, histology, and radiographic appearance		2				
Describe the non-neoplastic differential diagnosis of various mass lesions		2				
Describe the natural history of common intrinsic brain tumors		2				
Describe the genetics of brain tumors and genetic markers that impact prognosis		3				
Describe the use of advanced imaging in tumor evaluation and surgical planning (e.g., magnetic resonance [MR] tractography, functional imaging, spectroscopy)		3				
Describe the use of neuro-navigation and intra-operative imaging for brain tumor surgery		3				
Describe the role of skull-base surgical approaches in tumor resection, attendant complications, and their management		3				
Critical Care						
Perform a history and physical examination in critically-ill patients	2					
Order positioning, analgesics, sedation, neuromuscular blockade, intravenous (IV) fluids and nutrition in critically-ill patients	2					
Diagnose and formulate treatment plans for common pulmonary diseases	2					

Use electrocardiogram (EKG) to diagnose cardiac arrhythmia; initiates hemodynamic monitoring	2					
Perform a brain death examination	2					
Explain risks and benefits of ventilatory support	2					
Interpret diagnostic studies (e.g., chest x-ray [CXR], brain computed tomography [CT], echocardiogram)	2					
Manage intra-cranial hypertension (e.g., hyperosmolar agents, cerebral spinal fluid [CSF] drainage)	2					
Manage airway and performs endotracheal intubation	2					
Insert arterial and central venous catheters	2					
Diagnose and manage spinal or hypovolemic shock	2					
Formulate work-up and treatment plan for a comatose patient	2					
Manage refractory intra-cranial hypertension (e.g., blood pressure, cerebral perfusion pressure [CPP])	3					
Obtain confirmatory tests and make an accurate diagnosis of brain death	2					
Initiate management of pneumonia or systemic infection	2					
Independently formulate a treatment plan for complex patients (e.g., failure of cerebral autoregulation, multi-organ failure, non-recoverable central nervous system [CNS] injury)	3					
Diagnose and initiate management of adult respiratory distress syndrome	3					
Manage difficult and emergency airways	3					
Diagnose and manage CSF leak	3					
Initiate management of cardiac rhythm disturbances	2					
Describe intracranial pressure (ICP), CPP and cerebral blood flow (CBF) physiology		2				
Describe respiratory and ventilator physiology and effects on the CNS		2				
Describe the pathophysiology of myocardial infraction (MI) and congestive heart failure (CHF)		2				
Describe physiology of coagulation and hemostasis		2				
Describe principles of nutritional support		2				
List indications for ICP monitoring and hematoma evacuation		2				
Describe cerebral autoregulation		2				

Describe the pathophysiology and medical management of intra-cranial hypertension and cerebral edema		2				
Describe modes of mechanical ventilation and management of pulmonary shunting and dead space		2				
Describe prophylaxis for deep vein thrombosis (DVT)		2				
Describe the pathophysiology and treatment of diabetic ketoacidosis (DKA)		2				
Describe the etiology and imaging of traumatic intra-cranial hemorrhage and parenchymal injuries		2				
Describe indications for electroencephalography (EEG) monitoring		2				
Discuss indications for and risks of endotracheal intubation/ventilation		2				
Describe the pathophysiology and treatment of systemic critical illness (e.g., hypertension, coagulopathy, electrolyte imbalance, alcohol withdrawal)		2				
List indications and complications for decompressive craniectomy, CSF drainage, and barbiturate coma in traumatic brain injury (TBI)		3				
Describe expected outcomes after TBI and the impact of intra-cranial hypertension and of surgical intervention		3				
Understand trans-cranial Doppler (TCD) sonography and its role in monitoring		3				
Discuss the risks of CSF drainage, hyperosmolar therapy, and hyperventilation		2				
Describe methods to assess intra-vascular volume and tissue perfusion		2				
Spinal Neurosurgery						
Perform a history and physical examination in patients with spinal disorders	2					
Evaluate and treat a patient for medical comorbidities affecting elective spinal surgery	2					
Provide routine peri-operative care for spinal surgery patients	2					
Initiate the work-up of a patient with myelopathy or radiculopathy	2					
Safely position patients for spinal procedures	2					
Explain risks and benefits of surgical spine procedures	3					
Interpret diagnostic studies (e.g., imaging, EMG)	2					

Initiate management of a patient with acute spinal cord injury	2					
Perform cervical traction/reduction	2					
Assist with routine procedures (e.g., lumbar or cervical laminectomy, lumbar discectomy)	2					
Recognize and initiate work-up of complications (e.g., CSF leak, infection, radiculitis)	2					
Formulate a work-up and treatment plan for patients with lumbar or cervical degenerative disease	2					
Formulate a plan for surgical and adjunctive therapy of a patient with spinal column neoplastic disease	3					
Independently perform routine procedures	3					
Perform complex procedures with assistance (e.g., Anterior Cervical Discectomy and Fusion [ACDF], posterior lumbar fusion, spinal cord tumor resection, fracture stabilization)	3					
Manage complications with assistance	2					
Spinal: Degenerative Disease						
Describe vertebral and radicular anatomy by level		2				
Describe the physical findings and differential diagnosis of degenerative spinal disorders (e.g., radiculopathy, neurogenic claudication, spondylotic myelopathy)		2				
Describe basic principles of spinal biomechanics		2				
Describe medical and physical therapies for degenerative spinal disorders		2				
List surgical indications and options for degenerative spinal disorders		2				
Describe imaging findings in degenerative spinal disorders (e.g., x-ray, MRI, myelography)		2				
Describe the natural history of spinal degenerative disorders		2				
Describe EMG findings in spondylotic myeloradiculopathy		2				
Describe the pathophysiology of degenerative spondylotic myeloradiculopathy		3				
Describe and categorize degenerative spinal deformities by imaging (e.g., scoliosis, lumbar spondylolisthesis)		3				
Describe indications for anterior vs. posterior surgical approaches to the spine		3				
Describe the role of instrumentation and bony fusion in surgery for degenerative spinal disorders		3				
List indications for vertebroplasty and kyphoplasty		2				

Spinal: Trauma, Tumor, Infection						
Describe spinal cord and cauda equina anatomy		2				
Describe dermatomal sensory and motor levels and patterns of spinal cord injury		2				
Define spinal stability and instability		2				
Describe the pathophysiology of spine and spinal cord injuries		2				
Describe the medical treatment of spinal infections		2				
Describe the use and types of external bracing in spinal trauma, tumor, or infection		2				
Classify spinal fractures by mechanism and imaging appearance		2				
List surgical indications, contra-indications, and options for spinal trauma, tumor, and infection		3				
Describe the natural history of primary spinal tumors		3				
Describe the pathophysiology and imaging findings of spinal tumors (e.g., intradural tumor, vertebral metastasis)		3				
Describe the pathophysiology and imaging findings in spinal infection (e.g., discitis, epidural abscess, tuberculosis, osteomyelitis)		3				
Describe the role of instrumentation and bony fusion in surgery for spinal trauma, tumor, or infection		3				
Vascular Neurosurgery						
Perform a history and physical examination in patients with ischemic or hemorrhagic stroke	2					
Provide routine peri-operative care for patients undergoing extracranial and intracranial vascular surgery	2					
Initiate the work-up of a patient with ischemic or hemorrhagic stroke	2					
Explain risks and benefits of diagnostic catheter angiography	2					
Explain risks and benefits of surgery and endovascular therapy for aneurysms, vascular malformations, and ischemic stroke	3					
Interpret CT, MR, and angiographic studies	3					
Assist with routine components of procedures (e.g., pterional craniotomy, diagnostic catheter angiography)	2					

Recognize and initiate work-up of complications after surgery or endovascular therapy (e.g., hemorrhage, ischemic stroke, cardiovascular compromise	2					
Formulate a work-up and treatment plan for patients with aneurysms, vascular malformations, or ischemic stroke	3					
Independently perform routine components of procedures	3					
Perform complex procedures with assistance (e.g., carotid endarterectomy, aneurysm clipping, arteriovenous malformation resection)	3					
Manage complications with assistance	2					
Describe intracranial and extracranial vascular anatomy, including vascular territories		2				
Describe mechanisms of cerebral autoregulation		2				
Describe clinical presentations and imaging characteristics of ischemic and hemorrhagic stroke		2				
Describe clinical presentations and imaging characteristics of ischemic and hemorrhagic stroke		2				
Describe the embryology and anatomy of vascular lesions (e.g., aneurysms and vascular malformations)		2				
Describe the pathophysiology of intracranial and extracranial atherosclerotic disease		2				
List indications for intravenous thrombolytic therapy in ischemic stroke		2				
List indications for carotid endarterectomy and carotid angioplasty/stent		2				
Describe the natural history of aneurysms and vascular malformations		2				
List indications for surgical and endovascular treatment of aneurysms and vascular malformations		3				
Describe the clinical and imaging characteristics of delayed cerebral ischemia after subarachnoid hemorrhage		2				
Describe imaging findings in common cerebrovascular conditions		2				
Describe the pathophysiology of ischemic stroke (e.g., necrotic and apoptotic cell death)		2				
Describe methods for evaluating cerebral perfusion and blood flow		3				
List indications for surgical and endovascular treatment of complex aneurysms and vascular malformations		3				

Describe the imaging and angiographic characteristics of cerebral vasculopathies (e.g., atherosclerotic disease, dissection, vasculitis)		2				
Describe expected outcomes after surgery or endovascular therapy for intracranial and extracranial vascular disease		3				
Describe the indications for medical vs. endovascular treatment of intracranial arterial stenosis		3				
Describe the molecular mechanisms of ischemic protection strategies		3				
Describe the genetics and inheritance of familial cavernous malformations and hereditary hemorrhagic telangiectasia		3				
Traumatic Brain Injury						
Perform a history and physical examination of a comatose patient and assign Glasgow Coma Scale (GCS) score	2					
Evaluate a polytrauma patient and assign Injury Severity Score	2					
Provide initial management of a polytrauma patient	2					
Provide routine peri-operative care for patients with TBI	2					
Detect an altered neurological examination	2					
Place an ICP monitor and external ventricular drain	2					
Explain risks and benefits of neurosurgical procedures for TBI	2					
Interpret diagnostic imaging for a neurotrauma patient	2					
Organize emergency surgical team; position for craniotomy with cervical precautions	2					
Assist with routine procedures (e.g., burr hole, craniotomy for hematoma or penetrating injury)	2					
Recognize and initiate work-up of complications (e.g., hematoma, seizure, sepsis, monitor drift)	2					
Formulate an interdisciplinary treatment plan for patients with polytrauma	3					
Select patients for operative intervention	3					
Independently perform routine procedures	3					
Perform complex procedures with assistance (e.g., repair of vascular injury or CSF fistula, posterior fossa hematoma)	3					
Manage complications with assistance	3					
Manage ventricular drain	2					

Economics						
Identify the range of practice variation (e.g., medication, laboratory tests, imaging, and procedures)						2
Describe U.S. health payment systems						2
Describe the cost impact of practice variation in the context of system and national health resource utilization						3
Describe principles of ethical coding (e.g., diagnostic, E&M, and procedural)						3
Use health care resources responsibly (e.g., test ordering, OR efficiency, timely discharges/transfers)						3
Accurately code diagnoses and procedures in the ACGME Case Log System						3
Safety and Systems						
Define medical errors, near misses, and sentinel events; provides system-based examples of each						2
Assist care coordinator with discharge and outpatient services arrangements						2
Work in interdisciplinary teams to enhance safety and quality						2
Use protocols and checklists for patient hand-offs, medication orders, and emergencies						2
Effect inter-facility transfer, including records and physician communication						2
Report problematic behaviors, processes, and devices, including errors and near misses						3
Coordinate interdisciplinary inpatient care						3
Lifelong Learning						
Identify limitations in knowledge, skills, and experience; incorporate feedback			2			
Demonstrate information technology skills for evidence gathering			2			
Set learning and improvement goals; Identify resources, and perform appropriate learning activities			2			
Participate in informal patient, medical student, and resident teaching			2			
Utilize data for practice improvement (e.g., systematic reviews, meta-analyses, practice guidelines, clinical outcomes data)			3			
Teach colleagues and other health professionals in both formal and informal settings			3			

Research						
Describe basic concepts in clinical epidemiology, biostatistics, and clinical reasoning			2			
Describe the design and use of clinical registry outcomes data in practice improvement			2			
Categorize research study designs; evaluates quality and relevance			3			
Contribute to the peer-reviewed neurological surgery literature			3			
Incorporate evidence into routine clinical care decisions			3			
Compassion						
Demonstrate honest and caring patient interactions; respect privacy and autonomy					2	
Describe basic bioethical principles					2	
Form effective therapeutic bond with patients; receives praise from patients and families					2	
Identify and manage common ethical challenges during patient care					2	
Mitigate impact of cultural, ethnic, or socioeconomic differences on patient care outcomes					3	
Respond to patient needs that supersede self-interest					2	
Accountability						
Is punctual for conferences, rounds, pages, and operating room (OR)					2	
Manage fatigue and sleep deprivation					2	
Report duty hours in a timely and accurate manner					2	
Present appropriate attire and respectful demeanor					2	
Seek patient information with reliability, industry, and confidentiality					2	
Recognize individual limits in clinical situations and ask for assistance when needed					2	
Manage personal emotional, physical, and mental health					2	
Seek and accept professional criticism					2	
Demonstrate personal ownership of complications and patient outcomes					2	
Act as effective team leader for physicians and other health care personnel					2	
Lead accurate and effective discussions at morbidity and mortality conference					2	

Assume leadership responsibility for clinical care team decisions and outcomes					3	
Mediate conflict amongst members of the health care team					3	
Mediate conflict amongst members of the health care team					3	
Relational						
Describe the ethical principles of informed consent				2		
Describe methods to compassionately break bad news				2		
Identify elements of safe patient hand-offs and procedural pause				2		
Prioritize and convey simultaneous critical clinical events				2		
Obtain and document informed consent				2		
Participate in breaking bad news to a patient or family				2		
Participate in an advanced directive discussion				2		
Lead procedural pause				2		
Use checklists and informatics to support patient hand-offs				2		
Communicate effectively with patients and families from varied cultural and socioeconomic backgrounds				2		
Prioritize, convey, and manage simultaneous critical clinical events				2		
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				3		
Break bad news to a patient or family member				3		
Lead and document an advanced directive discussion				3		
Communicate effectively with physicians, health professionals, and health agencies				2		
Technology						
Use Electronic Medical Record (EMR) and radiology access systems for timely reporting of clinical information				2		
Create accurate patient orders and demonstrate use of EMR dosing and drug interaction safety mechanisms				2		
Complete timely and accurate operative notes and ACGME Case Log entries				2		

List the elements necessary for evaluation and management (E&M) coding at each encounter type/level				3		
Utilize Health Insurance Portability and Accountability Act (HIPAA) protection safeguards for Protected Health Information (PHI) and EMR				2		
Design and implement an EMR template				3		

Key References:

Table of Contents

Junior Resident, Gold Team (PGY 2 & 3 Residents)

Rotation Director: Cara Sedney, MD

Primary Evaluators: Joseph Voelker, MD; Cara Sedney, MD; Robert Marsh, MD, PhD; Cesar Augusto Serrano, MD

Description: This rotation is supervised by the primary neurosurgery faculty. Residents will be involved directly in the evaluation and care of general neurosurgery patients, with special emphasis on functional, epilepsy, peripheral nerve, pediatric, and spinal surgery and deformity.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Prepare and Present the Blue Team Morbidity and Mortality Conference, with demonstration of appropriate understanding of the causes of the complications as well as relevant prevention strategies	*	*	*	*		*
Critical Care						
Perform a history and physical examination in critically-ill patients	2					
Order positioning, analgesics, sedation, neuromuscular blockade, intravenous (IV) fluids and nutrition in critically-ill patients	2					
Diagnose and formulate treatment plans for common pulmonary diseases	2					
Use electrocardiogram (EKG) to diagnose cardiac arrhythmia; initiates hemodynamic monitoring	2					
Perform a brain death examination	2					
Explain risks and benefits of ventilatory support	2					
Interpret diagnostic studies (e.g., chest x-ray [CXR], brain computed tomography [CT], echocardiogram)	2					

Manage intra-cranial hypertension (e.g., hyperosmolar agents, cerebral spinal fluid [CSF] drainage)	2					
Manage airway and performs endotracheal intubation	2					
Insert arterial and central venous catheters	2					
Diagnose and manage spinal or hypovolemic shock	2					
Formulate work-up and treatment plan for a comatose patient	2					
Manage refractory intra-cranial hypertension (e.g., blood pressure, cerebral perfusion pressure [CPP])	3					
Obtain confirmatory tests and make an accurate diagnosis of brain death	2					
Initiate management of pneumonia or systemic infection	2					
Independently formulate a treatment plan for complex patients (e.g., failure of cerebral autoregulation, multi-organ failure, non-recoverable central nervous system [CNS] injury)	3					
Diagnose and initiate management of adult respiratory distress syndrome	3					
Manage difficult and emergency airways	3					
Diagnose and manage CSF leak	3					
Initiate management of cardiac rhythm disturbances	2					
Describe intracranial pressure (ICP), CPP and cerebral blood flow (CBF) physiology		2				
Describe respiratory and ventilator physiology and effects on the CNS		2				
Describe the pathophysiology of myocardial infraction (MI) and congestive heart failure (CHF)		2				
Describe physiology of coagulation and hemostasis		2				
Describe principles of nutritional support		2				
List indications for ICP monitoring and hematoma evacuation		2				
Describe cerebral autoregulation		2				
Describe the pathophysiology and medical management of intra-cranial hypertension and cerebral edema		2				

Describe modes of mechanical ventilation and management of pulmonary shunting and dead space		2				
Describe prophylaxis for deep vein thrombosis (DVT)		2				
Describe the pathophysiology and treatment of diabetic ketoacidosis (DKA)		2				
Describe the etiology and imaging of traumatic intra-cranial hemorrhage and parenchymal injuries		2				
Describe indications for electroencephalography (EEG) monitoring		2				
Discuss indications for and risks of endotracheal intubation/ventilation		2				
Describe the pathophysiology and treatment of systemic critical illness (e.g., hypertension, coagulopathy, electrolyte imbalance, alcohol withdrawal)		2				
List indications and complications for decompressive craniectomy, CSF drainage, and barbiturate coma in traumatic brain injury (TBI)		3				
Describe expected outcomes after TBI and the impact of intra-cranial hypertension and of surgical intervention		3				
Understand trans-cranial Doppler (TCD) sonography and its role in monitoring		3				
Discuss the risks of CSF drainage, hyperosmolar therapy, and hyperventilation		2				
Describe methods to assess intra-vascular volume and tissue perfusion		2				
Epilepsy & Movement Disorders						
Perform a history and physical examination in patients with epilepsy or movement disorders	2					
Evaluate and treat a patient for medical comorbidities affecting functional neurological surgery	2					
Provide routine peri-operative care for functional neurosurgical patients	2					
Initiate the work-up of a patient with an apparent seizure	2					
Recognize and initiate treatment of status epilepticus	2					

Explain risks and benefits of neurosurgical procedures for epilepsy and movement disorders	3					
Interpret diagnostic studies	3					
Assist with routine components of functional procedures (e.g., burr hole, craniotomy, generator change)	2					
Recognize and initiate work-up of complications (e.g., hematoma, seizure, infection, device malfunction)	2					
Place stereotactic head-frame	2					
Formulate a work-up and treatment plan for patients with epilepsy or a movement disorder (e.g., Parkinson disease, essential tremor)	3					
Independently perform routine functional procedures (e.g., deep brain simulation [DBS] placement, subdural electrode placement, topectomy)	3					
Perform complex functional procedures with assistance (e.g., temporal lobectomy)	3					
Manage complications with assistance	2					
Perform stereotactic targeting using frameless and frame-based systems	2					
Describe the embryology and functional anatomy of the basal ganglia, thalamus, and cortex		2				
Describe the physical findings and differential diagnosis of common movement disorders		2				
Describe the semiology and pathophysiology of common seizure disorders		2				
Describe medical therapy for status epilepticus		2				
Describe medical therapies for epilepsy and movement disorders		2				
List surgical indications for patients with epilepsy or movement disorders		2				
Describe imaging findings in common epilepsies and movement disorders (e.g., magnetic resonance imaging [MRI], Single Proton Emission Computerized Tomography [SPECT], and position emission tomography [PET])		3				
Describe the principle of arc-centered stereotaxy		2				
Describe sources of inaccuracy in stereotaxy (e.g., brain shift, human error)		2				
Describe the pathophysiology, including genetics, of the common movement disorders		3				
Describe the pathophysiology and pathoanatomy of common epilepsies		3				

Identify on MRI the structures targeted for movement disorder surgery		3				
Describe the use of surface and invasive EEG in seizure focus localization		3				
Identify common patterns of EEG abnormality		3				
Describe expected outcomes after surgery for epilepsy and movement disorders		3				
Describe responses to electrical stimulation around intended DBS targets and in various regions of eloquent cortex		3				

Pain & Peripheral Nerves						
Perform a history and physical examination in patients with chronic pain or peripheral nerve disorders	2					
Provide routine peri-operative care for patients with chronic pain or peripheral nerve disorders	2					
Initiate the work up of a patient with a peripheral nerve injury	2					
Recognize and initiate treatment of baclofen withdrawal or morphine overdose	2					
Explain risks and benefits of neurosurgical procedures for pain and peripheral nerve disorders	3					
Interpret diagnostic studies	3					
Assist with routine procedures (e.g., carpal tunnel release, spinal cord stimulation, intrathecal pump)	2					
Recognize and initiate work-up of complications (e.g., hematoma, infection, device malfunction)	2					
Formulate a work-up and treatment plan for patients with chronic pain or peripheral nerve disorders (e.g., trigeminal neuralgia, carpal tunnel syndrome)	3					
Independently perform routine procedures	3					
Perform complex procedures with assistance (e.g., dorsal root entry zone [DREZ] lesions, cordotomy, neuroma in continuity, brachial plexus repair, nerve graft, nerve transfer)	3					
Manage complications with assistance	2					
Describe the anatomy of spinal cord and thalamic pathways for pain and pain modulation		2				
Describe the anatomy of the brachial and lumbar plexi and major nerves of the extremities		2				
Describe nerve injury classifications and the prognosis and time course for recovery of each		2				
List medical therapies for chronic pain (e.g., trigeminal neuralgia, brachial plexus neuritis)		2				
Describe the anatomy and physical findings of common upper extremity entrapment neuropathies		2				
Describe the clinical findings and differential diagnosis of trigeminal neuralgia		2				
List surgical indications for patients with chronic pain or peripheral nerve disorders		2				

Describe the pathophysiology of chronic pain disorders		2				
Describe non-operative therapies for nerve entrapment disorders		2				
Describe the anatomy and physical findings of common lower extremity entrapment neuropathies		2				
Describe the findings of electromyography (EMG) and nerve conduction studies in peripheral nerve disorders		2				
Obtain and interpret diagnostic studies for chronic pain and peripheral nerve disorder patients		3				
Describe expected outcomes after surgery for chronic pain (e.g., microvascular decompression [MVD], DREZ lesions, cordotomy)		3				
Describe expected outcomes after surgery for peripheral nerve disorders (e.g., neurolysis, direct anastomosis, grafting)		3				
Describe the anatomy and physiology of spinal cord lesioning for pain (myelotomy, cordotomy)		3				
Pediatric						
Perform an age-appropriate history and physical examination with developmental assessment	2					
Provide routine peri-operative care for pediatric neurosurgical patients	2					
Program shunt valves and tap shunts	2					
Evaluate CSF shunt function	2					
Recognize and initiate notification and evaluation of non-accidental trauma	2					
Explain risks and benefits of neurosurgical procedures to parents and older children	2					
Interpret diagnostic studies with accurate identification of age-related variations	2					
Assist with routine procedures (e.g., CSF shunt, baclofen pump, Chiari decompression)	2					
Recognize in pre-verbal children, and initiates work-up of, complications (e.g., hematoma, infection, device malfunction, acute mental status decline)	2					
Formulate a work-up and treatment plan for pediatric patients (e.g., hydrocephalus, synostosis, tethered cord, birth injury)	2					
Independently perform routine procedures	3					

Perform complex procedures with assistance (e.g., brain tumor, synostosis repair, tethered cord, ventricular endoscopy, indirect vascular bypass, craniotomy for epilepsy)	3					
Manage complications with assistance	2					
Diagnose brain death in infants/children	2					
Describe the embryology of common CNS congenital anomalies		2				
Describe normal CSF physiology		2				
Describe the response of the developing brain to injury		2				
Describe developmental changes in cardio-pulmonary function and vital signs		2				
Describe proper utilization and dosing of narcotics in children		2				
Calculate circulating blood volume in infants and children		2				
Describe abnormal CSF physiology and anatomy in various forms of hydrocephalus		3				
Describe the radiological and clinical features of CNS tumors in children of various ages		3				
Describe the radiological and clinical features of hydrocephalus, benign macrocephaly, and subdural hygroma		3				
Describe the physical findings and mechanisms of head shape abnormalities		3				
Describe the natural history of congenital CNS anomalies		3				
Describe the implications of spinal column development for patterns of injury and treatment choice in children		3				
Spinal Neurosurgery						
Perform a history and physical examination in patients with spinal disorders	2					
Evaluate and treat a patient for medical comorbidities affecting elective spinal surgery	2					
Provide routine peri-operative care for spinal surgery patients	2					
Initiate the work-up of a patient with myelopathy or radiculopathy	2					
Safely position patients for spinal procedures	2					
Explain risks and benefits of surgical spine procedures	3					

Interpret diagnostic studies (e.g., imaging, EMG)	2					
Initiate management of a patient with acute spinal cord injury	2					
Perform cervical traction/reduction	2					
Assist with routine procedures (e.g., lumbar or cervical laminectomy, lumbar discectomy)	2					
Recognize and initiate work-up of complications (e.g., CSF leak, infection, radiculitis)	2					
Formulate a work-up and treatment plan for patients with lumbar or cervical degenerative disease	2					
Formulate a plan for surgical and adjunctive therapy of a patient with spinal column neoplastic disease	3					
Independently perform routine procedures	3					
Perform complex procedures with assistance (e.g., Anterior Cervical Discectomy and Fusion [ACDF], posterior lumbar fusion, spinal cord tumor resection, fracture stabilization)	3					
Manage complications with assistance	2					
Spinal; Degenerative Disease						
Describe vertebral and radicular anatomy by level		2				
Describe the physical findings and differential diagnosis of degenerative spinal disorders (e.g., radiculopathy, neurogenic claudication, spondylotic myelopathy)		2				
Describe basic principles of spinal biomechanics		2				
Describe medical and physical therapies for degenerative spinal disorders		2				
List surgical indications and options for degenerative spinal disorders		2				
Describe imaging findings in degenerative spinal disorders (e.g., x-ray, MRI, myelography)		2				
Describe the natural history of spinal degenerative disorders		2				
Describe EMG findings in spondylotic myeloradiculopathy		2				
Describe the pathophysiology of degenerative spondylotic myeloradiculopathy		3				

Describe and categorize degenerative spinal deformities by imaging (e.g., scoliosis, lumbar spondylolisthesis)		3				
Describe indications for anterior vs. posterior surgical approaches to the spine		3				
Describe the role of instrumentation and bony fusion in surgery for degenerative spinal disorders		3				
List indications for vertebroplasty and kyphoplasty		2				
Spinal; Trauma, Tumor, Infection						
Describe spinal cord and cauda equina anatomy		2				
Describe dermatomal sensory and motor levels and patterns of spinal cord injury		2				
Define spinal stability and instability		2				
Describe the pathophysiology of spine and spinal cord injuries		2				
Describe the medical treatment of spinal infections		2				
Describe the use and types of external bracing in spinal trauma, tumor, or infection		2				
Classify spinal fractures by mechanism and imaging appearance		2				
List surgical indications, contra-indications, and options for spinal trauma, tumor, and infection		3				
Describe the natural history of primary spinal tumors		3				
Describe the pathophysiology and imaging findings of spinal tumors (e.g., intradural tumor, vertebral metastasis)		3				
Describe the pathophysiology and imaging findings in spinal infection (e.g., discitis, epidural abscess, tuberculosis, osteomyelitis)		3				
Describe the role of instrumentation and bony fusion in surgery for spinal trauma, tumor, or infection		3				

Traumatic Brain Injury						
Perform a history and physical examination of a comatose patient and assign Glasgow Coma Scale (GCS) score	2					
Evaluate a polytrauma patient and assign Injury Severity Score	2					
Provide initial management of a polytrauma patient	2					
Provide routine peri-operative care for patients with TBI	2					
Detect an altered neurological examination	2					
Place an ICP monitor and external ventricular drain	2					
Explain risks and benefits of neurosurgical procedures for TBI	2					
Interpret diagnostic imaging for a neurotrauma patient	2					
Organize emergency surgical team; position for craniotomy with cervical precautions	2					
Assist with routine procedures (e.g., burr hole, craniotomy for hematoma or penetrating injury)	2					
Recognizes and initiate work-up of complications (e.g., hematoma, seizure, sepsis, monitor drift)	2					
Formulate an interdisciplinary treatment plan for patients with polytrauma	3					
Select patients for operative intervention	3					
Independently perform routine procedures	3					
Perform complex procedures with assistance (e.g., repair of vascular injury or CSF fistula, posterior fossa hematoma)	3					
Manage complications with assistance	3					
Manage ventricular drain	2					
Economics						
Identify the range of practice variation (e.g., medication, laboratory tests, imaging, and procedures)						2
Describe U.S. health payment systems						2
Describe the cost impact of practice variation in the context of system and national health resource utilization						3

Describe principles of ethical coding (e.g., diagnostic, E&M, and procedural)						3
Use health care resources responsibly (e.g., test ordering, OR efficiency, timely discharges/transfers)						3
Accurately code diagnoses and procedures in the ACGME Case Log System						3
Safety and Systems						
Define medical errors, near misses, and sentinel events; provides system-based examples of each						2
Assist care coordinator with discharge and outpatient services arrangements						2
Work in interdisciplinary teams to enhance safety and quality						2
Use protocols and checklists for patient hand-offs, medication orders, and emergencies						2
Effect inter-facility transfer, including records and physician communication						2
Report problematic behaviors, processes, and devices, including errors and near misses						3
Coordinate interdisciplinary inpatient care						3
Lifelong Learning						
Identify limitations in knowledge, skills, and experience; incorporate feedback			2			
Demonstrate information technology skills for evidence gathering			2			
Set learning and improvement goals; identify resources, and perform appropriate learning activities			2			
Participate in informal patient, medical student, and resident teaching			2			
Utilize data for practice improvement (e.g., systematic reviews, meta-analyses, practice guidelines, clinical outcomes data)			3			
Teach colleagues and other health professionals in both formal and informal settings			3			
Research						
Describe basic concepts in clinical epidemiology, biostatistics, and clinical reasoning			2			

Describe the design and use of clinical registry outcomes data in practice improvement			2			
Categorize research study designs; evaluates quality and relevance			3			
Contribute to the peer-reviewed neurological surgery literature			3			
Incorporate evidence into routine clinical care decisions			3			
Compassion						
Demonstrate honest and caring patient interactions; respect privacy and autonomy					2	
Describe basic bioethical principles					2	
Form effective therapeutic bond with patients; receives praise from patients and families					2	
Identify and manage common ethical challenges during patient care					2	
Mitigate impact of cultural, ethnic, or socioeconomic differences on patient care outcomes					3	
Respond to patient needs that supersede self-interest					2	
Accountability						
Is punctual for conferences, rounds, pages, and operating room (OR)					2	
Manage fatigue and sleep deprivation					2	
Report duty hours in a timely and accurate manner					2	
Present appropriate attire and respectful demeanor					2	
Seek patient information with reliability, industry, and confidentiality					2	
Recognize individual limits in clinical situations and ask for assistance when needed					2	
Manage personal emotional, physical, and mental health					2	
Seek and accept professional criticism					2	
Demonstrate personal ownership of complications and patient outcomes					2	
Act as effective team leader for physicians and other health care personnel					2	

Lead accurate and effective discussions at morbidity and mortality conference					2	
Assume leadership responsibility for clinical care team decisions and outcomes					3	
Mediate conflict amongst members of the health care team					3	
Mediate conflict amongst members of the health care team					3	
Relational						
Describe the ethical principles of informed consent				2		
Describe methods to compassionately break bad news				2		
Identify elements of safe patient hand-offs and procedural pause				2		
Prioritize and convey simultaneous critical clinical events				2		
Obtain and document informed consent				2		
Participate in breaking bad news to a patient or family				2		
Participate in an advanced directive discussion				2		
Lead procedural pause				2		
Use checklists and informatics to support patient hand-offs				2		
Communicate effectively with patients and families from varied cultural and socioeconomic backgrounds				2		
Prioritize, convey, and manage simultaneous critical clinical events				2		
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				3		
Break bad news to a patient or family member				3		
Lead and document an advanced directive discussion				3		
Communicate effectively with physicians, health professionals, and health agencies				2		
Technology						
Use Electronic Medical Record (EMR) and radiology access systems for timely reporting of clinical information				2		

Create accurate patient orders and demonstrate use of EMR dosing and drug interaction safety mechanisms				2		
Complete timely and accurate operative notes and ACGME Case Log entries				2		
List the elements necessary for evaluation and management (E&M) coding at each encounter type/level				3		
Utilize Health Insurance Portability and Accountability Act (HIPAA) protection safeguards for Protected Health Information (PHI) and EMR				2		
Design and implement an EMR template				3		

Key References:

Table of Contents

Academic Rotation (PGY 4 Resident)

Rotation Director: Cara Sedney, MD

Primary Evaluators: Joseph Voelker, MD; Cara Sedney, MD; Robert Marsh, MD PhD; Charles Rosen, MD, PhD; Sanjay Bhatia, MBBS

Description: This rotation is supervised by the primary neurosurgery faculty of the Clinical Competency Committee. Residents will be involved directly in the evaluation and care of general neurosurgery patients by continuing to participate in the regular call rotation. They will continue to participate in all core curricular activities and didactic experiences. They will not, however, have clinical service assignment for this rotation. The research or academic goals will be designed by the resident and approved in writing by the program director no later than 6 months prior to beginning the academic block. It is expected that the productivity of this time should at the minimum result in 2 first author, peer-reviewed papers in national or international journals.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication Skills	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Economics						
Cite peer-reviewed cost and outcomes data to support resource utilization decisions						*
Safety and Systems						
Conduct root cause or failure mode analysis of systems-based errors and effect prophylaxis						*
Coordinate team for interdisciplinary procedure						*
Establish timeline and Identify resources for transition to practice						*
Improve care systems to achieve optimal patient care						*
Work effectively in various health care delivery settings and systems						*
Lifelong Learning						
Participate in evidence-based practice improvement			*			

Organize educational activities at the program level			*			
Research						
Contribute systematic clinical or scientific information to the peer-reviewed literature			*			
Participate in clinical outcomes data gathering and analysis			*			
Formulate question or hypothesis, design investigation, execute project, and report results			*			
Utilize morbidity and mortality and program-level outcome data to institute systematic clinical practice changes			*			
Compassion						
Identify and manage complex ethical challenges during patient care					*	
Act as a mentor and role model to other residents					*	
Accountability						
Assume leadership responsibility for clinical care team decisions and outcomes					*	
Mediate conflict amongst members of the health care team					*	
Mediate conflict amongst members of the health care team					*	
Relational						
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				*		
Break bad news to a patient or family member				*		
Lead and document an advanced directive discussion				*		
Supervise patient hand-offs				*		
Quantify evidence for risk-benefit analysis during informed consent for a complex, elective neurosurgical procedure				*		
Manage and document an unexpected outcome (e.g., patient, care team and risk management communication)				*		

Lead response to an intra-operative or critical care emergency				*		
Act in a consultative role to other physicians				*		

Technology						
Create or update a neurosurgical care pathway and order set; implements use				*		

Key References:

Table of Contents

Pediatric Neurosurgery (PGY 5 Resident)

Rotation Director: Cesar Augusto Serrano, MD

Primary Evaluator: Cesar Augusto Serrano, MD

Description: In this rotation, the resident works directly with Dr. Serrano as the Senior Resident on an independent Pediatric Neurosurgery Service. The resident will attend all Pediatric Neurosurgery Clinics and scrub all pediatric neurosurgery operative cases. In this way they will experience an intense, focused pediatric neurosurgical practice, and understand the longitudinal care of pediatric patients across inpatient and outpatient settings. Note that the Pediatric service will be independent in this fashion for half of each academic year. When the Pediatric service is not complete, the service will be folded into the Gold Service along with functional neurosurgery and spine surgery.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication Skills	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Oversee the preparation of the Blue Team Morbidity and Mortality Conference, with demonstration of appropriate understanding of the causes of the complications as well as relevant prevention strategies, suggest appropriate care modifications to prevent such complications.	*	*	*	*		*
Independently formulate a treatment plan for patients with comorbidities or other complicating factors (e.g., other organ system congenital anomalies)	*					
Independently perform complex procedures	*					
Adapt standard treatment plans to special circumstances (e.g., previous surgery, developmental delay, coagulopathy)	*					
Independently manage complications	*					
Describe the impact of refractory epilepsy and spastic cerebral palsy on development and function		*				
Describe treatment strategies for CNS tumors in children		*				
Identify methods to limit radiation exposure in children during imaging		*				

Describe the effects of surgical diversion on CSF physiology		*				
Describe the risks, screening, incidence, and management of late effects from chemotherapy and radiation for childhood CNS tumors		*				
Describe the natural history of cranial synostosis and tethered cord with or without surgical intervention		*				
Describe expected medical and functional long-term outcomes in patients with myelomeningocele		*				
Economics						
Cite peer-reviewed cost and outcomes data to support resource utilization decisions						*
Safety and Systems						
Conduct root cause or failure mode analysis of systems-based errors and effect prophylaxis						*
Coordinate team for interdisciplinary procedure						*
Establish timeline and Identifies resources for transition to practice						*
Improve care systems to achieve optimal patient care						*
Work effectively in various health care delivery settings and systems						*
Lifelong Learning						
Participate in evidence-based practice improvement			*			
Organize educational activities at the program level			*			
Research						
Contribute systematic clinical or scientific information to the peer-reviewed literature			*			
Participate in clinical outcomes data gathering and analysis			*			
Formulate question or hypothesis, design investigation, execute project, and report results			*			
Utilize morbidity and mortality and program-level outcome data to institute systematic clinical practice changes			*			
Compassion						
Identify and manage complex ethical challenges during patient care					*	
Act as a mentor and role model to other residents					*	

Accountability						
Assume leadership responsibility for clinical care team decisions and outcomes					*	
Mediate conflict amongst members of the health care team					*	
Mediate conflict amongst members of the health care team					*	
Relational						
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				*		
Break bad news to a patient or family member				*		
Lead and document an advanced directive discussion				*		
Supervise patient hand-offs				*		
Quantify evidence for risk-benefit analysis during informed consent for a complex, elective neurosurgical procedure				*		
Manage and document an unexpected outcome (e.g., patient, care team and risk management communication)				*		
Lead response to an intra-operative or critical care emergency				*		
Act in a consultative role to other physicians				*		
Technology						
Create or update a neurosurgical care pathway and order set; implements use				*		

Key References:

Table of Contents

Elective Rotation (PGY 5 Resident)

Rotation Director: Joseph Voelker, MD

Primary Evaluators: Joseph Voelker, MD; Cara Sedney, MD; Charles Rosen, MD, PhD; Sanjay Bhatia, MBBS

Description: This rotation is supervised by the primary neurosurgery faculty of the Clinical Competency Committee. Residents will be involved directly in the evaluation and care of general neurosurgery patients by continuing to participate in the regular call rotation. They will continue to participate in all core curricular activities and didactic experiences. The service assignments for this 6 month block, however, will be designed by the resident and approved in writing by the program director in advance of beginning the training block. All experiences must occur in ACGME approved portions of the residency training program, but this block is intended to allow the resident to spend additional time in an area that is included in the training program, but perhaps not in great enough time blocks to allow a level of specialization they desire. Examples of a focus area could include, but are not limited to, functional neurosurgery, endovascular surgery, the epilepsy unit, pain intervention, pediatrics, brain mapping for tumor resection, or other areas for deeper focus beyond the routine requirements. It is expected that this experience should be planned with the program director to be complementary with, and build upon, the academic block recently completed in the PGY-4 year.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication Skills	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Economics						
Cite peer-reviewed cost and outcomes data to support resource utilization decisions						*
Safety and Systems						
Conduct root cause or failure mode analysis of systems-based errors and effect prophylaxis						*
Coordinate team for interdisciplinary procedure						*
Establish timeline and Identify resources for transition to practice						*
Improve care systems to achieve optimal patient care						*
Work effectively in various health care delivery settings and systems						*

Lifelong Learning						
Participate in evidence-based practice improvement			*			
Organize educational activities at the program level			*			
Research						
Contribute systematic clinical or scientific information to the peer-reviewed literature			*			
Participate in clinical outcomes data gathering and analysis			*			
Formulate question or hypothesis, design investigation, execute project, and report results			*			
Utilize morbidity and mortality and program-level outcome data to institute systematic clinical practice changes			*			
Compassion						
Identify and manage complex ethical challenges during patient care					*	
Act as a mentor and role model to other residents					*	
Accountability						
Assume leadership responsibility for clinical care team decisions and outcomes					*	
Mediate conflict amongst members of the health care team					*	
Mediate conflict amongst members of the health care team					*	
Relational						
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				*		
Break bad news to a patient or family member				*		
Lead and document an advanced directive discussion				*		
Supervise patient hand-offs				*		
Quantify evidence for risk-benefit analysis during informed consent for a complex, elective neurosurgical procedure				*		
Manage and document an unexpected outcome (e.g., patient, care team and risk management communication)				*		

Lead response to an intra-operative or critical care emergency				*		
Act in a consultative role to other physicians				*		
Technology						
Create or update a neurosurgical care pathway and order set; implements use				*		

Key References:

Table of Contents

Senior Resident, Blue Team (PGY 4 & 5 Residents)

Rotation Director: David Cohen, MD

Primary Evaluators: Charles Rosen, MD, PhD; Sanjay Bhatia, MBBS; David Cohen, MD; Christopher Cifarelli, MD, PhD

Description: This rotation is supervised by the primary neurosurgery faculty. Residents will be involved directly in the evaluation and care of general neurosurgery patients, with special emphasis on neurovascular, neurosurgical oncology, and skull base patients.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Oversee the preparation of the Blue Team Morbidity and Mortality Conference, with demonstration of appropriate understanding of the causes of the complications as well as relevant prevention strategies, suggest appropriate care modifications to prevent such complications.	*	*	*	*		*
Brain Tumors						
Independently formulate a treatment plan for patients with comorbidities or other complicating factors (e.g., systemic illness, radiation, chemotherapy)	4					
Independently perform complex procedures	4					
Adapt standard treatment plans to special circumstances (e.g., previous surgery, anticipated neurological morbidity)	4					
Independently manage complications	4					
Describe expected outcomes after surgery for brain and spinal cord tumors		4				
Describe the role of radiosurgery in brain tumor therapy		4				
Describe the role of palliative care for brain tumor patients		4				
Describe personalized medicine approaches for brain tumor treatment		4				

Spinal Neurosurgery						
Independently formulate a treatment plan for patients with comorbidities, previous surgery or other complicating factors (e.g., multiple system trauma, coagulopathy)	*					
Independently perform complex procedures	*					
Perform advanced procedures with assistance (e.g., thoracolumbar or craniocervical reconstruction, reconstruction after infection or vertebral tumor resection)	*					
Independently manage complications	*					
Spinal; Degenerative Disease						
Describe expected functional and pain outcomes after surgery for spinal degenerative disease		*				
Describe criteria for reoperation for degenerative spinal disease		*				
Describe the genetics, pathophysiology, and imaging findings of inflammatory spinal disorders		*				
Spinal; Trauma, Tumor, Infection						
Describe expected short- and long-term outcomes and complications after surgery for spinal trauma, tumor, or infection		*				
Describe factors affecting outcome in spinal tumor surgery (e.g., extent of resection)		*				
Describe the use of adjuncts during spinal trauma and tumor surgery (e.g., image guidance, ultrasound, monitoring)		*				
Describe the role of radiotherapy for treatment of spinal tumors		*				
Vascular Neurosurgery						
Independently Formulate a treatment plan for patients with comorbidities or other complicating factors (e.g., previous stroke, coronary artery disease, anti-coagulation)	*					
Independently perform complex procedures	*					
Perform advanced procedures with assistance (e.g., aneurysm coiling, vascular malformation embolization, extracranial-intracranial bypass)	*					
Independently manage complications	*					
Traumatic Brain Injury						
Prioritize the management of injuries in a polytrauma patient	*					

Independently perform complex procedures	*					
Manage unexpected intra-operative events (e.g., cerebral edema, hemorrhage, air embolus)	*					
Adapt standard treatment plans to special circumstances (e.g., medical comorbidity, coagulopathy)	*					
Independently manage CNS complications	*					
Economics						
Cite peer-reviewed cost and outcomes data to support resource utilization decisions						*
Safety and Systems						
Conduct root cause or failure mode analysis of systems-based errors and effect prophylaxis						*
Coordinate team for interdisciplinary procedure						*
Establish timeline and identify resources for transition to practice						*
Improve care systems to achieve optimal patient care						*
Work effectively in various health care delivery settings and systems						*
Lifelong Learning						
Participate in evidence-based practice improvement			*			
Organize educational activities at the program level			*			
Research						
Contribute systematic clinical or scientific information to the peer-reviewed literature			*			
Participate in clinical outcomes data gathering and analysis			*			
Formulate question or hypothesis, design investigation, execute project, and report results			*			
Utilize morbidity and mortality and program-level outcome data to institute systematic clinical practice changes			*			
Compassion						
Identify and manage complex ethical challenges during patient care					*	
Act as a mentor and role model to other residents					*	

Accountability						
Assume leadership responsibility for clinical care team decisions and outcomes					*	
Mediate conflict amongst members of the health care team					*	
Mediate conflict amongst members of the health care team					*	
Relational						
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				*		
Break bad news to a patient or family member				*		
Lead and document an advanced directive discussion				*		
Supervise patient hand-offs				*		
Quantify evidence for risk-benefit analysis during informed consent for a complex, elective neurosurgical procedure				*		
Manage and document an unexpected outcome (e.g., patient, care team and risk management communication)				*		
Lead response to an intra-operative or critical care emergency				*		
Act in a consultative role to other physicians				*		
Technology						
Create or update a neurosurgical care pathway and order set; implements use				*		

Key References:

Table of Contents

Senior Resident, Gold Team (PGY 6 Resident)

Rotation Director: Joseph Voelker, MD

Primary Evaluators: Joseph Voelker, MD; Cara Sedney, MD; Robert Marsh, MD, PhD; Cesar Augusto Serrano, MD

Description: This rotation is supervised by the primary neurosurgery faculty. Residents will be involved directly in the evaluation and care of general neurosurgery patients, with special emphasis on functional, epilepsy, peripheral nerve, pediatric, and spinal surgery and deformity.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Oversee the preparation of the Blue Team Morbidity and Mortality Conference, with demonstration of appropriate understanding of the causes of the complications as well as relevant prevention strategies, suggest appropriate care modifications to prevent such complications.	*	*	*	*		*
Epilepsy & Movement Disorders						
Independently formulate a treatment plan for patients with comorbidities or other complicating factors (e.g., eloquent seizure focus)	*					
Independently perform complex procedures	*					
Adapt standard treatment plans to special circumstances (e.g., previous surgery, neuropsychological limitations)	*					
Independently manage complications	*					
Describe indications for lesional vs. neuromodulatory interventions		*				
Describe the role of radiosurgery for functional lesions		*				
Describe indications for vagus nerve stimulation (VNS), callosotomy, and hemispherectomy		*				

Pain & Peripheral Nerves						
Independently formulate a treatment plan for patients with comorbidities or other complicating factors (e.g., recurrent trigeminal neuralgia)	*					
Independently perform complex procedures	*					
Adapt standard treatment plans to special circumstances (e.g., previous surgery, deafferentation pain)	*					
Independently manage complications	*					
Spinal Neurosurgery						
Independently formulate a treatment plan for patients with comorbidities, previous surgery or other complicating factors (e.g., multiple system trauma, coagulopathy)	*					
Independently perform complex procedures	*					
Perform advanced procedures with assistance (e.g., thoracolumbar or craniocervical reconstruction, reconstruction after infection or vertebral tumor resection)	*					
Independently manage complications	*					
Spinal; Degenerative Disease						
Describe expected functional and pain outcomes after surgery for spinal degenerative disease		*				
Describe criteria for reoperation for degenerative spinal disease		*				
Describe the genetics, pathophysiology, and imaging findings of inflammatory spinal disorders		*				
Spinal; Trauma, Tumor, Infection						
Describe expected short- and long-term outcomes and complications after surgery for spinal trauma, tumor, or infection		*				
Describe factors affecting outcome in spinal tumor surgery (e.g., extent of resection)		*				
Describe the use of adjuncts during spinal trauma and tumor surgery (e.g., image guidance, ultrasound, monitoring)		*				
Describe the role of radiotherapy for treatment of spinal tumors		*				

Traumatic Brain Injury						
Prioritize the management of injuries in a polytrauma patient	*					
Independently perform complex procedures	*					
Manage unexpected intra-operative events (e.g., cerebral edema, hemorrhage, air embolus)	*					
Adapt standard treatment plans to special circumstances (e.g., medical comorbidity, coagulopathy)	*					
Independently manage CNS complications	*					
Economics						
Cite peer-reviewed cost and outcomes data to support resource utilization decisions						*
Safety and Systems						
Conduct root cause or failure mode analysis of systems-based errors and effect prophylaxis						*
Coordinate team for interdisciplinary procedure						*
Establish timeline and Identify resources for transition to practice						*
Improve care systems to achieve optimal patient care						*
Work effectively in various health care delivery settings and systems						*
Lifelong Learning						
Participate in evidence-based practice improvement			*			
Organize educational activities at the program level			*			
Research						
Contribute systematic clinical or scientific information to the peer-reviewed literature			*			
Participate in clinical outcomes data gathering and analysis			*			
Formulate question or hypothesis, design investigation, execute project, and report results			*			
Utilize morbidity and mortality and program-level outcome data to institute systematic clinical practice changes			*			

Compassion						
Identify and manage complex ethical challenges during patient care					*	
Act as a mentor and role model to other residents					*	
Accountability						
Assume leadership responsibility for clinical care team decisions and outcomes					*	
Mediate conflict amongst members of the health care team					*	
Mediate conflict amongst members of the health care team					*	
Relational						
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				*		
Break bad news to a patient or family member				*		
Lead and document an advanced directive discussion				*		
Supervise patient hand-offs				*		
Quantify evidence for risk-benefit analysis during informed consent for a complex, elective neurosurgical procedure				*		
Manage and document an unexpected outcome (e.g., patient, care team and risk management communication)				*		
Lead response to an intra-operative or critical care emergency				*		
Act in a consultative role to other physicians				*		
Technology						
Create or update a neurosurgical care pathway and order set; implements use				*		

Key References:

Table of Contents

Chief Resident (PGY 7 Resident)

Rotation Director: Joseph Voelker, MD

Primary Evaluators: Joseph Voelker, MD; Cara Sedney, MD; Robert Marsh, MD, PhD; Cesar Augusto Serrano, MD; Charles Rosen, MD, PhD; Sanjay Bhatia, MBBS; David Cohen, MD; Christopher Cifarelli, MD, PhD

Description: This rotation is supervised by the primary neurosurgery faculty. The Chief Resident will be directly involved in the evaluation and care of all patients on the neurosurgery service. The Chief Resident will supervise the assignments of junior residents, the didactic program, and the acute care of all hospital admissions and consults. The Chief Resident will coordinate the use of midlevel providers with the residents to make sure that patient care is provided in a uniform and excellent fashion, and that the educational goals of the residents are protected.

Goals & Objectives	Patient Care	Medical Knowledge	Practice-Based Learning/ Improvement	Interpersonal & Communication Skills	Professionalism	System-Based Practice
Be prepared for didactic conferences, including appropriate reading on the assigned topic		*			*	
Oversee the preparation of the Blue Team Morbidity and Mortality Conference, with demonstration of appropriate understanding of the causes of the complications as well as relevant prevention strategies, suggest appropriate care modifications to prevent such complications.	*	*	*	*		*
Economics						
Cite peer-reviewed cost and outcomes data to support resource utilization decisions						*
Safety and Systems						
Conduct root cause or failure mode analysis of systems-based errors and effect prophylaxis						*
Coordinate team for interdisciplinary procedure						*
Establish timeline and Identifies resources for transition to practice						*
Improve care systems to achieve optimal patient care						*
Work effectively in various health care delivery settings and systems						*

Lifelong Learning						
Participate in evidence-based practice improvement			*			
Organize educational activities at the program level			*			
Research						
Contribute systematic clinical or scientific information to the peer-reviewed literature			*			
Participate in clinical outcomes data gathering and analysis			*			
Formulate question or hypothesis, design investigation, execute project, and report results			*			
Utilize morbidity and mortality and program-level outcome data to institute systematic clinical practice changes			*			
Compassion						
Identify and manage complex ethical challenges during patient care					*	
Act as a mentor and role model to other residents					*	
Accountability						
Assume leadership responsibility for clinical care team decisions and outcomes					*	
Mediate conflict amongst members of the health care team					*	
Mediate conflict amongst members of the health care team					*	
Relational						
Obtain and document informed consent in challenging circumstances (e.g., language or cultural barrier)				*		
Break bad news to a patient or family member				*		
Lead and document an advanced directive discussion				*		
Supervise patient hand-offs				*		
Quantify evidence for risk-benefit analysis during informed consent for a complex, elective neurosurgical procedure				*		
Manage and document an unexpected outcome (e.g., patient, care team and risk management communication)				*		

Lead response to an intra-operative or critical care emergency				*		
Act in a consultative role to other physicians				*		
Technology						
Create or update a neurosurgical care pathway and order set; implements use				*		

Key References:

Table of Contents

West Virginia University School of Medicine (Updated for 7/1/17)
Graduate Medical Education Policy on Supervision from GME Bylaws

XIV. Supervision and Accountability

Programs must provide a professional, respectful, and civil environment that is free from mistreatment, abuse, and coercion of residents, faculty, and staff. All GME-related supervision will be provided in a non-retaliatory and supportive manner. Programs, in partnership with their Sponsoring Institution, must have a process for education of residents and faculty regarding inappropriate and unprofessional behavior, *especially* when exhibited toward a trainee who is requesting supervision and guidance. *[VI.B.6. – with slight edits]*

Although the attending physician is ultimately responsible for the care of the patient, every physician shares in the responsibility and accountability for their efforts in the provision of care. Effective programs, in partnership with their Sponsoring Institution, define, widely communicate, and monitor a structured chain of responsibility and accountability as it relates to the supervision of all patient care. *[VI.A.2.a)]*

Supervision in the setting of graduate medical education provides: safe and effective care to patients; ensures each resident's development of the skills, knowledge, and attitudes required to enter the unsupervised practice of medicine; and establishes a foundation for continued professional growth. *[VI.A.2.a)]*

Each patient must have an identifiable, appropriately-credentialed and privileged, attending physician (or licensed independent practitioner as specified by the applicable Review Committee) who is responsible and accountable for the patient's care. This information must be available to residents, faculty members, other members of the health care team, and patients. Residents and faculty members must inform each patient of their respective roles in that patient's care when providing direct patient care. *[Section VI.A.2.a).(1)]*

Supervision may be exercised through a variety of methods. For many aspects of patient care, the supervising physician may be a more advanced resident or fellow. Other portions of care provided by the resident can be adequately supervised by the immediate availability of the supervising faculty member, fellow, or senior resident physician, either on site, or by means of telephonic and/or electronic modalities. Some activities require the physical presence of the supervising faculty member. In some circumstances, supervision may include post-hoc review of resident delivered care with feedback. *[VI.A.2.b)]*

The program must demonstrate that the appropriate level of supervision in place for all residents is based on each resident's level of training and ability, as well as patient complexity and acuity. Supervision may be exercised through a variety of methods, as appropriate to the situation. [The Review Committee may specify which activities require different levels of supervision.] *[VI.A.2.b).(1)]*

<u>Levels of Supervision *[Section VI.A.2.c)]*</u>

To promote oversight of resident supervision while providing for graded authority and responsibility, the program must use the following classifications of supervision:

<u>Direct Supervision</u>:

The supervising physician is physically present with the resident and patient.

Indirect Supervision:

…with direct supervision immediately available:

The supervising physician is physically within the hospital or other site of patient care, and is immediately available to provide Direct Supervision.

…with direct supervision available:

The supervising physician is not physically present within the hospital or other site of patient care, but is immediately available by means of telephonic and/or electronic modalities, and is available to provide Direct Supervision.

Oversight:

The supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered.

The privilege of progressive authority and responsibility, conditional independence, and a supervisory role in patient care delegated to each resident must be assigned by the program director and faculty members. *[VI.A.2.d)]*

The program director must evaluate each resident's abilities based on specific criteria, guided by the Milestones. *[VI.A.2.d).(1)]*

Faculty members functioning as supervising physicians must delegate portions of care to residents, based on the needs of the patient and the skills of each resident. *(Has changed from Detail to Core)* Senior residents or fellows should serve in a supervisory role of junior residents in recognition of their progress toward independence, based on the needs of each patient and the skills of the individual resident or fellow. *[VI.A.2.d).(2) & (3)]*

Programs must set guidelines for circumstances and events in which residents must communicate with the supervising faculty member(s). *[VI.A.2.e)]*

Each resident must know the limits of their scope of authority, and the circumstances under which the resident is permitted to act with conditional independence. Initially, PGY-1 residents must be supervised either directly or indirectly with direct supervision immediately available. [Each Review Committee may describe the conditions and the achieved competencies under which PGY-1 residents may progress to be supervised indirectly with direct supervision available.] [*VI.A.2.e).(1).(a)]*

Faculty supervision assignments must be of sufficient duration to assess the knowledge and skills of each resident and to delegate to the resident the appropriate level of patient care authority and responsibility. *(Has changed from Detail to Core) [VI.A.2.f)]*

Approved by GMEC Taskforce July 5, 2017
Approved by GMEC July 14, 2017

Table of Contents

West Virginia University School of Medicine
Graduate Medical Education – Clinical/Educational Work Hours & Well-Being – from the GME Bylaws

XV. Clinical/Educational Work Hours & Well-Being – Updated 7-1-17

Compliance with the Clinical & Educational (C&E) Work Hours Standards as outlined in the ACGME Common Program Requirements are expected for all programs.

The primary responsibility for the development of a call schedule that follows the ACGME's C&E Work Hour Standards resides with the program director, the program manager, and the core faculty of each program. In addition to the call schedule, the program manager for each program will regularly monitor their trainees logging of C&E Work Hours in order to: 1) Ensure timely logging; and 2) Monitor hours logged to allow for early intervention in unsafe work hoursituations.

The GME Office will also provide monthly central oversight to ensure institutional compliance across all programs with current standards as outlined in the ACGME Common Program Requirements.

Each program must have a written policy that: 1) follows the ACGME's C&E Work Hour Standards; 2) is program and department specific; 3) and is provided to all trainees and faculty on an annual basis. This policy must define an effective program structure that is configured to provide residents with excellent educational and clinical experience opportunities, while also allowing for reasonable opportunities for rest and personal well-being. *[VI.F.2.a)]*

Factors that must be addressed include, but are not limited to: maximum hours per week, and per shift; mandatory time free; frequency of in-house call; frequency of at-home call; night float; guaranteed time off for medical, dental, and mental health appointments; vacation & sick time procedures, as well as other types of leave; rules for inclement weather and/or disaster situations; and the expectation of honest, and timely logging of work hours.

<u>Honest and Timely Logging of Work Hours</u>:

- **Honesty is a cornerstone** of our ethical and professional code here at WVU SOM. Without honesty, there is no trust. **Log your work hours honestly**. *[VI.B.4.f)]*

- Our **institutional standard** for logging of work hours is to **log themdaily**.

- **However**, understanding that life is rarely standard – **if necessary, fall back on this <u>one</u>rule** – **at bare minimum, log every four days**. Beyond that, you will not remember what you actually worked.

<u>Maximum Hours</u>:

- C&E Work Hours **must** be limited to **no more than 80 hours per week**, **averaged** over a four-week period, inclusive of all in-house clinical and educational activities, clinical work done from home, and all moonlighting. *[VI.F.1.]*

- C&E Work **periods for residents and fellows must not exceed 24 hours of continuous scheduled assignment**. **Up to 4 hours of additional time** may be used for **activities related to patient safety**, such as providing **effective transitions of care**, and/or **resident education**. *Additional patient care responsibilities <u>must not</u> be assigned to a trainee during this time. [VI.F.3.a).(1) & .(a)]*

- **Exception** – In **rare circumstances**, after handing off all other responsibilities, **a resident or fellow, *on their own initiative*, may elect to remain or return to the clinical site** in the following circumstances:
    - To continue to provide care to a single severely ill or unstable patient
    - Humanistic attention to the needs of a patient or family
    - To attend unique educational events.

  All additional hours of care or education will be counted toward the 80-hour maximum weekly limit. *[VI.F.4.a) through VI.F.4.b)]*

Time Free:

- Residents and fellows **should have 8 hours off** between scheduled clinical work and education periods. *[VI.F.2.b)]*

- Residents and fellows **must have at least 14 hours free** of clinical work and education **after 24 hours** of in-house call. *[VI.F.2.c)]*

- Residents and fellows **must be scheduled for a minimum of one day in seven free** of clinical work and required education, when averaged over a 4-week period. *At-home call cannot be assigned on these free days. [VI.F.2.d)]*

Clinical Work Hours:

- **Night float** must occur within the context of the 80-hour week, and one-day-off-in-seven requirements. (Your specialty Review Committee may have further regulations regarding night float.) *[VI.F.6.]*

- Residents and fellows must be scheduled for **in-house call no more frequently than every third night,** averaged over a four-week period. *[VI.F.7.]*

- **At-home call** must not be so frequent or taxing as to preclude rest or reasonable time for personal care, and well-being, and it **must not be assigned on a free day**. **All clinical work** performed while on at-home call, *whether at home or in the hospital*, **must count toward the 80-hour maximum weekly limit**. *[VI.F.8.a) through VI.F.8.b)]*

Moonlighting:

- **PGY-1** residents are **not permitted to moonlight**. *[VI.F.5.c)]*

- **Must not interfere** with the trainee's ability to **achieve the goals & objectives** of the educational program.

- **Must not interfere** with the **trainee's fitness for work**, nor compromise **patient safety.** *[VI.F.5.a)]*

- Whether done at the teaching institution (internal), or at another facility (external), **all moonlighting hours must be counted toward the 80-hour maximum weekly limit**. *[VI.F.5.b)]*

Fatigue Mitigation:

- **Programs must** –
    - **Educate** all faculty, residents, and fellows to recognize the **signs of fatigue and sleep deprivation**; *[VI.D.1.a)]*

- **Educate** all faculty, residents, and fellows in **tools to mitigate fatigue**;*[VI.D.1.b)]*

- **Encourage** faculty, residents, and fellows **to use fatigue mitigation tools** tomanage **potentially negative effects** of fatigue on safe patient care, and learning. *[VI.D.1.c)]*

- **Ensure continuity of patient care** by maintaining a back-up system in the event that a resident or fellow is unable to perform their patientcare responsibilities due to excessive fatigue. *[VI.C.2 & VI.D.2]*

- Along with the help of the Sponsoring Institution, **ensure adequate sleep facilities** *AND* **safe transportation options** for residents and fellows who may be too fatigued to safely return home. *[VI.D.3.]*

Sick Time, Time Off for Health Care Appointments, & Other Types of Leave:

- **There are circumstances in which residents and fellows may be unable to attend work**, including but not limited to fatigue, illness, and family emergencies. **Each program must have policies and procedures in place** that ensure coverage of patient care in the event that a resident may be unable to perform their patient care responsibilities. These **policies must be implemented without fear of negative consequences for the resident or fellow** who is unable to provide the clinical work. *[VI.C.2.]*

- Residents and fellows **must** be given the **opportunity to attend medical, mental health, and dental care appointments**, *including those scheduled during their working hours*. *[VI.C.1.d).(1)]*

Vacation:

- **Residents and fellows should be encouraged to plan for, and use their allotted vacation time each year.** Programs must provide policies and procedures to their trainees annually. This includes a detailed vacation policy clearly stating all the necessary steps for the correct way to request their allotted time off.

Resident/Fellow Well-Being:

- **Psychological, emotional, and physical well-being** are **critical** in the development of the competent, caring, and resilient physician. **Self-care** is an important component of professionalism; it is also a skill that **must be learned and nurtured** in the context of other aspects of residency training. ***Programs** have the same **responsibility to address well-being** as they do to evaluate other aspects of resident competence.[VI.C.]*

- This responsibility must include:
  - Efforts to enhance **the meaning that each trainee finds in the experience of being a physician**, including protecting time with patients, minimizing non-physician obligations, providing administrative support, promoting progressive autonomy and flexibility, and enhancing professional relationships; *[VI.C.1.a)]*

  - Attention to **scheduling**, **work intensity**, and **work compression** that impacts resident/fellow well-being; *[VI.C.1.b)]*

  - Evaluating workplace safety data and **addressing the safety** of trainees and faculty members; *[VI.C.1.c)]*

- **Policies and programs** that **encourage optimal** trainee and faculty member **well-being**; *[VI.C.1.d)]*

- **Attention to** trainee and faculty member **burnout, depression, and substance abuse**; *[VI.C.1.e)]*

- **Educating** trainees and faculty members in **identification of the symptoms** of burnout, depression, and substance abuse, including **means to assist** those who experience these conditions; *[VI.C.1.e)]*

- **Educating** trainees and faculty members to r**ecognize those symptoms in themselves** and how to seek appropriate care; *[VI.C.1.e)]*

- **Encourage trainees and faculty members to alert** the program director, or the GME Office **regarding concerns** that a resident, fellow, or faculty member may be displaying signs of burnout, depression, substance abuse, suicidal ideation, or potential for violence; *[VI.C.1.e).(1)]*

- **Provide** access to appropriate **tools for self-screening**; *[VI.C.1.e).(2)]*

- **Provide** access to **confidential, affordable mental health assessment**, **counseling**, and **treatment**, including **access to urgent and emergent care 24** hours a day**, seven** days a week. *[VI.C.1.e).(3)]*

Approved by GMEC Taskforce July 5, 2017
Approved by GMEC July 14, 2017

Table of Contents

In a vague way, I always knew neurosurgery was different - more delicate, more difficult, more demanding. After all, we say things like, 'I'm no brain surgeon,' for a reason.
~ Sam Kean, American author