



**ACGME International**

**Advanced Specialty Program Requirements for  
Graduate Medical Education in  
Radiation Oncology**

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Radiation Oncology**

**I. Introduction**

**I.A. Definition and Scope of Specialty**

Radiation oncology is a medical specialty concerned with the causes, prevention, treatment, and follow-up of cancer and certain non-neoplastic conditions utilizing ionizing radiation.

**I.B. Duration of Education**

I.B.1. The education in radiation oncology must be 48 or 60 months in length.

I.B.1.a) The program may include an additional 12 months of education in fundamental clinical skills of medicine.

**II. Institutions**

**II.A. Sponsoring Institution**

See International Foundational Requirements, Section I.A.

**II.B. Participating Sites**

II.B.1. The preponderance of the educational experience should take place in the primary clinical site.

II.B.2. When multiple participating sites are used, a Program Letter of Agreement (PLA) should specify:

II.B.2.a) how continuity of the educational experience is ensured; and,

II.B.2.b) the number and types of patients and procedures available to residents.

**III. Program Personnel and Resources**

**III.A. Program Director**

See International Foundational Requirements, Section II.A.

**III.B. Faculty**

III.B.1. The program must provide, at the primary clinical site, at least four full-time-equivalent faculty radiation oncologists who devote their professional time to the program for the teaching of clinical radiation oncology.

- III.B.2. The faculty must include at least one full-time radiation biologist or cancer biologist (PhD-level or equivalent) who is on-site to provide a scholarly environment of research, and to participate in the teaching of radiation and cancer biology.
- III.B.3. The faculty must include at least one full-time faculty medical physicist (PhD-level or equivalent) who is on-site to provide a scholarly environment of research, and to participate in the teaching of radiation physics.
- III.B.4. The majority of both physician and PhD faculty members should demonstrate scholarship as defined in the International Foundational Requirements.
- III.B.5. The members of the faculty must ensure that each resident personally performs technical procedures, including treatment set-ups, as well as intra-cavitary and interstitial placement of radiation sources.

**III.C. Other Program Personnel**

See International Foundational Requirements, Section II.C.

**III.D. Resources**

- III.D.1. At the primary clinical site there must be:
  - III.D.1.a) two or more megavoltage machines;
  - III.D.1.b) a machine with a broad range of electron beam capabilities;
  - III.D.1.c) computed tomography (CT) simulation capability;
  - III.D.1.d) three-dimensional conformal computerized treatment and planning, including intensity-modulated radiation therapy (IMRT);
  - III.D.1.e) a system for the construction of treatment aids; and,
  - III.D.1.f) equipment to perform interstitial and intra-cavitary brachytherapy and radiosurgery.
- III.D.2. The program must have adequate space and equipment to educate residents in state-of-the-art radiation oncology.
- III.D.3. Adequate medical services must be available in the specialties of medical oncology, surgical oncology and its subspecialties, gynecologic oncology, and pediatric oncology.
- III.D.4. There must be access to current imaging techniques, nuclear medicine, pathology, a clinical laboratory, and a tumor registry.

III.D.5. In the primary clinical site and in participating sites, at least 600 patients must receive external beam irradiation yearly, including stereotactic radiosurgery procedures.

III.D.6. At the primary clinical site there should be ACGME International (ACGME-I)-accredited residencies in surgery, internal medicine, obstetrics and gynecology, and pediatrics.

#### **IV. Resident Appointments**

##### **IV.A. Eligibility Criteria**

IV.A.1. Residents must have successfully completed 12 months of a broad-based clinical program (PGY-1) that is:

IV.A.1.a) accredited by the ACGME International (ACGME-I), the ACGME, or the Royal College of Physicians and Surgeons of Canada in preliminary general surgery, preliminary internal medicine, or the transitional year; or,

IV.A.1.b) at the discretion of the Review Committee-International, a program where a governmental or regulatory body is responsible for the maintenance of a curriculum providing clinical and didactic experiences to develop competency in the fundamental clinical skills of medicine; or,

IV.A.1.b).(1) A categorical residency that accept candidates from these programs must complete an evaluation of each resident's fundamental clinical skills within six weeks of matriculation, and must provide remediation to residents as needed.

IV.A.1.c) integrated into the residency where the program director must oversee and ensure the quality of didactic and clinical education.

IV.A.2. The PGY-1 must be completed in a structured program in which residents are educated in high-quality medical care based on scientific knowledge, evidence-based medicine, and sound teaching by qualified educators.

IV.A.3. With appropriate supervision, residents must have first-contact responsibility for evaluation and management for all types and acuity levels of patients.

IV.A.4. Residents must have responsibility for decision-making and direct patient care in all settings, to include the writing of orders, progress notes, and relevant records.

IV.A.5. Residents must develop competency in the following fundamental clinical skills during the PGY-1:

IV.A.5.a) obtaining a comprehensive medical history;

- IV.A.5.b) performing a comprehensive physical examination;
- IV.A.5.c) assessing a patient's medical condition;
- IV.A.5.d) making appropriate use of diagnostic studies and tests;
- IV.A.5.e) integrating information to develop a differential diagnosis; and,
- IV.A.5.f) developing, implementing, and evaluating a treatment plan.

**IV.B. Number of Residents**

- IV.B.1. There must be at least one resident per year of the educational program.

**V. Specialty-Specific Educational Program**

**V.A. Regularly Scheduled Didactic Sessions**

- V.A.1. If it includes an integrated PGY-1, the educational program must contain regularly scheduled didactic sessions that enhance and correspond to the residents' fundamental clinical skills education.
- V.A.2. During the educational program in Radiation Oncology, scheduled didactic sessions must include:
  - V.A.2.a) intradepartmental clinical oncology conferences, including new patient conferences, weekly chart reviews, problem case conferences, continuous quality improvement, morbidity and mortality, physics, dosimetry, radiation and cancer biology, and journal review;
  - V.A.2.b) basic sciences essential to radiation oncology, including medical physics and radiation and cancer biology;
    - V.A.2.b).(1) The radiation and cancer biology curriculum must include instruction in classical and molecular effects of ionizing radiation, radiation effects on normal and neoplastic tissues, and the fundamental biology of the causes, prevention, and treatment of cancer.
  - V.A.2.c) practical demonstrations of radiation safety procedures, calibration of radiation therapy machines, use of state-of-the-art treatment planning systems, construction of treatment aids, and safe handling of sealed and unsealed radionuclides;
    - V.A.2.c).(1) The curriculum in safe handling of unsealed sources should address quality control procedures for instruments used to determine the activity of radiopharmaceuticals for human administration and procedures used to perform checks for proper operation of survey meters.

- V.A.2.d) medical statistics;
- V.A.2.e) the potential value and limitations of other oncologic disciplines, such as medical oncology (both adult and pediatric) and surgical oncology, as well as the various surgical specialties, all of which play a role in the management of the patient;
- V.A.2.e).(1) This may be accomplished by attendance at multidisciplinary and departmental conferences, or by clinical rotations.
- V.A.2.f) standard radiation techniques, as well as the use of treatment aids and treatment planning to optimize the distribution of the radiation dose;
- V.A.2.g) principles of normal tissue tolerance to radiation and tumor dose response;
- V.A.2.h) use of external beam modalities, including megavoltage irradiation, electron beam, simulation using conventional and CT simulators to localize anatomy, and computerized treatment planning; and,
- V.A.2.i) physics, radiation and cancer biology, and clinical applicability of the following areas: radiosurgery; intra-operative radiation therapy; three-dimensional conformal treatment planning and delivery; radioimmunotherapy; unsealed sources; total body irradiation as used in stem cell transplantation; total skin irradiation; high- and low-dose rate brachytherapy; hyperthermia; kilovoltage irradiation; plaque therapy; particle therapy; and any other components that may be developed as they apply to the core curriculum.

V.A.3. Conferences and teaching rounds must provide for progressive participation by residents.

V.A.4. Residents, radiation oncologists, and other staff members should attend required conferences.

V.A.5. The clinical curriculum should include a combined modality therapy and altered fractionation schemes.

V.A.6. There should be education in pain management and palliative care.

## **V.B. Clinical Experiences**

V.B.1. If the program includes an integrated PGY-1, this experience must include a minimum of 11 months of direct patient care.

V.B.1.a) During the integrated PGY-1 each resident's experiences must  
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include responsibility for patient care commensurate with his or her ability.

- V.B.1.a).(1) Residents must have responsibility for decision-making and direct patient care in all settings, subject to review and approval by senior-level residents and/or attending physicians, to include the planning of care and the writing of orders, progress notes, and relevant records.
- V.B.1.b) At a minimum, 28 weeks must be in rotations provided by a discipline or disciplines that offer fundamental clinical skills in the primary specialties, such as emergency medicine, family medicine, general surgery, internal medicine, obstetrics and gynecology, or pediatrics.
- V.B.1.b).(1) Subspecialty experiences, with the exception of critical care unit experiences, must not be used to meet fundamental clinical skills curriculum requirements.
- V.B.1.b).(2) Each experience must be at minimum a four-week continuous block.
- V.B.1.c) At a minimum, residents must have 140 hours of experience in ambulatory care provided in family medicine or primary care internal medicine, general surgery, obstetrics and gynecology, or pediatrics.
- V.B.1.d) Residents must have a maximum of 20 weeks of elective experiences.
- V.B.1.d).(1) Elective rotations should be determined by the educational needs of the individual resident.
- V.B.2. At least 36 months of the educational program in Radiation Oncology must be spent in clinical activities essential to the specialty.
- V.B.3. The program must include a minimum of a two-month rotation in medical oncology, to include adult and pediatric patients.
- V.B.3.a) The medical oncology requirement may be met by documented attendance at regularly-scheduled multidisciplinary conferences (at least four hours per month during the clinical rotations).
- V.B.4. The program must include a minimum of a one-month rotation in both oncologic pathology and diagnostic imaging.
- V.B.4.a) The pathology and diagnostic imaging requirements may be

satisfied through multidisciplinary conferences if pathology and imaging material for both pediatric and adult patients are shown and discussed (at least one hour per month during the clinical rotations for each discipline).

- V.B.5. At least nine months of education must allow for in-depth experience in individually-selected areas applicable to clinical radiation oncology.
- V.B.6. The number of patients treated with external beam irradiation by each resident should approximate 150 per year (determined by the number of patients simulated) with an absolute minimum of 450 over the four years of residency.
  - V.B.6.a) A resident should not treat more than 250 patients with external beam irradiation in any one year.
  - V.B.6.b) Only cases for which the resident has primary responsibility performing the simulation must be counted.
- V.B.7. Residents must perform interstitial implants and intra-cavitary implants.
  - V.B.7.a) Resident involvement should include planning, review of dosimetry, and hands-on participation in a significant portion of implantation procedures.
  - V.B.7.b) Separate applications of an implant in a given patient (such as two separate intra-cavitary applications) must be counted as two separate procedures.
  - V.B.7.c) Multiple fractions of a single application (such as multiple fractions of an interstitial implant) must be counted only once.
    - V.B.7.c).(1) Only one resident may count a specific application.
- V.B.8. Residents must participate in the administration of procedures using radioimmunotherapy, other targeted therapeutic radiopharmaceuticals, or unsealed radioactive sources.
- V.B.9. Residents must treat pediatric patients, including patients who have solid tumors.
- V.B.10. Residents must follow up with irradiated patients, including pediatric patients, on an inpatient or outpatient basis.
- V.B.11. Residents must participate in the treatment planning and administration of stereotactic radiosurgery.
  - V.B.11.a) Stereotactic radiosurgery should be delivered by a variety of available technologies using image-guided stereotactic localization procedures, either intracranial or extracranial.

- V.B.11.b) As defined, radiosurgery should be administered in a single fraction or extended to a maximum of five fractions.
- V.B.11.b).(1) More protracted courses of stereotactic radiation should be classified as external beam radiation cases.
- V.B.12. Residents must have experience with: lymphomas and leukemias; and gastrointestinal, gynecologic, genitourinary, breast, soft tissue, and bone, skin, head and neck, lung, pediatric, and central nervous system tumors.
- V.B.13. Residents must have experience in the treatment of benign diseases for which radiation is utilized.

**V.C. Residents' Scholarly Activities**

Residents must complete an investigative project under faculty member supervision.

- V.C.1. This may take the form of biological laboratory, clinical, translational, medical physics, or other research approved by the program director.
- V.C.2. The results of such projects must be suitable for publication in peer-reviewed scholarly journals or for presentation at scientific meetings.

**V.D. Duty Hour and Work Limitations**

See International Foundational Requirements, Section VI.

**VI. ACGME-I Competencies**

**VI.A. Patient Care**

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents must demonstrate proficiency in:

- VI.A.1. the causes, prevention, and treatment of cancer and certain non-neoplastic conditions utilizing ionizing radiation, including:
- VI.A.1.a) external beam irradiation;
  - VI.A.1.b) interstitial implants;
  - VI.A.1.c) intra-cavitary implants;
  - VI.A.1.d) radioimmunotherapy;

- VI.A.1.e) stereotactic radiosurgery; and,
- VI.A.1.f) treatment of benign diseases.
- VI.A.2. safe handling of unsealed sources;
- VI.A.3. quality control procedures for instruments used to determine the activity of radiopharmaceuticals for human administration; and,
- VI.A.4. procedures used to perform checks for proper operation of survey meters.

**VI.B. Medical Knowledge**

Residents 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. Residents must demonstrate proficiency in knowledge of:

- VI.B.1. the basic sciences essential to radiation oncology, including medical physics and radiation and cancer biology;
- VI.B.2. radiation safety procedures and calibration of radiation therapy machines;
- VI.B.3. the use of state-of-the-art treatment planning systems;
- VI.B.4. the construction of treatment aids;
- VI.B.5. classical and molecular effects of ionizing radiation, radiation effects on normal and neoplastic tissues, and the fundamental biology of the causes, prevention, and treatment of cancer;
- VI.B.6. the value and limitations of other oncologic disciplines, such as medical oncology (both adult and pediatric) and surgical oncology, as well as the various surgical specialties, all of which play a role in the management of the patient;
- VI.B.7. clinical radiation oncology, including the indications for irradiation and special therapeutic considerations unique to each site and stage of disease;
- VI.B.8. the problems of recurrent and disseminated tumors and of late after-effects and complications of radiation therapy; and,
- VI.B.9. medical statistics.

**VI.C. Practice-based Learning and Improvement**

Residents must demonstrate the ability to investigate and evaluate their care of  
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patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning. Residents are expected to develop skills and habits to be able to meet the following goals:

- VI.C.1. identify strengths, deficiencies, and limits in one's knowledge and expertise;
- VI.C.2. set learning and improvement goals;
- VI.C.3. identify and perform appropriate learning activities;
- VI.C.4. systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement;
- VI.C.5. incorporate formative evaluation feedback into daily practice;
- VI.C.6. locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems;
- VI.C.7. use information technology to optimize learning; and,
- VI.C.8. participate in the education of patients, families, students, residents, and other health professionals.

#### **VI.D. Interpersonal and Communication Skills**

Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals. Residents must:

- VI.D.1. communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds;
- VI.D.2. communicate effectively with physicians, other health professionals, and health-related agencies;
- VI.D.3. work effectively as a member or leader of a health care team or other professional group;
- VI.D.4. act in a consultative role to other physicians and health professionals; and,
- VI.D.5. maintain comprehensive, timely, and legible medical records, if applicable.

#### **VI.E. Professionalism**

Residents must demonstrate a commitment to carrying out professional  
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responsibilities and an adherence to ethical principles. Residents must demonstrate:

- VI.E.1. compassion, integrity, and respect for others;
- VI.E.2. responsiveness to patient needs that supersedes self-interest;
- VI.E.3. respect for patient privacy and autonomy;
- VI.E.4. accountability to patients, society and the profession; and,
- VI.E.5. sensitivity and responsiveness to a diverse patient population, including to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

**VI.F. Systems-based Practice**

Residents 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. Residents must:

- VI.F.1. work effectively in various health care delivery settings and systems relevant to their clinical specialty;
- VI.F.2. coordinate patient care within the health care system relevant to their clinical specialty;
- VI.F.3. incorporate considerations of cost awareness and risk-benefit analysis in patient- and/or population-based care, as appropriate;
- VI.F.4. advocate for quality patient care and optimal patient care systems;
- VI.F.5. work in interprofessional teams to enhance patient safety and improve patient care quality; and,
- VI.F.6. participate in identifying system errors and implementing potential systems solutions.