ACGME Program Requirements for Fellowship Education
in Musculoskeletal Radiology

Introduction

A. Definition and Scope of the Subspecialty

A fellowship program in a subspecialty of diagnostic radiology is an educational experience of at least one year designed to develop advanced knowledge and skills in a specific clinical area. ~~All educational components of the program should be related to program goals~~. The program design and/or structure must be approved by the Residency Review Committee as part of the regular review process.

The musculoskeletal radiology training program constitutes a closely supervised experience in the application and interpretation of all imaging examinations and procedures as they relate to the analysis of disorders of the musculoskeletal system, including bones, joints, and soft tissues. The imaging methods and procedures include, but are not necessarily limited to, routine radiography, computed tomography, ultrasonography, radionuclide scintigraphy/PET,magnetic resonance, arthrography, bone mineral density studies and diagnostic and therapeutic injections as well as image-guided percutaneous biopsy techniques. Training in musculoskeletal radiology will provide an organized, comprehensive, supervised, and progressively responsible full-time educational experience in the selection, interpretation, and performance of these examinations and procedures. A further objective is to provide the fellow an opportunity to develop skills necessary for clinical and/or basic research in the subspecialty of musculoskeletal radiology.

~~B. Duration and Scope of Education~~

~~Prerequisite training for entry into a diagnostic radiology subspecialty program should include the satisfactory completion of a diagnostic radiology residency accredited by the Accreditation Council for Graduate Medical Education (ACGME) or the Royal College of Physicians and Surgeons of Canada (RCPSC), or other training judged suitable by the program director~~.

I. Institutions

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.

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.

B. Participating Sites

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.

The PLA should:

a) identify the faculty who will assume both educational and supervisory responsibilities for fellows;

b) specify their responsibilities for teaching, supervision, and formal evaluation of fellows, as specified later in this document;

c) specify the duration and content of the educational experience; and,

d) state the policies and procedures that will govern fellow education during the assignment.

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).

3. A musculoskeletal radiology fellowship program ~~may~~ should be accredited in institutions that either sponsor a residency education program in diagnostic radiology accredited by the ACGME or are integrated by formal agreement into such programs. Close cooperation between the fellowship and residency program director is required. An exception to the above is a pediatric radiology fellowship which is structured in a freestanding children's hospital.

II. Program Personnel and Resources

A. Program Director

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. After approval, the program director must submit this change to the ACGME via the ADS.

a) *The program director should spend all of his/her professional time in musculoskeletal radiology, and devote sufficient time to fulfill all responsibilities inherent in meeting the educational goals of the program.*

2. Qualifications of the program director must include:

a) **requisite specialty expertise and documented educational and administrative experience acceptable to the Review Committee;**

b) **current certification in the specialty by the American Board of** Radiology**, or specialty qualifications that are acceptable to the Review Committee; and,**

c) **current medical licensure and appropriate medical staff appointment.**

d) current subspecialty certification in those subspecialties in which certification is offered.

e) post-residency experience in the subspecialty area, ~~preferably~~ including fellowship training, or five years of practice experience in the subspecialty for those subspecialties in which no certification is offered.

3. **The program director must administer and maintain an educational environment conducive to educating the fellows in each of the ACGME competency areas. The program director must:**

a) **prepare and submit all information required and requested by the ACGME;**

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;**

c) **obtain review and approval of the sponsoring institution's GMEC/DIO before submitting to the ACGME information or requests for the following:**

(1) **all applications for ACGME accreditation of new programs;**

(2) **changes in fellow complement;**

(3) **major changes in program structure or length of training;**

(4) **progress reports requested by the Review Committee;**

(5) **responses to all proposed adverse actions;**

(6) **requests for increases or any change to fellow duty hours;**

(7) voluntary withdrawals of ACGME-accredited programs;

(8) requests for appeal of an adverse action;

(9) appeal presentations to a Board of Appeal or the ACGME.

d) obtain DIO review and co-signature on all program information forms, as well as any correspondence or document submitted to the ACGME that addresses:

(1) program citations, and/or

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

B. Faculty

1. There must be a sufficient number of faculty with documented qualifications to instruct and supervise all fellows.

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.

3. The physician faculty must have current certification in the specialty by the American Board of Radiology**, or possess qualifications acceptable to the Review Committee.**

4. The physician faculty must possess current medical licensure and appropriate medical staff appointment.

5. In addition to the program director, the program must include at least one person experienced in musculoskeletal radiology who has a substantial commitment to the training program. If necessary, other radiologists with expertise in certain imaging methods or procedures may function at least as part-time members of the training program. To ensure adequate supervision of the fellows, there must be at least one full-time faculty person available for each two fellows in the program.

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.

1. *A program coordinator must devote sufficient time to support the administration and educational conduct of the program.*

2. ~~The presence of~~ There should be ACGME-accredited ~~training~~ programs in orthopedic surgery and rheumatology ~~is highly desirable~~.

3. Shared experiences with residents and fellows in orthopedic surgery, rheumatology, pathology, and other appropriate specialties, including surgical subspecialties~~, are strongly encouraged~~ should occur. When appropriate, supervision and teaching by faculty expert in these additional disciplines should be available.

4. Secretarial ~~help~~ support for the conduct of research projects should be provided for musculoskeletal radiology faculty and fellows.

5. Assistance with literature searches, editing, statistical tabulation, and photography should be provided.

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.

~~*1. The program must have a sufficient number of patients available to ensure appropriate inpatient and outpatient experience for each fellow*~~

1. *The program must have appropriate facilities and space for the education of the fellows. There must be office space, conference space, and access to computers.*

2. ~~Modern facilities and equipment and adequate space must be available to ensure an adequate educational experience for the fellow~~. Access to routine radiographic, computed tomographic, scintigraphic, magnetic resonance, and ultrasound equipment must be provided. Adequate space for image ~~film~~ display, ~~film~~ interpretation, and consultation with referring physicians must be available, ~~and adequate office space, and office supplies~~.

3. Fellows must be provided access to a variety of patients encompassing the entire range of disorders of the musculoskeletal system, including articular, degenerative, metabolic, hematopoietic, infectious, traumatic, vascular, congenital, and neoplastic diseases. The imaging methods and procedures available for education should include routine radiography, computed tomography, ultrasonography, bone mineral density, radionuclide scintigraphy, magnetic resonance, arthrography, diagnostic/therapeutic injections, and image-guided percutaneous biopsy techniques.

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.

III. Fellow Appointments

A. Eligibility Criteria

Each fellow must successfully complete an ACGME-accredited specialty program and/or meet other eligibility criteria as specified by the Review Committee. The program must document that each fellow has met the eligibility criteria.

1. *Prerequisite training for entry into ~~a subspecialty~~ the fellowship program ~~of Diagnostic Radiology~~ should include the satisfactory completion of a diagnostic radiology residency program accredited by the ACGME or the Royal College of Physicians and Surgeons of Canada (RCPSC), or completion of other radiology ~~training~~ experience judged to be ~~suitable~~ acceptable to ~~by~~ the program director.*

B. Number of Fellows

The program director may not appoint more fellows than approved by the Review Committee, unless otherwise stated in the specialty-specific requirements. The program's educational resources must be adequate to support the number of fellows appointed to the program.

1. *The presence of other learners (including, but not limited to residents from other specialties subspecialty fellows, PhD students, and nurse practitioners) in the program must not interfere with the appointed fellows' education.*

2. *The fellows must not dilute or detract from the educational opportunities available to residents in the core diagnostic radiology residency program. Lines of responsibilities of the diagnostic radiology residents and the subspecialty fellow must be clearly defined.*

IV. Educational Program

A. The curriculum must contain the following educational components:

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 annually, in either written or electronic form. These skills and competencies should be reviewed by the fellow at the start of each rotation;**

2. **ACGME Competencies**

   The program must integrate the following ACGME competencies into the curriculum:

a) Patient Care

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:

(1) must have the opportunity to provide consultation with referring physicians or services;

(2) should have a clearly defined role in educating diagnostic residents, and if appropriate, medical students and other professional personnel in the care and management of patients;

(3) must follow standards of care for practicing in a safe environment, attempt to reduce errors, and improve patient outcomes;

(4) must apply low dose radiation techniques in both adults and children;

(5) must have the opportunity to perform and interpret all specified exams and/or invasive studies under close, graded responsibility and supervision;

(6) must keep a log documenting the types of ~~arthrographic and biopsy~~ image-guided interventions ~~procedures~~ that she or he performs. With regard to invasive procedures, fellows are to be given graduated responsibility as competence increases; such responsibility should include preprocedural and postprocedural patient care. The program should ensure fellows have close coordination and cooperation with referring physicians, including orthopedic surgeons, rheumatologists, and emergency department specialists, and that they understand proper imaging protocols to ensure that excessive or inappropriate examinations are not ordered and performed. Access to both inpatients and outpatients is required.

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:

(1) must have advanced education to acquire special skills and knowledge in the subspecialty. This education should consist of a cognitive and technical component;

(2) *must be educated in low dose radiation techniques in both adults and children, and learn how to prevent and/or treat complications of contrast administration;*

(3) *should develop skills in preparing and presenting educational material for medical students, graduate medical staff, and allied health personnel;*

(4) must ~~have opportunities to~~ actively participate in the formulation of a diagnosis and/or the generation of an imaging protocol, although the precise responsibility of the fellow will vary from one clinical conference to another. This participation should be used by the program director and other faculty members to judge the fellow's progress.

c) Practice-based Learning and Improvement

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

(1) systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement;

(2) locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems.

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.

(1) *Fellows must communicate effectively with patients, colleagues, referring physicians, and other members of the health care team concerning imaging and procedure appropriateness, informed consent, safety issues, and the results of imaging tests or procedures. Competence in oral communication must be judged through direct observation. Competence in written communication must be judged on the basis of the quality and timeliness of dictated reports.*

e) Professionalism

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

Fellows ~~are expected~~ must to demonstrate:

(1) *compassion, integrity, and respect for others;*

(2) *responsiveness to patient needs that supersedes self-interest;*

(3) *respect for patient privacy and autonomy;*

(4) *accountability to patients, society and the profession;*

(5) *sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation; and*

(6) *compliance with institutional and departmental policies (HIPAA, the Joint Commission, patient safety, infection control, etc).*

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.

(1) *work in interprofessional teams to enhance patient safety and improve patient care quality; and,*

(2) *participate in identifying system errors and implementing potential systems solutions.*

3. Fellows must have clinical experience and didactic sessions encompassing the entire spectrum of musculoskeletal diseases. This must include both the axial and the appendicular skeletons of both adult and pediatric patients. The fellow must interpret, under appropriate supervision, diagnostic examinations ~~that include routine radiography, computed tomography, and magnetic resonance~~ listed above. Furthermore, the fellow must perform and interpret ~~arthrograms~~ image-guided interventions including ~~The program must provide experience with~~ image-guided percutaneous biopsy procedures, arthrograms and diagnoistic/therapeutic injections. The fellow should have experience with ultrasonography, bone densitometry, and radionuclide scintigraphy as they relate to diseases of the musculoskeletal system.

4. Fellows must have didactic conferences and teaching sessions that provide coverage of musculoskeletal concepts related to anatomy, physiology, pathology, orthopedic surgery, and rheumatology. Attendance at and participation in department conferences, such as daily ~~film~~ image interpretation sessions, are required. Regularly scheduled interdepartmental conferences are a necessary component of the

program and should include the disciplines of orthopedic surgery, neurosurgery, and other appropriate surgical specialties; pathology; rheumatology; and oncology. In addition, the training experience should include radiology oriented conferences with medical students and graduate medical staff.

5. *Fellows must participate on a regular basis in scheduled conferences. Conferences must provide for progressive fellow participation. Scheduled presentations by fellows should be encouraged. These conferences should include:*

   a) *intradepartmental conferences*

   b) *departmental grand rounds*

   c) *at least one interdisciplinary conference per week*

   d) *peer review case conference and/or M&M conference*

6. *Fellows should attend and participate in local conferences and at least one national meeting or post graduate course in the subspecialty while in training. Participation in local or national subspecialty societies should be encouraged. Reasonable expenses should be reimbursed.;*

7. *Fellows must attend didactic conferences directed to the level of the fellow that provides formal review of the topics in the specialty curriculum. These conferences should occur at least twice a month.*

B. Fellows' Scholarly Activities

1. *The program must provide instruction in the fundamentals of experimental design, performance, and interpretation of results.*

2. *All fellows must engage in a scholarly project. This project may take the form of laboratory research, clinical research, analysis of disease processes, imaging techniques or practice management issues. The results of such projects must be submitted for publication or presented at local, regional, national or international meetings.*

3. Laboratory facilities to support research projects should be available in the institution.

V. Evaluation

A. Fellow Evaluation

1. Formative Evaluation

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

505 **b) The program must:**
506
507 **(1) provide objective assessments of competence in**
508 **patient care, medical knowledge, practice-based**
509 **learning and improvement, interpersonal and**
510 **communication skills, professionalism, and systems-**
511 **based practice;**
512
513 **(2) use multiple evaluators (e.g., faculty, peers, patients,**
514 **self, and other professional staff); and,**
515
516 **(3) provide each fellow with documented semiannual**
517 **evaluation of performance with feedback.**
518
519 *(a) ensure that there is at least a quarterly review*
520 *which should include:*
521
522 *(i) review of faculty's evaluations of the fellow,*
523
524 *(ii) review of the procedure log*
525
526 *(iii) documentation of compliance with*
527 *institutional and departmental policies*
528 *(HIPAA, the Joint Commission, patient*
529 *safety, infection control, etc).*
530
531 **c) The evaluations of fellow performance must be accessible for**
532 **review by the fellow, in accordance with institutional policy.**
533
534 **2. Summative Evaluation**
535
536 **The program director must provide a summative evaluation for each**
537 **fellow upon completion of the program. This evaluation must**
538 **become part of the fellow's permanent record maintained by the**
539 **institution, and must be accessible for review by the fellow in**
540 **accordance with institutional policy. This evaluation must:**
541
542 **a) document the fellow's performance during their education,**
543 **and**
544
545 **b) verify that the fellow has demonstrated sufficient competence**
546 **to enter practice without direct supervision.**
547
548 **B. Faculty Evaluation**
549
550 **1. At least annually, the program must evaluate faculty performance as**
551 **it relates to the educational program.**
552
553 **2. These evaluations should include a review of the faculty's clinical**
554 **teaching abilities, commitment to the educational program, clinical**
555 **knowledge, professionalism, and scholarly activities.**

556
557 *3. These evaluations must include a written confidential evaluation by the*
558 *fellows. Faculty must receive annual feedback from these evaluations.*
559
560 **C. Program Evaluation and Improvement**
561
562 **1. The program must document formal, systematic evaluation of the**
563 **curriculum at least annually. The program must monitor and track**
564 **each of the following areas:**
565
566 **a) fellow performance, and**
567
568 **b) faculty development**
569
570 **2. If deficiencies are found, the program should prepare a written plan**
571 **of action to document initiatives to improve performance in the**
572 **areas listed in section V.C.1. The action plan should be reviewed**
573 **and approved by the teaching faculty and documented in meeting**
574 **minutes.**
575
576 **VI. Fellow Duty Hours in the Learning and Working Environment**
577
578 **A. Principles**
579
580 **1. The program must be committed to and be responsible for**
581 **promoting patient safety and fellow well-being and to providing a**
582 **supportive educational environment.**
583
584 **2. Duty hour assignments must recognize that faculty and fellows**
585 **collectively have responsibility for the safety and welfare of patients.**
586
587 **B. Supervision of Fellows**
588
589 **The program must ensure that qualified faculty provide appropriate**
590 **supervision of fellows in patient care activities.**
591
592 **C. Duty Hours (the terms in this section are defined in the ACGME Glossary**
593 **and apply to all programs)**
594
595 **Duty hours are defined as all clinical and academic activities related to the**
596 **program; i.e., patient care (both inpatient and outpatient), administrative**
597 **duties relative to patient care, the provision for transfer of patient care,**
598 **time spent in-house during call activities, and scheduled activities, such as**
599 **conferences. Duty hours do *not* include reading and preparation time spent**
600 **away from the duty site.**
601
602 **1. Duty hours must be limited to 80 hours per week, averaged over a**
603 **four-week period, inclusive of all in-house call activities.**
604
605 **2. Fellows must be provided with one day in seven free from all**
606 **educational and clinical responsibilities, averaged over a four-week**

607 **period, inclusive of call.**
608
609 **3. Adequate time for rest and personal activities must be provided.**
610 **This should consist of a 10-hour time period provided between all**
611 **daily duty periods and after in-house call.**
612
613 **D. On-call Activities**
614
615 **1. In-house call must occur no more frequently than every-third-night,**
616 **averaged over a four-week period.**
617
618 **2. Continuous on-site duty, including in-house call, must not exceed 24**
619 **consecutive hours. Fellows may remain on duty for up to six**
620 **additional hours to participate in didactic activities, transfer care of**
621 **patients, conduct outpatient clinics, and maintain continuity of**
622 **medical and surgical care.**
623
624 *a) During this time, fellows may complete call activities and*
625 *participate in read-out sessions with faculty of the previous night's*
626 *cases.*
627
628 **3. No new patients may be accepted after 24 hours of continuous duty.**
629
630 *a) A new patient is defined as reading a new study or participating in*
631 *an interventional procedure on a patient for whom the fellow has*
632 *not previously provided care.*
633
634 **4. At-home call (or pager call)**
635
636 **a) The frequency of at-home call is not subject to the every-**
637 **third-night, or 24+6 limitation. However at-home call must not**
638 **be so frequent as to preclude rest and reasonable personal**
639 **time for each fellow.**
640
641 **b) Fellows taking at-home call must be provided with one day in**
642 **seven completely free from all educational and clinical**
643 **responsibilities, averaged over a four-week period.**
644
645 **c) When fellows are called into the hospital from home, the**
646 **hours fellows spend in-house are counted toward the 80-hour**
647 **limit.**
648
649 **E. Moonlighting**
650
651 **Internal moonlighting must be considered part of the 80-hour weekly limit**
652 **on duty hours.**
653
654 1. Moonlighting must not interfere with the ability of the fellow to achieve the
655 goals and objectives of the educational program.
656

657 F. Duty Hours Exceptions
658
659 The Review Committee for Diagnostic Radiology will not consider requests for
660 duty hour exception.
661
662 VII. Experimentation and Innovation
663
664 Requests for experimentation or innovative projects that may deviate from the
665 institutional, common, and specialty-specific program requirements must be approved in
666 advance by the Review Committee. In preparing requests, the program director must
667 follow Procedures for Approving Proposals for Experimentation or Innovative Projects
668 located in the ACGME Manual on Policies and Procedures. Once a Review Committee
669 approves a project, the sponsoring institution and program are jointly responsible for the
670 quality of education offered to residents for the duration of such a project.
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674 ACGME: February 12, 1996 Effective: February 13, 1996
675 Revision: December 18, 2000
676 Revision: December 19, 2001 (editorial)
677 Revision: June 6, 2002 (editorial)
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