

UNITED COUNCIL
FOR
NEUROLOGIC
SUBSPECIALTIES

**Neuroimaging
Program Requirements**

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Neuroimaging Program Requirements

The common program requirements are standards required of accredited programs in all UCNS subspecialties. They are shown in **bold** typeface below. Requirements in regular typeface are defined by each subspecialty.

I. Introduction

- A. Neuroimaging is the subspecialty of neurology dedicated to the study of the structure of the nervous system with techniques that provide anatomical renditions, both static and dynamic, of the nervous system and related structures.

Because diseases of the nervous system alter its structure and function, Neuroimaging contributes substantially to the diagnosis, monitoring, and treatment of neurological diseases. Neuroimaging techniques currently employed include, but are not limited to, computed tomography, nuclear magnetic resonance (MRI, MRS, MRA, fMRI), positron emission tomography, single photon emission computed tomography, and catheter angiography.

B. Purpose of the Training Program

- 1. The purpose of the training program is to prepare the physician for independent practice of Neuroimaging. This training must be based on supervised clinical work with increasing patient care responsibilities and transition to independent practice over the course of the training program.**
 - 2. The program must require its fellows to obtain competencies in the six core competency areas defined by the Accreditation Council for Graduate Medical Education (ACGME). It is the responsibility of the program to provide precise definitions of specific knowledge, skills, and behaviors, as well as educational opportunities in which the fellow must demonstrate competence in those areas. The program's curricular goals and objectives must correlate to the appropriate ACGME Core Competencies and global learning objectives.**
- C. The training program in Neuroimaging is expected to provide the fellow with expertise in the application of Neuroimaging techniques for the management of disorders of the nervous system. As a subspecialty of neurology, Neuroimaging focuses primarily on the integration of clinical information with information provided by Neuroimaging techniques. Neuroimaging includes the selection of the appropriate technology to image the relevant structure or function of the nervous system and the correlation of the imaging findings with the rest of the clinical data. For this reason, the Neuroimaging fellow should become well acquainted with the histories, physical examinations, and other clinical data of the imaged patients.

Emphasis is placed on the correlation of the clinical data with information derived from the various modalities used to image and evaluate the nervous system and related structures (*integrated Neuroimaging*) and on the updating of algorithms leading to a cost effective and efficient use of imaging modalities for the diagnosis and treatment of the various nervous system disorders.

II. Institutional Support

There are three types of institutions that may comprise a program: 1) the sponsoring institution, which assumes ultimate responsibility for the program and is required of all

programs, 2) the primary institution, which is the primary clinical training site and may or may not be the sponsoring institution, and 3) the participating institution, which provides required experience that cannot be obtained at the primary or sponsoring institutions.

A. Sponsoring Institution

1. The sponsoring institution must be accredited by the ACGME or Canadian Excellence in Residency Accreditation (CanERA), formerly the Royal College of Physicians and Surgeons of Canada (RCPSC), and meet the current ACGME Institutional Requirements or CanERA General Standards of Accreditation for Institutions with Residency Programs. This responsibility extends to fellow assignments at all primary and participating institutions. The sponsoring institution must be appropriately organized for the conduct of graduate medical education (GME) in a scholarly environment and must be committed to excellence in both medical education and patient care.
2. A letter demonstrating the sponsoring institution's responsibility for the program must be submitted. The letter must:
 - a. confirm sponsorship and oversight of the training program's GME activities,
 - b. state the sponsoring institution's commitment to training and education, which includes the resources provided by the sponsoring institution, the primary institution, and/or the departments that support the program director's fulfillment of his or her duties as described in these program requirements, and
 - c. be signed by the designated institution official of the institution as defined by ACGME or postgraduate dean as defined by CanERA.
3. Institutional support and oversight are further demonstrated by the required designated institution official/postgraduate dean signature on all program accreditation and reaccreditation applications and annual report submissions.

B. Primary Institution

1. Assignments at the primary institution must be of sufficient duration to ensure a quality educational experience and must provide sufficient opportunity for continuity of care. The primary institution must demonstrate the ability to promote the overall program goals and support educational and peer activities.
2. A letter from the appropriate department chair(s) at the primary institution must be submitted. The letter must:
 - a. confirm the relationship of the primary institution to the program,
 - b. state the primary institution's commitment to training and education, and
 - c. list specific activities that will be undertaken, supported, and supervised at the primary institution.

C. Participating Institutions

1. Assignments to participating institutions must be based on a clear educational rationale, must have clearly stated learning objectives and activities, and should 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. Assignments at participating institutions must be of sufficient duration 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 overall program goals and support educational and peer activities.

3. If a participating institution is used, a participating institution letter must be submitted. The letter must:
 - a. confirm the relationship of the participating institution to the program,
 - b. state the participating institution's commitment to training and education,
 - c. list specific activities that will be undertaken, supported, and supervised at the participating institution, and
 - d. be signed by the appropriate official, e.g., department chair or medical director, of the participating institution.

III. Facilities and Resources

- A. Each program must demonstrate that it possesses the facilities and resources necessary to support a quality educational experience.
 1. Additional professional, technical, and administrative personnel must be provided to adequately support the fellowship training program in attaining its educational and administrative goals.
 2. In programs not situated in a department of neurology, evidence must be provided that demonstrates fellows have access to neurological services that include Neuroimaging.
 3. Equipment that must be available to a Neuroimaging training program include:
 - a. a magnetic resonance scanner, preferably with facilities to perform echoplanar imaging, and
 - b. a computed tomography (CT) scanner.
 4. Fellows must be exposed to, and receive appropriate instruction in, the use of clinical neuroimaging techniques and some emerging Neuroimaging technologies using these platforms.
 5. Adequate space for image display and interpretation of studies must be available. The program must provide adequate office space, computers, supplies, and administrative support to facilitate the performance of clinical or research projects.
 6. The program must provide access to core Neuroimaging journals, which may be online.
 7. A teaching file of at least 500 representative Neuroimaging cases, with case histories and images, covering a wide variety of disorders must be available to the fellow, either from the training institution itself or on electronic media.

IV. Faculty

The faculty of accredited programs consists of: 1) the program director, 2) core faculty, and 3) other faculty. Core faculty are physicians who oversee clinical training in the subspecialty. The program director is considered a core faculty member when determining the fellow complement. Other faculty are physicians and other professionals determined by the Subspecialty to be necessary to deliver the program curriculum. The program director and faculty are responsible for the general administration of the program and for the establishment and maintenance of a stable educational environment. Adequate durations of appointments for the program director and core faculty members are essential for maintaining such an environment. The duration of appointment for the program director must provide for continuity of leadership.

A. Program Director Qualifications

1. There must be a single program director responsible for the program. The person designated with this authority is accountable for the operation of the program and

he or she should be a member of the faculty or medical staff of the primary institution.

2. The program director must:

- a. possess requisite specialty expertise as well as documented educational and administrative abilities and experience in his or her field,
- b. be certified by the American Board of Medical Specialties (ABMS), American Osteopathic Association (AOA), RCPSC, or College of Family Physicians of Canada (CFPC) in neurology, child neurology, neurosurgery, or radiology with neuroradiology subspecialty,
- c. possess a current, valid, unrestricted, and unqualified license to practice medicine in the state or province of the program,
- d. be certified, and maintain certification, in Neuroimaging by the UCNS and,
 - i. New programs without a certified program director may apply for accreditation, as long as the application contains an attestation that the program director will become certified at the next available opportunity, which includes certification through the UCNS faculty diplomate pathway. The attestation must contain a statement that the program understands that should the program director fail to achieve certification, the program must immediately submit a program change request appointing an appropriately qualified program director.
- e. spend at least 80% of his or her clinical and academic time in Neuroimaging or a neurological-disease related field that focuses on Neuroimaging content.

B. Program Director Responsibilities

1. The program director must:

- a. oversee and organize the activities of the educational program in all institutions participating in the program including selecting and supervising the faculty and other program personnel at each institution, and monitoring appropriate fellow supervision and evaluation at all institutions used by the program,
- b. prepare accurate statistical and narrative descriptions of the program as requested by the UCNS as well as update the program and fellow records annually,
- c. ensure the implementation of fair policies and procedures, as established by the sponsoring institution, to address fellow grievances and due process in compliance with the ACGME's or CanERA's institutional requirements,
- d. monitor fellow stress, including mental or emotional conditions inhibiting performance or learning, and drug- or alcohol-related dysfunction, and
- e. obtain prior approval of the UCNS for changes in the program that may significantly alter the educational experience of the fellows. Upon review of a proposal for a program change, the UCNS may determine that additional oversight or a site visit is necessary. Examples of changes that must be reported include:
 - 1) change in the program director,
 - 2) the addition or deletion of sponsoring, primary, or participating institution(s),
 - 3) change in the number of approved fellows, and
 - 4) change in the format of the educational program

C. Core Faculty Qualifications

1. Each core faculty member must:
 - a. possess requisite specialty expertise as well as documented educational and administrative abilities and experience in his or her field,
 - b. be currently certified by the ABMS, AOA, RCPSC, or CFPC in neurology, neurosurgery, child neurology, or neuroradiology.
 - c. possess a current, valid, unrestricted, and unqualified license to practice medicine in the state or province of the program, and
 - d. be appointed in good standing to the faculty of an institution participating in the program.
2. The core faculty must include at least one neurologist. The neurologist may also be the program director.

D. Core Faculty Responsibilities

1. There must be a sufficient number of core faculty members with documented qualifications at each institution participating in the program to instruct and adequately supervise all fellows in the program.
2. Core faculty members must:
 - a. devote sufficient time to the educational program to fulfill their supervisory and teaching responsibilities,
 - b. evaluate the fellows they supervise in a timely manner, and
 - c. demonstrate a strong interest in the education of fellows, demonstrate competence in both clinical care and teaching abilities, support the goals and objectives of the educational program, and demonstrate commitment to their own continuing medical education by participating in scholarly activities.

E. Other Faculty and Personnel

1. The program may include other faculty appropriate for Neuroimaging training..

V. Fellow Appointment

A. Duration of Training

1. Fellowship programs must be no less than 12 months of clearly identifiable Neuroimaging training, the entirety of which must be spent in patient-oriented Neuroimaging education. At least 80% of the fellow's time must be spent in supervised training activities in the practice of Neuroimaging, including didactic and clinical education specific to the subspecialty, electives, and scholarly activities.
2. Flexible Fellowships
 - a. Programs may offer flexible fellowships for a variety of reasons, including, but not limited to: combined clinical/research fellowships or to allow fellows opportunities for work/life balance. Programs that combine clinical and research training (clinician-scientist fellowship program) may be up to 36 months in duration for a one-year program and 48 months for a two-year program. At least 12 full months of this extended-program period must be spent in patient-oriented Neuroimaging clinical, educational, and scholarly activity, the distribution of which across this extended period is at the program's discretion.

B. Fellow Eligibility

1. The fellow must possess a current valid and unrestricted license to practice medicine in the United States or its territories or Canada.

2. **The fellow must be a graduate of a residency program in neurology or child neurology accredited by the ACGME, AOA, RCPSC, or CanERA.**
3. **The fellow must be board certified or eligible for certification by the ABMS, AOA, RCPSC, or CFPC in neurology or child neurology.**

C. Fellow Complement

The fellow complement is the number of fellows allowed to be enrolled in the program at any given time, e.g., across all training years.

1. There must be at least 1 core faculty member for every 1 fellow.

D. Appointment of Fellows and Other Students

1. **The appointment of fellows who do not meet the eligibility criteria above must not dilute or detract from the educational opportunities of regularly appointed Neuroimaging fellows. Programs must include these fellows in all reports submitted to UCNS to demonstrate compliance with the approved fellow complement. Fellows who are enrolled without meeting the eligibility criteria must be notified that they may not apply for UCNS certification examinations as graduates of an accredited program.**

VI. Educational Program

A. Role of the Program Director and Faculty

1. **The program director, with assistance of the faculty, is responsible for developing and implementing the academic and clinical program of fellow education by:**
 - a. **preparing a written statement to be distributed to fellows and faculty and reviewed with fellows prior to assignment, which outlines the educational goals and objectives of the program with respect to the knowledge, skills, and other attributes to be demonstrated by fellows for the entire fellowship and on each major assignment and each level of the program,**
 - b. **preparing and implementing a comprehensive, well-organized, and effective curriculum, both academic and clinical, which includes the presentation of core specialty knowledge supplemented by the addition of current information,**
 - c. **providing fellows with direct experience in progressive responsibility for patient management,**
 - d. **monitoring the content and ensuring the quality of the program,**
 - e. **using the *Neuroimaging Core Curriculum* to define core competencies with regard to the medical knowledge, patient care skills, interpersonal and communication skills, practice- and systems-based competencies, and standards of professionalism that are to be developed during the period of fellowship training in Neuroimaging, and**
 - f. **providing appropriate clinical opportunities and experience as outlined in the program requirements.**

B. Competencies

1. **A fellowship program must require that its fellows obtain competence in the AGCME Core Competencies to the level expected of a new practitioner in the subspecialty. Programs must define the specific and unique learning objectives in the area including the knowledge, skills, and behaviors required and provide educational experiences as needed in order for their fellows to demonstrate the core competencies.**

2. **The program must use the ACGME Core Competencies to develop competency-based goals and objectives for all educational experiences during the period of fellowship training in Neuroimaging.**
 3. The purpose of the training program is to prepare the physician for the independent practice of Neuroimaging. This training must be based on supervised Neuroimaging work with increasing responsibility for the selection, performance, and interpretation of Neuroimaging procedures.
- C. Didactic Components**
1. **The program must include structured, fellow-specific educational experiences such as rounds, conferences, case presentations, lectures, and seminars that complement the clinical and self-directed educational opportunities. Together, various educational experiences must facilitate the fellow’s mastery of the core content areas and foster the competencies as described above.**
 2. Neuroimaging programs must include instruction in basic neuroscience, particularly as it relates to neuroanatomy, neuropathology, cerebral hemodynamics, and neurochemistry. It must also include instruction in physics, applied to the Neuroimaging procedures used in the program. Instruction may preferentially emphasize either adult or pediatric Neuroimaging. The content of the didactic component of training is outlined in the *Neuroimaging Core Content*.
- D. Clinical Components**
1. **The fellow’s clinical experience must be spent in supervised activities related to the care of patients with conditions requiring Neuroimaging procedures. Clinical experiences may include all training relevant to Neuroimaging, including lectures and individual didactic experiences and journal clubs emphasizing clinical matters.**
 2. Each fellow must interpret a minimum of 400 MRIs and 300 CT cases and provide written reports on a minimum of 150 MRI and 100 CT cases. The training must include significant didactic and clinical experience reflecting appropriate representation of the current status and trends in current imaging modalities as well as a breadth and balance of care for patients with a variety of neurologic conditions.
- E. Scholarly Activities**
1. **The responsibility for establishing and maintaining an environment of inquiry and scholarship rests with the faculty. Both faculty and fellows must participate actively in some form of scholarly activity. Scholarship is defined as activities unrelated to the specific care of patients, which includes scholarship pertaining to research, writing review papers, giving research-based lectures and participating in research-oriented journal clubs.**
 2. **There must be adequate resources for scholarly activities for faculty and fellows.**
 3. Fellows must regularly read leading Neuroimaging journals and Neuroimaging papers that appear in other biomedical journals of a high-impact factor.
- F. Fellow Supervision, Clinical Experience and Education, and Well-Being**
Providing fellows with a sound academic and clinical education must be carefully planned and balanced with concerns for patient safety and fellow well-being. Each program must ensure that the learning objectives of the program are not compromised by excessive reliance on fellows to fulfill service obligations. Didactic and clinical education defined by the program requirements must have priority in the allotment of a fellow’s time and energy.
1. **Fellow Supervision**

- a. All patient care required by the program requirements must be supervised by qualified faculty. The program director must ensure, direct, and document adequate supervision of fellows at all times. Fellows must be provided with rapid, reliable systems for communicating with supervising faculty.
 - b. Faculty schedules must be structured to provide fellows with continuous supervision and consultation.
 - c. Faculty and fellows must be educated about and meet ACGME or CanERA requirements concerning faculty and fellow well-being and fatigue mitigation.
2. Clinical Experience and Education and Well-Being
- a. Clinical assignments must recognize that the faculty and fellows collectively have responsibility for the safety and welfare of patients. Fellow clinical experience and education supervision, and accountability, and clinical work hours, including time spent on-call, must comply with the current ACGME or CanERA institutional program requirements.

VII. Evaluation

A. Fellow Evaluation

- 1. Fellow evaluation by faculty must:
 - a. take place at least semi-annually to identify areas of weakness and strength, which must be communicated to the fellow,
 - b. use the subspecialty milestones to document fellow experience and performance, and
 - c. include the use of assessment results to achieve progressive improvements in the fellow's competence and performance in the ACGME Core Competencies and the subspecialty's core knowledge areas. Appropriate sources of evaluation include faculty, patients, peers, self, and other professional staff.
- 2. The program must include a mechanism for providing regular and timely performance feedback to fellows. Issues of unacceptable performance must be addressed in a timely fashion and in accordance with the policies and procedures of the sponsoring institution.
- 3. Summary and final evaluation of the fellow must:
 - a. be prepared by the program director and should reflect the input of faculty,
 - b. include a formative evaluation of the fellow's demonstration of learning objectives and mastery of the ACGME Core Competencies using the subspecialty's milestones,
 - c. include a final, summative evaluation by the program director using the subspecialty's milestones to document the fellow's demonstration of sufficient competence and professional ability to practice the subspecialty competently and independently, and
 - d. include a statement specifically regarding the fellow's ability to practice the subspecialty independently upon completion of the program.

B. Faculty Evaluation

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

C. Program Evaluation and Outcomes

- 1. The 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.**
- 2. Confidential written evaluations by fellows must be utilized in this process.**
- 3. The program will use fellow performance and outcome assessment in its evaluation of the educational effectiveness of the fellowship program. At a minimum, the fellow performance on the UCNS certification examination should be used as a measure of the effectiveness of the education provided by the training program. The development and use of clinical performance measures appropriate to the structure and content of each program is encouraged.**
- 4. The program must have a process in place for using fellow performance and assessment results together with other program evaluation results to improve the fellowship program.**