

## AANEM POSITION STATEMENT ON NEUROMUSCULAR MEDICINE QUALIFICATIONS<sup>1</sup>

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**N**euromuscular (NM) medicine is the practice of medicine that involves the care of adult and pediatric patients with disorders of the peripheral nervous system (PNS) and its connections with the central nervous system. The PNS includes the motor and sensory neurons, peripheral nerves, NM junctions, and muscles. The care of patients with NM symptoms and signs includes physical examination, clinical investigation, diagnosis, management, and counseling for patients and their families.

The practice of NM medicine has evolved into a defined subspecialty, owing to the large body of scientific knowledge in the field (including pathophysiology, genetics, diagnosis, and treatment of NM diseases) that has developed to a degree of sophistication that is beyond the training and knowledge base expected of a general neurologist or physiatrist.<sup>1</sup>

### AREAS OF KNOWLEDGE

The practice of NM medicine requires knowledge and development of clinical expertise in a number of areas. These areas include basic scientific knowledge; the skills to obtain a thorough medical history and perform a comprehensive NM examination; an understanding of the varied disorders of the PNS; hands-on clinical experience that enables the physician to recognize NM disorders; and the knowledge of how to investigate, diagnose, and manage patients with NM disorders.

**Basic Scientific Knowledge.** The basic scientific knowledge needed in NM medicine includes anat-

**Abbreviations:** ABPMR, American Board of Physical Medicine and Rehabilitation; ABPN, American Board of Psychiatry and Neurology; ACGME, Accreditation Council for Graduate Medical Education; ALS, amyotrophic lateral sclerosis; ALSA, Amyotrophic Lateral Sclerosis Association; CSF, cerebrospinal fluid; IVIg, intravenous gammaglobulin; MDA, Muscular Dystrophy Association; NM, neuromuscular medicine; PNS, peripheral nervous system; QSART, quantitative sudomotor axon reflex test

**Key words:** clinical skills; expertise; neuromuscular; scientific knowledge; training

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omy of the PNS; pathophysiological, genetic, and molecular mechanisms of PNS disorders; histopathological correlations of PNS disorders; and neuroimaging features of PNS disorders.

**Clinical Skills.** The clinical skills needed include knowledge and proficiency in obtaining a history and performing an NM physical examination. In turn, these skills allow the practitioner to recognize evidence of NM disease and distinguish symptoms and signs referable to the PNS from those of the central nervous system and musculoskeletal system. Clinical skills may include procedural skills in techniques such as nerve conduction studies; needle electromyography (EMG); ultrasonography of peripheral nerve and muscle; injection of botulinum toxin; nerve and muscle biopsy; autonomic testing; and interpretation of skin, nerve, and muscle biopsy specimens. The American Association of Neuromuscular & Electrodiagnostic Medicine (AANEM) has developed statements on the qualifications for physicians performing electrodiagnostic (EDX) studies and ultrasonography.<sup>2,3</sup>

**Spectrum of NM Disorders.** The spectrum of medical conditions encompassed by NM medicine is large. The categories of disease include motor neuronopathies [amyotrophic lateral sclerosis (ALS); spinal muscular atrophy; focal, infectious, post-infectious, genetic, and paraneoplastic disorders], disorders of the roots and plexus, disorders of peripheral nerve (mononeuropathies, acquired and hereditary polyneuropathies, mononeuropathy multiplex, autonomic neuropathies), NM junction disorders (myasthenia gravis, Lambert-Eaton myasthenic syndrome, botulism), and muscle disorders (hereditary and acquired). NM specialists are also knowledgeable about various systemic and medical conditions that may have significant clinical manifestations in the PNS.

**Diagnostic Testing.** Practitioners of NM medicine have familiarity with the performance and interpretation of various testing modalities that aid in the diagnosis of NM disorders. These include laboratory tests of blood, urine, and cerebrospinal fluid (CSF) samples; genetic tests; electrodiagnosis (nerve

conduction studies, needle electromyography, and specialized testing such as single-fiber EMG); somatosensory evoked potentials; autonomic testing [quantitative sudomotor axon reflex test (QSART), thermoregulatory sweat test, sympathetic skin response, tilt table test, Valsalva maneuver]; quantitative sensory testing; nerve and muscle ultrasonography; neuroimaging studies; and biopsy of skin, nerve, and muscle for pathologic diagnosis.

**Patient Management.** NM medicine encompasses many individual disease processes, each of which requires its own management paradigm. Specific focuses of management include pharmacological and disease-modifying therapies, rehabilitation, and counseling.

NM medicine practitioners use disease-modifying therapies, such as immunosuppressant medications, intravenous gammaglobulin (IVIg), and plasmapheresis, to treat inflammatory and autoimmune disorders. Other pharmacological treatments are used in disorders such as myasthenia gravis, Lambert–Eaton syndrome, periodic paralysis, myopathies, and painful neuropathies, among others.

Counseling is necessary for all patients and varies with the specific disorder and individual patient situation. Disorders requiring special counseling include focal neuropathies and radiculopathies that may require surgical intervention, hereditary disorders that require genetic and family counseling, and life-threatening disorders such as ALS.

Rehabilitation is a critical component of the management of essentially all patients with NM disorders. Areas of rehabilitation include exercise; assistive technology and devices; orthotics; physical and occupational therapy; respiratory function; speech and swallowing; and vocational/avocational, psychological, and nutritional support.<sup>4</sup> Modalities used include physical and occupational therapy, therapeutic exercise, bracing, and speech therapy, among others. Rehabilitation is often required in both the acute and postacute hospital setting, as well as in the outpatient setting.

Because of the common occurrence of progressive disability in patients with NM conditions, multidisciplinary clinics play an important role in providing multiple services in one geographical location for disabled patients. Many NM conditions have involvement of organ systems outside the PNS and often require collaboration with specialists in other areas of medicine. Because NM specialists are knowledgeable about the effects of NM conditions on other organ systems and their impact on mobility and activities of daily living, they are best qualified to direct multidisciplinary clinics for the care of patients with NM conditions. NM physicians, nurses, physical and occupational

therapists, nutritionists, orthotists, and social workers see patients during clinic operation and then participate in management conferences to consider treatment options in a multidisciplinary setting. Muscular Dystrophy Association (MDA)-sponsored clinics and ALS Association (ALSA)-sponsored clinics are examples of systems of care that improve patient outcomes efficiently and cost-effectively.<sup>5</sup>

## **TRAINING**

The practice of NM medicine is ideally initiated after subspecialty post-residency fellowship training. The NM medicine fellowship curriculum is a natural extension of basic residency training in Neurology or Physical Medicine and Rehabilitation.<sup>6</sup> For this reason, neurologists and psychiatrists are best equipped to benefit from fellowship training and subsequently practice in the field of NM medicine. The Accreditation Council for Graduate Medical Education (ACGME) established standards for NM fellowship programs in February 2005. NM medicine specialists practicing prior to the start of these programs will not have completed an NM medicine fellowship. The American Board of Psychiatry and Neurology (ABPN) and the American Board of Physical Medicine and Rehabilitation (ABPMR) have established a practice track that allows physicians to participate in the NM examination without completing a fellowship program. Beginning in 2013 all applicants will be required to complete an ACGME-accredited training program in NM medicine in order to be eligible to sit for the examination.

The goal of the certification process in NM medicine is to serve the public interest by promoting excellence in patient care, teaching, and research for these often disabling and progressive diseases.<sup>1</sup> In addition, certification provides the diplomate with recognition for specialized training in the field that patients and referring physicians will find useful when seeking NM expertise.

Ideally, fellowship training in NM medicine should be gained by enrollment in an ACGME-accredited NM medicine fellowship program. This allows for eligibility to take the NM medicine subspecialty certification examination offered by the ABPN and the ABPMR, which was first offered in 2008. ACGME-accredited NM medicine training provides the clinical experiences, clinical skills development, and increased fund of knowledge that are the foundation of competent practice of NM medicine.<sup>4,6</sup>

## **PROFESSIONAL DEVELOPMENT**

The AANEM is prepared to provide continuing medical education to physicians who wish to acquire prerequisite skills in the clinical, laboratory, and electrodiagnostic evaluation of patients with

neuromuscular disease. The AANEM is also willing to partner with other interested medical organizations to improve education and research in the field of NM medicine.

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