Neuromuscular Medicine Fellowship Policy Manual 2026-2027

University of Minnesota
Graduate Medical Education

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Sponsored by

Department of Neurology

Introduction

Explanation of Manual

This fellowship addendum outlines policies and procedures specific to the Clinical Neurophysiology Fellowship program. Please refer to the Neurology Residency Program Manual for further departmental policies and procedures.

Purpose

The program manual is a tool with key policies and required procedures as well as general information to ensure a smooth transition to your institution and program.

At the department level, the Program Director is responsible for providing trainees with program-specific policies and procedures. This includes items such as ACGME Program Requirements, procedures to follow institutional policies, and other information specific to the department and the GME program.

Profile of Our Institution

Please review the Office of Graduate Medical Education introductory webpage for institutional Goals for Graduate Medical Education, Core Values, and a Statement of Commitment.

Statement of Commitment

The University of Minnesota Medical School is committed to graduate medical education, which emphasizes education and training of physicians to meet the healthcare needs of our region, advancement of knowledge, and leadership in the biomedical sciences and in academic medicine.

With this commitment, the University of Minnesota Medical School will provide adequate funding for administration, personnel, educational, clinical resources, and faculty teaching time to be certain that every program under our institutional sponsorship offers the best possible training environment and educational opportunities.

Statement of Goals for Graduate Medical Education

Our goal is to provide the highest quality of graduate and post-graduate medical, professional and educational training to prepare physicians for the practice of specialty and/or subspecialty training, or for the pursuit of academic and research medicine.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, marital status, disability, public assistance status, veteran status, or sexual orientation.

Statement of Diversity and Inclusion

The University of Minnesota Medical School is committed to excellence. Our mission will only be achieved through embracing and nurturing an environment of diversity, inclusiveness, equal opportunity, and respect for the similarities and differences in our community.

We strive to create an atmosphere where differences are valued and celebrated, knowing institutional diversity fuels the advancement of knowledge, promotes improved patient care and fosters excellence. We will train a culturally aware workforce qualified to meet the needs of the diverse populations we serve. We especially strive to have our community better reflect the broad range of identities in our state, including race, ethnicity, gender identity, gender expression, sexual orientation, disability, age, national origin, religious practice, and socioeconomic status.

Given the dynamic nature of our community, the Medical School Diversity Statement and Policy should be reviewed biennially to ensure it is current and reflective of our priorities.

Institutional Responsibilities

The Institution Manual, available at gmepolicy.umn.edu, is designed to be an umbrella policy manual. Some programs may have policies that are more tailored to their needs than the Institution Manual in which case the program policy will be followed. Should a policy in a Program Manual conflict with the Institution Manual, the Institution Manual will take precedence.

Statement of Inclusion of Fellowship Program

The information contained in this Policy Manual pertains to everyone in the department's programs except as otherwise identified.

Department Mission Statement

The University of Minnesota Neurology Residency Program has continuously graduated Neurology trainees since the 1940s. The program, initially developed under the guidance of Dr. A.B. Baker, the founder of the American Academy of Neurology, continues to provide an outstanding training experience designed to meet equally the needs of the future clinician or academician. The excellence of the training program is one of the highest priorities of the department. Among the significant strengths of the program are the range and the depth of the clinical experience provided at several teaching hospitals, the devotion of the full-time faculty at each of these hospitals to teaching, patient care, and scholarship, and the focus on both clinical and basic research in the midst of a first-rank neuroscience community.

Program Mission Statement

This Neuromuscular Medicine subspecialty fellowship program provides one year of supervised graduate medical education experience with graded and progressive responsibility. Designed to comply with the institutional and ACGME program requirements of accredited fellowships in neuromuscular medicine, the University of Minnesota training program is organized to provide the intellectual environment, formal instruction, peer interaction and broad supervised clinical experience necessary for fellows to master the knowledge, skills and attitudes essential to the practice of neuromuscular medicine, research, or a teaching career in neuromuscular medicine. Central to these goals is the fellows' attainment, at the level

of a practitioner, of the six ACGME core competencies in the areas of patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice, as described in Section 5. New developmental milestones will be added as required by the ACGME.

Prior to entering this program, trainees must have satisfactorily completed the eligibility conditions defined by the ACGME's Neuromuscular Medicine Program Requirements, and be board eligible.

Visa Sponsorship

The J-1 alien physician visa sponsored by ECFMG is the preferred visa status for foreign national trainees in all UMN graduate medical education programs; therefore, the Neuromuscular Medicine Program sponsors only J-1 visas. We do not sponsor H-1B visas. More on J-1 Visa Holders

Section 1 - Student Services

Campus Mail

Each trainee has a designated mailbox in the department. Trainees are expected to pick up their mail at least weekly. The address for receiving mail in the department is:

University of Minnesota
Department of Neurology
Attn: (name)
420 Delaware St SE
MMC 295
Minneapolis, MN 55455

Email and Internet Access

Each trainee has been assigned his/her own University email account prior to the start of their orientation. This corporate Gmail account is to be used for all program, department, and University business communications. The use of personal non-University email accounts is not permissible for business communications.

Announcements about important institution and program events or requirements are sent to your official University email account. **Trainees are expected to check this account daily.**

There are several computers available for use in the resident/fellows' room. Each has internet access. University email can be accessed via web browser at: mail.umn.edu.

Badges

All trainees and staff are required to have Academic Health Center badges, and to wear them. Your program coordinator will help you obtain your badge as part of your onboarding process. You will also be required to have badges for every hospital where you rotate and to always wear them when providing patient care.

Health Insurance Portability and Accountability ACT (HIPAA) Training

Residents are required to complete the University Privacy Training and the Public Jobs: Private Data Security Training. The Academic Health Center has designed training programs which are located at www.myu.umn.edu and are accessed via the trainee's University of Minnesota x500 Internet password. Once authenticated ("signed in"), go to the "Key Links" tab and choose "Training Hub" from the drop down to access "My Training." The University provides 90 days to complete your required training. For more information, ask your program coordinator to put you in touch with the department's Privacy & Security Coordinator.

Compliance is mandatory. Failure to complete the required training could result in suspension of your participation. Please review the Use of Information Technology Resources standards below.

Using Information Technology Resources Standards

Use of IDs and Passwords

- Do not share the password assigned to you.
- Select an obscure password and change it frequently.
- Understand that you are responsible for all activities on your username/account ID.
- Ensure that others cannot learn your password.
- If you have reason to believe that your username/account ID or password has been compromised, contact your System/Network Administrator immediately.

Use of Information/Data

- Access only accounts, files, and data that are your own, that are publicly available, or to which you have been given authorized access. Secure information that is in your possession.
- Maintain the confidentiality of information classified as private, confidential or data on decedents.
- Use University information for tasks related to job responsibilities and not for personal purposes.
- Never disclose information to which you have access, but for which you do not have ownership, authority, or permission to disclose. Keep your personal information/data current.
- Accurately update your own records through University self-service systems and other processes provided for you.

Use of Software and Hardware

- Use University email, computers, and networks only for legal, authorized purposes. Unauthorized or illegal uses include but are not limited to:
    - Harassment
    - Destruction of or damage to equipment, software, or data belonging to others;
    - Unauthorized copying of copyrighted materials; or
    - Conducting private business unrelated to University activities.

- Never engage in any activity that might be harmful to systems or to any information/data stored thereon, such as:
    - Creating or propagating viruses
    - Disrupting services or damaging files
    - Making unauthorized or non-approved changes.

When vacating computer workstations, sign-off or secure the system from unauthorized use.
Use only legal versions of copyrighted software on University of Minnesota owned computer or network resources, in compliance with vendor license requirements.

Be aware of any conditions attached to or affecting the provision of University technology services:

- Consult with the system administrator for any questions about system workload or performance.
- Refrain from monopolizing systems, overloading systems or networks with excessive data, or wasting computer time, connection time, disk space, printer paper, manuals, or other resources.

Consequences of Violations

Access privileges to the University's information technology resources will not be denied without cause. If in the course of an investigation, it appears necessary to protect the integrity, security, or continued operation of its computers and networks or to protect itself from liability, the University may temporarily deny access to those resources. Alleged policy violations will be referred to appropriate University investigative and disciplinary units. For example, alleged violations by students may be directed to the Student Judicial Affairs office. The University may also refer Women's Health Special listed violations of law to appropriate law enforcement agencies. Depending on the nature and severity of the offense, policy violations may result in loss of access privileges, University disciplinary action, and/or criminal prosecution.

Tuition and Fees

University Tuition and Fees are being waived at this time for residency and fellowship program training. However, any trainees who are enrolled in Graduate School must pay their own tuition and fees.

Section 2 - Benefits

MyU Portal

MyU is your portal to information about your pay, your contact information and privacy settings, central University announcements, and more. You can access the portal at MyU.umn.edu.

Stipends and Pay Information for 2026-2027

Trainee stipends are determined centrally by the Graduate Medical Education (GME) office.

Use the MyU portal for many payroll services, such as direct deposit set up, viewing pay statements, updating your W-4 tax information, viewing W-2, and viewing reimbursements/payments.

Insurance and Other Benefits Coverage Options

The University of Minnesota offers a broad range of coverage benefits to all Medical School trainees. Comprehensive information including medical, dental, life insurance, disability coverage, flexible spending accounts, dependent care reimbursement and more can be found on the Office of Student Health and Benefits website.

Trainee Leave Polices

Trainees must give notice in writing, of intent to use leave (such as a medical or parental leave) to their program director **at least 60 days in advance**, except under unusual circumstances. Trainees are also responsible for contacting the affected clinic or ward at least 60 days in advance as well.

Leaves of absence may necessitate that the trainee make up their time away from training, in order to meet board or accreditation criteria for completion of the training program. Details regarding length of leave and its effect on program end date should be discussed with the program director and coordinator 90 days prior to the leave start date.

Holidays

The educational requirements and the 24-hour operational needs of the hospital are taken into consideration when scheduling holiday time off. The program coordinator and director will work with each of the trainees in determining that holiday days off are spread among all trainees.

It is important to note that holiday schedules are different at different sites (i.e. UMN, UMP, VA, etc.)! It is still the trainee's responsibility to plan at least 60 days in advance for any holiday time off, and to make sure that the affected clinics are canceled before 60 days as well.

2026-2027 Holidays

- Friday, July 3, 2026 Independence Day
- Monday, September 7, 2026 Labor Day
- Thursday, November 26, 2026 Thanksgiving Day
- Wednesday, December 24 2026 Floating Holiday
- Friday, December 25, 2026 Christmas Day
- Friday, January 1, 2026 New Year's Day
- Monday, January 18, 2027 Martin Luther King, Jr. Day
- Monday, May 31, 2026 Memorial Day
- Friday, June 18, 2027 Juneteenth

Vacation Leave

The Department of Neurology provides each trainee with **22 days of paid time off (PTO)**. Any leave that exceeds 22 days will be unpaid unless it is for a qualifying reason such as parental leave. There is no carryover of vacation or sick time from one year to the next. It is recommended that trainees reserve at least five PTO days for sick leave. Please review the Policy on Effect of Leave for Satisfying Completion of Program for more information.

For all scheduled time off (e.g., vacations, personal business, interviews, conferences, etc.) it is the trainee's responsibility to submit the requested dates to the program coordinator **at least 60 days in advance** as well as the respective clinics/services. *Any absences must also be communicated to the program coordinator.* Trainees must also inform the faculty and colleagues that would expect them in the clinic or in the patient care unit. If appropriate, trainees should arrange for proper coverage from another trainee.

Please contact the program coordinator Patrick Puskala (pusk0001@umn.edu) with vacation requests. Your vacation is recorded in the scheduling spreadsheet for your fellowship

A maximum of two weeks of vacation may be taken at one time. Please note that depending on the needs of the clinic/service, vacation requests may be denied. Do not make travel arrangements until you get the official approval from your program director.

Sick Leave

Please record your absences due to sickness in your MYU@u site. The coordinator will be informed of your absence. Additionally, notify your program director as soon as possible. If the situation necessitates, namely when expected at the CSC clinic, please call the Production Team at 612-676-5088. If it is after hours please leave a voice message. If possible, arrange for one of your fellow-trainees to cover your clinic. Inform all team members/faculty of what has been arranged as soon as possible.

Parental Leave

The resident/fellow (trainee) as defined below must give notice, in writing, of intent to use parental leave and other leaves used in conjunction with parental leave to their program director and coordinator **at least 60 days in advance, except under unusual circumstances.** Note the Department of Neurology has a greater notification period than the general policy.

More detail is available in the Graduate Medical Education Leave & Time Off Policy under Parental Leave.

Medical Leave

A trainee shall be granted, upon request to the program director, a leave of absence for their serious illness/injury that requires an absence of greater than 14 days. The trainee may qualify for Short-Term and Long-Term Disability according to their elected benefits. The trainee must give notice, in writing, of intent to use medical leave to their program director **at least four weeks in advance**, except under unusual circumstances. Trainees are expected to make every effort to find coverage for their call during their absence and must notify their sites of their absence.

Personal Leave of Absence

Only under unusual circumstances, such as a personal or family emergency, will a personal leave of absence be considered. Trainees must give notice, in writing, of intent to use personal leave to the Program Director at least 60 days in advance, except under unusual circumstances. Trainees are expected to make every effort to find coverage for their rotations and must notify all sites of their absence. A trainee requesting a non-medical personal leave must use all remaining vacation and sick days, if the trainee does not have any vacation/sick time left, they will be required to use unpaid time. Personal leaves of absence may require an extension of training. For more information, discuss with your program director or coordinator.

Professional and Academic Leave

Trainees may be approved for up to five days of professional and academic leave per academic year to sit for board exams, present at or attend conferences, and to conduct job interviews. Time away must be requested and approved in the same manner as other leaves, and is at the discretion of the program director and coordinator. Trainees requesting professional leave during inpatient rotations must arrange coverage for their absence.

Bereavement Leave

Trainees shall be granted, upon the approval of the program director, up to 5 days off to attend the funeral of an immediate family member. Sick, vacation, or other PTO must be used.

If the trainee is not able to arrange for coverage of essential duties, chief residents, the program director, and the program coordinator will assist with ensuring safe patient care is maintained.

More detail is available in the Graduate Medical Education Leave & Time Off Policy under Bereavement.

Family and Medical Leave Act (FMLA)

Details are available in the Graduate Medical Education Leave & Time Off Policy under Family Medical Leave Act.

Witness or Jury Duty Leave

Details are available in the Graduate Medical Education Leave & Time Off Policy under Military, Court Appearance, or Civic Duty Leave.

Military Leave

Details are available in the Graduate Medical Education Leave & Time Off Policy under Military, Court Appearance, or Civic Duty Leave.

Unauthorized Leave

Unauthorized or unapproved leave may be subject to disciplinary action, including dismissal from the training program. It is important all trainees keep in close contact with their program directors, and discuss any concerns early and often.

Policy on Effect of Leave for Satisfying Completion of Program

Time away from training due to absences in excess of 22 days per year, whether for additional vacation, sick leave, leave under FMLA, or LOA may extend training.

Worker's Compensation

Detailed information and instructions on treatment and UMN reporting requirements is provided by the GME Office.

Call 24/7 HealthPartners Nurse CareLine if you need advice on where to receive emergent care (you must identify yourself as a UMN Medical Resident/Fellow): 612-339-3663

Professional Liability (Malpractice) Insurance Information

Refer to the Medical Malpractice Credentialing / Insurance Verification webpage.

Meals

Trainees on inpatient service have access to food services 24 hours a day at all institutions. HCMC adds funds to meal cards based on the number of days rotating at that hospital. The UMMC meal card policy provides meals based on the number of night/weekend shifts worked in-hospital.

Laundry Service

Personalized lab coats are purchased for each trainee at the beginning of their program. Soiled white coats can be placed in the yellow bin in the white coat closet in the department. Cleaned coats will be placed in the closet for pick up. White coats must be turned in upon completion of training. Clean scrubs are available on each of the inpatient units at all hospital sites.

Laundering of scrub suits is provided for residents at all sites. Scrubs should be used at, and returned to the site they were obtained from.

Exercise Room

The University of Minnesota Medical Center (UMMC) Medical Executive Committee provides an exercise facility for use by University of Minnesota residents and fellows.

- Location: Room C-496 Mayo Memorial Building (Locker rooms/showers are located directly across the hall)
- Hours: The facility is open 24 hours a day, 7 days a week
- Access Code to Exercise Room and Locker Rooms: 9111 (Please do not share with anyone other than residents and fellows)

The space also includes a small kitchenette area with refrigerator, microwave, coffeemaker and hot/cold water dispenser. If you have any concerns about the facility, call 612-273-7482.

Call Rooms

There are call rooms available at both UMMC and HCMC for trainees to use if they are too tired to drive home.

UMMC

Located on the 4th floor of Mayo building, next to C-496 exercise room. Call 626-6330 for reservations; check-in time 2 PM to 7 AM.

UMMC also has a general resident lounge on the 6th floor, which offers a TV, computer, telephone, and light refreshments (restocked twice a day).

HCMC

walk-in available at R5.302, door code 2354. Reserve through Katie Dolan, 873-2595 x4 when need is known in advance.

Parking Services

Parking is provided at each site.

University of Minnesota Medical Center, Fairview

Parking is provided at the Oak Street Ramp. Fellows are issued parking cards on the first day of their PGY-5 year. Cards must be returned to the Residency Program Coordinator when graduating or leaving the program. Residents will be charged $25.00 for lost cards.

Contact your program coordinator for more information.

Hennepin County Medical Center

Parking arrangements are made through the Neurology Office. All other rotating residents must go to the Parking/Security Office (RL.150) and pay a $50.00 deposit for their card, before picking up. This card **must be returned** at the end of the year at which time you will get your deposit back.

Contact Aubrey Sufka at aubrey.sufka@hcmed.org for more information.

Minneapolis VA Health Care System

Residents rotating at the VA may park in any lot designated for employees, which does not include the staff physician's parking lot. Parking in the lots designated for visitors and outpatients may result in a parking ticket from the VA Police.

Call neurology Program Support Assistant at 612-467-2047 for more information.

Campus Shuttle Services

A Fairview shuttle service is available between the West Riverside and East University campuses from 5:20 AM to 8:30 PM. See the shuttle schedule near the boarding locations on each campus. The shuttle picks up and drops off at the Variety Club Research Center (VCRC) circle at 401 East River Pkwy on the University campus and in the West circle entrance outside Subway restaurant on the Riverside campus. There are also shuttles running every 5-10 minutes from the PWB and UMMC lobby doors to the CSC clinic building.

Membership in Medical Societies

The Department will pay for annual American Academy of Neurology (AAN) membership for trainees.

Research Resources

All trainees have access to the biomedical library and its services. See the Health Sciences Library website for more information on librarian consultation, literature search support, research and data services, and guides to publication.

Academic Business Expense Reimbursement Policy

Residents and Fellows have the benefit of an academic business expense fund of ***$1000 per academic year,*** to be used for conference registration, travel expenses, textbooks, board review courses, subscriptions, professional society memberships, etc. The financial source for this benefit for fellows may come from grants or foundation funds, and may not be available every year.

Use of these funds requires pre-approval of the program director.

Taxable items (anything becoming the property of the trainee) will be processed through payroll and are subject to tax withholding. Non-taxable items such as conference registration and expenses, subscriptions, memberships, etc. will be processed through a non-payroll payment.

Non-reimbursable items include any technology purchase, monthly access and internet service charges, warranties, and software/hardware updating and maintenance.

Parameters and Process for Academic Business Expense Reimbursement

1. All purchases must be made after your first day of employment to qualify for reimbursement.
2. Obtain pre-approval on your purchase from your program director. All purchases must be compliant with this policy.
3. Funds of $1,000 may be available for each resident or fellow year. Residents funds will be available for up to $4,000 over four years for purchase of academic or clinical items.
4. All purchases must be made at least **three (3) months prior** to completing training.
5. All reimbursement requests must be submitted at least 30 days prior to completing training.
6. Residents/fellows must submit a copy of all itemized receipts along with a justification (who, what, when, why) for purchase within 60 days of the purchase to Patrick Puskala (pusk0001@umn.edu) for reimbursement.
7. University policy states receipts must be detailed supplier receipts. If a vendor is unable to supply a receipt, a copy of a bank statement or printout from an online banking transaction history must be submitted.
8. Employee Expenses must include a proper justification including who initiated the purchase, why the item is being purchased, what it will be used for, when it will be used, and how the purchase will help you in your role as a resident/fellow or benefit the University goals. If this information is not included the request will be held until the department receives an updated response.
9. The University of Minnesota sales tax exemption CANNOT be used when an employee pays for items with their own funds (cash, check, or credit card) EVEN IF they will be reimbursed by the University later. Penalty for improper use of the University's tax exemption may be a fine to the user in the amount of $100 per transaction. Please refer to the UMN Tax Management Office's guideline on Using the University of Minnesota's Exempt Sales Tax Status for additional information.

Refer to the UMN Administrative Policy for Traveling on University Business prior to requesting reimbursement for any travel-related expenses.

Section 3 - Institution Responsibilities
The Institution Manual is designed to be an umbrella policy manual. Some programs may have policies that are more rigid than the Institution Manual in which case the program policy would be followed. Should a policy in a Program Manual conflict with the Institution Manual, the Institution Manual would take precedence.

Section 4 - Disciplinary and Grievance Procedures

Please refer to the Institution Manual for information regarding academic probation, dismissal, academic grievance, substance use/abuse, and harassment.

Trainees are encouraged to voice any problems or concerns immediately. Contact the Education Manager, Program Coordinator, faculty advisors, and the Program Director are encouraged. It is the intention of the program that these resources appropriately triage and escalate resident concerns, and facilitate resolution by providing resources, advocacy, and policy/procedure change when warranted.

There are no Neuromuscular Medicine policies that are more specific than the institutional policies.

Section 5 - General Program Policies and Procedures

Neuromuscular Medicine Program Overview

Neuromuscular Medicine (NMM) is a sub-discipline of neurology that deals with the pathophysiology, genetics, pathology, diagnosis, and treatment of neuromuscular disorders at a level significantly beyond the training and knowledge expected of a general neurologist or child neurologist. The mission of the Neuromuscular Section is to provide core competency standards of training for the evaluation and treatment of patients with neuromuscular disorders; to reduce death and disability for these diseases; and to improve coordination and treatment of patients with neuromuscular disorders.

This is a one-year ACGME-accredited fellowship, with training at the University of Minnesota and affiliated hospitals:

- University of Minnesota Medical Center, Fairview (UMMC)
- Hennepin County Medical Center (HCMC)
- Minneapolis VA Health Care System (MVAHCS)

Specialists in NMM possess specialized knowledge in the science, clinical evaluation, and management of disorders of the motor neuron, nerve roots, peripheral nerves, neuromuscular junction and muscle that affect patients of all ages. Specific diseases within NMM include amyotrophic lateral sclerosis, peripheral neuropathies, the muscular dystrophies, inflammatory myopathies, myasthenia gravis and related disorders of neuromuscular transmission, and other less common disorders.

Diagnostic procedures relevant to NMM include nerve conduction studies and electromyography, autonomic testing; nerve, muscle, and skin biopsy; genetic testing, nerve and muscle imaging, forearm exercise testing, and immunologic testing.

Therapeutic modalities include pharmacologic therapies, immunomodulatory therapies (immunosuppressive drugs, plasmapheresis and IVIg) and rehabilitation of neuromuscular disorders.

The practice of NMM is based on a fundamental, detailed knowledge of the anatomy, physiology, and biochemistry of the peripheral nervous system and muscle and requires an interdisciplinary approach involving basic science, epidemiology, clinical neurology, risk factor identification and management, pharmacology, electrophysiology, pathology, neurological critical care, rehabilitation and supportive services, and counseling. The field of NMM is of major importance to all areas of patient care.

Overall Program Goals

The main 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. To that effect, we intend to develop the trainees through graded autonomy to the level of independent practitioner in the ACGME Competencies and NMM professional societies-approved developmental milestones.

It is the intent of the Neuromuscular Medicine training program to develop neurologists and physical medicine rehabilitation specialists 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 solid fund of basic clinical knowledge and the ability to maintain it at current levels for a lifetime of continuous education
- The ability to perform an adequate history and physical examination
- The ability to appropriately order and interpret diagnostic tests
- Adequate technical skills to carry out selected diagnostic procedures
- Clinical judgment to critically apply the above data to individual patients
- Attitudes conducive to the practice of neurology, including appropriate interpersonal interactions with patients, professional colleagues and supervisory faculty, and all paramedical personnel
- Personal integrity
- Regular, timely attendance at educational activities in the Department of Neurology
- Timely dictation of test reports and appropriate letters and phone calls to referring physicians
- Recognition of professional and unprofessional behavior
- 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.

ACGME Competencies

The ACGME competencies abbreviations are tied to all Goals and Objectives in the NMM rotations, as defined below.

Patient Care (PC)

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.

Medical Knowledge (MK)

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.

Practice-based Learning and Improvement (PBLI)

Fellows are expected to develop skills and habits to be able to meet the following goals:

- systematically analyze practice using quality improvement methods, and implement changes
- with the goal of practice improvement; and,
- locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems.

Interpersonal and Communication Skills (ICS)

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

Professionalism (Prof)

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

Systems-based Practice (SBP)

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.

Fellowship Goals and Objectives - Core Competencies

Trainees will master advanced knowledge and skills regarding neuromuscular disorders including their assessment, monitoring, treatment and prevention using a combination of clinical evaluation, imaging, interventional techniques, and medication.

Attainment of requisite knowledge, skills, and attitudes will prepare trainees to practice neuromuscular medicine, an interdisciplinary specialty that incorporates aspects of epidemiology, basic science, clinical neurology, neuroimaging, critical care, neuromuscular pathology, muscular dystrophy, neurobehavior, and neurorehabilitation. Neuromuscular Medicine encompasses both inpatient and outpatient practice. NM Dx are serious and life threatening conditions and many patients require life long care. The inpatient consult rotation will include direct and indirect management of inpatients in the Neuromuscular Medicine clinics and service, as well as consultation for NMM inpatients on other clinical services. Patients will be seen in the critical care units, step-down units, rehabilitation units, electrodiagnostic laboratories and medical and/or surgical beds. The subspecialist in Neuromuscular Medicine will be familiar with all of these patient care environments in the context of the ACGME competencies:

Patient Care (PC)

Fellows are expected to provide patient care that is compassionate, appropriate and effective and to provide care that promotes health, prevents illness and addresses the needs of patients. Trainees will be able to evaluate and manage patients with NM and develop an individualized NM treatment program for each patient.

Medical Knowledge (MK)

Fellows are expected to demonstrate knowledge of established and evolving biomedical, clinical and social sciences, as they relate to each patient's underlying medical conditions and demonstrate the application of their knowledge to patient care and the education of others. Through mastery of the Neuromuscular Medicine core knowledge content, the trainee will be able to manage clinical problems according to generally accepted best practices and evidence based guidelines.

Practice Based Learning and Improvement (PBLI)

Fellows are expected to be able to use scientific evidence and methods to investigate, evaluate and improve patient care practices. The fellow will be engaged in ongoing quality improvement through the NM program, including ensuring compliance with JCAHO and all other standards. Fellows will also participate in the Neurology morbidity and mortality processes.

Interpersonal and Communication Skills (ICS)

Fellows are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families and other members of the health care team. Graduates/trainees will be able to discuss the prognosis and risks/benefits of various management strategies in the setting of NM Dx with patients, families and relevant providers. The trainee will also be a teacher to students, other residents, paramedical and physician colleagues.

Professionalism (Prof)

While on the Neuromuscular Medicine service, fellows are expected to behave professionally at all times and demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, an understanding and sensitivity to diversity, and a responsible attitude toward their patients, their profession, and society. The fellow will be able to interact effectively with multiple providers, to support and advocate effectively for NMD patients.

Systems Based Practice (SBP)

Fellows are expected to demonstrate both an understanding of the contexts and systems in which health care is provided and the ability to apply this knowledge to improve and optimize healthcare. The fellow will be familiar with the emergency medical system as well as the multiple community services available for individuals with NMD.

Fellowship Goals and Objectives - Experiences

There are 6 major longitudinal experiences during the year of training. The abbreviations following each objective refer to the ACGME core competency addressed (PC = patient care, MK = medical knowledge, Prof = professionalism, PBLI = practice-based learning and improvement, SBP = systems-based practice, ICS = interpersonal and communication skills).

1. Neuromuscular medicine rotation (equiv to 6 months)
2. Electromyography/nerve conduction rotation (equiv to 2.5 month)
3. Muscle, nerve, and skin pathology rotation (equiv to 1.3 months)
4. Rehabilitation medicine rotation (equiv to 0.8 month)
5. Neuromuscular research elective (equiv to 0.9 month)
6. Neurogenetics rotation (equiv to 0.4 month)

1. Neuromuscular Medicine Rotation

Objectives and Goals

Fellows will 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.

A. Fellows will demonstrate knowledge, familiarity, clinical care and research application of:
    a. The theoretical basis for clinical interventions used in Neuromuscular Medicine (MK, PC).
    b. Major disorders, including: (MK, PC)
        i. amyotrophic lateral sclerosis,
        ii. neuropathies,
        iii. neuromuscular junction disorders,
        iv. Myasthenia gravis and
        v. Lambert–Eaton syndrome
        vi. muscular dystrophies
        vii. inflammatory myopathies,
        viii. other myopathic disorders.
    c. Pathophysiology of major Neuromuscular Medicine disorders and familiarity with the scientific basis of neurological diseases, including: (MK, PC)
        i. neuroanatomy,
        ii. neuropathology,
        iii. neurochemistry,
        iv. neurophysiology,
        v. neuropharmacology,
        vi. neuroimmunology/neurovirology,

vii. neurogenetics/molecular neurology and neuroepidemiology,
viii. neuroimaging,
ix. neurological rehabilitation,
x. issues related to neuromuscular disorders.

d. Gross and microscopic specimens taken from the normal nervous system and from patients with major neuromuscular disorders .

B. Fellows will demonstrate the knowledge, ability and skills to: (MK, PC, Prof, ICS)
   a. Perform and document a comprehensive NMM history and examination.
   b. Create differential NMM diagnoses.
   c. Develop and maintain the technical skills to:
      i. identify and describe abnormalities seen in common neuromuscular disorders on radiographic testing,
      ii. evaluate the application and relevance of investigative procedures and interpretation in the diagnosis of neurologic disease, including the following:
         1. motor and sensory nerve conduction studies
         2. electromyography
         3. evoked potentials
         4. nerve pathology
         5. muscle pathology
         6. cutaneous nerve fiber pathology
         7. CSF analysis
         8. quantitative sensory testing
         9. interpret neuromuscular genetic testing
         10. radiographic studies as outlined above.
   d. To recognize and treat major neuromuscular disorders.

C. Fellows will maintain and apply an investigatory and analytic thinking approach to clinical situations, to be demonstrated by optimal clinical care of patients; teaching residents and other professionals; formal presentations at conferences; self-initiated independent learning. (MK, PC, ICS, Prof, SBP, PBLI)

D. Fellows will be able to provide patient care that is compassionate, appropriate and effective for the treatment of neuromuscular disorders. (MK, PC)
   a. Fellows will demonstrate knowledge, familiarity and application of:
      i. Interpretation and NCS, EMG and muscle, nerve and skin biopsies. (MK, PC, ICS, Prof, SBP, PBLI)
      ii. Available treatment methods for the major Neuromuscular Medicine disorders and the evidence which supports their use (MK, PC, ICS, Prof, SBP, PBLI)
      iii. Preventive interventions used in Neuromuscular Medicine (MK, PC, ICS, Prof, SBP, PBLI)
   b. Fellows will:
      i. Become strong advocates for the patient's best interests (MK, PC, ICS, Prof, SBP, PBLI)
      ii. Strive to provide quality care within available resources (MK, PC, ICS, Prof, SBP, PBLI)
      iii. Be sensitive to patient's cultural differences and confidentiality and consent issues (MK, PC, ICS, Prof, SBP, PBLI)
      iv. Gain familiarity with demographic, social, financial and other factors that impact neuromuscular patients and the services and systems that address them, enabling fellows to (MK, PC, Prof, SBP):

1. Effectively discuss patient status and prognosis with family members and designated others,
2. Recognize the impact of health insurance and payment mechanisms on available rehabilitative services and work with other team members to provide optimal care,
3. Develop an appreciation for the impact of culture and demographic factors on health status and use of health care services in neuromuscular patients and their families.

c. Demonstrated by:
    i. 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.

E. Fellows will 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.
    a. Fellows will demonstrate knowledge, skills and attitudes of:
        i. Interviewing techniques (MK, PC, ICS, Prof, SBP, PBLI)
        ii. Communication techniques (MK, PC, ICS, Prof, SBP, PBLI)
        iii. Serving as an effective consultant to other medical specialists and community agencies. (MK, PC, ICS, Prof, SBP, PBLI)
        iv. Communicating effectively with patients and their families (MK, PC, ICS, Prof, SBP, PBLI)
        v. Maintaining an attitude of respect for others, even those with differing points of view (MK, PC, ICS, Prof, SBP, PBLI)
        vi. Exhibiting culturally sensitive, professional, ethically sound behavior in all patient and professional interactions (MK, PC, ICS, Prof, SBP, PBLI)
        vii. Maintaining an attitude of interdisciplinary collaboration (MK, PC, ICS, Prof, SBP, PBLI)
    b. Demonstrated by:
        i. Chart documentation; direct observation; teaching others; professional relationships; formal presentations; independent learning; seeking feedback on communication and performance

F. Fellows will demonstrate the knowledge, skills and attitudes necessary to initiate self-directed and independent learning. Fellows will keep abreast of current information and practices relevant to Neuromuscular Medicine.
    a. Fellows will demonstrate knowledge, application and familiarity of:
        i. Research methodology, including critical assessment of professional journal articles (MK, PC, ICS, Prof, SBP, PBLI)
        ii. Principles of evidence-based medicine (MK, PC, ICS, Prof, SBP, PBLI)
        iii. Awareness to available information technologies and the ability to assess them (MK, PC, ICS, Prof, SBP, PBLI)
    b. Fellows will be able to:
        i. 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 (MK, PC, ICS, Prof, SBP, PBLI)

ii. Demonstrate the ability to effectively use information technology, including internet-based searches and literature databases (e.g., Medline) (MK, PC, ICS, Prof, SBP, PBLI).
iii. Assess the generalizability or applicability of research findings to patients in relation to their socio-demographic and clinical characteristics (MK, PC, ICS, Prof, SBP, PBLI).
iv. Develop and Maintain an attitude of inquiry and scholarship, recognizing the need for lifelong learning (MK, PC, ICS, Prof, SBP, PBLI)
v. Maintain openness and flexibility in treatment approaches with patients, assimilating new knowledge in patient care practices (MK, PC, ICS, Prof, SBP, PBLI)

c. Fellows will:
i. Demonstrate the knowledge, skills and attitudes necessary to practice professionally responsible, ethical and compassionate care in Neuromuscular Medicine. (MK, PC, ICS, Prof, SBP, PBLI).
ii. Provide continuity of care including appropriate consultation, transfer or termination of patients (clinic rotation)
iii. Demonstrate appreciation of end-of-life care and issues regarding provision for or withholding of care
iv. Promote the highest standards of medical healthcare to the public and participate in the review of the professional conduct of his or her colleagues
v. Maintain an attitude of inquiry and scholarship, recognizing the need for life long learning.
vi. Become sensitive to how patient care practices and related actions impact component units of health care delivery
vii. Apply Systems-based approaches for controlling health care costs and allocating resources.
viii. Advocate for patients within a variety of systems

d. Demonstrated by:
i. Self-directed inquiry guiding clinical care of patients; formal presentations which include literature review; teaching others

Other Activities on the Neuromuscular Medicine Rotation

- Discuss with the attending physician, interpret and dictate neuromuscular consultations on the day of service
- Edit dictated reports on the following day for attending physician review
- Organize muscle and nerve biopsy conferences on a rotational basis
- Present EMG neuromuscular topics on a rotational basis
- Participate in Journal Club
- Prepare for participation in the U of M Course in Neuromuscular Disease
- Give one case presentation per year
- Participate in neuromuscular lectures to neurology residents

Reading Suggestions

- Amato and Russell, *Neuromuscular Disorders*
- Engel and Franzini-Armstrong, *Myology*
- Dyck and Thomas, *Peripheral Neuropathy*

- Mendell, Kissel and Cornblath; *Diagnosis and Management of Peripheral Nerve Disorders*
- Mitsumoto, Przdeborski, Gordon; *Amyotrophic Lateral Sclerosis*
- Engel, *Myasthenia Gravis and Myasthenic Disorders*
- Dumitiur and Amato, *Electrodiagnostic Medicine*
- Brown and Bolton, *Clinical Electromyography*
- Levin and Luders, *Comprehensive Neuromuscular Medicine*
- Preston and Shapiro, *Electromyography and Neuromuscular Disorders*
- Dubowitz, *Muscle Biopsy: A Practical Approach*
- Oh, *Color Atlas of Nerve Biopsy Pathology*
- Brumback and Leech, *Color Atlas of Muscle Histochemistry*

Neuromuscular Diseases, General

- Brown WF, Bolton CF, Aminoff MJ. *Neuromuscular Function and Disease.* Philadelphia. W.B. Saunders Co, 2002
- Jones HR, DeVivo DC, Darras BT. *Neuromuscular Disorders of Infancy, Childhood, and Adolescence.* Philadelphia. Butterworth-Heinemann, 2003.
- Pourmand R. *Neuromuscular Diseases. Expert Clinicians' Views.* Boston. Butterworth-Heinemann, 2001

Muscle Pathology

- Dubowitz V. *Muscle Pathology: A Practical Approach.* 2nd Ed. Baillière Tindall, 1985
- Carpenter S, Karpati G. *Pathology of Skeletal Muscle.* 2nd Ed. Oxford University Press, 2001.
- Karpait G, Hilton-Jones D, Griggs RC. *Disorders of Voluntary Muscle.* Cambridge University Press, 2001

Nerve Pathology

- Midroni G, Bilbao JM. *Biopsy Diagnosis of Peripheral Neuropathy.* Butterworth-Heinemann, 1995
- Richardson EP Jr., De Girolami U. P*athology of the Peripheral Nerve.* WB Saunders Co, 1995
- Vital C, Vallat J-M. *Ultrastructural Study of the Human Diseased Peripheral Nerve.* 2nd Ed. Elsevier, 1987

Electrodiagnosis

- Kimura J. *Electrodiagnosis in Diseases of Nerve and Muscle.* 3rd Ed. Oxford University Press, 2001
- Oh, S. *Clinical Electromyography.* 2nd Ed. Williams & Wilkins, 1993
- Preston D, Shapiro B. *Electromyography and Neuromuscular Disorders.* Butterworth-Heinemann, 1998
- Dumitru D, Amato a, Zwarts MJ. *Electrodiagnostic Medicine.* Philadelphia. Hanley & Belfus, Inc., 2002

Disorders of Peripheral Nerve

- Griffin J, Low P, Poduslo J. *Peripheral Neuropathy.* 3rd Ed. W.B. Saunders Co., 1993

Disorders of Muscle

- Engel A, Franzini-Armstrong C. *Myology.* 2nd Ed. McGraw-Hill, 1994
- Griggs R, Mendell J, Miller R. *Evaluation and Treatment of Myopathies.* Philadelphia: F.A. Davis Co., 1995

- Walton J, Karpati G, Hilton-Jones D. Disorders of Voluntary Muscle. 6th Ed. Churchill Livingstone, 1994

2. Electromyography/Nerve Conduction Rotation

Goals and Objectives

A. The fellow will be able to:
   a. Understand the peripheral nervous system neuroanatomy (MK, PC).
   b. Understand the indications for and limitations of electrodiagnostic testing (PC, MK, PBLI, SBP)
   c. Perform and interpret nerve conduction studies (PC, MK)
   d. Perform and interpret nerve conduction studies and needle electromyography (PC, MK, PBLI)
   e. Perform patient evaluation and develop treatment plans for patient with epilepsy (PC, MK)
   f. Conduct appropriate evaluation of patients with neuromuscular diseases/symptoms (PC, MK, ICS)
   g. Formulate and implement appropriate treatment plans for patients with neuromuscular diseases (PC, MK, ICS)
   h. Perform and interpret autonomic testing and understand the role of these tests in the evaluation and management of patients with autonomic symptoms (PC, MK)
   i. Effectively communicate complex and difficult diagnoses and information to patients and their families (PC, ICS)
   j. Understand the role of hospice and palliative medicine in the care of patients with degenerative and terminal conditions (PC, MK, SBP)
   k. Work effectively with members of a multi-specialty and multi-disciplinary treatment team (PC, SBP, Prof)
   l. Communicate effectively in written and verbal communications with referring providers (PC, MK, SBP, ICS).
   m. To learn how to interview, examine, test, diagnose, and treat patients with neuromuscular-related complaints. (MK, PC)
   n. To provide exposure to electrodiagnostic studies, diagnosis, evaluation and treatment of neuromuscular disorders in adults and children. (MK)
   o. Under attending supervision, to perform and interpret at least 200 electrodiagnostic evaluations.(MK)
   p. Every electrodiagnostic study has to be reviewed and staffed with an attending physician. (PBLI)
   q. Every patient seen in the clinic has to be discussed and staffed with an attending physician. (PC, PBLI)
   r. The fellows will be able to communicate effectively with patients, technologists and referring physicians. (ICS)
   s. The fellows will show evidence of initiative in self-education. (MK, SBP)
   t. The fellows will demonstrate professionalism by following up on results and further tests in a timely fashion. (PC, ICS)
   u. Improve skills in coordinating care: this would include providing continuous care via telephone or taking responsibility for test interpretation between visits. Fellows will also

learn to provide patient education and access appropriate social services to improve quality of life for their patients. (SBP, PC)

v. Improve ability to understand and accept diversity in cultures, lifestyles and coping strategies among their patients, and learn to communicate within the patient's mode of understanding, with a focus on improving overall quality of life. (ICS, PC)

3. Muscle, Nerve and Skin Pathology Rotation

Objectives and Goals

A. Fellows will demonstrate knowledge about established and evolving neuroscience that would be critical to the practice of muscle, nerve and skin biopsy.
   a. Fellows will demonstrate knowledge of:
      i. The theoretical basis for processing and evaluating muscle, nerve and skin tissues based on comprehensive understanding of basic tissue reactions to a wide variety of neuromuscular disorders
      ii. Gross and microscopic specimens taken from the normal nervous system and from patients with major neuromuscular disorders
   b. Fellows will demonstrate abilities to:
      i. Use common devices to perform good quality:
         1. muscle, nerve and skin biopsies
         2. tissue preparation, preservation and processing
         3. tissue histopathologic, enzymatic and immunologic studies
      ii. Perform:
         1. an abbreviated history and physical exam
         2. an interpretation of the tissue pathologic alterations within 24 hours of the biopsy
         3. review the tissue within 48 hours of tissue availability with the neuromuscular specialist
      iii. Assess major disorders including disorders of the anterior horn cell, root, plexus, nerve, neuromuscular junction and muscle
      iv. Use NMM pathological methods in the evaluation and treatment of a wide range of diseases

B. Fellows will maintain and apply an investigatory and analytic thinking approach to clinical situations, to be demonstrated by optimal clinical care of patients; teaching residents and other professionals; formal presentations at conferences; self-initiated independent learning. (MK, PC, ICS, Prof, SBP, PBLI)
   a. Fellows will be able to provide and demonstrate knowledge, familiarity and application of:
      i. Patient care that is compassionate, appropriate and effective for the treatment of neuromuscular disorders. (MK, PC)
      ii. Interpretation and NCS, EMG and muscle, nerve and skin biopsies. (MK, PC, ICS, Prof, SBP, PBLI)
      iii. Available treatment methods for the major Neuromuscular Medicine disorders and the evidence which supports their use (MK, PC, ICS, Prof, SBP, PBLI)
      iv. Preventive interventions used in Neuromuscular Medicine (MK, PC, ICS, Prof, SBP, PBLI)
      v. Strong advocacy for the patient's best interests (MK, PC, ICS, Prof, SBP, PBLI)
      vi. Quality care within available resources (MK, PC, ICS, Prof, SBP, PBLI)

vii. Sensitiveness to patient's cultural differences and confidentiality and consent issues (MK, PC, ICS, Prof, SBP, PBLI)

C. Fellows will 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. (ICS, Prof, SBP, PBLI)
    a. Fellows will demonstrate knowledge, skills and attitudes of:
        i. Interviewing techniques (ICS, Prof, SBP, PBLI)
        ii. Communication techniques (ICS, Prof, SBP, PBLI)
        iii. Serving as an effective consultant to other medical specialists and community agencies. (ICS, Prof, SBP, PBLI)
        iv. Communicating effectively with patients and their families (ICS, Prof, SBP, PBLI)
        v. Maintaining an attitude of respect for others, even those with differing points of view (ICS, Prof, SBP, PBLI)
        vi. Exhibiting culturally sensitive, professional, ethically sound behavior in all patient and professional interactions (ICS, Prof, SBP, PBLI)
        vii. Maintaining an attitude of interdisciplinary collaboration (ICS, Prof, SBP, PBLI)
D. Fellows will demonstrate the knowledge, skills and attitudes necessary to initiate self-directed and independent learning.
    a. Fellows will keep abreast of current information and practices relevant to Neuromuscular Medicine, demonstrating knowledge, application and familiarity of:
        i. Research methodology, including critical assessment of professional journal articles (MK, PC, Prof, PBLI)
        ii. Principles of evidence-based medicine (MK, PC, Prof, PBLI)
        iii. Awareness to available information technologies and the ability to assess them (MK, PC, Prof, PBLI)
        iv. Obtaining, interpreting and evaluating up-to-date information from the scientific and practice literature to assist in the quality care of patients (MK, PC, Prof, PBLI)
        v. Effective use of information technology, including internet-based searches and literature databases (e.g., Medline) (MK, PC, Prof, PBLI)
    b. Fellows will:
        i. Demonstrate the knowledge, skills and attitudes necessary to practice professionally responsible, ethical and compassionate care in Neuromuscular Medicine. (MK, PC, Prof, PBLI)
        ii. Provide continuity of care including appropriate consultation, transfer or termination of patients (clinic rotation) (MK, PC, Prof, PBLI)
        iii. Demonstrate appreciation of end-of-life care and issues regarding provision for or withholding of care (MK, PC, Prof, SBP)
        iv. Promote the highest standards of medical healthcare to the public and participate in the review of the professional conduct of his or her colleagues (MK, PC, Prof, SBP
        v. Maintain an attitude of inquiry and scholarship, recognizing the need for lifelong learning. (MK, PC, Prof, SBP)
        vi. Become sensitive to how patient care practices and related actions impact component units of health care delivery (MK, PC, Prof, SBP)
        vii. Apply Systems-based approaches for controlling health care costs and allocating resources. (MK, PC, Prof, SBP)
        viii. Advocate for patients within a variety of systems (MK, PC, Prof, SBP)

c. Demonstrated by:
    i. Self-directed inquiry guiding clinical care of patients; formal presentations which include literature review; teaching others.
    ii. 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.

Other Activities on the NMM Pathology Rotation

- Discuss with the attending physician, interpret and dictate pathology reports within 48 hours of the day of service in light of the clinical presentation
- Edit dictated reports on the following day for attending physician review
- Organize muscle and nerve biopsy conferences on a rotational basis
- Present EMG neuromuscular topics on a rotational basis
- Participate in Journal Club
- Prepare for participation in the U of MN Symposium in Neuromuscular Disease
- Participate in lectures in EMG and nerve conduction studies to neurology residents
- Read the first 14 chapters in Comprehensive Neuromuscular Medicine by Levin and Luders

4. Rehabilitation Medicine Rotation

Objectives and Goals

The fellow will:

- Learn the fundamentals of neurorehabilitation. (MK, PC, ICS, Prof, SBP, PBLI)
- Gain an appreciation of the recovery process from neuromuscular and other neurological disorders. (MK, PC, ICS, Prof, SBP, PBLI)
- Become familiar with Post stroke rehabilitation, patients with traumatic brain injury and spinal cord injury as well as neuromuscular disease, Parkinson's disease, and multiple sclerosis away from the acute inpatient setting. (MK, PC, ICS, Prof, SBP, PBLI)
- Become familiar with activities of the physical therapist, occupational therapist and the speech therapist in order to learn how rehab actually helps patient recover from their neurologic illnesses. (MK, PC, ICS, Prof, SBP, PBLI)

While rotating on neurorehabilitation , the fellow will:

- Develop familiarity and expertise with a team approach to rehabilitation including an appreciation of the roles of physical therapy, occupational therapy, communication and swallowing services (PC, SBP).
- Gain expertise in management of cognitive deficits, spasticity, pain, incontinence, and other common complications of NM disease (PC, MK).
- Become proficient in determining the appropriate rehabilitation venue for NM disease patients (e.g. acute rehabilitation, subacute rehabilitation, skilled care, outpatient rehabilitation) (PC, MK, SBP).

5. Neuromuscular Research Elective Rotation

The research elective rotation will adhere to the ACGME core competencies described above.

Goals and Objectives

The goals of the NMM Research rotation are guided by the principles of the AAN Research Statement, and strategies of the Department of Neurology.

Learning Activities

A. Fellows are expected to complete learning activities in order to become competent in at least the following areas:
    a. literature study, to ascertain the exact state of knowledge before undertaking new investigation;
    b. formulation of hypothesis and specific goals, ensuring that the hypothesis is testable, that the goals are appropriate, and that statistical power is achievable;
    c. development of the research plan and the protocol, including study design, importance of appropriate controls in clinical investigation, and recruitment of subjects, ethical considerations, informed consent and protection of privacy, data collection modes, full description of procedures, and institutional approval of human investigation, where appropriate, and writing a research grant;
    d. data collection, including preparation of routine data forms;
    e. development of analytic methods or procedural skills, as required, and particularly the handling of artifacts, missing data, outliers, and statistical inference;
    f. presentation of results, preferably both oral and written, emphasizing that no investigation is complete until it is reported as a full paper in peer-reviewed journals;
    g. risk–benefit analysis, regarding both patient (subject) and societal risk–benefit; and
    h. research ethics, recognition of key concepts in the conduction of responsible research including but not restricted to data acquisition/management and protection, conflicts of interest, publication practices, and authorship and scientific conduct.

Activities: 3 – 6 months prior to rotation, during and after rotation:

- Identify potential mentors and meet with them to discuss potential projects
- Obtain review articles and prior publications in areas of potential research to guide investigative directions.
- Meet with other members of potential research team (lab staff, research assistants, etc.)
- Identify research mentor and area of research
- Submit name of research mentor and area of research to Chief of Neurology for approval
- Perform literature search on area of research, develop hypothesis and research protocols, in conjunction with mentor
- Submit and obtain protocol and consent form for IRB approval
- Discuss details of implementation of protocol and review any pertinent late breaking data from other relevant investigations (repeat literature review) that may alter protocol design
- Work with other members of research team, learn respective responsibilities of other members and seek guidance from mentor about role in team; become familiar with other research projects being carried out by research team
- Implement protocol (data collection)
- Present (in neurology fellows' research conf) the project's hypothesis and protocol design
- Implement protocol and complete data collection

- Meet with research mentor (one-on-one) no less than twice per week throughout the rotation to discuss progress of research Attend all meetings of research team you are a part of (and any other relevant conferences, as directed by mentor)
- Attend all Neurology, Neurosurgery and Neurosciences research conferences
- Meet with Chief of Neuromuscular Medicine no less than monthly to review progress
- Complete data collection
- Perform data analysis with assistance of mentor and/or data center staff
- Prepare AAN, UCNS or American Association of Electrodiagnostic Medicine abstract for submission

End of Rotation or Post-rotation:

- Present project at national neurology or internal medicine scientific sessions
- Submit research to Division of NMM research section
- Outline and write paper with mentor
- Submit and revise paper as needed for acceptance to peer reviewed journal or national grant agencies

Objectives and Competencies

A. The fellows will be expected to demonstrate the knowledge, skills and attitudes to:
    a. Effectively communicate with patients, ancillary staff, research team members and other participants regarding appropriate, ethical and effective conduct of research (ICS, PBLI, SBP)
    b. Develop an understanding of the systems and resources necessary to effectively conduct neuromuscular research (MK, SBP)
    c. Critically assess the research literature (MK, ICS, Prof)
    d. Identify a research problem, critically analyze the relevant literature and formulate a competitive research proposal. (MK, ICS, Prof, SBP)
    e. Understand the benefits of peer review and constructive criticism during all phases of research. (MK, Prof, PBLI, SBP)
    f. Formulate a scientific research hypothesis, determine whether it is testable, and describe how to test it. (MK, ICS, Prof)
    g. Become familiar with research methodologies specific to the individual research project. (MK, PBLI, SBP)
    h. Learn the basics of experimental design, including the appropriate use of control groups. (MK, Prof, ICS)
    i. Understand and apply the concepts of sample size and statistical power to the design of experiments and interpretation of data. (MK, Prof)
    j. Collect, organize, and preserve experimental data. (MK, Prof)
    k. Analyze experimental and observational data objectively and evaluate the quality, impact and limitations of the data (MK, PBLI, ICS, Prof)
    l. Perform clear organization and presentation of research results (ICS, MK)
    m. Learn the strengths and weaknesses of basic, clinical, and health services research techniques. (MK, Prof)
    n. Lead responsible conduct of research including general issues of scientific integrity as well as issues specific to the individual research product including animal care requirements, protection of privacy, informed consent, and institutional approval of human investigation. (ICS, Prof, PBLI, SBP)

o. Evaluate the risks and benefits of a research project from the points of view of the research subjects and society. (MK,ICS, Prof, SBP)
p. Become ‘expert’ in a very specific area of neuromuscular medicine (MK, ICS, Prof)
q. Obtain new skills which may have application to the future practice of neurology (MK, PBLI, SBP)
r. Learn to work as part of a research “team” (often involving several non-physicians with research expertise) (ICS,Prof, SBP)

Content and Methods

- Direct research experience under the supervision and guidance of a mentor/ faculty neurologist.
- Informal teaching and project discussion with mentor(s)/faculty neurologists.
- Self initiative and adherence to timelines

Supervision

Supervision is provided by the research mentor, program director and Division Chief, with weekly formal and informal interactions. PD maintains supervision through weekly meetings and contact with research mentor and fellow.

Other faculty and senior fellows participate in supervising the research fellow and the outcomes of his/her research as needed.

6. Neurogenetics Rotation

Goals

The goals of the NMM NEUROGENETICS (NG) rotation are guided by the principles of the AAN, and strategies of the Department of Neurology. The fellow will :prepared for independent, unsupervised practice of Neuromuscular Medicine, including NEUROGENETICS assessment and counseling of NM diseases

The goals of the rotation in Neurogenetics are to train the NMM fellows in the diagnosis, management, and genetic counseling of individuals with child and adult-onset neurogenetic disease, including mental retardation and single gene disorders of the population. These goals include to prepare the fellow to develop specialized knowledge in the science, clinical evaluation and clinical management of genetic diseases of the nervous system. This encompasses knowledge of the pathophysiology, pathology, diagnosis, and treatment of these disorders at a level that is significantly beyond the training and knowledge expected of a general neurologist.

The goals of the neurogenetics rotation include:
To facilitate the development of neuromuscular medicine subspecialists with expertise in hereditary diseases of the nervous system.

A. The fellow will:
B. be able to provide diagnoses, counseling and care for patients with neurogenetic disorders,
    a. be able to educate other physicians, healthcare personnel, and the public about these disorders.

b. acquire expertise in the evaluation and management of patients with hereditary diseases of the nervous system. This includes:
    i. develop skill in the interview and examination of patients and families with neurogenetic diseases.
    ii. demonstrate knowledge of the differential diagnoses for the various clinical presentations of neurogenetic disorders,
    iii. demonstrate knowledge of patterns of mendelian inheritance and non-mendelian inheritance.
    iv. demonstrate the ability to recognize common dysmorphologic syndromes.
    v. acquire knowledge of the appropriate laboratory investigations for diagnosis of neurogenetics disorders, including the sensitivity and specificity of DNA-based tests.
    vi. develop expertise in the management of a subset of inherited disorders of the nervous system such as inherited ataxias, Huntington disease, inherited neuropathies, etc.
    vii. develop expertise, skills and attitudes required in counseling patients and at-risk individuals regarding penetrance, expressivity, prognosis, and recurrence risk.
    viii. demonstrate knowledge of legal and ethical issues regarding DNA-based and non-DNA-based genetic testing and counseling.
    ix. develop a familiar background in the molecular biology, neurophysiology, neuroanatomy, neuropharmacology, and neuropathology of neurogenetic conditions.
    x. be exposed to and demonstrate familiarity with the clinical presentation, laboratory investigation, management and genetic counseling of a wide-range of neurogenetic disorders.
c. become familiar with clinical and/or laboratory research neurogenetic methods and the process of writing manuscripts for publication and grant applications.
d. develop the diagnostic and therapeutic skills necessary to provide care for patients with neurogenetic disorders.
e. be able to benefit from opportunities to observe, evaluate, and manage patients with a wide variety of hereditary diseases of the nervous system, including inpatient consultation, outpatient care, and knowledge of support services in pathology, radiology, electrodiagnosis and genetic and biochemical laboratory medicine.
f. obtain basic science training, including laboratory experience in molecular, genetic or biochemical aspects of neurogenetic diseases or basic mechanisms relevant to those diseases
g. participate in discussion and didactic activities on molecular biology, neuropathology, neurophysiology, and the clinical diagnosis and management of neurogenetic disorders.
h. appropriately perform clinical assignments which will include progressively increasing responsibilities for patient care with direct supervision by the appropriate faculty and/or staff.
i. take an active role in the teaching and training of neurology residents.

Medical Knowledge

A. On completing the Neurogenetics rotation(s), the fellow is expected to be able to:

a. Demonstrate an understanding of the pathogenesis, clinical manifestations and diagnosis of various neuromuscular disorders, and of specific genetic alterations associated with these.
b. Demonstrate an understanding of the relationship between the nature of these changes and the types of tests used to detect these alterations, the performance of and interpretation of these tests, and their pitfalls.
c. Perform, review, interpret and report tests performed in the laboratory:
    i. Nuclear and mitochondrial DNA mutations, duplications, deletions, and repeat expansions.
    ii. SMN1 mutations and copy number alterations.
    iii. Next generation sequencing and whole exome sequencing.

Patient Care

A. On completing the Neurogenetics rotation(s), the fellow is expected to be able to:
    a. Understand the clinical implications and limitations of these tests and, when appropriate, communicate these to ordering physicians.
    b. Understand the ethical and legal aspects of genetic counseling as they apply to neuromuscular medicine.
    c. When relevant, collect clinical information, information from neuropathological evaluation of muscle and nerve, other laboratory data, and integrate this with results of tests performed in the laboratory.
    d. When these tests are inadequate to answer relevant clinical questions, help the treating physician identify clinically appropriate tests, laboratories performing such tests, and assist the clinician in interpreting these tests.

Practice based Learning and Improvement

A. On completing the Neurogenetics rotation(s), the fellow is expected to be able to:
    a. Regularly collect and study the relevant literature and demonstrate the ability to critically evaluate and compare published material.
    b. Review the literature pertaining to the tests performed in the neurogenetics laboratory.
    c. Show an understanding of how newly developing molecular technologies such as microarray technology and high throughput sequencing can impact the diagnosis of mitochondrial disorders and other nervous system disorders.
    d. Educate other physicians and allied health professionals about these developments in laboratory meetings and in departmental conferences.

Interpersonal and Communication Skills

A. During the rotation, fellows must demonstrate interpersonal and communication skills that result in effective information exchange and teaming with other health care providers, laboratory personnel, patients, and patients' families. Towards this end, the fellows will:
    a. Develop effective working relationships with professional and technical staff in the neurogenetics laboratory, and outside consultants.
    b. Demonstrate effective verbal communication skills when communicating results to clinicians, at the appropriate level for the information being transmitted; convey and explain test results clearly, precisely, and concisely to physicians in direct conversations, or at conferences; communicate effectively with technical personnel when troubleshooting assays, or when managing the laboratory.

c. Develop excellent written skills for communication of complicated results when issuing reports, for the development and implementation of new laboratory policies and procedures, and for presentation of scientific research data, as appropriate.
d. Develop presentation skills that include selection of appropriate presentation materials and visual aids, good oral presentation and mannerisms, and the ability to answer questions effectively.

Professionalism

A. During the rotation, fellows must demonstrate a commitment to professional responsibilities, adherence to highest ethical standards, and respect for all. Towards this, they shall:
    a. Demonstrate respect and compassion for the patient and a dedication to patient care.
        i. Treat each sample as belonging to a patient, and not just a number.
        ii. Show respect for the confidentiality of all patient information.
        iii. Understand the need for and the role of appropriate informed consent prior to genetic testing.
    b. Conduct themselves with integrity and honor;
        i. If they identify any errors, or any area where there is a possibility of unreliable results, quickly bring this to the attention of those responsible so errors may be prevented, or corrected immediately.
    c. Demonstrate reliability in all assigned activities;
    d. Demonstrate perfect attendance at all laboratory activities;
    e. Demonstrate completeness in the workup of all cases in the neurogenetics laboratory.
    f. Educate other health care professionals in the technical aspects and clinical implications of the various functions of the neurogenetics laboratory.
    g. Actively assume responsibility and leadership roles:
        i. Progressively assume greater responsibility in the review of cases and quality control. By the end of the rotation, they should be able to independently interpret all test results produced by the laboratory, identify potential problems and suggest corrective action.
        ii. Progressively assume greater responsibility in the evaluation of various aspects of laboratory management.
        iii. Progressively assume greater responsibility in the oversight of residents rotating in the lab.
    h. Pursue continuing professional growth and educational opportunities.
        i. Actively participate in academic conferences
        ii. Actively seek out and interact with various experts in neurology, neurobiology and neurogenetics in the medical center as appropriate for the cases seen in the neurogenetics laboratory.
        iii. Actively evaluate cases seen in the neurogenetics laboratory for opportunities for scholarly activities, either case reports and reviews, or new diagnostic approaches.

Systems Based Practice

A. Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to call on system resources to provide molecular genetic pathology services that are of optimal value. Towards this the fellows shall, where appropriate:
    a. Provide guidance to clinicians and counselors to ensure that testing in the neurogenetics is used and integrated into patient care in an appropriate and cost-efficient manner.

b. Demonstrate knowledge of scientific, legal, and ethical issues relating to neurogenetics testing.
    i. Understand the implications not only to patients, but also their families, of results of molecular genetic tests.
    ii. Understand the need for informed consent, and as well as the legal requirement for informed consents in the state of MN.
    iii. Monitor the compliance of the laboratory with these requirements in cases that the fellow is involved with.
    iv. Demonstrate an understanding of the regulatory issues governing the operations of the laboratory, including CLIA regulations, MN State regulations, CAP implementation of CLIA regulations, and the various guidelines of the Clinical Laboratory and Standards Institute (CLSI) to help laboratories meet these guidelines and provide optimal testing services to patients.
c. Demonstrate knowledge of the impact of neurogenetics management and activities on other health care professionals, organizations, and society.
d. with the laboratory director and other faculty, help clients (patient, physicians, referring laboratories), in the provision of optimal patient care.
e. Practice cost-effective health care and resource allocation that does not compromise quality of care.
f. Be an advocate for quality patient care and contribute to clinician education.
g. Demonstrate the ability to assess, understand, and use the resources, personnel, and health care systems necessary to provide optimal care.
h. Gain experience with neurometabolic and neurologic disorders of genetic origin.
i. Demonstrate the knowledge, skills and attitudes required to evaluate and manage adult neurogenetic diseases such as CMT, inherited ataxias, myotonic dystrophy, Niemann-Pick disease, and muscular dystrophies.

Objectives

A. Fellows will demonstrate knowledge, familiarity, clinical care and research application of:
    a. The theoretical basis for neurogenetic interventions used in neuromuscular diseases (MK, PC)
    b. The neurogenetic basis of major neurological disorders: (MK, PC)
    c. Pathophysiology of major neuromuscular disorders of genetic origin and familiarity with the scientific basis of neurogenetic testing and counseling (MK, PC)
B. The fellows will be able to:
    a. Perform and document a comprehensive NMM history and examination focusing on neurogenetics. (MK, PC)
    b. Create differential NM diagnoses, based on neurogenetic knowledge. (MK, PC)
    c. Develop and maintain the technical skills to: (MK, PC, ICS, Prof, SBP, PBLI)
        i. Perform appropriate NM genetic testing and counseling
        ii. Identify and describe abnormalities seen in NM disorders using neurogenetics testing
        iii. Evaluate the application and relevance of neurogenetic investigative procedures and interpretation in the diagnosis and management of neuromuscular diseases.
C. Fellows will be able to provide patient care that is compassionate, appropriate and effective for the treatment of genetic neuromuscular disorders. (MK, PC)
D. Fellows will demonstrate knowledge, familiarity and application of:

a. Performance and Interpretation of diagnostic and therapeutic neuromuscular genetics procedures for neuromuscular diseases. (MK, PC, ICS, Prof, SBP, PBLI)
b. Available neuromuscular genetics testing and counseling methods for the major NM disorders and the evidence which supports their use (MK, PC, ICS, Prof, SBP, PBLI)
c. Preventive neuromuscular genetics testing and interventions used in Neuromuscular Medicine (MK, PC, ICS, Prof, SBP, PBLI)

E. Fellows will:
   a. Become strong advocates for the patient's and family's best interests (MK, PC, ICS, Prof, SBP, PBLI)
   b. Strive to provide quality care within available resources (MK, PC, ICS, Prof, SBP, PBLI)
   c. Be sensitive to patient's cultural differences and confidentiality and consent issues (MK, PC, ICS, Prof, SBP)
F. The fellows will be expected to demonstrate the knowledge, skills and attitudes to:
   a. Effectively communicate with patients, ancillary staff, research team members and other participants regarding appropriate, ethical and effective conduct of neuromuscular genetics research (IPC, PBLI,SBP)
   b. Develop an understanding of the systems and resources necessary to effectively conduct neuromuscular genetics research (MK, SBP)
   c. Outline and write paper, abstract or presentation with mentor. (IPC, Prof, PBLI, SBP)

MOVED PROFICIENCY TABLE

MOVED CONFERENCES AND JOURNAL CLUB

Supervision

NMM Policy For Supervision of Fellows

Our Fellowship in Neuromuscular Medicine complies with the University of Minnesota Medical School institutional policies for trainee supervision at each level of the fellowship program. They are applied at all sites, and maintained in the Fellowship Manual.

Our program's policies are also monitored through periodic department reviews, with institutional oversight through the GMEC internal review process.

The NMM fellows are supported, covered, and supervised by faculty at all times, in all cases, including transfer of responsibilities. The only exception may be due to an immediate emergency. There is no in-house call.

Our program supports and encourages effective supervisory behaviors, including:

- Setting clear expectations
  - When to call
  - Situations in which trainees should always call
  - How to call –provide accurate pager/phone numbers, available in the departmental directory
  - Trainees role in the care of the patient
- Creating a safe learning environment
  - Reassure the trainee that is is always appropriate to call if uncertain

    - Recognize and address uncertainty in the trainee
    - Being readily available
    - Answer pages and phone calls promptly (check current Departmental Directory)
    - Planned communication (schedule times for calls)
- Balancing supervision with fellow autonomy
    - Provide input but don't take over the case.
    - The faculty will monitor the fellows' function and activity according to the level of responsibility and conditional independence. (See table below.)
- Being respectful
    - Be patient with the fellow regardless of time of day
- Being aware of clinical needs that exceed the ability of the fellow
- Recognizing sleep deprivation and fellow impairment.
    - Faculty immediately support and cover the fellows' responsibility. The wellbeing of the fellow shall be paramount.

Effective Fellow Behaviors

- Neuromuscular fellow may request the physical presence of an attending at any time and is never to be refused
- Present data to supervisor accurately. If you omitted part of the exam let them know.
- Provide feedback to supervisor regarding what was helpful
- Know and follow your program's policies for when you must always contact a supervisor.

Situations that Require Contacting Faculty

Each institution has specific requirements listing situations in which a trainee must contact the supervising physician immediately. Examples of these situations are:

In outpatient neurology clinic:

- When patients are behaviorally disordered or threatening
- When there is need for a CODE team activation

When on the inpatient service or on consults:

- Unexpected transfer to ICU or higher level of care
- Unanticipated intubation or ventilator support
- Change in CODE status
- Major neurologic change
- Major medical problem (e.g. cardiac arrest, a CODE, new or rapidly worsening respiratory distress, PE)
- Clinical intervention due to medication or treatment errors
- Development of any new clinical problem requiring an invasive procedure or operation for treatment
- Patient, family, or clinical staff request for attending notification.

If you are uncertain...call your supervisor
If a patient has a change in status...call your supervisor

Levels of Supervision

- Direct: the supervising physician is physically present with the trainee and patient

- Indirect:
    - With supervision immediately available the supervising physician is physically within the hospital or other site of patient care and is immediately available to provide direct supervision
    - With direct supervision available the supervising physician is not physically present within the hospital or other site of patient care, but is immediately available by phone and/or other electronic modalities and is available to provide direct supervision
- Oversight: the supervising physician is available to provide review of procedures/ encounters with feedback provided after the care is delivered

Level of Responsibility by Proficiency Level

Function/activity	***Beginning*** *(Trimester 1)*	***Developing*** *(Trimester 2)*	***Proficient*** *(Trimester 3)*
Clinical data collection	independent, with staff supplementation	independent, with staff confirmation	independent, with selective staff confirmation
Formulation of clinical assessments/plans	jointly with staff	independent, with staff confirmation	independent, with selective staff confirmation
Communication of recommendations to 1 teams/ referring MDs	after discussion with staff	preliminary, independent; final, after discussion with staff	independent, with selective staff confirmation
Case conference preparation	jointly with staff	independent, with staff confirmation	independent, with selective staff confirmation
Supervision of students/ residents	jointly with staff	independent, with staff review	independent, with selective staff confirmation
Research	directed background reading, tutored skill development	execution of existing projects with staff oversight	analysis and presentation of results, new project development, independent conduct of research with selective staff review

Conferences and Journal Club

Fellows will be offered a unique lecture series appropriate to their level and the goal of training subspecialists in neuromuscular medicine. This will include multiple formats: case-based discussions, didactic lectures, journal club discussions, and morbidity and mortality discussions. The following conferences are available during the various rotations.

Required conferences for all rotations

- Neuromuscular Medicine conference, 8:00 am Fridays,
    - Cases on 1st, 3rd, 5th Fridays in 12-132 PWB
    - Pathology Cases on 2nd Friday in room D175 Mayo;
    - Journal Club on 4th Friday in room 12-132 PWB

Recommended conferences

- Muscular Dystrophy Center Conference, 9:00 am UMMC, twice a month
- Clinical Neuroscience Conference, 7:30am Tuesdays, 12-109 PWB (when at UMMC)
- Neurology Grand Rounds, Noon Fridays,

Additional available conferences

- Neurology/Neurosurgery/Neuroradiology, 11:00am Fridays, HCMC, P5.310 case conference (when at HCMC)
- Rehabilitation lecture series, Wednesday AM, UMMC PM&R
- Autopsy gross neuropathology conference, 11:00am Wed (2nd/4th), Ettinger Conf Rm, HCMC
- Neuropathology gross brain conference, 9:30am Tuesdays, UMMC, C-145 Mayo

ACLS/BLS/PALS Certification Requirements

All trainees are expected to have BLS certification. Certification is typically valid for 2 years. Once the initial certification expires, the trainee is responsible for scheduling a recertification class. Contact the Fairview education office at 612-373-6195 (Terry Nelson, tnelson1@fairview.org) or the VA (Robin Rabey robin.rabey2@va.gov) to schedule.

The program does not require ACLS to be renewed, but trainees may wish to do so. It will be required if you are moonlighting, provide conscious sedation, or working on a code team.

Contact your program coordinator for requirement and scheduling details.

Security/Safety

Security and personal safety measures are provided to trainees at all locations, including but not limited to parking facilities, on-call quarters, hospital and institutional grounds, and related clinical facilities (e.g. medical office buildings).

Contact Information

- University of Minnesota Medical Center Security Office: 612-273-4544
- University of Minnesota Security Monitor Program: 612-624-WALK
- VA Medical Center Security Office: 612-467-2007 / office located on the first floor, in room 1U-162
- Hennepin County Security Office 612-873-2359 / office located at RL150

Medical Records and Reference Materials

As part of the onboarding process at each site, every fellow receives logon instructions for accessing that hospital's electronic medical records system, and information about what reference materials are

available in print in the clinic area. All fellows also have access to electronic medical literature databases with search capabilities through the University of Minnesota's Biomedical Library.

UMMC Hospital

There is access to the Fairview Medical Library both from hospital/clinic computers and using mobile devices.

Health Sciences Library

All residents and fellows have access to full facilities of the University of Minnesota Health Sciences Libraries, which is physically located in the Health Sciences Education Center. Through the Health Sciences Libraries website hsl.lib.umn.edu and with an x500 login, hundreds of online journals, textbooks, databases, etc, can be accessed. Reference sites, such as UpToDate, PubMed, ClinicalKey, Micromedex, Ovid Medline and more. And to E-Books and journals such as NEJM, JAMA, Neurology, Lancet, etc. (Some of these are accessible only from hospital computers.)

Library subject specialist are available for help researching a topic or for tips on using library resources.

Combined "Others" with section below

Other Educational Resources

Other sites, like the American Academy of Neurology website, NIH website, etc, also have news articles, practice guidelines.

Fellows have at their disposal a learning area in the department, which includes several computers, computer-based teaching tools covering neurology, neuroradiology and pathology, and the most frequently used, up-to-date textbooks. The computers provide Medline searches. In addition, fellows have access to the hospital and biomedical libraries, which include a sizable collection of neurology journals and classic textbooks.

Laboratory/Pathology/Radiology Service

Inpatient clinical support services are available on a 24-hour basis at University of Minnesota Medical Center, Hennepin County Medical Center, and the Minneapolis VA Health Care System, to meet reasonable and expected demands, including intravenous services, phlebotomy services, messenger/transporter services, Inpatient Radiology services including laboratory and radiologic information retrieval systems allow prompt access to results.

Duty Hours

The combined total of hours worked should not exceed 80 hrs per week. Fellows are expected to have at least 8 hours off every day; 10 hours off preferred. Fellows must also have at least 1 day per week free of all educational duties, as averaged over a four week period.

The program coordinator and program director are constantly vigilant to assure that frequency and intensity of hours worked does not adversely impact the fellows' educational experience.

Moonlighting

Fellows interested in moonlighting must discuss it with the Program Director. If moonlighting is approved, a form letter requesting approval must be downloaded from RMS and completed by both the trainee and the Program Director. The completed letter goes to the Fellowship Coordinator, and also gets uploaded to RMS. No moonlighting can be performed without an approval letter. All moonlighting hours must be reported via the RMS duty hours, and will be counted towards the 80 hour per week duty hour limit.

Monitoring of Trainee Well-Being

The well-being and mental health of all trainees is top priority. Program directors and teaching staff will be sensitive to the need for timely provision of confidential counseling and psychological support services to all trainees. Training situations that consistently produce undesirable stress on fellows or residents will be evaluated and modified.

More details about support resources can be found at the Mental Health Resources page.

MOVED Other Educational Resources To Be Used up

Evaluation Methods

Evaluation by faculty, of faculty, of rotations

Each quarter, fellowship faculty are asked to evaluate each fellow's performance, via evaluations in the New Innovations RMS web-based system.

Also each quarter, fellows are asked to evaluate the program faculty, as well as the various rotations they have completed.

Neuromuscular Milestones

One of the ACGME program requirements is that all trainees be rated using the Milestones twice a year. The fellowship's Clinical Competency Committee (CCC) rates each fellow in early December and early June. The results will be shared at the semi-annual meeting with the program director (see below).

360 Degree Evaluation

Semi-annually, there is a semi-annual "360-degree" assessment of each trainee by the clinic and lab technical and nursing staff, as well as patients.

Semi-annual meeting with PD

One of the ACGME program requirements is a meeting between each trainee and the program director on a semi-annual basis.

At these meetings, the PD will review each trainee's ratings and evaluations submitted by himself and other faculty. Also discussed will be any 360 degree evaluations received and the Milestone ratings from the CCC. A written evaluation summary will be prepared and signed by both the PD and the trainee.

Annual Meetings

Annually, the Program Director completes a slightly more extensive evaluation of each fellow that summarizes their performance during the full year and indicates whether the fellow is ready to assume increased responsibility or whether he/she has demonstrated sufficient competence to enter clinical neurophysiology practice without direct supervision.

Also annually, fellows and faculty are encouraged to complete confidential written evaluations of the program itself. These are also scheduled and completed through the New Innovations RMS system. Anonymous, aggregated information from all rotation and program evaluations are used in an ACGME required annual, formal, fellowship evaluation meeting.

The results of the above annual evaluations, the rotation evaluations, the faculty evaluations, and the quarterly fellow evaluations all become part of the material considered in the formal, ACGME-required, annual Program Evaluation meeting. All faculty and fellows are invited to attend.

In-Service Exams

All fellows take an inservice examination:

1. American Association of Neuromuscular & Electrodiagnostic (EDX) Medicine Self-Assessment Examination (SAE). First week of May.

Board Examinations

It is the program's expectation that all graduates of this fellowship will take the ABPN Neuromuscular Medicine board examination within 3 years of graduation.

Section 6 - Administration

Important Contacts

Role	Name	Email	Phone
Department of Neurology Head	Jerrold Vitek, MD, PhD	vitek004@umn.edu	612-624-1903
Vice-Chair for Education	Michael Howell, MD	howel020@umn.edu	-
Neurology Residency Program Director	Will Schmalstieg, MD	wschmals@umn.edu	612-301-1048
Neurology Residency Coordinator	Rebecca Johnson	umnneurores@umn.edu	
Medical Student Coordinator	Patrick Puskala	pusk0001@umn.edu	
Education Manager	Rossi Cannon	bist0009@umn.edu	

Program Director	Georgios Manousakis, MD	gmanousa@umn.edu	314-517-6582
Fellowship Coordinator	Patrick Puskala	pusk0001@umn.edu	
HCMC Education Coordinator	Cheryl Neel	Cheryl.Neel@hcmed.org	612-873-2595
HCMC Site Director	Adam Loavenbruck, MD	Adam.Loavenbruck@hcmed.org	-
HCMC Neurology clinic	-	-	612-873-2515
HCMC EMG Lab	-	-	612-873-9320
UMMC Neuromuscular Site Director	Georgios Manousakis, MD	gmanousa@umn.edu	-
CSC EMG Clinic Desk	-	-	612-626-6680
MHFV Neurology Clinic	-	-	612-626-6688
UMN Dept of Neuro Admin Main Line	-	-	612-625-9900
VA Neurology Department Head	Kevin N. Brown, DO	kevin.brown13@va.gov	-

Fellow Contact Information

Fellows are expected to keep both their program coordinator and the University Payroll department informed of any changes to their contact information. Address and phone number changes can be completed online by visiting the MyU website and selecting the My Info tab.

Confirmation of Receipt of Fellowship Addendum

All fellows must complete a form indicating that they have received and reviewed the program manual. The form to complete is on the next page.

Only the dates of this manual and names were changed. The index linking, which takes the user straight to the topic, was also changed.

Z-Link to Manual

https://z.umn.edu/bctw

Last updated June 2025

University of Minnesota
Department of Neurology
Neuromuscular Medicine Fellowship

Confirmation of Receipt of your Fellowship Program Manual

By signing this document you are confirming that you have received and reviewed your Fellowship Program Manual for this academic year. This policy manual contains policies and procedures pertinent to your training program.

This receipt will be kept in your personnel file.

Fellow Name (Please print): _____

Fellow Signature: _____

Date: _____

Coordinator Initials: _____

Date: _____