ACGME Program Requirements for Graduate Medical Education in Neuroradiology

ACGME-approved: February 2007; effective: July 1, 2007
Revised Common Program Requirements effective: July 1, 2011
ACGME approved focused revision: September 30, 2012; effective: July 1, 2013
Revised Common Program Requirements effective: July 1, 2015
Revised Common Program Requirements effective: July 1, 2016
Revised Common Program Requirements effective: July 1, 2017
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One-year Common Program Requirements are in BOLD

Where applicable, text in italics describes the underlying philosophy of the requirements in that section. These philosophic statements are not program requirements and are therefore not citable.

Introduction

Int.A. Residency and fellowship programs are essential dimensions of the transformation of the medical student to the independent practitioner along the continuum of medical education. They are physically, emotionally, and intellectually demanding, and require longitudinally-concentrated effort on the part of the resident or fellow.

The specialty education of physicians to practice independently is experiential, and necessarily occurs within the context of the health care delivery system. Developing the skills, knowledge, and attitudes leading to proficiency in all the domains of clinical competency requires the resident and fellow physician to assume personal responsibility for the care of individual patients. For the resident and fellow, the essential learning activity is interaction with patients under the guidance and supervision of faculty members who give value, context, and meaning to those interactions. As residents and fellows gain experience and demonstrate growth in their ability to care for patients, they assume roles that permit them to exercise those skills with greater independence. This concept--graded and progressive responsibility--is one of the core tenets of American graduate medical education. Supervision in the setting of graduate medical education has the goals of assuring the provision of safe and effective care to the individual patient; assuring each resident’s and fellow’s development of the skills, knowledge, and attitudes required to enter the unsupervised practice of medicine; and establishing a foundation for continued professional growth.

Int.B. The body of knowledge and practice of neuroradiology comprises both imaging (computed tomography, magnetic resonance imaging, plain film interpretation, neurosonography, and nuclear radiology) and invasive procedures related to the brain, spine and spinal cord, head, neck, and organs of special sense (eyes, ears, nose) in adults and children. Special training and skills are required to enable the neuroradiologist to function as an expert diagnostic and therapeutic consultant and practitioner. In addition to knowledge of imaging findings, the fellows must learn the fundamentals of pathology, pathophysiology, and clinical manifestations of the brain, spine and spinal cord, head, neck, and organs of special sense. The program must provide fellows with an organized, comprehensive, and supervised full-time educational experience in the selection, interpretation, and performance of neuroradiologic examinations and procedures. The program must also provide fellows with opportunities to conduct research in the field of neuroradiology.
The training program must provide the fellow with the opportunity to develop, under supervision, progressively independent skills in the performance and interpretation of neuroradiologic imaging studies and invasive procedures. At the culmination of training, the fellow should be capable of independent and accurate clinical decision-making in all areas of neuroradiology.

Int.C. The program shall offer one year of graduate medical education in neuroradiology. *(Core)*

I. Institutions

I.A. Sponsoring Institution

One sponsoring institution must assume ultimate responsibility for the program, as described in the Institutional Requirements, and this responsibility extends to fellow assignments at all participating sites. *(Core)*

The sponsoring institution and the program must ensure that the program director has sufficient protected time and financial support for his or her educational and administrative responsibilities to the program. *(Core)*

I.B. Participating Sites

I.B.1. There must be a program letter of agreement (PLA) between the program and each participating site providing a required assignment. The PLA must be renewed at least every five years. *(Core)*

The PLA should:

I.B.1.a) identify the faculty who will assume both educational and supervisory responsibilities for fellows; *(Detail)*

I.B.1.b) specify their responsibilities for teaching, supervision, and formal evaluation of fellows, as specified later in this document; *(Detail)*

I.B.1.c) specify the duration and content of the educational experience; and, *(Detail)*

I.B.1.d) state the policies and procedures that will govern fellow education during the assignment. *(Detail)*

I.B.2. The program director must submit any additions or deletions of participating sites routinely providing an educational experience, required for all fellows, of one month full time equivalent (FTE) or more through the Accreditation Council for Graduate Medical Education (ACGME) Accreditation Data System (ADS). *(Core)*

II. Program Personnel and Resources

II.A. Program Director
II.A.1. There must be a single program director with authority and accountability for the operation of the program. The sponsoring institution’s GMEC must approve a change in program director. (Core)

II.A.1.a) The program director must submit this change to the ACGME via the ADS. (Core)

II.A.2. Qualifications of the program director must include:

II.A.2.a) requisite specialty expertise and documented educational and administrative experience acceptable to the Review Committee; (Core)

II.A.2.b) current certification in the subspecialty by the American Board of Radiology, or subspecialty qualifications that are acceptable to the Review Committee; and, (Core)

II.A.2.c) current medical licensure and appropriate medical staff appointment. (Core)

II.A.3. The program director must administer and maintain an educational environment conducive to educating the fellows in each of the ACGME competency areas. (Core)

The program director must:

II.A.3.a) prepare and submit all information required and requested by the ACGME; (Core)

II.A.3.b) be familiar with and oversee compliance with ACGME and Review Committee policies and procedures as outlined in the ACGME Manual of Policies and Procedures; (Detail)

II.A.3.c) obtain review and approval of the sponsoring institution’s GMEC/DIO before submitting information or requests to the ACGME, including:

II.A.3.c).(1) all applications for ACGME accreditation of new programs; (Detail)

II.A.3.c).(2) changes in fellow complement; (Detail)

II.A.3.c).(3) major changes in program structure or length of training; (Detail)

II.A.3.c).(4) progress reports requested by the Review Committee; (Detail)

II.A.3.c).(5) requests for increases or any change to fellow duty hours; (Detail)
II.A.3.c).(6) voluntary withdrawals of ACGME-accredited programs; (Detail)

II.A.3.c).(7) requests for appeal of an adverse action; and, (Detail)

II.A.3.c).(8) appeal presentations to a Board of Appeal or the ACGME. (Detail)

II.A.3.d) obtain DIO review and co-signature on all program application forms, as well as any correspondence or document submitted to the ACGME that addresses: (Detail)

II.A.3.d).(1) program citations, and/or, (Detail)

II.A.3.d).(2) request for changes in the program that would have significant impact, including financial, on the program or institution, (Detail)

II.A.4. The program director must be a credentialed member of the radiology faculty and must spend at least 80% of his or her time in the practice of neuroradiology. (Detail)

II.B. Faculty

II.B.1. There must be a sufficient number of faculty with documented qualifications to instruct and supervise all fellows. (Core)

II.B.1.a) The neuroradiology faculty or staff must include, in addition to the program director, one or more neuroradiologists. (Core)

II.B.1.a).(1) These faculty or staff members must spend at least 80% of their time in the practice of neuroradiology. (Detail)

II.B.1.b) To ensure adequate supervision and evaluation of a fellow’s academic progress, the faculty/fellow ratio must be at least one full-time faculty person for each fellow. (Core)

II.B.2. The faculty must devote sufficient time to the educational program to fulfill their supervisory and teaching responsibilities and demonstrate a strong interest in the education of fellows. (Core)

II.B.2.a) These responsibilities must include supervision of fellows’ performance and interpretation of neuroradiologic procedures. (Core)

II.B.3. The physician faculty must have current certification in the subspecialty by the American Board of Radiology, or possess qualifications judged acceptable to the Review Committee. (Core)

II.B.3.a) At least 50% of the physician faculty must have subspecialty certification in neuroradiology from the American Board of
II.B.4. The physician faculty must possess current medical licensure and appropriate medical staff appointment. (Core)

II.C. Other Program Personnel

The institution and the program must jointly ensure the availability of all necessary professional, technical, and clerical personnel for the effective administration of the program. (Core)

II.C.1. Administrative support should be provided for the conduct of research projects. (Core)

II.C.1.a) Assistance with literature searches, editing, statistical tabulation, and photography should be provided. (Detail)

II.D. Resources

The institution and the program must jointly ensure the availability of adequate resources for fellow education, as defined in the specialty program requirements. (Core)

II.D.1. Equipment and Space

II.D.1.a) The following "state-of-the-art" equipment must be available: magnetic resonance (MR) scanner, multi-detector computed tomography (CT) scanner, digital subtraction angiography equipment, a radiographic-fluoroscopic room(s) with tilt table suitable for performing myelography, and conventional radiographic equipment. There must be advanced image processing workstations available for techniques such as CT angiography, perfusion imaging and multiplanar/three-dimensional anatomic image reconstruction. Physiological monitoring must be available. There must be adequate facilities, adjacent to or within examination rooms, for storing supplies needed for the conduct of invasive neuroradiologic procedures. There must be appropriately trained nurses and technologists for these invasive procedures. A crash cart for emergency ventilation and cardiac life support must be available. (Core)

II.D.1.b) Adequate space for image display, interpretation of studies, and consultation with clinicians must be available. There must be adequate office space and support space for neuroradiology faculty/staff and fellows. (Core)

II.D.1.c) The program should provide adequate office space and supplies for the conduct of research projects. (Detail)

II.D.2. Library
There should be ready direct or indirect access to a library of current general medical texts and periodicals. In particular, there should be periodicals and texts in the fields of neuroradiology, diagnostic radiology, head and neck radiology, neurology, neurosurgery, neuroanatomy, physics, neuropathology, otolaryngology, neurophysiology, and orthopedic surgery. Internet access and web-based literature search facilities must be available at all times. A film-based, web-based, or electronic neuroradiology teaching file must be available for use by the neuroradiology fellows. The available teaching material should be enhanced with new cases when appropriate. (Detail)

II.E. Medical Information Access

Fellows must have ready access to specialty-specific and other appropriate reference material in print or electronic format. Electronic medical literature databases with search capabilities should be available. (Detail)

III. Fellow Appointments

III.A. Eligibility Requirements – Fellowship Programs

All required clinical education for entry into ACGME-accredited fellowship programs must be completed in an ACGME-accredited residency program, or in an RCPSC-accredited or CFPC-accredited residency program located in Canada. (Core)

Prerequisite training for entry into a diagnostic radiology subspecialty program should include the satisfactory completion of a diagnostic radiology residency accredited by the ACGME or the RCPSC. (Core)

III.A.1. Fellowship programs must receive verification of each entering fellow’s level of competency in the required field using ACGME or CanMEDS Milestones assessments from the core residency program. (Core)

III.A.2. Fellow Eligibility Exception

A Review Committee may grant the following exception to the fellowship eligibility requirements:

An ACGME-accredited fellowship program may accept an exceptionally qualified applicant**, who does not satisfy the eligibility requirements listed in Sections III.A. and III.A.1., but who does meet all of the following additional qualifications and conditions: (Core)

III.A.2.a) Assessment by the program director and fellowship selection committee of the applicant’s suitability to enter the program, based on prior training and review of the summative evaluations of training in the core specialty; and (Core)
IIIA.2.b) Review and approval of the applicant’s exceptional qualifications by the GMEC or a subcommittee of the GMEC; and

IIIA.2.c) Satisfactory completion of the United States Medical Licensing Examination (USMLE) Steps 1, 2, and, if the applicant is eligible, 3, and;

IIIA.2.d) For an international graduate, verification of Educational Commission for Foreign Medical Graduates (ECFMG) certification; and,

IIIA.2.e) Applicants accepted by this exception must complete fellowship Milestones evaluation (for the purposes of establishment of baseline performance by the Clinical Competency Committee), conducted by the receiving fellowship program within six weeks of matriculation. This evaluation may be waived for an applicant who has completed an ACGME International-accredited residency based on the applicant’s Milestones evaluation conducted at the conclusion of the residency program.

IIIA.2.e).(1) If the trainee does not meet the expected level of Milestones competency following entry into the fellowship program, the trainee must undergo a period of remediation, overseen by the Clinical Competency Committee and monitored by the GMEC or a subcommittee of the GMEC. This period of remediation must not count toward time in fellowship training.

** An exceptionally qualified applicant has (1) completed a non-ACGME-accredited residency program in the core specialty, and (2) demonstrated clinical excellence, in comparison to peers, throughout training. Additional evidence of exceptional qualifications is required, which may include one of the following: (a) participation in additional clinical or research training in the specialty or subspecialty; (b) demonstrated scholarship in the specialty or subspecialty; (c) demonstrated leadership during or after residency training; (d) completion of an ACGME-International-accredited residency program.

IIIA.3. The Review Committee for Diagnostic Radiology does allow exceptions to the Eligibility Requirements for Fellowship Programs in Section III.A.

IIIB. Number of Fellows

The program’s educational resources must be adequate to support the number of fellows appointed to the program.

IIIB.1. The program director may not appoint more fellows than approved
by the Review Committee, unless otherwise stated in the specialty-specific requirements. (Core)

III.B.2. The minimum number of fellows need not be greater than one, but two or more fellows are preferable. (Detail)

III.B.3. The number of fellows must not have a negative impact on the core diagnostic radiology program. (Detail)

IV. Educational Program

IV.A. The curriculum must contain the following educational components:

IV.A.1. Skills and competencies the fellow will be able to demonstrate at the conclusion of the program. The program must distribute these skills and competencies to fellows and faculty at least annually, in either written or electronic form. (Core)

IV.A.2. ACGME Competencies

The program must integrate the following ACGME competencies into the curriculum: (Core)

IV.A.2.a) Patient Care and Procedural Skills

IV.A.2.a).(1) Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Fellows: (Outcome)

IV.A.2.a).(1).(a) must interpret all non-invasive imaging studies of the brain, spine, neck, organs of special sense and vascular supply to these regions, including: (Outcome)

IV.A.2.a).(1).(a).(i) CT – Anatomic imaging CT, CT Perfusion, Multiplanar imaging and advanced image reconstruction; (Outcome)

IV.A.2.a).(1).(a).(ii) MR – Anatomic imaging, MR angiography, MR Perfusion, MR spectroscopy, Diffusion Imaging, Diffusion Tensor Imaging and functional MR; (Outcome)

IV.A.2.a).(1).(a).(iii) plain radiography; (Outcome)

IV.A.2.a).(1).(a).(iv) ultrasound – fetal, vascular sonography, and transcranial Doppler sonography; (Outcome)

IV.A.2.a).(1).(a).(v) nuclear medicine studies including PET; and, (Outcome)
IV.A.2.a).(1).(a).(vi) new and evolving imaging techniques. (Outcome)

IV.A.2.a).(1).(b) must demonstrate understanding of all aspects of administering and monitoring sedation of the conscious patient; (Outcome)

IV.A.2.a).(2) Fellows must be able to competently perform all medical, diagnostic, and surgical procedures considered essential for the area of practice. Fellows:
(Outcome)

IV.A.2.a).(2).(a) must perform 1500 neuroradiological CT scans and 1500 neuroradiological MR scans; (Outcome)

IV.A.2.a).(2).(b) must participate in and document the performance and interpretation of a minimum of: (Outcome)

IV.A.2.a).(2).(b).(i) 50 catheter-based angiographic procedures (participation in at least 5 intracranial microcatheter procedures is highly recommended); (Outcome)

IV.A.2.a).(2).(b).(ii) 50 image-guided invasive procedures (CT, MR, or fluoroscopically guided); and, (Outcome)

IV.A.2.a).(2).(b).(iii) 250 non-invasive (CT and/or MR) angiograms. (Outcome)

IV.A.2.a).(2).(c) must perform invasive procedures including: diagnostic catheter-based cerebral angiography; percutaneous minimally-invasive procedures for image-guided biopsies, spinal canal access (for myelography, spinal fluid analysis, and medication installation); and spine interventions, with direct supervision by an attending radiologist including pre- and postprocedural patient care; (Outcome)

IV.A.2.a).(2).(d) must perform non-invasive imaging studies related to the brain, head, neck, organs of special sense, skull base, and spine should include: CT; MRI; non-invasive (MR/CT) angiography; nuclear medicine studies (including SPECT and PET), and radiography; (Outcome)

IV.A.2.a).(2).(e) must perform advanced techniques such as magnetic resonance spectroscopy (MRS), functional activation studies (fMRI); (Outcome)

IV.A.2.a).(2).(f) must have completed advanced cardiac life support
IV.A.2.a).(2).(g)

**Training and Certification;**

must perform the following invasive procedures:

- IV.A.2.a).(2).(g).(i) angiography (diagnostic and therapeutic) of the cranial cavity, neck, and spine; **(Outcome)**
- IV.A.2.a).(2).(g).(ii) image guided access to the spinal subarachnoid space for the purposes of myelography, CSF analysis, and/or instillation of therapeutic agents; **(Outcome)**
- IV.A.2.a).(2).(g).(iii) image guided biopsies of the spine, skull, and neck; and, **(Outcome)**
- IV.A.2.a).(2).(g).(iv) spine procedures including vertebroplasty, kyphoplasty, discography epidural injections, and nerve blocks. **(Outcome)**

IV.A.2.a).(2).(h)

must perform relevant patient evaluation, demonstrate patient management skills, and relevant pharmacology skills. **(Outcome)**

**IV.A.2.b) Medical Knowledge**

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care. Fellows: **(Outcome)**

IV.A.2.b).(1)

must demonstrate an understanding of the following topics:

- IV.A.2.b).(1).(a) the indications, limitations, risks, alternatives and appropriate utilization of neuroradiologic imaging and interventional procedures; **(Outcome)**
- IV.A.2.b).(1).(b) normal anatomy, physiology and genetics of the central and peripheral nervous systems; **(Outcome)**
- IV.A.2.b).(1).(c) pathophysiology, pathology, anatomy, and genetics of diseases that affect the brain, neck and spine, including congenital, traumatic, vascular, neoplastic, infectious, inflammatory, metabolic, and neurodegenerative disorders; **(Outcome)**
- IV.A.2.b).(1).(d) neuroradiologic consequences of medical and surgical treatments of diseases of the brain, spine and head and neck; and, **(Outcome)**
IV.A.2.b).(1).(e) radiologic sciences with an emphasis on CT and MR physics, radiation biology, and the pharmacology of radiographic contrast materials. (Outcome)

IV.A.2.c) Practice-based Learning and Improvement

Fellows are expected to develop skills and habits to be able to meet the following goals:

IV.A.2.c).(1) systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement; (Outcome)

IV.A.2.c).(2) locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems; (Outcome)

IV.A.2.c).(3) reach their own diagnostic conclusions; (Outcome)

IV.A.2.c).(4) actively participate in a regular review of all morbidity and mortality related to the performance of interventional procedures; (Outcome)

IV.A.2.c).(5) participate in one or more weekly departmental and/or interdepartmental conferences with allied clinical departments; (Outcome)

IV.A.2.c).(6) utilize web-based educational materials including those provided by ASNR to enhance their learning; (Outcome)

IV.A.2.c).(7) teach conferences for medical students, radiology residents, residents from other services, graduate medical staff, and other health professionals; (Outcome)

IV.A.2.c).(8) present at least one didactic lecture reflecting their research; and, (Outcome)

IV.A.2.c).(9) attend and participate in local and regional extramural conferences and should attend at least one national meeting or post-graduate course in neuroradiology, and participate in local, regional, and national neuroradiology societies. (Outcome)

IV.A.2.d) Interpersonal and Communication Skills

Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals. (Outcome)
IV.A.2.e) Professionalism

Fellows must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. (Outcome)

IV.A.2.f) Systems-based Practice

Fellows must 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. (Outcome)

IV.A.3. Procedure log

The fellows are required to maintain documentation (a procedure log) of the invasive cases they have performed. The program director must review the log with the fellow at least quarterly. (Core)

IV.A.4. Interchange with students and fellows in other specialties

IV.A.4.a) Fellows should be encouraged to participate in the research projects of staff persons and fellows in other specialties. (Detail)

IV.A.4.b) Fellows should attend clinical conferences in other specialties and serve as consultants to these conferences. (Outcome)

IV.A.4.b).(1) It is desirable that they participate in the clinical teaching of medical students and also in the preclinical curriculum in subjects such as neuroanatomy and neurophysiology. (Detail)

IV.A.5. Participation in a journal club that meets on a regular basis, in which a fellow presents and leads a discussion on current peer reviewed articles pertaining to the specialty of neuroradiology, is encouraged. (Outcome)

IV.A.6. The curriculum must provide:

IV.A.6.a) dedicated training in pediatric neuroradiology; (Core)

IV.A.6.a).(1) Pediatric neuroradiology should be scheduled for a minimum of four weeks or equivalent time period. (Detail)

IV.A.6.b) dedicated training in head and neck radiology; (Core)

IV.A.6.b).(1) Head and neck radiology should be scheduled for a minimum of four weeks or equivalent time period. (Detail)

IV.A.6.c) training in spine radiology including non-invasive studies and image-guided procedures such as access to the spinal canal for myelography and medication installation, biopsy, discography, and
therapeutic spine procedures; *(Core)*

**IV.A.6.c).(1)** Spine radiology should be scheduled for a minimum of four weeks or equivalent time period. *(Detail)*

**IV.A.6.d)** training in vascular neuroradiology. *(The program must offer the opportunity for fellows to perform and interpret non-invasive and invasive diagnostic catheter-based cervicocerebral angiography. During this period there should be a special emphasis on catheter-based selective cervicocerebral angiography. Experience in microcatheter techniques for thrombolysis treatment of acute stroke and endovascular treatment of aneurysms is strongly recommended.)* *(Core)*

**IV.A.6.d).(1)** Vascular neuroradiology should be scheduled for a minimum of six weeks or equivalent time period. *(Detail)*

**IV.A.6.e)** general (adult) neuroradiology. During this time there should be an experience in new and evolving techniques such as Perfusion Imaging (CTP and MRP), MR spectroscopy, Diffusion Weighted Imaging (DWI), Diffusion Tension Imaging (DTI), fMRI, and PET. *(Core)*

**IV.A.6.e).(1)** The remainder of the time should be spent in general (adult) neuroradiology. *(Detail)*

Note: Since programs may not offer dedicated rotations in each subspecialty equivalent, it is possible that training may be calculated based on case volumes in each subspecialty. *(Detail)*

**IV.A.6.f)** morbidity and mortality review related to the performance of interventional procedures. *(Core)*

**IV.A.6.f).(1)** These must be held at least four times a year. *(Detail)*

**IV.A.6.g)** departmental and/or interdepartmental conferences with allied clinical departments. *(Core)*

**IV.A.6.g).(1)** These must occur weekly.

**IV.A.6.g).(2)** Examples include neurology, neurological surgery, orthopaedic surgery, neuron-oncology, head and neck surgery, and ophthalmology, in addition to neuroscience grand rounds. *(Detail)*

**IV.B. Fellows’ Scholarly Activities**

**IV.B.1.** The fellows should learn the fundamentals of experimental design, performance, and interpretation of results. *(Core)*
IV.B.2. Fellows should participate in clinical, basic biomedical, or health services research projects. (Core)

IV.B.2.a) Fellows should be encouraged to undertake at least one project as principal investigator. (Detail)

IV.B.3. Fellows should submit at least one scientific paper or exhibit for presentation at a regional or national meeting. (Outcome)

IV.B.4. The opportunity also must be provided for fellows to develop their competence in critical assessment of new imaging modalities and of new procedures in neuroradiology. (Core)

V. Evaluation

V.A. Fellow Evaluation

V.A.1. The program director must appoint the Clinical Competency Committee. (Core)

V.A.1.a) At a minimum the Clinical Competency Committee must be composed of three members of the program faculty. (Core)

V.A.1.a).(1) The program director may appoint additional members of the Clinical Competency Committee.

V.A.1.a).(1).(a) These additional members must be physician faculty members from the same program or other programs, or other health professionals who have extensive contact and experience with the program’s fellows in patient care and other health care settings. (Core)

V.A.1.a).(1).(b) Chief residents who have completed core residency programs in their specialty and are eligible for specialty board certification may be members of the Clinical Competency Committee. (Core)

V.A.1.b) There must be a written description of the responsibilities of the Clinical Competency Committee. (Core)

V.A.1.b).(1) The Clinical Competency Committee should:

V.A.1.b).(1).(a) review all fellow evaluations semi-annually; (Core)

V.A.1.b).(1).(b) prepare and ensure the reporting of Milestones evaluations of each fellow semi-annually to ACGME; and, (Core)

V.A.1.b).(1).(c) advise the program director regarding fellow
progress, including promotion, remediation, and dismissal.  

V.A.2. Formative Evaluation

V.A.2.a) The faculty must evaluate fellow performance in a timely manner.  

V.A.2.b) The program must:

V.A.2.b).(1) provide objective assessments of competence in patient care and procedural skills, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice based on the specialty-specific Milestones;  

V.A.2.b).(2) use multiple evaluators (e.g., faculty, peers, patients, self, and other professional staff); and,  

V.A.2.b).(3) provide each fellow with documented semiannual evaluation of performance with feedback.  

V.A.2.c) The evaluations of fellow performance must be accessible for review by the fellow, in accordance with institutional policy.  

V.A.2.d) Fellow assessment must include quarterly meetings with the program director to discuss performance and methods for improvement.  

V.A.2.e) Diagnostic conclusions must be reviewed with the faculty.  

V.A.2.e).(1) Diagnostic reports generated by fellows should be reviewed for content, level of confidence, grammar, and style. Feedback must be provided and the reports must be signed by a neuroradiology staff physician.  

V.A.3. Summative Evaluation

V.A.3.a) The specialty-specific Milestones must be used as one of the tools to ensure fellows are able to practice core professional activities without supervision upon completion of the program.  

V.A.3.b) The program director must provide a summative evaluation for each fellow upon completion of the program.  

This evaluation must:

V.A.3.b).(1) become part of the fellow’s permanent record
maintained by the institution, and must be accessible for review by the fellow in accordance with institutional policy;  

V.A.3.b).(2) document the fellow’s performance during their education; and,  

V.A.3.b).(3) verify that the fellow has demonstrated sufficient competence to enter practice without direct supervision.  

V.B. Faculty Evaluation  
V.B.1. At least annually, the program must evaluate faculty performance as it relates to the educational program.  

V.B.2. These evaluations should include a review of the faculty’s clinical teaching abilities, commitment to the educational program, clinical knowledge, professionalism, and scholarly activities.  

V.C. Program Evaluation and Improvement  
V.C.1. The program director must appoint the Program Evaluation Committee (PEC).  

V.C.1.a) The Program Evaluation Committee:  
V.C.1.a).(1) must be composed of at least two program faculty members and should include at least one fellow;  

V.C.1.a).(2) must have a written description of its responsibilities; and,  

V.C.1.a).(3) should participate actively in:  
V.C.1.a).(3).(a) planning, developing, implementing, and evaluating educational activities of the program;  

V.C.1.a).(3).(b) reviewing and making recommendations for revision of competency-based curriculum goals and objectives;  

V.C.1.a).(3).(c) addressing areas of non-compliance with ACGME standards; and,  

V.C.1.a).(3).(d) reviewing the program annually using evaluations of faculty, fellows, and others, as specified below.  

V.C.2. The program, through the PEC, must document formal, systematic
evaluation of the curriculum at least annually, and is responsible for rendering a written, annual program evaluation. (Core)

The program must monitor and track each of the following areas:

V.C.2.a) fellow performance; (Core)
V.C.2.b) faculty development; and, (Core)
V.C.2.c) progress on the previous year’s action plan(s). (Core)

V.C.3. The PEC must prepare a written plan of action to document initiatives to improve performance in one or more of the areas listed in section V.C.2., as well as delineate how they will be measured and monitored. (Core)

V.C.3.a) The action plan should be reviewed and approved by the teaching faculty and documented in meeting minutes. (Detail)

VI. The Learning and Working Environment

Fellowship education must occur in the context of a learning and working environment that emphasizes the following principles:

- Excellence in the safety and quality of care rendered to patients by fellows today

- Excellence in the safety and quality of care rendered to patients by today’s fellows in their future practice

- Excellence in professionalism through faculty modeling of:
  - the effacement of self-interest in a humanistic environment that supports the professional development of physicians
  - the joy of curiosity, problem-solving, intellectual rigor, and discovery

- Commitment to the well-being of the students, residents/fellows, faculty members, and all members of the health care team

VI.A. Patient Safety, Quality Improvement, Supervision, and Accountability

VI.A.1. Patient Safety and Quality Improvement

All physicians share responsibility for promoting patient safety and enhancing quality of patient care. Graduate medical education must prepare fellows to provide the highest level of clinical care with continuous focus on the safety, individual needs, and humanity of their patients. It is the right of each patient to be cared for by fellows who are appropriately supervised; possess the requisite knowledge,
skills, and abilities; understand the limits of their knowledge and experience; and seek assistance as required to provide optimal patient care.

Fellows must demonstrate the ability to analyze the care they provide, understand their roles within health care teams, and play an active role in system improvement processes. Graduating fellows will apply these skills to critique their future unsupervised practice and effect quality improvement measures.

It is necessary for fellows and faculty members to consistently work in a well-coordinated manner with other health care professionals to achieve organizational patient safety goals.

VI.A.1.a) Patient Safety

VI.A.1.a).(1) Culture of Safety

A culture of safety requires continuous identification of vulnerabilities and a willingness to transparently deal with them. An effective organization has formal mechanisms to assess the knowledge, skills, and attitudes of its personnel toward safety in order to identify areas for improvement.

VI.A.1.a).(1).(a) The program, its faculty, residents, and fellows must actively participate in patient safety systems and contribute to a culture of safety. (Core)

VI.A.1.a).(1).(b) The program must have a structure that promotes safe, interprofessional, team-based care. (Core)

VI.A.1.a).(2) Education on Patient Safety

Programs must provide formal educational activities that promote patient safety-related goals, tools, and techniques. (Core)

VI.A.1.a).(3) Patient Safety Events

Reporting, investigation, and follow-up of adverse events, near misses, and unsafe conditions are pivotal mechanisms for improving patient safety, and are essential for the success of any patient safety program. Feedback and experiential learning are essential to developing true competence in the ability to identify causes and institute sustainable systems-based changes to ameliorate patient safety vulnerabilities.
VI.A.1.a).(3).(a) Residents, fellows, faculty members, and other clinical staff members must:

VI.A.1.a).(3).(a).(i) know their responsibilities in reporting patient safety events at the clinical site; (Core)

VI.A.1.a).(3).(a).(ii) know how to report patient safety events, including near misses, at the clinical site; and, (Core)

VI.A.1.a).(3).(a).(iii) be provided with summary information of their institution’s patient safety reports. (Core)

VI.A.1.a).(3).(b) Fellows must participate as team members in real and/or simulated interprofessional clinical patient safety activities, such as root cause analyses or other activities that include analysis, as well as formulation and implementation of actions. (Core)

VI.A.1.a).(4) Fellow Education and Experience in Disclosure of Adverse Events

Patient-centered care requires patients, and when appropriate families, to be apprised of clinical situations that affect them, including adverse events. This is an important skill for faculty physicians to model, and for fellows to develop and apply.

VI.A.1.a).(4).(a) All fellows must receive training in how to disclose adverse events to patients and families. (Core)

VI.A.1.a).(4).(b) Fellows should have the opportunity to participate in the disclosure of patient safety events, real or simulated. (Detail)

VI.A.1.b) Quality Improvement

VI.A.1.b).(1) Education in Quality Improvement

A cohesive model of health care includes quality-related goals, tools, and techniques that are necessary in order for health care professionals to achieve quality improvement goals.
VI.A.1.b).(1).(a) Fellows must receive training and experience in quality improvement processes, including an understanding of health care disparities. *(Core)*

VI.A.1.b).(2) Quality Metrics

*Access to data is essential to prioritizing activities for care improvement and evaluating success of improvement efforts.*

VI.A.1.b).(2).(a) Fellows and faculty members must receive data on quality metrics and benchmarks related to their patient populations. *(Core)*

VI.A.1.b).(3) Engagement in Quality Improvement Activities

*Experiential learning is essential to developing the ability to identify and institute sustainable systems-based changes to improve patient care.*

VI.A.1.b).(3).(a) Fellows must have the opportunity to participate in interprofessional quality improvement activities. *(Core)*

VI.A.1.b).(3).(a).(i) This should include activities aimed at reducing health care disparities. *(Detail)*

VI.A.2. Supervision and Accountability

VI.A.2.a) 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 Institutions, define, widely communicate, and monitor a structured chain of responsibility and accountability as it relates to the supervision of all patient care.

*Supervision in the setting of graduate medical education provides safe and effective care to patients; ensures each fellow’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).(1) Each patient must have an identifiable and 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. *(Core)*
VI.A.2.a).(1).(a) This information must be available to fellows, faculty members, other members of the health care team, and patients. (Core)

VI.A.2.a).(1).(b) Fellows and faculty members must inform each patient of their respective roles in that patient’s care when providing direct patient care. (Core)

VI.A.2.b) Supervision may be exercised through a variety of methods. For many aspects of patient care, the supervising physician may be a more advanced fellow. Other portions of care provided by the fellow can be adequately supervised by the immediate availability of the supervising faculty member or fellow 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 fellow-delivered care with feedback.

VI.A.2.b).(1) The program must demonstrate that the appropriate level of supervision in place for all fellows is based on each fellow’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. (Core)

VI.A.2.c) Levels of Supervision

To promote oversight of fellow supervision while providing for graded authority and responsibility, the program must use the following classification of supervision: (Core)

VI.A.2.c).(1) Direct Supervision – the supervising physician is physically present with the fellow and patient. (Core)

VI.A.2.c).(2) Indirect Supervision:

VI.A.2.c).(2).(a) 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. (Core)

VI.A.2.c).(2).(b) 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. (Core)
VI.A.2.c).(3) Oversight – the supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered. (Core)

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

VI.A.2.d).(1) The program director must evaluate each fellow’s abilities based on specific criteria, guided by the Milestones. (Core)

VI.A.2.d).(2) Faculty members functioning as supervising physicians must delegate portions of care to fellows based on the needs of the patient and the skills of each fellow. (Core)

VI.A.2.d).(3) Fellows should serve in a supervisory role to residents or junior fellows in recognition of their progress toward independence, based on the needs of each patient and the skills of the individual resident or fellow. (Detail)

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

VI.A.2.e).(1) Each fellow must know the limits of their scope of authority, and the circumstances under which the fellow is permitted to act with conditional independence. (Outcome)

VI.A.2.f) Faculty supervision assignments must be of sufficient duration to assess the knowledge and skills of each fellow and to delegate to the fellow the appropriate level of patient care authority and responsibility. (Core)

VI.B. Professionalism

VI.B.1. Programs, in partnership with their Sponsoring Institutions, must educate fellows and faculty members concerning the professional responsibilities of physicians, including their obligation to be appropriately rested and fit to provide the care required by their patients. (Core)

VI.B.2. The learning objectives of the program must:

VI.B.2.a) be accomplished through an appropriate blend of supervised patient care responsibilities, clinical teaching, and didactic educational events; (Core)
VI.B.2.b) be accomplished without excessive reliance on fellows to fulfill non-physician obligations; and, (Core)

VI.B.2.c) ensure manageable patient care responsibilities. (Core)

VI.B.3. The program director, in partnership with the Sponsoring Institution, must provide a culture of professionalism that supports patient safety and personal responsibility. (Core)

VI.B.4. Fellows and faculty members must demonstrate an understanding of their personal role in the:

VI.B.4.a) provision of patient- and family-centered care; (Outcome)

VI.B.4.b) safety and welfare of patients entrusted to their care, including the ability to report unsafe conditions and adverse events; (Outcome)

VI.B.4.c) assurance of their fitness for work, including: (Outcome)

VI.B.4.c).(1) management of their time before, during, and after clinical assignments; and, (Outcome)

VI.B.4.c).(2) recognition of impairment, including from illness, fatigue, and substance use, in themselves, their peers, and other members of the health care team. (Outcome)

VI.B.4.d) commitment to lifelong learning; (Outcome)

VI.B.4.e) monitoring of their patient care performance improvement indicators; and, (Outcome)

VI.B.4.f) accurate reporting of clinical and educational work hours, patient outcomes, and clinical experience data. (Outcome)

VI.B.5. All fellows and faculty members must demonstrate responsiveness to patient needs that supersedes self-interest. This includes the recognition that under certain circumstances, the best interests of the patient may be served by transitioning that patient’s care to another qualified and rested provider. (Outcome)

VI.B.6. Programs must provide a professional, respectful, and civil environment that is free from mistreatment, abuse, or coercion of students, residents/fellows, faculty, and staff. Programs, in partnership with their Sponsoring Institutions, should have a process for education of fellows and faculty regarding unprofessional behavior and a confidential process for reporting, investigating, and addressing such concerns. (Core)

VI.C. Well-Being
In the current health care environment, fellows and faculty members are at increased risk for burnout and depression. 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 fellowship training. Programs, in partnership with their Sponsoring Institutions, have the same responsibility to address well-being as they do to evaluate other aspects of fellow competence.

VI.C.1. This responsibility must include:

VI.C.1.a) efforts to enhance the meaning that each fellow 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; (Core)

VI.C.1.b) attention to scheduling, work intensity, and work compression that impacts fellow well-being; (Core)

VI.C.1.c) evaluating workplace safety data and addressing the safety of fellows and faculty members; (Core)

VI.C.1.d) policies and programs that encourage optimal fellow and faculty member well-being; and, (Core)

VI.C.1.d).(1) Fellows must be given the opportunity to attend medical, mental health, and dental care appointments, including those scheduled during their working hours. (Core)

VI.C.1.e) attention to fellow and faculty member burnout, depression, and substance abuse. The program, in partnership with its Sponsoring Institution, must educate faculty members and fellows in identification of the symptoms of burnout, depression, and substance abuse, including means to assist those who experience these conditions. Fellows and faculty members must also be educated to recognize those symptoms in themselves and how to seek appropriate care. The program, in partnership with its Sponsoring Institution, must: (Core)

VI.C.1.e).(1) encourage fellows and faculty members to alert the program director or other designated personnel or programs when they are concerned that another resident, fellow, or faculty member may be displaying signs of burnout, depression, substance abuse, suicidal ideation, or potential for violence; (Core)
VI.C.1.e).(2) provide access to appropriate tools for self-screening; and, (Core)

VI.C.1.e).(3) 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. (Core)

VI.C.2. There are circumstances in which 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 fellow may be unable to perform their patient care responsibilities. These policies must be implemented without fear of negative consequences for the fellow who is unable to provide the clinical work. (Core)

VI.D. Fatigue Mitigation

VI.D.1. Programs must:

VI.D.1.a) educate all faculty members and fellows to recognize the signs of fatigue and sleep deprivation; (Core)

VI.D.1.b) educate all faculty members and fellows in alertness management and fatigue mitigation processes; and, (Core)

VI.D.1.c) encourage fellows to use fatigue mitigation processes to manage the potential negative effects of fatigue on patient care and learning. (Detail)

VI.D.2. Each program must ensure continuity of patient care, consistent with the program’s policies and procedures referenced in VI.C.2, in the event that a fellow may be unable to perform their patient care responsibilities due to excessive fatigue. (Core)

VI.D.3. The program, in partnership with its Sponsoring Institution, must ensure adequate sleep facilities and safe transportation options for fellows who may be too fatigued to safely return home. (Core)

VI.E. Clinical Responsibilities, Teamwork, and Transitions of Care

VI.E.1. Clinical Responsibilities

The clinical responsibilities for each fellow must be based on PGY level, patient safety, fellow ability, severity and complexity of patient illness/condition, and available support services. (Core)

VI.E.2. Teamwork

Fellows must care for patients in an environment that maximizes
communication. This must include the opportunity to work as a member of effective interprofessional teams that are appropriate to the delivery of care in the specialty and larger health system. (Core)

VI.E.3. Transitions of Care

VI.E.3.a) Programs must design clinical assignments to optimize transitions in patient care, including their safety, frequency, and structure. (Core)

VI.E.3.b) Programs, in partnership with their Sponsoring Institutions, must ensure and monitor effective, structured hand-over processes to facilitate both continuity of care and patient safety. (Core)

VI.E.3.c) Programs must ensure that fellows are competent in communicating with team members in the hand-over process. (Outcome)

VI.E.3.d) Programs and clinical sites must maintain and communicate schedules of attending physicians and fellows currently responsible for care. (Core)

VI.E.3.e) Each program must ensure continuity of patient care, consistent with the program’s policies and procedures referenced in VI.C.2, in the event that a fellow may be unable to perform their patient care responsibilities due to excessive fatigue or illness, or family emergency. (Core)

VI.F. Clinical Experience and Education

Programs, in partnership with their Sponsoring Institutions, must design an effective program structure that is configured to provide fellows with educational and clinical experience opportunities, as well as reasonable opportunities for rest and personal activities.

VI.F.1. Maximum Hours of Clinical and Educational Work per Week

Clinical and educational 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. (Core)

VI.F.2. Mandatory Time Free of Clinical Work and Education

VI.F.2.a) The program must design an effective program structure that is configured to provide fellows with educational opportunities, as well as reasonable opportunities for rest and personal well-being. (Core)

VI.F.2.b) Fellows should have eight hours off between scheduled
VI.F.2.b).(1) There may be circumstances when fellows choose to stay to care for their patients or return to the hospital with fewer than eight hours free of clinical experience and education. This must occur within the context of the 80-hour and the one-day-off-in-seven requirements.

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

VI.F.2.d) Fellows must be scheduled for a minimum of one day in seven free of clinical work and required education (when averaged over four weeks). At-home call cannot be assigned on these free days.

VI.F.3. Maximum Clinical Work and Education Period Length

VI.F.3.a) Clinical and educational work periods for fellows must not exceed 24 hours of continuous scheduled clinical assignments.

VI.F.3.a).(1) Up to four hours of additional time may be used for activities related to patient safety, such as providing effective transitions of care, and/or fellow education.

VI.F.3.a).(1).(a) Additional patient care responsibilities must not be assigned to a fellow during this time.

VI.F.4. Clinical and Educational Work Hour Exceptions

VI.F.4.a) In rare circumstances, after handing off all other responsibilities, a fellow, on their own initiative, may elect to remain or return to the clinical site in the following circumstances:

VI.F.4.a).(1) to continue to provide care to a single severely ill or unstable patient;

VI.F.4.a).(2) humanistic attention to the needs of a patient or family; or,

VI.F.4.a).(3) to attend unique educational events.

VI.F.4.b) These additional hours of care or education will be counted toward the 80-hour weekly limit.

VI.F.4.c) A Review Committee may grant rotation-specific exceptions for up to 10 percent or a maximum of 88 clinical and
educational work hours to individual programs based on a sound educational rationale.

The Review Committee for Diagnostic Radiology will not consider requests for exceptions to the 80-hour limit to the fellows’ work week.

VI.F.4.c).(1) In preparing a request for an exception, the program director must follow the clinical and educational work hour exception policy from the ACGME Manual of Policies and Procedures. (Core)

VI.F.4.c).(2) Prior to submitting the request to the Review Committee, the program director must obtain approval from the Sponsoring Institution’s GMEC and DIO. (Core)

VI.F.5. Moonlighting

VI.F.5.a) Moonlighting must not interfere with the ability of the fellow to achieve the goals and objectives of the educational program, and must not interfere with the fellow’s fitness for work nor compromise patient safety. (Core)

VI.F.5.b) Time spent by fellows in internal and external moonlighting (as defined in the ACGME Glossary of Terms) must be counted toward the 80-hour maximum weekly limit. (Core)

VI.F.6. In-House Night Float

Night float must occur within the context of the 80-hour and one-day-off-in-seven requirements. (Core)

VI.F.7. Maximum In-House On-Call Frequency

Fellows must be scheduled for in-house call no more frequently than every third night (when averaged over a four-week period). (Core)

VI.F.8. At-Home Call

VI.F.8.a) Time spent on patient care activities by fellows on at-home call must count toward the 80-hour maximum weekly 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 clinical work and education, when averaged over four weeks. (Core)

VI.F.8.a).(1) At-home call must not be so frequent or taxing as to preclude rest or reasonable personal time for each fellow. (Core)

VI.F.8.b) Fellows are permitted to return to the hospital while on at-
home call to provide direct care for new or established patients. These hours of inpatient patient care must be included in the 80-hour maximum weekly limit. (Detail)

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*Core Requirements*: Statements that define structure, resource, or process elements essential to every graduate medical educational program.

Detail Requirements: Statements that describe a specific structure, resource, or process, for achieving compliance with a Core Requirement. Programs and sponsoring institutions in substantial compliance with the Outcome Requirements may utilize alternative or innovative approaches to meet Core Requirements.

Outcome Requirements: Statements that specify expected measurable or observable attributes (knowledge, abilities, skills, or attitudes) of residents or fellows at key stages of their graduate medical education.

Osteopathic Recognition
For programs seeking Osteopathic Recognition for the entire program, or for a track within the program, the Osteopathic Recognition Requirements are also applicable. (http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/Osteopathic_Recognition_Requirements.pdf)