Division of Neurology

Housestaff Guidebook

July 2007
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# Directory

**Division of Neurology**  
St. Michael’s Hospital

## Location and Telephone

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* 55 Queen = 55 Queen St. E. 9th Floor

## Courtesy Staff

- Dr. Paul Marchetti
- Dr. David Morgenthau
- Dr. Dan Selchen
- Dr. Melanie Ursell

## Emeritus

- Dr. Henry Berry
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* CC = *Cardinal Carter*
Overview of the Neurology Rotation at St. Michael's Hospital

The Neurology rotation at St. Michael's Hospital offers ample learning opportunities for developing neurological skills in many key areas. The multi-faceted hospital population ensures exposure to a remarkably wide range of situations. It consists of learning experiences in three major settings that are complimentary to each other:

Inpatient Neurology Ward (9 Cardinal Carter South)

The neurology inpatient service has 8 inpatient beds. Residents will learn to diagnose and manage a large number of acute and chronic neurological disorders, as well as to perform diagnostic procedures such as lumbar puncture.

Admissions typically consist of:
1. Patients referred from the Emergency Department who present with a suspected neurological problem but are otherwise well.
2. Elective patients from the office practice of staff neurologists who present with interesting or unusual undiagnosed neurological problems that require expedient investigations or treatment.
3. Patients transferred from other hospitals for a neurological consultation with respect to diagnostic work-up and treatment (acceptance of these patients is approved by the attending staff).

Neurology Consultation Service

St. Michael’s Hospital has a very active consultation service for various medical and surgical specialties.

Ambulatory Clinics

St. Michael’s Hospital has a general neurology ambulatory clinic that is specifically designed as a teaching clinic to expose both neurology and non-neurology residents to common outpatient neurology problems. All referrals are reviewed and triaged by Clinic Director, Dr. David Chan, to ensure the appropriateness and variety of cases. Other clinics include multiple sclerosis, stroke and epilepsy, with the latter two being optional.

All patients seen in any of the above settings are always reviewed and discussed with at least one staff neurologist. For a given month, there is a different attending staff for each of the ward and consultation services. Clinical experience in these settings is coupled with regularly scheduled, formal teaching sessions, which enable the trainee to consolidate an understanding of clinical neuroscience, focused on patient care.

The staff members of the Division of Neurology have special expertise in the following areas:
- General neurology
- Multiple sclerosis
- Epilepsy
• Stroke
• Neuromuscular disease
• Neurophysiology (electromyography and nerve conduction studies, electroencephalography, and evoked potentials)
• Neuro-epidemiology and clinical trials
• Educational research
• Legal context of medical practice

We are also a designated stroke centre in the GTA. Dr. Neville Bayer is the director of the Stroke Program (see latter section for more details of the Stroke Program).

Learning objectives will be reviewed with the residents at the beginning of each rotation. An informal interim evaluation will occur at mid-rotation, and a formal evaluation will be completed on POWER and reviewed with each resident at the end of the rotation. The final evaluation will be based on the attainment of learning objectives and CanMEDS competencies.
Goals and Objectives of the Neurology Rotation

Goal

• To develop skills in the assessment and management of patients in both inpatient and ambulatory settings presenting with various problems of a primarily neurological nature, incorporating diagnosis, investigations and treatment, and to communicate effectively with patients, their families and/or caregivers, and other health care professionals.

Objectives

For residents rotating through Neurology, each resident is expected to achieve the following CanMEDS competencies:

Medical Expert

• Perform a complete history and physical examination of the nervous system with confidence.
• Synthesize findings in various components of the neurological examination in order to determine appropriate anatomical localization(s).
• Formulate provisional as well as differential diagnosis of a patient’s symptoms based on the history and the anatomical localization.
• Recognize the indications, advantages, and limitations of common diagnostic tests and procedures in neurology.
• Synthesize the above data into an investigation and management plan for individual patients.
• Implement the patient management plan and document outcomes in the patient record at regular intervals.
• Develop a follow-up plan for each patient and evaluate the effectiveness of the management strategies implemented.
• Arrange for appropriate follow-up post-discharge and to record this in the hospital records.
• Develop an approach to common neurologic problems.*
• List common drugs and their adverse effects in the treatment of common neurologic disorders.
• Relate the underlying pathophysiological mechanisms of common neurological disorders to their clinical manifestations and treatment.

Communicator

• Communicate in an empathic manner with patients, as well as their family members and/or caregiver(s).
• Demonstrate the ability to facilitate informed decision-making by discussing with patients and family members about the plan of investigations, as well as the risks and benefits of tests chosen and available treatment options.
• Demonstrate the ability to communicate to the patient and/or caregiver(s) diagnostic conclusions reached and the treatment options available.
Communicate effectively with medical colleagues and other health care professionals in both inpatient and outpatient settings.

Document legible, succinct, written admission and consultation history and physical examination findings, as well as regular follow-up progress notes.

Dictate concise but informative final and clinic notes in a timely manner, and appropriately address them to all relevant physicians and health care professionals who are involved in the care of the patient.

Collaborator
- Consult effectively with other physicians and health care professionals in achieving the best quality of patient care.
- Contribute effectively to interdisciplinary team activities (e.g. Kardex rounds).
- Contribute any special skills of his or her background to improving patient outcomes.

Manager
- Work effectively and efficiently in a health care organization.
- Allocate finite health care resources effectively by ordering the appropriate investigations and minimizing the length of stay without compromising patient care.
- Maintain complete and accurate medical records.
- Utilize information technology to optimize patient care, lifelong learning, and other patient-related or educational activities.
- Demonstrate skills in time management (e.g. assessing patients expeditiously in order to maintain a good patient flow in the context of a clinic environment).

Health Advocate
- Recognize the modifiable risk factors responsible for the development or perpetuation of neurologic disorders.
- Counsel patients about aspects of prevention of neurologic disorders, including risk factors as well as genetic and environmental concerns.
- Demonstrate awareness of community resources for patients with chronic neurologic disorders.

Scholar
- Demonstrate ability to use appropriate resources to research on specific diagnostic or management issues that arise from patient care.
- Critically appraise sources of medical information, and apply evidence-based and clinical practice guidelines (if available) in the investigation and management of patients with neurologic disorders.
- Deliver academic and/or patient presentations at Neurology Medical Rounds during the rotation.
- Demonstrate self-initiative in achieving one’s learning goals during the rotation.

Professional
- Deliver highest quality care with integrity, honesty, compassion and empathy.
- Exhibit appropriate personal and interpersonal professional behaviours.
• Practice medicine ethically consistent with the obligations of a physician.
• Respect the opinions of colleagues and other health care professionals.
• Attend scheduled clinics as well as ward, consult and teaching rounds on time, and notify the attending staff and the senior neurology resident ahead of time if not able to do so for legitimate reasons.
• Follow up on patients at appropriate intervals.

Neurology residents should fulfill the above-listed objectives as a minimum. In addition, they should refer to the general and training year-specific goals and objectives listed in a separate document from the Division of Neurology, University of Toronto (dated January 2005).

* The resident should also have developed an approach to evaluating common neurological situations, namely:
  • Headaches
  • Dizziness and vertigo
  • Transient episodes of loss of consciousness
  • Transient focal neurological events
  • Back and neck pain
  • Sensory disorders
  • Gait disorders
  • Involuntary movements
  • Visual disturbances
  • Memory impairment
  • Coma

At the end of the rotation, the resident should expect to have an understanding of the relevant anatomy, pathophysiology, and treatment of the following common disorders:
• Stroke and TIA
• Epilepsy
• Parkinsonism
• Hyperkinetic movement disorders
• Primary and secondary headache disorders
• Vertigo
• CNS infections
• Multiple sclerosis
• Spinal cord lesions
• Spondylotic disorders of the cervical and lumbar regions
• Peripheral neuropathies
• Guillain-Barré syndrome
• Common mononeuropathies (e.g. Bell's Palsy, carpal tunnel syndrome)
• Neuromuscular junction disorders
• Inflammatory myopathies
• Dementia
• Coma and encephalopathies
Responsibilities of Residents during the Neurology Rotation

Call Responsibilities and Guidelines:

There are usually three to five residents available to take call during the Neurology rotation. The housestaff typically consists of one to two Neurology trainees, and two to three trainees from specialties including Internal Medicine, Physical Medicine and Rehabilitation, Emergency Medicine, Paediatric Neurology, Neurosurgery and Psychiatry.

All residents are allowed to take out-of-hospital call (i.e. home call).

Residents on-call from home are required to remain in hospital until their work is completed. If a resident is responsible for an acutely ill patient who may require urgent intervention, arrangements should be made to sleep in the on-call room provided by the hospital.

Residents should live within a reasonable distance from hospital if they are going to take out-of-hospital call. A maximum of 30 minutes from the hospital is felt reasonable. Acute stroke treatment by thrombolysis has to be given within a three-hour time window.

Acute medical, cardiac or neurological emergencies should be covered by the Senior Resident in general medicine or residents in the other specialties involved until the Neurology trainee arrives.

The Medical Consults service provides assistance is managing acute medical issues (i.e. non-neurological) arising from acute stroke patients post-thrombolysis. Examples include blood pressure control, pneumonia, hypoxia, and undifferentiated chest pain. Other acute medical issues (e.g. MI, acute renal failure) should be directed to the appropriate specialty services.

Consultations:

A neurological consultation service is provided to all patients at St. Michael's Hospital. The number of consultations is variable, ranging from 5 to 15+ per week. Consultations must be prioritized and seen the same day if possible, and reviewed with the attending staff within 24 hours. **Urgent consultations must be reviewed immediately after assessment by the resident.**

All consultations (except after hours and on weekends) should be given to the senior neurological resident to ensure equitable distribution of cases, in order to equalize workload and educational opportunity for all residents.

Consultations should be discussed with the Senior Neurology Resident prior to being seen by the attending staff (unless time does not permit doing so), so that the junior residents can derive maximal educational benefit.
Residents are required to attend promptly for consultations in the Emergency Department. Consultations may be called by the ER staff or by other disciplines. All consultations seen in the ER must be discussed with the staff neurologist on call. Consultations should be reviewed by the ward attending staff if the patient is deemed likely to require an admission to Neurology, and by the consult attending staff if the patient is deemed likely to be discharged or admitted to another service.

Referrals from other hospitals should be directed towards the staff on the ward service, or after hours, the staff on call. Acceptance is on a staff-to-staff basis. Particular care should be taken to ensure that patients who may need transfer to the Intensive Care Unit are identified prior to acceptance and that an appropriate bed is available (e.g. a patient with Gullain-Barré syndrome or myasthenia gravis).

Ward responsibilities:

There are up to 8 inpatient neurology beds located on 9 Cardinal Carter South.

Residents are responsible for documenting full admission histories, physical examinations and management plans, including the implementation of the latter. Follow-up notes are essential.

Trainees are responsible for interacting with the team responsible for the care of patients, including nurses, physiotherapists, occupational therapists, speech-language pathologists, social workers and pharmacists. Kardex rounds are mandatory. A major involvement with discharge planning is required.

In the interests of financial responsibility, shortness of stay is a key factor as are co-morbid conditions. These determine the amount paid to the hospital per patient and also identify excessive lengths of stay. This is the cost per weighted case index. Completion of the front sheets of patients’ charts in detail is very important in this regard to capture the full complexity of all cases.

Ambulatory Care Clinics:

It is in this setting that trainees see the majority of neurology patients with a wide variety of problems.

- General Neurology (Dr. David Chan): one half-day per week. Attendance is mandatory except for the resident who is on-call.

- Multiple Sclerosis (Dr. Trevor Gray): one half-day per week. Attendance is mandatory, with a maximum of two residents per clinic.

- Stroke clinic (optional): one half-day per week. Can be arranged directly with Dr. Neville Bayer, provided that it does not conflict with requirements in the General Neurology Clinic.
Acute Stroke Care (“Code Stroke”)

Intravenous thrombolysis (IV tPA) has become a standard of care for patients with acute ischemic stroke if the treatment can be given within three hours of symptom-onset (or when the patient was last witnessed to be normal if the time of symptom-onset cannot be precisely determined), provided that there are no contraindications otherwise.

It has been shown in multiple randomized controlled trials (i.e. Class I evidence) that IV tPA significantly improves recovery to independent function after an acute ischemic stroke, and the efficacy is greater if the treatment is given earlier within the three-hour window. It represents one of the few areas in neurology where acute care exists and directed primarily by neurologists, and where a proven treatment is readily available to make a difference to patients. It is now the standard of care in the treatment of acute stroke where the drug can be given within three hours in patients who otherwise have no contraindications for the drug.

St. Michael’s Hospital is designated as one of the regional stroke centres in the Greater Toronto Area. Under the “Toronto Acute Stroke Protocol”, EMS personnel use guidelines to assess and transport eligible stroke patients to the closest designated regional stroke centre where thrombolysis is available. If a community hospital is bypassed to transport a patient to the Regional Stroke Centre, the stroke case manager assists in repatriating the patient back to the local hospital when patient no longer requires the services of the regional stroke centre.

This centralization of care in a dedicated stroke centre has been shown to improve patient outcome, reduce complications and decrease length of stay after a stroke. The current frequency of code strokes averages about one every other day, although they rarely occur after midnight.

All acute stroke pages will be followed by “99”, indicating a stat call. When an acute stroke occurs, the following physicians will be paged:

- Neurology resident-on-call
- Staff neurologist on-call (or the consult staff during working hours from Monday to Friday)
- Radiology resident
- CT technician

The resident on-call will come in to the hospital together with the staff neurologist to assess the patient. Essentially, the resident will work side-by-side the staff, and receive one-on-one teaching with respect to:

1. The “emergency” neurologic history and physical examination as applied to the acute stroke patient.
2. The indications and contraindications of thrombolysis.
3. The interpretation of CT scans, CT angiograms, and CT perfusion scans and their utilization in the decision-making of thrombolysis.
4. The process of explaining to the patient and families about the risks and benefits of thrombolysis.
Please note the following specifics regarding acute stroke management:

1. **Acute stroke cases presenting in less than 3 hours from symptom-onset are to get a CTA (CT with angiogram and perfusion)** with rare exceptions (e.g. renal insufficiency, neurologist staff-person’s discretion).

2. **If IV tPA is given then you must check the result of the CT for the presence of CLOT and MISMATCH on perfusion** – the radiology resident will review the scans with you. Unless both of these are present, give full-dose IV tPA as usual.

3. **If BOTH of these are present, the neurology staff-person will likely elect to call neuroradiology soon after the IV tPA is started to consider an angiogram, possibly IA tPA, or a MERCI catheter procedure.**

4. As IA tPA and angiography are NOT the standard of care, neuroradiology needs to obtain full consent for tests and procedures from the patient/family in order to proceed with these activities.

5. Generally the CT resident/fellow will speak to the neurointerventional on-call and explain the results of the CT. If they agree that further intervention is required, consider stopping IV tPA at 40 minutes (i.e. approximately two-thirds of the total dose). Again, as this is not the standard of care, the full 60-minute dose can be completed as usual (there do not appear to be any issues with larger doses of tPA being given in IV/IA cases, however). This particular decision is best made in discussion with the staff neurologist, neurointerventionalist and patient/family. Carotid/basilar occlusion and large MCA clot are particularly amenable to these strategies. In the case of basilar artery thrombosis, the time window for intra-arterial thrombolysis is extended to 24 hours giving its potentially devastating outcome.

6. Patients who were given tPA will be admitted under Neurology. Patients will be admitted to the MSICU for the first 24 hours post-tPA (or to the Stroke Unit on 14CC if an ICU bed is not available), and then transferred to the Stroke Unit on 14CC for further stroke work-up and inpatient rehabilitation.

7. Patients who were deemed not a tPA candidate will be admitted to Team Medicine if they did not bypass their nearest emergency department. Otherwise, they should be repatriated back to their local hospital if a bed is available. The latter can be facilitated through the assistance of the bed allocator in the Emergency Department.

8. Patients presenting with intracerebral hemorrhage (e.g. due to hypertension, amyloid angiopathy or anticoagulants) who presents to the Emergency Department within 3 to 4 hours may qualify for recombinant factor VII treatment. These patients typically present as a “code stroke”, but CT scan demonstrates the presence of hemorrhage (thus making them a non-tPA candidate). Full consent needs to be obtained as this has yet to become the standard of care (i.e. two randomized-controlled trials showing conflicting results), and the hematologist-on-call has to approve the treatment.
The resident CD contains a folder with the following materials related to stroke management:

- An acute stroke worksheet for recording the history, physical examination, and CT findings (also available in the Stroke Box in ER)
- Pre-printed tPA orders
- Labetolol protocol for management of hypertension in acute stroke patients
- Transfer guidelines from other hospitals
- Current clinical practice guidelines on primary and secondary stroke prevention
- Evidence-based review articles on IV and IA thrombolysis
- Review article on imaging of acute stroke
- NEJM article and guidelines on the use of factor VII in intracerebral hemorrhage

For further information, please refer to the PDF document “SMH stroke program information” as well as other resources in the “Acute Stroke at SMH” folder, included in the resident CD.
Additional Objectives for the Senior Neurology Resident (SNR):

Goal:
• During the period of attachment the SNR will have consolidated skills incorporating clinical, teaching, and administrative activities appropriate to the expected outcome of becoming a consultant neurologist.

Objectives

Upon completion of this rotation, the SNR will have demonstrated the following additional CanMEDS competencies:

Medical Expert
• Formulate a comprehensive diagnostic and management plan as a consultant neurologist.

Collaborator
• Willingly share knowledge with others and whom they are associated, thus ensuring the most effectively delivery of health care to patients.

Communicator
• Explain the anatomical, physiological, and therapeutic basis of frequently encountered conditions in a comprehensible manner to patients and their caregivers.
• Communicate with allied health care practitioners to facilitate excellent patient care.
• Provide constructive feedback to junior residents.

Manager
• Supervise more junior residents, including internal medicine residents and other rotating trainees, in providing patient care.
• Prioritize and assign admissions and consultations.
• Assign junior residents to designated clinics.
• Organize the call schedule for trainees, and resolve any conflicts that might arise from switching calls.
• Participate in the regularly scheduled educational events and ensure attendance of junior residents.
• Liaise with staff regularly to ensure that patient care is efficient and comprehensive.

Scholar
• Apply the principles of adult learning in teaching medical students and residents on the Neurology service, in the context of weekly clinical activities.
• Provides instruction to medical students and junior residents at a level appropriate to their clinical education and professional competence.
• Review cases with junior residents if time permits.

Professional
• By example demonstrate the importance of attending rounds and clinics on time and ensuring that work is completed in a timely manner.
Objectives of Specific Programs in Neurology

**Stroke**

**Goal:**
- To recognize various stroke presentations, to classify stroke types, and to investigate and treat patients presenting with TIA or stroke.

**Objectives:**

At the end of the rotation the resident will be able to:

1. Diagnose TIA and differentiate it from other transient neurological events.
3. Classify TIAs and stroke types at a clinical level.
4. Utilize various neuroimaging modalities in the diagnosis and decision-making in stroke patients, and to recognize early features of an acute cerebral infarct on a CT scan.
5. List the indications and contraindications of thrombolysis in the treatment of acute ischemic stroke.
6. Manage post-thrombolysis patients in the first 24 hours.
7. Select appropriate non-invasive and/or invasive investigations to identify the etiology of stroke in patients.
8. Recognize the risk factors for stroke and institute appropriate treatment for their long-term modification.
9. Recognize the psychosocial implications of stroke to the patients and their families.

**Epilepsy**

**Goal:**
- To become familiar with the clinical features, classification, investigation and treatment of adult patients with seizure disorders.

**Objectives:**

Upon completion of this rotation the resident will be able to:
1. Obtain a detailed history aimed at differentiating seizures from other causes of transient neurological dysfunction.

2. Perform a complete physical and neurological examination with specific reference to the causes of epilepsy.

3. Classify seizures and epileptic syndromes according to the currently accepted international classification schemes.

4. Utilize biochemical, neuroimaging and electrophysiologic (EEG) tests appropriately to investigate patients with seizure disorders.

5. Treat acute symptomatic seizures, status epilepticus and chronic recurrent seizures of different types.

6. State the mechanisms of action and pharmacokinetic properties of antiepileptic drugs.

7. Recognize the psychosocial impact of epilepsy and explain the disorder and its treatment to patients and their families.

Multiple Sclerosis

Goal:
• To become familiar with the clinical features, diagnosis, as well as disease-modifying and symptomatic treatment of multiple sclerosis (MS).

Objectives:

Upon completion of this rotation the resident will be able to:

1. Describe the current theories of etiology, genetics, epidemiology and pathological features of MS.

2. Take a clinical history and perform a neurological examination with special reference to symptoms and signs frequently encountered in patients with MS, and to localize lesions and arrive at a diagnosis and differential diagnosis.

3. List the common investigations used in the diagnosis of MS, the rationale for their use, and the utility of each in establishing or ruling out the diagnosis.

4. State the indications, mechanisms of action, efficacy and side-effects of various disease-modifying immunomodulatory agents in the treatment of MS.

5. Institute therapy for the management of various symptoms in patients with MS, and to list their mechanisms of action and side effects.
6. List the immunosuppressive drugs used as “rescue” treatment in MS and their side effects.

**Research:** Opportunities for research projects and fellowships are available under the supervision of Dr. Paul O’Connor. A large population of well-documented patients is available.

**Evaluation:** The resident and Dr. Paul O’Connor (or his delegate) will review the goals and objectives at the beginning of the elective. Feedback and suggestions for improvement will be provided at mid-rotation and again at the end of the rotation.

**Multiple Sclerosis Clinic**

The Multiple Sclerosis Clinic is located on 3-Shuter. It is an outpatient multidisciplinary care service. The clinic co-coordinator is Sheryl Clarke. There are seven neurologists:

- Dr. Trevor Gray: every Tuesday
- Dr. Marika Hohol: every Wednesday PM
- Dr. Paul O’Connor: every Wednesday
- Dr. Paul Marchetti: every Thursday
- Dr. Melanie Ursell: every Thursday
- Dr. Melanie Ursell: every Thursday
- Dr. David Morgenthau: Monday PM (2/month)
- Dr. Daniel Selchen: Wednesday (1/month)

**Responsibilities of Non-Neurology Residents:**

- To attend the MS Clinic on Tuesday afternoons as assigned by the Senior Neurology Resident.
- To assess patients, review with the staff neurologist, and participate in the plan of care and correspond with referring physicians.
- To participate in the weekly MS Clinic multidisciplinary meeting on Tuesday from 4 to 5 pm.

**Responsibilities of Neurology Residents:**

- Same as non-neurology residents.
- Neurology residents will also be asked to see MS Clinic patients who require urgent medical attention. These urgent visits will be arranged by the clinic coordinator and the Senior Neurology Resident, as required.

**Electromyography and Neuromuscular Diseases**

**Supervisor:** Dr. Gyl Midroni

**Goals:**

- To acquire the manual skills required for performing nerve conduction studies and needle electromyographic testing
• To acquire the knowledge of anatomy, physiology, and clinical aspects of neuromuscular disease required in order to plan an appropriate electrodiagnostic consultation
• To learn how to interpret electrodiagnostic findings in the context of a clinical picture and communicate the relevance of the findings to patients and other health care professionals.
• To perform at least 100-200 EMG studies in their entirety (from patient assessment, through study planning, execution and interpretation) involving a range of conditions including focal neuropathies, plexopathies, radiculopathies, peripheral neuropathy, disorders of muscle, and anterior horn cell disorders.

Objectives

Upon completion of this rotation, each 6-month resident trainee is expected to achieve the following CanMEDS competencies:

Medical Expert

• Comprehensive knowledge of peripheral nerve anatomy including roots, plexuses, and all clinically significant major nerve trunks and their branches.
• Comprehensive knowledge of the relevant physiology of myelinated axons, motor and sensory, including issues such as:
  a. Wallerian degeneration
  b. Conduction block
  c. Demyelination and remyelination
  d. Axonal regeneration
  e. Collateral sprouting
  f. Neuromuscular safety margin
  g. Muscle fiber membrane excitability
• Perform a history and physical examination directed at identifying evidence of nerve, muscle, and neuromuscular pathology.
• Synthesize findings in various components of the neurological examination and history in order to determine appropriate anatomical localization(s). Focus is on neuromuscular problems, but possible role of CNS pathology must also be recognized.
• Formulate provisional as well as differential diagnosis of a patient’s symptoms based on the history and the anatomical localization.
• Recognize the indications, advantages, and limitations of EMG testing in the context of various nerve, muscle, anterior horn cell, and neuromuscular conditions.
• Synthesize the above data into a testing protocol.
• Implement the tests according the laboratory standards and protocols.
• Interpret test results so as to answer questions posed by the referring physician.
• Appreciate that the role of EMG is not only for lesion localization, but for assessment of severity, prognosis, and long term followup. Use the testing appropriately depending on the principal issue being addressed.
Communicator
- Explain the nature of EMG testing in a comprehensible manner to patients.
- Perform the testing in a manner which will engender patient confidence.
- Performing the testing in a manner which will not cause unnecessary pain to the patient. This requires both:
  - Technical skill
  - Knowledge of which tests are more important and worth persevering with, versus those that should be abandoned if patient discomfort is a problem, as they are not particularly informative.
- Demonstrate the ability to communicate to the patient and/or caregiver(s) diagnostic conclusions reached.
- Communicate the results and significance of EMG test results effectively with medical colleagues and other health care professionals in both inpatient and outpatient settings.
- Formulate concise and clinically useful EMG reports, and prepare them in a timely manner.
- Address the concerns raised by the referring physician(s) and provide guidance where appropriate.

Collaborator
- Consult effectively with other physicians and health care professionals in achieving the best quality of patient care.
- Contribute any special skills of his or her background to improving patient outcomes.

Manager
- Work effectively and efficiently in a health care organization.
- Utilize information technology to optimize patient care, lifelong learning, and other patient-related or educational activities.
- Demonstrate skills in time management (e.g. assessing patients expeditiously in order to maintain a good patient flow in the context of a clinic environment).

Health Advocate
- Recognize the value of EMG testing in appropriate contexts.
- Recognize the limitations of EMG testing in order to not perform the test unnecessarily, or to an unnecessary extent.

Scholar
- Demonstrate ability to use appropriate resources to research clinical and scientific/physiology questions that arise in the course of EMG assessments.
- Critically appraise sources of medical information, and apply evidence-based and clinical practice guidelines to electrodiagnostic testing.
- Deliver academic and/or patient presentations at Neurology Medical Rounds during the rotation.
- Demonstrate self-initiative in achieving one’s learning goals during the rotation.
Professional

- Deliver highest quality care with integrity, honesty, compassion and empathy.
- Exhibit appropriate personal and interpersonal professional behaviours.
- Practice medicine ethically consistent with the obligations of a physician.
- Respect the opinions of colleagues and other health care professionals.
- Attend scheduled clinics on time, avoid keeping patients and colleagues waiting unnecessarily.

The resident should also have developed an approach to evaluating, and an understanding of the expected electrodiagnostic findings in common or important neuromuscular problems including

- Carpal Tunnel Syndrome
- Ulnar neuropathy
- Facial neuropathy
- Peroneal, sciatic and tibial neuropathies at various sites
- Lumbar and cervical radicuopathy
- Brachial plexopathies, traumatic and non-traumatic
- Lumbar plexopathy, traumatic and non-traumatic
- Peripheral neuropathies
  - Acquired vs. genetic
  - Axonal vs. demyelinating
  - Mononeuropathy multiplex
- Muscle disorders
  - Myotonic muscle disease
  - Inflammatory myopathy
  - Muscular dystrophy
  - Metabolic muscle disease
- Neuromuscular transmission disorders
  - Myasthenia gravis
  - LEMS
  - Botulism
- Motor neuron disorders
  - ALS
  - Spinal muscular atrophy
  - Monomelic amyotrophy
Neurology Teaching Rounds  
Mondays, 12:00 to 1:00 pm, Fitzgerald Academy Classrooms  

**Goal:** To introduce a clinical approach to common neurological problems, using a case-based interactive format.  

**General Neurology**  
- Approach to the neurological examination  
- Lesion localization  

**Stroke**  
- Stroke syndromes  
- Management of acute stroke  
- Approach to TIA and secondary stroke prevention  

**Multiple Sclerosis**  
- Diagnosis and differential diagnosis of MS  
- Disease modifying treatment in MS  
- Symptomatic treatment of MS  

**Neuromuscular Diseases**  
- Approach to rapid onset weakness  
- When to order EMG and nerve conduction studies  
- Approach to peripheral neuropathy  
- Common focal neuropathies in the upper and lower extremities  

**Movement Disorders**  
- Approach to parkinsonism  

**Epilepsy**  
- Management of status epilepticus  
- Common management issues in patients with epilepsy  

**Headache**  
- Headache in the Emergency Room  

**Neuro-otology**  
- Approach to vertigo  

**Neuro-ophthalmology**  
- Approach to diplopia  
- Approach to acute visual loss  

**Critical Care Neurology**  
- Failure to wean in the ICU  
- Approach to the comatose patient  

**Cognitive Neurology**  
- Diagnosis of common dementia syndromes
Guidelines for Neurology Medical Rounds

Housestaff presentation (Thursdays, 0830-0900):

1. Rounds begin promptly at 8:30 AM
2. Topics recommended are:
   • Presentation related to selected aspect(s) of a common neurological condition, based on a patient’s case
   • Journal club - once per month
   • Basic science presentation - once per month
3. Presentations should be concise and well-illustrated. A critical appraisal of the information given should be included.
4. The presenter at this session is subject to formal evaluation and is encouraged to incorporate the scores and feedback into their teaching dossier.

Patient presentation (Thursdays, 0910-1000):

1. Select a case after discussion with the Senior Neurology Resident.
2. Ensure that the staff supervising the case will be present.
3. Ensure that the patient arrives on time.
4. Other specialists involved in the care of the patient that might contribute to the discussion (e.g. neurosurgery, neuropathology, neuroradiology) are encouraged to attend and should be notified in advance.
5. The patient's chart must be present but the presenter should be familiar with the history, physical examination findings and test results for the patient.
6. The case should be presented concisely with only pertinent negatives.
7. Presentation of the physical examination should be restricted to positive findings and other parts of the examination as requested by staff.
8. Findings should be summarized, the structures within the nervous system which are affected should be identified and the lesion localized. A differential diagnosis should be provided in order of likelihood in the specific case.
9. Pertinent laboratory investigations are then presented.
10. Imaging studies should be brought to rounds for review.
Selected References
(Textbooks and Web-Based Resources)

Neurologic Examination

ALL RESIDENTS SHOULD REVIEW THE FOLLOWING TWO RESOURCES (at http://www.utoronto.ca/neuronotes) BEFORE OR DURING THE FIRST WEEK OF THEIR ROTATION.

The Neurological Examination
- Web-based video demonstrating the essential techniques in performing a complete neurological examination

Functional Neuroanatomy
- Review of clinically-relevant neuroanatomy and neuroradiology

Textbooks:
2. Haerer AF. DeJong’s The Neurological Examination, 5th Edition. J.B. Lippincott Company, 1992. (A classic text, but the level of detail is more suitable for Neurology residents)

General Neurology

Neuroanatomy

**Neurophysiology**

**Coma**

**Epilepsy**

**Multiple Sclerosis**

**Neuro-Ophthalmology**

**Peripheral Neuropathy**
Electromyography and Nerve Conduction Studies

Stroke

Movement Disorders
Essential References for Non-Neurology Residents

Non-neurology residents are strongly encouraged to read these articles during their rotation (all available in the resident CD), although they should always read around specific patient cases that they encountered as well.

**Stroke**

**Epilepsy**

**Movement Disorders**

**Coma and Brain Death**
Multiple Sclerosis

Headache

Neuromuscular
1. Midroni G. Approach to diagnosis of peripheral neuropathy.

CNS Infections

Vertigo

Lumbar Puncture
## Weekly Schedule of Educational Activities in Neurology

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>0900</td>
<td>Ward Rounds</td>
<td>9-CC</td>
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<tr>
<td></td>
<td>1100</td>
<td>Kardex Rounds or Multidisciplinary Stroke Rounds</td>
<td>9-CC or 14-CC</td>
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<tr>
<td></td>
<td>1200</td>
<td>Teaching Rounds</td>
<td>Staff’s Office</td>
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<td></td>
<td>1500</td>
<td>Consult Rounds</td>
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<td></td>
<td>1630</td>
<td>Neuroscience Rounds</td>
<td>7-Queen (Sept to June)</td>
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<tr>
<td>Tuesday</td>
<td>0815</td>
<td>Neuropathology Slides Review (Dr. David Munoz)</td>
<td>Neuropathology (2-CC)</td>
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<tr>
<td></td>
<td>0900</td>
<td>General Neurology Clinic* (Dr. Gustavo Saposnik)</td>
<td>Martin Centre</td>
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<td>(Main Floor, Queen Wing)</td>
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<td></td>
<td>1300</td>
<td>MS Clinic</td>
<td>3-Shuter</td>
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<tr>
<td>Wednesday</td>
<td>0815</td>
<td>Brain Cutting (Dr. David Munoz)</td>
<td>Neuropathology (2-CC)</td>
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<td></td>
<td>0900</td>
<td>Consult Rounds</td>
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<td></td>
<td>1200</td>
<td>Medical Grand Rounds</td>
<td>Auditorium</td>
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<tr>
<td></td>
<td>1300</td>
<td>Ward Rounds</td>
<td>9-CC</td>
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<tr>
<td>Thursday</td>
<td>0830</td>
<td>Neurology Medical Rounds</td>
<td>3-Bond Board Room</td>
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<td></td>
<td>1030</td>
<td>Consult Rounds</td>
<td>Martin Centre</td>
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<td></td>
<td>1300</td>
<td>General Neurology Clinic (Dr. David Chan)</td>
<td>Martin Centre</td>
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<td>(Main Floor, Queen Wing)</td>
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<td></td>
<td>1300</td>
<td>Stroke Clinic* (Dr. Neville Bayer)</td>
<td>Martin Centre</td>
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<td>(Main Floor, Queen Wing)</td>
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<tr>
<td>Friday</td>
<td>0800-</td>
<td>Core Lecture Series for Neurology Residents†</td>
<td>Toronto Western Hospital</td>
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<td>1200</td>
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<tr>
<td></td>
<td>1300</td>
<td>Ward Rounds</td>
<td>9-CC</td>
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<tr>
<td>PM</td>
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<td>Weekend Clean-up Consult Rounds (schedule with staff)</td>
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* Clinics indicated in italics are OPTIONAL
† Off-service residents must stay behind to cover ward and consults