Neuroscience Intensive Care Unit Rotation Objectives

The Neuroscience Intensive Care Unit (NICU) rotation is designed for fellows in Anesthesia Critical Care to gain expertise in the management of patients critically ill from neurological conditions. The patients admitted to the NICU includes pre- and post-operative neurosurgical patients, those suffering from neurotrauma, stroke, epilepsy, and neuromuscular disorders. The NICU will admit both surgical and medical patients and Critical Care fellows will be working with neurologists, neurosurgeons, and supervising nurse practitioners and physician assistants in addition to residents; neurocritical care attendings will be either surgeons, anesthesiologists, or neurologists.

Learning Objectives

Patient Care
Fellows should be able to demonstrate efficient and thorough history taking and physical examination skills, with particular focus on a detailed and accurate neurologic exam, in the evaluation of multiple critically ill neurologic patients at the same time and be able to triage them effectively. They must be able to develop an appropriate differential diagnosis and initial treatment plan and order and interpret appropriate additional workup, and institute appropriate therapy. Fellows must be proficient in procedural skills including arterial puncture, central venous catheter placement, endotracheal intubation, thoracentesis, chest thoracostomy tube placement, lumbar puncture, intravenous and intraosseous catheter placement, bronchoscopy, and basic wound care, as well as the ability to run an effective code.

Medical Knowledge
Fellows should demonstrate the ability to diagnose and manage patients with complex neurological conditions and complications from neurosurgery such as the following:

- Respiratory Failure including ventilator management and ventilator weaning
- Cardiogenic Failure including post-operative myocardial ischemia/infarcts and arrhythmias
- Renal Failure including the peri-operative diagnosis of pre-renal, intra-renal and post-renal causes for renal dysfunction and developing appropriate treatments.
- Neurologic complications of anesthesia and neurosurgical procedures including cognitive dysfunction, delirium, seizures, myoclonus and stroke.
- Hemodynamic instability including hypovolemia, sepsis and SIRS
- Hematologic dysfunction including coagulopathy and thrombocytopenia
- Hemorrhagic, ischemic, and embolic stroke
- Epilepsy, seizures, and status epilepticus
- Neuromuscular disorders such as Guillain-Barre, myasthenia gravis, and muscular dystrophy
- Management and monitoring of cerebral aneurysm rupture, as well as diagnosis and management of cerebral vasospasm
- Brain death examination and diagnostic criteria

Practice-based Learning and Improvement
Fellows must exhibit a commitment to investigation and evaluation of one’s own patient care as well as appraisal and assimilation of scientific evidence and improvements in patient care. They should be able to apply knowledge of study designs and statistical methods to the appraisal of such studies and other information on diagnostic and therapeutic effectiveness. The NICU fellow should be able to utilize information technology infrastructure to facilitate patient care. Finally, fellows should regularly participate in fellow-level journal clubs, Quality
Improvement (QI) projects and should attend and present cases in Neurocritical Care Morbidity and Mortality conferences.

**Interpersonal and Communication Skills**
Fellows must demonstrate interpersonal and communication skills that result in the effective, respectful, and efficient exchange of information and collaboration with patients, their families, and other health professionals, paying particular attention in learning prognosis in the recovery of severe neurologic injury. They must respect the diverse and cultural, ethnic, spiritual, emotional, and age-specific differences in patients and other members of the health care team and be able to negotiate and resolve conflicts that may arise. They must recognize the differences in effective supervision of midlevel providers compared to residents. Furthermore, fellows should be able to understand and effectively use feedback provided by others. These skills should result in the fellow’s effective participation in and leadership of the healthcare team.

**Professionalism**
Fellows must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Specifically, they must skillfully address ethical issues for patients and families in an adult intensive care unit such as goals of care and end-of-life discussions. In the NICU, there is specific focus on incorporating quality of life and meaningful recovery into such discussions. Fellows must also exhibit professionalism in all aspects of interaction with colleagues and other team members, behaving in a manner befitting an advanced healthcare professional. This can be exhibited by setting a tone of respect and collegiality for the healthcare team members, willingly seeing patients and families to discuss a patient’s care, protecting staff, family, and patient interests and confidentiality, and completing medical records punctually and with appropriate and honest documentation.

**Systems-based Practice**
Fellows must practice in a way that demonstrates an awareness of and responsiveness to the larger context and system of health care and an ability to effectively call on system resources to provide care that is of optimum value. For the NICU rotation, this means developing an understanding of resource utilization in the hospital as well as in the community at large (when handling potential transfers from and to outside hospitals). Recognition of the indications for organ donation in the brain dead patient and appropriate interaction with the New England Organ Bank should become familiar by the end of the NICU rotation. Finally, the fellow must be able to understand and develop cost-effective care and demonstrate appropriate use of ICU protocols and practice strategies designed to facilitate and advance the care and outcome of the critically ill patient.