



American Association of Neuromuscular & Electrodiagnostic Medicine Educational Guidelines for Electrodiagnostic Training Programs

The American Association of Neuromuscular & Electrodiagnostic Medicine (AANEM) has created these educational guidelines to aid training program directors in establishing new electrodiagnostic (EDX) training programs or in reviewing the current status of existing programs. This document was developed by the EDX Self-Assessment Committee and approved by the Board of Directors of the AANEM. It is not intended to serve as a mechanism for training program accreditation.

Electrodiagnostic Training Program Director and Faculty

Training and experience equivalent to that described in the AANEM's position statements: [*Who is Qualified to Practice Electrodiagnostic Medicine?*](#) and [*Overview of Electrodiagnostic Medicine*](#), are considered essential for an EDX training program director. Ideally, the program director should have additional training and experience beyond the minimal qualifications described and **also** be a Diplomate of the American Board of Electrodiagnostic Medicine (ABEM) or have equivalent competency in EDX medicine. In addition, this individual, or an appropriate designee with similar qualifications, should devote sufficient time to the laboratory to ensure that the clinical and educational activities are carried out properly. This should include fulfillment of all aspects of AANEM educational requirements for trainees, including periodic progress assessments and proper supervision of all studies carried out by trainees. Ideally, a program should consist of at least two qualified faculty, one of whom may be the training program director, with primary board certification and ABEM or equivalent certification. Faculty should ideally be in an academic department with an accredited graduate medical training program in neurology or physical medicine and rehabilitation.

Duration of Training Program

At least 6 months full-time supervised training (or its equivalent part-time) is considered necessary for trainees to develop adequate basic skills in EDX medicine. This training need not be continuous but should at all levels include adequate supervision and staff interaction and gradually increasing responsibility for the trainee. The progression of increasing responsibility should be clearly delineated in a formal curriculum, subject to modification pending the rate of resident or fellow progression, during his or her training.

Training Admission Requirements

For an adequate educational experience, EDX trainees should receive their training as part of a residency in physical medicine and rehabilitation or neurology or during a fellowship program. The first 3 months of the program should be rigidly structured and supervised. The residency should be approved by the appropriate residency review committee of the parent professional association or academy. Fellowships should either be approved by the appropriate residency review committee or be sponsored by a program whose residency has been approved by the appropriate residency review committee.

Full competency in EDX medicine can only be achieved by performing and interpreting EDX examinations on a broad range of neuromuscular diseases. Therefore, it is recommended that trainees obtain the following experience during their training:

- Straightforward Diagnosis – Approximately 100-150 patient encounters involving the identification of a simple diagnosis, such as any common entrapment neuropathy or radiculopathy
- Moderate Complexity Diagnosis – Approximately 50-100 patient encounters involving the identification or ruling out of a moderately complex diagnosis, such as polyneuropathy or myopathy.
- High Complexity Diagnosis – Approximately 10-25 patient encounters involving the identification or the ruling out of a complex diagnosis, such as motor neuron disease, plexopathy, mononeuritis multiplex, or neuromuscular transmission defect.

Didactic Curriculum and Technical Training

Proficiency in EDX medicine requires adequate knowledge in the following academic areas:

1. Anatomy of limb, trunk, and cranial musculature, and of the peripheral and central nervous system.
2. Physiology of muscle and the peripheral and central nervous systems.
3. Pathology and pathophysiology in neuromuscular disorders.
4. Clinical aspects of neurologic, neuromuscular, autonomic, and musculoskeletal disorders, including their diagnosis and treatment.
5. Electrophysiology, including knowledge of:
 - a. Nerve conduction studies: motor, sensory, and delayed response studies.
 - b. Needle electromyography (EMG), including normal and abnormal motor unit analysis, motor unit recruitment, firing rates, and recognition of spontaneous activity.
 - c. Neuromuscular junction testing, including repetitive stimulation and single fiber electromyography (SFEMG).
 - d. Autonomic nervous system testing.
6. Electrodiagnostic instrumentation: Applied electronics, including basic circuit theory, filter parameters and function, electrical safety, concepts of electrical source generators, and recognition of technical limitations and pitfalls.
7. Evidence based knowledge of contraindications and safety precautions as they relate to EDX testing.
8. Ethical principles of EDX medicine, especially as they relate to appropriate test utilization, respect for patient autonomy, and informed consent.
9. Statistics as related to EDX medicine, including the development and use of reference values.
10. Report generation, including an understanding of the elements of findings, reasoning, and summative conclusions.

Proficiency in the above areas can be accomplished by any combination of lectures, conferences, meetings, discussions, and the use of electronic learning resources.

Some programs have found lectures and/or conferences, held weekly, which require primary participation from residents and/or fellows to be advantageous. Use of the AANEM's educational materials is strongly recommended since they have been developed to provide knowledge of all the basic aspects of EDX medicine. The trainee is expected to develop technical proficiency in the performance of nerve conduction studies and needle electromyography. Trainees should understand the principles, technical aspects, and interpretation of repetitive nerve stimulation studies, SFEMG, neuromuscular ultrasound (NMUS), and autonomic testing.

Program and Trainee Assessment

The EDX training program director, or an appropriate designee with similar qualifications on the faculty of the training program, should directly observe trainees early in training. Later, when the trainees are working more independently, the training program director or appropriate designee should be immediately available at all times to observe the studies should questions arise during the examination and must be available at the conclusion of the study to discuss the findings, conclusions, and report.

A written description of the training program, with trainee goals, objectives, and responsibilities should be available to trainees and faculty. Periodic assessments should be carried out by the faculty to assure that trainees have developed proficiency in or adequate knowledge of the areas listed under the heading Didactic Curriculum. This can include any combination of written or oral examinations, either formal or informal. The use of the AANEM EDX Self-Assessment Examination may help in this evaluation process. Comprehensive final evaluations of the trainees should be maintained in confidential and permanent files. A mechanism should also be available for trainees to assess the effectiveness of the educational activities of the training program. Trainees should complete evaluations of the program, and the results of trainee evaluations should be used to inform program improvement plans.

Laboratory Clinical Activity

Adequate laboratory activity is necessary for trainees to acquire requisite skills and experience. At least 200 EDX evaluations should be performed by each trainee during the training period of at least 6 months full-time (or its equivalent part-time). The studies should be documented and interpreted and include exposure to neuromuscular disorders in adults and children. Regular and accurate narrative and statistical records of the program should be maintained.

Scholarly Activities of Faculty and Trainees

A vigorous, intellectually active training program generates publications in peer-reviewed journals or presentations at regional, national, and international meetings. Ideally, trainees should participate in EDX (or related) research to enhance the educational experience provided by the training program.

Institutional Support

Establishment and maintenance of an adequate training program requires the support of an institution (hospital or medical school) that has the resources necessary to maintain the proper educational environment. The EDX laboratory and equipment should be maintained in compliance with the safety regulations of the institution. The program must have the approval and support of the department chair and the residency program director.

Developed by the 1993-1994 American Association of Electrodiagnostic Medicine (AAEM) Training Program Committee: Chair: Francis O. Walker, MD; Members: John D. England, MD; Robert L. Harmon, MD, MS; Susan L. Hubbell, MD; John C. King, MD; and Zachary Simmons, MD. Amended by the 1996-1997 AAEM Training Program Committee. Reviewed by the 2011-2012 EDX SAE Committee. Revised 2012 by Andrew H. Dubin, MD, MS, Michael D. Weiss, MD, Zachary Simmons, MD, and Malhotra Gautam, MD Approved by: AANEM Board of Directors October 2012. Revised 2023 by AANEM GME Committee.

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