

**2001**

(Please see also the "Policies and Procedures.")

## **DEFINITION**

Neurology is that branch of medicine concerned with the study of the nervous system in health and disease.

## **GENERAL OBJECTIVES**

Residents must demonstrate the knowledge, skills and attitudes relating to gender, culture and ethnicity pertinent to neurology. In addition, all residents must demonstrate an ability to incorporate 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 for patients with neurologic disorders.
2. Communicate effectively with patients, their families and medical colleagues (particularly referring physicians), and other health care professionals.
3. Counsel patients 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.
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.

These elements of competence are expanded as detailed objectives, for greater clarity, in the following pages. The terms "effective" and "appropriate" are used frequently in these statements. "Effective" is defined for the purpose of this document as "adequate to the efficient solution of the problem". "Appropriate" is defined as "appropriate to the presenting problem(s) and patient attitudes and activity". Throughout this document, the term "nervous system" is understood to refer to the central nervous system, the peripheral nervous system, the neuromuscular junction and skeletal muscle.

The detailed objectives describe minimal standards and in no way exclude the necessity for mastery of additional knowledge, skills or attitudes necessary for the most effective management of patients with nervous system disorders.

## **SPECIFIC OBJECTIVES**

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

### **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 neurologic disorders.

## **1. Clinical Skills**

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

- Obtain a complete neurologic history from adults and children obtaining a collateral history where necessary.
- 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.

## **2. Technical Skills**

- Perform a lumbar puncture, Tensilon testing and caloric testing.
- Identify and describe abnormalities seen in common neurologic disorders on plain x rays; myelograms; angiograms and computerized tomography (CT), isotope, magnetic resonance imaging (MRI) and position emission tomography (PET) scans of the neuraxis.
- 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; myelogram; angiogram; ultrasound and CT, isotope, MRI and PET 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 neurologic disorders.

## **3. 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 neurologic disorders
- the clinical features of the major psychiatric syndromes and their known or postulated neurochemical basis
- 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

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- 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, aphasia, 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 mechanism(s) of action of apheresis including the rationale for the therapeutic usefulness of the procedure in specific neurological diseases, and the indications and contraindications for its use
  - 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
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- 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

### **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.

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- Counsel patients 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.

### **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.

### **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.

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- 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 neurologic 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 neurologic 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.

### **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. home care, occupational and physiotherapy, drug plans, application for nursing homes 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 on the importance of taking responsibility for their own well-being and recognize the important determinants predisposing to neurological disorders (e.g. risk factors for transient ischemic attack (TIA) and stroke, teratogenic effects of anti-epileptic drugs).

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- Understand the role of national and international bodies (e.g. Alzheimer, Stroke, Multiple Sclerosis Societies) in the promotion of neurological health, and the prevention, detection, and treatment of neurological disorders.

### **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 neurologic literature as it relates to patient diagnosis, investigation and treatment:
  - Develop criteria for evaluating neurological literature.
    - o Critically assess the neurological literature using these criteria.
- 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.

### **Professional**

#### *General Requirements:*

- Deliver highest quality care with integrity, honesty and compassion.
- Exhibit appropriate personal and interpersonal professional behaviours.
- Practise 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.

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- 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.

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