

2010

**EDITORIAL REVISION – JUNE 2014
VERSION 1.1**

This document applies to those who begin training on or after July 1st, 2010.

DEFINITION

Neurosurgery is the specialty of surgery dedicated to the diagnosis, surgical and non-surgical management of congenital abnormalities, trauma and diseases affecting the nervous system, its blood supply, and supporting structures.

GOALS

Upon completion of training, a resident is expected to be a competent specialist in Neurosurgery capable of assuming a consultant's role. The resident must acquire a thorough working knowledge of the theoretical basis of Neurosurgery, including its foundations in basic medical sciences and research.

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

The resident must be well-grounded in the general principles of both Neurosurgery and surgery in general. The fully-trained resident must demonstrate proficiency and expertise in the care of neurosurgical conditions as well as pre- and post- surgical care.

In addition to knowledge, clinical ability, and surgical skill as these apply to surgical diseases of the nervous system, the resident will be expected to have a working knowledge of the related disciplines of basic and clinical neuroscience.

Residents must demonstrate a detailed knowledge of the normal structure and function of the nervous system and its supporting structures, and the pathological processes affecting them. They must demonstrate the diagnostic skills to identify congenital and acquired conditions affecting the nervous system and the therapeutic skills for ethical and effective patient care. They must develop learning strategies to enhance their knowledge and expertise so as to maintain and enhance quality of neurosurgical care.

In this document the term “advanced knowledge” refers to a broad and deep level of knowledge, from basic science to clinical application, including the ability to apply the scientific literature, adapting and extrapolating as required, sufficient to independently manage a problem in the area.

NEUROSURGERY 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, Neurosurgeons 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: Neurosurgeons are able to...

- 1. Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical and patient-centered medical care**
 - 1.1. Perform a neurosurgical consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to a request from another health care professional
 - 1.2. Demonstrate use of all CanMEDS competencies relevant to their practice
 - 1.3. Identify and appropriately respond to relevant ethical issues arising in patient care
 - 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. Recognize and respond to the ethical dimensions in medical decision-making
 - 1.7. Demonstrate medical expertise in situations other than patient care, such as providing expert legal testimony or advising governments, as needed

- 2. Demonstrate and maintain clinical knowledge, skills and attitudes appropriate to their practice**
 - 2.1. Apply knowledge of the clinical, socio-behavioural, and fundamental biomedical sciences relevant to Neurosurgery
 - 2.1.1. Basic and clinical sciences fundamental to all surgical specialties as outlined in the Royal College Foundations of Surgery objectives of training document
 - 2.1.2. Embryology of the nervous system and the mechanisms of congenital anomalies

- 2.1.3. Anatomy and physiology of the nervous system
 - 2.1.3.1. Cerebral cortex, subcortical regions, basal ganglia, thalamus, brain stem, cerebellum and cranial nerves
 - 2.1.3.2. Spinal cord
 - 2.1.3.3. Spine and skull
 - 2.1.3.4. Nerve roots, peripheral nerves and associated muscles
 - 2.1.3.5. Neurotransmission including but not limited to nerve conduction, the neuromuscular junction, axonal transport, neurotransmitters and neuromodulators, resting membrane potentials, action potentials and synaptic transmission
 - 2.1.3.6. Formation, circulation and absorption of cerebrospinal fluid
 - 2.1.3.7. Cerebral and spinal vascular anatomy and physiology including cerebral blood flow, metabolism and the blood-brain barrier
 - 2.1.3.8. Consciousness, sleep and mechanisms of wakefulness
 - 2.1.3.9. Speech, memory, learning and behaviour
 - 2.1.3.10. Special senses
 - 2.1.3.11. Motor and sensory systems
 - 2.1.3.12. Autonomic system
 - 2.1.3.13. Pain
- 2.1.4. Anatomy and physiology of those areas outside the nervous system relevant to neurosurgical practice
- 2.1.5. Gross and microscopic pathology of neurosurgical conditions
- 2.1.6. Advanced knowledge of the clinical features, including symptoms, signs, natural history, and prognosis, and treatment of disorders of the central and peripheral nervous system in the following categories:
 - 2.1.6.1. Neurosurgical emergencies
 - 2.1.6.2. Infectious, inflammatory, and degenerative conditions
 - 2.1.6.3. Metabolic and endocrine conditions
 - 2.1.6.4. Cerebrovascular disorders
 - 2.1.6.5. Functional neurosurgery and epilepsy
 - 2.1.6.6. Neuro-critical care
 - 2.1.6.7. Neuro-oncology
 - 2.1.6.8. Pediatric and congenital neurosurgical conditions
 - 2.1.6.9. Peripheral nerve disorders
 - 2.1.6.10. Spinal disorders
 - 2.1.6.11. Trauma

OBJECTIVES OF TRAINING IN NEUROSURGERY (2010)

- 2.1.7. Clinical pharmacology: the indications for, mechanism(s) of action, side effects and dosages of drugs and agents used in neurosurgical therapeutics
 - 2.1.8. Clinical and molecular genetics of neurosurgical diseases
 - 2.1.9. Clinical epidemiology of neurosurgical diseases
 - 2.1.10. Common and important neurological conditions, with particular emphasis on those neurological entities which have important differential diagnostic considerations with respect to neurosurgical care
 - 2.1.11. Infectious diseases of the nervous system
 - 2.1.12. Physiology and fundamentals of clinical endocrinology, especially neuroendocrinology
 - 2.1.13. Principles of neuro-ophthalmology and neuro-otology
 - 2.1.14. Principles of neuropsychology relevant to Neurosurgery
 - 2.1.15. Physiology and fundamental principles of neuroanesthesia
 - 2.1.16. Principles of physical medicine and rehabilitation in the treatment of neurosurgical patients
 - 2.1.17. Therapeutic and toxic effects of radiation on the nervous system
 - 2.2. Describe the CanMEDS framework of competencies relevant to Neurosurgery
 - 2.3. Apply the lifelong learning skills of the Scholar Role to implement a personal education program to keep up-to-date, and to enhance areas of professional competence
 - 2.4. Contribute to the enhancement of quality care and patient safety in their practice, integrating the best available evidence and knowledge of best practices
- 3. Perform a complete and appropriate assessment of a neurosurgical patient**
- 3.1. Elicit a history that is relevant, clear, concise and accurate
 - 3.2. Perform a physical examination that is relevant, clear, concise and accurate
 - 3.3. Select medically appropriate investigative methods in a resource-effective and ethical manner
 - 3.3.1. Select and interpret appropriate general diagnostic tests for the management of neurosurgical patients
 - 3.3.2. Select and interpret appropriate specific diagnostic tests for the management of neurosurgical patients
 - 3.3.2.1. Cerebrospinal fluid studies
 - 3.3.2.2. Electrophysiology
 - 3.3.2.3. Neuroimaging
 - 3.3.2.4. Tests of clinical electrophysiology
 - 3.3.2.4.1. Electroencephalography

- 3.3.2.4.2. Electrocorticography
- 3.3.2.4.3. Evoked potentials
- 3.3.2.4.4. Electromyography
- 3.3.2.4.5. Nerve conduction studies

3.3.2.5. Interpret neuroimaging examinations

- 3.3.2.5.1. Plain x-rays
- 3.3.2.5.2. Computed tomography
- 3.3.2.5.3. Magnetic resonance imaging
- 3.3.2.5.4. Angiography
- 3.3.2.5.5. Ultrasonography
- 3.3.2.5.6. Radionuclide imaging

- 3.4. Demonstrate effective clinical problem solving and judgment in generating differential diagnoses and management plans

4. Use preventive and therapeutic interventions effectively

- 4.1. Demonstrate appropriate application of preventive interventions relevant to Neurosurgical practice
- 4.2. Provide high quality surgical and non-operative care and followup, in collaboration with the patient and their family
- 4.3. Obtain appropriate informed consent for proposed interventions
- 4.4. Provide appropriate end-of-life care

5. Demonstrate proficient and appropriate diagnostic and therapeutic procedural skills

- 5.1. Select and perform appropriate therapeutic procedures in a timely fashion
 - 5.1.1. Demonstrate advanced knowledge of the indications, contraindications, and management of potential complications of neurosurgical procedures
 - 5.1.2. Demonstrate proficiency in the performance of the following procedural skills, including appropriate documentation:
 - 5.1.2.1. Burr holes for the purpose of:
 - 5.1.2.1.1. Biopsy
 - 5.1.2.1.2. Removal of hematoma
 - 5.1.2.1.3. Intracranial pressure monitoring

- 5.1.2.2. Supratentorial craniotomies for the purpose of:
 - 5.1.2.2.1. Removal of intracranial hematomas
 - 5.1.2.2.2. Repair of cerebral aneurysms
 - 5.1.2.2.3. Removal of intrinsic and extrinsic tumors
 - 5.1.2.2.4. Treatment of intracranial infections
 - 5.1.2.2.5. Brain biopsy
 - 5.1.2.2.6. Decompression for cerebral swelling

- 5.1.2.3. Infratentorial craniotomies for the purpose of:
 - 5.1.2.3.1. Removal of intracranial hematomas
 - 5.1.2.3.2. Removal of intrinsic and extrinsic tumors
 - 5.1.2.3.3. Treatment of intracranial infections
 - 5.1.2.3.4. Brain biopsy
 - 5.1.2.3.5. Cerebellar decompression

- 5.1.2.4. Utilization of image guidance technology
- 5.1.2.5. Transsphenoidal removal of pituitary tumours
- 5.1.2.6. Exposure of extracranial carotid arteries, and simple arterial repair
- 5.1.2.7. Treatment of simple and compound depressed skull fractures
- 5.1.2.8. Spinal decompression for congenital, degenerative, neoplastic, traumatic and infectious disease
 - 5.1.2.8.1. Cervical
 - 5.1.2.8.1.1. Anterior
 - 5.1.2.8.1.1.1. Discectomy
 - 5.1.2.8.1.1.2. Vertebrectomy
 - 5.1.2.8.1.2. Posterior
 - 5.1.2.8.1.2.1. Laminectomy
 - 5.1.2.8.1.2.2. Foraminotomy
 - 5.1.2.8.2. Thoracic
 - 5.1.2.8.2.1. Posterior
 - 5.1.2.8.2.1.1. Laminectomy
 - 5.1.2.8.2.1.2. Posterolateral decompression

OBJECTIVES OF TRAINING IN NEUROSURGERY (2010)

- 5.1.2.8.3. Lumbosacral
 - 5.1.2.8.3.1. Posterior
 - 5.1.2.8.3.1.1. Discectomy
 - 5.1.2.8.3.1.2. Laminectomy
 - 5.1.2.8.3.1.3. Posterolateral decompression
- 5.1.2.9. Spinal arthrodesis for congenital, degenerative, neoplastic, traumatic and infectious disease
 - 5.1.2.9.1. Cervical
 - 5.1.2.9.1.1. Anterior
 - 5.1.2.9.1.1.1. With and without instrumentation
 - 5.1.2.9.1.2. Posterior
 - 5.1.2.9.1.2.1. With instrumentation
 - 5.1.2.9.1.2.2. Cranial-cervical
 - 5.1.2.9.1.2.3. Cervical
 - 5.1.2.9.2. Thoracolumbar
 - 5.1.2.9.2.1. Posterior
 - 5.1.2.9.2.1.1. With and without instrumentation
 - 5.1.2.9.3. Lumbar
 - 5.1.2.9.3.1. Posterior
 - 5.1.2.9.3.1.1. With and without instrumentation
- 5.1.2.10. Closed reduction and external immobilization of cervical spinal fractures
- 5.1.2.11. Resection of intradural extramedullary spinal tumours
- 5.1.2.12. Peripheral nerve
 - 5.1.2.12.1. Carpal tunnel decompression
 - 5.1.2.12.2. Ulnar nerve decompression and transposition
 - 5.1.2.12.3. Nerve and muscle biopsy
 - 5.1.2.12.4. Sural nerve harvest
 - 5.1.2.12.5. Resection of simple nerve tumours
- 5.1.2.13. Cerebrospinal fluid management
 - 5.1.2.13.1. Ventricular and spinal shunts

- 5.1.2.13.2. Fontanelle tap
- 5.1.2.13.3. Cerebrospinal fluid leak repair
- 5.1.2.13.4. External ventricular drainage
- 5.1.2.13.5. Endoscopic third ventriculostomy
- 5.1.2.13.6. Ventricular or cyst access device

- 5.1.2.14. Spinal Dysraphism
 - 5.1.2.14.1. Release of tethered cord

- 5.1.2.15. Skull
 - 5.1.2.15.1. Tumour biopsy/removal
 - 5.1.2.15.2. Cranioplasty
 - 5.1.2.15.3. Treatment of simple sagittal craniosynostosis

- 5.1.2.16. Ventricular endoscopy for tumour biopsy or excision
- 5.1.2.17. Cranial nerve disorders
 - 5.1.2.17.1. Microvascular decompression
 - 5.1.2.17.2. Percutaneous techniques for trigeminal neuralgia

- 5.1.3. Recognition and management of periprocedural complications

- 5.2. Describe the following procedural skills, along with the indications for the procedures, the nature and purpose of the procedures, and their potential complications:
 - 5.2.1. Supratentorial craniotomies for:
 - 5.2.1.1. Complex aneurysms
 - 5.2.1.2. Vascular malformations
 - 5.2.1.3. Vascular reconstruction and bypass
 - 5.2.1.4. Complex intrinsic and extrinsic tumours

 - 5.2.2. Infratentorial craniotomies for:
 - 5.2.2.1. Aneurysms
 - 5.2.2.2. Vascular malformations
 - 5.2.2.3. Complex intrinsic and extrinsic tumours

 - 5.2.3. Stereotactic and functional procedures:
 - 5.2.3.1. Surgical treatment of epilepsy

- 5.2.3.2. Deep brain stimulation
- 5.2.3.3. Spinal stimulation
- 5.2.3.4. Intrathecal pump insertion
- 5.2.3.5. Selective dorsal rhizotomy

- 5.2.4. Expanded endonasal skull base approaches
- 5.2.5. Stereotactic radiotherapy and radiosurgery
- 5.2.6. Endovascular procedures:
 - 5.2.6.1. Carotid stenting
 - 5.2.6.2. Aneurysm and vascular malformation management
 - 5.2.6.3. Tumour embolization

- 5.2.7. Spinal decompression for congenital, degenerative, neoplastic, traumatic and infectious disease
 - 5.2.7.1. Cervical
 - 5.2.7.1.1. Anterior
 - 5.2.7.1.1.1. Transoral

 - 5.2.7.2. Thoracic
 - 5.2.7.2.1. Anterior Transcavitary
 - 5.2.7.2.1.1. Discectomy
 - 5.2.7.2.1.2. Vertebrectomy

 - 5.2.7.3. Lumbosacral
 - 5.2.7.3.1. Anterior
 - 5.2.7.3.1.1. Transabdominal or retroperitoneal
 - 5.2.7.3.1.1.1. Discectomy
 - 5.2.7.3.1.1.2. Vertebrectomy

- 5.2.8. Spinal reconstruction and arthrodesis (for congenital, degenerative, neoplastic, traumatic and infectious disease)
 - 5.2.8.1. Cervical
 - 5.2.8.1.1. Anterior
 - 5.2.8.1.1.1. Odontoid screw fixation
 - 5.2.8.1.1.2. Multilevel complex reconstruction

5.2.8.1.2. Posterior

5.2.8.1.2.1. C1-2 fixation

5.2.8.1.2.2. Multilevel complex reconstruction

5.2.8.1.2.3. Cervical-thoracic

5.2.8.2. Thoracic

5.2.8.2.1. Posterior

5.2.8.2.1.1. With and without instrumentation

5.2.8.3. Vertebral augmentation

5.2.8.3.1. Vertebroplasty

5.2.8.3.2. Kyphoplasty

5.2.8.4. Laminoplasty

5.2.9. Spinal cord tumours and vascular malformations

5.2.10. Spinal Dysraphism

5.2.10.1. Complex dysraphic conditions

5.2.11. Peripheral nerve

5.2.11.1. Brachial plexus

5.2.11.2. Other nerve entrapments

5.2.11.3. Nerve grafting

5.2.11.4. Complex nerve tumours

5.2.11.5. Sympathectomy

5.3. Ensure that informed consent is obtained and adequate followup is arranged for procedures performed

6. Seek appropriate consultation from other health professionals

6.1. Demonstrate insight into their own limits of expertise

6.2. Demonstrate effective, appropriate, and timely consultation of other health professionals as needed for optimal patient care

Communicator

Definition:

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

Key and Enabling Competencies: Neurosurgeons 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 Neurosurgeons, and that effective physician-patient communication can foster patient satisfaction, physician satisfaction, and improved clinical outcomes
- 1.2. Establish positive therapeutic relationships with patients and their 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 nonverbal cues
- 1.6. Facilitate a structured clinical encounter effectively
- 1.7. Use appropriate language and terminology to facilitate understanding and decision making

2. Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues, and other professionals

- 2.1. Gather information about a disease and about a patient's beliefs, concerns, expectations and illness experience
- 2.2. Seek out and synthesize relevant information from other sources, such as a patient's family, caregivers and other professionals

3. Convey relevant information and explanations accurately to patients and families, colleagues and other professionals

- 3.1. Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and facilitates participation in decision-making

4. Encourage a common understanding of 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 context, responses, concerns, and preferences

- 4.2. Respect diversity and differences, including but not limited to the impact of gender, religion and cultural beliefs on decision-making
- 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
- 4.5. Address challenging communication issues effectively, such as obtaining informed consent, delivering bad news, and addressing anger, confusion and misunderstanding

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

- 5.1. Demonstrate the ability to present information to a group of peers or other health care professionals in a clear and understandable way
 - 5.1.1. Maintain clear, accurate, and appropriate records of clinical encounters and plans
 - 5.1.2. Present oral reports of clinical encounters and plans
- 5.2. Present medical information to the public or media about a medical issue

Collaborator

Definition:

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

Key and Enabling Competencies: Neurosurgeons are able to...

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

- 1.1. Describe the Neurosurgeon's roles and responsibilities to other professionals
- 1.2. Describe the roles and responsibilities of other professionals within the health care team
- 1.3. Recognize and respect the diversity of roles, responsibilities and competencies of other professionals in relation to their own
- 1.4. Work with others to assess, plan, provide and integrate care for individual patients or groups of patients
- 1.5. Work with others to assess, plan, provide and review other tasks, such as research problems, educational activities, program reviews and administrative responsibilities
- 1.6. Participate in interprofessional team meetings

- 1.7. Enter into interdependent relationships with other professions for the provision of quality care
- 1.8. Describe the principles of team dynamics
- 1.9. Respect team ethics, including confidentiality, resource allocation and professionalism
- 1.10. Demonstrate leadership in a health care team, as appropriate
 - 1.10.1. Contribute administrative skills to the physician team, including leadership of committees and teams, and their meetings

2. Work with other health professionals effectively to prevent 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, misunderstanding and limitations that may contribute to interprofessional tension
- 2.6. Reflect on interprofessional team function

Manager

Definition:

As *Managers*, Neurosurgeons 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: Neurosurgeons are able to...

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

- 1.1. Work collaboratively with others in their organizations
- 1.2. Participate in systematic quality process evaluation and improvement, such as patient safety initiatives
- 1.3. Demonstrate a thorough appreciation of the necessity of quality assurance in the delivery of health care
- 1.4. Describe the structure and function of the health care system as it relates to their specialty, including the role of physicians

- 1.5. Describe principles of health care financing, including models of physician remuneration, budgeting and organizational funding

2. Manage their practice and career effectively

- 2.1. Set priorities and manage time to balance patient care, practice requirements, outside activities and personal life
- 2.2. Manage a practice 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. Recognize the importance of just allocation of health care resources, balancing effectiveness, efficiency and access with optimal patient care
- 3.2. Apply evidence and management processes for cost-appropriate care

4. Serve in administration and leadership roles, as appropriate

- 4.1. Participate effectively in committees and meetings
 - 4.1.1. Contribute administrative skills to the physician team, including leadership of committees and teams, and their meetings
- 4.2. Lead or implement change in health care
- 4.3. Plan relevant elements of health care delivery (e.g., work schedules)

Health Advocate

Definition:

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

Key and Enabling Competencies: Neurosurgeons are able to...

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

- 1.1. Identify the health needs of an individual patient
- 1.2. Identify opportunities for advocacy, health promotion and disease prevention with individuals to whom they provide care

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

- 2.1. Describe the practice communities that they serve

- 2.2. Identify opportunities for advocacy, health promotion and disease prevention in the communities that they serve, and respond appropriately
- 2.3. Appreciate the possibility 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 populations, including barriers to access to care and resources
- 3.2. Identify vulnerable or marginalized populations within those served and respond appropriately

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

Key and Enabling Competencies: Neurosurgeons are able to...

1. Maintain and enhance professional activities through ongoing learning

- 1.1. Describe the principles of maintenance of competence
- 1.2. Describe the principles and strategies for implementing a personal knowledge management system
- 1.3. Recognize and reflect on learning issues in practice
- 1.4. Conduct a personal practice audit
- 1.5. Pose an appropriate learning question
- 1.6. Access and interpret the relevant evidence

- 1.7. Integrate new learning into practice
- 1.8. Evaluate the impact of any change in practice
- 1.9. 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 clinical 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, as appropriate**
 - 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 a question
 - 4.6. Disseminate the findings of a study

Professional

Definition:

As *Professionals*, Neurosurgeons 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: Neurosurgeons are able to...

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

- 1.1. Exhibit appropriate professional behaviours in practice, including honesty, integrity, dedication, compassion, respect and altruism
 - 1.1.1. Meet deadlines
 - 1.1.2. Demonstrate punctuality
 - 1.1.3. Monitor patients
 - 1.1.4. Provide appropriate followup
- 1.2. Demonstrate a commitment to delivering the highest quality care and maintenance of competence
- 1.3. Recognize and appropriately respond to ethical issues encountered in practice
- 1.4. Appropriately 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 boundaries with patients

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 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

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