

Neurocritical Care Fellowship Program Requirements

I. Introduction

A. Definition

The medical subspecialty of Neurocritical Care is devoted to the comprehensive, multisystem care of the critically-ill neurological patient. Like other intensivists, the neurointensivist assumes the primary care role for his or her patients in the ICU, coordinating both the neurological and medical management of the patient. Hence, the Neurocritical Care Core Curriculum is evenly split between neurological and medical diseases and conditions, and fellowship training may include rotations through non-neurological ICUs. Most uniquely, neurocritical care is concerned with the interface between the brain and other organ systems in the setting of critical illness. The neurointensivist defragments and harmonizes the care of his or her patients by taking responsibility for various elements of ICU care that might otherwise be provided by multiple subspecialists (i.e., cardiology, endocrinology, infectious diseases, pulmonary medicine, and neurology). Expertise in Neurocritical Care involves procedural skills and proficiency with standard forms of ICU monitoring (i.e., cardiovascular hemodynamic monitoring and mechanical ventilation) as well as specialized forms of neurological monitoring (i.e. ICP and continuous EEG monitoring) and interventions (i.e., hypertensive hypervolemic therapy, therapeutic hypothermia). The neurointensivist works closely with neurosurgeons, neuroradiologists, neurologists, emergency medicine, and other medical and surgical subspecialists, as well as with nurses and other care providers in an environment that fosters multi-disciplinary collaboration. The ultimate goal of clinical care is to resuscitate and support the acutely-ill neurological patient, provide appropriate therapies to treat the primary injury, minimize secondary neurological injury and medical complications, and expedite and facilitate the patient's transition to a recovery environment.

B. Goals and Objectives

The purpose of the training program is to prepare the physician for the independent practice of Neurocritical Care. This training must be based on supervised clinical work, with increasing patient care responsibility over the course of the training program. It must have a foundation of organized instruction in basic elements of both neurological and medical aspects of critical care.

C. Program Setting

The training program must exist in the context of a team of critical care physicians who provide comprehensive and around-the-clock ICU coverage to a specified population of critically-ill neurological patients. This may occur in a dedicated neurocritical care unit, or in the setting of a larger medical-surgical ICU.

II. Institutional Support

A. SPONSORING INSTITUTION

The Sponsoring Institution must assume the ultimate responsibility for the program and must meet the current ACGME Institutional Requirements. This responsibility extends to fellow assignments at all participating institutions.

1. UCNS-accredited GME (Graduate Medical Education) programs must operate under the authority and control of a sponsoring institution, defined as the institution that assumes the

- ultimate responsibility for a program of GME. One sponsoring institution must assume the ultimate responsibility for the program and this responsibility extends to fellow assignments at all participating institutions.
2. The Sponsoring Institution must be appropriately organized for the conduct of GME in a scholarly environment and must be committed to excellence in both medical education and patient care.

B. PARTICIPATING INSTITUTIONS

1. Inclusion of a participating institution must be based on a clear educational rationale, it must be integrated with the program curriculum, have clearly-stated activities and objectives, and provide resources not otherwise available to the program. When multiple participating institutions are used, there should be assurance of the continuity of the educational experience.
2. Assignment to a participating institution requires a Participating Institution Letter. Such a letter should:
 - i. Confirm the relationship of the participating institution to the program;
 - ii. State the participating institution's commitment to training and education;
 - iii. List specific educational activities that will be undertaken, supported, and supervised at the participating institution; and
 - iv. Be signed by the department chair of the participating institution.
3. Assignments at participating institutions must be of sufficient length to ensure a quality educational experience, and should provide sufficient opportunity for continuity of care. All participating institutions must demonstrate the ability to promote the program goals as well as educational and peer activities.

III. Duration of Training and Trainee Appointment

A. Duration of Training

1. Fellowship programs must be no less than 24 months in duration.
 - i. During this period, trainees must complete at least 12 months of "on-service" critical care experience in which the trainee participates in a team that has primary responsibility for patient management in the ICU. The majority (more than 50 percent) of this experience should take place in a setting in which the emphasis of care is primarily on neurological and neurosurgical patients, whether in a neuro-ICU, or as part of a team responsible for the care of neurological patients in the context of a medical-surgical ICU. Consultative experience alone does not provide the exposure necessary to train a neurointensivist. Part of the 12 month critical care experience may also be spent as a member of an ICU team in the setting of a medical, pulmonary, surgical/anesthesia, cardiac, pediatric, trauma, transplant, or other subspecialty ICU, or in the operating room (OR) under the guidance of an anesthesiologist. None of these non-neurological critical care rotations are considered mandatory.
 - ii. Apart from the 12 month minimum of critical care experience, the remaining rotations may be scheduled through a variety of non-critical care clinical rotations, such as an inpatient or outpatient stroke service, clinical neurophysiology, or diagnostic or interventional neuroradiology or research.

B. Eligibility

The trainee must:

1. Have a current valid and unrestricted license to practice medicine in the US or Canada.
2. Be a graduate of a residency program in neurology, neurological surgery, internal medicine, anesthesiology, surgery, or emergency medicine accredited by the Accreditation Council for Graduate Medical Education (ACGME) or the Royal College of Physicians and Surgeons of Canada (RCPSC).

C. Additional Qualifications

Each trainee must achieve provider and/or instructor status in the following:

1. Advanced Cardiac Life Support (ACLS)
2. Certification in one or more of the following is desirable:
3. Advanced Trauma Life Support (ATLS)
4. Pediatric Advanced Life Support (PALS)
5. Fundamental Critical Care Support (FCCS)

IV. Faculty and Personnel

The faculty must function as a team of physicians who provide full-time around-the-clock coverage as the primary providers of critical care to a specified population of critically-ill neurological patients. Although a minimum of two faculty members is desirable, a single program director may function as the sole faculty member, but only when he or she is part of a larger general group of critical care specialists who provide comprehensive around-the-clock coverage in an ICU.

At each participating institution, there must be a sufficient number of faculty with documented qualifications to adequately instruct and supervise all trainees in the program. A minimum trainee-to-faculty of 1 to 1 is required; in no instances should there be more than one trainee per faculty member. The Program Director may be counted as one of the faculty in determining the ratio.

A. Program Director Qualifications

There must be a single Program Director responsible for the training program. The person designated with this authority is accountable for the operation of the program and should be a member of the staff of the sponsoring or integrated institution.

The Program Director must:

1. Have training and experience in the management of critically-ill patients.
2. Submit evidence of a minimum of 50% of clinical time in the management of neurocritical care patients.
3. Have the interest, authority, and time required to fulfill teaching and administrative responsibilities to develop, implement, and achieve the educational goals of the training program. Examples should be submitted documenting the program director's prior experience teaching, lecturing, or writing on topics related to neurocritical care, as well as activities related to the organization and management of an ICU clinical and teaching program.
4. Be American Board of Medical Specialty (ABMS) or Royal College of Physicians and Surgeons of Canada (RCPSC) certified in his/her primary specialty.
5. Be certified by the UCNS in neurocritical care or possess appropriate equivalent qualifications.
6. Maintain continuing education in both neurocritical care and in critical care medicine.
7. Be licensed to practice in the state where the institution that sponsors the program is located.
8. Demonstrate a commitment to the principles and practices of educational theory and methodologies.

B. Program Director Responsibilities

The Program Director must oversee and organize the activities of the educational program in all affiliated institutions that participate in the program. This includes:

1. Selecting and supervising the faculty and other program personnel, and monitoring appropriate trainee supervision and educational progress;
2. Preparing a written statement outlining the educational goals of the program with respect to knowledge, skills, and other attributes of fellows at each level of training and for each major rotation or other program assignment. This statement must be distributed to fellows and members of the teaching staff;
3. Providing fellows explicit written descriptions of supervisory lines of responsibility for the care of patients. Such guidelines must be communicated to all members of the program staff;
4. Selecting trainees and faculty in accordance with institutional and departmental policies and procedures;
5. Providing regular evaluation of the knowledge, skills, and overall performance of trainees. This should include semi-annual evaluations with feedback, and a written final evaluation;
6. Implementing of fair procedures as established by the sponsoring institution regarding academic discipline and fellow complaints or grievances;
7. Monitoring of health and well-being of trainees, including mental or emotional conditions inhibiting performance of learning, and drug-or alcohol-related dysfunction. Both the program director and faculty should be sensitive to the need for timely provision of confidential counseling and psychological support services to trainees. Situations that demand excessive service or that consistently produce undesirable stress on fellows must be evaluated and modified;
8. Functioning as one of the primary providers of Neurocritical care to a clearly-defined population of ICU patients.

C. Faculty Qualifications

Faculty must:

1. Possess appropriate educational and administrative in Neurocritical care;
2. Devote sufficient time to the educational program to fulfill their supervisory and teaching responsibilities;
3. Be ABMS or RCPSC certified in their primary specialty;
4. Be appointed in good standing to the staff of an institution participating in the program;
5. Be certified by the UCNS or possess appropriate qualifications. Neurocritical Care Program

D. Faculty Responsibilities

1. The responsibility for establishing and maintaining an environment of inquiry and scholarship rests with the faculty, and an active research component must be included in each program. Scholarship is defined as the following:
 - i. The scholarship of discovery, as evidenced by peer-reviewed funding or by publication of original research in a peer reviewed journal.
 - ii. The scholarship of dissemination, as evidenced by review articles or chapters in textbooks.
 - iii. The scholarship of application, as evidenced by the publication or presentation of, for examples, case reports or clinical series at local, regional, or national professional and scientific society meetings.
2. Activities supportive of scholarship include the regular participation in clinical discussions, rounds, journal clubs, and research conferences in a manner that promotes a spirit of inquiry and scholarship.

E. Other Teaching Staff

Training programs in Neurocritical Care should take advantage of an institution's multidisciplinary faculty. In the course of their clinical activities, trainees should be routinely exposed to specialists in neurosurgery, interventional and diagnostic neuroradiology, emergency medicine, pulmonary, medical, or surgical critical care, anesthesiology, and various medical subspecialties in the course of caring for their patients. A collaborative multi-disciplinary approach to patient care should be emphasized. These clinicians may also provide instruction regarding specific procedural skills (i.e., endotracheal intubation, ventricular drain placement), under the overall supervision of the fellowship director.

F. Other Program Personnel

Programs must provide the professional, technical, and clerical personnel needed to support the administration and educational conduct of the program.

V. Educational Program

The program goals should be defined in a comprehensive, well-organized, and effective curriculum, both academic and clinical, which includes the presentation of core specialty knowledge supplemented by current information. This should include an individualized plan for each trainee's ICU, clinical elective, research, and off-service time.

Fellows must be provided with training that provides progressively increasing responsibility for patient management.

A. Competencies

In addition to the specific cognitive and procedural competencies listed in the *Neurocritical Care Core Curriculum* the program must require its trainees to obtain competence in the six areas listed below (ACGME core competencies) to the level expected of a new practitioner of neurocritical care. Programs must define the specific knowledge, skills, behaviors, and attitudes required, provide educational experiences as needed and develop means for measuring and assuring competence in order for their trainees to demonstrate the following:

1. *Patient care* that is compassionate, appropriate, and effective for the treatment of critically ill neurological patients.
2. *Medical Knowledge* about established and evolving biomedical, clinical, and basic sciences, as well as the application of this knowledge to patient care.
3. *Practice-based learning* and improvement that involves the investigation and evaluation of care for their patients, the appraisal and assimilation of scientific evidence, and improvements in patient care.
4. *Interpersonal and communication skills* that result in the effective exchange of information and collaboration with patients, their families, and other health professionals.
5. *Professionalism*, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds.
6. *Systems-based practice*, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

B. Interdisciplinary Critical Care Training and Elective Rotations

In addition to each trainee's rotations in the neurocritical care setting, a number of elective rotations designed to provide broad exposure to allied fields in critical care, neurology, medicine, and surgery should be made available to the trainee. These may require inter-institutional cooperation among medical centers to provide the trainee with a broad general critical care patient experience.

1. Trainees may spend time on any of the following non-neurological critical care rotations listed below, and time spent on these rotations may be applied to the 12-month minimum for "on service" ICU time (Section III.A.1). No more than six months of time in a non-neurological critical care setting may be counted toward the 12-month minimum of "on service" critical care exposure. None of these rotations are considered mandatory.
 - i. Medical ICU
 - ii. Surgical/anesthesia ICU
 - iii. Cardiac or cardiothoracic ICU
 - iv. Trauma ICU
 - v. Operating room
 - vi. Post-anesthesia recovery room
 - vii. Pediatric ICU
 - viii. Transplant ICU
2. Additional elective non-critical care clinical rotations may also include the following, although this list should not be considered exhaustive.
 - i. Neurosurgery
 - ii. Interventional or diagnostic neuroradiology
 - iii. Neurovascular or stroke service
 - iv. Emergency department
 - v. Doppler lab
 - vi. Clinical neurophysiology
 - vii. Diagnostic neuroradiology
 - viii. Pathology
 - ix. Research

C. Didactic Components

Trainees must regularly attend seminars and conferences in neurology, neurosurgery, critical care, and neuroradiology. Additional didactic exposure may be desirable in neuropathology, neuromuscular disease, cerebrovascular disease, epilepsy and neurophysiology, pain management, and rehabilitation. A regularly scheduled research conference or seminar should be attended. Trainees must learn about major developments in both the basic and clinical sciences relating to critical care, neurology, neurosurgery, and neuroradiology. Trainees must attend periodic seminars, journal clubs, and lectures in basic science, didactic courses, and meetings of local and national scholarly societies relevant to neurocritical care. All core elements of the *Neurocritical Care Core Curriculum* must be addressed.

D. Clinical Components

1. Patient care responsibilities may include inpatient, outpatient, and consultation experiences in addition to the minimum of 12 months of ICU exposure.
2. The ICU trainee rotations must function in the context of a team of critical care physicians who provide comprehensive and around-the-clock ICU coverage to a specified population of critically-ill neurological patients. This may occur in a dedicated neurocritical care unit, or in the setting of a larger medical-surgical ICU.
3. Patient care in the ICU must be conducted through faculty-supervised teaching rounds, in which practical elements of patient care are combined with discussions. These rounds must

- involve faculty, fellowship trainees, consulting physicians and other specialists, fellows, medical students, nurses, nurse practitioners, physician assistants, respiratory therapists, pharmacists, and other health care providers. Teaching is a required aspect of the trainee's education.
4. Programs must provide opportunities for increasing patient care responsibilities during the course of the fellowship.
 5. Criteria must be established to evaluate and document procedural competencies (i.e., both basic and advanced critical care and neurological interventions). This should include (but is not limited to) how this training is conducted, the minimum number of directly-observed procedures before the trainee can operate independently, and mentor sign-off procedures.

E. Scholarly Activities

Each program must provide an opportunity for fellows to participate in research or other scholarly activities.

F. Program Resources and Facilities

1. There must be an adequate number and variety of patients to expose trainees to the broad spectrum of diseases that occur in critically-ill neurological patients. Trainees should gain direct exposure to the most common neurological conditions listed in Section A of the Neurocritical Care Core Curriculum.
2. There must be adequate space and equipment for the educational program, including meeting rooms, classrooms with audiovisual and other educational aids, office space for staff and trainees, and access to pertinent reference materials. The ICU environment must contain the necessary diagnostic, therapeutic and imaging equipment for trainees to gain competence in all essential core procedural competencies listed in Section B of the Neurocritical Care Core Curriculum.

G. Trainee Duty Hours And Working Environment

1. Trainee duty hours and work environment must be consistent with the current ACGME requirements.

VI. Evaluation

A. Trainee Evaluation

Trainee evaluation by staff must be made at least bi-annually and areas of weakness and strength must be communicated to the trainee. Records must be maintained documenting fellow experience and performance. The evaluation must include the trainee's fund of knowledge, basic clinical competence, general skills in the primary specialty, and the specific technical skills required for neurocritical care. The summary and final evaluation of the trainee must be prepared by the Program Director and should reflect the input of all faculty.

B. Faculty Evaluation

The performance of the faculty must be evaluated by the Program Director on an annual basis. The evaluations should include a review of their teaching abilities, commitment to the educational program, clinical knowledge, and scholarly activities. These evaluations must include annual confidential written evaluations by fellows.

C. Program Evaluation

The educational effectiveness of a program must be evaluated in a systematic manner. In particular, the quality of the curriculum and the extent to which the educational goals have been met must be assessed. Confidential written evaluations by trainees must be utilized in this process. One measure of the quality of a training program is the proportion of its graduates who take the certification examination in neurocritical care provided by the UCNS, as well as their performance on those examinations.

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