

**UNIVERSITY OF KANSAS
NEUROMUSCULAR FELLOWSHIP
PROGRAM GOALS, OBJECTIVES AND COMPETENCIES
BY ROTATION**

The goal of the training in Neuromuscular Medicine is to provide the resident with the opportunity to develop the expertise necessary to evaluate and manage patients with neuromuscular disorders using specialized procedures and techniques.

It is the intent of the Neuromuscular Medicine training program to develop neurologists and physical medicine rehabilitation specialist into competent neuromuscular specialists. Neurologists / physiatrists successfully completing the program will be eligible for Neuromuscular Medicine subspecialty certification by the American Board of Psychiatry and Neurology. The objective is to provide residents with the opportunity to develop the expertise necessary to evaluate and manage patients using the procedures and techniques of Neuromuscular Medicine and that all trainees will pass the examination.

Neuromuscular Medicine includes the assessment of selective neurological disorders involving central, peripheral and autonomic nervous systems and muscles. Assessment, monitoring and treatment are involved in electrophysiological testing in combination with clinical evaluation.

The goals of the training program include extensive experience in neuromuscular clinical evaluation, rehabilitation, nerve and muscle pathology, motor and sensory conduction studies and diagnostic electromyography. Familiarity with single fiber electromyography, skin pathology and autonomic function is included.

Clinical competence in Neuromuscular Medicine requires:

- a. A solid fund of basic clinical knowledge and the ability to maintain it at current levels for a lifetime of continuous education
- b. The ability to perform an adequate history and physical examination
- c. The ability to appropriately order and interpret diagnostic tests
- d. Adequate technical skills to carry out selected diagnostic procedures
- e. Clinical judgment to critically apply the above data to individual patients
- f. Attitudes conducive to the practice of neurology, including appropriate interpersonal interactions with patients, professional colleagues and supervisory faculty, and all paramedical personnel
- g. Personal integrity
- h. Regular, timely attendance at educational activities in the Department of Neurology
- i. Timely dictation of test reports and appropriate letters and phone calls to referring physicians
- j. Recognition of professional

- k. Controversial issues require direct and immediate participation of the responsible attending supervising physician

Basic neuroscience pertaining to Neuromuscular Medicine includes knowledge of neuroanatomy, Neuropharmacology, neurophysiology, neurochemistry and neuropathology in normal and disease states.

The fellow will have the instruction and practical experience to permit him or her to develop diagnostic, procedural, technical, and interventional skills essential to the performance of Neuromuscular Medicine. The experience includes opportunities to observe, evaluate, and manage inpatients and outpatients of all ages with a wide variety of disorders of the nervous system and muscles as well as to learn the effectiveness of the procedures. The opportunity includes experience in clinical diagnosis and accumulation/interpretation of laboratory data relevant to these disorders as part of outpatient and inpatient diagnostic evaluations with good support from pathology, rehabilitation medicine and radiology. Basic clinical knowledge should include the neuromuscular aspects of the following disease processes of the nervous system:

- a) Motor neuron disease
- b) Myopathy/neuromuscular transmission disorders
- c) Peripheral neuropathy
- d) Cranial/spinal single and multiple mononeuropathies
- e) Polyneuropathy: infectious/inflammatory
- f) Inherited neuropathy
- g) Polyneuropathy: ischemia/physical agents/toxins
- h) Polyneuropathy/systemic disease

Basic and clinical Neuromuscular Medicine topics will be covered during the one year training period through a combination of clinical experience of both inpatient and outpatient, basic and clinical Neuromuscular Medicine conferences, and EMG case conferences.

The Neuromuscular Medicine program has five rotations. Goals for the competency Clinical Science/Medical Knowledge are listed by rotation and are as follows:

A. NEUROMUSCULAR EVALUATION ROTATION

B. ELECTROMYOGRAPHY ROTATION

C. MUSCLE, NERVE AND SKIN PATHOLOGY ROTATION

D. REHABILITATION MEDICINE ROTATION

E. NEUROMUSCULAR RESEARCH ELECTIVE ROTATION

A. NEUROMUSCULAR EVALUATION ROTATION:

I. Clinical Science/Medical Knowledge

Goal: Fellows must demonstrate knowledge about established and evolving neuroscience that would be critical to the practice of Neuromuscular Medicine in the inpatient and outpatient settings. This includes initiation of and participation in research projects.

Knowledge – Fellows will demonstrate knowledge of:

1. The theoretical basis for clinical interventions used in Neuromuscular Medicine
2. Major disorders, including:
 - a) the epidemiology of the disorder
 - b) the etiology of the disorder, including contributing medical, genetic and social factors
 - c) the phenomenology of the disorder
 - d) diagnostic criteria
 - e) appropriate evaluation
 - f) course and prognosis
 - g) effective treatment strategies
3. Pathophysiology of major Neuromuscular Medicine disorders and familiarity with the scientific basis of neurological diseases, including:
 - a) neuroanatomy
 - b) neuropathology
 - c) neurochemistry
 - d) neurophysiology
 - e) neuropharmacology
 - f) neuroimmunology/neurovirology
 - g) neurogenetics/molecular neurology and neuroepidemiology
 - h) neuroimaging
 - i) neuro-ophthalmology
 - j) neuro-otology
 - k) cerebrospinal fluid
 - l) neurological rehabilitation
 - m) issues related to neuromuscular disorders
4. Gross and microscopic specimens taken from the normal nervous system and from patients with major neuromuscular disorders

Skills – Fellows will demonstrate ability to:

1. Perform and document a comprehensive history and examination to include, as appropriate:
 - a) chief complaint

- b) history of present illness
 - c) developmental history
 - d) past medical history
 - e) review of systems
 - f) family history
 - g) social history
 - h) mental status
 - i) neuromuscular examination
2. Create differential diagnoses:
 - a) to determine if a patients' symptoms are the result of a disease affecting the central and/or peripheral nervous system or are of another origin
 - b) to make a formulation, laboratory investigation, and cost-effective management plan
 3. To develop and maintain the technical skills to:
 - a) perform edrophonium testing
 - b) identify and describe abnormalities seen in common neuromuscular disorders on radiographic testing including plain film, myelography, angiography, CT, isotope and MRI
 - c) evaluate the application and relevance of investigative procedures and interpretation in the diagnosis of neurologic disease, including the following:
 - i. electroencephalogram
 - ii. motor and sensory nerve conduction studies
 - iii. electromyography
 - iv. evoked potentials
 - v. polysomnography
 - vi. electronystagmogram
 - vii. audiometry
 - viii. perimetry
 - ix. psychometry
 - x. CSF analysis
 - xi. vascular imaging (Duplex, transcranial Doppler)
 - xii. radiographic studies as outlined above
 - d) identify and describe gross and microscopic specimens taken from the normal nervous system and from patients with major neuromuscular disorders
 4. To recognize and treat major neuromuscular disorders

Attitudes:

Fellows must maintain and apply an investigatory and analytic thinking approach to clinical situations

Demonstrated by:

Clinical care of patients; teaching residents and other professionals; formal presentations at conferences; self-initiated independent learning

Evaluation:

Fellow evaluation
Formal and informal observation

Remediation:

The program director will semi-annually review the fellow's performance and will:

1. Identify and specific deficits
2. Document all areas requiring remediation or additional concentration
3. Provide additional recommendations for remediation of specific deficiencies

OTHER ACTIVITIES ON THE NEUROMUSCULAR ROTATION:

1. Discuss with the attending physician, interpret and dictate neuromuscular consultations on the day of service
2. Edit dictated reports on the following day for attending physician review
3. Organize muscle and nerve biopsy conferences on a rotational basis
4. Present EMG neuromuscular topics on a rotational basis
5. Participate in Journal Club
6. Prepare for participation in the Carrell-Krusen Symposium in Neuromuscular Disease
7. Give one case presentation per year
8. Participate in neuromuscular lectures to neurology residents
9. Reading suggestions:

Amato and Russell:	<i>Neuromuscular Disorders</i>
Engel and Franzini-Armstrong:	<i>Myology</i>
Dyck and Thomas:	<i>Peripheral Neuropathy</i>
Mendell, Kissel and Cornblath:	<i>Diagnosis and Management of Peripheral Nerve Disorders</i>
Mitsumoto, Przdeborski, Gordon:	<i>Amyotrophic Lateral Sclerosis</i>
Engel:	<i>Myasthenia Gravis and Myasthenic Disorders</i>
Dumitriur and Amato:	<i>Electrodiagnostic Medicine</i>
Brown and Bolton:	<i>Clinical Electromyography</i>
Levin and Luders:	<i>Comprehensive Neuromuscular Medicine</i>
Preston and Shapiro:	<i>Electromyography and Neuromuscular Disorders</i>

Kimura:	<i>Electrodiagnosis in Disease of Nerve and Muscle</i>
Dubowitz:	<i>Muscle Biopsy: a practical approach</i>
Oh:	<i>Color Atlas of Nerve Biopsy Pathology</i>
Brumback and Leech:	<i>Color Atlas of Muscle Histochemistry</i>

II. Patient Care

Goal: Fellows must be able to provide patient care that is compassionate, appropriate and effective for the treatment of neurological problems.

Knowledge – Fellows will demonstrate knowledge of:

1. The lesion localization and differential diagnosis in neuromuscular disorders
2. Investigational plan
3. Interpretation and NCS, EMG and muscle, nerve and skin biopsies
4. Available treatment methods for the major Neuromuscular Medicine disorders and the evidence which supports their use
5. Preventive interventions used in Neuromuscular Medicine

Skills – Fellows will demonstrate the ability to:

1. Perform and document a comprehensive history and examination to include, as appropriate:
 - a) chief complaint
 - b) history of present illness
 - c) developmental history
 - d) past medical history
 - e) review of systems
 - f) family history
 - g) social history
 - h) mental status
2. Create differential diagnoses
3. Evaluate, assess and recommend cost-effective management of patients
4. Recognize and treat Neuromuscular Medicine disorders
5. Apply the use of electrical, tissue pathological and mechanical methods in the evaluation and treatment of a wide range of diseases

Attitudes:

Fellows will:

1. Be strong advocates for the patient's best interests
2. Strive to provide quality care within available resources
3. Be sensitive to patient's cultural differences

4. Be sensitive to confidentiality and consent issues

Demonstrated by:

Clinical care of patients; teaching residents and other professionals; formal presentations at conferences; self-initiated independent learning; direct observation by faculty during clinics and on clinic rotations; case conferences; chart review with supervisors.

Evaluation:

Supervision and rotation evaluations
Formal and informal observations

Remediation:

The program director will regularly review the fellow's performance and will:

1. Identify and specific deficits
2. Document all areas requiring remediation or additional concentration
3. Provide additional recommendations for remediation of specific deficiencies

III. Interpersonal and Communication Skills

Goal: Fellows must demonstrate the knowledge, skills and attitudes necessary to develop and maintain appropriate interpersonal relationships and to communicate effectively with patients, families, colleagues and the public.

Knowledge – Fellows will demonstrate knowledge of:

1. Interviewing techniques
2. Communication techniques

Skills – Fellows will be able to:

1. Demonstrate the ability to obtain, interpret and evaluate consultations from other medical specialties. This shall include:
 - a) knowing when to solicit consultation and having sensitivity to assess need for consultation
 - b) discussing consultation findings with patients and their families
 - c) evaluating the consultation findings
2. Serve as an effective consultant to other medical specialists and community agencies. This shall include:
 - a) communicating effectively with the requesting party to refine the consultation question

- b) maintain the role of consultant
 - c) communicate clear and specific recommendations
 - d) respect the knowledge and expertise of the requesting party
3. Demonstrate the ability to communicate effectively with patients and their families by:
 - a) gearing all communication to the educational/intellectual levels of patients and their families
 - b) providing explanations of Neuromuscular Medicine disorders and treatment (both verbally and in written form) that are jargon-free and geared to the educational/intellectual level of patients and their families
 - c) providing preventive education that is understandable and practical as well as applicable
 - d) respecting the patients' cultural, ethnic and economic backgrounds
 - e) developing and enhancing rapport and a working alliance with patients and families
 4. Maintain medical records and written prescriptions that are legible and up-to-date. These records must capture essential information while simultaneously respecting patient privacy and be useful to health professionals outside Neuromuscular Medicine
 - a) recognize the need for, and effectively use, interpreters when necessary
 - b) give one Grand Rounds per year and/or present at a national or regional meeting
 - c) provide feedback to students, residents and other professionals

Attitudes:

Fellows will:

1. Maintain an attitude of respect for others, even those with differing points of view
2. Exhibit culturally sensitive, professional, ethically sound behavior in all patient and professional interactions
3. Maintain an attitude of interdisciplinary collaboration
4. Maintain a polite and courteous attitude at all times

Demonstrated by:

Chart documentation; direct observation; teaching others; professional relationships; formal presentations; independent learning; seeking feedback on communication and performance

Evaluation:

Direct observation
Rotation evaluation

Remediation:

The program director will regularly review the fellow's performance and will:

1. Identify and specific deficits
2. Document all areas requiring remediation or additional concentration
3. Provide additional recommendations for remediation of specific deficiencies

IV. Practice Based Learning and Improvement

Goal: Fellows will demonstrate knowledge, skills and attitudes necessary to initiate self-directed and independent learning. Fellows must keep abreast of current information and practices relevant to Neuromuscular Medicine.

Knowledge – Fellows will demonstrate knowledge of:

1. Research methodology, including critical assessment of professional journal articles
2. Principles of evidence-based medicine
3. Awareness to available information technologies and the ability to assess them

Skills – Fellows will be able to:

1. Demonstrate the ability to obtain, interpret and evaluate up-to-date information from the scientific and practice literature to assist in the quality care of patients. This shall include:
 - a) use of medical libraries
 - b) use of information technology, including internet-based searches and literature databases (e.g., Medline)
 - c) use of drug information databases
 - d) active participation, as appropriate, in educational courses, conferences and other organized educational activities both at the local and national levels
 - e) conducting and presenting reviews of current research in such formats as journal clubs, Grand Rounds and/or original publications
 - f) participation in funded research projects
2. Assess the generalizability or applicability of research findings to patients in relation to their socio-demographic and clinical characteristics. The physician shall demonstrate the ability to critically evaluate the relevant medical literature
3. Evaluate caseload and practice experience in a systematic manner. This may include:
 - a) case-based learning
 - b) the review of patient records and outcomes
 - c) obtaining appropriate supervision and consultation
 - d) maintaining a system for examining errors in practice and initiating improvements to eliminate or reduce errors

Attitudes:

Fellows will:

1. Maintain an attitude of inquiry and scholarship, recognizing the need for life long learning
2. Maintain openness and flexibility in treatment approaches with patients, assimilating new knowledge in patient care practices

Demonstrated by:

Self-directed inquiry guiding clinical care of patients; formal presentations which include literature review; teaching others

Evaluation:

Direct observation
Rotation evaluation

Remediation:

The program director will regularly review the fellow's performance and will:

1. Identify and specific deficits
2. Document all areas requiring remediation or additional concentration
3. Provide additional recommendations for remediation of specific deficiencies

V. Professionalism and Ethical Behavior

Goal: Fellows must demonstrate the knowledge, skills and attitudes necessary to practice professionally responsible, ethical and compassionate care in Neuromuscular Medicine

Knowledge – Fellows will demonstrate knowledge of:

1. The impact of gender, culture, religion, socioeconomic factors, and family structures and systems on issues pertaining to Neuromuscular Medicine
2. The different roles a neuromuscular specialist might fulfill in different settings
3. Legal issues relevant to Neuromuscular Medicine
4. Ethical issues in Neuromuscular Medicine. This includes knowledge of the American Academy of Neurology Code of Ethics
5. Ethical issues important in conducting of research with humans and the role of the Committee for Protection of Human Subjects

Skills – Fellows will be able to:

1. Respond to communications from patients and health professionals in a timely manner. If unavailable, the physician shall establish and communicate back-up arrangements
2. Use medical records for appropriate documentation of the course of illness and its treatment

3. Provide continuity of care including appropriate consultation, transfer or termination of patients (clinic rotation)
4. Demonstrate ethical behavior, integrity, honesty, professional conduct, compassion and confidentiality in the delivery of patient care, including obtaining informed consent/assent, and declaring conflict of interest
5. Demonstrate respect for patients and colleagues as individuals by showing sensitivity to their age, culture, disabilities, ethnicity, gender, socioeconomic background, religious beliefs, political affiliations, and sexual orientation
6. Demonstrate appreciation of end-of-life care and issues regarding provision for or withholding of care
7. Acknowledge responsibility for his or her decisions and demonstrate commitment to the review and remediation of his or her professional conduct
8. Promote the highest standards of medical healthcare to the public and participate in the review of the professional conduct of his or her colleagues

Attitudes:

Fellows will:

1. Maintain an attitude of inquiry and scholarship, recognizing the need for life long learning
2. Maintain openness and flexibility in treatment approaches with patients, assimilating new knowledge in patient care practices

Demonstrated by:

Self-directed inquiry guiding clinical care of patients; formal presentations which include literature review; teaching others

Evaluation:

Rotation evaluation

Regular review by the program director

Remediation:

The program director will regularly review the fellow's performance and will:

1. Identify and specific deficits
2. Document all areas requiring remediation or additional concentration
3. Provide additional recommendations for remediation of specific deficiencies

VI. Systems Based Practice

Goal: Fellows must demonstrate the knowledge, skills and attitudes necessary to effectively

in multiple, diverse, complex systems of care to provide effective treatment, consultations and referrals for patients.

Knowledge – Fellows will demonstrate knowledge of:

1. Basic concepts of systems theory
2. How fellows and residents' patient care practices and related actions impact component units of health care delivery
3. Systems-based approaches for controlling health care costs and allocating resources

Skills – Fellows will be able to:

1. Advocate for patients within a variety of systems
2. Partner with insurance and managed care companies to meet patient needs
3. Strive to practice cost-effective health care and resource allocation that does not compromise the quality of care

Attitudes:

Fellows will:

1. Maintain an attitude of interdisciplinary collaboration, advocacy and cooperation
2. Maintain flexibility in adapting to the needs and expectations of different settings and systems
3. Maintain the patient's best interests as the top priority

Demonstrated by:

Care of patients; interactions with other agencies involved in the care of patients; consultation with other professionals; participation in Quality Assurance, Utilization Review and Performance Improvement committees; self-directed independent learning; teaching others

Evaluation:

Rotation evaluation

Regular review by the program director

Remediation:

The program director will regularly review the fellow's performance and will:

1. Identify and specific deficits

2. Document all areas requiring remediation or additional concentration
3. Provide additional recommendations for remediation of specific deficiencies

Fellow Signature:

Faculty Signature: