



Welcome to the Neurology Residency Program!!

The Neurology Residency Program is a part of the Department of Clinical Neurological Sciences (CNS) at Western University. The CNS Department is composed of the divisions of Neurology and Neurosurgery, with affiliations to the departments of Neuropathology, Neuroradiology, Neuro-Oncology, Neuropediatrics, and Neuro-Ophthalmology.

This handbook serves as an introduction to the Neurology Residency Program. In the handbook you will find important contact information, a description of the Residency Program Committee, goals and objectives of the program, the educational curriculum, an outline of the clinical rotations from PGY1 to 5, and important policies and procedures. We hope you will find this handbook useful and informative. If there are any questions not answered in this handbook, please let us know.

As a neurology resident, you are now a member of the CNS Department. We are very pleased to have you join our program. We wish you every success over your residency tenure!

Mary Jenkins, MD, FRCPC  
Neurology Program Director

Lisa Baker-Spiller, HBA  
Neurology Program Education Coordinator

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## PROGRAM CONTACT INFORMATION

### Neurology Resident Program Administrative Staff:

Lisa Baker-Spiller – Education Coordinator  
University Hospital Room B7-005, Phone 519-663-3696 (ext. 33696)

Blanka Jordanov – Education Assistant  
University Hospital Room A7-023, Phone 519-685-8500 (ext 36487)

### Neurology Resident Program Faculty:

Dr. Mary Jenkins – Program Director  
University Hospital Room A10-304, Phone 519-663-3404, Pager 13205

Dr. Shannon Venance – Clinical Teaching Unit and University Hospital Site Supervisor, Member of the Resident Program Committee

Dr. Alex Fraser – Victoria Hospital Site Supervisor, Member of the Resident Program Committee

### CNS Department and Neurology Leadership

Dr. Paul Cooper – Chair of the Department of Clinical Neurological Sciences

Dr. Michael Nicolle – Chief of the Division of Neurology

### Neurology Program Web-Sites:

Department of Clinical Neurological Sciences

<http://www.cnsuwo.ca/>

- “EBN” will take you to the Evidence Based Neurology site
- “Schedules” will take you to the Grand Rounds and weekly teaching rounds

Neurology Resident Website

<http://www.box.com/>

*User name: resident.uwoneuro@gmail.com*

*Password: aspirin*

## **NEUROLOGY RESIDENCY PROGRAM COMMITTEE (RPC)**

### **RPC Committee Function:**

The RPC meets six times a year and at the call of the Chair. Subcommittees may be formed to deal with specific issues. There is an annual review meeting in May, attended by all residents, to review the current academic year and to allow more prolonged discussion of various topics.

### **Membership:**

Program Director: Dr. Mary Jenkins

Faculty Members: Dr. Shannon Venance, CTU Supervisor  
Dr. Alex Fraser, Victoria Hospital Site Supervisor

Resident Members:

1 to 2 residents from each of the PGY years are chosen (elected) by their peers to the Residency Program Committee.

Corresponding Members:

Dr. Simon Levin – for any Pediatric Neurology issues  
Dr. Elizabeth Finger – Resident Research Co-ordinator

Ex officio member:

Dr. Paul Cooper – Chair of the Division of Neurology  
Lisa Baker-Spiller – Education Administrator

### **CNS Education Committee:**

The Department of Clinical Neurological Sciences also has a CNS Education Committee whose membership includes representatives from Neurology, Neurosurgery, Paediatric Neurology, Neuroradiology and Neuropathology. Educational items that affect the Department as a whole are discussed in the meeting. The program director (Dr. Jenkins) and a Neurology resident representative are members of CNS Education Committee and will bring any issues from the RPC to these meetings.

## **TERMS OF REFERENCE OF THE RESIDENCY PROGRAM COMMITTEE**

The Residency Program Committee (RPC) will function in accordance with the standards of the Royal College accreditation committee and the standards of the Neurology Specialty Committee.

### **1. Members**

- 1) The RPC will consist of the Program Director (chair), the Clinical Teaching Unit Supervisor, 1 to 2 other Faculties members, 1 to 2 resident representatives from each year or training (PGY1 to PGY5) that are chosen by the residents, and the Educational Administrator.
- 2) Corresponding members will include the Resident Research Coordinator, the liaison for Pediatric Neurology, the Chief of Neurology, and the Chair of Clinical Neurological Sciences.

### **2. Meetings**

- 1) Meetings will be held every 2 months or at the call of the chair.
- 2) An agenda will be circulated in advance of each meeting for comments, and additional agenda items will solicited from all RPC members.
- 3) All members have an equal voice at the table when issues are discussed, and decision-making is by consensus whenever possible.
- 4) Minutes of meetings are prepared by the program's educational administrator and are circulated after meetings for comments. Minutes are sent to the Chief of Neurology and the Chair of Clinical Neurological Sciences so they are aware of the discussions and decisions from the RPC. The Program Director will bring any relevant issues to the Neurology Division and CNS Department meetings.

### **3. RPC and Subcommittee Responsibilities**

- 1) To manage the Neurology Residency Program for the Department of Clinical Neurological Sciences (CNS). To ensure the program is meeting the requirements of the Royal College and the Neurology Specialty Committee.
- 2) To regularly review the Neurology residency program including the academic curriculum, grand rounds, teaching rounds, all clinical rotations, the resources and facilities, the teaching Faculty, and the research component. To recommend and implement improvements to the program where indicated.

- 3) To select candidates for admission to the Neurology residency program.
- 4) To review residents evaluation assessments and promotion of residents through the program.
- 5) To support residents who are experiencing difficulties and organize remediation when needed. (see Resident Evaluation and Appeals Policy\*)
- 6) To receive and review appeals from residents (see Resident Evaluation and Appeals Policy\*)
- 7) To develop and support career counseling through the Neurology program.
- 8) To support residents in stress management.
- 9) To maintain a safe environment for residents to work and learn. (see Resident Safety Policy\* and Supervision of Postgraduate Medical Trainees\*)

\* <http://www.schulich.uwo.ca/medicine/postgraduate/policies/>

## **TEACHING ROUNDS AND ACADEMIC HALF-DAY**

Residents are given protected educational time on Tuesday mornings to attend CNS Grand Rounds and Neurology teaching sessions. Formal teaching rounds also occur on a weekly and monthly basis.

### **CNS Grand Rounds**

CNS Grand Rounds are held on Tuesday mornings at 8:00 am. They are usually located at University Hospital, 3<sup>rd</sup> Floor, in Auditorium A; except for the first Tuesday of the month, when they are held at Victoria Hospital, 2<sup>nd</sup> Floor, North Tower Amphitheatre B2-119. The details of the rounds presentations and the location are E-mailed the previous week and are also available on the CNS web-site.

CNS Grand Rounds are attended by faculty and residents from neurology, neurosurgery, neuroradiology, neuropathology, neuro-oncology, neuro-ophthalmology, nursing and allied health professionals. These interactive presentations may include a neurological case, a neurosurgical case, research presentations, a clinical-pathological presentation, a presentation by a member of the CNS department, or a guest lecturer.

### **Academic Half-Day Teaching**

Academic Half-Day Teaching sessions follow CNS Grand Rounds on Tuesday mornings from 10:30 am to 12:30 pm.

Teaching sessions encompass all neurological disorders, basic neurosciences review, evidence based neurology, neuropathology, ethics, communication skills, managerial skills, quality assurance, roles of collaborative health care professionals, professionalism, and health care advocacy.

These sessions follow a two-year curriculum. The curriculum is designed to follow the requirements as outlined in the Objectives of Training and Specialty Training Requirements in Neurology, including the seven CanMEDS roles.

The sessions are scheduled by the senior residents with faculty teaching (leading) all sessions except for Neurosciences Review teachings which are lead by senior residents and Evidence Based Neurology tutorials which are lead by a junior resident (with faculty support).

### **Other Teaching Rounds: Neurology**

There are weekly and monthly teaching rounds which occur at University Hospital. Residents are expected to attend these when they are on the Neurology CTU, consult service, outpatients, neuroradiology, neuropathology, EMG, and EEG rotations.

- Multiple Sclerosis Rounds: Mondays, 1200-1300, second Monday of each month (LHSC – UH)
- Neuroradiology Rounds: Wednesdays, 0800-0900h, held weekly LHSC - UH
- Neuromuscular Rounds: Wednesdays, 1200-1300h, first Wednesday of each month (LHSC – UH)
- Stroke Rounds: Wednesdays, 1200-1300h, monthly (LHSC – UH)
- Movement Disorder Rounds: Thursdays, 0800-0900h, 2<sup>nd</sup> and 4<sup>th</sup> Thursday (LHSC – UH)
- Neuro-Critical Care Rounds: Thursdays, 0800-0900h, 1<sup>st</sup> and 3<sup>rd</sup> Thursday (LHSC – UH)
- Quality of Care Rounds: Thursdays, 1200-1300h, held bi-monthly (LHSC-UH)
- Physical Diagnosis Rounds: Friday, 1200-1300h, held monthly (LHSC-UH)
- Epilepsy Rounds: Fridays, 0800-0900h, held weekly (LHSC-UH)

**PostGraduate Medical Education Academic Half-Days:**

The Postgraduate Medical Education Office of Western University sponsors educational half-days devoted to topics of general interest to residents. You are strongly encouraged to attend these sessions, which take place on Wednesdays.

## ACADEMIC HALF-DAY CURRICULUM FOR NEUROLOGY UPDATED MAY 2012

The half-day curriculum will be organized around themes. As much as possible, sessions related to the same theme will be delivered over consecutive weeks to ensure continuity of learning.

Each year, two academic half-day spots will be allocated to OSCEs (first Tuesday of November and May) and two more to OSCE review sessions (the week following the OSCE examination). One hour for the short answer written exam (March or April).

Allowing for Christmas and perhaps a cancellation of a few half-days for conferences, CaRMS interviews, etc., the curriculum will consist of 45 half-day teaching sessions per year (90 teaching hours). The entire curriculum will be presented twice during a resident's training (i.e. 225-hour curriculum, repeated every 30 months).

The curriculum will be reviewed yearly by the residency training committee, with adjustments made as the committee sees fit.

### THEME 1: NEURO-OPHTHALMOLOGY/OTOLOGY

#### Core Topics

- Optic nerve disorders (1h)
- Approach to diplopia (1h)
- Nystagmus and other disorders of gaze (1h)
- Transient monocular/binocular vision loss (1h)
- Optic neuropathy/neuritis (1h)
- Interpretation of visual fields (1h)
- Ischemic ocular motor cranial neuropathy (1h)
- Pupil abnormality (1h)
- Approach to dizziness and vertigo (1h)

#### Special Topics

- Basic neuroscience (2h)
  - Visual pathways
  - Control of eye movements
  - Vestibular system
- CanMEDS Scholar (Evidence Based Neurology) (1h)

Total: 10 hours

## THEME 2: NEURO-ONCOLOGY

### Core Topics

- Primary brain and spinal cord tumours (2 hours)
- Metastatic involvement of the nervous system (1 hour)
- Paraneoplastic syndromes (1 hour)
- Neuroradiology of brain tumours (1-2 hrs.)

### Special Topics

- CanMEDS Communicator: “Breaking Bad News” (1-2 hrs.)
- Neuropathology: primary brain tumours (1-2 hrs.)
- Basic neuroscience: molecular biology of brain tumour development (1h)
- CanMEDSs Scholar (Evidence Based Neurology)

Total: 8-10 hours

## THEME 3: PAIN AND HEADACHE

### Core Topics

- Primary headache syndromes - migraine, cluster, tension (2 h)
- Less common headache syndromes – IIH, intracranial hypotension, SUNCT, post-concussive etc. (1h)
- Neuropathic pain and its treatment (1h)
- Cancer pain syndromes (1h)
- CanMEDs Collaborator: Multidisciplinary approach to management of back pain

### Special Topics

- Basic neuroscience (2h)
  - Pain pathways
  - Migraine pathophysiology
  - Pathophysiology of neuropathic pain.
- CanMEDs Scholar (Evidence Based Neurology) (1h)

Total: 8 hours

## THEME 4: INFECTIOUS DISEASES IN NEUROLOGY

### Core Topics

- Bacterial/fungal meningitis (1h)

- Viral and aseptic meningitis (1h)
- Viral encephalitis (1h)
- Neurologic complications of HIV infection (1h)
- Prion diseases, including Creutzfeld-Jacob disease (1h)
- West-nile, Leprosy, brain abscess, syphilis, and other rarely seen but important infectious diseases (1h)
- Medical Microbiology

#### Special Topics

- Neuropathology: Infectious diseases of the nervous system (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)
- CanMEDS Health Advocate: Community health issues related to infectious diseases (eg. West Nile, meningitis) (1h)

Total: 10 hours

### THEME 5: DEMYELINATING DISEASE

#### Core Topics

- Diagnosis and differential diagnosis of multiple sclerosis (1h)
- Management of MS (1h)
- Other demyelinating diseases (1h)

#### Special Topics

- Basic neuroscience: current concepts of MS pathogenesis (1h)
- Basic neuroscience: imaging in demyelinating diseases (1h)
- CanMEDs Scholar (Evidence Based Neurology)
- Neuropathology: MS and other demyelinating diseases (1h)

Total: 7 hours

### THEME 6: NEUROLOGIC COMPLICATIONS OF SYSTEMIC DISEASE

#### Core Topics

- Neurologic complications of cardiac disease and of cardiac procedures (1h)
- Neurologic complications of connective tissue disease (1h)
- Neurologic complications of diabetes (1h)
- Neurologic complications of pituitary and other endocrine disease (1h)
- Neurologic complications of pregnancy (1h)
- Neurotoxicology, including alcohol (1h)

- Nutritional deficiencies (1h)
- Liver disturbance and hepatic encephalopathy (1h)

#### Special Topics

- CanMEDS Communicator: The family meeting – techniques for discussing life-and-death decision-making with families of critically ill patients (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)

Total: 8 hours

### THEME 7: PEDIATRIC NEUROLOGY

#### Core Topics

- Approach to the floppy infant (1h)
- Approach to the child with developmental delay or regression (1h)
- Chromosomal abnormalities and inborn errors of metabolism (1h)
- Neurocutaneous syndromes (1h)

#### Special Topics

- NSR: Developmental milestones, primitive reflexes and their significance (1 h)
- NSR: Neuroembryology – structures, primary neurulation, neuronal migration, stages of CNS development, cortical architecture layers, Brodmann's areas (1-2h)
- Neuropathology: Congenital anomalies of the brain and spinal cord (1h)
- CanMEDS Communicator: Dealing with “difficult” patients and families (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)

Total: 7-8 hours

### THEME 8: NEUROGENETICS

#### Core Topics

- Genetic principles and mechanisms of human disease (2h)
  - Types of inheritance
  - Mitochondrial genetics
  - Genetic heterogeneity
  - Penetrance, other important concepts
- Trinucleotide repeat disorders in neurology (1h)
- CanMEDs Communicator/Professional: Genetic counselling: techniques, bioethics, consent (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)

Total: 5 hours

## THEME 9: CEREBROVASCULAR DISEASE

### Core Topics

- Clinical presentation/ localization of stroke syndromes (1h)
- Management of stroke
  - Acute management, including tPA (1h)
  - Secondary prevention (1h)
- Cardiogenic stroke (1h)
- Less common etiologies (i.e. MELAS/vasculitis/venous thrombosis) (1h)
- Intracerebral hemorrhage (1h)

### Special Topics

- Stroke in the young/children (1h)
- Basic neuroscience: Vascular anatomy of the nervous system (1h)
- Basic neuroscience: consequences of cerebral ischemia (1h)
- CanMEDS Health Advocate: Effective counselling of patients regarding risk factor modification (1h)
- CanMEDs Scholar (Evidence Based Neurology)
- CanMEDs Communicator / Ethics: Management of post stroke neurological patient
- Neuropathology: cerebrovascular disease (1h)
- Best Practice Stroke Guidelines review (SWO Regional Stroke Education Coordinator)

Total: 10 hours

## THEME 10: NEUROMUSCULAR DISEASE

### Core Topics

- Approach to peripheral neuropathy (1-2h)
- AIDP and CIDP (1h)
- Approach to myopathy (1-2h)
- Diseases of the neuromuscular junction and their treatment (1h)
- The myotonias (1h)
- IVIg
- Neuromuscular pearls
- Clinical examination and investigation for autonomic dysfunction (1h)
- Disorders of the autonomic nervous system (1h)
- Management of respiratory failure in neuromuscular disease
- Physiological basis of normal EMG/NCS and common EMG/NCS abnormalities (1 h)

### Special Topics

- Basic neuroscience (2h)
  - Genetics of inherited neuropathies/myopathies
  - Immunopathogenesis of immune-mediated neuropathies
  - Autonomic nervous system
- Neuropathology: muscle and nerve pathology (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)
- CanMEDS Collaborator: Neuromuscular disease & the multidisciplinary team (1h)

Total: 10-12 hours

## THEME 11: MOVEMENT DISORDERS

### Core Topics

- Approach to and differential diagnosis of Parkinsonism (1h)
- Therapy of Parkinson's Disease (1h)
- Hyperkinetic movement disorders
  - Tics, myoclonus and tremor (1h)
  - Chorea and Huntington's disease (1h)
  - The dystonias (1h)
- Acquired and inherited ataxias (1h)

### Special Topics

- Basic neuroscience: Basal ganglia anatomy and physiology (1h)
- Basic neuroscience: Spinocerebellar pathways and disorders (1h)
- Neuropathology of key movement disorders (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)

Total: 9 hours

## THEME 12: EPILEPSY

### Core Topics

- Childhood epilepsies (1h)
- Approach to new-onset seizures in an adult (1h)
- Medical treatment of epilepsy (1h)
  - Rational pharmacotherapy
  - AED pharmacology
- Surgical treatment of epilepsy (1h)
- Status epilepticus (1h)

### Special Topics

- EEG: Basic concepts (1h)

- Basic mechanisms underlying epilepsy and treatment, including the action potential, ion channels, neurotransmitters and epileptogenesis (1-2h)
- Epilepsy and driving (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)

Total: 8 hours

### THEME 13: COGNITIVE NEUROLOGY

#### Core Topics

- Clinical approach to suspected dementia (1h)
- Clinical approach to aphasia (1h)
- Behavioural neurology examination: apraxia, agnosia, etc. (1h)
- Alzheimer's disease (1h)
- Vascular dementia (1h)
- Other dementias – FTD, CBD, DLB (1h)

#### Special Topics

- Neuropathology: the dementias (1h)
- Pathophysiology of the dementias (1h)
- CanMEDs Scholar (Evidence Based Neurology) (1h)
- CanMEDS: Communicator, Health Advocate, Collaborator: Care planning for individuals with dementia (1h)
- CanMEDs Professional: Bioethics around life-sustaining treatment and the demented (1h)

Total: 11 hours

### THEME 14: SLEEP NEUROLOGY

#### Core Topics

- Approach to sleep studies (1h)
- Sleep disorders i.e. parasomnias, narcolepsy, sleep disordered breathing (1h)
- Restless leg syndrome (1h)

Total: 3 hours

### THEME 15: TRAUMA OF THE CENTRAL NERVOUS SYSTEM

#### Core Topics

- Acquired Brain Injury (1 h)
  - Approach to mild and severe brain injury
  - Pathophysiology and management, including seizures

- CanMEDS: Health Advocate: Returning to sports after mild head injury (1 h)
- Spinal cord injury – management and pathophysiology (1 h)
- CanMEDS: Collaborator: Rehabilitation of head injury and spinal cord injury (1 h)

Total: 4 hours

## THEME 16: NEURO-INTENSIVE CARE

### Core Topics

- Diagnosis of Brain Death (1 h)
- Coma (1 h)
  - Post-Hypoxic Coma – acute management, prognostic investigations
  - Metabolic encephalopathy
- Critical Illness Polyneuropathy (1 h)

### Special topics

- CanMEDS Professional/ Communicator: End-of-life and the dying patient discussion with families (1h)

Total: 4 hours

## THEME 15: “ORPHAN” TOPICS

### Core Topics

- Disorders of smell and taste: clinical aspects (1h)
- Approach to disorders of bowel, bladder, and sexual function (1h)
- Clinical disorders of CSF circulation, including hydrocephalus (1h)

### Special Topics

- Basic neuroscience: anatomy/physiology of smell and taste (1h)
- Basic neuroscience: autonomic nervous system (1h)
- Basic neuroscience: CSF pathways (1h)
- Basic neuroscience: Neurotransmitters (Glutamate, GABA, Dopamine, Serotonin, Ach, Opiate)

Total: 10 hours

**CanMEDs Manager Topics**

- Career planning (community neurologists, academic neurologists) (1 h)
- Running an office (1 h)
- Running the inpatient service efficiently (Breedea, Dr. Nicolle, others.) (1 h)
- Transition from Junior Resident to Senior Resident (PGY2-5, Dr. Jenkins) (1 h)

**CanMEDS Professional / Communicator Topics**

- Discussing Do-Not-Resuscitate Orders (1 h)
- Medical error disclosure (1 h)

## CLINICAL ROTATIONS

### TRANSITIONING THROUGH THE YEARS

#### YEAR 1:

Welcome to the Neurology Program!!

The first year of the program is a general year to introduce you to the Neurology program and allow experiences in a broad range of other medical and surgical programs that related to the practice of Neurology and to help prepare you for the MCCQE examination.

In your PGY1 year, you will spend 2 months on the Neurology in-patient CTU. The remainder of the year is spent in other programs, which may include Internal Medicine, Psychiatry, Emergency Medicine, Neuroradiology, Neurosurgery.

The Neurology Speciality Committee of the Royal College has the following required rotations:

Two months of Internal Medicine CTU

One month of Intensive Care Unit

Two months of Neurology CTU

The Neurology program at Western has the following required rotations in PGY1: neuroradiology, psychiatry and neurosurgery.

Electives may be chosen in emergency medicine, internal medicine subspecialties, physical medicine and rehabilitation, and other rotations as deemed appropriate by the program director.

#### YEAR 2:

In the second year residents spend 4 months (blocks) on the Neurology inpatient CTU. The remainder of the year are chosen electives in internal medicine, physical medicine and rehabilitation, neuro-oncology, and other electives as deemed appropriate by the program director.

A list of possible electives will be circulated in the spring (March/ April) of the PGY1 year and you will be asked to choose electives for the remaining 9 blocks.

Over the first 2 years, residents are required by the complete 10 months of rotations in the area of internal medicine.

#### YEAR 3:

Over the third year of the resident program, residents transition to the role of senior resident. The year is divided into four main components – Neurology inpatient CTU, consult service, subspecialty outpatients clinics and urgent neurology clinic. In addition, you will begin your

longitudinal clinic over this year.

Neurology inpatient CTU – Residents are on the CTU service for four months: the first half as a junior resident and then the second half as a senior resident managing the CTU.

Consult Service – Residents are on the inpatient consult service at University Hospital for two months in the PGY3 year. In addition to reviewing consults from the inpatient wards, the consult resident (along with the attending staff) also covers acute stroke cases from the emergency department until 12 noon. All consults are reviewed with the CTU attending in the afternoon. The consult resident, with support from attending staff, also responds to telephone consultations.

Subspecialty Outpatient Clinics – Four months are devoted to outpatient clinics. These clinics are booked directly with consultant and secretaries by the resident. A list of subspecialty clinic times will be provided through by the program administrator (Lisa Baker-Spiller).

Urgent Neurology Clinics – Residents spend two months at the Urgent Neurology Clinic at Victoria Hospital, Zone B, Level 2. In the mornings, new outpatient consults are reviewed, and in the afternoons, inpatient consults are seen at Victoria Hospital.

Longitudinal Clinics – During the third year, each resident will start in the longitudinal clinic. Residents will choose patients from CTU, urgent neurology clinic, or the consult service to follow in this clinic. The clinics are held at UH, 7<sup>th</sup> floor outpatient on the 2<sup>nd</sup> and 4<sup>th</sup> Friday afternoon of each month. Each resident will attend the clinic once every 2 months and will follow their patients in this clinic. Supervising consultants rotate through the clinic. Linda Cole, RN and Dr. Jenkins will help coordinate the clinic.

One month of elective is available in during the third year. This may be used for research, a community elective, an elective in another center, NeuroICU, or any other elective mutually agreed upon by the resident and program director.

#### **YEAR 4 and YEAR 5:**

In the senior years, residents have more flexibility in their program over the last 26 blocks.

The Royal College requires 3 months of neuropsychiatry, 2 months of neuropathology (most residents will do 3 months), 2 months of Neurology inpatient CTU as the senior resident, and one month of research.

Residents will also do 2 to 3 months of EMG/ Neuromuscular clinics; 2 to 3 months of EEG/ Epilepsy clinics; 2 to 3 months of Urgent Neurology Clinic; and 2 to 3 months of consult service. Usually an additional 4 months is spent in subspecialty outpatient clinics.

The remaining blocks may be spent in electives at Western or other academic centres, community electives, additional outpatient time, or research.

Residents do not have night time call duties 6 months prior to the Royal College examination, to allow time to prepare for the examination.

### HOSPITAL AND ROTATION LOCATIONS

The Neurology Clinical Teaching Unit and most of the Neurology Outpatient Clinics are located at University Hospital. Victoria Hospital houses the Urgent Neurology Clinic, Neuro-oncology, Pediatrics, Headache clinics and Neuropathic Pain clinics. In addition, the Cognitive / Behavioural Clinics are located at St. Joseph's Health Care Centre.

	University Hospital	Victoria Hospital	St. Joseph's Hospital
Address	339 Windermere Road London, Ontario	800 Commissioner Road London, Ontario	268 Grosvenor Street London, Ontario
Telephone	519-685-8500	519-685-8500	519-646-6000
Clinical Rotations	Neurology CTU Neurology Outpatient Clinics Medicine CTU Medicine Outpatients Neurology Consult Service Neurosurgery Neuroradiology Neuropathology EMG, EEG rotations	Medicine CTU Medicine Outpatients Urgent Neurology Clinic Neurology Consult Service Pediatric Neurology Neuro-oncology Clinics	Cognitive Neurology Clinics Medicine Outpatient Clinics
Parking	City Wide Parking Passes: UH Parkade – Telephone ext. 32446		
ID Badges	Issued through Customer Support, UH CLL-102 (basement)		
Library	7th Floor Room B7-006	2 <sup>nd</sup> Floor – B wing, outside amphitheatre	

## NEUROLOGY PROGRAM EVALUATIONS AND EXAMINATIONS

### **Observed History and Physical Examinations (STACERS):**

PGY-1 and PGY-2 residents will have clinical skills evaluations (practice oral examinations) once yearly, while residents in the PGY-3, 4, and 5 years will have clinical skills evaluations twice yearly. These evaluations will consist of a history and physical observed by a consultant neurologist, followed by an approximately one-hour oral examination based upon the case. The Program Director will notify the trainee of the month in which the examination needs to be carried out and the faculty member assigned to do the examination. It is the responsibility of the resident to arrange the date and time of the examination with the faculty member and inform the Education Office when this has been arranged.

### **American Academy of Neurology Resident-In-Training (RITE) Examination:**

All residents in the PGY-3, 4 and 5 years will write the annual American Academy of Neurology RITE in March. This is a full day multiple choice examination covering all topics in neurology and basic neurosciences. Residents will receive their scores shortly after this examination, including percentile scores that allow comparison of their performance with other residents at the same level.

### **Western Neurology Short Answer Written Examination:**

Written Examination: All residents will participate in a yearly written short answer written examination held in March or April. This is to model the Royal College style of examination. Residents will receive individual scores within 1 -2 weeks of the examination and the answers will be shared at that time.

### **Observed Standardized Clinical Evaluation (OSCE):**

All residents will participate in an OSCE held twice yearly, on the first Tuesday of November and the first Tuesday of May. Residents will receive individual scores within 1-2 weeks of the OSCE, and each OSCE station will be reviewed with all residents during the following week's academic half day session.

### **Clinical Rotation Evaluations (ITERS):**

Rotations Evaluations: All residents will have verbal mid-rotation evaluations and online written

end-of-rotation evaluations by clinical rotation supervisors.

**Multi-Source Feedback Evaluations:**

Each resident will choose 3 health professionals (nurses, allied health etc) to provide an evaluation on the non-Medical Expert CanMEDS roles. The evaluators will send feedback to Lisa Baker-Spiller who will compile the summative evaluation.

**Evaluations of Teaching at Grand Rounds and Academic Half-Day:**

Residents will receive feedback quarterly from all attendees at Grand Rounds or other teaching rounds. Grand Rounds feedback will include a scoring out of 25 as well as comments. Each year, awards will be given for the top 3 resident Grand Rounds presentations.

**Twice Yearly Meetings with Program Director**

Results of evaluations will be reviewed by the Program Director on a regular basis. Residents will meet with the Program Director twice yearly to formally review these evaluations.

## **HOLIDAY, VACATION, AND CONFERENCES:**

### **Away Times:**

Requests for holiday, vacation and conference time should be submitted to the Education Assistant, who will then refer these to the appropriate person, either the Chief Resident on service or the vacation approver for the given off-service rotation. Vacations should be submitted a minimum of one month prior to the date requested. The request must be approved by the rotation head or the Chief Resident and by the Site Chief before it can be considered approved.

It is expected that some residents will, of necessity, have to work on religious and hospital holidays. The Chief Resident is responsible for ensuring that this “burden” is shared relatively equally by all housestaff. It is not possible for any trainee to be exempted from duty on all religious holidays.

Under normal circumstances, residents are asked not to take holidays during the first two weeks in July or last two weeks of June.

### **Conferences:**

Residents are entitled to 7 days conference leave annually.

Residents are encouraged to use these days to attend either the annual American Academy of Neurology or the Canadian Congress of Neurological Sciences meetings, which hold special courses and scientific sessions.

Other sub-specialty conferences may be attended by the residents on request or when they are involved in clinical or basic research projects and have the opportunity to make presentations of their work.

### **Neurology Program Financial Support for Conferences:**

The Neurology Program provides financial support to the residents to attend ONE annual conference according to the following schedule:

1. For those residents presenting at the conference:
  - up to \$2,500 which includes the cost of the registration, economy flights, hotel, and \$50.00 per diem for food (maximum 4 days)
2. For those not presenting (educational only):
  - up to \$1,500 which includes the cost of the registration, economy flights, hotel, \$50 per diem for food (maximum 4 days)

**Additional Support for Conferences:**

Travel grants are available through the Post-graduate Medical Education Office of Western University. The application must be submitted with a letter of support from the program director and is generally given to individuals who will be presenting at the conference.

Travel award grants are also available from the American Academy of Neurology to attend this conference. This is a competitive grant and an application must be submitted by the program director.

## IMPORTANT POLICIES

### **Western University, Schulich School of Medicine and Dentistry, Postgraduate Medical Education Home Page:**

<http://www.schulich.uwo.ca/medicine/postgraduate/index.php>

The "Students & Learners" link provides policies and procedures on the following important matters:

- Resident Evaluation And Appeals
- Leaves Of Absence And Training Waivers
- Resident Supervision / Health And Safety
- Transfers
- Conduct / Ethics / Professionalism
- Rotations Related (On-Call Policies, Vacation Requests Etc).

### **The College of Physicians and Surgeons of Ontario (Home Page):**

<http://www.cpso.on.ca>

On that site, resident attention is directed particularly to the following:

Under "Policies/ Practice Guide":

- Maintaining Appropriate Boundaries and Preventing Sexual Abuse
- Confidentiality of Personal Health Information
- Consent to Medical Treatment
- Decision-making for End of Life
- Disclosure of Harm
- Physician Behaviour in the Professional Environment
- Blood Borne Pathogens

Under "Policies/Administrative"

- Third Party Reports
- Medical Records
- Mandatory Reporting

**Royal College of Physicians and Surgeons of Canada:**

<http://rcpsc.medical.org>

For those sitting for the Royal College Examinations in Neurology there are deadlines that **must be followed**. It is the responsibility of residents to make themselves aware of these deadlines.

Information can be found at the Royal Colleges website

**Royal College- Specific information with respect to examination:**

<http://rcpsc.medical.org/information/index.php?specialty=145&submit=Select>

- Objectives of Training and Specialty Training Requirements
- Specific Standards of Accreditation for Residency Programs
- Deadlines for assessment of training
- Examination dates
- Accredited residency programs and program directors
- Examination format

## **GOALS AND OBJECTIVES:**

There are rotation-specific learning goals and objectives for every rotation in the Neurology residency program. These are written specifically for the program at Western and cover the 5 years of the residency program.

The goals and objectives are based around the CanMEDS roles and reflect the Objectives of Training and the Specialty requirements of the Royal College of Physicians and Surgeons of Canada.

The goals and objectives are outlined on the following pages. They are also available on-line through the One45 system.

*Go to your One45 home page, go to “handouts /links”, go to “Neurology rotation Objects”.*

The Royal College Objectives of Training for the Neurology residency training and the Specialty Requirements for Neurology are also listed below.

## Objectives for Rotation on the Neurology Clinical Teaching Unit: Senior Resident

### Medical Expert

By the end of the senior rotation, the resident will...

1. Obtain complete histories from patients seen in the emergency department and on the inpatient ward, obtaining a collateral history where necessary
2. Perform appropriate and efficient general and neurological physical examinations
3. Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder
4. Provide accurate anatomical localization for the disease process in question
5. Formulate appropriate differential and provisional diagnoses
6. Develop appropriate investigative, and therapeutic, treatment and general management plans for patients under their care
7. Develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as; the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
8. Demonstrate the ability to independently manage neurological emergencies including the following:
  - a. Acute bacterial meningitis
  - b. Acute encephalitis
  - c. Coma
  - d. Recurrent seizures and status epilepticus
  - e. Acute intracranial haemorrhage
  - f. Acute stroke
  - g. Recurrent transient ischaemic events and threatened stroke
  - h. Incipient transtentorial herniation
  - i. Acute paralytic illness

- j. Impending spinal cord compression
- 9. Perform technical procedures including lumbar puncture, Tensilon® Test, and Dix-Hallpike Test
- 10. Demonstrate the ability to diagnose and manage neurological inpatients at the level of a junior consultant

### Communicator

By the end of the senior rotation, the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Demonstrate effective communication with patients, family and the health care team in the setting of a family conference
3. Anticipate problems of interpretation or expression by patients and their families
4. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
5. Explain the reason for consultations by other physicians or members of the health care team
6. Address the issue of prognosis honestly and sensitively where possible
7. Maintain accurate and up-to-date clinical notes and records for each patient, including admission history and physical notes, daily progress notes, and discharge summaries
8. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
9. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
10. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study

11. Ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

By the end of the senior rotation, the resident will...

1. Consult appropriately and in a timely fashion with other physicians and health care professionals
2. Interact in a collaborative fashion with other members of the health care team to maximize the appropriate use of everyone's skills in caring for the patient.
3. Contribute effectively to interdisciplinary team activities, including attending multidisciplinary team meetings for hospital inpatients and leading such meetings when appropriate
4. Work effectively with resident or medical student colleagues assigned to the Neurology Clinical Teaching Unit to form a collegial and efficient team
5. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness
6. Collaborate appropriately with patient and families on management decisions

#### Manager

By the end of the senior rotation, the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Supervise more junior medical trainees and students in a manner that ensures the efficient and effective delivery of health care for patients
3. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs

4. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
5. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
6. Formulate evidence-based (whenever possible) management plans that take into consideration the seriousness of the illness and the costs and benefits of various diagnostic and therapeutic interventions
7. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

By the end of the senior rotation, the resident will...

1. Counsel patients and others on aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns
2. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases, and make appropriate referrals to such organizations and services
3. Identify opportunities to contribute, as a neurologist, to improving the health of patients and communities
4. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem

#### Scholar

By the end of the senior rotation, the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and residents), other health-care personnel and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education

3. Demonstrate proficiency in critically appraisal of the neurological literature as it relates to the patient diagnosis, investigation, and treatment
4. Participate, when feasible, in clinical or basic-science studies as a member of a research team
5. Present clinical cases and pertinent review of the literature at CNS Grand Rounds

## Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow Trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Demonstrate professional behaviours including punctuality and reliability.
6. Describe how ethical principles guide the practice of medicine

## Objectives for Rotation on the Neurology Clinical Teaching Unit:

### PGY 1 and 2 (Junior Resident)

#### Medical Expert

By the end of the PGY2 year rotation, the resident will...

1. Independently obtain complete histories from patients seen in the emergency department and on the inpatient ward, obtaining a collateral history where necessary
2. Independently perform an appropriate general physical examination and a basic neurological examination.
3. Accurately assess the seriousness of a patient's presenting illness.
4. Be able to evaluate whether a patient's symptoms and signs are the result of an organic or psychological disorder
5. Be able to provide the anatomical localization for the disease process in question
6. Working with support from the senior resident and/or consultant, formulate appropriate differential diagnoses
7. Working with the senior resident and/or consultant, develop appropriate investigative, therapeutic, treatment and general management plans for patients under their care
8. Working with the senior resident and/or consultant, develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as; the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
9. Recognize and provide initial emergency management for the following acute neurological problems:
  - a. Acute bacterial meningitis
  - b. Acute encephalitis
  - c. Coma
  - d. Recurrent seizures and status epilepticus
  - e. Acute intracranial haemorrhage
  - f. Acute stroke

- g. Recurrent transient ischaemic events and threatened stroke
- h. Incipient transtentorial herniation
- i. Acute paralytic illness
- j. Impending spinal cord compression

### Communicator

By the end of the PGY2 year rotation the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. With support from the senior resident and/or consultant, clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. With support from the senior resident and/or consultant, explain the reason for consultations by other physicians or members of the health care team
5. With support from the senior resident and/or consultant, address the issue of prognosis honestly and sensitively where possible
6. Independently maintain accurate and up-to-date clinical notes and records for each patient, including admission history and physical notes, daily progress notes, and discharge summaries
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study

10. With support from the senior and/ or consultant, ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

By the end of the PGY2 rotation, the resident will...

1. Recognize his/her limitations and consult with senior resident and/or Neurology consultant appropriately.
2. Interact in a collaborative fashion with other members of the health care team to maximize the appropriate use of everyone's skills in caring for the patient.
3. Demonstrate an understanding of the reasons to consult with other physicians and health care professionals
4. Work effectively with resident or medical student colleagues assigned to the Neurology Clinical Teaching Unit to form a collegial and efficient team
5. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness
6. Collaborate appropriately with patient and families on management decisions

#### Manager

By the end of the PGY2 rotation the resident will...

1. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
2. Formulate evidence-based (whenever possible) management plans that take into consideration the seriousness of the illness and the costs and benefits of various diagnostic and therapeutic interventions
3. Use information technology to provide optimal patient care and life-long learning opportunities

### Health Advocate

By the end of the PGY2 rotation the resident will...

1. Recognize and respect the diverse cultural, social, biologic, economic, and religious factors that may influence patient health and affect patient interaction with the health care system
2. Demonstrate knowledge and skills in areas of Preventive Medicine and Community Health and the ability to apply these to the problems of individual patients or groups of patients.
3. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases

### Scholar

By the end of the PGY2 rotation the resident will...

1. Formulate a personal plan of study for acquiring the necessary knowledge, skills, and attitudes to successfully achieve the objectives of the Neurology training programme.
2. Demonstrate the ability to critically appraise the neurological literature as it relates to the patient diagnosis, investigation, and treatment
3. With support from the senior resident and consultant, present a clinical case and review of the literature at CNS Grand Rounds

### Professional

By the end of the PGY2 rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the practice of medicine
4. Demonstrate self-awareness, including an awareness of his or her own limitations

5. Show appropriate consideration of the opinions of other members of the health-care team, including fellow Trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved

## Objectives for Outpatient Clinic Rotation for Neurology Residents: PGY 5

### Medical Expert

By the end of this rotation the resident will...

1. Obtain complete histories from patients seen in the outpatient clinic setting, obtaining a collateral history where necessary
2. Perform appropriate and efficient neurological and general examinations
3. Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder
4. Provide accurate anatomical localization for the disease process in question
5. Independently formulate appropriate differential and provisional diagnoses
6. Independently develop appropriate investigative, and therapeutic, treatment and general management plans for patients under their care
7. Independently develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
8. Perform procedures including lumbar puncture, Tensilon® Test, and Dix-Hallpike Test with proficiency

By the end of the 4 months of PGY5 outpatient clinic experience provided during residency training in neurology, the resident will...

1. Demonstrate proficiency at the level of an independent neurologist in evaluating and managing outpatients from all major subspecialty areas of neurology, including patients with multiple sclerosis, epilepsy, neuromuscular disease, headache, pain, neuro-oncology, cognitive neurology, movement disorders, and neurodegenerative disease

### Communicator

By the end of this rotation the resident will...

1. When dealing with patients and their families in the clinic setting, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively
6. Communicate effectively with medical colleagues, including referring physicians, in person, by telephone, and through dictated consultation and follow-up letters
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that clinical notes are up to date, that the risks and benefits of proposed investigations or treatments have been explained to the patient and noted in the record
11. Ensure that informed consent has been obtained and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

During this rotation the resident will...

1. Consult appropriately with other physicians and health care professionals
2. Contribute effectively to interdisciplinary team activities

3. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness
4. Collaborate appropriately with patient and families on management decisions

### Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Develop an approach to the scheduling of clinic patients in a way that suits his or her style of practice and minimizes patient waiting time
3. Identify basic principles of physician billing for medical services
4. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
5. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
6. Use information technology to provide optimal patient care and life-long learning opportunities

### Health Advocate

During this rotation the resident will...

1. Counsel patients and others on aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns
2. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases, and make appropriate referrals to such organizations and services

3. Identify opportunities to contribute, as a neurologist, to improving the health of patients and communities
4. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem
5. Access financial supports for patients when appropriate, including advocating for funding sources to offset medication costs for the patient and advocating for disability income support where needed

### Scholar

By the end of this rotation the resident will...

1. Develop a strategy for maintaining professional competence by various methods of continuing medical education
2. Critically assess the neurological literature as it relates to the patient diagnosis, investigation, and treatment
3. Identify gaps in knowledge, and educational methods by which these gaps may be filled
4. Develop the ability to pose good learning questions relevant to patient care

### Professional

By the end of this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Recognize the ethical principles that guide the practice of neurology
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Demonstrate professional behaviours, including punctuality and reliability

## Objectives for Outpatient Clinic Rotation for PGY 3 Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Obtain complete histories from patients seen in the outpatient clinic setting, obtaining a collateral history where necessary
2. Perform appropriate general and neurological physical examinations
3. Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder
4. Provide accurate anatomical localization for the disease process in question
5. In conjunction with the consultant, formulate appropriate differential and provisional diagnoses
6. In conjunction with the consultant, develop appropriate investigative, and therapeutic, treatment and general management plans for patients under their care
7. In conjunction with the consultant, develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
8. Where appropriate, perform procedures including lumbar puncture, Tensilon® Test, and Dix-Hallpike Test

At the end of the 4 months of PGY3 outpatient clinic experience provided during residency training in neurology, the resident will...

1. Gain experience in evaluating and managing outpatients from all major subspecialty areas of neurology, including patients with multiple sclerosis, epilepsy, neuromuscular disease, headache, pain, neuro-oncology, cognitive neurology, movement disorders, and neurodegenerative disease

### Communicator

By the end of this rotation the resident will...

1. In conjunction with the consultant, communicate effectively with clinic patients and their families, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. In conjunction with the consultant, clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. In conjunction with the consultant, address the issue of prognosis honestly and sensitively where possible
6. Working with the consultant, communicate effectively with medical colleagues, including referring physicians, in person, by telephone, and through dictated consultation and follow-up letters
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that clinical notes are up to date, that the risks and benefits of proposed investigations or treatments have been explained to the patient and noted in the record
11. Ensure that informed consent has been obtained and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

Collaborator

By the end of this rotation the resident will...

1. Working with the consultant, consult appropriately with other physicians and health care professionals
2. Contribute effectively to interdisciplinary team activities
3. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness
4. Collaborate appropriately with patient and families on management decisions

### Manager

By the end of this rotation the resident will...

1. Demonstrate the importance of initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Begin to demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
4. Use information technology to provide optimal patient care and life-long learning opportunities

### Health Advocate

By the end of this rotation the resident will...

1. Demonstrate a knowledge of aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns
2. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases, and make appropriate referrals to such organizations and services

3. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem

#### Scholar

By the end of this rotation the resident will...

1. Critically assess the neurological literature as it relates to the patient diagnosis, investigation, and treatment
2. Identify gaps in knowledge, and educational methods by which these gaps may be filled
3. Develop the ability to pose good learning questions relevant to patient care

#### Professional

By the end of this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Recognize the ethical principles that guide the practice of neurology
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Demonstrate professional behaviours, including punctuality and reliability

## Objectives for Rotation on the Neurology Consult Service – PGY5

### Medical Expert

By the end of the PGY5 year rotation, the resident will...

1. Independently obtain complete histories from patients seen in consultation on the inpatient wards, obtaining a collateral history where necessary
2. Independently perform an appropriate general physical examination and a basic neurological examination.
3. Accurately assess the seriousness of a patient's presenting illness.
4. Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder
5. Be able to provide the anatomical localization for the disease process in question
6. Independently formulate appropriate differential diagnoses
7. Independently develop appropriate investigative, therapeutic, treatment management plans for patients seen in consult
8. Demonstrate appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as; the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
9. Demonstrate the ability to diagnose and manage neurological inpatient consultations at the level of an independent neurologist.
10. Demonstrate the ability to independently manage neurological emergencies including the following:
  - a. Acute bacterial meningitis
  - b. Acute encephalitis
  - c. Coma
  - d. Recurrent seizures and status epilepticus
  - e. Acute intracranial haemorrhage
  - f. Acute stroke

- g. Recurrent transient ischaemic events and threatened stroke
- h. Incipient transtentorial herniation
- i. Acute paralytic illness
- j. Impending spinal cord compression

### Communicator

By the end of the PGY5 year rotation the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Demonstrate effective communication with patients, family, and the health care team in the setting of a family conference
5. Clearly explain the reason for consultations by other physicians or members of the health care team
6. Address the issue of prognosis honestly and sensitively where possible
7. Independently complete an initial consultation note and relevant progress notes, including diagnosis, treatment plan, and outcome of investigations
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

## Collaborator

By the end of the PGY5 rotation, the resident will...

1. Interact in a collaborative fashion with other members of the health care team to maximize the appropriate use of everyone's skills in caring for the patient.
2. Consult appropriately and in a timely fashion with other physicians and health care professionals
3. Work effectively with the consulting medical or surgical service to form a collegial and efficient approach to patient care
4. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and support the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness. This may involve teaching the consulting medical or surgical services about the role and importance of other health care professionals.
5. Collaborate appropriately with patient and families on management decisions.

## Manager

By the end of the PGY5 rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Supervise more junior medical trainees and students in a manner that ensures the efficient and effective delivery of health care for patients
3. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
4. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
5. Formulate evidence-based (whenever possible) management plans that take into consideration the seriousness of the illness and the costs and benefits of various diagnostic and therapeutic interventions

6. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
7. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

By the end of the PGY5 rotation the resident will...

1. Recognize and respect the diverse cultural, social, biologic, economic, and religious factors that may influence patient health and affect patient interaction with the health care system
2. Counsel patients and others on aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns
3. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases, and make appropriate referrals to such organizations and services
4. Identify opportunities to contribute, as a neurologist, to improving the health of patients and communities
5. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem

#### Scholar

By the end of the PGY5 rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and residents), other health-care personnel and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Demonstrate proficiency in critically appraisal of the neurological literature as it relates to the patient diagnosis, investigation, and treatment

4. Participate, when feasible, in clinical or basic-science studies as a member of a research team

#### Professional

By the end of the PGY5 rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including the referring medical or surgical service in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Demonstrate professional behaviours including punctuality and reliability.
6. Show appropriate consideration of the opinions of other members of the health-care team, including the consulting service team in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved

## Objectives for Rotation on the Neurology Consult Service – PGY3

### Medical Expert

By the end of the PGY3 year rotation, the resident will...

1. Independently obtain complete histories from patients seen in consultation on the inpatient wards, obtaining a collateral history where necessary
2. Independently perform an appropriate general physical examination and a basic neurological examination.
3. Accurately assess the seriousness of a patient's presenting illness.
4. Be able to evaluate whether a patient's symptoms and signs are the result of an organic or psychological disorder
5. Be able to provide the anatomical localization for the disease process in question
6. Working with support from the consultant, formulate appropriate differential diagnoses
7. Working with the consultant, develop appropriate investigative, therapeutic, treatment management plans for patients seen in consult
8. Working with the consultant, develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as; the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
9. Recognize and provide initial emergency management for the following acute neurological problems:
  - a. Acute bacterial meningitis
  - b. Acute encephalitis
  - c. Coma
  - d. Recurrent seizures and status epilepticus
  - e. Acute intracranial haemorrhage
  - f. Acute stroke
  - g. Recurrent transient ischaemic events and threatened stroke
  - h. Incipient transtentorial herniation

- i. Acute paralytic illness
- j. Impending spinal cord compression

#### Communicator

By the end of the PGY3 year rotation the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. With support from the consultant, clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. With support from the consultant, explain the reason for consultations by other physicians or members of the health care team
5. With support from the consultant, address the issue of prognosis honestly and sensitively where possible
6. Independently, complete an initial consultation note and relevant progress notes, including diagnosis, treatment plan, and outcome of investigations
7. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
8. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
9. With support from the consultant, ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

By the end of the PGY3 rotation, the resident will...

1. Recognize his/her limitations and consult with the Neurology consultant appropriately.
2. Interact in a collaborative fashion with other members of the health care team to maximize the appropriate use of everyone's skills in delivering excellent care for the patient.
3. Demonstrate an understanding of the rationale for consultation with other physicians and health care professionals
4. Work effectively with the consulting medical or surgical service to form a collegial and efficient approach to patient care
5. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and support the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness. This may involve teaching the consulting medical or surgical services about the role and importance of other health care professionals.
6. Collaborate appropriately with patient and families on management decisions

#### Manager

By the end of the PGY3 rotation the resident will...

1. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
2. Formulate evidence-based (whenever possible) management plans that take into consideration the seriousness of the illness and the costs and benefits of various diagnostic and therapeutic interventions
3. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

By the end of the PGY3 rotation the resident will...

1. Recognize and respect the diverse cultural, social, biologic, economic, and religious factors that may influence patient health and affect patient interaction with the health care system
2. Demonstrate knowledge and skills in areas of Preventive Medicine and Community Health and the ability to apply these to the problems of individual patients or groups of patients.
3. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases

### Scholar

By the end of the PGY3 rotation the resident will...

1. Formulate a personal plan of study for acquiring the necessary knowledge, skills, and attitudes to successfully achieve the objectives of the Neurology training programme.
2. Demonstrate the ability to critically appraise the neurological literature as it relates to the patient diagnosis, investigation, and treatment

### Professional

By the end of the PGY3 rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the practice of medicine
4. Demonstrate self-awareness, including an awareness of his or her own limitations
5. Show appropriate consideration of the opinions of other members of the health-care team, including the consulting service team in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved

## Objectives for Urgent Neurology Clinic Rotation: PGY5

### Medical Expert

By the end of this rotation, the resident will...

1. Obtain complete histories from patients seen in the urgent neurology clinic and from hospital inpatients, obtaining a collateral history where necessary
2. Perform appropriate and efficient physical examinations
3. Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder
4. Provide accurate anatomical localization for the disease process in question
5. Independently formulate appropriate differential and provisional diagnoses
6. Independently develop appropriate investigative, and therapeutic, treatment and general management plans for patients under their care
7. Independently develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
8. Perform technical procedures including lumbar puncture, Tensilon® Test, and Dix-Hallpike Test with proficiency.

At the end of the 2 months of PGY5 urgent neurology clinic experience provided during residency training in neurology, the resident will...

1. Demonstrate proficiency at the level of an independent neurologist in evaluating and managing outpatients in the area of community general neurology practice including syncope, TIA, seizure, peripheral neuropathy, Benign Paroxysmal Positional Vertigo, Bell's palsy, third nerve palsy, headache, and initial diagnosis and management of other neurological diseases (eg. MS, Parkinson's disease, neurodegenerative disorders, neuromuscular disease).

## Communicator

By the end of this rotation the resident will...

1. When dealing with patients and their families, in the clinic or inpatient setting, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible
6. Communicate effectively with all medical colleagues, including referring physicians in all settings, in person, by telephone, and through clinic or inpatient records, letters and discharge summaries.
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that clinical notes are up to date, that the risks and benefits of proposed investigations or treatments have been explained to the patient and noted in the record
11. Ensure that informed consent has been obtained and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

## Collaborator

By the end of this rotation the resident will...

1. Consult appropriately with other physicians and health care professionals
2. Contribute effectively to interdisciplinary team activities
3. Work effectively with resident or medical student colleagues assigned to the urgent neurology clinic to form a collegial and efficient team
4. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness
5. Collaborate appropriately with patient and families on management decisions

### Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Supervise more junior medical trainees and students in a manner that ensures the efficient and effective delivery of health care for patients
3. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
4. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
5. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
6. Use information technology to provide optimal patient care and life-long learning opportunities
7. Develop an approach to the scheduling of clinic patients in a way that suits his or her style of practice and minimizes patient waiting time
8. Identify basic principles of physician billing for medical services

## Health Advocate

By the end of this rotation the resident will...

1. Counsel patients and others on aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns
2. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases, and make appropriate referrals to such organizations and services
3. Identify opportunities to contribute, as a neurologist, to improving the health of patients and communities
4. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem
5. Access financial supports for patients when appropriate, including advocating for funding sources to offset medication costs for the patient and advocating for disability income support where needed

## Scholar

By the end of this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Critically assess the neurological literature as it relates to the patient diagnosis, investigation, and treatment
4. Participate, when feasible, in clinical or basic-science studies as a member of a research team

## Professional

By the end of this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Recognize the ethical principles that guide the practice of neurology
5. Demonstrate self-awareness, including recognition of his or her own limitations

## Objectives for Urgent Neurology Clinic Rotation: PGY3

### Medical Expert

By the end of this rotation, the resident will...

1. Obtain complete histories from patients seen in the urgent neurology clinic and from hospital inpatients, obtaining a collateral history where necessary
2. Perform appropriate and efficient physical examinations
3. Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder
4. Provide accurate anatomical localization for the disease process in question
5. In consultation with the consultant, formulate appropriate differential and provisional diagnoses
6. In consultation with the consultant, develop appropriate investigative, and therapeutic, treatment and general management plans for patients under their care
7. In consultation with the consultant, develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
8. Perform technical procedures including lumbar puncture, Tensilon® Test, and Dix-Hallpike Test

At the end of the 2 months of PGY3 urgent neurology clinic experience provided during residency training in neurology, the resident will...

1. Gain experience in evaluating and managing outpatients in the area of community general neurology practice including syncope, TIA, seizure, peripheral neuropathy, Benign Paroxysmal Positional Vertigo, Bell's palsy, third nerve palsy, headache, and initial diagnosis and management of other neurological diseases (eg. MS, Parkinson's disease, neurodegenerative disorders, neuromuscular disease).

## Communicator

By the end of this rotation the resident will...

1. In conjunction with the consultant, communicate effectively with clinic patients and families responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. In conjunction with the consultant, clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. In conjunction with the consultant, address the issue of prognosis honestly and sensitively where possible
6. Working with the consultant, communicate effectively with all medical colleagues, including referring physicians in all settings, in person, by telephone, and through clinic or inpatient records, letters and discharge summaries.
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that clinical notes are up to date, that the risks and benefits of proposed investigations or treatments have been explained to the patient and noted in the record
11. Ensure that informed consent has been obtained and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

## Collaborator

By the end of this rotation, the resident will...

1. Working with the consultant, consult appropriately with other physicians and health care professionals
2. Contribute effectively to interdisciplinary team activities
3. Work effectively with resident or medical student colleagues assigned to the urgent neurology clinic to form a collegial and efficient team
4. Recognize that the optimal treatment of many patients with neurologic disorders requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing patients with neurologic illness
5. Collaborate appropriately with patient and families on management decisions

#### Manager

By the end of this rotation the resident will...

1. Demonstrate the importance of initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Supervise more junior medical trainees and students in a manner that ensures the efficient and effective delivery of health care for patients
3. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
4. Begin to demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
5. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

By the end of this rotation the resident will...

1. Demonstrate a knowledge of aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns
2. Recognize the role of lay organizations and community services in providing support for individuals with neurological diseases, and make appropriate referrals to such organizations and services
3. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem

#### Scholar

By the end of this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and off service residents) and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Critically assess the neurological literature as it relates to the patient diagnosis, investigation, and treatment
4. Participate, when feasible, in clinical or basic-science studies as a member of a research team

#### Professional

By the end of this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved

4. Recognize the ethical principles that guide the practice of neurology
5. Demonstrate self-awareness, including recognition of his or her own limitations

### **Objectives for Rotation in Community Neurology**

#### Medical Expert

By the completion of this rotation, the resident will...

1. Obtain an accurate medical history from a patient presenting for neurological consultation
2. Perform an efficient, detailed, and accurate neurological examination on a patient presenting for neurological consultation
3. Provide anatomic localization of the presenting symptoms and signs
4. Formulate an appropriate differential diagnosis based upon the clinical presentation
5. Outline a plan for investigation and management of a patient presenting with neurological symptoms and/or signs
6. Demonstrate relevant technical skills including lumbar puncture, Tensilon test, Dix-Hallpike maneuver

#### Communicator

By the completion of this rotation, the resident will...

1. Demonstrate effective and accurate information gathering skills through history taking
2. Demonstrate empathy and effective listening skills in interactions with patients and their families
3. Deliver information to patients and their families about suspected or confirmed diagnoses, investigation results, management plans, risks of treatment, and prognosis in a humane and understandable manner
4. Communicate effectively with colleagues and other health care professionals

5. Produce and maintain clear and accurate written records of clinical encounters, including the dictation of consultation and follow-up notes to send to referring physicians

#### Collaborator

By the completion of this rotation the resident will...

1. Demonstrate effective consultation and collaboration with other health professionals in the community
2. Recognize the role of the community neurologist and the responsibilities of the community neurologist toward family physicians and other referring physicians
3. Work effectively within an interprofessional team of health care professionals in a community
4. Recognize when referral for subspecialty neurology consultation is appropriate

#### Manager

By the end of this rotation the resident will...

1. Recognize and analyze costs and benefits of available diagnostic procedures and therapeutic interventions to facilitate allocation of finite resources
2. Develop a practice management plan appropriate to the community setting, including scheduling of office patients, management of office staff, maintenance of patient records, and billing for services
3. Recognize factors important in negotiating with local health administrators for the support necessary to sustain a successful community neurology practice

#### Health Advocate

By the end of this rotation the resident will...

1. Identify important community health issues in the population served

2. Mobilize community resources as appropriate to meet the health needs of individual patients
3. Counsel patients appropriately regarding modification of risk factors for neurological disease
4. Describe how the community neurologist may participate in advocacy activities within the community served, such as working with community organizations dedicated to assisting those with neurological disease
5. Recognize and respect the diverse cultural, social, and religious factors that may influence patient health and affect patient interaction with the health care system

### Scholar

By the end of this rotation, the resident will...

1. Recognize the need to engage in lifelong learning in community practice, and begin to develop a plan for maintaining professional competence while in community practice
2. Participate actively in educational activities through the local medical and neurological communities
3. Critically assess the neurological literature and apply evidence-based medicine principles to community practice
4. Identify gaps in his or her knowledge and develop appropriate learning questions and strategies to fill these gaps
5. Appreciate the advantages and disadvantages of community neurology as a career option, thus facilitating career planning

### Professional

During this rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the approach to managing patients with neurological diseases
4. Demonstrate self-awareness, including an awareness of his or her own limitations
5. Describe methods of ensuring patient privacy and confidentiality in a community office setting and in a hospital setting

## Objectives for EMG/ Neuromuscular Rotation

### Medical Expert

By the end of this rotation the resident will...

1. Describe the clinical features of major neuromuscular disorders.
2. Obtain appropriate and complete histories from patients with neuromuscular complaints seen in the outpatient neuromuscular clinic and EMG laboratory
3. Perform appropriate and efficient physical examinations, with particular emphasis on the examination of the peripheral nervous system
4. Provide accurate anatomical localization for the neuromuscular disease process in question, specifically being able to localize problems to muscle, neuromuscular junction, nerve, plexus, root, anterior horn cell or spinal cord pathology
5. Formulate appropriate differential diagnoses, and select appropriate investigations to evaluate the differential diagnoses
6. Construct, based upon clinical assessment, an appropriate electrodiagnostic approach specific to the clinical presentation
7. Describe the basic principles and techniques of nerve conduction studies and needle electromyography
8. Describe the basic principles and techniques of other specialized studies including repetitive nerve stimulation, single fibre EMG, blink responses, somatosensory evoked potentials and visual evoked potentials
9. Explain the physiology of normal nerve conduction in myelinated and unmyelinated fibres, neuromuscular transmission, and excitation-contraction coupling, and identify disease processes where this normal physiology is disturbed
10. Recognize the characteristic physical examination findings and electrophysiologic findings observed in myelopathies, motor neuron disease, radiculopathies, plexopathies, focal and generalized neuropathies, disorders of neuromuscular transmission, and myopathies
11. Recognize when electrophysiologic results do not fit the clinical picture and may represent technical errors, normal variations, or incidental findings
12. Formulate appropriate management plans for common neuromuscular diseases.

### Communicator

By the end of this rotation the resident will...

1. Communicate effectively with patients and their families in the neuromuscular clinic and EMG laboratory, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation by patients and their families
3. Clearly explain the performance of electrophysiologic studies, the reasons for their performance, and their risks, complications, and potential benefits
4. Communicate effectively with medical colleagues, including referring physicians, in person, by telephone, and through dictated consultation letters and EMG reports
5. Request appropriate electrodiagnostic studies by providing sufficient information on an EMG requisition to permit selection of studies
6. Communicate courteously, clearly, effectively, and appropriately with EMG technicians and other members of the health-care team

### Collaborator

During this rotation the resident will...

1. Recognize and respect the roles of other health care professionals involved in the care of patients with neuromuscular disease, including EMG technicians, nurse clinicians, physiotherapists, occupational therapists, speech-language pathologists, social workers, nutritionists, and clinic and laboratory support staff
2. Recognize the importance of close collaboration with EMG technicians when designing studies specific for an individual patient

### Manager

By the end of this rotation the resident will...

1. Identify principles of quality assurance important in the management of an EMG laboratory
2. Identify measures required to ensure patient safety in the EMG laboratory setting
3. Identify basic principles of physician billing for medical services, including billing for the technical and professional components of electrodiagnostic services
4. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
5. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
6. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

During this rotation the resident will...

1. Recognize the role of community services and lay organizations in providing support for individuals with neuromuscular diseases, and make appropriate referrals to such organizations and services
2. Advocate effectively for timely access to specific electrodiagnostic, imaging, and muscle biopsy studies based upon the urgency of the presenting problem
3. Recommend studies beyond those requested by the referring physicians when appropriate to provide optimal care

#### Scholar

During this rotation the resident will...

1. Develop a strategy for maintaining professional competence by various methods of continuing medical education
2. Critically assess the neurological literature as it relates to patient diagnosis, investigation, and treatment

3. Identify gaps in knowledge, and educational methods by which these gaps may be filled, including review of key readings relevant to an understanding of basic principles of neurophysiology and electrophysiology
4. Develop the ability to pose good learning questions relevant to patient care
5. Attend and participate in formal and informal team learning sessions, including EMG lab educational sessions, daily review of EMG studies, and neuromuscular rounds

### Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Recognize the ethical principles that guide the practice of neurology, including principles of informed consent for electrodiagnostic tests and specific treatments (such as IVIG and medications)
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Demonstrate professional behaviours, including punctuality and reliability

## Objectives for Rotation in Epilepsy and Electroencephalography (EEG)

### Medical Expert

By the end of this rotation the resident will...

1. Describe the basic principles of EEG recording, and discuss the indications for and limitations of EEG as a diagnostic tool
2. Obtain complete histories from patients with epilepsy, recognizing the importance of collateral history
3. Perform appropriate and efficient physical examinations on patients presenting with seizures
4. Correlate clinical features with EEG findings in patients with epilepsy
5. Recognize the EEG features that are characteristic of common epilepsy syndromes
6. Recognize EEG features characteristic of certain non-epileptic disorders, including herpes simplex encephalitis, hepatic encephalopathy, and Creutzfeldt-Jakob disease
7. Demonstrate proficiency in the medical management of epilepsy, including:
  - a. Principles of anticonvulsant use
  - b. Choice of drug
  - c. Recognition of drug pharmacology and side effects
  - d. Principles of monitoring anticonvulsant treatment
8. Identify indications for surgical management of epilepsy, and describe an approach to the workup of potential surgical candidates

### Communicator

By the end of this rotation the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person

2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic and therapeutic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible
6. Maintain accurate and up-to-date clinical notes and records for each patient
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

During this rotation the resident will...

1. Contribute effectively to interdisciplinary team activities on the epilepsy service
2. Work effectively with resident or fellow colleagues assigned to the epilepsy service
3. Recognize and respect the roles of other health care providers involved in the care of patients with epilepsy, including EEG technicians, neurosurgeons, psychologists, research nurses, and clinic support staff.

#### Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
4. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with epilepsy
5. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

During this rotation the resident will...

1. Recognize the role of lay organizations and community services in providing support for individuals with epilepsy, and make appropriate referrals to such organizations and services
2. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem
3. Identify important biologic, psychological, social, cultural, and economic influences on the presentation and management of epilepsy

#### Scholar

During this rotation the resident will...

1. Develop a strategy for maintaining professional competence by various methods of continuing medical education
2. Critically assess the neurological literature as it relates to the diagnosis, investigation, and treatment of epilepsy
3. Participate, when feasible, in clinical or basic-science studies as a member of a research team

4. Participate in Epilepsy Rounds, including presenting and discussing interesting cases
5. Attend EEG reading sessions to improve familiarity with normal and abnormal EEG patterns

## Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Recognize the ethical principles that guide the practice of neurology
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Be punctual and reliable in all professional activities

## Objectives for Rotation in Neurocritical Care

### Medical Expert

By the completion of this rotation, the resident will...

1. Demonstrate proficiency in the recognition, assessment, investigation, and management of patients with life-threatening disorders of the nervous system, including the following:
  - a. Comatose states
  - b. Raised intracranial pressure
  - c. Status epilepticus
  - d. Acute myelopathy
  - e. Neurogenic respiratory failure
  - f. Acute peripheral nerve disease including Guillain Barre syndrome
  - g. Failure to wean from the ventilator
  - h. Severe head injury
  - i. Intracranial hemorrhage
  - j. CNS infections
  - k. Neurological consequences of systemic illness, including transplant-related neurological syndromes
2. Demonstrate the steps and procedures involved in the determination of brain death
3. Develop a strategy for offering prognostic advice and treatment recommendations for critically ill patients where decisions regarding withdrawal of life support arise
4. Recognize common abnormalities on cranial CT and MRI scans
5. Correctly interpret CSF findings in critically ill patients
6. Recognize the indications for and limitations of diagnostic tests used in neurocritical care including EEG, continuous EEG monitoring, evoked responses, CSF analysis, and neuro-imaging

### Communicator

During this rotation the resident will...

1. Demonstrate empathy and effective listening skills in interactions with patients and their families
2. Deliver information to patients and their families about suspected or confirmed diagnoses, investigation results, management plans, risks of treatment, and prognosis in a humane and understandable manner
3. Communicate effectively with colleagues and other health care professionals
4. Produce and maintain clear and accurate written records of clinical encounters
5. Participate in and/or lead discussions with the families of critically ill patients when life-and-death decision-making is required

### Collaborator

During this rotation the resident will...

1. Demonstrate understanding of the roles of the different health care professionals involved in the care of critically ill patients
2. Demonstrate respectful interactions with other members of the health care team
3. Appropriately consult with other health care professionals to optimize care for critically ill patients
4. Recognize the role of the neurologist within the larger context of a multidisciplinary care team for an individual with a critical illness

### Manager

By the completion of this rotation the resident will...

1. Recognize and analyze the costs and benefits of available diagnostic procedures and therapeutic interventions to facilitate allocation of finite resources to patients with critical illnesses

2. Manage time effectively, including providing consultation on patients with life-threatening neurological illness in a timely manner, and prioritizing patient assessments based on the acuity of the presenting problem

#### Health Advocate

By the completion of this rotation the resident will...

1. Recognize and respect the diverse cultural, social, and religious factors that may influence patient health and affect patient interaction with the health care system
2. Recognize important risk factors for serious neurological disease and counsel patients and their families accordingly to reduce recurrence risks where possible
3. Demonstrate awareness of the medical and societal issue of brain death and organ donation, and develop a strategy for introducing this issue in family discussion when necessary

#### Scholar

During this rotation, the resident will...

1. Participate actively in organized educational activities including rounds and team meetings
2. Critically assess the neurological literature and apply evidence-based principles to the investigation and management of patients with critical illness
3. Identify gaps in his or her knowledge and develop appropriate learning questions and strategies to fill these gaps

#### Professional

During this rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.

2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the approach to managing patients with life-threatening neurological diseases, including principles related to surrogate decision-making for critically ill patients unable to speak for themselves
4. Demonstrate self-awareness, including an awareness of his or her own limitations

## Objectives for Rotation in Stroke for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Obtain complete histories from patients presenting with stroke-related symptoms in the emergency department and in stroke or TIA clinics, obtaining a collateral history where necessary
2. Perform appropriate and efficient physical examinations on patients presenting with stroke-related symptoms
3. Identify and provide anatomic localization for the common symptoms and syndromes of stroke and transient ischemic attack
4. Distinguish the different pathological subtypes of stroke based upon clinical and radiological features
5. Describe the vascular supply to the central nervous system, and relate clinical stroke symptoms and syndromes to disruptions to this vascular supply
6. Discuss the principles of thrombolysis for acute stroke, including its indications and contraindications, and develop a protocol for screening patients for thrombolysis and for delivering tPA to appropriate candidates and providing appropriate monitoring and follow-up
7. Discuss the role of the following interventions for acute stroke:
  - a. Endovascular treatment
  - b. Surgical treatment for intracerebral hemorrhage
  - c. Surgical and medical management of subarachnoid hemorrhage

### Communicator

By the end of this rotation the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person

2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic and therapeutic procedures (including thrombolysis), the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible
6. Maintain accurate and up-to-date clinical notes and records for each patient, including admission history and physical notes, daily progress notes, and discharge summaries
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

During this rotation the resident will...

1. Contribute effectively to interdisciplinary stroke team activities
2. Work effectively with resident or fellow colleagues assigned to the stroke team
3. Recognize and respect the roles of other health care providers involved in the care of patients with stroke, including psychiatrists, physiotherapists, occupational therapists, speech-language pathologists, social workers, research nurses, and clinic support staff.

#### Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
4. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
5. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

During this rotation the resident will...

1. Demonstrate understanding of principles of secondary stroke prevention, including the role of anti-thrombotic agents, vascular risk factor management, and lifestyle modification
2. Counsel patients and their families on aspects of stroke prevention
3. Recognize the role of lay organizations and community services in providing support for individuals with stroke, and make appropriate referrals to such organizations and services
4. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem
5. Recognize the role of the neurologist in advocating for timely access to acute stroke care, and describe opportunities for reducing barriers to such access, including education at the community level

#### Scholar

During this rotation the resident will...

1. Develop a strategy for maintaining professional competence by various methods of continuing medical education
2. Critically assess the neurological literature as it relates to the diagnosis, investigation, and treatment of cerebrovascular disease
3. Participate, when feasible, in clinical or basic-science studies as a member of a research team

### Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Recognize the ethical principles that guide the practice of neurology, including demonstrating detailed understanding of the informed consent process as it applies to acute stroke care
4. Demonstrate self-awareness, including recognition of his or her own limitations
5. Be punctual and reliable in all professional activities

## Objectives for Rotation in Pediatric Neurology

### Medical Expert

By the end of this rotation the resident will...

1. Obtain a relevant history from a child and/or the child's parent or caregiver when presented with a child with neurological symptoms
2. Perform an appropriate neurological examination on a child, taking into account the effect of the changing normal neurodevelopmental baseline
3. Perform a developmental assessment on a child presenting with neurological symptoms
4. Develop evidence-based approaches to the investigation and management of children presenting with:
  - a. Headache
  - b. Altered level of consciousness
  - c. Paroxysmal disorders, including seizures and their mimics
  - d. Developmental delay and regression
  - e. Hypotonia in infancy
  - f. Ataxia
  - g. Hemiplegia, monoplegia, paraplegia, and quadriplegia
  - h. Movement disorders
  - i. Disorders of vision and ocular motility
  - j. Sensory and autonomic disturbances
  - k. Lower brainstem and cranial nerve dysfunction
5. Develop evidence-based diagnostic and management strategies for common diseases in pediatric neurology, including:
  - a. Epilepsy
  - b. Stroke in childhood
  - c. Hydrocephalus

- d. Metabolic disorders
  - e. Neuromuscular diseases such as Duchenne and other muscular dystrophies
  - f. Pediatric migraine
  - g. Tourette's syndrome and other childhood movement disorders
  - h. Neurocutaneous syndromes, including neurofibromatosis I and II, Sturge-Weber syndrome, and tuberous sclerosis
  - i. Meningitis, encephalitis, and other CNS infections
  - j. Inherited neuropathies, including Charcot-Marie-Tooth
6. Describe the principles of rehabilitation involved in the management of the brain-injured child
  7. Identify important differences in the pharmacotherapy of children versus that of adults presenting with neurological diseases

#### Communicator

By the end of this rotation the resident will...

1. When dealing with children and their families, in the clinic or inpatient setting, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible

6. Communicate effectively with all medical colleagues, including referring physicians in all settings, in person, by telephone, and through clinic or inpatient records, letters and discharge summaries.
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen

#### Collaborator

During this rotation the resident will...

1. Recognize and respect the roles of the multidisciplinary team members involved in providing care for children with neurological illnesses, including physicians, nursing staff, clinical nurse specialists, physiotherapists, occupational therapists, social workers, psychologists, music and art therapists, pharmacists, and clerical and support staff
2. Consult appropriately with other physicians and health care professionals
3. Contribute effectively to interdisciplinary team activities, providing leadership where appropriate

#### Manager

During this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem

4. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for children with neurological diseases
5. Use information technology to provide optimal patient care and life-long learning opportunities

#### Health Advocate

By the end of this rotation the resident will...

1. Counsel patients and families on aspects of prevention of neurological disorders, including risk factors modification
2. Provide genetic counseling regarding inherited neurological diseases
3. Recognize the role of lay organizations and community services in providing support for children with neurological diseases, and make appropriate referrals to such organizations and services
4. Identify opportunities to contribute, as a neurologist, to improving the health of patients and communities
5. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem

#### Scholar

By the end of this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients

2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Critically assess the neurological literature as it relates to the patient diagnosis, investigation, and treatment

## Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Recognize the ethical principles that are especially relevant when providing care to children, including principles of consent to treatment in the pediatric population
5. Demonstrate self-awareness, including recognition of his or her own limitations

## Objectives for Rotation in Neuropathology

Medical Expert

By the end of this rotation the resident will...

1. Demonstrate appropriate knowledge of the gross anatomy of the brain and spinal cord, including identification of the following structures on gross specimens:
  - a. Major fissures, gyri, sulci, and lobes of the brain
  - b. Circle of Willis and its branches
  - c. Cranial nerves 1-12
  - d. Midbrain, pons, medulla
  - e. Pituitary stalk and optic chiasm
  - f. Mamillary bodies, pineal gland, and colliculi
  - g. Foraminae of Magendie and Luschka
  - h. Major divisions of the cerebellum
  - i. Cerebral and cerebellar peduncles
  - j. Ventricular system
  - k. Olives and pyramids
  - l. Anterior and posterior nerve roots and dorsal root ganglia
  - m. Gracile and cuneate fasciculi
  - n. Anterior spinal artery
  - o. Spinal cord, its cervical and lumbar enlargements, conus medullaris, filum terminale
2. Identify the meninges, their attachments to brain and spinal cord, and the associated dural sinuses
3. Describe the venous drainage of the brain
4. Identify the major bones of the skull, the sutures, the major foraminae and fissures, and the neurological structures associated with them

5. Identify the following structures on sectioned, fixed brain:
  - a. The ventricles and choroid plexuses
  - b. Components of the basal ganglia
  - c. Amygdala
  - d. Hippocampal formation
  - e. Major commissures and white matter tracts
  - f. Lateral geniculate body
  - g. Calcarine cortex
  - h. Locus ceruleus
  - i. Dentate nucleus of the cerebellum and the vermis and tonsils
  - j. Inferior olivary nuclei
  - k. Mamillary bodies, fornices, pineal gland
  - l. Pyramids
  - m. Cerebral and cerebellar peduncles
  - n. Territories of blood supply of major cerebral arteries
  - o. Cranial nerves
6. Identify on fixed sections of spinal cord:
  - a. The level from which the section was taken
  - b. Anterior and posterior horns
  - c. Intermediolateral cell columns
  - d. Substantia gelatinosa, gracile and cuneate fasciculi, major tracts
7. Demonstrate knowledge of the microscopic anatomy of the brain, including:
  - a. Identification of neurons, oligodendrocytes, astrocytes, microglia, ependymal cells, anterior pituitary cells, and choroid plexus based upon microscopic appearance
  - b. Identification of various tissues based on microscopic appearance, including
    - i. Cerebellar cortex

- ii. 6-layer cerebral cortex
  - iii. hippocampal formation
  - iv. substantia nigra
  - v. occipital cortex
  - vi. retina
  - vii. anterior horn cells, dorsal root ganglion, spinal cord
  - viii. anterior and posterior pituitary
  - ix. skeletal muscle
  - x. peripheral nerve
8. Describe the utility of the following techniques for examining the central and peripheral nervous system and muscle:
- a. Hematoxylin and eosin
  - b. Nissl stain
  - c. Golgi methods
  - d. Myelin stains
  - e. Silver stains
  - f. Congo red
  - g. Histochemical staining of muscle
  - h. Immunohistochemistry
  - i. Teased fibre preparations of peripheral nerve
  - j. In-situ hybridization techniques
  - k. Electron microscopy
9. Demonstrate understanding of the developmental anatomy of the brain and spinal cord, and its application to congenital malformations
10. Recognize the gross and histologic appearance and features of the following:
- a. Open and closed head trauma
  - b. Cerebral herniations

- c. Spinal cord trauma
  - d. Cerebral edema
  - e. Cerebral infarction
  - f. Atheromatous lesions of carotid and intracranial vessels
  - g. Subarachnoid hemorrhage and various types of cerebral aneurysms
  - h. Vasculitis and arteritis
  - i. Intracerebral hemorrhage
  - j. HIV and AIDS and its effects on the central nervous system
  - k. Meningitis, bacterial and otherwise
  - l. Viral and other encephalitides
  - m. Brain and spinal abscess and subdural empyema
  - n. Wernicke's encephalopathy
  - o. Subacute combined degeneration of the spinal cord
  - p. Multiple sclerosis
  - q. Primary and secondary tumors of the brain, spinal cord, meninges, pituitary, and cranial and peripheral nerves
  - r. Anoxic cerebral injury
  - s. Epilepsy, including mesial temporal sclerosis
  - t. Degenerative diseases of the nervous system, including Alzheimer's disease, Parkinson's disease, motor neuron disease, multiple systems atrophy
  - u. Primary muscle and nerve diseases
  - v. Common congenital malformations of the brain and spinal cord
11. Demonstrate proficiency in the following:
- a. Chart review to extract pertinent details and write a good clinicopathologic correlation protocol
  - b. Brain and spinal cord removal at autopsy
  - c. Cutting and displaying preserved brain and spinal cord to detect and describe common gross pathologic changes

### Communicator

By the end of this rotation the resident will...

1. Prepare written reports of neuropathologic examinations that offer concise descriptions of relevant pathologic changes and clear neuropathologic diagnoses
2. Provide accurate verbal reports of neuropathologic examinations to referring physicians when necessary

### Collaborator

During this rotation the resident will...

1. Demonstrate understanding of the roles of the different members of the neuropathology team, including physicians, laboratory technicians, and clerical and support staff
2. Demonstrate respectful interactions with other members of the neuropathology team
3. Work appropriately with other physicians (including neurologists and neurosurgeons) to ensure the best care for patients requiring neuropathology service.

### Manager

During this rotation the resident will...

1. Recognize and analyze the costs and benefits of available diagnostic procedures in neuropathology to facilitate optimal allocation of finite resources to patients with neurological illnesses
2. Manage time effectively, including prioritizing interpretation of neuropathology studies based on the acuity of the presenting problem

### Health Advocate

By the end of this rotation the resident will...

1. Recognize opportunities for health advocacy within the field of neuropathology, including advocating for adequate resources to meet the needs of patients and referring physicians
2. Appreciate the role of the neuropathologist in advocating for the best approach to diagnosis for patients, including discussing cases with referring physicians or advocating for additional studies based upon results of initial studies

### Scholar

By the end of this rotation the resident will...

1. Participate actively in organized educational activities and teaching rounds
2. Critically assess the literature and apply evidence-based principles to the use of neuropathologic techniques in the diagnosis of neurological illness
3. Identify gaps in his or her knowledge and develop appropriate learning questions and strategies to fill these gaps

### Professional

During this rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the approach to neuropathology, including an understanding of consent for autopsy and/or use of tissue samples
4. Demonstrate self-awareness, including an awareness of his or her own limitations



## Objectives for Rotation in Neuroradiology

### Medical Expert

By the end of this rotation, the resident will...

1. Identify the detailed normal anatomy of the brain, skull, and spine, as seen on plain x-ray, computerized axial tomogram and magnetic resonance images, and extracranial and intracranial arterial and venous systems, as seen on angiography.
2. Interpret changes in the plain x-ray, MRI and CT imaging of the neuraxis by stating a most probable and differential diagnosis of the common neurological conditions that produce such changes.
3. Discuss the techniques and limitations of the various common protocols for neuroimaging including plain x-rays, MRI and CT imaging of neuraxis and its appendages.
4. Discuss the techniques, risks, and interpretation of cerebral and spinal angiography.
5. Recognize and treat reactions to radiographic contrast material.

### Communicator

By the end of this rotation the resident will...

1. Provide succinct clinical summaries for appropriate neuroimaging protocol planning and interpretation.
2. Produce, with the assistance of a neuroradiologist, concise written reports of the results of neuroradiological procedures.
3. Provide accurate verbal reports of neuroradiologic procedures to referring physicians in emergency situations

### Collaborator

By the completion of this rotation the resident will...

1. Demonstrate understanding of the roles of the different members of the neuroradiology team
2. Demonstrate respectful interactions with other members of the neuroradiology team
3. Work appropriately with other physicians (including neurologists and neurosurgeons) to ensure the best care for patients requiring neuroimaging

#### Manager

By the completion of this rotation the resident will...

1. Recognize and analyze the costs and benefits of available diagnostic procedures in neuroradiology to facilitate optimal allocation of finite resources to patients with neurological illnesses
2. Manage time effectively, including prioritizing imaging procedures for patients with neurological symptoms based on the acuity of the presenting problem

#### Health Advocate

By the completion of this rotation, the resident will...

1. Recognize opportunities for health advocacy within the field of neuroradiology, including advocating for adequate resources to meet the imaging needs of patients with neurological symptoms
2. Appreciate the role of the neuroradiologist in advocating for the best imaging for patients, including discussing cases with referring physicians or advocating for additional imaging based upon results of initial studies

#### Scholar

During this rotation, the resident will...

1. Participate actively in organized educational activities and teaching rounds
2. Critically assess the neuroradiologic literature and apply evidence-based principles to

the imaging of patients with neurological symptoms and signs

3. Identify gaps in his or her knowledge and develop appropriate learning questions and strategies to fill these gaps

#### Professional

During this rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the approach to imaging patients with neurological signs and symptoms, including the process of obtaining informed consent for procedures and tests
4. Demonstrate self-awareness, including an awareness of his or her own limitations

## Objectives for Neurology Longitudinal Clinic

### Medical Expert

By the end of this rotation the resident will...

1. Demonstrate ability to obtain accurate medical histories from patients presenting for neurological consultation
2. Perform an efficient, detailed, and accurate neurological examination on a patient presenting for neurological consultation
3. Provide anatomic localization of the presenting symptoms and signs
4. Formulate an appropriate differential diagnosis based upon the clinical presentation
5. Outline a plan for investigation and management of a patient presenting with neurological symptoms and/or signs
6. Demonstrate an organized and effective approach to the long-term follow-up of patients with neurological diseases, including:
  - a. Anticipating and managing side effects of treatment
  - b. Identifying alternative treatment approaches when initial lines of treatment are ineffective or poorly tolerated
  - c. Monitoring patients with serial directed clinical examination, supplemented as necessary with imaging or laboratory tests
  - d. Recognizing new symptoms or signs that may require a revision of the original diagnostic impression

### Communicator

By the end of this rotation the resident will...

1. Demonstrate effective and accurate information gathering skills through history taking
2. Demonstrate empathy and effective listening skills in interactions with patients and their families

3. Deliver information to patients and their families about suspected or confirmed diagnoses, investigation results, management plans, risks of treatment, and prognosis in a humane and understandable manner
4. Communicate effectively with colleagues and other health care professionals
5. Produce and maintain clear and accurate written records of clinical encounters, including the dictation of consultation and follow-up notes to send to referring physicians

#### Collaborator

During this rotation the resident will...

1. Demonstrate effective consultation and collaboration with other health professionals
2. Work effectively within an interprofessional team of health care professionals in providing care for patients with chronic neurological illnesses
3. Recognize when referral to other health professionals, including other physicians, physiotherapists, occupational therapists, speech-language pathologists, social workers, psychologists, and others is appropriate for patients with chronic neurological illnesses
4. Recognize when referral for subspecialty neurology consultation is appropriate

#### Manager

During this rotation the resident will...

1. Recognize and analyze costs and benefits of available diagnostic procedures and therapeutic interventions to facilitate allocation of finite resources
2. Develop a practice management plan that includes scheduling of office patients, maintenance of patient records, and billing for services
3. Manage time effectively to balance career demands and personal responsibilities and needs
4. Identify appropriate situations where patients can or should be discharged from the practice

### Health Advocate

By the end of this rotation the resident will...

1. Mobilize community resources as appropriate to meet the health needs of individual patients
2. Counsel patients appropriately regarding modification of risk factors for neurological disease
3. Recognize and respect the diverse cultural, social, biologic, economic, and religious factors that may influence patient health and affect patient interaction with the health care system

### Scholar

By the end of this rotation the resident will...

1. Recognize the need to engage in lifelong learning in neurological practice, and begin to develop a plan for maintaining professional competence
2. Critically assess the neurological literature and apply evidence-based medicine principles to practice
3. Identify gaps in his or her knowledge and develop appropriate learning questions and strategies to fill these gaps

### Professional

During this rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.

3. Describe how ethical principles guide the approach to managing patients with neurological diseases
4. Demonstrate self-awareness, including an awareness of his or her own limitations
5. Describe methods of ensuring patient privacy and confidentiality in an office setting and in a hospital setting

## Objectives for Research Rotation

*Research projects are completed over years PGY2 to 5. All residents are required to complete one scholarly project over the residency period. One month of research block is scheduled for the senior (PGY3, 4 or 5) years, but more blocks of elective time may be used for research up to a maximum of 6 months.*

### Communicator

1. Present a completed research project, including design, results and conclusions, in at least one scientific presentation (Resident Research Day, CNSF or other scholarly meeting).

### Collaborator

1. Interact in a collaborative fashion with the research supervisor to develop a research design, and carry out the research project.
2. Contribute effectively to the presentation materials for the research project (this may include a oral presentation, poster, or manuscript).

### Manager

1. Take responsibility for initiating and sequencing activities of the research plan and project implementation in a timely fashion.
2. Utilize personal time and energy effectively to balance other residency responsibilities and the research project.
3. Set priorities for the timing of the implementation of the research project.

## Scholar

1. Participate in clinical or basic-science studies as a member of a research team
2. Develop a research question, in conjunction with the research supervisor.
3. Review the literature using critical appraisal skills to support your research hypothesis.
4. Write a research proposal which may be used to apply for ethics submission and/or grant funding (grant funding is not a requirement of the research objects).
5. Implement a research project, with support from the research supervisor.
6. Analysis the study results with support from the research supervisor.
7. Interpret the findings of the study.
8. Present the research in a scholarly forum.

## Professional

1. Demonstrate professional attitudes including integrity and honesty as it relates to medical research.
2. Describe how ethical principles guide the research process.

## Objectives for Rotation in Neurosurgery for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Describe the indications for, and provide a basic description of the performance of, the following neurosurgical procedures:
  - a. Craniotomy for tumor
  - b. Brain biopsy (open and stereotactic)
  - c. Craniotomy for aneurysm
  - d. Epilepsy surgery, including awake craniotomy
  - e. Ventriculoperitoneal shunt
  - f. Lumbar and cervical discectomy
  - g. Carotid endarterectomy
  - h. Carpal tunnel release
  - i. Nerve and muscle biopsy
  - j. Craniotomy or burr hole procedures for trauma
2. Identify important complications of common neurosurgical procedures
3. Outline the principles of management for the following neurosurgical emergencies:
  - a. Intracerebral hemorrhage
  - b. Subarachnoid hemorrhage
  - c. Acute hydrocephalus
  - d. Acute cerebellar infarction
  - e. Acute spinal cord compression
  - f. Acute cauda equina compression
  - g. Craniocerebral trauma
  - h. Spinal cord and spinal column trauma

4. Discuss the pathophysiology of increased intracranial pressure, recognize its clinical presentation, develop an adequate differential diagnosis for a patient presenting with increased intracranial pressure, and demonstrate proficiency in its management
5. Develop a clinical approach to the following scenarios, including the development of a differential diagnosis and an evidence-based plan for investigation and management:
  - a. Bilateral weakness, including that due to spinal cord injury, spinal tumors, cervical spondylolytic myelopathy, cervical disc herniation, epidural abscess, and spinal AVM
  - b. Unilateral or focal weakness, including that due to carpal tunnel syndrome, other peripheral nerve lesions, radiculopathy, brain tumors, intracerebral hemorrhage, and acute stroke
  - c. Bilateral numbness, including that due to spinal cord tumor or syringomyelia
  - d. Focal or unilateral numbness, including that due to carpal tunnel syndrome, transient ischemic attacks, and partial seizures
  - e. Anosmia, including that due to craniocerebral trauma and olfactory groove meningioma
  - f. Visual loss, including that due to optic sheath meningioma, optic nerve or chiasmal glioma, and carotid ophthalmic aneurysm
  - g. Diplopia, including that due to posterior communicating artery aneurysm
  - h. Altered hearing and vertigo, including that due to acoustic neuroma, other cerebellopontine angle tumors, and glomus tumors
  - i. Ataxia and gait disturbance, including that due to cerebellar infarction, hemorrhage, or neoplasm or to hydrocephalus
  - j. Dementia with a surgically treatable etiology, including normal pressure hydrocephalus and chronic subdural hematoma
  - k. Coma, including that due to intracerebral or subarachnoid hemorrhage or craniocerebral trauma
6. Identify indications for surgical management in neurological diseases including Parkinson's disease, epilepsy, and chronic pain syndromes

Communicator

By the end of this rotation the resident will...

1. When dealing with patients and their families, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible
6. Maintain accurate and up-to-date clinical notes and records for each patient, including admission history and physical notes, daily progress notes, and discharge summaries
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that informed consent has been obtained for procedures or treatments and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

#### Collaborator

During this rotation the resident will...

1. Consult appropriately with other physicians and health care professionals
2. Contribute effectively to interdisciplinary team activities, including attending multidisciplinary team meetings for hospital inpatients and leading such meetings when appropriate

3. Work effectively with resident or medical student colleagues assigned to the Neurosurgical Service to form a collegial and efficient team
4. Recognize and respect the role of other health care professionals (neurosurgeons, neuroradiologists, neuropathologists, physiatrists, clinical nurse specialists, ward and OR nurses, occupational therapists, physiotherapists, speech-language pathologists, pharmacists, social workers, and clerical staff) in managing patients requiring neurosurgical treatment

### Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
4. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurosurgical diseases
5. Use information technology to provide optimal patient care and life-long learning opportunities

### Health Advocate

During this rotation the resident will...

1. Counsel patients and others on aspects of prevention of neurosurgical disorders, including risk factors, and genetic and environmental concerns
2. Recognize the role of lay organizations and community services in providing support for individuals with neurosurgical diseases, and make appropriate referrals to such organizations and services

3. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem
4. Counsel patients regarding a return-to-work plan following neurosurgical procedures

#### Scholar

During this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Critically assess the neurosurgical literature as it relates to patient diagnosis, investigation, and treatment

#### Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Recognize the ethical and medicolegal principles that guide the practice of neurosurgery, including principles of informed consent for procedures, emergency consent, and surrogate decision-making
5. Demonstrate self-awareness, including recognition of his or her own limitations
6. Be punctual and reliable in all professional activities



## Objectives for Neuro-Oncology Rotation

### Medical Expert

By the end of this rotation, the resident will...

1. Obtain complete histories from patients seen in the neuro-oncology clinic and, as required, on the hospital in-patient unit, obtaining a collateral history where necessary
2. Perform appropriate and efficient physical examinations
3. Provide accurate anatomical localization for the disease process in question
4. Develop appropriate investigative, therapeutic, and general management plans for patients under their care
5. Develop appropriate clinical judgment in formulating an investigative and therapeutic plan which takes into account matters such as the patient's age, general health, risks and costs of investigative procedures, risks and costs of therapeutic interventions, and epidemiology of the disease
6. Demonstrate understanding of the clinical, radiologic, and pathologic features of the most common primary brain tumours, including low grade glioma, anaplastic glioma, glioblastoma, CNS lymphoma, meningioma, and schwannoma.
7. Demonstrate understanding of the usual clinical presentation and the radiologic and pathologic features of metastatic tumours affecting the brain
8. Develop familiarity with the management approach to primary and secondary tumours of the brain, including the role of surgery, radiation, and chemotherapy
9. Recognize the clinical presentation of acute spinal cord compression and plan an appropriate strategy for investigation and management of this situation
10. Recognize the clinical presentation of leptomeningeal involvement by cancer, and plan an appropriate strategy of investigation and management for this situation
11. Recognize important neurologic complications of cancer and its treatment, including brachial and lumbosacral plexopathy, paraneoplastic syndromes, and chemotherapy-induced neuropathy
12. Identify the indications for anticonvulsant use in patients with brain tumours, and describe appropriate dosing guidelines and side effect concerns for common anticonvulsant medications

13. Identify the indications for corticosteroid use in patients with brain tumours, and describe possible side effects of their use

## Communicator

By the end of this rotation the resident will...

1. When dealing with patients and their families, in the clinic or inpatient setting, communicate effectively and regularly, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible
6. Communicate effectively with all medical colleagues, including referring physicians in all settings, in person, by telephone, and through clinic or inpatient records, letters and discharge summaries.
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team
9. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
10. Ensure that clinical notes are up to date, that the risks and benefits of proposed investigations or treatments have been explained to the patient and noted in the record
11. Ensure that informed consent has been obtained and that the requisitions for investigations or consultations have been filled out clearly, concisely, legibly, and factually

## Collaborator

During this rotation the resident will...

1. Consult appropriately with other physicians and health care professionals, recognizing in particular the roles of the neurosurgeon, radiation oncologist, and neuro-oncologist/medical oncologist in the management of patients with brain tumours
2. Contribute effectively to interdisciplinary team activities
3. Recognize that the optimal treatment of many patients with brain tumours requires a team approach, and understand the role of other health care professionals (occupational therapists, physiotherapists, speech-language pathologists, social workers) in managing such patients
4. Make appropriate use of palliative care services and home care services for patients with brain tumours and other neurologic complications of cancer

## Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
4. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with neurological diseases
5. Use information technology to provide optimal patient care and life-long learning opportunities

## Health Advocate

During this rotation the resident will...

1. Recognize the role of lay organizations and community services in providing support for individuals with brain tumours, and make appropriate referrals to such organizations and services
2. Advocate effectively for timely access to investigations, consultations, and treatment interventions for patients based upon the urgency of the presenting problem
3. Advocate appropriately for financial coverage for patients requiring non-formulary medications or chemotherapy

## Scholar

During this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Critically assess the neuro-oncology literature as it relates to the patient diagnosis, investigation, and treatment
4. Participate, when feasible, in clinical or basic-science studies as a member of a research team
5. Describe the consent process related to clinical trials participation

## Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures

3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Recognize the ethical principles that guide the practice of neuro-oncology
5. Demonstrate self-awareness, including recognition of his or her own limitations

## **Objectives for Rotation in General Internal Medicine for Neurology Residents**

### **Medical Expert**

By the end of this rotation the resident will...

1. Demonstrate proficiency in assessment of patients presenting with undifferentiated medical complaints and problems, including:
  - a. Eliciting a relevant history
  - b. Performing an appropriate physical examination
  - c. Employing diagnostic tests appropriately
2. Develop evidence-based management approaches to common medical illnesses, as well as less common but remediable conditions
3. Demonstrate effective, integrated management of multiple medical problems in patients with complex illnesses
4. Perform common procedures used in the diagnosis and management of medical patients, including:
  - a. ECG interpretation
  - b. Central line insertion
  - c. Bone marrow aspiration/biopsy
  - d. Thoracentesis
  - e. Lumbar puncture
  - f. Paracentesis

g. Joint aspiration

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories from patients with medical illnesses
2. Demonstrate effective presentation of clinically relevant information at the bedside
3. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
4. Produce clear and concise consultation notes that communicate effectively with referring physicians and colleagues
5. Develop skills in presenting and discussing medical illness-related topics at teaching and patient care rounds

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of medical patients
2. Recognize and respect the roles of the various team members, including other physicians, nursing staff, respiratory therapists, social workers, occupational therapists, physiotherapists, pharmacists, nutritionists, and support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate

2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, and an awareness of the resources available to assist in paying for those aspects of care for which patients are financially responsible
5. Demonstrate effective time management to achieve balance between career and personal responsibilities

## Health Advocate

By the end of this rotation the resident will...

1. Identify important determinants of health, including psychosocial, economic, and biologic
2. Adapt patient assessment and management based on health determinants
3. Recognize the importance of preventative strategies in patients with medical illness or risk factors for medical illness
4. Demonstrate appropriate attention to prevention counseling in patient encounters
5. Advocate where appropriate for timely patient access to tests or consultation, based upon the acuity of the presenting problem

## Scholar

By the end of this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
2. Demonstrate the ability to generate clinical questions related to patient care and utilize and analyze available resources to develop and implement evidence-based solutions to such questions
3. Demonstrate adequate knowledge of the basic sciences relevant to patient care, including physiology, pathophysiology, biochemistry, and pharmacology

4. Develop a strategy for maintaining professional competence by various methods of continuing medical education
5. Critically assess the medical literature as it relates to diagnosis, investigation, and treatment of cardiovascular diseases

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society
3. Demonstrate understanding of the ethical underpinnings of medical and research practice, including the ethics surrounding consent to treatment and end-of-life care
4. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
5. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
6. Demonstrate self-awareness, including recognition of his or her own limitations
7. Demonstrate professional behaviours including punctuality and reliability

## Objectives for Rotation in Cardiology for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Develop evidence-based approaches to the investigation and management of patients presenting with:
  - a. Chest pain
  - b. Heart failure/dyspnea
  - c. Disturbances of cardiac rhythm
  - d. Hypotension/shock/cardiac arrest
  - e. Hypertensive crisis
2. Develop evidence-based management strategies for the following diseases:
  - a. Acute myocardial infarction
  - b. Unstable angina
  - c. Acute pulmonary edema and chronic heart failure
  - d. Cardiac arrest/ life-threatening arrhythmias
  - e. Disorders of cardiac rhythm and conduction
  - f. Shock/hypotension
  - g. Hypertensive urgency/emergency
  - h. Common forms of valvular heart disease
  - i. Endocarditis
  - j. Pericardial diseases
  - k. Atherosclerosis
3. Demonstrate proficiency in the following procedures:
  - a. Clinical examination of the cardiovascular system

- b. ECG interpretation
  - c. Chest Xray interpretation as it pertains to cardiovascular disease
  - d. Resuscitative skills according to ACLS guidelines
  - e. Arterial and venous catheterization
4. Identify the indications for, limitations of, and risks associated with the following:
- a. Holter monitor/loop recorder
  - b. Exercise ECG – stress test
  - c. Echocardiography
  - d. Myocardial perfusion imaging and radionuclide angiography
  - e. Cardiac catheterization and angiography
  - f. Revascularization strategies
5. Recognize the neurological complications of cardiovascular diseases and of cardiac procedures

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories from patients with cardiovascular disease
2. Demonstrate effective presentation of clinically relevant information at the bedside
3. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
4. Produce clear and concise consultation notes that communicate effectively with referring physicians and colleagues
5. Develop skills in presenting and discussing cardiac topics at teaching and patient care rounds

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of cardiovascular patients
2. Recognize and respect the roles of the various team members, including invasive and noninvasive cardiologists, cardiac surgeons, nursing staff, technicians in various cardiologic services, respiratory therapists, social workers, occupational therapists, physiotherapists, pharmacists, nutritionists, and clinic support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate
2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, and an awareness of the resources available to assist in paying for those aspects of care for which patients are financially responsible

## Health Advocate

By the end of this rotation the resident will...

1. Identify social, genetic, and economic factors that predispose to or exacerbate cardiovascular disease
2. Recognize the importance of preventative strategies in cardiovascular disease, particularly as they relate to:
  - a. Modification of risk factors for atherosclerosis including smoking, hypertension, diabetes, and hyperlipidemia

- b. Prevention of cardiac thromboembolism
  - c. Recognition of the importance of identifying and treating hypertension to prevent complications including MI, stroke, renal dysfunction, heart failure
  - d. Antibiotic prophylaxis to prevent endocarditis
  - e. Secondary prevention of asymptomatic LV dysfunction and congestive heart failure
3. Demonstrate appropriate attention to prevention counseling in patient encounters
  4. Advocate where appropriate for timely patient access to tests or consultation, based upon the acuity of the presenting problem

## Scholar

By the end of this rotation the resident will...

1. Demonstrate understanding of key basic science principles relevant to the function of the cardiovascular system, including:
  - a. Physiology of the cardiac cycle
  - b. Normal cardiac rhythm/conduction
  - c. Determinants of myocardial oxygen demand
  - d. Pharmacology of cardioactive drugs
  - e. Pathophysiology of common cardiovascular diseases including atherosclerosis
2. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
3. Develop a strategy for maintaining professional competence by various methods of continuing medical education
4. Critically assess the medical literature as it relates to diagnosis, investigation, and treatment of cardiovascular diseases

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society, including requirements to inform various licensing authorities regarding patients where the severity of their cardiac disease imposes physical limitations that impact occupational or driving safety
3. Demonstrate understanding of the ethical underpinnings of providing care for patients with cardiovascular diseases, including the ethics surrounding consent to treatment
4. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
5. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
6. Demonstrate self-awareness, including recognition of his or her own limitations
7. Demonstrate professional behaviours including punctuality and reliability

## Objectives for Rotation in Emergency Medicine for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Demonstrate proficiency in assessment of patients presenting with undifferentiated complaints and problems, including:
  - a. Eliciting a relevant history
  - b. Performing an appropriate physical examination
  - c. Employing diagnostic tests appropriately
2. Develop an approach to the assessment, investigation, and emergency management of patients presenting with:
  - a. Fever
  - b. Dizziness and vertigo
  - c. Weakness
  - d. Confusion
  - e. Decreased level of consciousness
  - f. Seizures
  - g. Headache
  - h. Dyspnea
  - i. Chest pain
  - j. Syncope
  - k. Nausea and vomiting
  - l. Abdominal pain
  - m. Gastrointestinal bleeding
  - n. Diarrhea or constipation

- o. Jaundice
  - p. Vaginal bleeding and acute pelvic pain
  - q. Back pain
  - r. Orthopedic trauma
  - s. Wound management issues
  - t. Intoxication
  - u. Acute psychiatric symptoms
3. Develop familiarity with common emergency procedures, demonstrating proficiency if possible with the following:
    - a. Suturing
    - b. Casting
    - c. Foreign body removal
    - d. Venous access
    - e. Chest tube placement
    - f. Intubation
  4. Distinguish problems requiring urgent care from those requiring emergent care, and develop speed and efficiency in assessments of those patients with particularly acute problems
  5. Recognize the typical presentations of patients with neurological illnesses requiring emergent care, including status epilepticus, acute stroke syndromes, infectious diseases of the CNS, and acute neuromuscular syndromes

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories in an efficient manner from patients presenting to the emergency department
2. Anticipate problems of interpretation or expression by patients and their families
3. Demonstrate effective presentation of clinically relevant information at the bedside

4. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
5. Explain the reason for consultations by other physicians or members of the health care team
6. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
7. When requesting investigative procedures, ensure that adequate information is provided about the patient and the reasons for the investigation to the person who will be performing or reporting the study
8. Maintain clear and concise written records that accurately reflect the clinical encounter

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of patients in the emergency department
2. Recognize and respect the roles of the various team members, including other physicians, nursing staff, respiratory therapists, social workers, and support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate
2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, and an awareness of the resources available to assist in paying for those aspects of care for which patients are financially responsible

5. Demonstrate effective time management to achieve balance between career and personal responsibilities
6. Assign priority to patient care tasks taking into account the acuity of the presenting problem

## Health Advocate

By the end of this rotation the resident will...

1. Identify important determinants of health, including psychosocial, economic, and biologic
2. Adapt patient assessment and management based on health determinants
3. Recognize the importance of preventative strategies, and demonstrate appropriate attention to prevention counseling in patient encounters
4. Advocate where appropriate for timely patient access to tests or consultation, based upon the acuity of the presenting problem

## Scholar

By the end of this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
2. Demonstrate the ability to generate clinical questions related to patient care and utilize and analyze available resources to develop and implement evidence-based solutions to such questions
3. Demonstrate adequate knowledge of the basic sciences relevant to patient care, including physiology, pathophysiology, biochemistry, and pharmacology
4. Develop a strategy for maintaining professional competence by various methods of continuing medical education
5. Critically assess the medical literature as it relates to emergency medicine
6. Participate actively in Emergency Medicine Grand Rounds and journal clubs

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society
3. Demonstrate understanding of the ethical underpinnings of medical practice, including the ethics surrounding consent to treatment in the emergency setting
4. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
5. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
6. Demonstrate self-awareness, including recognition of his or her own limitations
7. Demonstrate professional behaviours including punctuality and reliability

## Objectives for Rotation in Hematology for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Develop evidence-based approaches to the investigation and management of patients presenting with
  - a. Anemia
  - b. Polycythemia
  - c. Thrombocytopenia
  - d. Thrombocytosis

- e. Leukocytosis
  - f. Neutropenia
  - g. Pancytopenia
  - h. Lymphadenopathy/splenomegaly
  - i. Suspected venous thromboembolism
  - j. Suspected bleeding disorder
2. Develop evidence-based management strategies for the following diseases:
- a. Iron-deficiency anemia
  - b. Megaloblastic anemia
  - c. Anemia of chronic disease
  - d. Thalassemia
  - e. Sickling disorders
  - f. Autoimmune hemolytic anemia
  - g. Microangiopathic hemolytic anemia
  - h. Immune thrombocytopenia
  - i. Chronic and acute leukemias
  - j. Polycythemia vera and primary thrombocytosis
  - k. Myelodysplastic syndromes
  - l. Aplastic anemia
  - m. Lymphomas and myeloma
  - n. Deep vein thrombosis and pulmonary embolism
  - o. Bleeding disorders
3. Recognize common neurological complications of hematologic disorders, including thrombosis or hemorrhage affecting the nervous system
4. Demonstrate proficiency in the following procedures:
- a. Clinical examination of superficial lymph nodes
  - b. Clinical examination of the spleen

- c. Bone marrow aspiration and biopsy
- d. Interpretation of the complete blood count and blood smear
5. Demonstrate appropriate use of hypercoagulability screening, particularly as it applies to patients presenting with stroke
6. Identify appropriate use of blood transfusion products and appreciate potential complications of transfusion

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories from patients with hematologic disease
2. Demonstrate effective presentation of clinically relevant information at the bedside
3. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
4. Produce clear and concise consultation notes that communicate effectively with referring physicians and colleagues
5. Develop skills in presenting and discussing hematologic topics at teaching and patient care rounds

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of hematologic patients
2. Recognize and respect the roles of the various team members, including nurse-clinicians, pharmacists, palliative care team members, and clinic support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate
2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, and an awareness of the resources available to assist in paying for those aspects of care for which patients are financially responsible

## Health Advocate

By the end of this rotation the resident will...

1. Identify social, genetic, and economic factors that predispose to or exacerbate hematologic disease
2. Recognize the importance of preventative strategies in hematologic disease
3. Demonstrate appropriate attention to prevention counseling in patient encounters

## Scholar

By the end of this rotation the resident will...

1. Demonstrate understanding of key basic science principles from biochemistry and physiology that underlie the normal function of the blood system
2. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
3. Develop a strategy for maintaining professional competence by various methods of continuing medical education

4. Critically assess the hematologic literature as it relates to patient diagnosis, investigation, and treatment

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society
3. Demonstrate understanding of the ethical underpinnings of providing care for patients with hematologic disease, including the ethics surrounding consent to transfusion of blood products and the ethical principles underlying decision-making for end-of-life care in patients with hematologic disease
4. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
5. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
6. Demonstrate self-awareness, including recognition of his or her own limitations
7. Demonstrate professional behaviours including punctuality and reliability

## Objectives for Rotation in Infectious Disease for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Develop evidence-based approaches to the investigation and management of patients presenting with:
  - a. Fever
  - b. Leukocytosis
  - c. Septic shock
  - d. Stiff neck and headache
  - e. Heart murmurs
  - f. Lymphadenitis/lymphadenopathy
  - g. Soft tissue inflammation
  - h. Inflamed joints
  - i. Cough and sputum production
  - j. Embolic lesions
  - k. Painful throat, ears, or sinuses
2. Develop evidence-based management strategies for the following diseases:
  - a. Fever of unknown origin
  - b. Septicemia
  - c. Meningitis
  - d. Encephalitis
  - e. Pneumonia, bronchitis
  - f. Mediastinitis
  - g. Endo-or pericarditis

- h. Intraabdominal sepsis
  - i. Hepatitis
  - j. Osteomyelitis and septic arthritis
  - k. HIV infection and AIDS
  - l. Viral syndromes
  - m. Infections in immunosuppressed patients
  - n. Pharyngitis, sinusitis, otitis
  - o. Soft tissue infections
  - p. Sexually transmitted diseases
3. Recognize the neurologic complications of infectious diseases including HIV, Lyme disease, West Nile virus, syphilis
  4. Demonstrate proficiency in the following procedures:
    - a. Interpretation of microbiology laboratory investigations including stains, cultures, serology
    - b. TB skin test
    - c. Monitoring HIV infection with laboratory tests

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories from patients with infectious diseases
2. Demonstrate effective presentation of clinically relevant information at the bedside
3. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
4. Produce clear and concise consultation notes that communicate effectively with referring physicians and colleagues
5. Develop skills in presenting and discussing infectious disease topics at teaching and patient care rounds

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of infectious disease patients
2. Recognize and respect the roles of the various team members, including infection control nurses, pharmacists, clinical microbiology laboratory staff, and clinic support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate
2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, including the costs of antibiotics and infection control procedures

## Health Advocate

By the end of this rotation the resident will...

1. Identify social, genetic, and economic factors that predispose to or exacerbate infectious disease
2. Recognize the importance of preventative strategies in infectious disease, including the prophylaxis of certain communicable diseases
3. Demonstrate appropriate attention to prevention counseling in patient encounters

4. Recognize the advocacy role of the infectious disease physician in controlling infectious diseases in hospitals, communities, and populations through methods such as advocating vaccinations, contact tracing in certain illnesses, use of prophylactic antibiotics for contacts of infected individuals where appropriate, and counseling to communities regarding methods of reducing the risk of transmission of infection

## Scholar

By the end of this rotation the resident will...

1. Demonstrate understanding of key basic science principles including microbial virulence factors and host defense mechanisms
2. Demonstrate understanding of the pharmacology of selected antimicrobial agents
3. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
4. Develop a strategy for maintaining professional competence by various methods of continuing medical education
5. Critically assess the medical literature as it relates to patient diagnosis, investigation, and treatment in infectious diseases

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society
3. Demonstrate understanding of the ethical underpinnings of providing care for patients with infectious disease, including the ethics surrounding consent to investigation and treatment as well as ethical issues related to managing patients with HIV infection
4. Identify diseases that are reportable to the Ministry of Health, and recognize the societal responsibility involved in such reporting
5. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role

6. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
7. Demonstrate self-awareness, including recognition of his or her own limitations
8. Demonstrate professional behaviours including punctuality and reliability

## Objectives for Rotation in Rheumatology for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Perform an organized, comprehensive MSK screening examination
2. Demonstrate those components of the MSK appropriate for the identification of:
  - a. Ankylosing spondylitis
  - b. Lumbar disc disease with radiculopathy
  - c. Fibromyalgia
  - d. IP and MCP capsular distension, median nerve compression, deQuervain's tenosynovitis, flexor tendon nodules
  - e. Medial and lateral elbow epicondylitis, elbow joint capsular distension, olecranon bursitis, rheumatoid nodules
  - f. Frozen shoulder, supraspinatus tendonitis, subacromial bursitis, rotator cuff tear
  - g. Hip joint disease, trochanteric bursitis, meralgia paresthetica
  - h. Knee joint effusions, patellofemoral dysfunction, ligamentous disease of the knee, bursitis at the knee
  - i. Achilles tendonitis, plantar fasciitis, posterior tibial tenosynovitis, MTP inflammation
3. Recognize the neurologic complications of common rheumatologic illnesses including rheumatoid arthritis, systemic lupus erythematosus, Sjogren's syndrome, scleroderma, and osteoarthritis
4. Describe the settings where the following investigations are appropriate:
  - a. Synovial fluid analysis
  - b. RF, ANA, anti-DNA, anti-ENA, uric acid
  - c. Plain Xrays

- d. Bone scan
  - e. MSK CT scan
  - f. MSK MRI scan
5. Detect and describe characteristic Xray findings in patients with:
- a. Rheumatoid arthritis
  - b. Osteoarthritis
  - c. CPPD
  - d. Gout
  - e. Psoriatic arthritis
  - f. Ankylosing spondylitis
6. Identify the features on history, examination, and laboratory investigation that permit diagnosis of:
- a. Osteoarthritis
  - b. Rheumatoid arthritis
  - c. SLE
  - d. Psoriatic arthritis
  - e. Fibromyalgia
  - f. Gout
  - g. Pseudogout
  - h. Palindromic rheumatism
  - i. Septic arthritis
  - j. Polymyalgia rheumatica
7. Outline a treatment approach for patients with:
- a. New onset rheumatoid arthritis
  - b. Recurrent gouty arthritis
  - c. Fibromyalgia
  - d. Osteoarthritis of the knee

- e. Acute low back pain

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories from patients with rheumatologic disease
2. Demonstrate effective presentation of clinically relevant information at the bedside
3. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
4. Produce clear and concise consultation notes that communicate effectively with referring physicians and colleagues
5. Develop skills in presenting and discussing rheumatologic topics at teaching and patient care rounds

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of rheumatologic patients
2. Recognize and respect the roles of the various team members, including occupational therapists, physiotherapists, pharmacists, and clinic support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate

2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, and an awareness of the resources available to assist in paying for those aspects of care for which patients are financially responsible

## Health Advocate

By the end of this rotation the resident will...

1. Identify social, genetic, and economic factors that predispose to or exacerbate rheumatologic disease
2. Recognize the importance of preventative strategies in rheumatologic disease
3. Demonstrate appropriate attention to prevention counseling in patient encounters
4. Advocate where appropriate for timely patient access to tests or consultation, based upon the acuity of the presenting problem

## Scholar

By the end of this rotation the resident will...

1. Demonstrate understanding of key basic science principles from biochemistry and physiology that underlie the normal function of the musculoskeletal system
2. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
3. Develop a strategy for maintaining professional competence by various methods of continuing medical education
4. Critically assess the medical literature as it relates to diagnosis, investigation, and treatment of rheumatologic diseases

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society
3. Demonstrate understanding of the ethical underpinnings of providing care for patients with rheumatologic diseases, including the ethics surrounding consent to treatment
4. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
5. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
6. Demonstrate self-awareness, including recognition of his or her own limitations
7. Demonstrate professional behaviours including punctuality and reliability

## Objectives for Neurology Resident Rotation in Critical Care Medicine

### Medical Expert

By the end of this rotation the resident will...

1. Demonstrate applied knowledge of the following:
  - a. Respiratory dysfunction
    - i. Determine the presence of respiratory failure, provide for its emergency support, and develop a plan of action for its investigation and management
  - b. Cardiovascular dysfunction
    - i. Recognize the nature of the problem, provide emergency life support including ACLS, and develop a plan for investigation and management
  - c. Neurological dysfunction
    - i. Develop an approach to the patient with an altered level of consciousness, including instituting immediate life-sustaining measures, carrying out an appropriate neurological examination, deriving an anatomic localization and differential diagnosis, and making a plan for investigation and management
    - ii. Recognize acute and chronic neuromuscular disorders requiring life-sustaining treatment, and develop a plan for diagnosis, support, and specific therapy
  - d. Renal dysfunction
    - i. Recognize the problem of a patient with oliguria or advancing or established renal failure
    - ii. Institute measures to preserve remaining renal function in such patients, a while developing a plan for precise diagnosis, adequate supportive measures, and appropriate definitive therapy
  - e. Gastrointestinal dysfunction
    - i. Evaluate the nature of the illness in patients presenting with gastrointestinal crisis, including the provision of immediate life-sustaining support and the development of a diagnostic and therapeutic plan

- f. Hepatic dysfunction
  - i. Recognize the problem of jaundice and/or hepatic failure, and provide for immediate life-sustaining support while developing a plan for diagnosis and definitive therapy
- g. Hematologic and oncologic disorders
  - i. Recognize the problem of a patient with malignancy, thrombotic or thrombolytic disorder, bleeding, neutropenia, or anemia, and provide life-sustaining support while devising a plan for investigation, support, and therapy
- h. Metabolic and endocrine disorders
  - i. Recognize the nature and severity of common metabolic, endocrine, or fluid and electrolyte abnormalities, and develop a plan for precise diagnosis, emergency and long-term treatment, and appropriate monitoring
- i. Septic illness
  - i. Identify the features of catastrophic septic illness, and provide for immediate life-sustaining treatment while devising a plan for definitive diagnosis, continued life support, and appropriate definitive therapy
- j. Intoxication
  - i. Formulate a differential diagnosis for patients potentially suffering from toxic syndromes
  - ii. Devise a plan to support organ function, prevent further absorption, alter distribution, and enhance elimination of common toxins
- k. Nutritional support
  - i. Evaluate the nutritional status of a critically ill patient
  - ii. Devise a management strategy for providing enteral and/or parenteral nutrition for critically ill patients
- l. Pharmacotherapy
  - i. Demonstrate knowledge of the indications, risks, and side effects of drugs commonly used in the critical care environment, including pressor agents, analgesics, sedatives, and antimicrobials
- m. End-of-life issues

- i. Where death is inevitable, facilitate a dignified process of withdrawal of life-sustaining support, without withdrawal of care
2. Demonstrate practical knowledge of the following technical skills:
  - a. Airway assessment and maintenance
  - b. Care of patients requiring conventional and non-invasive ventilation
  - c. Central venous cannulation
  - d. Resuscitation of patients in undefined shock and with cardiac rhythm disturbance
  - e. Arterial cannulation
  - f. Thoracentesis and chest tube insertion
  - g. Application and maintenance of a pulmonary artery catheter
  - h. Portable chest Xray interpretation
  - i. Lumbar puncture
  - j. Brain death determination
  - k. Peritoneal tap

Not all residents will have hands-on exposure to all these experiences during their limited time in the ICU, but residents should strive to become familiar with the indications for and general principles surrounding these interventions.

## Communicator

During this rotation the resident will...

1. Obtain thorough and relevant histories
2. Present a concise synopsis of a patient's clinical problem to the team during rounds
3. Discuss diagnosis, investigations, management, and prognosis with patients and their families in terms that are understandable
4. Obtain and document informed consent for tests and procedures
5. Maintain clear and accurate clinical notes and records

## Collaborator

During this rotation the resident will...

1. Recognize and respect the roles of other physicians, nursing staff, respiratory therapists, physiotherapists, occupational therapists, nutritionists, pharmacists, social workers, secretarial, and support staff in the provision of optimal patient care in an ICU setting
2. Recognize that effective teamwork is critical in the ICU setting, and demonstrate proficiency in working effectively within the ICU health care team
3. Consult specialist physicians appropriately to optimize patient care

## Manager

During this rotation the resident will...

1. Utilize health care resources in a scientifically, ethically, and economically defensible manner
2. Be aware of and utilize clinical practice guidelines where appropriate
3. Demonstrate effective time management to achieve a balance between professional and personal responsibilities

## Health Advocate

During this rotation the resident will...

1. Recognize and respect the diverse cultural, social, and religious factors that may influence patient health and affect patient interaction with the health care system
2. Recognize important risk factors for critical illness and counsel patients and their families accordingly to reduce recurrence risks where possible
3. Demonstrate awareness of the medical and societal issue of brain death and organ donation, and develop a strategy for introducing this issue in family discussion when necessary

## Scholar

During this rotation the resident will...

1. Develop an effective personal learning strategy
2. Generate clinical questions related to patient care and utilize and analyze available resources to develop and implement evidence-based solutions to such questions
3. Demonstrate effective teaching skills in dealings with more junior trainees, patients, families, and other health care personnel
4. Participate actively in organized educational activities including rounds and team meetings

## Professional

During this rotation the resident will...

1. Demonstrate professional attitudes and qualities, including honesty, integrity, compassion, and respect for patient dignity and confidentiality.
2. Demonstrate professional behaviours including punctuality and reliability.
3. Describe how ethical principles guide the approach to managing patients with critical illness, including principles related to surrogate decision-making for critically ill patients unable to speak for themselves
4. Demonstrate self-awareness, including an awareness of his or her own limitations

## Objectives for Rotation in Psychiatry for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Demonstrate proficiency in obtaining a psychiatric history, supplementing with collateral history where necessary
2. Demonstrate proficiency in the assessment of mental status
3. Recognize and classify important psychiatric symptoms and develop a differential diagnosis based upon interpretation of these symptoms
4. Develop an evidence-based approach to the evaluation and management of patients presenting with:
  - a. Mood disorders, including depression and bipolar mood disorder
  - b. Anxiety disorders
  - c. Psychotic disorders, including schizophrenia and other delusional disorders
  - d. Suicidal ideation or attempt
  - e. Somatoform disorders
  - f. Personality disorders
  - g. Dementia
5. Identify circumstances where psychiatric symptoms may be due to neurologic or systemic disease, and outline a plan for appropriate investigation of such patients
6. Recognize the potential neurological complications of treatment for psychiatric illness, including drug-induced movement disorders, and describe a plan for managing such complications
7. Describe the mechanisms of action of and indications for medications that have roles in the management of both psychiatric and neurological illnesses, including anticonvulsants, antidepressants, and typical and atypical antipsychotic agents

## Communicator

By the end of this rotation the resident will...

1. Communicate effectively and regularly with patients and their families, responding to questions in a considerate, sympathetic, and factual manner, appropriate to the clinical situation, in terms that are understandable to the lay person
2. Anticipate problems of interpretation or expression by patients and their families, including the potential effects of mental illness on the ability of patients to communicate accurately
3. Clearly explain the performance of all diagnostic procedures, the reasons for their performance, their risks, complications, and potential benefits, and the likely outcome of the anticipated results
4. Explain the reason for consultations by other physicians or members of the health care team
5. Address the issue of prognosis honestly and sensitively where possible
6. Maintain accurate and up-to-date clinical notes and records for each patient, including admission history and physical notes, daily progress notes, and discharge summaries
7. Ensure that consultation requests provide sufficient information for the physician to understand why the patient is being seen
8. Communicate courteously, clearly, effectively, and appropriately with nurses and other members of the health-care team

## Collaborator

During this rotation the resident will...

1. Consult appropriately with other physicians and health care professionals
2. Contribute effectively to interdisciplinary team activities, including attending multidisciplinary team meetings for hospital inpatients and leading such meetings when appropriate
3. Work effectively with resident or medical student colleagues assigned to the Psychiatry Service to form a collegial and efficient team

4. Recognize that the optimal treatment of many patients with mental illness requires a team approach, and understand the role of other health care professionals (nurses, psychologists, occupational therapists, social workers) in managing patients with psychiatric illness
5. Identify community agencies that may play a key role in the management of patients with mental illness

## Manager

By the end of this rotation the resident will...

1. Take responsibility for initiating and sequencing activities of care for each patient, interpreting the outcomes, and clearly outlining the medical plan of care to all members of the health care team.
2. Utilize personal time and energy effectively to balance patient care responsibilities, learning needs and personal needs
3. Set priorities for the timing of assessment of requested consultations based upon the acuity of the presenting problem
4. Demonstrate an appreciation of the cost-benefit of various interventions, and develop strategies for wise use of finite health care resources for patients with mental illness
5. Identify indications for inpatient care for patients with mental illness, and demonstrate awareness of the costs and benefits of institutional versus community care
6. Use information technology to provide optimal patient care and life-long learning opportunities

## Health Advocate

During this rotation the resident will...

1. Demonstrate understanding of biological, social, cultural, and economic determinants of mental health
2. Counsel patients appropriately regarding prevention strategies for exacerbations of psychiatric illness

3. Recognize the role of lay organizations and community services in providing support for individuals with psychiatric diseases, and make appropriate referrals to such organizations and services
4. Mobilize resources to assist patients with the personal financial costs of psychiatric illness and its treatment, including advocating for funding support for medications and for income support via disability programs as appropriate

## Scholar

During this rotation the resident will...

1. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
2. Develop a strategy for maintaining professional competence by various methods of continuing medical education
3. Critically assess the psychiatric literature as it relates to patient diagnosis, investigation, and treatment
4. Develop the ability to ask and answer learning questions that address gaps in knowledge and enhance patient care

## Professional

During this rotation the resident will...

1. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
2. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
3. Show appropriate consideration of the opinions of other members of the health-care team, including fellow trainees in the management of patient problems and be able to provide means whereby differences of opinion can be discussed and resolved
4. Recognize the ethical and medicolegal principles that guide the practice of psychiatry, including guidelines for involuntary hospitalization, consent to treatment in the mentally ill, and patient privacy and confidentiality

5. Demonstrate self-awareness, including recognition of his or her own limitations
6. Be punctual and reliable in all professional activities

## Objectives for Rotation in Endocrinology and Metabolism for Neurology Residents

### Medical Expert

By the end of this rotation the resident will...

1. Develop evidence-based approaches to the investigation and management of patients presenting with
  - a. Polyuria and polydipsia
  - b. Weight loss and gain
  - c. Palpitations, shakiness, and/or sweating
  - d. Fatigue
  - e. Visual field loss or blurred vision
  - f. Delayed or premature sexual development
  - g. Sexual dysfunction
2. Develop evidence-based management strategies for the following diseases:
  - a. Diabetes (Types 1 and 2) and its complications
  - b. Hyper- and hypothyroidism
  - c. Clinically significant and incidentally found nodules of endocrine glands
  - d. Pituitary dysfunction
  - e. Dysfunction of the adrenal cortex and medulla
  - f. Hyper- and hypocalcemia
  - g. Hypogonadism
  - h. Hyperandrogenism
  - i. Hypoglycemia
  - j. Hypertension

3. Recognize the neurologic complications that may occur in endocrine diseases, including diabetes, thyroid disease, parathyroid disease, and adrenal disease
4. Demonstrate proficiency in the following procedures:
  - a. Clinical examination of the thyroid
  - b. Clinical examination to detect complications of diabetes
  - c. Visual field testing and extraocular muscle testing

## Communicator

By the end of this rotation the resident will...

1. Obtain thorough and relevant histories from patients with endocrinologic disease
2. Demonstrate effective presentation of clinically relevant information at the bedside
3. Convey information to patients and families about diagnosis, proposed investigation, and proposed management in a clear, understandable manner
4. Produce clear and concise consultation notes that communicate effectively with referring physicians and colleagues
5. Develop skills in presenting and discussing endocrinologic topics at teaching and patient care rounds

## Collaborator

During this rotation the resident will...

1. Participate effectively in the multidisciplinary management of endocrine patients
2. Recognize and respect the roles of the various team members, including nurse-educators, nutritionists, pharmacists, clinic support staff
3. Consult appropriately with other physicians and health care professionals

## Manager

During this rotation the resident will...

1. Participate in the function of the health care team, assuming leadership responsibilities where appropriate
2. Demonstrate appropriate use of available resources including diagnostic tests, inpatient services, and consultative services
3. Recognize the economic implications of clinical decisions regarding resource allocation
4. Develop an understanding of the costs of treatment for individual patients, and an awareness of the resources available to assist in paying for those aspects of care for which patients are financially responsible

## Health Advocate

By the end of this rotation the resident will...

1. Identify social, genetic, and economic factors that predispose to or exacerbate endocrine disease
2. Recognize the importance of preventative strategies in endocrine disease
3. Demonstrate appropriate attention to prevention counseling in patient encounters

## Scholar

By the end of this rotation the resident will...

1. Demonstrate understanding of key basic science principles from biochemistry and physiology that underlie the normal function of the endocrine system
2. Develop effective teaching skills through teaching other physicians (including medical students and house officers), other health-care personnel and patients
3. Develop a strategy for maintaining professional competence by various methods of continuing medical education

4. Critically assess the endocrinological literature as it relates to patient diagnosis, investigation, and treatment

## Professional

During this rotation the resident will...

1. Recognize his or her professional obligations to patients and colleagues
2. Demonstrate awareness of the responsibility of the medical profession to society
3. Demonstrate understanding of the ethical underpinnings of providing care for patients with endocrine disease, including the ethics surrounding consent to investigation and treatment
4. Demonstrate personal and professional attitudes including integrity, honesty, and compassion, consistent with developing into the consulting physician role
5. Include the patient in discussions and decisions concerning appropriate diagnostic and management procedures
6. Demonstrate self-awareness, including recognition of his or her own limitations
7. Demonstrate professional behaviours including punctuality and reliability



*This document applies to those who begin training on or after July 1<sup>st</sup>, 2011.*

(Please see also the “Policies and Procedures.”)

## **DEFINITION**

Neurology is that branch of medicine concerned with the nervous system in health and disease. The neurologist is an expert in the prevention, diagnosis and management of patients with diseases of the nervous system.

## **GOALS**

Upon completion of training, a resident is expected to be a competent specialist in Neurology.

The resident must acquire a working knowledge of the theoretical basis of the specialty, including its foundations in the basic medical sciences and research.

Residents must demonstrate the requisite knowledge, skills, and attitudes for effective patient-centered care and service to a diverse population. In all aspects of specialist practice, the graduate must be able to address issues of gender, sexual orientation, age, culture, ethnicity and ethics in a professional manner.

During the residency program in Neurology, residents must participate in a wide range of clinical experiences involving the care of inpatients and outpatients with acute and chronic neurological disorders, as well as the prevention and rehabilitation of neurological disorders. They must follow a program of formal educational activities and be exposed to current research activities.

The detailed objectives below describe standards required to achieve competence and in no way exclude the need to obtain additional knowledge, skills or attitudes necessary to ensure the most effective diagnosis and management of patients with nervous system disorders.

For greater clarity, these skills elements are expanded as detailed objectives in the following pages. The terms “effective” and “appropriate” are used frequently in these statements. Within the scope of this document, “effective” is defined as “adequate to the efficient solution of the problem; “appropriate” is defined as “appropriate to the presenting problem(s) and patient attitude and activity.” Throughout this document, the term “nervous system” refers to the central nervous system, the peripheral nervous system, the neuromuscular junction and skeletal muscles.

## NEUROLOGY COMPETENCIES

At the completion of training, the resident will have acquired the following competencies and will function effectively as a:

### Medical Expert

#### **Definition:**

As *Medical Experts*, Neurologists integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centered care. *Medical Expert* is the central physician Role in the CanMEDS framework.

#### **Key and Enabling Competencies: Neurologists are able to...**

### **1. Function effectively as specialists in their domain, integrating all of the CanMEDS Roles to provide optimal, ethical and patient-centered medical care**

- 1.1. Perform a consultation, including the presentation of well-documented neurological assessments and recommendations in written and verbal form in response to a request from another health care professional
- 1.2. Demonstrate effective management of a patient with a neurological condition, including the assessment and treatment at the level of a consultant Neurologist
- 1.3. Demonstrate effective use of all CanMEDS competencies relevant to Neurology
- 1.4. Demonstrate the ability to prioritize professional duties when faced with multiple patients and problems
- 1.5. Demonstrate compassionate and patient-centered care
- 1.6. Identify and appropriately respond to relevant ethical issues arising in medical decision-making and patient care
- 1.7. Demonstrate competence in situations other than patient care, such as providing expert legal testimony or advising governments, as needed

### **2. Establish and maintain clinical knowledge, skills and attitudes appropriate to Neurology**

- 2.1. Demonstrate the clinical and basic science knowledge required for the practice of Neurology, which includes, but is not limited to:
  - 2.1.1. Vascular diseases of the central nervous system
    - 2.1.1.1. Anatomy of cerebral and spinal vascular systems

## OBJECTIVES OF TRAINING IN NEUROLOGY (2011)

- 2.1.1.2. Physiology of cerebral and spinal blood flow
- 2.1.1.3. Risk factors, prevention, etiology, pathophysiology, clinical features, investigation and management of cerebral ischemia, infarction and related disorders, including:
  - 2.1.1.3.1. Atherothrombotic infarction and carotid stenosis
  - 2.1.1.3.2. Embolic infarction and cardio-embolic disorders
  - 2.1.1.3.3. Lacunar infarction
  - 2.1.1.3.4. Arterial dissection
  - 2.1.1.3.5. Prothrombotic conditions
  - 2.1.1.3.6. Vasculitis
  - 2.1.1.3.7. Thrombosis of cerebral veins and venous sinuses
  - 2.1.1.3.8. Strokes in adolescents, children and neonates
  - 2.1.1.3.9. Management of acute ischemia
- 2.1.1.4. Risk factors, prevention, etiology, pathophysiology, clinical features, investigation and management of hemorrhagic cerebrovascular disorders and vascular malformations, including but not limited to:
  - 2.1.1.4.1. Intracerebral hematomas
  - 2.1.1.4.2. Subarachnoid hemorrhage and cerebral aneurysms
  - 2.1.1.4.3. Vascular malformations, including arteriovenous fistulas
- 2.1.1.5. Risk factors, prevention, etiology, pathophysiology, clinical features, investigation and management of vascular diseases of the spinal cord
- 2.1.2. Neuro-oncology
  - 2.1.2.1. Epidemiology, etiology, pathogenesis, pathology, clinical features (including localization), investigation, management and prognosis of neoplasms of the nervous system in adults and children, including but not limited to:
    - 2.1.2.1.1. Primary neoplasms of brain and spinal cord
    - 2.1.2.1.2. Meningiomas
    - 2.1.2.1.3. Metastatic neoplasms of brain, spinal cord and meninges, including spinal cord compression
    - 2.1.2.1.4. Neoplasms of the skull base and anterior visual pathways, including pituitary adenoma and craniopharyngioma
    - 2.1.2.1.5. Neoplasms of cranial nerves, peripheral nerves and nerve roots
  - 2.1.2.2. Pathogenesis, pathology, clinical features, investigation, management and prognosis of paraneoplastic neurological syndromes

## OBJECTIVES OF TRAINING IN NEUROLOGY (2011)

- 2.1.2.3. Pathogenesis, clinical features and management of intracranial hypertension due to central nervous system (CNS) tumours
- 2.1.2.4. Neurological complications of cancer treatment including chemotherapy and radiation therapy
  
- 2.1.3. Disorders of cerebrospinal fluid (CSF) flow and intracranial pressure
  - 2.1.3.1. Physiology and anatomy of CSF production, flow and reabsorption and the blood-brain barrier
  - 2.1.3.2. Etiology, pathophysiology, clinical manifestations, investigation and management of disorders of CSF flow and intracranial pressure, including:
    - 2.1.3.2.1. Obstructive hydrocephalus
    - 2.1.3.2.2. Non-obstructive hydrocephalus, including normal pressure hydrocephalus
    - 2.1.3.2.3. Idiopathic intracranial hypertension (pseudotumour cerebri)
    - 2.1.3.2.4. Intracranial hypotension
    - 2.1.3.2.5. Cerebral edema
  
- 2.1.4. Infectious and transmissible diseases affecting the CNS
  - 2.1.4.1. Analysis of the CSF and interpretation of the results in CNS infections
  - 2.1.4.2. Etiology, pathogenesis, pathology, epidemiology, clinical manifestations, investigation and management of infectious diseases of the CNS, including:
    - 2.1.4.2.1. Meningitis, meningoencephalitis and encephalitis due to bacterial or viral pathogens
    - 2.1.4.2.2. Cerebral abscess
    - 2.1.4.2.3. Epidural abscess, subdural empyema and intracranial thrombophlebitis
    - 2.1.4.2.4. CNS tuberculosis
    - 2.1.4.2.5. Neurosyphilis
    - 2.1.4.2.6. Lyme disease
    - 2.1.4.2.7. Fungal infections of the nervous system
    - 2.1.4.2.8. CNS infections caused by protozoa, Rickettsia species and parasites
    - 2.1.4.2.9. Neurological complications of human immunodeficiency virus
    - 2.1.4.2.10. Opportunistic CNS infections in the immunocompromised patient
    - 2.1.4.2.11. Prion diseases

- 2.1.5. Demyelinating and inflammatory diseases of the CNS
  - 2.1.5.1. Pathogenesis, genetics, pathology, epidemiology, clinical manifestations, investigation, diagnostic criteria, management and prognosis of multiple sclerosis (MS)
  - 2.1.5.2. Etiology, pathogenesis, pathology, epidemiology, clinical manifestations, investigation, management and prognosis of demyelinating and inflammatory CNS diseases other than MS, including:
    - 2.1.5.2.1. Acute disseminated encephalomyelitis and its variants
    - 2.1.5.2.2. Cerebellitis
    - 2.1.5.2.3. Brainstem encephalitis
    - 2.1.5.2.4. Transverse myelitis
    - 2.1.5.2.5. Optic neuritis
    - 2.1.5.2.6. Neuromyelitis optica
    - 2.1.5.2.7. Neurosarcoidosis
  - 2.1.5.3. Etiology, pathogenesis, pathology, epidemiology, clinical manifestations, investigation, management and prognosis of diseases that can mimic MS
- 2.1.6. Epilepsy
  - 2.1.6.1. Basic mechanisms underlying epilepsy and its treatment, including the action potential, ion channels, neurotransmitters and epileptogenesis
  - 2.1.6.2. Classification of epileptic seizures and syndromes
  - 2.1.6.3. Epidemiology, genetics, clinical manifestations, treatment and prognosis of epileptic seizures and syndromes in adults and children
  - 2.1.6.4. Pharmacological principles, complications and teratogenic effects of anti-epileptic drug administration
  - 2.1.6.5. Non-pharmacological treatment of epilepsy, including ketogenic diet, surgery and vagal nerve stimulation
  - 2.1.6.6. Effects of pregnancy on epilepsy and its management
  - 2.1.6.7. Diagnosis and management of status epilepticus
  - 2.1.6.8. Diagnosis and differential diagnosis of non-epileptic seizures

- 2.1.7. Headache and craniofacial pain
  - 2.1.7.1. Anatomy and physiology of craniofacial pain pathways
  - 2.1.7.2. Classification of headache
  - 2.1.7.3. Pathophysiology, clinical feature and management of headache and craniofacial pain disorders, including but not limited to
    - 2.1.7.3.1. Primary headaches, including:
      - 2.1.7.3.1.1. Migraine and its variants
      - 2.1.7.3.1.2. Tension-type headache
      - 2.1.7.3.1.3. Trigeminal autonomic cephalgias
      - 2.1.7.3.1.4. Other primary headaches
    - 2.1.7.3.2. Secondary headaches
    - 2.1.7.3.3. Thunderclap headache including reversible cerebral vasoconstriction syndrome
    - 2.1.7.3.4. Cranial neuralgias and primary facial pain
- 2.1.8. Dementia and amnesia
  - 2.1.8.1. Anatomy and physiology of memory and the limbic system
  - 2.1.8.2. Classification, diagnostic criteria, pathogenesis, pathology, clinical features and management of dementia and disorders of memory, including:
    - 2.1.8.2.1. Mild cognitive impairment
    - 2.1.8.2.2. Alzheimer's disease
    - 2.1.8.2.3. Frontotemporal degeneration and dementia
    - 2.1.8.2.4. Dementia with Lewy bodies
    - 2.1.8.2.5. Vascular dementia
    - 2.1.8.2.6. Other secondary dementias, including Korsakoff syndrome
    - 2.1.8.2.7. Pseudodementia
    - 2.1.8.2.8. Transient global amnesia and epileptic amnesia
    - 2.1.8.2.9. Amnestic states
- 2.1.9. Delirium and other acute confusional states
  - 2.1.9.1. Etiology, pathophysiology, clinical features, diagnosis and management of delirium and other acute confusional states
- 2.1.10. Syndromes caused by focal CNS lesions
  - 2.1.10.1. Anatomy and physiology of cerebral cortical function

## OBJECTIVES OF TRAINING IN NEUROLOGY (2011)

- 2.1.10.2. Pathophysiology and clinical features of syndromes caused by focal cerebral lesions, including:
  - 2.1.10.2.1. Lesions of frontal, temporal, parietal or occipital lobe
  - 2.1.10.2.2. Brainstem lesions
  - 2.1.10.2.3. Cerebellar lesions
  - 2.1.10.2.4. Lesions of white matter tracts, including disconnection syndromes
  
- 2.1.11. Movement disorders
  - 2.1.11.1. Anatomy and physiology of the extrapyramidal motor pathways
  - 2.1.11.2. Etiology, genetics, pathophysiology, pathology and clinical features of movement disorders, including but not limited to:
    - 2.1.11.2.1. Primary parkinsonian disorders, including Parkinson's disease and atypical parkinsonian disorders
    - 2.1.11.2.2. Secondary parkinsonian disorders
    - 2.1.11.2.3. Chorea/ballismus
    - 2.1.11.2.4. Dystonia and related disorders
    - 2.1.11.2.5. Tremor
    - 2.1.11.2.6. Tics and Tourette's syndrome
    - 2.1.11.2.7. Paroxysmal dyskinesias
    - 2.1.11.2.8. Drug-induced movement disorders
    - 2.1.11.2.9. Myoclonus
  
  - 2.1.11.3. Management of movement disorders and complications of treatment
  
- 2.1.12. Cerebellar and spinocerebellar disorders
  - 2.1.12.1. Anatomy and physiology of the cerebellum and its pathways
  - 2.1.12.2. Etiology, genetics, pathophysiology, pathology, clinical features and management of cerebellar and spinocerebellar disorders, including but not limited to:
    - 2.1.12.2.1. Cerebellar malformations
    - 2.1.12.2.2. Inherited ataxias and spinocerebellar ataxias
    - 2.1.12.2.3. Infectious and post-infectious ataxias
    - 2.1.12.2.4. Cerebellar disorders caused by metabolic dysfunction and inborn errors of metabolism
    - 2.1.12.2.5. Cerebellar disorders caused by toxins
    - 2.1.12.2.6. Episodic ataxias

2.1.13. Motor neuron disorders

2.1.13.1. Anatomy and physiology of the pyramidal pathways and reflex arc

2.1.13.2. Mechanisms and management of spasticity

2.1.13.3. Etiology, pathophysiology, clinical features and management of motor neuron disorders:

2.1.13.3.1. Disorders primarily affecting upper motor neurons (UMN), including:

2.1.13.3.1.1. Cerebral palsy

2.1.13.3.1.2. Primary lateral sclerosis

2.1.13.3.1.3. Hereditary spastic paraplegias

2.1.13.3.1.4. Human T-lymphotrophic virus (HTLV) infections

2.1.13.3.1.5. UMN disorders caused by toxins

2.1.13.3.2. Disorders primarily affecting lower motor neurons (LMN), including:

2.1.13.3.2.1. Pediatric and adult-onset spinal muscular atrophies

2.1.13.3.2.2. Benign focal amyotrophy

2.1.13.3.2.3. Infectious causes of lower motor neuron disorders

2.1.13.3.2.4. Post-polio syndrome

2.1.13.3.2.5. Genetic causes of LMN disorders

2.1.13.3.2.6. LMN disorders cause by inborn errors of metabolism

2.1.13.3.2.7. LMN disorders caused by toxins, radiation and neoplasms

2.1.13.3.3. Disorders affecting both upper and lower motor neurons, including:

2.1.13.3.3.1. Amyotrophic lateral sclerosis (ALS), including sporadic and familial ALS

2.1.13.3.3.2. ALS syndromes with dementia or parkinsonism

2.1.13.3.3.3. Disorders caused by inborn errors of metabolism

2.1.14. Peripheral neuropathies

2.1.14.1. Histology and macroscopic anatomy of peripheral nerves, including muscle innervation and sensory dermatomes

2.1.14.2. Physiology of axons and peripheral nerves and their reactions to injury

## OBJECTIVES OF TRAINING IN NEUROLOGY (2011)

- 2.1.14.3. Etiology, genetics, pathophysiology, pathology, clinical features, investigation and management of peripheral nerve disorders, including:
  - 2.1.14.3.1. Hereditary neuropathies
  - 2.1.14.3.2. Traumatic, entrapment and idiopathic mononeuropathies
  - 2.1.14.3.3. Inflammatory and demyelinating polyradiculoneuropathies, including acute and chronic demyelinating polyneuropathies and multifocal motor neuropathy with conduction block
  - 2.1.14.3.4. Neuropathies caused by metabolic, toxic and nutritional disorders, including critical illness polyneuropathy
  - 2.1.14.3.5. Neuropathies caused by systemic inflammatory and vasculitic disorders
  - 2.1.14.3.6. Neuropathies caused by paraproteinemias, monoclonal gammopathies and neoplasms, including paraneoplastic disorders
  - 2.1.14.3.7. Infectious neuropathies
- 2.1.15. Nerve root and plexus disorders
  - 2.1.15.1. Anatomy of nerve roots and brachial and lumbosacral plexi, including muscle innervation and sensory dermatomes
  - 2.1.15.2. Etiology, pathophysiology, pathology, clinical features, investigation and management of nerve root and plexus disorders, including:
    - 2.1.15.2.1. Traumatic and congenital radiculopathy and plexopathy
    - 2.1.15.2.2. Disc herniation
    - 2.1.15.2.3. Diabetic polyradiculopathy, amyotrophy and other ischemic plexopathies
    - 2.1.15.2.4. Neoplastic and radiation-induced polyradiculopathy and plexopathy
    - 2.1.15.2.5. Idiopathic brachial plexopathy and neuralgic amyotrophy
    - 2.1.15.2.6. Dorsal root ganglion disease
- 2.1.16. Neuromuscular junction disorders
  - 2.1.16.1. Etiology, pathophysiology, pathology, clinical features, investigation and management of diseases affecting the neuromuscular junction, including:
    - 2.1.16.1.1. Myasthenia gravis
    - 2.1.16.1.2. Congenital myasthenic syndromes
    - 2.1.16.1.3. Lambert-Eaton syndrome
    - 2.1.16.1.4. Botulism
    - 2.1.16.1.5. Disorders caused by drugs and toxins

- 2.1.17. Muscular disorders and myopathies
    - 2.1.17.1. Histology and physiology of normal muscle
    - 2.1.17.2. Etiology, genetics, pathophysiology, pathology, clinical features, investigation and management of diseases affecting muscle, including:
      - 2.1.17.2.1. Muscular dystrophies
      - 2.1.17.2.2. Congenital myopathies
      - 2.1.17.2.3. Muscle disorders caused by channelopathies
      - 2.1.17.2.4. Metabolic and mitochondrial myopathies
      - 2.1.17.2.5. Inflammatory myopathies
      - 2.1.17.2.6. Myopathies caused by endocrinological and electrolyte disorders
      - 2.1.17.2.7. Myopathies caused by drugs and toxins
      - 2.1.17.2.8. Critical illness myopathy
  - 2.1.18. Neurological complications of acquired systemic and metabolic disorders
    - 2.1.18.1. Etiology, pathophysiology, pathology, clinical manifestations, investigation, management and prognosis of neurological disorders caused by acquired systemic and metabolic disorders, including:
      - 2.1.18.1.1. Hypo- and hyperglycemia
      - 2.1.18.1.2. Disorders of electrolytes and water balance
      - 2.1.18.1.3. Vitamin deficiencies
      - 2.1.18.1.4. Cardiovascular disorders, including syncope and ischemic-hypoxic encephalopathy
      - 2.1.18.1.5. Respiratory disorders
      - 2.1.18.1.6. Hematological disorders
      - 2.1.18.1.7. Hepatic and gastrointestinal disorders
      - 2.1.18.1.8. Renal disorders and dialysis
      - 2.1.18.1.9. Rheumatological disorders and vasculitis
      - 2.1.18.1.10. Endocrinological disorders, including diseases of the thyroid, parathyroid, adrenal and pituitary glands
      - 2.1.18.1.11. Complications of organ transplantation and immune suppression
  - 2.1.19. Neurological complications of pregnancy and delivery
  - 2.1.20. Neurological disorders caused by drugs and toxins
    - 2.1.20.1. Pathophysiology, pathology, clinical manifestations, investigation, management and prognosis of neurological disorders caused by drugs and toxins, including:
      - 2.1.20.1.1. Ethanol and other alcohols, including fetal alcohol syndrome;
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## OBJECTIVES OF TRAINING IN NEUROLOGY (2011)

- 2.1.20.1.2. Psychoactive drugs, including opioids, stimulants and hallucinogens
  - 2.1.20.1.3. Dopamine and dopaminergic agents
  - 2.1.20.1.4. Anticonvulsants, including fetal teratogenesis
  - 2.1.20.1.5. Antineoplastic and immunosuppressive agents
  - 2.1.20.1.6. Cardioactive drugs
  - 2.1.20.1.7. Bacterial toxins, including botulism, tetanus and diphtheria
  - 2.1.20.1.8. Environmental and occupational toxins, including metals, organic chemicals and carbon monoxide
- 2.1.21. Traumatic injury of the nervous system and coma
- 2.1.21.1. Anatomy and physiology of consciousness
  - 2.1.21.2. Clinical features, classification and management of mild brain injury, including criteria for return to playing sports
  - 2.1.21.3. Clinical features, pathophysiology, pathology and management of moderate-severe traumatic brain injury and brain herniation
  - 2.1.21.4. Prognosis for neurological recovery and seizures after traumatic brain injury
  - 2.1.21.5. Diagnosis of brain death, minimally conscious state and persistent vegetative state
  - 2.1.21.6. Clinical features and management of traumatic spinal cord injury
- 2.1.22. Inborn errors of metabolism affecting the nervous system
- 2.1.22.1. Pathophysiology, genetics, clinical manifestations, investigation, management and prognosis of neurological disorders caused by inborn errors of metabolism, including:
    - 2.1.22.1.1. Amino acid disorders
    - 2.1.22.1.2. Organic acidemias
    - 2.1.22.1.3. Galactosemia
    - 2.1.22.1.4. Disorders associated with hyperammonemia
    - 2.1.22.1.5. Pyrimidine disorders
    - 2.1.22.1.6. Disorders of copper and iron metabolism
    - 2.1.22.1.7. Lipoprotein deficiencies
    - 2.1.22.1.8. Mitochondrial and oxidative metabolism disorders
    - 2.1.22.1.9. Peroxisomal and lysosomal disorders

- 2.1.23. Developmental abnormalities of the nervous system
  - 2.1.23.1. Embryology and clinical, radiological and pathological features of the major developmental abnormalities of the nervous system, including:
    - 2.1.23.1.1. Neural tube defects
    - 2.1.23.1.2. Disorders of segmentation and cleavage, including holoprosencephaly, septo-optic dysplasia and dysgenesis of corpus callosum
    - 2.1.23.1.3. Disorders of proliferation
    - 2.1.23.1.4. Disorders of migration
    - 2.1.23.1.5. Disorders of organization
    - 2.1.23.1.6. Disorders of myelination
    - 2.1.23.1.7. Posterior fossa malformations
- 2.1.24. Delayed development, developmental regression and behavioural disorders
  - 2.1.24.1. Normal developmental milestones and primitive reflexes
  - 2.1.24.2. Clinical features, differential diagnosis and management of delayed development, developmental regression and behavioural disorders, including:
    - 2.1.24.2.1. Global developmental delay
    - 2.1.24.2.2. Intellectual impairment
    - 2.1.24.2.3. Developmental regression/neurodegenerative disorders
    - 2.1.24.2.4. Motor development disorders
    - 2.1.24.2.5. Language development disorders
    - 2.1.24.2.6. Behavioural and attention disorders
    - 2.1.24.2.7. Autism and pervasive development disorders
- 2.1.25. Neurogenetic disorders
  - 2.1.25.1. Basic knowledge of genetics as applied to neurological diseases
  - 2.1.25.2. Ethical considerations in neurogenetics
  - 2.1.25.3. Genetics, clinical presentation, management and testing of the major neurogenetic syndromes, including:
    - 2.1.25.3.1. Neurocutaneous syndromes
    - 2.1.25.3.2. Trisomy 21
    - 2.1.25.3.3. Fragile X syndrome
    - 2.1.25.3.4. Turner syndrome
    - 2.1.25.3.5. Noonan syndrome
    - 2.1.25.3.6. Aicardi syndrome

*OBJECTIVES OF TRAINING IN NEUROLOGY (2011)*

- 2.1.25.3.7. Angelman and Prader-Willi syndromes
- 2.1.25.3.8. Cockayne syndrome
- 2.1.25.3.9. Rett syndrome
  
- 2.1.26. Sleep disorders
  - 2.1.26.1. Anatomy and physiology of sleep and wakefulness
  - 2.1.26.2. Etiology, pathophysiology, classification, clinical features and management of sleep disorders, including:
    - 2.1.26.2.1. Intrinsic sleep disorders, including:
      - 2.1.26.2.1.1. Insomnia
      - 2.1.26.2.1.2. Narcolepsy
      - 2.1.26.2.1.3. Hypersomnia
      - 2.1.26.2.1.4. Central sleep apnea
      - 2.1.26.2.1.5. Restless legs syndrome
    - 2.1.26.2.2. Extrinsic sleep disorders
    - 2.1.26.2.3. Parasomnias
    - 2.1.26.2.4. Sleep disorders associated with neurological disorders
  
- 2.1.27. Somatoform (functional) disorders with neurological manifestations
  - 2.1.27.1. Clinical manifestations, investigation and management of somatoform disorders with neurological manifestations, including:
    - 2.1.27.1.1. Conversion disorder, including non-epileptic seizures
    - 2.1.27.1.2. Somatization disorder
  
- 2.1.28. Neurointensive care
  - 2.1.28.1. Recognize and manage neurological conditions requiring an intensive care unit
  
- 2.1.29. Neuro-ophthalmological disorders
  - 2.1.29.1. Anatomy and physiology of the afferent visual pathways, ocular motor system, pupillary pathways and accommodation
  - 2.1.29.2. Etiology, genetics, pathophysiology, clinical features (including visual field findings), investigation and management of neuro-ophthalmological disorders, including:
    - 2.1.29.2.1. Disorders of optic nerve, optic chiasm, retrochiasmal pathways, calcarine cortex and extrastriate visual cortex
    - 2.1.29.2.2. Neurologically relevant retinal disorders, including retinal ischemia and infarction

*OBJECTIVES OF TRAINING IN NEUROLOGY (2011)*

- 2.1.29.2.3. Papilledema
- 2.1.29.2.4. Central and peripheral disorders of eye movement, including those causing strabismus, nystagmus and saccadic oscillations
- 2.1.29.2.5. Pupillary disorders
- 2.1.29.2.6. Ptosis
- 2.1.29.2.7. Orbital disorders and proptosis
  
- 2.1.30. Neuro-otological disorders
  - 2.1.30.1. Anatomy and physiology of the auditory, vestibular and vestibulo-ocular systems
  - 2.1.30.2. Etiology, pathophysiology, clinical features, investigation and management of neuro-otological disorders, including:
    - 2.1.30.2.1. Sensorineural hearing loss and tinnitus
    - 2.1.30.2.2. Vertigo and unilateral loss of vestibular function
    - 2.1.30.2.3. Bilateral loss of vestibular function
  
- 2.1.31. Disorders of other cranial nerves and related disorders
  - 2.1.31.1. Disorders of smell and taste
    - 2.1.31.1.1. Anatomy and physiology of olfaction and taste sensation
    - 2.1.31.1.2. Etiology, pathogenesis, clinical features, investigation and management of disorders of smell and taste
  
  - 2.1.31.2. Anatomy and physiology of cranial nerves V, VII and IX – XII and related brainstem and cerebral pathways
  - 2.1.31.3. Etiology, pathogenesis, clinical features, investigation and management of disorders of other cranial nerves and related disorders, including:
    - 2.1.31.3.1. Disorders of trigeminal nerve and corneal and facial sensation
    - 2.1.31.3.2. Disorders of facial nerve and facial movement
    - 2.1.31.3.3. Glossopharyngeal neuralgia
    - 2.1.31.3.4. Disorders of the vagus nerve and dysphagia
    - 2.1.31.3.5. Disorders of the spinal accessory nerve
    - 2.1.31.3.6. Disorders of the hypoglossal nerve
    - 2.1.31.3.7. Bulbar and pseudobulbar palsy
    - 2.1.31.3.8. Multiple cranial nerve palsies
  
- 2.1.32. Autonomic nervous system disorders
  - 2.1.32.1. Anatomy and physiology of the autonomic nervous system

## OBJECTIVES OF TRAINING IN NEUROLOGY (2011)

- 2.1.32.2. Etiology, pathophysiology, clinical features, investigation and management of disorders of the autonomic nervous system, including:
    - 2.1.32.2.1. Acute autonomic paralysis (pure pandysautonomia)
    - 2.1.32.2.2. Primary autonomic failure
    - 2.1.32.2.3. Dysautonomia and orthostatic hypotension caused by peripheral neuropathy
    - 2.1.32.2.4. Autonomic dysfunction in neurodegenerative disorders
    - 2.1.32.2.5. Autonomic dysreflexia after spinal cord lesions
    - 2.1.32.2.6. Neurological disorders of bladder function
  
  - 2.1.33. Pain disorders
    - 2.1.33.1. Anatomy and physiology of nociception and pain pathways
    - 2.1.33.2. Etiology, pathogenesis, clinical features investigation and management of pain disorders, including:
      - 2.1.33.2.1. Central and peripheral neuropathic pain disorders
      - 2.1.33.2.2. Complex regional pain syndrome
      - 2.1.33.2.3. Post-herpetic neuralgia
      - 2.1.33.2.4. Back pain
  
  - 2.1.34. Electroencephalography (EEG)
    - 2.1.34.1. Physiological basis of normal EEG and common EEG abnormalities
    - 2.1.34.2. Recognition of normal physiological rhythms in wakefulness, drowsiness and sleep
    - 2.1.34.3. Principal characteristics of neurophysiological maturation in children
    - 2.1.34.4. EEG indications and limitations, including sleep-deprived, video, intensive care monitoring and ambulatory EEG
    - 2.1.34.5. Recognition of common EEG abnormalities and their significance
  
  - 2.1.35. Electromyography and nerve conduction studies (EMG/NCS)
    - 2.1.35.1. Physiological basis of normal EMG/NCS and common EMG/NCS abnormalities
    - 2.1.35.2. Indications for, and limitations of, EMG/NCS in neurological disorders
    - 2.1.35.3. Recognition of common EMG/NCS abnormalities and their significance
  
  - 2.1.36. Neuroimaging
    - 2.1.36.1. Neuroradiological anatomy and pathophysiology
    - 2.1.36.2. Normal and abnormal neuroimaging findings
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*OBJECTIVES OF TRAINING IN NEUROLOGY (2011)*

- 2.1.36.3. Indications, contraindications and limitations for neuroimaging, including the selection of appropriate magnetic resonance studies and indications for functional neuroimaging
- 2.1.36.4. Differential diagnosis of common neuroimaging abnormalities
- 2.1.37. Other laboratory investigations
  - 2.1.37.1. Anatomic and physiologic basis, indications, contraindications and interpretation of results, of:
    - 2.1.37.1.1. Lumbar puncture
    - 2.1.37.1.2. Visual field testing, including Goldmann and automated perimetry
    - 2.1.37.1.3. Visual evoked responses
    - 2.1.37.1.4. Auditory brainstem evoked responses
    - 2.1.37.1.5. Somatosensory evoked responses
    - 2.1.37.1.6. Vestibular and caloric testing
    - 2.1.37.1.7. Apnea testing for brain death
    - 2.1.37.1.8. Edrophonium (Tensilon) test or equivalent test
- 2.1.38. Classification of, and clinical approach to, manifestations of neurological diseases, including
  - 2.1.38.1. Muscle weakness, paralysis and cramps
  - 2.1.38.2. Sensory disturbances
  - 2.1.38.3. Autonomic disturbances
  - 2.1.38.4. Regional pain
  - 2.1.38.5. Seizures and syncope
  - 2.1.38.6. Headache and facial pain
  - 2.1.38.7. Movement disorders
  - 2.1.38.8. Ataxia, inco-ordination and disturbances of gait
  - 2.1.38.9. Disturbances of vision, eye movement and pupillary and eyelid function
  - 2.1.38.10. Dizziness and vertigo
  - 2.1.38.11. Altered hearing
  - 2.1.38.12. Dysphagia
  - 2.1.38.13. Disturbances of speech and language
  - 2.1.38.14. Impaired consciousness and acute confusion
  - 2.1.38.15. Sleep disturbances
  - 2.1.38.16. Disturbances of memory, cognitive function and behaviour
  - 2.1.38.17. Disturbances of smell and taste

2.1.38.18. Developmental delay and regression

2.1.38.19. Dysmorphic features

2.2. Describe the CanMEDS competencies relevant to Neurology

2.3. Apply lifelong learning skills of the Scholar Role and implement a personal learning program to keep up-to-date and enhance areas of professional competence

2.4. Contribute to the enhancement of quality care and patient safety in Neurology, integrating the available best evidence and best practices

### **3. Perform a complete and appropriate assessment of a patient**

3.1. Identify and explore problems to be addressed in a patient encounter effectively

3.2. Elicit a history that is relevant, concise and accurate, including the patient's context and preferences

3.3. Perform a relevant physical examination that is efficient and accurate

3.4. Order appropriate laboratory tests and imaging, identify normal and abnormal results and evaluate their significance

3.5. Demonstrate effective clinical problem solving and judgement, including interpreting available data and integrating information to generate differential diagnoses and management plans

### **4. Use preventive and therapeutic interventions effectively**

4.1. Implement a management plan in collaboration with patients and families

4.2. Demonstrate appropriate and timely application of preventive and therapeutic interventions relevant to Neurology, including thrombolysis in acute stroke

4.3. Ensure appropriate informed consent is obtained for therapies

4.4. Ensure patients receive appropriate end-of-life care

### **5. Demonstrate proficient and appropriate use of procedural skills, both diagnostic and therapeutic**

5.1. Demonstrate effective, appropriate and timely performance of diagnostic and therapeutic procedures relevant to Neurology, including:

5.1.1. Lumbar puncture

5.1.2. Edrophonium test or equivalent

5.1.3. Apnea testing for brain death

5.1.4. Caloric test

5.1.5. Dix-Hallpike and particle repositioning maneuvers

5.2. Ensure appropriate informed consent is obtained for procedures

- 5.3. Document and disseminate information related to procedures performed and their outcomes
- 5.4. Ensure adequate follow-up is arranged for procedures performed
- 6. Seek appropriate consultation from other health professionals, recognizing the limits of their expertise**
  - 6.1. Demonstrate insight into their own limitations of expertise
  - 6.2. Demonstrate effective, appropriate, and timely consultation of another health professional as needed for optimal patient care
  - 6.3. Arrange appropriate follow-up care services for patients and their families

## **Communicator**

### ***Definition:***

As *Communicators*, Neurologists effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.

### ***Key and Enabling Competencies: Neurologists are able to...***

- 1. Develop rapport, trust, and ethical therapeutic relationships with patients and families**
    - 1.1. Recognize that being a good communicator is a core clinical skill for Neurologists, and that effective physician-patient communication fosters diagnostic accuracy, patient and physician satisfaction, adherence to medical advice and improved clinical outcomes
    - 1.2. Establish positive therapeutic relationships with patients and families that are characterized by understanding, trust, respect, honesty and empathy
    - 1.3. Respect patient confidentiality, privacy and autonomy
    - 1.4. Listen effectively
    - 1.5. Recognize and respond to non-verbal cues
    - 1.6. Use nonverbal communication such as eye contact, smiling and nodding appropriately
    - 1.7. Disclose medical errors and adverse events promptly and accurately
  - 2. Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues, and other professionals**
    - 2.1. Gather accurate histories effectively and efficiently from patients with neurological symptoms, including patients' beliefs and expectations about their illnesses
    - 2.2. Seek out and synthesize relevant information from other sources, such as a patient's family, caregivers and other professionals
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**3. Convey relevant information and explanations accurately to patients and families, colleagues and other professionals**

- 3.1. Deliver information to patients and families in a humane and understandable manner
  - 3.1.1. Explain neurological diagnosis, prognosis and treatment
  - 3.1.2. Explain relevant genetic aspects of neurological diseases
  - 3.1.3. Convey restrictions on activities, including driving, that are mandated medically or legally because of neurological disorders
  - 3.1.4. Explain issues of competency
- 3.2. Deliver information to colleagues and other professionals in a concise and respectful manner

**4. Develop a common understanding on issues, problems and plans with patients, families and other professionals to develop a shared plan of care**

- 4.1. Identify and explore problems to be addressed from a patient encounter effectively, including the patient's and family's context, responses, concerns, and preferences
  - 4.1.1. Counsel patients and families regarding genetic concerns
- 4.2. Respect diversity and differences, including the impact of gender, religion and cultural beliefs on decision-making, with the knowledge that this varies from one individual to the next and needs open-ended discussion
- 4.3. Encourage discussion, questions, and interaction in the encounter
- 4.4. Engage patients, families, and relevant health professionals in shared decision-making to develop a plan of care
  - 4.4.1. Obtain informed consent effectively for diagnostic and therapeutic procedures employed in neurological conditions
  - 4.4.2. Lead discussions about prognosis of neurological disorders, level of care and transition to end-of-life care
  - 4.4.3. Lead discussions on brain death and organ donation
- 4.5. Address other challenging communication issues effectively, such as diagnostic uncertainty, delivering bad news and addressing anger, confusion and misunderstanding

**5. Convey effective oral and written information about a medical encounter**

- 5.1. Maintain clear, accurate and appropriate records (written or electronic) of clinical encounters and plans

- 5.2. Present verbal reports of clinical encounters and plans
- 5.3. Produce clear, accurate and appropriate neurological consultation notes and letters
- 5.4. Present medical information to the public or media about a neurological issue

## **Collaborator**

### ***Definition:***

As *Collaborators*, Neurologists effectively work within a health care team to achieve optimal patient care.

### ***Key and Enabling Competencies: Neurologists are able to...***

#### **1. Participate effectively and appropriately in an interprofessional health care team**

- 1.1. Describe the Neurologist's roles and responsibilities to other professionals
- 1.2. Recognize and respect the diversity of roles, responsibilities and competencies of other professionals within the neurological care team
- 1.3. Work with others to assess, plan, provide and integrate care for individual patients or groups of patients with neurological disorders
- 1.4. Work with others to assess, plan, provide and review other tasks, such as research problems, educational work, program review or administrative responsibilities
- 1.5. Participate in interprofessional team meetings, discharge planning and transfer of care
- 1.6. Collaborate with other professions for the provision of quality care
- 1.7. Describe the principles of team dynamics
- 1.8. Respect team ethics, including confidentiality, resource allocation and professionalism
- 1.9. Demonstrate leadership in a health care team, as appropriate

#### **2. Work with other health professionals effectively to prevent, negotiate and resolve interprofessional conflict**

- 2.1. Demonstrate a respectful attitude towards other colleagues and members of an interprofessional team
- 2.2. Work with other professionals to prevent conflicts
- 2.3. Employ collaborative negotiation to resolve conflicts
- 2.4. Respect differences and address misunderstandings and limitations in other professionals
- 2.5. Recognize one's own differences, misunderstandings and limitations that may contribute to interprofessional tension

2.6. Reflect on interprofessional team function

**Manager**

***Definition:***

As *Managers*, Neurologists are integral participants in health care organizations, organizing sustainable practices, making decisions about allocating resources, and contributing to the effectiveness of the health care system.

***Key and Enabling Competencies: Neurologists are able to...***

**1. Participate in activities that contribute to the effectiveness of their health care organizations and systems**

- 1.1. Participate in systemic quality process evaluation and improvement, such as patient safety initiatives
- 1.2. Describe the structure and function of the health care system as it relates to Neurology
- 1.3. Describe principles of health care financing, including physician remuneration, budgeting and organizational funding

**2. Manage their practices and careers effectively**

- 2.1. Set priorities and manage time efficiently to balance patient care, practice requirements, outside activities and personal life
- 2.2. Manage a practice in Neurology or a subspecialty of Neurology, including finances and human resources
- 2.3. Implement processes to ensure personal practice improvement
- 2.4. Employ information technology appropriately for patient care

**3. Allocate finite health care resources appropriately**

- 3.1. Describe the importance of just allocation of health care resources, balancing effectiveness, efficiency and access with optimal patient care
  - 3.1.1. Prioritize laboratory tests and neuroimaging effectively within the context of limited resources
  - 3.1.2. Choose the appropriate setting for assessment and care of patients with neurological disorders
- 3.2. Apply evidence and management processes for cost-appropriate care

**4. Serve in administration and leadership roles, as appropriate**

- 4.1. Chair or participate effectively in committees and meetings
- 4.2. Lead or implement changes in health care
- 4.3. Plan relevant elements of health care delivery (e.g., work schedules)

**Health Advocate**

***Definition:***

*As Health Advocates, Neurologists responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations.*

***Key and Enabling Competencies: Neurologists are able to...***

**1. Respond to individual patient health needs and issues as part of patient care**

- 1.1. Identify the health needs and issues of individual patients
  - 1.1.1. Identify at-risk patients that may have neurological diseases
  - 1.1.2. Identify complications of neurological diseases
  - 1.1.3. Advocate for appropriate lifestyle and workplace accommodation and benefits for those with neurological related disability
  - 1.1.4. Identify and discuss the need for advance care plans
- 1.2. Identify the need for advocacy, health promotion and disease prevention for individual patients with neurological disorders, and respond appropriately
  - 1.2.1. Facilitate appropriate access to health and social services, including neuroimaging, required by individual patients
  - 1.2.2. Promote primary and secondary disease prevention for at-risk patients

**2. Respond to the health needs of the communities that they serve**

- 2.1. Identify the need for advocacy, health promotion and disease prevention in the communities that Neurologists serve, and respond appropriately
  - 2.1.1. Identify deficiencies in resources, including equipment and medications, required for appropriate care of patients with neurological disorders, and advocate to have them addressed
  - 2.1.2. Describe community resources and related patient support groups
  - 2.1.3. Facilitate access to community resource programs (including home care, occupational and physiotherapy, drug plans and application for nursing homes)

- 2.2. Identify instances of competing interests between the communities served and other populations

**3. Identify the determinants of health for the populations that they serve**

- 3.1. Identify the determinants of health of the various groups of patients that Neurologists serve, including barriers to access to care and resources
  - 3.1.1. Identify the biological, psychosocial, environmental and economic factors affecting neurological health
- 3.2. Identify vulnerable or marginalized neurological patients within those served, including those without a family doctor, poor access to expensive medications, those of low socioeconomic status or with poor social supports and respond appropriately
- 3.3. Promote primary and secondary disease prevention for at-risk patient groups, including patients with cerebral ischemia

**4. Promote the health of individual patients, communities and populations**

- 4.1. Describe an approach to implementing a change in a determinant of health of the populations they serve
- 4.2. Describe how public policy impacts on the health of the populations served
- 4.3. Identify points of influence in the health care system and its structure
- 4.4. Describe the ethical and professional issues inherent in health advocacy, including altruism, social justice, autonomy, integrity and idealism
- 4.5. Appreciate the possibility of conflict inherent in their role as a health advocate for a patient or community with that of manager or gatekeeper
- 4.6. Describe the role of the medical profession in advocating collectively for health and patient safety

**Scholar**

***Definition:***

As *Scholars*, Neurologists demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge.

***Key and Enabling Competencies: Neurologists are able to...***

**1. Maintain and enhance professional activities through ongoing learning**

- 1.1. Describe the principles and strategies for implementing a personal knowledge management system
- 1.2. Recognize and address learning issues in practice

- 1.3. Conduct a personal practice audit
  - 1.4. Pose an appropriate learning question
  - 1.5. Access and interpret the relevant evidence regarding diagnosis, pathogenesis, prognosis and management of neurological disorders
  - 1.6. Integrate new learning into practice
  - 1.7. Evaluate the impact of any change in practice
  - 1.8. Document the learning process
- 2. Critically evaluate medical information and its sources, and apply this appropriately to practice decisions**
- 2.1. Describe the principles of critical appraisal
  - 2.2. Critically appraise retrieved evidence in order to address a neurological question
  - 2.3. Integrate critical appraisal conclusions into clinical care
- 3. Facilitate the learning of patients, families, students, residents, other health professionals, the public and others**
- 3.1. Describe principles of learning relevant to medical education
  - 3.2. Identify collaboratively the learning needs and desired learning outcomes of others
  - 3.3. Select effective teaching strategies and content to facilitate others' learning
  - 3.4. Demonstrate an effective lecture or presentation
  - 3.5. Assess and reflect on a teaching encounter
  - 3.6. Provide effective feedback
  - 3.7. Describe the principles of ethics with respect to teaching
- 4. Contribute to the development, dissemination, and translation of new knowledge and practices**
- 4.1. Describe the principles of research and scholarly inquiry
  - 4.2. Describe the principles of research ethics
  - 4.3. Pose a scholarly question
  - 4.4. Conduct a systematic search for evidence
  - 4.5. Select and apply appropriate methods to address the question
  - 4.6. Disseminate the findings of a study

## Professional

### **Definition:**

As *Professionals*, Neurologists are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, and high personal standards of behaviour.

### **Key and Enabling Competencies: Neurologists are able to...**

#### **1. Demonstrate a commitment to their patients, profession, and society through ethical practice**

- 1.1. Exhibit appropriate professional behaviors in practice, including honesty, integrity, commitment, compassion, respect and altruism
- 1.2. Demonstrate a commitment to delivering the highest quality care and maintenance of competence, including regular scanning of current neurological literature and attendance at relevant rounds and conferences
- 1.3. Recognize and appropriately respond to ethical issues encountered in practice
- 1.4. Manage conflicts of interest
- 1.5. Recognize the principles and limits of patient confidentiality as defined by professional practice standards and the law
- 1.6. Maintain appropriate relations with patients
- 1.7. Demonstrate knowledge of one's own limitations and regularly evaluate one's own knowledge and skills

#### **2. Demonstrate a commitment to their patients, profession and society through participation in profession-led regulation**

- 2.1. Demonstrate knowledge and an understanding of the professional, legal and ethical codes of neurological practice
- 2.2. Fulfill the regulatory and legal obligations required of current practice
- 2.3. Demonstrate accountability to professional regulatory bodies
- 2.4. Recognize and respond to others' unprofessional behaviours in practice
- 2.5. Participate in peer review

#### **3. Demonstrate a commitment to physician health and sustainable practice**

- 3.1. Balance personal and professional priorities to ensure personal health and a sustainable practice
- 3.2. Strive to heighten personal and professional awareness and insight
- 3.3. Recognize other professionals in need and respond appropriately

*These training requirements apply to those who begin training on or after July 1<sup>st</sup>, 2011.*

## **MINIMUM TRAINING REQUIREMENTS**

### **A. ADULT NEUROLOGY**

Five (5) years of approved residency training. This period must include:

1. Twenty-four (24) months of foundational training, to include:
  - 1.1. Ten (10) months of clinical training in Internal Medicine. This must include:
    - 1.1.1. A minimum of two (2) months on a General Internal Medicine clinical teaching unit (CTU) or its equivalent
    - 1.1.2. A minimum of one (1) month in Critical Care Medicine
    - 1.1.3. A minimum of one (1) month and maximum of two (2) months each in selective subspecialty rotations in Internal Medicine, which may include:
      - 1.1.3.1. Endocrinology
      - 1.1.3.2. Geriatrics
      - 1.1.3.3. General Internal Medicine Consultation
      - 1.1.3.4. General Internal Medicine Ambulatory Care
      - 1.1.3.5. Cardiology
      - 1.1.3.6. Infectious Disease
      - 1.1.3.7. Emergency Medicine
      - 1.1.3.8. Rheumatology
      - 1.1.3.9. Other Internal Medicine rotations approved by the Neurology program director
  - 1.2. Fourteen (14) months of training pertinent to adult Neurology, which must include:
  - 1.3. A maximum of four (4) months of further clinical training in Internal Medicine
    - 1.3.1. A minimum of two (2) months and a maximum of seven (7) months in clinical Neurology

*SPECIALTY TRAINING REQUIREMENTS IN NEUROLOGY (2011)*

- 1.3.2. A minimum of three selective rotations, each of one (1) to two (2) months duration, in any of:
  - 1.3.2.1. Psychiatry
  - 1.3.2.2. Neurosurgery
  - 1.3.2.3. Neuroradiology
  - 1.3.2.4. Physical Medicine and Rehabilitation
  - 1.3.2.5. Emergency Medicine
  - 1.3.2.6. Pain/palliative care
  - 1.3.2.7. Neuro-Ophthalmology
  - 1.3.2.8. Neuro-Oncology
  - 1.3.2.9. Clinical electrophysiology
  - 1.3.2.10. Research
2. Thirty-six (36) months of further residency training, to include:
  - 2.1. Twenty-four (24) months of training in clinical Neurology. This must include:
    - 2.1.1. A minimum of eighteen (18) months in adult Neurology which must incorporate, in aggregate, at least:
      - 2.1.1.1. Four (4) months in general or subspecialty Neurology clinics
      - 2.1.1.2. Six (6) months of direct patient care on a Neurology CTU or its equivalent, including at least two (2) months in PGY4 or PGY5 as a senior resident with increased responsibility
    - 2.1.2. A minimum of three (3) months in pediatric Neurology
  - 2.2. Twelve (12) months of residency training or research pertinent to Neurology. This must include in aggregate:
    - 2.2.1. A minimum of two (2) months in Neuropathology
    - 2.2.2. A minimum of two (2) months in clinical electrophysiology
    - 2.2.3. A minimum of one (1) month in Neuroradiology
    - 2.2.4. A minimum of one (1) month devoted to a scholarly project

## **B. PEDIATRIC NEUROLOGY**

Five (5) years of approved residency training. This period must include:

1. Twenty-four (24) months of foundational training, to include:
  - 1.1. Twelve (12) months of clinical training in Pediatrics. This must include:
    - 1.1.1. A minimum of three (3) months on a general Pediatrics clinical teaching unit (CTU) or its equivalent
    - 1.1.2. A minimum of one (1) month in pediatric Critical Care Medicine
    - 1.1.3. A minimum of one (1) month and a maximum of two (2) months each in selective subspecialty rotations in Pediatrics, which may include:
      - 1.1.3.1. Developmental Pediatrics
      - 1.1.3.2. Neonatology
      - 1.1.3.3. Endocrinology
      - 1.1.3.4. General pediatric consultation
      - 1.1.3.5. General pediatric ambulatory care
      - 1.1.3.6. Cardiology
      - 1.1.3.7. Infectious Disease
      - 1.1.3.8. Emergency Medicine
      - 1.1.3.9. Rheumatology
      - 1.1.3.10. Other Pediatric rotations approved by the Neurology program director
  - 1.2. Twelve (12) months of training pertinent to Pediatric Neurology. This must include:
    - 1.2.1. A maximum of eight (8) months in Pediatrics
    - 1.2.2. A maximum of six (6) months in clinical Neurology
    - 1.2.3. A minimum of three selective rotations, each of one (1) to two (2) months duration, in any of:
      - 1.2.3.1. Psychiatry
      - 1.2.3.2. Neurosurgery
      - 1.2.3.3. Neuroradiology
      - 1.2.3.4. Genetics
      - 1.2.3.5. Metabolics
      - 1.2.3.6. Embryology
      - 1.2.3.7. Neonatal Neurology
      - 1.2.3.8. Physical Medicine and Rehabilitation
      - 1.2.3.9. Pain/palliative care
      - 1.2.3.10. Neuro-Ophthalmology

## *SPECIALTY TRAINING REQUIREMENTS IN NEUROLOGY (2011)*

- 1.2.3.11. Neuro-Oncology
  - 1.2.3.12. Clinical electrophysiology
  - 1.2.3.13. Research
2. Thirty-six (36) months of further residency training, to include:
- 2.1. Twenty-four (24) months of training in clinical Neurology. This must include:
    - 2.1.1. A minimum of eighteen (18) months in pediatric Neurology, which must incorporate, in aggregate, at least:
      - 2.1.1.1. Five (5) months in general or subspecialty Neurology clinics
      - 2.1.1.2. Five (5) months on an inpatient Neurology consultation service or CTU or its equivalent, including at least two (2) months in PGY4 or PGY5 as a senior resident with increased responsibility
    - 2.1.2. Six (6) months in adult Neurology
  - 2.2. Twelve (12) months of residency training or research pertinent to Neurology. This must include in aggregate:
    - 2.2.1. A minimum of two (2) months in Neuropathology
    - 2.2.2. A minimum of two (2) months in clinical electrophysiology
    - 2.2.3. A minimum of one (1) month in Neuroradiology
    - 2.2.4. A minimum of one (1) month devoted to a scholarly project

### **NOTES:**

Rotations completed in 1.2 may be counted as credit toward the same rotations required in 2.1 and 2.2.

Royal College certification in Neurology requires all of the following:

- 1. Successful completion of a 5-year Royal College accredited program in Neurology; or successful completion of a 4-year Accreditation Council for Graduate Medical Education (ACGME) - accredited Neurology program with certification by the American Board of Psychiatry and Neurology (ABPN) plus completion of one year of specialty experience and possession of an unrestricted licence to practice medicine in the United States or Canada; and
- 2. Successful completion of the certification examination in Neurology

The program outlined above is to be regarded as the minimum training requirements. Additional training may be required by the program director to ensure that clinical competence has been achieved.

**REVISED - 2011**