



# McGill

**Neurology Residency  
Program**  
Department of Neurology &  
Neurosurgery

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## **Adult Neurology Residency Training Program McGill University Objectives of Training and Training Requirements**

### **In Pediatric Neurology for Adult Neurology Residents**

All trainees in Adult Neurology will spend a minimum of 3 months on the Child Neurology Service at the Montreal Children's Hospital. So that adult neurology residents may be exposed to pediatric neurology relatively early on in their training and in order to provide a "refresher" for senior adult trainees, to periods of the three period rotation will take place during PGY3 while the final period will take place during PGY5. Anyone wishing may elect to do an additional 3 months of pediatric neurology during their elective period. The objectives for Adult Neurology Trainees will have to be appropriate for a 3 month rotation.

#### **GENERAL OBJECTIVES:**

Residents must demonstrate the knowledge, skills and attitudes relating to age, gender, culture and ethnicity pertinent to pediatric neurology. In addition, all residents must demonstrate an ability to incorporate age, gender, cultural and ethnic perspectives in research methodology, data presentation and analysis.

On completion of the educational program, the graduate physician will be competent to function as a consultant neurologist. This requires the physician to:

1. Provide scientifically based, comprehensive and effective diagnosis and management plan for patients with neurological disorders.
2. Communicate effectively with patients, their families and medical colleagues (particularly referring physicians), and other health care professionals.
3. Counsel patients and their families and others on aspects of prevention of neurological disorders, including risk factors, and genetic and environmental concerns.
4. Maintain complete and accurate medical records.
5. Effectively coordinate the work of the health care team.

6. Be an effective teacher of other physicians (including medical students and house officers), other health care personnel and patients and their family.
7. Be proficient in professional and technical skills related to the specialty.
8. Demonstrate personal and professional attitudes consistent with a consultant physician role.
9. Be willing and able to appraise accurately his or her own professional performance.
10. Be willing and able to keep his or her practice current through reading and other modes of continuing medical education.
11. Be able to critically assess the neurological literature as it relates to patient diagnosis, investigation and management.
12. Be able to participate in clinical or basic science studies as a member of a research team.

### **SPECIFIC OBJECTIVES:**

At the completion of training, the resident will have acquired, along with those outlined by the Royal College of Physicians and Surgeons of Canada Education Committee Objectives of Training and Specialty Training Requirements in Pediatric Neurology, the following competencies and will function effectively in the following CanMEDS roles as:

#### **1. Medical Expert/Clinical Decision-Maker**

##### ***General Requirements***

- Demonstrate diagnostic and therapeutic skills for ethical and effective patient care.
- Access and apply relevant information to clinical practice.
- Demonstrate effective consultation services with respect to patient care, education and legal opinions.

##### ***Specific Requirements***

Provide scientifically based, comprehensive and effective diagnosis and management for patients with neurological disorders.

## Clinical Skills

For a patient with a neurological complaint or disorder, the physician will be able to:

- Obtain a complete neurological history from children and/or their parents, obtaining a collateral history where necessary.
- To obtain an accurate and complete history and carry out a competent neurological examination in a pediatric setting. Trainees will be expected to acquire and accurately record a family history reinforcing their understanding of various modes of inheritance of genetic disorders. They will be expected to take an accurate history of pregnancy, labour and delivery, and to have an understanding of the neonatal period and developmental milestones.
- Obtain a history and physical examination in the Neonatal Intensive Care Unit and in the Pediatric Intensive Care Unit.
- Perform an appropriate physical examination.
- Determine whether a patient's symptoms and signs are the result of an organic or psychological disorder. Where they are due to an organic disorder, the resident must determine whether they result from unifocal, multifocal or diffuse involvement of the nervous system and, where possible, appropriately localize the lesion(s).
- Formulate an appropriate differential and provisional diagnosis.
- Outline an appropriate plan of laboratory investigation.
- Outline an appropriate therapeutic plan.
- Exhibit appropriate clinical judgment in outlining a differential diagnosis and an investigative and therapeutic plan, taking into account matters such as the patient's age, general health, risk and cost of investigative procedures, risk and cost of therapeutic interventions, and epidemiology of the disease.
- To learn how to function in a pediatric outpatient setting via

New patient clinics: the evaluation of patients never previously seen in Neurology employing the basic clinical skills previously mentioned. This setting would also be used to teach communication with parents, of interim diagnostic impressions, plans for investigation and possible therapeutic plans.

Follow-up clinics: to develop skills in rapid chart review, extracting pertinent data, good concise record keeping. The development of good communication skills in reporting previous results, assessing ongoing progress, and encouraging compliance with treatment will be encouraged.

Telephone communication: working with the Neurology nurse and will full Neurology staff support, the trainee will learn how to evaluate clinical situations over the telephone. He is expected to formulate accurate impressions and plans of action.

### **Technical Skills**

- Perform a lumbar puncture in a pediatric patient.
- Identify and describe abnormalities seen in common neurological disorders on plain x-rays, cerebral and spinal angiograms, computerized tomography (CT) of the brain and spinal column, magnetic resonance imaging (MRI) of the brain and spinal column.
- With regard to a specific patient or clinical history, evaluates the relevance of a specific report on the following investigative procedures: electroencephalogram; motor and sensory nerve conduction study; electromyography; evoked responses; electronystagmogram; audiogram; perimetry; psychometry; cerebrospinal fluid (CSF) analysis; plain x-ray; angiogram; ultrasound and CT, MRI scans of the neuraxis.
- Identify and describe gross and microscopic specimens taken from the normal nervous system and from the nervous system of patients affected by the major neurological disorders.

### **Knowledge**

- As a basis for clinical competence, the neurologist must be familiar with and able to describe or discuss:
- the clinical features, including presenting signs and symptoms, natural history, and prognosis, for the major neurological disorders including: neurological complications of systemic diseases, trauma to the nervous system, cerebrovascular disorders, nervous system tumors, infections of the nervous system, demyelinating disorders, anoxic/ischemic and toxic/metabolic encephalopathies, deficiency syndromes, neurocutaneous disorders, movement disorders, the epilepsy syndromes and clinical seizure types, headache disorders, disorders/diseases of the following anatomic structures; cerebellum, cranial nerves, special senses, roots, plexi, peripheral nerves, neuromuscular junctions, muscle
- the embryological development of the nervous system and how congenital anomalies arise from disorders of this process
- the gross and microscopic anatomy of the nervous system, nerve roots, peripheral nerves, muscles and the vascular system of the nervous system; this includes the recognition of the structures in

both anatomical and neuro-imaging formats (when technically feasible)

- the anatomy, composition and physiology of myelin
- the mechanisms underlying the resting membrane potential, conduction of an action potential and synaptic transmission
- axonal transport
- the major neurotransmitters and neuromodulators including their clinical significance
- the role of trophic factors in the nervous system
- the formation and circulation of the cerebrospinal fluid (CSF)
- the biologic basis for the blood-brain, blood-cerebrospinal fluid and blood-nerve barriers, and their clinical importance in health and disease
- cerebral blood flow and cerebral metabolism
- function and dysfunction of the immune system with particular emphasis on the implications for nervous system disease
- the anatomical and physiological basis of consciousness, sleep and wakefulness
- the anatomical and physiological basis of speech, memory, learning and behaviour
- the anatomical and physiological basis of the following systems: special senses, sensory, motor, autonomic, limbic, and reticular activating system
- the physiology of the following major subdivisions of the central nervous system: major cortical regions, basal ganglia, thalamus, cerebellum, reticular activating system, respiratory centres and the limbic system
- the anatomic and physiologic basis of the normal neurological examination taking into account the effect of age
- the pathophysiology of neurologic symptoms and signs in the major, primary and secondary neurologic disorders; (examples of these include seizures, spasticity, tremor, etc.)
- the basic principles underlying the interpretation of the major clinical tests such as nerve conduction studies, electromyography, electroencephalography, evoked potentials, perimetry, electronystagmography, audiometry, psychometry and CSF analysis; the indications for, and potential value of and limitations

and contraindications for, the tests in any clinical situation where their use is being contemplated

- the indications for, side effects and dosages of the major agents used in neurologic therapeutics
- the mechanism(s) of action of the major drugs used in neurological therapeutics
- the teratogenic effects of the major drugs used in neurological therapeutics
- the role of surgery in the therapy of neurological disorders including indications and contraindications for its use
- the role of rehabilitative medicine in the treatment of neurological disorders
- the basic histopathologic reactions which occur in nervous system disorders
- the pathologic changes (gross and microscopic) occurring in the major neurologic diseases
- infectious diseases of the nervous system
- the major bacteria causing nervous system infections including classification, staining characteristics, and antibiotic sensitivities
- the basic principles of clinical genetics
- the basic mechanisms of chromosomal division, and chromosomal abnormalities seen in the major neurological disorders that result from disturbances in these mechanisms
- the patterns of inheritance, where known, of neurological disorders
- the principles underlying and the diagnostic value of gene localization
- the biochemical basis for the major neurologic syndromes resulting from inborn errors of metabolism
- the basic procedures used in clinical epidemiology and the clinical epidemiology of nervous system disorders
- the major neurotoxicologic agents and their effects
- the therapeutic and toxic effects of irradiation on nervous tissue, its role in the treatment of, and its relationship to the production of nervous system disorders

- Trainees will have some basic knowledge of

Prenatal Encephalopathies:

Cerebral Dysgenesis

- Concept of “Cerebral Palsy”
- Chromosomal abnormalities.

Perinatal encephalopathies: Hypoxic ischemic encephalopathy – pathophysiology, pathology, clinical syndromes.

The understanding of static versus progressive encephalopathies

Progressive encephalopathies – understanding of the clinical course, pathophysiology, and underlying genetics of:

- lysosomal storage disorders
- mitochondrial encephalopathies,
- peroxisomal disorders.

Epilepsy

- Classification of seizures
- Classification of epilepsies
- Anticonvulsant medications
- Status epilepticus in childhood
- Childhood epileptic syndromes eg

Kleffner-Landau syndrome

Myoclonic epilepsies

Non epileptic paroxysmal disorders of childhood; eg syncope and migraine

The evaluation of the child with developmental delay, learning disorder, neurobehavioral disorders, eg ADHD.

Basic understanding of the principles of neurogenetics to be carried out through the neurogenetics clinics and neurofibromatosis clinics

Neuromuscular disorders in childhood

Anterior horn cell, peripheral nerve, disorders of the neuromuscular junction and muscle in childhood.

Residents will have exposures to these problems both in general neurology clinics, on the ward and in the neuromuscular clinic.

## **2. Communicator**

### ***General Requirements***

- Establish therapeutic relationships with patients/families.
- Obtain and synthesize relevant history from patients/families/communities.
- Listen effectively.
- Discuss appropriate information with patients/families and the health care team.

### ***Specific Requirements***

Communicate effectively with patients, their families and medical colleagues (particularly referring physicians), and other health care professionals in both the inpatient and outpatient settings. The Neurologist will:

- Communicate effectively and regularly with patients and their families.
- Be considerate and compassionate in communicating with patients and families, willingly provide accurate information appropriate to the clinical situation, with a reasonable attempt at prognosis.
- Communicate effectively and appropriately with nurses and paramedical personnel.
- When ordering investigative procedures, ensure there has been adequate communication about the patient with the person who will actually be doing and/or reporting the diagnostic study.

Counsel patients and their families and others about aspects of prevention of neurologic disorders, including risk factors, and genetic and environmental concerns. The neurologist will:

- Recognize that complete patient care requires that, in addition to the need for making a correct diagnosis, a search for risk factors for the disorder be undertaken.
- Recognize that treatment for a patient with a neurological disorder may require in addition to specific medical and surgical interventions, the elimination of risk factors and genetic counseling.



### 3. Collaborator

#### ***General Requirements***

- Consult effectively with other physicians and health care professionals.
- Contribute effectively to other interdisciplinary team activities.

#### ***Specific Requirements***

Be an effective teacher of other physicians (including medical students and house officers), other health care personnel, and patients. The neurologists will:

- Provide instruction to medical students and more junior physicians at a level appropriate to their clinical education and professional competence.
- Willingly share knowledge with others with whom they are associated, thus ensuring the most effective delivery of health care to patients.
- Participate in multi-disciplinary ward rounds where and when appropriate.

### 4. Manager

#### ***General Requirements***

- Utilize resources effectively to balance patient care, learning needs, and outside activities.
- Allocate finite health care resources wisely.
- Work effectively and efficiently in a health care organization.
- Utilize information technology to optimize patient care, life-long learning and other activities.

#### ***Specific Requirements***

Be proficient in professional skills related to the specialty.

Demonstrate the following professional skills in time management:

- Recognize that effective use of time depends upon punctuality.
- Recognize that effective use of time requires planning.
- Develop speed as well as accuracy in clinical skills.

- Reserve time for reading and keeping current with the neurological literature.
- Establish routines for carrying out regular activities and adhere to them.

Maintain complete and accurate medical records:

- Record and maintain a complete and accurate medical record for every patient seen; this record will include the patient's history and the findings on physical examination (including the neurological examination), a differential diagnosis, a provisional diagnosis, a plan for management, appropriate progress notes, and a comprehensive discharge summary.

Effectively coordinate the work of the health care team:

- Organize and supervise the more junior physicians and medical students on a ward and/or consultation service in a manner that ensures the efficient and effective delivery of health care for the patients.
- Indicate, by the treatment plan, that for the optimal treatment of many patients with neurological disorder, a team approach is necessary -- members of the team may include nurses, rehabilitation personnel (physiotherapists, occupational therapists, speech therapists, etc.), psychologists, social workers, etc.
- Identify where an important role(s) can be played by disease focused lay groups with regard to helping the patient and/or family and to facilitate its happening.

## **5. Health Advocate**

### ***General Requirements***

Identify the important determinants of health affecting patients.

Contribute effectively to improved health of patients and communities.

Recognize and respond to those issues where advocacy is appropriate.

### ***Specific Requirements***

Learn about community resources and related patient support groups; provide assistance to access programs (e.g. CLSC, home care, occupational and physiotherapy, etc) and participate in their activities.

Educate, be able to generate and access information (e.g. printed material, video tapes web sites) and be available as a resource person to counsel patients effectively on neurological disorders.

Counsel patients and families on the importance of taking responsibility for their own well-being and recognize the important determinants predisposing to neurological disorders

Understand the role of national and international bodies in the promotion of neurological health, and the prevention, detection, and treatment of neurological disorders.

## **6. Scholar**

### ***General Requirements***

Develop, implement and monitor a personal continuing education strategy.

Critically appraise sources of medical information.

Facilitate learning of patients, house staff/students and other health professionals.

Contribute to development of new knowledge.

### ***Specific Requirements***

Be able to critically assess the neurological literature as it relates to patient diagnosis, investigation and treatment:

- Develop criteria for evaluating neurological literature.
- Critically assess the neurological literature using these criteria.
- Be familiar with the design of experimental and observational studies, especially randomized controlled trials.
- Be able to calculate absolute risk reductions, relative risk reductions and numbers needed to treat or harm.

Be able to participate in clinical or basic science studies as a member of a research team:

- Be able to describe principles of good research.
- Use the above principles, and be able to judge whether a research project is properly designed

## **7. Professional**

### ***General Requirements***

Deliver highest quality care with integrity, honesty and compassion.

Exhibit appropriate personal and interpersonal professional behaviours with patients/families, peer residents. And other health care professionals.

Practice medicine ethically consistent with obligations of a physician.

### ***Specific Requirements***

Demonstrate personal and professional attitudes consistent with a consulting physician role:

- Periodically review his/her own personal and professional performance against national standards set for the specialty.
- Be willing to include the patient in discussions concerning appropriate diagnostic and management procedures.
- Show appropriate respect for the opinions of fellow consultants and referring physicians in the management of patient problems and be willing to provide means whereby differences of opinion can be discussed and resolved.

Be willing and able to appraise accurately his/her own professional performances and show that he/she recognizes his/her own limitations with regard to skill and knowledge by appropriately consulting other physicians and paramedical personnel when caring for the patient.

Be willing and able to keep his/her practice current through reading and other modes of continuing medical education and develop a habit of maintaining current his/her clinical skill and knowledge base through continuing medical education.