

# Entrustable Professional Activities for Neurosurgery

**2019**  
**VERSION 1.0**

## **Neurosurgery: Transition to Discipline EPA # 1**

### **Performing and reporting the history and physical exam for patients with a neurosurgical presentation**

#### Key features:

- The focus of this EPA is the application of the clinical skills acquired in medical school in the new setting of Neurosurgery residency.
- This EPA includes performing a complete history and both general and neurological examinations, documenting these findings, and presenting the case to a supervisor.
- It does not include determining the site of a lesion, nor developing plans for investigation or management.

#### Assessment plan:

Direct observation by supervisor

Use Form 1.

Collect 2 observations of achievement

#### Relevant Milestones:

- 1 **COM 1.2** Optimize the physical environment for patient comfort, privacy, engagement, and safety
- 2 **COM 1.1 Establish rapport and explain the purpose of the visit**
- 3 **ME 2.2 Elicit an accurate history**
- 4 **COM 2.1** Conduct the interview in a patient-centered manner
- 5 **ME 2.2** Perform a general physical exam
- 6 **ME 2.2 Perform a neurological exam**
- 7 **COM 2.3 Identify other sources of information (e.g. family, medical record) that may assist in a given patient's care**
- 8 **ME 2.2 Synthesize patient information from the clinical assessment for the purpose of written or verbal summary to a supervisor**
- 9 **ME 1.4** Demonstrate knowledge of basic neuroanatomy
- 10 **P 1.1 Complete assigned responsibilities**

## Neurosurgery: Foundations EPA #1

### Assessing patients with a neurosurgical presentation

#### Key Features:

- This EPA focuses on performing a complete clinical assessment including history, physical exam and interpretation/ordering of investigations to complete the assessment and/or prepare for surgery.
- This may include further imaging as well as laboratory or electrodiagnostic investigations, as appropriate.
- It includes determining the anatomic localization of a lesion, formulating an appropriate differential diagnosis, and presenting the assessment to the supervisor.
- It does not include decision making regarding surgical candidacy or other management.
- The EPA may be observed in any common neurosurgical condition.

#### Assessment plan:

Indirect observation by supervisor (staff or senior resident)

Use Form 1. Form collects information on:

- Setting: emergency room; inpatient; outpatient clinic
- Location: central; spine; peripheral
- Etiology: trauma; tumour; hemorrhage; other

Collect 5 observations of achievement

- At least 2 outpatient clinic
- At least 2 emergency room or inpatient
- At least 1 each of trauma, tumor, hemorrhage, spine, peripheral
- At least 2 different assessors

#### Relevant Milestones:

- 1 **ME 2.2** Perform the history and physical exam in a timely manner, without excluding key elements
- 2 **ME 2.2 Perform a relevant, focused neurological exam**
- 3 **ME 2.2 Interpret the findings of the history and physical exam to localize the clinical problem**
- 4 **ME 2.2 Develop a differential diagnosis relevant to the patient's presentation**
- 5 **ME 2.2 Order investigations as appropriate, including laboratory, imaging, and electrodiagnostic investigations**
- 6 **ME 2.2 Interpret investigations, including but not limited to CT scans, for neurosurgical presentations**
- 7 **ME 3.1** Describe the indications, contraindications, risks, and alternatives for a given procedure or therapy
- 8 **ME 2.2 Synthesize patient information from the clinical assessment for the purpose of written or verbal summary to supervisor**
- 9 **COM 3.1** Provide information to the patient and family clearly and compassionately

- 10 COM 4.3** Answer questions from the patient and/or family
- 11 ME 4.1** Determine the need and timing of followup

## Neurosurgery: Foundations EPA #2

### Providing initial management for patients with a cranial emergency

#### Key Features:

- This EPA focuses on clinical assessment and management including indications for imaging, appropriate timing of escalation of care, acuity of intervention or monitoring, and provision of specific initial treatment, such as medical therapy and management of increased intracranial pressure. This also includes appropriate disposition of the patient.
- This does not include definitive management, such as decisions for surgical or other interventions.
- Patient presentations relevant to this EPA include traumatic head injury, raised intracranial pressure of any etiology, intracerebral hemorrhage, and subarachnoid hemorrhage.

#### Assessment plan:

Direct or indirect observation by supervisor (staff or senior resident)

Use Form 1. Form collects information on:

- Case mix: subarachnoid hemorrhage; severe traumatic brain injury; spontaneous intracranial hemorrhage; acute hydrocephalus; mass lesion with acute deterioration
- Herniation syndrome: yes; no

Collect 5 observations

- At least 1 of each case mix
- At least 1 herniation syndrome
- At least 2 different assessors

#### Relevant Milestones:

- 1 ME 1.5 Recognize urgent problems and seek assistance**
- 2 ME 2.1 Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status**
- 3 ME 2.2 Perform a relevant, focused neurological exam**
- 4 COM 2.3 Seek and synthesize relevant information from other sources**
- 5 ME 2.2 Interpret the findings of the physical exam to ascertain clinical significance**
- 6 ME 2.2 Interpret investigations, including but not limited to CT scans, for neurosurgical presentations**
- 7 ME 2.2 Develop a differential diagnosis relevant to the patient's presentation**
- 8 ME 2.4 Develop plans for initial management of patients with cranial emergencies that include appropriate monitoring, medical management, and disposition**
- 9 ME 2.4 Implement plans for blood pressure control and/or medical management of increased intracranial pressure/hydrocephalus**

- 10 ME 2.4 Identify patients that may need further surgical or radiological intervention**
- 11 COM 5.1 Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions**
- 12 COL 1.2 Work effectively with other physicians and health care professionals engaged in the mutual care of a patient**
- 13 L 2.2 Apply evidence and guidelines with respect to resource utilization in common clinical scenarios**
- 14 COM 3.1 Provide timely updates to the patient's family regarding changes in medical condition or patient transfer to an acute unit**

## Neurosurgery: Foundations EPA #3

### Providing initial management for patients with a spinal emergency

#### Key Features:

- This EPA focuses on clinical assessment and initial management. This includes performing a relevant history and physical exam, ordering and prioritizing investigations, recognizing urgent presentations on imaging, recognizing patients with an unstable injury, making decisions about patient disposition (ICU, other), identifying patients with indications for surgery and mitigating secondary injury.
- This does not include definitive management of the spinal emergency.
- Patient presentations may include traumatic spine injury and cauda equina syndrome, or cord compression of any cause.

#### Assessment plan:

Direct or indirect observation by supervisor

Use form 1. Form collects information on:

- Level: cervical; thoracic and/or lumbar
- Neurologic deficit: yes; no
- Mechanically unstable: yes; no

Collect 3 observations of achievement

- At least 1 cervical
- At least 1 thoracic and/or lumbar
- At least 1 patient with a neurologic deficit
- At least 1 patient with a mechanically unstable spine
- At least 2 different assessors

#### Relevant Milestones:

- 1 ME 1.5 Recognize urgent problems and seek assistance**
- 2 ME 2.1 Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status**
- 3 ME 1.4 Apply knowledge of complex anatomy of spine and nervous structures including anatomic/congenital variants**
- 4 ME 1.4 Apply principles of spine biomechanics and spinal stability**
- 5 ME 2.2 Perform a relevant, focused neurological exam**
- 6 ME 2.2 Order investigations as appropriate, including laboratory, imaging, and electrodiagnostic investigations**
- 7 ME 2.2 Interpret clinical findings and diagnostic studies with the appropriate emphasis on spinal balance and biomechanics**
- 8 ME 2.2 Develop a differential diagnosis relevant to the patient's presentation**
- 9 ME 2.4 Develop plans for initial management of patients with spinal emergencies that include appropriate monitoring, medical management, and disposition**

- 10 ME 2.4 Identify patients that may need further surgical or radiological intervention**
- 11 COL 3.1** Identify patients requiring handover to other physicians or health care professionals
- 12 COM 3.1** Provide information to the patient and family clearly and compassionately
- 13 COM 5.1** Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions

## Neurosurgery: Foundations EPA #4

### Managing complications of neurosurgical conditions for hospitalized patients, including post-operative complications

#### Key Features:

- This EPA focuses on common complications in patients on the neurosurgical ward. This includes patients admitted for observation or medical management as well as patients in the post-operative phase of their care
- This includes complications such as electrolyte imbalance (SIADH, DI, etc), any neurological deterioration (seizure, focal deficit), meningitis, brain abscess, CSF leak, wound complications, as well as post-operative bleeding, hematomas, or infections.
- This EPA includes patient assessment, selection and interpretation of investigations and initial treatment
- This EPA should be observed in cases of moderate or high complexity. Low complexity cases are not suitable for the observation of this EPA

#### Assessment Plan:

Direct or indirect observation by supervisor (may be nurse practitioner, senior resident or staff)

Use form 1. Form collects information on:

- Type of issue: CSF leak; seizure; CNS related endocrine and metabolic disturbances; CNS infection; vasospasm; new postoperative neurologic deficit; trouble shooting drains

Collect 5 observations of achievement

- At least 4 different issues
- At least 2 assessors

#### Relevant Milestones:

- 1 **ME 1.5 Recognize urgent problems and seek assistance**
- 2 **ME 2.1 Identify patients that are at risk of clinical deterioration**
- 3 **ME 2.2 Perform the history and physical exam in a timely manner, without excluding key elements**
- 4 **ME 2.2 Interpret the findings of the history and physical exam to localize the clinical problem**
- 5 **ME 2.2 Interpret investigations, including but not limited to CT scans, for neurosurgical presentations**
- 6 **ME 2.4 Develop and implement initial management plans**
- 7 **ME 3.3 Consider urgency and potential for deterioration, in advocating for the timely execution of a procedure or therapy**
- 8 **COM 3.2 Communicate the reasons for unanticipated clinical outcomes and/or disclose patient safety incidents to patients and families**
- 9 **COM 5.1 Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions**

## Neurosurgery: Foundations EPA #5

### Assessing patients with common neurologic conditions

#### Key Features:

- This EPA focuses on differentiating the site and cause of the neurologic lesion through the performance of the clinical assessment and interpretation of investigations
- This EPA may be observed in any type of patient assessment (e.g. consult, followup) and in any clinical setting (i.e. ambulatory clinic, emergency room, hospitalized patients, EMG lab), and should be observed in a Neurology training experience
- This may include patients with a range of known neurologic conditions as well as patients with undifferentiated presentations of neurologic disease

#### Assessment plan:

Direct or indirect observation by supervisor

Use Form 1. Form collects information on

- Location: central; spinal; peripheral
- Type of observation: indirect; direct

Collect 3 observations of achievement

- At least 1 of each type of location
- At least 1 direct observation

#### Relevant Milestones:

- 1 **COM 2.2 Conduct a focused patient interview, managing the flow of the encounter while being attentive to the patient's cues and responses**
- 2 **ME 2.2 Perform a relevant, focused neurological exam**
- 3 **ME 2.2 Interpret the findings of the history and physical exam to localize the clinical problem**
- 4 **ME 2.2 Develop a differential diagnosis relevant to the patient's presentation**
- 5 **ME 2.2 Order investigations as appropriate, including laboratory, imaging, and electrodiagnostic investigations**
- 6 **ME 2.2 Interpret investigations for neurological presentations**

## Neurosurgery: Foundations EPA #6

### Providing initial management for patients with an acute stroke

#### Key Features:

- This EPA focuses on the rapid assessment, triage, and initial management of patients with an acute stroke.
- This includes effective and efficient facilitation of access to imaging, coordination of the acute stroke team, and assessment of suitability to receive active intervention (i.e. thrombolytic therapy or endovascular intervention).
- This EPA should be observed on a neurology or acute stroke service.

#### Assessment plan:

Indirect observation by supervisor

Use Form 1. Form collects information on:

- Active intervention: yes; no

Collect 2 observations of achievement

- At least 1 patient who had active intervention

#### Relevant Milestones:

- 1 **ME 1.5** Recognize urgent problems and seek assistance
- 2 **ME 2.1** Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status
- 3 **ME 2.2** Perform a relevant, focused neurological exam
- 4 **ME 2.2** Order appropriate investigations
- 5 **ME 2.2** Interpret the findings of the history and physical exam to localize the clinical problem
- 6 **ME 2.4** Develop and implement initial management plans
- 7 **ME 3.3** Consider urgency and potential for deterioration, in advocating for the timely execution of a procedure or therapy
- 8 **COL 1.2** Consult as needed with other health care professionals, including other physicians
- 9 **COL 3.1** Identify patients requiring handover to other physicians or health care professionals
- 10 **COM 3.1** Provide information to the patient and family clearly and compassionately
- 11 **COM 4.1** Answer questions from the patient and/or family
- 12 **COM 5.1** Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions

## Neurosurgery: Foundations EPA #7

### Inserting CSF drains and ICP monitors

#### Key Features:

- This EPA focuses on the safe and effective placement of an external ventricular drain/intracranial pressure monitor and performance of a lumbar puncture/placement of lumbar drain
- This includes assessing the need and urgency of the procedure, obtaining consent, preparing necessary equipment, preparing the patient, performing the procedure, documenting the procedure and providing appropriate post-procedural orders.
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

##### Part A: Procedural skills

Direct observation by supervisor (staff or senior resident) and/or indirect observation including case review and review of post-procedure imaging and/or function of catheter or monitor

Use Form 2. Form collects information on:

- Type of drain: lumbar drain; intracranial pressure monitor; external ventricular drain

Collect 5 observations of achievement

- At least 1 lumbar drain
- At least 1 ICP monitor
- At least 2 EVDs

##### Part B: Logbook

Resident submits logbook of general neurosurgical procedures

Logbook tracks:

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

##### Part A: Procedural skills

- 1 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 2 **ME 3.2** Demonstrate knowledge of the indications and contraindications for the procedure
- 3 **ME 3.4 Identify anatomical landmarks and select an appropriate operative**

**site**

- 4 **ME 3.4** Select and provide sedation and local analgesia, as appropriate
- 5 **ME 3.4 Demonstrate aseptic technique: skin preparation, draping, establishing and respecting the sterile field**
- 6 **ME 3.4 Position the patient appropriately**
- 7 **ME 3.4 Execute the steps of the procedure in a safe and efficient manner**
- 8 **ME 3.4 Set up the drainage system or monitor, and ensure it is functioning well**
- 9 **COM 5.1** Document the procedure

## Neurosurgery: Foundations EPA #8

### Applying external spinal fixation and/or traction

#### Key Features:

- This EPA includes assessing the need and urgency of performing the application of halo ring/tongs, obtaining consent, preparing necessary equipment and performing the procedure.
- This EPA may be observed in patients with any indication for spinal stabilization and any technique of spinal traction.
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience.

#### Assessment plan:

##### Part A: Procedural skills

Direct or indirect observation by supervisor or delegate

Use form 2. Form collects information on:

- Scenario: clinical; simulation

Collect 1 observation of achievement

##### Part B: Logbook

Submit logbook of general neurosurgical procedures

Logbook tracks:

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

- 1 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 2 **ME 3.2** Demonstrate knowledge of the indications and contraindications for the procedure
- 3 **ME 3.4 Select and provide sedation and local analgesia, as appropriate**
- 4 **ME 3.4 Position the patient appropriately**
- 5 **ME 3.4 Place the halo ring or tongs in the appropriate position**
- 6 **ME 3.4 Assess and manage alignment, including the safe application of traction weight or vest**
- 7 **ME 3.4 Order and review post procedure imaging**
- 8 **COM 5.1 Document the procedure**

**Neurosurgery: Foundations EPA #9**

**Performing burr hole drainage of a chronic subdural hematoma**

**Key Features:**

- This EPA includes all aspects of the performance of this procedure from start to finish, including selection of operative site
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Procedural skills

Direct observation by supervisor (staff or senior resident)

Use Form 2. Form collects information on:

- Supervisor role: staff; senior resident

Collect 2 observations of achievement

- At least one with staff as supervisor

Part B: Logbook

Resident submits logbook of general neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

- 1 ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 2 ME 2.2 Interpret imaging studies to determine diagnosis and indications for surgical intervention**
- 3 ME 3.4 Identify anatomical landmarks and select an appropriate operative site**
- 4 ME 3.2** Obtain informed consent
- 5 ME 3.4** Gather and/or manage the availability of appropriate instruments and materials
- 6 ME 3.4** Position the patient appropriately
- 7 ME 3.4** Demonstrate aseptic technique: skin preparation, establishing and respecting the sterile field
- 8 ME 3.4 Create burr hole**
- 9 ME 3.4 Perform durotomy and drainage of hematoma**
- 10 ME 3.4 Safely insert drain, if required**

- 11 **ME 3.4 Establish and implement a plan for post-procedure care**
- 12 **ME 5.2** Use cognitive aids such as surgical checklists, structured communication tools, or care paths, to enhance patient safety
- 13 **COM 5.1** Document the procedure
- 14 **COL 1.2 Work effectively with the interprofessional team**

## Neurosurgery: Foundations EPA #10

### Performing the technical skills of a supratentorial craniotomy

#### Key Features:

- This EPA includes opening and closing the scalp and temporalis muscle (as appropriate), creating and connecting burr holes (adequate handling of perforator and craniotome), and creating a dural opening and closure.
- This EPA does not include making the decision to perform the procedure or creating the plan for the procedure.
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience.

#### Assessment Plan:

##### Part A: Procedural skills

Direct observation by supervisor (staff or senior resident)

Use Form 2

##### Collect 3 observations

- At least 2 assessors

##### Part B: Logbook

Submit logbook of general neurosurgical procedures

##### Logbook tracks:

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

- 1 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 2 **ME 3.2** Demonstrate knowledge of the indications and contraindications for the procedure
- 3 **ME 2.2** Interpret preoperative imaging related to the nature of the condition and surgical planning
- 4 **ME 3.4** Demonstrate aseptic technique: skin preparation, establishing and respecting the sterile field
- 5 **ME 3.4 Open and close the incision**
- 6 **ME 3.4 Set up the drill and its attachments**
- 7 **ME 3.4 Provide adequate exposure of target cranial surface**
- 8 **ME 3.4 Place burr holes and safely complete craniotomy**

- 9   **ME 3.4 Manage epidural hemostasis**
- 10   **ME 3.4 Perform safe dural opening**
- 11   **ME 3.4 Perform effective dural closing**
- 12   **COL 1.2 Work effectively with the interprofessional team**

## Neurosurgery: Foundations EPA #11

### Performing midline posterior subaxial spinal column exposure and closure

#### Key Features:

- This EPA may be observed during a procedure at any level of the spinal column and consists of exposure of the dorsal spine up to the lamina, while preserving the facets and minimizing soft tissue disruption, and appropriate closure of the fascial layer.
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

##### Part A: Procedural skills

Direct observation by supervisor (staff or senior resident)

Use form 2. Form collects information on

- Location: cervical; thoracic; lumbar

Collect 3 observations of achievement

- At least one of each location (cervical, thoracic, lumbar)
- At least two assessors

##### Part B: Logbook

Submit logbook of general neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

- 1 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed procedure**
- 2 ME 3.2 Demonstrate knowledge of the indications and contraindications for the procedure**
- 3 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 4 ME 3.4 Demonstrate aseptic technique: skin preparation, establishing and respecting the sterile field**
- 5 ME 3.4 Open and close the incision**
- 6 ME 3.4 Perform midline exposure of the posterior elements**
- 7 ME 3.4 Separate fascia from spinous processes or appropriate levels**

- 8 ME 3.4 Expose the spinous processes and lamina cleanly, without disruption of the facet joints**
- 9 COL 1.2 Work effectively with the interprofessional team**

## Neurosurgery: Core EPA #1

### Managing the neurosurgical inpatient service

#### Key Features:

- This EPA focuses on the effective management of the team of junior learners (residents and/or students) providing care for an inpatient service as well as related administrative tasks
- This also includes working effectively with the other health care professionals on the ward as well as other services (e.g. critical care, consulting physicians)

#### Assessment Plan:

Multiple observers provide feedback individually, which is then collated to one report

Use Form 3. Form collects information on:

- Role of observer: attending staff; other services (ICU) nurse; clinical assistant; other health professional; other trainee (e.g. fellow; resident; medical student)

Collect feedback on 2 occasions, one each at junior core and senior core.

Each occasion should include

- At least 4 observers
- At least 1 attending staff
- At least 2 other observer roles

#### Relevant Milestones:

- 1 ME 2.4 Establish and adjust management plans for patients admitted to the Neurosurgery ward**
- 2 COL 2.1 Delegate tasks and responsibilities in an appropriate and respectful manner**
- 3 COL 1.2 Consult as needed with other health care professionals, including other physicians**
- 4 COL 1.3 Communicate effectively with other physicians and colleagues**
- 5 L 4.2 Organize formal educational activities, such as M and M rounds**
- 6 L 4.2 Plan relevant work schedules (e.g. call schedules)**
- 7 S 2.3 Supervise learners to ensure they work within their limits**
- 8 S 2.4 Provide bedside and other informal clinical teaching**
- 9 S 2.5 Provide ongoing feedback to enhance learning and performance**
- 10 L 4.2 Run the service efficiently, safely and effectively**
- 11 L 2.1 Allocate health care resources for optimal patient care**
- 12 P 1.1 Exhibit appropriate professional behaviors**

## Neurosurgery: Core #2

### Providing definitive management for patients with a cranial emergency

#### Key Features:

- This EPA builds on the skills of Foundations to add the skills of interpreting investigations, making the decision regarding intervention and selecting the appropriate intervention as well as communicating with the family regarding the diagnosis, prognosis, plan and informed consent, as appropriate. This may also include consultation with other services and prioritization/triage of patient management
- Patient presentations relevant to this EPA include traumatic head injury, raised intracranial pressure of any etiology, intracerebral hemorrhage and subarachnoid hemorrhage

#### Assessment plan:

Direct and indirect observation by supervisor

Use form 1. Form collects information on:

- Case mix: subarachnoid hemorrhage; severe traumatic brain injury; spontaneous intracranial hemorrhage; acute hydrocephalus; mass lesion with acute deterioration
- Herniation syndrome: yes; no

Collect 5 observations of achievement

- At least 1 of each case mix
- At least 2 different assessors

#### Relevant Milestones:

- 1 **ME 2.1 Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status**
- 2 **ME 2.2 Focus the clinical encounter, performing it in a time-effective manner, without excluding key elements**
- 3 **ME 2.2 Select, prioritize, and interpret investigations**
- 4 **ME 2.2 Identify indications for surgical intervention**
- 5 **ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 6 **ME 2.4 Institute appropriate medical and monitoring parameters**
- 7 **L 2.1 Triage interventions for the patient in the context of the urgent care needs of other patients**
- 8 **ME 4.1 Determine the necessity and appropriate timing of referral to another health care professional**
- 9 **COM 3.1 Provide information to the patient and family clearly and compassionately**

### Neurosurgery: Core #3

#### Providing definitive management for patients with complications of neurosurgical conditions

##### Key Features:

- This EPA builds on the skills of Foundations to add the skills of making the decision regarding the need and urgency of intervention, and selection of the appropriate intervention as well as communicating with the family regarding the diagnosis, prognosis, plan, and informed consent, as appropriate. This may also include consultation with other services
- This EPA focuses on common complications in patients on the neurosurgical ward. This includes patients admitted for observation or medical management as well as patients in the post-operative phase of their care
- This includes complications such as neurological deterioration (seizure, focal deficit) meningitis, brain abscess, CSF leak, wound complications as well as post-operative bleeding, hematomas or infections.

##### Assessment Plan:

Direct and indirect observation by supervisor

Use form 1. Form collects information on

- Type of issue: CSF leak; wound infection; vasospasm; new postoperative neurologic deficit; post-operative hemorrhage

Collect 5 observations of achievement

- At least 1 of each type of issue
- At least 2 assessors

##### Relevant Milestones:

- 1 **ME 2.1 Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status**
- 2 **ME 2.2 Focus the clinical encounter, performing it in a time-effective manner, without excluding key elements**
- 3 **ME 2.2 Select, prioritize, and interpret investigations**
- 4 **ME 2.2 Identify indications for surgical intervention**
- 5 **ME 2.3 Recognize and respond to changes in patient status that indicate a need to reassess goals of care**
- 6 **ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 7 **ME 2.4 Institute appropriate medical and monitoring parameters**
- 8 **L 2.1 Triage interventions for the patient in the context of the urgent care needs of other patients**

- 9 ME 4.1** Determine the necessity and appropriate timing of referral to another health care professional
- 10 COM 3.1** Provide information on diagnosis and prognosis in a clear, compassionate manner
- 11 COM 3.2 Communicate the reasons for unanticipated clinical outcomes and/or patient safety incidents to patients and families**
- 12 ME 5.1** Identify adverse events as cues to adapt practice and adopt strategies to avoid complications

**Neurosurgery: Core EPA #4**

**Leading discussions with patients and/or their families in emotionally charged situations**

Key Features:

- This EPA focuses on the application of communication and conflict resolution skills to address difficult situations
- This EPA may be observed in any scenario that is emotionally charged. Examples include: breaking bad news; disclosing an adverse event; dealing with a patient complaint

Assessment plan:

Direct observation by supervisor

Use form 1. Form collects information on:

- Scenario: bad news; adverse event; other

Collect 2 observations of achievement

Relevant Milestones:

- 1 **COM 1.5 Recognize when strong emotions (such as anger, fear, anxiety, or sadness) are impacting an interaction and respond appropriately**
- 2 **COM 1.4 Respond to patients' non-verbal communication and use appropriate non-verbal behaviours to enhance communication**
- 3 **COM 3.1 Provide information to the patient and family clearly and compassionately**
- 4 **COM 1.5 Establish boundaries as needed in emotional situations**
- 5 **COM 4.1 Facilitate discussions with the patient and family in a way that is respectful, non-judgmental, and culturally safe**
- 6 **COM 4.3 Avoid the use of medical jargon and technical terminology; use language that the patient can understand**
- 7 **COM 4.3 Answer questions regarding care delivery, treatment decisions and/or prognosis in a respectful manner**
- 8 **COL 2.2 Listen for the purposes of understanding and finding common ground**
- 9 **COL 2.2 Manage differences and resolve conflicts**

**Neurosurgery: Core EPA #5**

**Providing neurosurgical consultation for patients with a CNS infection**

**Key Features:**

- This EPA focuses on the clinical assessment and management, including selection of appropriate antibiotics, consultation with other services as required (infectious disease, radiology) and decision regarding surgical management as appropriate, including timing or urgency

**Assessment plan:**

Indirect observation by supervisor

Use form 1: Form collects information on

- Location: intracranial infection; spinal epidural abscess; other

Collect 2 observations of achievement

- At least one intracranial
- At least one spinal

**Relevant Milestones:**

- 1 ME 1.5 Perform clinical assessments that address all relevant issues**
- 2 ME 2.1 Determine the acuity of the issue and establish priorities for patient care**
- 3 ME 2.1 Treat the patient's urgent issues: provide relief from acute pain and/or initiate antibiotics as appropriate**
- 4 ME 2.2 Select, prioritize, and interpret investigations**
- 5 ME 2.4 Develop a plan for determining the source and nature of the infection**
- 6 ME 2.4 Initiate appropriate empiric antibiotic therapy**
- 7 ME 2.4 Determine the need for, plan for, and timing of surgical intervention**
- 8 ME 4.1 Determine the plan for medical management and monitoring in collaboration with other health care professionals (e.g. infectious disease, pharmacy)**
- 9 COL 1.2 Work effectively with other physicians or surgeons to provide all needed aspects of care**

## Neurosurgery: Core EPA #6

### Providing neurosurgical consultation for patients with a CSF related disorder

#### Key Features:

- This EPA focuses on decision making regarding suitability for surgical intervention
- This EPA includes patients with hydrocephalus (obstructive, communicating, normal pressure hydrocephalus), Chiari malformations, syrinx, arachnoid cyst and shunt related problems

#### Assessment plan:

Indirect observation by supervisor (e.g. case discussion, review of consult letter or other documents)

Use form 1. Form collects information on:

- Case mix: obstructive hydrocephalus; normal pressure hydrocephalus; communicating hydrocephalus; Chiari/syrinx; arachnoid cyst

Collect 5 observations of achievement

- At least 2 hydrocephalus of any type with at least 1 normal pressure hydrocephalus
- At least 1 Chiari
- At least 1 arachnoid cyst

#### Relevant Milestones:

- 1 ME 1.4** Apply knowledge of basic CSF physiology
- 2 ME 1.4** Apply knowledge of normal CSF-related anatomy
- 3 ME 1.4** Apply knowledge of pathophysiology of CSF-related disorders, and their clinical presentations and differential diagnosis
- 4 ME 1.5** Perform clinical assessments that address all relevant issues
- 5 ME 2.2** Interpret imaging studies
- 6 ME 2.2** Synthesize patient information to determine diagnosis
- 7 ME 2.4** Determine the need for, plan for, and timing of surgical intervention
- 8 S 3.4** Integrate best evidence and clinical expertise into decision-making
- 9 HA 1.2** Select and provide relevant patient education resources
- 10 COM 4.3** Use communication skills and strategies that help patients make informed decisions about their health

## Neurosurgery: Core EPA #7

### Discussing and documenting informed consent for neurosurgical procedures

#### Key Features:

- This EPA includes effective communication with the patient and family in the discussion of consent for a surgical procedure
- This EPA may be observed in the clinical or simulation setting

#### Assessment plan:

Direct observation by supervisor

Use form 1: Form collects information on

- Procedure: [write in]

Collect 2 observations of achievement

- At least 2 different procedures

#### Relevant Milestones:

- 1 ME 1.4** Apply knowledge of the indications and techniques for surgical procedures
- 2 COM 1.6** Identify patients who lack decision-making capacity and seek out their substitute decision maker
- 3 COM 3.1** Provide information to the patient and family clearly and compassionately
- 4 ME 3.2** Explain the risks and benefits of, and the alternatives for a proposed procedure
- 5 COM 4.3** Avoid the use of medical jargon and technical terminology; use language that the patient can understand
- 6 COM 2.1** Actively listen and respond to patient cues and questions
- 7 ME 3.2** Use shared decision-making in the consent process, taking risk and uncertainty into consideration
- 8 ME 2.3** Share concerns, in a constructive and respectful manner, with patients and their families about their goals of care when they are not felt to be achievable
- 9 COM 5.1** Document the consent discussion in an accurate and complete manner

**Neurosurgery: Core EPA #8**

**Performing common craniotomies (JC)**

**Key Features:**

- This EPA refers to performing the setup, positioning, skin incision/closure, bone work and dural opening and closure
- This EPA focuses on convexity, pterional and posterior fossa craniotomies
- This EPA may be observed in craniotomies performed for any indication
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use form 2. Form collects information on

- Type of craniotomy: infratentorial; pterional; supratentorial

Collect 4 observations of achievement

- At least 1 infratentorial
- At least 1 pterional
- No more than 2 observations by senior/chief resident

Part B: Logbook

Submit logbook of general neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 3.4** Apply the surgical safety checklist
- 2 ME 3.4 Plan the incision, with or without the use of navigation**
- 3 ME 3.4 Position, prep, and drape the patient**
- 4 ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 5 ME 3.4** Select appropriate instruments, implants, sutures and/or equipment
- 6 ME 3.4** Open and close the incision
- 7 ME 3.4 Provide adequate exposure of target cranial surface**
- 8 ME 3.4 Place burr holes and safely complete craniotomy**
- 9 ME 3.4 Manage epidural hemostasis**
- 10 ME 3.4 Perform safe dural opening**

- 11 ME 3.4 Perform effective dural closing**
- 12 ME 3.4** Recognize and address anatomical variants, and modify the surgical procedure as appropriate
- 13 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #9**

**Providing surgical management for patients with a head injury**

Key Features:

- This EPA focuses on performing the procedures of decompressive craniotomy and repair of a skull fracture
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence  
Direct observation by supervisor

Use form 2. Form collects information on

- Type of procedure (check all that apply): craniotomy for traumatic brain injury; repair of a skull fracture
- Location: epidural; subdural; intraaxial

Collect 3 observations of achievement

- At least 1 craniotomy
- At least 1 repair of a skull fracture

Part B: Logbook  
Submit logbook of general neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones:

Part A: Surgical competence

- 1 ME 3.4** Apply the surgical safety checklist
- 2 ME 3.4 Plan the incision, with or without the use of navigation**
- 3 ME 3.4 Position, prep, and drape the patient**
- 4 ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 5 ME 3.4** Select appropriate instruments, implants, sutures and/or equipment
- 6 ME 3.4** Open and close the incision
- 7 ME 3.4** Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling
- 8 ME 3.4 Evacuate hematoma, as required**
- 9 ME 3.4 Manage the associated fracture, as required**

- 10 ME 3.4 Manage intraoperative complications as required, including brain edema and/ active bleeding**
- 11 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #10**

**Providing surgical management for patients with a CSF-related disorder**

Key Features:

- This EPA includes procedures related to shunts (ventriculoperitoneal (VP); ventriculopleural (VPI), ventriculoatrial (VA), lumboperitoneal), posterior fossa decompression for Chiari, endoscopic third ventriculostomy, and arachnoid cyst fenestration
- This EPA may include pediatric cases
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on

- Procedure: shunt insertion; shunt revision; Chiari; Cyst; ETV; Syrinx to SAH/P shunt
- Location: not applicable; ventriculoperitoneal; ventriculopleural; ventriculoatrial; lumboperitoneal

Collect 5 observations of achievement

- At least 3 CSF shunt procedures
- At least 1 CSF shunt revision procedure
- At least 2 endoscopic third ventriculostomy procedures
- At least 2 different assessors

Part B: Logbook

Submit logbook of general neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones:

Part A: Surgical competence

- 1 ME 2.2** Interpret preoperative imaging related to the nature of the condition and surgical planning
- 2 ME 3.4 Select appropriate instruments, implants, sutures and/or equipment**
- 3 ME 3.4 Plan the incision, with or without the use of navigation**
- 4 ME 3.4 Position, prep, and drape the patient**
- 5 ME 3.4 Perform intraventricular navigation of a neuroendoscope, in relevant**

procedures

- 6 ME 3.4** Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling
- 7 ME 3.4 Demonstrate intraoperative judgment, fluidity of movement, and forward progression**
- 8 ME 3.4** Establish and implement a plan for post-procedure care
- 9 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 10 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #11**

**Documenting operative procedures (JC)**

**Key Features:**

- This EPA focuses on the application of communication skills in the preparation of an operative report
- This includes a synthesis of the procedure and pertinent clinical findings
- The documents submitted for review must be the sole work of the resident

**Assessment plan:**

Review of clinical documentation by supervisor (neurosurgeon or chief resident)

Use form 1.

Collect 3 observations of achievement

- At least 2 different operations
- At least 2 observations by a neurosurgeon

**Relevant Milestones:**

- 1 COM 5.1 Organize information in appropriate sections**
- 2 COM 5.1 Describe the encounter to convey the procedure and outcome**
- 3 COM 5.1 Convey surgical reasoning and the rationale for decisions**
- 4 COM 5.1 Document all relevant findings**
- 5 COM 5.1 Complete clinical documentation in a timely manner**

## Neurosurgery: Core EPA #12

### Developing and executing scholarly projects

#### Key features:

- This EPA includes using appropriate methods, analyzing results, critically reflecting on the findings, and disseminating results in some format. It may include obtaining grant funding and preparing a manuscript for publication.
- This may include basic or clinical science related to neurosurgery, neurosciences, or medical education research
- The achievement of this EPA may be observed via submission of a manuscript suitable for submission to a peer reviewed journal, or presentation of the project at a peer-reviewed local, national, or international scientific meeting

#### Assessment plan:

Supervisor does assessment based on review of resident's submission of the research project

Use Form 1.

Collect 1 observation of achievement

#### Relevant Milestones

- 1 **S 4.4 Generate focused questions for scholarly investigation**
- 2 **S 4.4 Identify, consult, and collaborate with content experts and others in the conduct of scholarly work**
- 3 **S 3.3 Critically evaluate the integrity, reliability, and applicability of health-related research and literature**
- 4 **S 4.5 Summarize the findings of a literature review**
- 5 **S 4.4 Select appropriate methods of addressing a given scholarly question**
- 6 **S 4.2 Identify ethical principles in research**
- 7 **S 4.3 Actively participate as a research team member, balancing the roles and responsibilities of a researcher with the clinical roles and responsibilities of a physician**
- 8 **S 4.4 Collect data for a scholarly project**
- 9 **S 4.4 Perform data analysis**
- 10 **S 4.4 Integrate existing literature and findings of data collection**
- 11 **S 4.4 Identify areas for further investigation**
- 12 **S 4.5 Disseminate findings via manuscript or presentation**

**Neurosurgery: Core EPA #13**

**Contributing to quality improvement and educational initiatives**

**Key Features:**

- The observation of this EPA is divided into two parts: quality improvement activities and teaching
- The quality improvement aspect focuses on the review of a case or series of cases, with an analysis of the quality of care provided and identification of factors that may lead to improved quality of care. This may be a resident presentation at Morbidity and Mortality rounds, a report, an abstract or other form of submission
- The teaching aspect focuses on clear, accurate information delivery targeted to the audiences' needs. This may be observed in any formal teaching activity (e.g. grand rounds)

**Assessment plan:**

**Part A: Quality Improvement**

Direct or indirect observation by supervisor (i.e. observes presentation at rounds, reviews report or abstract)

Use form 1.

Collect 1 observation of achievement

**Part B: Teaching**

Multiple audience members provide feedback based on observation of a teaching presentation

Use form 3.

Collect evaluations from 2 teaching encounters

- At least two evaluations from each teaching presentation

**Relevant Milestones:**

**Part A: Quality improvement**

- 1 **L 1.1 Review a case, or series of cases, to assess outcomes of health care delivery**
- 2 **L 1.1 Compare outcomes to established best practices to identify opportunities for quality improvement**
- 3 **L 1.1 Identify factors that may contribute to improvements in quality of care**
- 4 **L 3.1 Propose changes to improve clinical outcomes and/or quality of health care delivery**
- 5 **L 3.2 Develop a strategy for implementing change in health care delivery**

- 6 **S 3.3** Critically evaluate the integrity, reliability, and applicability of health-related research and literature
- 7 **S 3.4 Integrate best evidence and clinical expertise**
- 8 **S 2.4 Present the information in an organized manner to facilitate understanding**
- 9 **P 2.2** Demonstrate a commitment to patient safety and quality improvement initiatives within their own practice environment

Part B – Teaching

- 1 **S 2.4** Identify the learning needs and desired learning outcomes of others
- 2 **S 2.4 Develop learning objectives for a teaching activity**
- 3 **S 3.3 Critically evaluate the integrity, reliability, and applicability of health-related research and literature**
- 4 **S 3.4 Integrate best evidence and clinical expertise**
- 5 **S 2.4 Present the information in an organized manner to facilitate understanding**
- 6 **S 2.4 Use audiovisual aids effectively**
- 7 **S 2.4 Provide adequate time for questions and discussion**

## Neurosurgery: Core EPA #14

### Assessing patients' candidacy for advanced functional procedures

#### Key Features:

- This EPA focuses on establishment of a management plan which may include observation, medical therapy or referral for surgical intervention. This includes clinical assessment, interpretation of relevant investigations, and the development and communication of a management plan.
- Patient presentations may include movement disorders (e.g. Parkinson's disease, tremor and dystonia), epilepsy, and pain and/or spasticity.

#### Assessment plan:

Indirect observation by supervisor

Use form 1. Form collects information on

- Patient presentation: epilepsy; movement disorder; pain and/or spasticity, other

Collect 4 observations of achievement

- At least one each of epilepsy, movement disorder and pain and/or spasticity

#### Relevant Milestones:

- 1 ME 1.5 Perform clinical assessments that address all relevant issues**
- 2 ME 2.2 Elicit information regarding the impact of the disorder on the patient's functional ability**
- 3 ME 2.2 Select and/or interpret investigations**
- 4 ME 2.3 Address the impact of the medical condition on the patient's ability to pursue life goals and purposes**
- 5 ME 2.2 Determine if the patient would benefit from surgical intervention**
- 6 ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 7 ME 4.1 Provide referral for advanced neurosurgical procedures, as appropriate**
- 8 COM 3.1 Provide information to the patient and family clearly and compassionately**
- 9 COM 4.3 Use communication skills and strategies that help patients make informed decisions about their health**
- 10 COL 1.2 Work effectively with other physicians or surgeons to provide all needed aspects of care**
- 11 HA 1.1 Facilitate timely patient access to health services and resources**

**Neurosurgery: Core EPA #15**

**Providing neurosurgical consultation for patients with trigeminal neuralgia and other neurovascular compression syndromes**

**Key Features:**

- This EPA focuses on establishing a management plan which may include observation, medical therapy or surgical intervention. This includes clinical assessment, interpretation of relevant investigations and the development and communication of a management plan with the patient.

**Assessment plan:**

Indirect observation by supervisor

Use form 1. Form collects information on

- Trigeminal neuralgia: yes; no
- Decision: no surgery; percutaneous technique; open technique

Collect 2 observations of achievement

- At least one trigeminal neuralgia

**Relevant Milestones:**

- 1 ME 1.5 Perform clinical assessments that address all relevant issues**
- 2 ME 2.2 Elicit information regarding the impact of the disorder on the patient's functional ability**
- 3 ME 2.2 Select and/or interpret investigations**
- 4 ME 2.2 Determine if the patient would benefit from surgical intervention**
- 5 ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 6 COM 3.1 Provide information to the patient and family clearly and compassionately**
- 7 COM 4.3 Use communication skills and strategies that help patients make informed decisions about their health**
- 8 COL 1.2 Work effectively with other physicians or surgeons to provide all needed aspects of care**
- 9 HA 1.1 Facilitate timely patient access to health services and resources**

## Neurosurgery: Core EPA # 16

### Performing stereotactic procedures

#### Key Features:

- This EPA focuses on the application of the principles of frame based and frameless stereotaxy, as well as the safe performance of stereotactic procedures (i.e. avoidance of vessels, sulci, ventricles etc)
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

##### Part A: Surgical competence

Direct observation by supervisor

Use form 2. Form collects information on

- Indication: biopsy; movement disorder; radiosurgery; other
- Use of stereotactic frame: yes; no

Collect 2 observations of achievement

- At least one biopsy
- At least one application of stereotactic frame

##### Part B: Logbook

Submit logbook of functional neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

##### Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 3.4 Select and apply local anesthesia, as appropriate**
- 3 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 4 **ME 3.4 Select an appropriate procedure plan, including targeting**
- 5 **ME 3.4 Apply the frame and/or register the frameless system**
- 6 **ME 3.4** Recognize and address anatomical variants, and modify the surgical procedure as appropriate
- 7 **ME 3.4** Anticipate and/or manage intraoperative complications
- 8 **COM 5.1** Document surgical clinical encounters in a complete and timely manner

### **Neurosurgery: Core EPA # 17**

#### **Providing surgical management of trigeminal neuralgia and other neurovascular compression syndromes**

##### **Key Features:**

- This EPA includes performing microvascular decompression or percutaneous rhizotomy for the management of neurovascular compression syndromes
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

##### **Assessment plan:**

###### **Part A: Surgical competence**

Direct observation by supervisor

###### **Use form 2. Form collects information on**

- Surgical technique: percutaneous rhizotomy; microvascular decompression

###### **Collect 3 observations of achievement**

- At least one percutaneous rhizotomy
- At least one microvascular decompression

###### **Part B: Logbook**

Submit logbook of functional neurosurgical procedures

###### **Logbook tracks**

- Procedure: [write in]
- Role in procedure: [write in]

##### **Relevant Milestones**

###### **Part A: Surgical competence**

- 1 ME 3.4 Position, prep, and drape the patient**
- 2 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 3 ME 3.4 Select appropriate instruments, implants, sutures and/or equipment**
- 4 ME 3.4 Recognize and address anatomical variants, and modify the surgical procedure as appropriate**
- 5 ME 3.4 Anticipate and/or manage intraoperative complications**
- 6 ME 3.4 Manage intraoperative hemostasis, including effective use of adjunctive agents as appropriate**
- 7 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 8 COL 1.2 Work effectively with the operating room team**

Relevant for “microvascular decompression” context only:

- 9      ME 3.4 Perform arachnoid dissection**
- 10     ME 3.4 Identify and decompress the target nerve**

Relevant for “percutaneous rhizotomy” context only:

- 9      ME 3.4 Achieve successful targeting of needle**
- 10     ME 3.4 Achieve adequate nerve lesioning**
- 11     ME 3.4 Use intraoperative imaging appropriately (e.g. fluoroscopy)**

## Neurosurgery: Core EPA # 18

### Providing neurosurgical consultation for patients with disorders of the peripheral nervous system

#### Key Features:

- This EPA focuses on patient assessment, interpretation of relevant investigations, including electrodiagnostics, and determination of suitability for surgical intervention
- This EPA may be observed in clinic or on the inpatient service

#### Assessment plan:

Indirect observation by supervisor (case discussion, review of consult letter or other documents)

Use Form 1. Form collects information on:

- Case mix: carpal; ulnar; brachial plexus; other
- Other: [write in]

Collect 4 observations of achievement

- At least 1 carpal
- At least 1 ulnar
- At least 1 brachial plexus
- At least 1 other

#### Relevant Milestones:

- 1 **ME 1.4** Apply knowledge of peripheral nerve anatomy and physiology
- 2 **ME 1.4** Apply knowledge of brachial and lumbosacral plexus anatomy
- 3 **ME 1.4** Apply knowledge of traumatic nerve injuries
- 4 **ME 1.4** Apply knowledge of nerve compression syndromes
- 5 **ME 2.2 Elicit information regarding the impact of the disorder on the patient's functional ability**
- 6 **ME 2.2 Perform sensory and motor examination relevant to peripheral nerve, and brachial and lumbosacral plexus**
- 7 **ME 2.2 Select and/or interpret investigations**
- 8 **ME 2.2 Interpret electrodiagnostic evaluations**
- 9 **ME 2.2 Distinguish between peripheral neuropathy and other etiologies**
- 10 **ME 2.4 Recognize indications for treatment**
- 11 **ME 2.4 Determine the need for, plan for, and timing of surgical intervention**
- 12 **ME 2.4 Provide non-operative management options for common entrapment neuropathies (e.g. carpal tunnel syndrome; ulnar neuropathy; meralgia paresthetica)**
- 13 **COM 4.3** Use communication skills and strategies that help patients make informed decisions about their health
- 14 **HA 1.2 Select and provide relevant patient education resources**

**Neurosurgery: Core EPA # 19**

**Performing peripheral nerve decompression procedures (JC)**

Key Features:

- This EPA focuses on routine carpal tunnel and ulnar decompression procedures.
- This EPA includes appropriate landmarking for the incision, identification of the nerve, complete release, avoidance of complications (anatomical variations, recurrent branch), closure of the incision and provision of discharge instructions
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Type of procedure: carpal tunnel decompression; ulnar nerve decompression/ transposition

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of peripheral nerve neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones:

Part A: Surgical competence

- 1 ME 3.4 Position, prep, and drape the patient**
- 2 ME 3.4 Select and apply local anesthesia, as appropriate**
- 3 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 4 ME 3.4 Select appropriate instruments, implants, sutures and/or equipment**
- 5 ME 3.4 Open and close the incision**
- 6 ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 7 ME 3.4 Recognize and address anatomical variants, and modify the surgical procedure as appropriate**
- 8 ME 4.1 Provide discharge instructions and plan for follow-up**
- 9 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 10 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #20**

**Performing sural nerve and/or muscle biopsy (JC)**

**Key Features:**

- This EPA includes landmarking for the incision, identifying the nerve, performing a biopsy appropriately, and avoiding complications
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence  
Direct observation by supervisor

Use Form 2. Form collects information on

- Type of procedure: sural nerve biopsy; muscle biopsy

Collect 1 observation of achievement

Part B: Logbook  
Submit logbook of peripheral nerve neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 3.4 Position, prep, and drape the patient**
- 2 ME 3.4 Select and apply local anesthesia, as appropriate**
- 3 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 4 ME 3.4 Open and close the incision**
- 5 ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 6 ME 4.1 Provide discharge instructions and plan for follow-up**
- 7 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 8 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA # 21**

**Performing resection of common peripheral nerve tumors (SC)**

**Key Features:**

- This EPA includes exposure of the nerve (including normal nerve above and below), effective use of the nerve stimulator, full (360 degrees) exposure of tumor, identification of normal fascicles, intracapsular resection, avoidance of complications and recognition of variant pathologies (MPNST, neurofibroma, perineurioma)
- This EPA may be observed in a patient with spinal nerve root tumour or any other peripheral nerve tumour
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use form 2

Collect 1 observation of achievement

Part B: Logbook

Submit logbook of peripheral nerve neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 3 **ME 3.4** Open and close the incision
- 4 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 5 **ME 3.4 Recognize and address anatomical variants, and modify the surgical procedure as appropriate**
- 6 **ME 3.4** Integrate neuropathology into intraoperative surgical decision-making
- 7 **ME 3.4 Utilize intraoperative neurophysiologic monitoring effectively, as appropriate**
- 8 **ME 3.4** Anticipate and/or manage intraoperative complications

- 9 **ME 3.4** Manage intraoperative hemostasis, including effective use of adjunctive agents as appropriate
- 10 **COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 11 **COL 1.2 Work effectively with the operating room team**

## Neurosurgery: Core EPA #22

### Providing neurosurgical consultation for patients with non-urgent spinal conditions

#### Key Features:

- This EPA include patients with degenerative spinal conditions, neoplastic spinal conditions (both intradural and extradural), and congenital and deformity conditions.
- This EPA focuses on patient assessment, interpretation of relevant investigations, assessment of spinal stability, determination of suitability for surgical intervention and appropriate selection and timing of intervention.
- This EPA may be observed in the clinic, emergency department, or an inpatient unit.

#### Assessment plan:

Indirect observation by supervisor

Use Form 1. Form collects information on

- Type of spinal condition: degenerative; neoplastic; congenital; deformity; syrinx; other
- Neurologic deficit: yes; no
- Mechanically unstable: yes; no
- Level: cervical; thoracic and/or lumbar

Collect 5 observations of achievement

- At least 2 degenerative spinal conditions
- At least 1 neoplastic spinal condition
- At least 1 deformity condition
- At least 1 with neurological deficit
- At least 1 with mechanical instability
- At least 2 assessors

#### Relevant Milestones:

- 1 ME 1.4 Apply knowledge of the natural history and outcomes of patients with spinal conditions**
- 2 ME 1.4 Apply knowledge of operative and non-operative management of spine conditions and their complications**
- 3 ME 1.5 Perform clinical assessments that address all relevant issues**
- 4 ME 2.2 Focus the clinical encounter, performing it in a time-effective manner, without excluding key elements**
- 5 ME 2.2 Select and/or interpret investigations**
- 6 ME 2.2 Synthesize patient information to determine diagnosis**
- 7 ME 2.2 Recognize the indications for instrumented fusion**
- 8 ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 9 S 3.4 Integrate best evidence and clinical expertise into decision-making**

- 10 **ME 4.1** Determine the necessity and appropriate timing of referral to another health care professional
- 11 **COM 3.1 Convey information related to the patient's health status, care and needs in a timely, honest, and transparent manner**
- 12 **ME 3.3 Triage a procedure or therapy, taking into account clinical urgency, potential for deterioration, and available resources**
- 13 **HA 1.1** Facilitate timely patient access to health services and resources

**Neurosurgery: Core EPA # 23**

**Providing definitive management for patients with spinal emergencies**

Key Features:

- This EPA builds on the competencies achieved in Foundations in the initial assessment and management of patients with spinal emergencies.
- This EPA focuses on the decision making regarding surgical intervention, and includes an assessment of spinal stability, risk and surgical candidacy, and the appropriate selection and timing of intervention.
- This also includes communication with the family regarding diagnosis, prognosis, plan, and informed consent as well as consultation with other services and prioritization/triage of patient management
- Patient presentations relevant to this EPA include traumatic spine injury, cauda equine syndrome, or cord compression of any cause

Assessment plan:

Direct and/or indirect observation by supervisor

Use Form 1. Form collects information on:

- Level: cervical; thoracic and/or lumbar
- Neurologic deficit: yes; no
- Mechanically unstable: yes; no
- Etiology: trauma; malignancy; other

Collect 5 observations of achievement

- At least 2 cervical
- At least 2 thoracic and/or lumbar
- At least 1 patient with a neurologic deficit
- At least 1 patient with a mechanically unstable spine
- At least 2 trauma
- At least 1 urgent spinal oncology case
- At least 2 different assessors

Relevant Milestones:

- 1 ME 1.4 Apply knowledge of the natural history and outcomes of patients with spinal conditions**
- 2 ME 1.4 Apply knowledge of operative and non-operative management of spine conditions and their complications**
- 3 ME 2.1 Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status**
- 4 ME 2.2 Focus the clinical encounter, performing it in a time-effective manner, without excluding key elements**
- 5 ME 2.2 Recognize the indications for instrumented fusion**
- 6 ME 2.2 Select, prioritize, and interpret investigations**

- 7 **ME 2.2** Synthesize patient information to determine diagnosis
- 8 **ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 9 **ME 3.2** Use shared decision-making in the consent process, taking risk and uncertainty into consideration
- 10 **ME 3.3 Triage a procedure or therapy, taking into account clinical urgency, potential for deterioration, and available resources**
- 11 **ME 4.1 Determine the necessity and appropriate timing of referral to another health care professional**
- 12 **COM 3.1** Provide information on diagnosis and prognosis in a clear, compassionate manner

**Neurosurgery: Core EPA #24**

**Performing lumbar laminectomy (JC)**

**Key Features:**

- This EPA focuses on the performance of a primary lumbosacral laminectomy and decompression of the neural elements.
- This includes proper patient positioning, level confirmation, and removal of the lamina while preserving unininvolved ligaments and dural integrity. It includes midline and lateral recess decompression.
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2.

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 2 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 ME 3.4 Plan the incision**
- 4 ME 3.4 Position, prep, and drape the patient**
- 5 ME 3.4 Expose and close for the procedure**
- 6 ME 3.4 Perform intraoperative verification of surgical level**
- 7 ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 8 ME 3.4 Perform adequate decompression**
- 9 ME 3.4 Consider spinal stability**
- 10 COM 5.1 Document surgical clinical encounters in a complete and timely manner**

**11 COL 1.2** Work effectively with the operating room team

**Neurosurgery: Core EPA #25**

**Exposing the anterior cervical spine (JC)**

Key Features:

- This EPA focuses on the performance of anterior sub-axial cervical spine exposure.
- This includes patient positioning, identifying the correct level and applying knowledge of the anatomy of the anterior neck structures to achieve appropriate exposure for subsequent decompression and fusion.
- This EPA does not include performance of the discectomy or fusion portions of the procedure
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence

Direct assessment by supervisor

Use Form 2. Form collects information on:

- Etiology: trauma; other

Collect 2 observations of achievement

- At least one trauma case

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones:

Part A: Surgical competence

- 1 ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 2 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 ME 3.4** Plan the incision
- 4 ME 3.4** Position, prep, and drape the patient
- 5 ME 3.4** Perform intraoperative verification of surgical level
- 6 ME 3.4** Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling
- 7 ME 3.4** Place and position retractor system
- 8 ME 3.4** Anticipate and/or manage intraoperative complications

- 9 COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 10 COL 1.2** Work effectively with the operating room team

**Neurosurgery: Core EPA #26**

**Performing lumbar microdiscectomy (SC)**

Key Features:

- This EPA focuses on the performance of a lumbar microdiscectomy, with appropriate use of the microscope with regard to position, zoom, focus and interaction with the assistant.
- This includes appropriate patient positioning, correct level identification and performance of the laminotomy, nerve root mobilization and disc removal.
- This EPA does not include endoscopic or percutaneous techniques
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Etiology: cauda equina syndrome; other
- Revision: no; yes

Collect 2 observations of achievement

- At least one revision procedure

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones:

Part A: Surgical competence

- 1 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 2 **ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 **ME 3.4** Plan the incision
- 4 **ME 3.4 Position, prep, and drape the patient**
- 5 **ME 3.4** Expose and close for the procedure
- 6 **ME 3.4 Perform intraoperative verification of surgical level**

- 7 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 8 **ME 3.4 Perform adequate decompression**
- 9 **ME 3.4 Consider spinal stability**
- 10 **ME 3.4 Anticipate and/or manage intraoperative complications**
- 11 **COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 12 **COL 1.2 Work effectively with the operating room team**

## Neurosurgery: Core EPA #27

### Performing posterior cervical or thoracic decompression (SC)

#### Key Features:

- This EPA focuses on the performance of a cervical or thoracic laminectomy and decompression of the neural elements.
- This includes proper patient positioning, level confirmation, and removal of the lamina while preserving unininvolved ligaments and respecting the spinal cord. This also includes wider postero-lateral thoracic decompression for anterior pathology, which involves resection of the facet joints and pedicle.
- This EPA does not include instrumented fusion
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

Part A: Surgical competence

Direct observation by supervisor

Use Form 2.

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

Part A: Surgical competence

- 1 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 2 **ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 **ME 3.4** Plan the incision
- 4 **ME 3.4 Position, prep, and drape the patient**
- 5 **ME 3.4** Expose and close for the procedure
- 6 **ME 3.4 Perform intraoperative verification of surgical level**
- 7 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 8 **ME 3.4 Perform adequate decompression**
- 9 **ME 3.4 Consider spinal stability**

- 10 ME 3.4 Anticipate and/or manage intraoperative complications**
- 11 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 12 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #28**

**Performing anterior cervical decompression (SC)**

**Key Features:**

- This EPA focuses on the performance of an anterior cervical decompression with a discectomy or vertebrectomy.
- This EPA does not include instrumented fusion.
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience.

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2.

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 2 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 ME 3.4 Plan the incision**
- 4 ME 3.4 Expose the appropriate spinal level**
- 5 ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 6 ME 3.4 Perform adequate decompression**
- 7 ME 3.4 Consider spinal stability**
- 8 ME 3.4 Anticipate and/or manage intraoperative complications**
- 9 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 10 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #29**

**Performing procedures utilizing spinal instrumentation including posterior subaxial, posterior thoraco-lumbar, occipito-cervical and anterior cervical (SC)**

**Key Features:**

- This EPA focuses on spinal instrumentation and fusion, and includes instrumentation of the spine at the occipito-cervical, anterior and posterior cervical, posterior thoracic and lumbar levels, as well as lumbar interbody instrumentation
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Approach: anterior; posterior
- Level: occipito-cervical; cervical; thoracic; lumbar
- Interbody fusion: no; yes

Collect 8 observations of achievement

- At least one occipito-cervical
- At least 2 anterior cervical
- At least 2 posterior cervical
- At least 1 posterior thoracic
- At least 2 posterior lumbar
- At least one lumbar interbody instrumentation
- At least two different assessors

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 2 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 ME 3.4 Select appropriate instruments, implants, sutures and/or equipment**
- 4 ME 3.4** Plan the incision

- 5 **ME 3.4 Position, prep, and drape the patient**
- 6 **ME 3.4 Expose and close for the procedure**
- 7 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 8 **ME 3.4 Design a fusion construct that optimizes stability and alignment**
- 9 **ME 3.4 Ensure adequate bony substrate for fusion**
- 10 **ME 3.4 Perform safe and effective instrumentation**
- 11 **ME 3.4 Anticipate and/or manage intraoperative complications**
- 12 **COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 13 **COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #30**

**Providing surgical management of spinal intra-dural lesions (SC)**

**Key Features:**

- This EPA focuses on surgical management of intradural spinal pathologies
- This includes all the required steps to address intradural pathologies, including intramedullary lesions
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Level: cervical; thoracic; lumbar
- Location: intramedullary; extramedullary

Collect 2 observations of achievement

- At least one extramedullary at spinal cord level
- At least one intramedullary

Part B: Logbook

Submit logbook of spinal neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 2 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 3 ME 3.4 Plan the incision**
- 4 ME 3.4 Position, prep, and drape the patient**
- 5 ME 3.4 Select and use intraoperative monitoring effectively, as indicated**
- 6 ME 3.4 Perform intraoperative verification of surgical level**
- 7 ME 3.4 Open and close spinal dura**
- 8 ME 3.4 Perform safe intradural tissue dissection of relevant structures with gentle tissue handling**

- 9 ME 3.4** Consider spinal stability
- 10 ME 3.4** Integrate neuropathology into intraoperative surgical decision-making
- 11 COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 12 COL 1.2** Work effectively with the operating room team

**Neurosurgery: Core EPA # 31**

**Providing neurosurgical consultation for patients with non-urgent cranial and spinal vascular conditions**

Key Features:

- This EPA focuses on patient assessment, interpretation of relevant investigations, natural history, determination of suitability for surgical intervention, and risk optimization for the surgical or endovascular procedure.
- This includes plans for ongoing monitoring of patients that are not (or not yet) surgical candidates.
- This EPA may be observed in the ambulatory clinic, emergency department or inpatient ward.

Assessment plan:

Indirect observation by supervisor

Use Form 1. Form collects information on:

- Location: cranial; spinal; other
- Condition: aneurysm; vascular malformation; carotid stenosis

Collect 3 observations of achievement

- At least one cranial aneurysm
- At least one vascular malformation
- At least one carotid stenosis

Relevant Milestones:

- 1 **ME 1.4** Apply knowledge of indications for endovascular and surgical aneurysm repair
- 2 **ME 1.4** Apply knowledge of available endovascular techniques for intracranial aneurysm repair
- 3 **ME 2.2** Synthesize patient information to determine diagnosis
- 4 **ME 2.2 Select and/or interpret investigations**
- 5 **ME 2.2 Interpret imaging studies**
- 6 **ME 2.2 Determine natural history of the vascular lesion, with reference to risk factors**
- 7 **ME 3.1 Identify all relevant treatment options and discuss relative risk and benefits of endovascular versus surgical treatment as appropriate**
- 8 **ME 3.1** Determine if the condition warrants surgical intervention and if the patient is a candidate for interventional procedures
- 9 **ME 2.4 Develop an appropriate management plan including but not limited to observation, surgery and/or endovascular intervention**
- 10 **ME 3.2 Use shared decision-making in the consent process, taking risk and uncertainty into consideration**
- 11 **ME 4.1** Determine the necessity and appropriate timing of referral to another health care professional

- 12 **ME 2.4** Provide peri-procedural management for patient undergoing endovascular intervention
- 13 **ME 4.1** Establish plans for ongoing care
- 14 **COM 3.1 Provide information to the patient and family clearly and compassionately**
- 15 **COL 1.2** Consult as needed with other health care professionals, including other physicians
- 16 **COL 1.3** Communicate effectively with other physicians and colleagues

**Neurosurgery: Core EPA #32**

**Providing neurosurgical consultation for patients with urgent cranial and spinal vascular conditions**

**Key Features:**

- This EPA builds on the competencies achieved in Foundations in the initial assessment and management of patients with cranial and spinal emergencies.
- This EPA focuses on the decision making regarding surgical and endovascular interventions, and includes an assessment of risk and surgical candidacy, the appropriate selection and timing of intervention, and management of complications.

**Assessment plan:**

Indirect observation by supervisor (e.g. case discussion, review of consult letter or other documents)

Use Form 1. Form collects information on:

- Location: cranial; spinal; other
- Condition: aneurysm; vascular malformation; carotid stenosis

Collect 3 observations of achievement

- At least one cranial aneurysm
- At least one vascular malformation
- At least one carotid stenosis

**Relevant Milestones :**

- 1 **ME 1.4** Apply knowledge of indications for endovascular and surgical aneurysm repair
- 2 **ME 1.4** Apply knowledge of available endovascular techniques for intracranial aneurysm repair
- 3 **ME 2.1 Identify patients at risk of clinical deterioration**
- 4 **ME 2.1 Prioritize aspects of the patient's assessment and management, responding to urgent presentations as well as ongoing changes in patient status**
- 5 **ME 2.2 Select, prioritize, and interpret investigations**
- 6 **ME 3.1 Identify all relevant treatment options and discuss relative risk and benefits of endovascular versus surgical treatment as appropriate**
- 7 **ME 3.3 Triage a procedure or therapy, taking into account clinical urgency, potential for deterioration, and available resources**
- 8 **ME 3.2 Use shared decision-making in the consent process, taking risk and uncertainty into consideration**
- 9 **ME 2.4 Develop an appropriate management plan including but not limited to observation, surgery and/or endovascular intervention**
- 10 **ME 3.1 Determine if the condition warrants surgical intervention and if the patient is a candidate for interventional procedures**

- 11 **ME 2.4** Provide peri-procedural management for patient undergoing endovascular intervention
- 12 **ME 4.1** Determine the necessity and appropriate timing of referral to another health care professional
- 13 **COM 3.1 Provide information to the patient and family clearly and compassionately**
- 14 **COL 1.2** Work effectively with other physicians or surgeons to provide all needed aspects of care

**Neurosurgery: Core EPA # 33**

**Performing carotid endarterectomy**

Key Features:

- This EPA focuses on the technical performance of cranial vascular neurosurgical procedures. This includes patient positioning, selection of operating instruments, neuromonitoring where appropriate, anesthetic considerations and intraoperative imaging
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence  
Direct observation by supervisor

Use Form 2.

Collect 2 observations of achievement

Part B: Logbook  
Submit logbook of vascular neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones :

Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 3 **ME 3.4** Select appropriate instruments, implants, sutures and/or equipment
- 4 **ME 3.4** Open and close the incision
- 5 **ME 3.4 Manage intraoperative anticoagulation**
- 6 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 7 **ME 3.4** Recognize and address anatomical variants, and modify the surgical procedure as appropriate
- 8 **ME 3.4 Ensure adequate proximal and distal vessel exposure**
- 9 **ME 3.4 Perform arteriotomy, plaque dissection, and vessel arteriotomy closure safely and effectively**
- 10 **ME 3.4 Monitor for and address inadequate cerebral perfusion**

- 11 **ME 3.4 Manage intraoperative hemostasis, including effective use of adjunctive agents**
- 12 **COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 13 **COL 1.2** Work effectively with the operating room team

**Neurosurgery: Core EPA # 34**

**Performing surgery for patients with an intracranial aneurysm**

**Key Features:**

- This EPA focuses on the clipping of a simple aneurysm
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of vascular neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 ME 3.4** Position, prep, and drape the patient
- 2 ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 3 ME 3.4** Use the operating microscope effectively
- 4 ME 3.4** Perform craniotomy for exposure
- 5 ME 3.4** Perform arachnoid dissection safely
- 6 ME 3.4** Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling
- 7 ME 1.4** Apply knowledge of neuroprotective adjuncts
- 8 ME 3.4** Determine indications for and use temporary clipping, as relevant
- 9 ME 3.4** Select and apply aneurysm clip
- 10 ME 3.4** Confirm aneurysm exclusion and patency of parent vessel
- 11 ME 3.4** Anticipate and/or manage intraoperative complications
- 12 ME 3.4** Manage intraoperative hemostasis, including effective use of adjunctive agents
- 13 COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 14 COL 1.2** Work effectively with the operating room team

**Neurosurgery: Core EPA #35**

**Performing surgery for patients with spontaneous intracerebral hemorrhage with or without an underlying vascular malformation**

**Key Features:**

- This EPA focuses on the technical performance of the evacuation of an intracerebral hematoma with or without definitive management of the source of bleeding. This includes patient positioning, selection of operating instruments, neuromonitoring where appropriate, anesthetic considerations, and intraoperative imaging
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2.

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of vascular neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 3 **ME 3.4** Select appropriate instruments, implants, sutures and/or equipment
- 4 **ME 3.4** Plan the incision, with or without the use of navigation
- 5 **ME 3.4** Open and close the incision
- 6 **ME 3.4** Perform craniotomy for exposure
- 7 **ME 3.4** Open dura for exposure
- 8 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 9 **ME 3.4** Recognize and address anatomical variants, and modify the surgical procedure as appropriate
- 10 **ME 3.4 Recognize and manage any associated pathology (e.g. AVM, tumour)**

- 11 **ME 3.4 Manage intraoperative hemostasis, including effective use of adjunctive agents**
- 12 **COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 13 **COL 1.2** Work effectively with the operating room team

## Neurosurgery: Core EPA #36

### Providing neurosurgical consultation for patients with simple brain tumours (JC)

#### Key Features:

- This EPA includes taking a focused history and performing a physical examination, arranging and interpreting appropriate investigations (including imaging, laboratory testing and ancillary tests and including staging as appropriate), developing a differential diagnosis and formulating a management plan as well as engaging the oncology team and communicating the pertinent information to the patient
- This EPA includes common intra-axial primary and secondary malignancies, convexity extra-axial tumours and pituitary adenomas

#### Assessment plan:

Indirect observation by supervisor (e.g. case discussion and review of consult letter)

Use Form 1. Form collects information on:

- Location: extra-axial; intra-axial; pituitary adenoma
- Tumour: primary; metastatic; other

Collect 4 observations of achievement

- At least one extra-axial
- At least one pituitary adenoma
- At least one metastatic tumour
- At least one primary intra-axial tumour
- At least two different assessors

#### Relevant Milestones:

- 1 ME 1.5 Perform clinical assessments that address all relevant issues**
- 2 ME 2.2 Select and/or interpret investigations**
- 3 ME 2.2 Synthesize patient information to determine diagnosis**
- 4 ME 2.4 Develop management plans including observation, biopsy, resection, radiotherapy, radiosurgery, and/or chemotherapy**
- 5 ME 2.4 Determine the need for, plan for, and timing of surgical intervention**
- 6 ME 3.2 Obtain and document informed consent**
- 7 ME 4.1 Determine the necessity and appropriate timing of referral to another health care professional**
- 8 COM 3.1 Provide information to the patient and family clearly and compassionately**
- 9 COL 1.3 Communicate effectively with other physicians and colleagues**
- 10 HA 1.2 Select and provide relevant patient education resources**

**Neurosurgery: Core EPA # 37**

**Providing neurosurgical consultation for patients with complex brain tumours (SC)**

**Key Features:**

- This EPA includes taking a focused history and performing a physical examination, arranging and interpreting appropriate investigations (including staging as appropriate), developing a differential diagnosis and formulating a management plan as well as engaging the OR oncology team and communicating the pertinent information to the patient
- This EPA includes skull base lesions, intraventricular tumours, lesions in the pineal region, acoustic neuromas and primary intra-axial tumours in eloquent brain

**Assessment plan:**

Indirect observation by supervisor (e.g. case discussion, review of consult letter or other documents)

Use Form 1. Form collects information on:

- Case mix: skull base; eloquent brain primary; ventricular; pineal region; posterior fossa; acoustic neuroma

Collect 5 observations of achievement

- At least three different types of case mix
- At least two different assessors

**Relevant Milestones:**

- 1 ME 1.5 Perform clinical assessments that address all relevant issues**
- 2 ME 2.2 Select and/or interpret investigations**
- 3 ME 2.2 Synthesize patient information to determine diagnosis**
- 4 ME 2.4 Develop management plans including observation, biopsy, resection, radiotherapy, radiosurgery, chemotherapy and/or preoperative embolization**
- 5 ME 2.4 Determine the need for, plan for, and timing of surgical intervention**
- 6 S 3.4 Integrate best evidence and clinical expertise into decision-making**
- 7 ME 3.2 Obtain and document informed consent**
- 8 ME 4.1 Determine the necessity and appropriate timing of referral to another health care professional**
- 9 COM 3.1 Provide information to the patient and family clearly and compassionately**
- 10 COL 1.3 Communicate effectively with other physicians and colleagues**
- 11 HA 1.2 Select and provide relevant patient education resources**

## Neurosurgery: Core EPA #38

### Performing surgery for patients with simple intra-axial brain tumours (JC)

#### Key Features:

- The EPA focuses on planning, positioning, appropriate utilization of surgical adjuncts (navigation), and the surgical procedure
- This EPA includes supratentorial and infratentorial non-eloquent intra-axial tumours as well as convexity extra-axial tumours (e.g. meningioma)
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

##### Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Location: extra-axial; intra-axial; posterior fossa
- Tumour type: primary; metastatic

Collect 4 observations of achievement

- At least one extra-axial
- At least one metastatic intra-axial
- At least one primary intra-axial
- At least one posterior fossa tumour

##### Part B: Logbook

Submit logbook of oncologic neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

##### Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 3 **ME 3.4** Use optical magnification appropriately
- 4 **ME 3.4 Plan the incision, with or without the use of navigation**
- 5 **ME 3.4** Debulk the tumour and dissect the brain tumour interface
- 6 **ME 2.4** Assess and determine plan for extent of resection
- 7 **ME 3.4** Integrate neuropathology into intraoperative surgical decision-making

- 8 ME 3.4 Manage intraoperative hemostasis, including effective use of adjunctive agents**
- 9 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 10 COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #39**

**Performing surgery for patients with complex brain tumours (SC)**

Key Features:

- The EPA focuses on planning, positioning, appropriate utilization of surgical adjuncts (navigation), and the surgical procedure
- This EPA include patients with complex meningioma (e.g. involving venous sinus or sphenoid wing) or skull base tumour, primary posterior fossa tumour or eloquent intraaxial brain tumour
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

Assessment plan:

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Case mix: complex meningioma; skull base tumour; primary posterior fossa tumour; eloquent intraaxial brain tumour

Collect 4 observations of achievement

- At least one posterior fossa tumour
- At least one complex meningioma
- At least one eloquent intraaxial brain tumour

Part B: Logbook

Submit logbook of oncologic neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

Relevant Milestones:

Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 3.4 Plan the incision, with or without the use of navigation**
- 3 **ME 3.4 Select and use intraoperative monitoring and mapping effectively as indicated**
- 4 **ME 3.4 Debulk the tumour and dissect the brain tumour interface, nerve, or vessel**
- 5 **ME 3.4 Use optical magnification appropriately**
- 6 **ME 2.4 Assess and determine plan for extent of resection**

- 7 **ME 3.4** Integrate neuropathology into intraoperative surgical decision-making
- 8 **ME 3.4 Anticipate and/or manage intraoperative complications**
- 9 **ME 3.4 Manage intraoperative hemostasis, including effective use of adjunctive agents**
- 10 **COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 11 **COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA # 40**

**Performing transnasal surgery for patients with pituitary tumours (SC)**

**Key Features:**

- The EPA focuses on planning, positioning, appropriate utilization of surgical adjuncts (navigation), and performing the surgical procedure
- This EPA includes the trans-nasal approach to the sella
- This EPA does not include craniotomies for sellar pathology
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence

Direct observation by supervisor

Use Form 2.

Collect 2 observations of achievement

Part B: Logbook

Submit logbook of oncologic neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 **ME 3.4** Position, prep, and drape the patient
- 2 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure
- 3 **ME 3.4 Plan the incision, with or without the use of navigation**
- 4 **ME 3.4** Set up and use endoscope for intraoperative visualization
- 5 **ME 2.4 Assess and determine plan for extent of resection**
- 6 **ME 3.4 Debulk the tumour and protect critical adjacent structures: optic apparatus, internal carotid, normal pituitary gland**
- 7 **ME 3.4 Ensure appropriate reconstruction of skull base**
- 8 **ME 3.4 Manage intraoperative hemostasis, including effective use of adjunctive agents**
- 9 **ME 3.4** Anticipate and/or manage intraoperative complications
- 10 **COM 5.1** Document surgical clinical encounters in a complete and timely manner
- 11 **COL 1.2 Work effectively with the operating room team**

**Neurosurgery: Core EPA #41**

**Assessing and providing initial management for pediatric patients with a neurosurgical emergency**

Key Features:

- This EPA includes traumatic cranial or spinal injury as well as other emergencies
- This EPA focuses on assessing the urgency of the presentation, initiating further investigations, providing management to stabilize the patient and identifying patients that require surgical intervention

Assessment plan:

Indirect observation by supervisor

Use Form 1. Form collects information on

- Age: [write in]

Collect 2 observations of achievement

- At least one child less than 5 years of age

Relevant Milestones:

- 1 ME 1.5 Recognize urgent problems and seek assistance**
- 2 ME 1.4 Apply knowledge of physiology and anatomy of the pediatric spine**
- 3 ME 1.4 Demonstrate knowledge of the management (operative and non-operative) of pediatric head and spine injury**
- 4 ME 1.4 Demonstrate knowledge of birth trauma relating to nerve, brain, and spine**
- 5 ME 2.2 Perform an age appropriate history and physical examination**
- 6 COM 2.3 Seek and synthesize relevant information from other sources, including the patient's family**
- 7 ME 2.2 Develop a specific differential diagnosis relevant to the patient's presentation**
- 8 ME 2.2 Select, prioritize, and interpret investigations**
- 9 ME 2.4 Develop and implement initial management plans**
- 10 ME 1.4 Apply knowledge of pediatric physiology, including blood volumes, blood pressure, heart rate, and fluid resuscitation**
- 11 P 3.1 Apply the laws governing consent/assent in the pediatric age group**
- 12 COM 4.3 Answer questions from the patient and family about next steps**
- 13 COM 5.1 Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions**
- 14 COL 1.2 Consult as needed with other health care professionals, including other physicians**
- 15 HA 1.2 Counsel patients regarding preventive strategies for trauma and head injury prevention**
- 16 P 3.1 Adhere to requirements for mandatory reporting, such as suspicious injury**

## Neurosurgery: Core EPA #42

### Assessing pediatric patients being considered for neurosurgical intervention

#### Key Features:

- This EPA focuses on performing an age appropriate neurosurgical consultation, and discussing surgical options.
- This EPA may be observed with any presentation, and in any clinical setting
- This includes a range of diagnoses: hydrocephalus, craniosynostosis, congenital malformations and tumour.

#### Assessment plan:

Indirect observation by supervisor

Use Form 1. Form collects information on:

- Diagnosis: hydrocephalus; craniosynostosis; tethered cord; epilepsy; brain tumour; posterior fossa brain tumour
- Age: [write in]

Collect 3 observations of achievement

- At least one posterior fossa brain tumour
- At least two other diagnoses
- At least one child less than 5 years of age

#### Relevant Milestones:

- 1 **ME 1.4** Apply knowledge of embryological development as it relates to congenital malformations
- 2 **ME 2.2 Elicit a history, including the prenatal history as relevant**
- 3 **ME 2.2 Perform the physical exam in a manner that minimizes discomfort or distress, without excluding key elements**
- 4 **ME 2.2 Adapt the clinical assessment to the child's age and development**
- 5 **ME 2.2 Develop a specific differential diagnosis relevant to the patient's presentation**
- 6 **ME 2.2 Select investigations, including imaging with consideration of the need for sedation, and radiation exposure**
- 7 **ME 2.2 Interpret imaging studies**
- 8 **ME 2.4 Develop a management plan which may include observation, surgical intervention and/or non-operative intervention**
- 9 **ME 3.1 Demonstrate knowledge of surgical options and indications**
- 10 **COM 3.1 Provide information to the patient and family clearly and compassionately**
- 11 **COM 4.3 Answer questions from the patient and family about next steps**
- 12 **COM 5.1 Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions**
- 13 **P 3.1 Apply the laws governing consent/assent in the pediatric age group**

**Neurosurgery: Core EPA# 43**

**Managing the care of hospitalized pediatric patients**

Key Features:

- This EPA includes all aspects of care for hospitalized neurosurgical patients, including progressing the care plan, discharge planning and communication with family.

Assessment plan:

Indirect observation by supervisor

Use Form 1.

Collect 2 observations of achievement

Relevant Milestones:

- 1 **ME 1.5 Perform clinical assessments that address all relevant issues**
- 2 **ME 2.4 Provide routine post-operative management, including intravenous fluids, diet, wound care, and medications**
- 3 **ME 2.4 Provide appropriate pain management**
- 4 **ME 2.4 Adjust medication dosing for patient age, size, and/or renal function**
- 5 **COM 3.1 Provide information to the patient and family clearly and compassionately**
- 6 **COL 1.2 Work effectively with other physicians and health care professionals engaged in the mutual care of a patient**
- 7 **HA 1.3 Incorporate health promotion into interactions with the patient and family**

## Neurosurgery: Core 44

### Performing CSF shunt procedures for pediatric patients

#### Key Features:

- This EPA may be observed in an initial procedure or a revision
- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

##### Part A: Surgical competence

Direct observation by supervisor

Use Form 2: Form collects information on:

- Age: infant; toddler; older child; adolescent

Collect 2 observations of achievement

- At least one infant or toddler

##### Part B: Logbook

Submit logbook of pediatric neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

##### Part A: Surgical competence

- 1 ME 2.2 Interpret preoperative imaging related to the nature of the condition and surgical planning**
- 2 ME 3.4 Select appropriate instruments, implants, sutures and/or equipment**
- 3 ME 3.4 Plan the incision, with or without the use of navigation**
- 4 ME 3.4 Position, prep, and drape the patient**
- 5 ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 6 ME 3.4 Recognize and address anatomical variants, and modify the surgical procedure as appropriate**
- 7 ME 3.4 Demonstrate intraoperative judgment, fluidity of movement, and forward progression**
- 8 ME 3.4 Establish and implement a plan for post-procedure care**
- 9 COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 10 COL 1.2 Work effectively with the operating room team**
- 11 ME 4.1 Provide post-operative orders for patient and device management**

**Neurosurgery: Core EPA #45**

**Performing craniotomy in an infant/toddler**

**Key features**

- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

**Assessment plan:**

Part A: Surgical competence  
Direct observation by supervisor

Use Form 2

Collect one observation of achievement

Part B: Logbook  
Submit logbook of pediatric neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

**Relevant Milestones:**

Part A: Surgical competence

- 1 **ME 3.4** Apply the surgical safety checklist
- 2 **ME 3.4 Plan the incision, with or without the use of navigation**
- 3 **ME 3.4 Position, prep, and drape the patient**
- 4 **ME 1.4** Apply knowledge of key anatomic relationships to the specific or proposed procedure
- 5 **ME 3.4** Select appropriate instruments, implants, sutures and/or equipment
- 6 **ME 3.4** Open and close the incision
- 7 **ME 3.4 Provide adequate exposure of target cranial surface**
- 8 **ME 3.4 Place burr holes and safely complete craniotomy**
- 9 **ME 3.4 Perform safe dural opening**
- 10 **ME 3.4 Perform effective dural closing**
- 11 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 12 **ME 3.4 Ensure meticulous control of blood loss**
- 13 **ME 3.4** Recognize and address anatomical variants, and modify the surgical procedure as appropriate
- 14 **COL 1.2** Work effectively with the operating room team
- 15 **ME 4.1** Provide post-operative orders

## Neurosurgery: Core EPA #46

### Performing spine procedures for pediatric patients

#### Key features

- The observation of this EPA is divided into two parts: direct observation of specific surgical skills within a procedure; a log of procedures to demonstrate the breadth of experience

#### Assessment plan:

Part A: Surgical competence

Direct observation by supervisor

Use Form 2. Form collects information on:

- Diagnosis: tethered cord; other

Collect one observation of achievement

Part B: Logbook

Submit logbook of pediatric neurosurgical procedures

Logbook tracks

- Procedure: [write in]
- Role in procedure: [write in]

#### Relevant Milestones:

Part A: Surgical competence

- 1 **ME 3.4 Position, prep, and drape the patient**
- 2 **ME 1.4 Apply knowledge of key anatomic relationships to the specific or proposed surgical procedure**
- 3 **ME 3.4 Select appropriate instruments, implants, sutures and/or equipment**
- 4 **ME 3.4 Plan the incision, with or without the use of navigation**
- 5 **ME 3.4 Open and close the incision**
- 6 **ME 3.4 Use optical magnification appropriately**
- 7 **ME 3.4 Perform safe tissue dissection of relevant structures and tissue layers with gentle tissue handling**
- 8 **ME 3.4 Recognize and address anatomical variants, and modify the surgical procedure as appropriate**
- 9 **COM 5.1 Document surgical clinical encounters in a complete and timely manner**
- 10 **COL 1.2 Work effectively with the operating room team**
- 11 **ME 4.1 Provide post-operative orders**

**Neurosurgery: TTP EPA # 1**

**Managing an out-patient clinic**

Key Features:

- This EPA focuses on the overall performance in an ambulatory setting rather than care of individual patient conditions. This includes:
  - o Managing a schedule with the appropriate number and variety of patients (new patients and follow up patients; spots left open for emergency consults)
  - o Wait list management
  - o Time management in an office setting
  - o Completing dictations in a timely manner
  - o Reviewing test results/acting on results appropriately and in a timely manner
  - o Working effectively with the staff and/or other learners in the clinic

Assessment plan:

Direct and/or indirect observation by supervisor, with input from clinic staff, based on longitudinal observation

Use Form 1

Collect 2 observations during Transition to Practice

Relevant Milestones:

- 1 ME 1.5 Prioritize patients based on the urgency of clinical presentations**
- 2 L 4.2 Manage bookings to optimize clinic scheduling**
- 3 S 3.4 Integrate best evidence and clinical expertise into decision-making**
- 4 ME 2.4 Establish patient centered-management plans**
- 5 COM 5.1 Document clinical encounters in an accurate, complete and timely manner**
- 6 L 4.2 Book operative cases with appropriate urgency, duration, and equipment**
- 7 L 4.1 Manage time effectively in the ambulatory clinic**
- 8 L 4.1 Review and act on test results in a timely manner**
- 9 P 1.1 Respond punctually to requests from patients or other health care providers**
- 10 L 4.1 Integrate supervisory and teaching responsibilities into the overall management of the clinical service**

## Neurosurgery: TTP EPA # 2

### Coordinating, organizing and executing the surgical day of Core procedures

#### Key Features:

- This EPA integrates the resident's surgical abilities for individual cases with their abilities to function effectively as a surgeon; managing a case load, prioritizing, supervising junior learners and working effectively with other health professionals
- The observation of this EPA is divided into two parts: surgical competence and working effectively with the interprofessional team

#### Assessment plan:

##### Part A: Surgical competence

Direct observation by supervisor, at end of a surgical day

Use Form 1. Form collects information on:

- Type of procedures (*select all that apply*): general; functional; peripheral; spinal; vascular; oncology; pediatric; other

Collect 3 observations of achievement

- At least two different types of procedures
- Two different assessors

##### Part B: Interprofessional teamwork

Multiple observers provide feedback individually, which is then collated to one report

Use Form 3. Form collects information on:

- Observer role: anesthetist; nurse

Collect feedback from at least 4 observers on one occasion

- At least one anesthetist
- At least two nurses

#### Relevant Milestones:

##### Part A: Surgical competence

- 1 P 1.2 Prepare for surgical procedures, reviewing the list of planned operations**
- 2 ME 3.4 Select appropriate materials and equipment for the procedure**
- 3 ME 5.2 Lead the team in the use of the surgical safety checklist**
- 4 ME 3.4 Perform procedures in a skillful and safe manner**
- 5 ME 3.4 Manage unexpected intraoperative findings and perioperative issues, adjusting the procedure as appropriate**
- 6 ME 4.1 Establish plans for post-operative care**
- 7 COL 3.2 Transition patient care safely to the post-operative team**

- 8 **COM 3.1 Convey information about the procedure, operative findings and patient status to the family clearly and compassionately**
- 9 **COM 5.1 Document surgical procedures in an accurate, complete, timely and accessible manner**
- 10 **P 4.1 Maintain professional clinical performance in demanding or stressful clinical settings**

Part B: Interprofessional work/supervision

- 1 **L 4.2 Demonstrate leadership skills in the operating room**
- 2 **COL 1.2 Make effective use of the scope and expertise of other health care professionals**
- 3 **COL 2.1 Delegate tasks and responsibilities in an appropriate and respectful manner**
- 4 **COL 1.3 Communicate effectively with the operating room team**
- 5 **S 2.3 Provide junior learners with opportunities for appropriate clinical responsibility**
- 6 **S 2.5 Provide junior learners with feedback to enhance learning and performance**
- 7 **P 1.1 Intervene when behaviours toward colleagues and/or learners undermine a respectful environment**
- 8 **P 4.1 Maintain professional clinical performance in demanding or stressful clinical settings**

**Neurosurgery: TTP EPA #3**

**Contributing surgical expertise to interprofessional neurosurgery teams**

Key features:

- This EPA focuses on shared decision-making with other health care professionals, working effectively as a member of an interprofessional team. Examples include tumour board, endovascular team, or epilepsy team.
- This EPA includes contributing surgical expertise to the team discussion, advocating for the patient and demonstrating professional behaviour

Assessment plan:

Direct observation, on one occasion

Use Form 1. Form collects information on:

- Role of observer: neurosurgeon; other physician or health care professional

Collect 1 observation of achievement

- At least 1 neurosurgeon
- At least 1 other physician or health care professional

Relevant Milestones:

- 1 ME 1.4** Apply a broad base and depth of knowledge in clinical and biomedical sciences to manage the breadth of patient presentations in Neurosurgery
- 2 ME 2.4** Establish patient-centered management plans
- 3 ME 3.3** Advocate for a patient's procedure or therapy on the basis of urgency and available resources
- 4 COL 1.1** Establish positive relationships with other members of the health care team
- 5 COL 1.3 Communicate effectively with other physicians and colleagues**
- 6 COL 1.3 Contribute to quality patient care by sharing surgical expertise**
- 7 COL 2.1** Actively listen to and engage in interactions with collaborators
- 8 COL 2.2 Achieve consensus when there are differences in recommendations provided by other health care professionals**
- 9 L 2.1 Allocate health care resources for optimal patient care**
- 10 S 3.4 Integrate best evidence and clinical expertise into decision-making**
- 11 P 1.1** Exhibit professional behaviours