



ACGME International

**Advanced Specialty Program Requirements for
Graduate Medical Education in
Medical Genetics**

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I Introduction

I.A. Definition and Scope of Specialty

Clinical medical geneticists are physicians who provide comprehensive diagnostic, management, treatment, risk assessment, and genetic counseling services for patients who have or are at risk for having genetic disorders or disorders with a genetic component.

I.B. Duration of Education

- I.B.1. The education program in clinical medical genetics must be 24 or 36 months in length.

II Institutions

II.A. Sponsoring Institution

- II.A.1. Institutions sponsoring medical genetics programs should also sponsor ACGME- International (ACGME-I)-accredited programs in internal medicine, obstetrics and gynecology, and pediatrics.

II.B. Participating Sites

See International Subspecialty Foundational Requirements, Section I.B.

III Program Personnel and Resources

III.A. Program Director

- III.A.1. The program director must:
- III.A.1.a) maintain continuing involvement in scholarly activity;
 - III.A.1.b) participate in key national scientific human genetics meetings;
 - III.A.1.c) contribute to medical education, both locally and internationally;
 - III.A.1.d) ensure that clinical teaching conferences are organized by the faculty for the fellows; and,
 - III.A.1.e) ensure that attendance by the fellows and the members of the faculty at scheduled didactics is documented.

III.B. Faculty

- III.B.1. There must be at least three members of the teaching faculty, including the program director, who are members of the medical staffs at participating sites.
- III.B.1.a) At least two of these individuals must be trained in clinical medical genetics.
- III.B.2. Those responsible for fellow education in a given area must have training in that area. Specifically:
- III.B.2.a) the person(s) responsible for fellow education in biochemical genetics must be trained in biochemical genetics;
- III.B.2.b) the person(s) responsible for fellow education in molecular genetics must be trained in molecular genetics; and,
- III.B.2.c) the person(s) responsible for fellow education in clinical cytogenetics must be trained in clinical cytogenetics.

III.C. Other Program Personnel

- III.C.1. Fellows must have regular opportunities to work with genetic counselors, nurses, nutritionists, and other health care professionals who are involved in the provision of clinical medical genetics services.

III.D. Resources

- III.D.1. Participating sites must provide a sufficient number and variety of inpatients and outpatients (e.g., pregnant and non-pregnant, all ages) to permit fellows to gain experience with the natural history of a wide range of genetic disorders and other disorders with a genetic component.
- III.D.1.a) Each fellow should care for at least 100 different patients or families per year.
- III.D.1.a).(1) These patients and families must be seen in both outpatient and inpatient settings.
- III.D.2. Adequate space and equipment and space for patient care activities, including meeting rooms, classrooms, office space, research facilities, and facilities for record storage and retrieval, must be available to meet the educational goals of the program.
- III.D.3. Office and laboratory space must be provided for the fellows for both patient care and participation in scholarly activity.

- III.D.4. There must be other learners in medical genetics and in other specialties at participating sites to maintain a stimulating educational environment.
- III.D.5. Participating sites should have a clinical cytogenetics laboratory, a clinical biochemical genetics laboratory, and a clinical molecular genetics laboratory, each of which provides an appropriate volume and variety of services related to medical genetics, together with an adequate number of qualified staff members.
- III.D.5.a) If a laboratory is not located in a participating site, a written letter of agreement from the laboratory director detailing the laboratory's contributions to the education of medical genetics fellows should be prepared and kept on file by the program director.
- III.D.6. Fellows should have access to computer-based genetic diagnostic systems.

IV Fellow Appointment

IV.A. Eligibility Criteria

- IV.A.1. Prior to appointment in the program, fellows must have completed an ACGME-I-accredited residency program.

IV.B. Number of Fellows

See International Subspecialty Foundational Requirements, Section III.B.

V Specialty-Specific Educational Program

V.A. Regularly Scheduled Didactic Sessions

- V.A.1. The clinical teaching conferences must be distinct from the basic science lectures and didactic sessions.
- V.A.1.a) Clinical teaching conferences may include formal didactic sessions on clinical laboratory topics, medical genetics rounds, journal clubs, and follow-up conferences for genetic clinics.
- V.A.1.b) Lectures or other didactic sessions should include basic mechanisms of inheritance, specifically, sex chromosomes, autosomes, and mitochondrial DNA.
- V.A.2. Fellows must have the opportunity to develop the skills to diagnose genetic disorders, counsel patients, and manage and treat patients of all ages experiencing the broad range of clinical problems that are encompassed by medical genetics.

V.A.3. Research seminars should be a part of the fellowship experience, but must not replace the basic science didactic component.

V.B. Clinical Experiences

V.B.1. The educational program must include at least 18 months of broad-based, clinically-oriented medical genetics activities.

V.B.2. The workload for a fellow at any level must be no more than:

V.B.2.a) four patients with confirmed diagnoses of inborn errors of intermediary metabolism in an ICU setting;
or,

V.B.2.b) six patients with confirmed diagnoses of inborn errors of intermediary metabolism in a non-ICU setting.

V.B.3. Fellows must spend a minimum of two continuous weeks in each type of laboratory (clinical biochemical, molecular genetic, and cytogenetic) to develop their abilities to understand and critically interpret laboratory data.

V.B.4. Fellows must develop an understanding of the appropriate use of laboratories during diagnosis, counseling, management, and treatment of patients with genetic disorders.

V.B.5. Fellows must participate in the working conferences of laboratories, as well as in discussion of laboratory data during other clinical conferences.

V.B.6. Fellows must have responsibility for direct patient care in all settings, including planning, management, and treatment, both diagnostic and therapeutic, subject to review and approval by the attending physician.

V.B.7. Fellows must have formal instruction on the basic economic and business knowledge necessary to function effectively in future practice settings.

V.B.8. Fellows should have access to information technology to support patient care decisions and patient education.

V.C. Fellows' Scholarly Activities

See International Subspecialty Foundational Requirements, Section IV.B.

V.D. Duty Hour and Work Limitations

See International Subspecialty Foundational Requirements, Section VI.

VI ACGME-I Competencies

VI.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 must demonstrate proficiency in:

- VI.A.1. mature clinical judgment through their involvement in the decision-making process and in the continuity of patient care in all settings, including planning, management, and treatment, both diagnostic and therapeutic;
- VI.A.2. gathering essential and accurate information about their patients through:
 - VI.A.2.a) medical interviewing, including the taking and interpreting of a complete family history, to include construction of a pedigree;
 - VI.A.2.b) completing comprehensive genetics physical examinations; and,
 - VI.A.2.c) selecting appropriate diagnostic studies, interpreting laboratory data generated from biochemical genetic, cytogenetic, and molecular genetic analyses, and understanding the utility and limitations of genetic testing.
- VI.A.3. making informed decisions about diagnostic and therapeutic interventions based on patient and family information and preferences, up-to-date scientific evidence, and clinical judgment through:
 - VI.A.3.a) demonstrating effective and appropriate clinical problem-solving skills;
 - VI.A.3.b) understanding the limits in their own knowledge and expertise; and,
 - VI.A.3.c) appropriately using consultants and referrals.
- VI.A.4. developing and carrying out effective patient management plans;
- VI.A.5. prescribing medications and performing medical interventions essential for the care of patients with heritable disorders;
- VI.A.6. counseling and educating patients and their families through:
 - VI.A.6.a) taking measures needed to enhance or maintain health and function and to prevent disease and injury;
 - VI.A.6.b) encouraging active family participation in a patient's care, and in providing information that will contribute to that care; and,

- VI.A.6.c) empowering patients to make informed decisions, interpret risk assessment, and use predictive testing for themselves and family members.
- VI.A.7. using information technology to support patient care decisions and patient education;
- VI.A.8. assisting patients in accomplishing their personal health goals;
- VI.A.9. working with other health care professionals, including those from other disciplines, to provide patient-focused care; and,
- VI.A.10. understanding and critically interpreting laboratory data.

VI.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 must demonstrate proficiency in their knowledge of

- VI.B.1. using current medical information and scientific evidence for patient care, including:
 - VI.B.1.a) results from genetics laboratory tests;
 - VI.B.1.b) quantitative risk assessment; and,
 - VI.B.1.c) available bioinformatics.
- VI.B.2. biochemical genetics, cytogenetics, mendelian and non-mendelian genetics, molecular genetics, and population and quantitative genetics.

VI.C. Practice-based Learning and Improvement

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

- VI.C.1. obtain and use information about their own patients and the larger population from which their patients are drawn; and,
- VI.C.2. use information technology to manage information, access online medical information, and support their own education.

VI.D. Interpersonal and Communication Skills

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

- VI.D.1. communicate effectively and demonstrate caring and respectful behavior when interacting with patients and their families;
- VI.D.2. communicate effectively with patients and their families to create and sustain a professional and therapeutic relationship; and,
- VI.D.3. counsel and educate patients and their families in order to assist them to:
 - VI.D.3.a) take measures needed to enhance or maintain health and function and to prevent disease and injury, and participate actively in the patient's care; and,
 - VI.D.3.b) make informed decisions, interpret risk assessment, and understand the use of predictive testing and the possibility of unanticipated or incidental findings in genetic testing.

VI.E. Professionalism

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

- VI.E.1. a commitment to excellence and ongoing professional development;
- VI.E.2. a commitment to ethical principles pertaining to the provision or withholding of clinical care, confidentiality of patient information, informed consent, conflict of interest, and business practices; and,
- VI.E.3. an awareness of the unique ethical principles pertaining to the use of diagnostic and predictive genetic testing, genetic testing of minors, and genetic discrimination.

VI.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. Fellows must:

- VI.F.1. deal with the complexities of the health care system; and,
- VI.F.2. promote health and function that can prevent disease and injury.