

Neuro-Oncology Program Requirements

I. Introduction

A. Definition

Neuro-oncology is a subspecialty that involves the neurological, medical, surgical, and oncologic management of patients with primary or metastatic central and peripheral nervous system neoplasms and any other disorders or complications affecting the nervous system that result directly or indirectly from nervous system or systemic neoplasms or from related treatment.

The primary purposes of this document are: 1) to define a common set of minimum training and core content requirements for neuro-oncology trainees within neuro-oncology fellowship programs, and 2) to define the minimum necessary training program elements, program director and faculty qualifications and composition, and other resources that are required of programs involved in the comprehensive advanced training of neuro-oncologists.

II. Institutional Support

A. Sponsoring Institution

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. 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. A participating institution is defined as an institution that provides specific learning experiences within a multi-institutional program of GME. Subsections of institutions, such as a department, clinic, or unit of a hospital do not qualify as participating institutions. A participating institution is also defined as one to which trainees rotate for a required experience and/or those that require explicit approval by the sponsoring institution prior to utilization.
2. Assignment to a participating institution must be based on a clear educational rationale, integral to the program curriculum, with clearly-stated activities and objectives, and resources at the participating institution should enhance the overall program. When multiple participating institutions are used, there should be coordination of the continuity of the educational experience.
3. 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 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.
4. Assignments at participating institutions must be of sufficient length (e.g., at least two weeks) to ensure a quality education experience, and should provide sufficient opportunity for continuity of care. Although the number of participating institutions may vary with the subspecialty's needs, all participating institutions must demonstrate the ability to promote the program goals as well as educational and peer activities.
5. Participating institutions must provide the program director with adequate protection of time necessary to carry out the duties and responsibilities of this role.

III. Duration of Training and Trainee Appointment

A. Minimum Length of Training and Number of Trainees

1. The minimum length of clinical training will be 12 months.
2. There is no maximum limit to the length of training.
3. The training requirements must not necessarily be met in a consecutive 12-month period; justification for extension must be provided in writing to the local GME committee substantiating the need for such extension and documented in the trainee's records.
4. The faculty to fellow ratio should not be less than 2:1.

B. Eligibility

The trainee must:

1. Have a current valid and unrestricted license to practice medicine in the US or Canada.
2. Have completed an Accreditation Council for Graduate Medical Education (ACGME) or Royal College of Physicians and Surgeons of Canada (RCPSC) accredited residency training in Neurology or Child Neurology; Neurological Surgery; Internal Medicine and Medical Oncology; or Pediatrics and Pediatric Hematology-Oncology.
3. Have a temporary or permanent license in good standing in the state(s) of the participating institution.
4. The trainee may be required to meet additional requirements for eligibility at the discretion of the program.

IV. Faculty and Personnel

A. Program Director Qualifications

There must be a single program director responsible for the program. An alternate director should be officially established in the event that the director is absent or is otherwise unable to carry out the requirements of his/her position. The program director must be selected by either the departmental chair or by another accepted mechanism utilized for appointment of educational officers at the primary teaching site.

The program director must:

1. possess appropriate subspecialty expertise such as demonstrated evidence of experience in the field of neuro-oncology and at least 5 years in post-graduate practice, plus documented educational and administrative abilities;
2. be a licensed physician in practice at the institution of training;
3. be primarily based and in good standing at the sponsoring institution;
4. be board certified in one of the ABMS-approved specialties of Neurology or Child Neurology; Neurological Surgery; Internal Medicine and Medical Oncology; or Pediatrics and Pediatric Hematology-Oncology;
5. be certified by the UCNS or possess appropriate qualifications (as determined by the UCNS Accreditation Council);
6. have significant prior experience in the training of medical students or post-doctoral medical or surgical trainees;
7. be in a position to foster and optimize multidisciplinary interactions and teaching in neuro-oncology within the institution(s)

B. Program Director Responsibilities

1. ensure that trainees adequately meet expectations of professional conduct, educational goals and other responsibilities as delineated in the Neuro-Oncology Program Requirements;
2. demonstrate that adequate resources and faculty support are present;
3. advise faculty and trainees of the process and content of the training program;

4. provide a stable educational environment;
5. coordinate and delegate responsibilities of training faculty;
6. provide conferences, educational didactic programs and other educational activities of the program;
7. organize an objective evaluation process for program development and quality control; direct evaluations of individual trainees and reverse evaluations of faculty by trainees;
8. report on the training program to the department chairperson or responsible GME director or committee, or other institutional committee in accord with institutional requirements;
9. retain records of performance evaluations, recommendations, communications, and educational and administrative meeting minutes that are directly related to the conduct of the training program and provide security and confidentiality of this documentation in accordance with institutional, Health Insurance Portability and Accountability Act (HIPAA), ACGME, and UCNS standards;
10. implement changes in the program as recommended by the formal annual internal evaluation of the program in a timely manner;
11. implement changes that result from formal amendment to the Neuro-Oncology Program Requirements in a timely manner;
12. provide a mechanism for selection of a new program director to ensure adequate continuity of the training experience, in the event that a change in program directorship occurs;
13. monitor trainee stress and well being, as observed directly or indirectly via the program faculty or by other trainees. In circumstances where the program director has reasonable concern that there might be significant compromise of the training experience or a safety issue, appropriate referral or other interventional action should be made in accord with institutional standards.

C. Faculty Qualifications

The composition of the faculty, and availability of other specialists at the institution that are not directly involved in the training but are supportive to the program, should be such that an adequate training experience is provided. Faculty must:

1. Be licensed physicians or graduate basic research staff members;
2. Be in good standing.

D. Required Faculty

1. neuro-oncologist – defined as one of the following:
 - i. A neurologist, board certified in Neurology or Child Neurology, who has a specific focus of practice in neuro-oncology - must have a supporting faculty member who is a board certified medical or pediatric oncologist, unless the neurologist is also board certified in Medical or Pediatric Oncology;
 - ii. An oncologist, board certified in Medical or Pediatric Oncology, who has a specific focus of practice in neuro-oncology - must have a supporting faculty member who is a board certified neurologist or child neurologist, unless the oncologist is also board certified in Neurology or Child Neurology;
 - iii. A neurosurgeon, board certified in Neurological Surgery, who has a specific focus of practice in neuro-oncology - must have a) a supporting faculty member who is board certified in Medical or Pediatric Oncology, and b) a supporting faculty member who is a board certified neurologist. It is preferred that these supporting personnel have experience in the management of neuro-oncologic patients;
2. neurosurgeon with reasonable experience in surgical treatment of neuro-oncology patients, and management of patients with central nervous system (CNS) tumors;
3. radiation oncologist;
4. neuro-radiologist;
5. neuropathologist or general pathologist with significant experience or training in the evaluation of nervous system tumors and complications of cancer and cancer treatment on the nervous system;
6. medical oncologist;

7. pediatric neuro-oncologist (only for those programs offering Pediatric Neuro-oncology Fellowships).

Faculty should:

1. have prior clinical experience in the training of neurology, medical oncology, neurosurgical, or neuro-oncology trainees;
2. include individual(s) with experience in clinical research methodology and clinical trials, as well as necessary support personnel (e.g., research nurses, statisticians, clinical data/research coordinators, etc.) who will provide adequate mentorship in clinical research. For programs that offer training in basic research as a part of the training curriculum, it is expected that qualified individuals with established experience in basic neuro-oncologic or related research would be part of the faculty.

E. Faculty Responsibilities

Faculty must:

1. provide direct supervision of trainees during the course of outpatient, inpatient and consultative services;
2. provide written evaluations of trainees, which correspond to the observational training period or rotation;
3. make recommendations regarding the strength or weaknesses of individual trainees to the program director where appropriate and indicate any areas of major concern on an as needed basis;
4. notify the program director in situations where there is concern of abnormal stress manifested by the trainee that interferes with the training process;
5. assist the program director in the annual internal evaluations of the program strengths and weaknesses and provide suggestions for improvement;

Faculty should:

1. contribute significantly and in a demonstrable way to the instruction of the trainees;
2. participate in continuing medical education conferences, presentations, generation of publications or other documents, mentoring and clinical research supervision, and other methods of instruction germane to the training program in neuro-oncology.

F. Other Program Members and Administrative Staff

1. required administrative and nursing staff:
 - i. clinical and/or research nurse (preferably certified oncology);
 - ii. secretary with partial or full FTE in support of the trainees.
2. other program members (strongly encouraged)
 - i. Although not considered faculty, whenever possible the following individuals should be identified as associated with the program, due to their importance in neuro-oncology training and practice:
 - biostatistician(s),
 - clinical research associate / data manager,
 - neuropsychologist,
 - social worker / case manager,
 - pain management professional,
 - palliative care / hospice professional.

V. Educational Program

A. Role of Program Director and Faculty

1. The program director and faculty must ensure that the trainee masters the competencies described elsewhere in this document by the end of the training experience.
2. The program director and faculty are responsible for providing progressive responsibility commensurate with demonstrated competence of the trainee and provide a productive working environment, program and faculty composition that will allow this process to be optimized.
3. The program director or his/her designate will be the primary faculty advisor for the trainees.

B. Competencies

1. The curriculum for the training program should be modeled wherever possible utilizing the guidelines established in this document. A written curriculum should be maintained by the program and modified on a yearly basis as needed to reflect suggested changes, improvements or amendments.
2. The general curriculum, content of the program, competency expectations, and other requirements must be presented to the trainees at the start of the program, and official changes in requirements must be provided by the program director to trainees in a timely fashion during the course of their training.
3. A written administrative process for changes in the curriculum must be in place at the participating institutions.
4. A detailed description of the core content is provided in the Neuro-Oncology Core Curriculum. A brief summary of the areas of required competencies includes:
 - i. knowledge of advanced principles of management of primary and metastatic nervous system tumors;
 - ii. expertise in the treatment of primary central nervous system tumors including surgery, radiation, chemotherapy and other medical therapies, and an up-to-date knowledge of agents in clinical research as applicable to neuro-oncology;
 - iii. expertise in the treatment of metastatic cancer to the nervous system including brain, spinal cord, leptomeningeal, epidural, plexus, peripheral nerve, and skull metastases;
 - iv. expertise in the treatment of cancer-related neurologic complications, specifically as it applies to neuro-oncologic patients, including: toxic, nutritional or metabolic encephalopathy; CNS and systemic infections; cerebrovascular disease; seizures; increased intracranial pressure; deep venous thromboembolism; neutropenia, thrombocytopenia, and anemia; paraneoplastic syndromes;
 - v. expertise in the evaluation and provision of basic medical care for neuro-oncologic complications of cancer or medical disorders that may typically occur in neuro-oncology patients, including treatment of toxic effects of surgery, chemotherapy, radiotherapy or other neuro-oncologic therapeutic modalities; in the safe and approved use of blood products and growth factor support; and basic competency in supportive and end-of-life care and pain management of neuro-oncology patients;
 - vi. skills involved in coordination of the overall management plan for neuro-oncology patients, including oversight of the interdisciplinary management of patients with neuro-oncologic disorders (e.g., appropriate indications for referral for consultation with or care by medical oncologists, neurosurgeons, radiation oncologists, neuroradiologists, neuropathologists, pain management specialists, rehabilitative personnel, and/or palliative care personnel).
5. The fellowship program must ensure that its fellows master the ACGME core competency areas listed below to the level expected of a new practitioner of neuro-oncology. Programs must define the specific knowledge, skills, behaviors, and attitudes required and provide educational experiences as needed in order for their fellows to demonstrate the following:
 - i. *patient care* that is compassionate, appropriate and effective for the treatment of health problems and the promotion of health;

- ii. *medical knowledge* about established and evolving biomedical, clinical, and cognate sciences, as well as the application of this knowledge to patient care;
- iii. *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;
- iv. *interpersonal and communication skills* that result in the effective exchange of information and collaboration with patients, their families, and other health professionals.
- v. *professionalism*, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds;
- vi. *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.

C. Didactic Components

The education must include a formal, didactic core content course of a minimum of 50 hours total length. The core content course must provide instruction in principles of treatment of CNS primary and metastatic tumors and related conditions; toxicities of therapy and administration; treatment of medical complications of cancer as they apply to neuro-oncology, and supportive care of neuro-oncology patients.

1. Essential elements of the core content course, with the minimum periods of didactic educational instruction include:
 - i. review of the major classes of chemotherapy, dosing and schedules, formulations, pharmacokinetics, toxicities and methods of administration as applicable to neuro-oncology (8 hours);
 - ii. diagnosis and medical treatment of adult gliomas, CNS lymphoma, meningioma and other primary CNS tumors (8 hours);
 - iii. diagnosis and medical treatment of the unique spectrum of primary brain tumors arising primarily but not exclusively in children, including optic pathway gliomas, diffuse brainstem gliomas, primitive neuroectodermal tumors, craniopharyngioma, ependymoma, and CNS germ cell tumors (8 hours);
 - iv. molecular targeted therapies, viral and immunotherapies, and novel therapeutics (2 hours);
 - v. basic principles of neurosurgical therapy as it applies to neuro-oncology (2 hours);
 - vi. basic principles of radiation oncology as it applies to neuro-oncology (2 hours);
 - vii. diagnosis and treatment of metastatic cancer to the nervous system including brain, spinal cord, leptomeningeal, epidural, plexus, peripheral nerve, and skull metastases (8 hours);
 - viii. hematologic toxicity monitoring, administration of growth factors and blood products (2 hours);
 - ix. principles of corticosteroid use (1 hour);
 - x. diagnosis and treatment of common medical complications in neuro-oncology patients, including seizures, raised intracranial pressure, vomiting, pain and headache, infections, venous thrombosis and pulmonary emboli, radiation toxicity, and other common associated conditions and toxicities; expertise in end-of-life care (10 hours);
 - xi. familiarity with the hereditary syndromes that predispose to CNS tumors.
2. In addition to the core content course, the educational experience must include additional didactic exposure that may be provided via clinical conferences as follows:
 - i. a multidisciplinary (radiation oncology, medical oncology, neurosurgery, neuro-oncology, neuropathology, and/or neuroradiology) conference at which neuro-oncology cases are presented. This conference should be a regularly scheduled conference that meets at least semiweekly excepting holidays or other extenuating circumstances.
 - ii. attendance at additional conferences, if available and relevant to neuro-oncology, should be encouraged, for examples: oncology grand rounds or general tumor board, journal club, neuropathology case review session, neuro-radiology conference, experimental neuro-oncology

conference, protocol development meetings, and/or administrative neuro-oncology or medical oncology meetings.

D. Clinical Components

The 12-month minimum clinical training can be arbitrarily divided into three main areas of training experience that should include:

1. approximately one-third of time (4 month equivalents, combined in- or out- patient experience), during which the trainee has exposure to routine and emergent neuro-oncology consultations (systemic cancer and hematologic malignancies and secondary or treatment related complications);
2. approximately one-third of time (4 month equivalents, combined in- or out- patient experience), during which time the trainee has exposure to routine and emergent care of patients with primary central and peripheral nervous system neoplasms, and related diagnostic and management issues;
3. approximately one-third of time (4 month equivalents) combined in- or out-patient experience), during which time the trainee is exposed to supportive or ancillary care of patients with primary or metastatic brain tumors. This experience may include rotations on any combination of the following: radiation oncology, medical oncology, pediatric oncology or pediatric neuro-oncology, neuroradiology, tumor neuropathology, neurosurgery, pain management, palliative care, or clinical research.

Although clinical training blocks are preferred, the clinical training described in D (1-3) above does not necessarily need to be consecutive, or organized into specific blocks (e.g., exclusive practice on primary brain tumor patients), as it is recognized that many programs for practical reasons offer ongoing parallel experiences in in-patient and ambulatory training settings with mixtures of patients with neuro-oncologic complications of systemic cancer, primary brain tumors, or those requiring supportive neuro-oncologic care. Thus, the training exposures can be organized into defined in- or out- patient rotations of specified length or can occur as a summation of experience gained throughout the entire training period. However, the program director must be able to defend adequately for the purposes of overall program evaluation that trainees are in fact receiving adequate training in the areas and for lengths of time as described in D (1-3). Examples of such defense might include patient consultation or admission lists with diagnoses, written estimates from supervising faculty on completion of rotations, etc.

E. Scholarly Activities

1. Clinical Research

During the training period, trainees should receive basic instruction in clinical research methodology including:

- i. education regarding the clinical trial process, including but not limited to clinical scientific research methodology and protocol design, the process of informed consent, data management and related biostatistical considerations;
- ii. education regarding ethical and regulatory issues pertaining to clinical research;
- iii. education regarding the process of evaluation of eligibility and enrollment of patients in clinical trials;
- iv. education regarding the evaluation of toxicity, safety and local and Federal reporting requirements related to adverse events and serious adverse events;
- v. observation of the steps involved in actual conduct of the clinical trials, including generation of orders and administration of agents and/or other treatment modalities; follow up examinations and documentation; management of toxicity; and off study procedures;
- vi. interaction and experience with clinical research nursing and data management (clinical research associate) personnel and biostatisticians who are actively involved in clinical trials.

2. Basic Research
 - i. The involvement in basic research by the trainee is optional for neuro-oncology trainees. Generally, training programs will offer such additional training that may precede or follow the primary neuro-oncology clinical training period. In special circumstances this basic research training period may occur in between periods of direct clinical training, or concomitant with such training, but should not significantly compromise the clinical neuro-oncology training.
 - ii. Trainees should be updated on new practice-changing or paradigm-shifting basic research discoveries in neuro-oncology. This exposure can occur through self-study, formal lectures, participation in rotations through basic research laboratories, or formal national/international conference offerings.
3. Publications and Presentations
 - i. The trainee should make a reasonable effort to participate in the preparation of abstracts for presentation at national meetings, presentations at local institutions, and/or preparation of manuscripts for publication related to neuro-oncology.
 - ii. Publications and presentations should be encouraged by faculty and properly mentored.
 - iii. Programs may add specific publication and presentation requirements at their discretion

F. Program Resources and Facilities

1. Sponsoring and participating institutions must comply with ACGME Institutional Requirements detailed at the following location: <http://www.acgme.org/IRC/Ircpr900.asp>.
2. Faculty and staff resources are additionally described in IV A-E above.
3. The institution should provide the trainees with a suitable working environment and demonstrable access to administrative support, typical office equipment and supplies, and educational and library (including electronic) resources.
4. The trainees are expected to have a balance of out- and in-patient experience reflective in time allotment and content of typical conduct of a neuro-oncology practice. This includes a reasonable number of patients to ensure an appropriate experience with the majority of types of patient disorders encountered in a typical neuro-oncology practice.

G. Trainee Duty Hours and Working Environment

1. During clinical patient care rotations, the trainee duty hours and working environment must be in accordance with requirements for post-doctoral trainees as delineated in the ACGME document: <http://www.acgme.org/IRC/Ircpr900.asp>

VI. Evaluation

A. Trainee Evaluation

1. Written evaluations of the trainee's performance must be provided by the rotational supervisor for each rotation or other separately identifiable 'training unit' during the training program. These evaluations should follow the standard format approved by the institution or in compliance with ACGME and/or Residency Review Committee recommendations for postdoctoral medical training, and be reviewed by both the faculty member and trainee.
2. A final written evaluation of performance must be provided by the program director at the conclusion of the training program, discussed by the trainee and program director and signed by both.
3. The educational experience must be documented in the trainee's file, including the curriculum present during the time of training, and a certificate or letter signed by the appropriate supervisor(s) (program director, departmental chairperson, etc.) indicating: a) successful completion of the fellowship program, and b) competency regarding its content, which may be ascertained as desired by the program director (e.g., interview, examination).

4. The program director should meet on a regular basis (at least quarterly) with the trainee(s) to discuss performance, clinical practice, and quality assurance issues as applicable to the actual training experience and clinical practice of trainees, and produce written minutes reflecting the proceedings of such meetings that will be kept confidential and protected.
5. All evaluations described should remain confidential and will not be disclosed except in accordance with institutional and state policies. The program director is responsible for making reasonable efforts to ensure confidentiality and protected security of these records.
6. At the discretion of the program director, periodic or final competency examination(s) regarding the training experience may be administered as a form of evaluation.

B. Faculty Evaluation

1. The trainee must provide feedback, preferably in the form of a written evaluation, of the faculty supervisors and of the training experience, following each major rotation or equivalent training unit. These evaluations will be kept in a secure and confidential place by the program director.
2. The program director must evaluate the faculty for suitability of participation in the training program on a yearly basis and make appropriate changes, additions or substitutions in the faculty as necessary. In the event that a dispute arises, the arbitration process in place at the departmental or institutional level should be applied.

C. Program Evaluation

1. On an annual basis, the trainees must provide a written evaluation of the program and training experience, including perceived strengths and weaknesses. These issues should be summarized by the program director and discussed with the trainees and with the faculty.
2. On an annual basis, the faculty involved in the training program should provide a written composite evaluation of the program. A summary of this evaluation should subsequently be provided to the training faculty.
3. The program director or the designated trainee advisor should meet at least quarterly with the trainee for an informal discussion of the program conduct, strengths and weakness, and preferably retain minutes of these discussions.
4. On an annual basis, the program director, in consultation with the training faculty and departmental chairperson, should make any necessary changes in the program that would result in improvement or enhancement of the quality of the training program. Substantive changes in the curriculum or program should be documented annually in the form of minutes.

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