

# **GUIDELINES FOR COMBINED TRAINING IN PEDIATRICS AND MEDICAL GENETICS AND GENOMICS LEADING TO DUAL CERTIFICATION**

## **PREAMBLE**

This document is intended to provide educational guidance to program directors in pediatrics and medical genetics and genomics as well as to individuals potentially interested in combined training in pediatrics and medical genetics and genomics. All program requirements in both specialties, as described on the ACGME Web site ([www.acgme.org](http://www.acgme.org)), apply to the combined training unless specifically modified in this document. This integrated program will require **four**, not five, years as would be necessary if these two residency programs were completed sequentially. Every program that plans to offer this combined training must be approved by both the American Board of Pediatrics (ABP) and the American Board of Medical genetics and genomics (ABMGG) before residents are recruited. In addition, both Boards (and Review Committees (RCs), when applicable) will review these training requirements periodically.

## **OBJECTIVES OF COMBINED TRAINING**

Combined training in pediatrics and medical genetics and genomics should allow the development of physicians who are fully qualified in both specialties. Physicians completing this training should be competent pediatricians and medical geneticists capable of professional activity in either discipline. It is anticipated that many trainees will develop careers focused on genetic diseases in children. The strengths of the two residencies should complement each other to provide the optimal educational experience.

Both Boards encourage residents to extend their training for an additional fifth year or more in investigative or academic pursuits in order to prepare graduates of this combined training program for careers in research and academics.

## **GENERAL REQUIREMENTS**

### Residency Candidates

Residents should enter a combined training residency at the first postgraduate year level (PG-1). A resident may enter a combined residency at the PG-2 level only if the first residency year was served in a categorical residency in pediatrics in the same academic health system. Exceptions to training at the same academic health system may be considered at the discretion of both Boards. Transitional year training will provide no credit toward the requirements of either Board. Residents may not enter combined residency training and receive credit beyond the PG-1 level or transfer to another combined residency without prospective approval of both Boards. A resident transferring from a combined residency to a categorical pediatric or medical genetics and genomics program should seek specific eligibility information from the appropriate Board.

Vacations, leave, and meeting time will be shared equally by both training residencies. Absences from training (e.g. vacation, parental leave, sick leave) exceeding 4 of the 48 months of required training must be made up.

### Characteristics of Eligible Combined Residencies

The two participating core residency programs must be accredited by the ACGME, be sponsored by the same ACGME sponsoring institution and must be in geographic proximity within the same academic health system. At the discretion of both Boards, exceptions may be considered. Affiliated residencies must be located close enough to facilitate cohesion among the residencies' house staff, attendance at weekly continuity clinics when scheduled, integrated conferences and faculty exchanges of curriculum, evaluation, administration and related matters.

The components of combined training must be derived from training that has been accredited by ACGME as part of the core programs. Participating sites that are used for training by the combined program must be approved for simultaneous use by the core programs.

#### Objectives of Combined Training

The training requirements for eligibility for the certification process of each Board will be fulfilled by the satisfactory completion of 48 months of approved combined training. The integration of training after the PG-1 year will increase the exposure of pediatric categorical residents to medical genetics and genomics via the combined residency trainees. The working relationships developed among categorical and combined residency trainees will facilitate communication between the two specialties.

The first year of training should be spent in pediatrics in direct patient care experiences. During the final 36 months, continuous assignment to one specialty or the other should be for not less than 3 or more than 6 months' duration in any given year, with the option for up to 9 months spent in clinical genetics and genomics in the 4th year. Training in each discipline must incorporate graded responsibility throughout the training period.

#### Faculty

The combined residency must have one designated Program Director who will be responsible for all administrative aspects of the program and who can devote substantial time and effort to the educational program. This individual can be the Director of either the categorical program in pediatrics or medical genetics and genomics; the Director of the other categorical residency program will be designated the Associate Program Director of this combined program to ensure both integration of the residency and supervision in each discipline. An exception to this requirement would be a single Director who is currently certified in both specialties and has an academic appointment in each department.

To achieve appropriate coordination of the combined program, including integration of the training and supervision in each discipline, the Program Directors of the core programs and the Program Director(s) of the combined program must hold at least quarterly meetings that involve consultation with faculty and residents from both departments.

Well-established communication must occur between these individuals, particularly in those areas where the basic concepts in both specialties overlap, to assure that the training of residents is well coordinated.

The Program Director is responsible for assuring all aspects of the program requirements are met. This individual, along with the Associate Program Director, should submit the application for the program to both the ABP and ABMGG and notify both Boards should any significant changes occur in either of the associated categorical residency programs. The Program Director and Associate Program Director are responsible for completing evaluation forms for all trainees in the combined program as required by their respective Boards, and both must verify satisfactory completion of the training program on the resident's final evaluation form. As a general principle, the training of residents in pediatrics is the responsibility of the pediatric faculty and the training of residents in medical genetics and genomics is the responsibility of the medical genetics faculty.

There should be an adequate number of faculty members who devote sufficient time to provide leadership to the residency and supervision of the residents. It is recommended that some faculty members have completed combined training in these two specialties. Since each component of the residency must be accredited by its respective discipline, the faculty must meet the requirements for their specialty.

#### Curricular Requirements

A clearly described written curriculum must be available for residents, faculty and the ACGME's RC for both Pediatrics and Medical genetics and genomics. The curricular components must conform to the program requirements for accreditation in pediatrics and medical genetics and genomics. The curriculum must assure a cohesive, planned educational experience and not simply comprise a series of rotations between the two

specialties. Duplication of clinical experiences between the two specialties should be avoided. Periodic review of the residency curriculum must be performed by the Program Director(s) in consultation with residents and faculty from both departments. Combined training must not interfere with or compromise the training of the categorical residents in either field.

There must be 24 core pediatrics months as per ACGME requirements, 18 core months in clinical genetics months as per ACGME requirements, and 6 months of an individualized curriculum with the oversight of the two Program Directors.

**While a single rotation may not “count” in more than one specialty, it is recognized that many of the rotations will have educational value in both disciplines. For example, training in Developmental-Behavioral Pediatrics is necessary for Pediatric Medical Geneticists who will be evaluating and caring for children with developmental disabilities; experience in a pediatric intensive care unit is needed to care for patients with inborn errors of metabolism who are experiencing a metabolic crisis. Likewise, providing a medical home for a patient with a chronic condition such as phenylketonuria or Down syndrome is an important experience for the pediatrician as well as the clinical geneticist.**

Joint educational conferences involving residents from pediatrics and medical genetics and genomics are desirable and should specifically include the participation of all residents in the combined training residency whenever possible.

Periodic Evaluations

Both Boards require the annual tracking evaluations to be completed at the end of each training year.

Periodic evaluation of the educational progress of the resident by the Program Directors in both specialties is required as specified by each specialty. The evaluations should be discussed with the resident at least annually and signed by the resident, and must be kept on file and available for review.

**PEDIATRIC REQUIREMENTS**

The training should be the same as described in the ACGME Program Requirements for Graduate Medical Education for Pediatrics as outlined in this document with the exceptions that follow.

The curriculum should be organized in educational units. An educational unit should be a block (4 weeks or 1 month) or a longitudinal experience. An outpatient educational unit should be a minimum of 32 half-day sessions. An inpatient educational unit should be a minimum of 200 hours.

The specific curriculum elements are detailed in the following chart.

**Program Requirements in General Pediatrics  
For  
Combined Training in Pediatrics Medical genetics and genomics  
(effective July 2013)**

| Component                            | Educational Unit*         |
|--------------------------------------|---------------------------|
| Emergency Medicine and Acute Illness | 3 (with at least 2 in ED) |
| Developmental-Behavioral Pediatrics  | 1                         |
| Adolescent Medicine                  | 1                         |
| Term Newborn                         | 1                         |
| Inpatient Pediatrics (non-ICU)       | 5 (no maximum)            |

|   |             |
|---|-------------|
| Ambulatory Experiences (to include community pediatrics and child advocacy) | 2           |
| NICU  | 2           |
| PICU  | 2           |
| **Additional Subspecialty   | 7 (minimum) |

*\*Educational Unit = 4 weeks or 1 month block OR outpatient longitudinal experience of 32 half-day sessions OR inpatient longitudinal experience of 200 hours*

\*\*Additional Subspecialty includes 4 units from 4 different subspecialties from the following list:

- child abuse
- pediatric allergy and immunology
- pediatric cardiology
- pediatric dermatology
- pediatric endocrinology
- pediatric gastroenterology
- pediatric hematology-oncology
- pediatric infectious diseases
- pediatric nephrology
- pediatric neurology
- pediatric pulmonology
- pediatric rheumatology

An additional 3 units of single or combined subspecialties are required from the list above or below:

- child and adolescent psychiatry
- hospice and palliative medicine
- neurodevelopmental disabilities
- pediatric anesthesiology
- pediatric dentistry
- pediatric ophthalmology
- pediatric orthopaedic surgery
- pediatric otolaryngology
- pediatric rehabilitation medicine
- pediatric radiology
- pediatric surgery
- sleep medicine
- sports medicine

#### Subspecialty Experience

Educational experiences in the subspecialties must emphasize the competencies and skills needed to practice high-quality general pediatrics in the community. They should be a blend of inpatient and outpatient experiences and prepare residents to participate as team members in the care of patients with chronic and complex disorders.

Medical genetics and genomics should not be utilized to fulfill the subspecialty requirements during the 24 months of general pediatrics training.

#### Supervisory Responsibility

At least 5 months of supervisory responsibility must be provided for each resident during the 48 months of training. At least 3 of these months must occur during training in pediatrics and must include experience leading an inpatient team. Two months may occur during the genetics training. The supervisory responsibilities must involve both inpatient and outpatient experience.

#### Continuity Clinic

There must be a minimum of 36 half-day sessions per year of a longitudinal outpatient experience in a continuity clinic throughout the 48 months of training. The sessions must not be scheduled in a time period fewer than 26 weeks per year. The patients should include those previously cared for in the hospital, well children of various ages and children of various ages with special health-care needs and chronic conditions. PG-1 and PG-2 residents must have a longitudinal general pediatrics outpatient experience in a setting that provides a medical home for the spectrum of pediatric patients and must care

for a panel of patients who identify the resident as their primary care provider. PG-3 and PG-4 residents should continue this experience in a longitudinal pediatric genetics and metabolism outpatient clinic. Allowing residents to serve as primary care providers for children with genetic and metabolic disorders throughout their training is encouraged.

The medical home model of care must focus on wellness and prevention, coordination of care, longitudinal management of children with special health care needs including metabolic conditions, chromosome abnormalities and other genetic syndromes and provide a patient- and family-centered approach to care.

## **MEDICAL GENETICS AND GENOMICS REQUIREMENTS**

The development of a resident's skills in medical genetics and genomics will be fostered by rotations that prepare residents to provide comprehensive diagnostic, management, treatment, risk assessment, interpretation of genetic and genomic testing, and genetic counseling services for patients who have or are at risk for genetic disorders or disorders with a genetic component. Upon completion of training, residents will be able to: (a) diagnose and manage genetic disorders; (b) provide patient and family counseling; (c) use their knowledge of heterogeneity, variability and natural history of genetic disorders in patient-care decision making; (d) elicit and interpret individual and family medical histories; (e) interpret clinical genetic and specialized laboratory testing information; (f) explain the causes and natural history of genetic disorders and genetic risk assessment; and (g) interact with other health-care professionals in the provision of services for patients with genetically influenced disorders.

The training should be the same as described in the Program Requirements of the Residency Review Committee for Medical genetics and genomics, with the exceptions that follow.

### Curriculum Organization and Resident Experiences

The curriculum must include 18 months of broad-based, clinically-oriented medical genetics and genomics activities, which must include experiences with prenatal, pediatric and adult patients and patients who have cancer. It is expected that at least 6 of the core medical genetics and genomics training months will be spent in the evaluation, treatment and care of patients in the pediatric age population. For patients with metabolic diseases, residents must have experience in both inpatient and outpatient settings. There must also be a minimum of 2 continuous weeks in each type of laboratory (clinical biochemical genetics, clinical molecular genetics, and clinical cytogenetics). (See the ACGME Program Requirements for Graduate Medical Education in Medical genetics and genomics for details of what these experiences must include). Residents must not be assigned clinical responsibilities at the same time they are participating in the required laboratory experiences. As outlined above, residents must continue their continuity clinic experiences during this period of training.

### Patient Population

Residents must have the opportunity to care for a number of patients and families sufficient to permit them to develop an understanding of the wide variety of medical genetic problems, including mendelian disorders, inborn errors of metabolism, diseases of chromosome number and structure, multifactorial disorders, syndromes, congenital malformations, other birth defects and other genetically influenced conditions. Typically, this will mean that programs will be sufficiently broad-based to care for at least 100 different patients or families per year for each resident. These patients or families must be evaluated in outpatient and inpatient settings. As medical genetics and genomics involves families and individuals of all ages, residents must be competent to work with adults and children and must have an opportunity to gain an understanding of family dynamics as they relate to issues of diagnosis, counseling and management.

### Correlation of Laboratory and Clinical Experience

Experiences in clinical biochemical genetic, molecular genetic and cytogenetic laboratories must be integral components of each program, and residents must have regular opportunities to develop their abilities to understand and critically interpret laboratory data. Residents should develop an understanding of the appropriate use of laboratories during diagnosis, counseling and management of patients with genetic disorders. Toward this end, resident education must include ongoing participation in the working

conferences of laboratories as well as discussions of laboratory data during other clinical conferences.

### Other Health-Care Professionals

Residents 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 and genomics services. Because of the complex nature and multiple system involvement of genetic disorders, residents must be exposed to multidisciplinary and interdisciplinary models during the residency and must be proficient in organizing teams of health-care professional to provide the necessary resources for their patients.

### Responsibilities for Patient Care, Including Continuity Care Experiences

The development of mature clinical judgment requires that residents, properly supervised, be given responsibility for patient care commensurate with their ability. This can be achieved only if a resident is involved in the decision-making process and in the continuity of patient care. Residents must be given the responsibility for direct patient care in all settings, including diagnostic and therapeutic planning and management, subject to review and approval by the attending physician. Continuity clinic experiences must continue throughout the 48-month training period (see Continuity Clinic description above).

### Didactic Curriculum

The didactic curriculum must include clinical teaching conferences distinct from the basic science lectures and didactic sessions. Clinical teaching conferences should include formal didactic sessions about clinical laboratory topics, medical genetics and genomics rounds, journal clubs and follow-up conferences for genetic clinics. There must also be lectures or other didactic sessions on basic molecular biologic techniques pertinent to clinical testing and understanding genetic research; the cell cycle and molecular genetics of cancer; DNA, RNA and protein chemistry, including DNA repair; principles of replication, recombination and segregation of alleles during meiosis; basic mechanisms of inheritance, including sex chromosomes, autosomes and mitochondrial DNA; mechanisms of chromosomal rearrangement; behavior of genes in a population, including Hardy-Weinberg equilibria of alleles; Bayesian analysis and other methods of genetic risk assessment; human embryology and development; genetic linkage, mapping and association studies; molecular organization of the genome, including molecular evolution mechanisms; gene expression and mechanisms of regulation of genes and genomes, including epigenetic regulation; bioinformatic approaches to interpreting molecular test results, including methods to assign causation to novel findings; inheritance of complex traits and genetic variation; and principles of biochemical genetics and metabolism. Research seminars should be provided as part of the experience.

Integration of the genetic clinical conferences with involvement of the pediatric generalists and subspecialists is urged.

## **INDIVIDUALIZED CURRICULUM**

To fulfill the additional 6 months of training required in the combined program, an individualized curriculum should be developed. The focus should be on providing experiences that will help a resident be better prepared for the next step in their career after residency. The curriculum might include additional subspecialty experiences not already used to fulfill the core subspecialty requirement in pediatrics. Additional supervisory experiences on an inpatient pediatric service that includes care for patients with genetic and metabolic disorders are encouraged. Rotations that will also be helpful for a pediatric medical geneticist such as pediatric radiology and pediatric neurology can be utilized. This 6-month period could also be devoted to a research experience.

## **EVALUATION**

There must be adequate ongoing evaluation of the knowledge, skills and performance of residents. Entry evaluation assessment, interim testing and periodic reassessment, utilizing appropriate evaluation modalities, including in-training examinations as currently required by both pediatrics and medical genetics and genomics, should be employed. There must be a method of documenting the procedures that are performed by the residents. Such documentation must be maintained by the program director(s), be

available for review by the RCs in Pediatrics and Medical genetics and genomics, the ABP, the ABMGG, and site visitors, and may be used to provide documentation for application for hospital privileges by graduates of these training programs.

The specialty-specific Milestones must be used as one of the tools to ensure residents are able to practice core professional activities without supervision upon completion of the program. The Program Director must provide a summative evaluation for each resident upon completion of the program.

Residents should be advanced to positions of higher responsibility only on the basis of evidence of their satisfactory progressive scholarship and professional growth.

The Program Director(s) are responsible for the maintenance of a permanent record of each resident and its accessibility to the resident and other authorized personnel. The Program Director(s) and faculty are responsible for providing a written final evaluation for each resident who completes the program. This evaluation must include a review of the resident's performance during the final period of training in each specialty and should verify that the resident has demonstrated sufficient professional ability to practice competently and without supervision and is prepared to apply for the certification processes of both the ABP and ABMGG. This final evaluation should be part of the resident's permanent record and should be maintained by the institution.

### **ELIGIBILITY FOR CERTIFICATION**

Residents in a combined training residency must satisfactorily complete the specific requirements of both the ABP and ABMGG to be eligible for the examination by each Board. Clinical competence must be verified by both Program Directors in each of the respective core specialties. Lacking this verification, the resident must satisfactorily complete 3 years of training in pediatrics or 2 years training in medical genetics and genomics in addition to the PG-1 year to qualify for the examination in the respective specialty.

Upon successful completion of all requirements of the combined residency, the candidate is qualified to take both the ABP and the ABMGG certification examinations. Residents may submit an application for the general pediatrics and clinical genetics certifying examinations during their fourth year of training; however, applicants may not take either examination until all of the combined residency training requirements have been successfully completed. The candidate will be certified by each Board upon successful completion of its certifying examination. Certification in one specialty will not be contingent upon certification in the other. It is the candidate's responsibility to complete the certification process in each specialty.

**9/96 Approved by the American Board of Pediatrics**

**10/96 Approved by the American Board of Medical genetics and genomics**

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