**New Application: Endovascular Surgical Neuroradiology**

**Review Committees for Neurological Surgery, Neurology, or Diagnostic Radiology**

**ACGME**

**Sponsoring Institution**

1. Does the Sponsoring Institution also sponsor ACGME-accredited programs in the following specialties? [PR Int.C.3.]

Neurological Surgery  YES  NO

Diagnostic Radiology  YES  NO

Neuroradiology  YES  NO

Neurology  YES  NO

If no to any of the above, explain how the program will be jointly administered by programs in these specialties.

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1. Will the program director have adequate support from the institution and the radiology, neurological surgery, and neurology departments to carry out the mission of the program? [PR I.A.1.]  
     YES  NO

If no, provide an explanation.

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**Program Personnel and Resources**

**Program Director**

1. Does the program director have the following qualifications?
2. Special expertise in endovascular surgical neuroradiology techniques [PR II.A.2.d)]  
     YES  NO
3. Appointment by and responsibility to the program director of the core program [PR II.A.2.e)]  
     YES  NO
4. Appointment to the teaching staff in the departments of radiology, neurological surgery, and neurology [PR II.A.2.f)]  YES  NO

If no to any of the above, provide an explanation.

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1. Does the program director concentrate at least 50% of his or her practice in endovascular surgical neuroradiology therapy? [PR II.A.2.d).(1)]  YES  NO

If no, provide an explanation.

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**Faculty**

1. Do the physician faculty hold primary and/or joint appointments in the departments of radiology, neurological surgery and neurology? [PR II.B.4.c)]  YES  NO

If no, provide an explanation.

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1. Do the physician faculty concentrate at least 50% of their practice in endovascular surgical neuroradiology therapy? [PR II.B.4.b)]  YES  NO

If no, provide an explanation.

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**Facilities and Space**

Describe the following resources available to the program:

1. Conference facilities and space

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2. Research space and laboratory facilities [PR II.D.1.d)]

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3. Radiographic-fluoroscopic room with tilt table [PR II.D.1.a)]

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4. Endovascular surgical neuroradiology procedure rooms with physiological monitoring and resuscitation equipment [PR II.D.1.a)]

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5. Facilities for storing catheters, guidewires, contrast materials, embolic agents [PR II.D.1.b)]

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6. Space for image display and interpretation [PR II.D.1.b)]

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7. Office space for faculty/trainees

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Indicate whether each site has the following facilities available. [PR II.D.1.c)]

|  | **Site #1** | **Site #2** | **Site #3** | **Site #4** |
| --- | --- | --- | --- | --- |
| Inpatient | YES  NO | YES  NO | YES  NO | YES  NO |
| Outpatient | YES  NO | YES  NO | YES  NO | YES  NO |
| Emergency | YES  NO | YES  NO | YES  NO | YES  NO |
| Intensive Care | YES  NO | YES  NO | YES  NO | YES  NO |

**Equipment**

Indicate whether each site has the following equipment available: [PR II.D.1.a)]

|  | **Site #1** | **Site #2** | **Site #3** | **Site #4** |
| --- | --- | --- | --- | --- |
| Intraoperative ultrasound |  |  |  |  |
| Imaging workstation dedicated to endovascular applications |  |  |  |  |
| Angiographic unit (indicate if digital) | Digital?   Y  N | Digital?   Y  N | Digital?   Y  N | Digital?   Y  N |
| C-Arm with digital subtraction (indicate how many in radiology and in the operating room) | Rad: #  OR: # | Rad: #  OR: # | Rad: #  OR: # | Rad: #  OR: # |
| Single plane (include the size of the intensifiers) | Click here to enter text. | Click here to enter text. | Click here to enter text. | Click here to enter text. |
| Biplane (include the size of the intensifiers) | Click here to enter text. | Click here to enter text. | Click here to enter text. | Click here to enter text. |
| Magnetic Resonance Scanners |  |  |  |  |
| Computed Tomography Scanners |  |  |  |  |

**Patient Data**

|  |  |  |
| --- | --- | --- |
| Reporting Period (Recent 12-month period): | From: Click here to enter a date. | To: Click here to enter a date. |

1. Capacity

|  | **Site #1**  **(Primary Teaching Site)** | **Site #2** | **Site #3** | **Site #4** |
| --- | --- | --- | --- | --- |
| Hospital Bed Capacity | # | # | # | # |
| Hospital Admissions (total) | # | # | # | # |
| Adult | # | # | # | # |
| Pediatric | # | # | # | # |
| Number of Neurological Surgery Admissions | # | # | # | # |
| Number of Neurology Admissions | # | # | # | # |
| Diagnostic Radiology Examinations | # | # | # | # |
| Adult | # | # | # | # |
| Pediatric | # | # | # | # |

2. Neurovascular Cases [PR II.D.2.]

|  | **Site #1** | | | **Site #2** | | | **Site #3** | | | **Site #4** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Total** | **Treated Surgically** | **Treated by ENS Approach** | **Total** | **Treated Surgically** | **Treated by ENS Approach** | **Total** | **Treated Surgically** | **Treated by ENS Approach** | **Total** | **Treated Surgically** | **Treated by ENS Approach** |
| Aneurysms [PR II.D.2.a)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Brain arteriovenous malformations [PR II.D.2.b)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Atherosclerotic disease of the cervical vessels [PR II.D.2.c)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Brain, Pial Arteriovenous fistulas (e.g. Vein of Galen) | # | # | # | # | # | # | # | # | # | # | # | # |
| Dural arteriovenous fistulas | # | # | # | # | # | # | # | # | # | # | # | # |
| Tumors: | | | | | | | | | | | | |
| Cerebral parenchymal | # | # | # | # | # | # | # | # | # | # | # | # |
| Dural, extradural (including meningioma) | # | # | # | # | # | # | # | # | # | # | # | # |
| Microcatheter Drug Delivery (i.e., intra-arterial chemotherapy) | # | # | # | # | # | # | # | # | # | # | # | # |
| Occlusive vascular diseases [PR II.D.2.d)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Intracranial neoplasm [PR II.D.2.e)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Angioplasty procedures: | | | | | | | | | | | | |
| Intracranial (Atherosclerosis) | # | # | # | # | # | # | # | # | # | # | # | # |
| Extracranial | # | # | # | # | # | # | # | # | # | # | # | # |
| Strokes: | | | | | | | | | | | | |
| Arterial recanalization | # | # | # | # | # | # | # | # | # | # | # | # |
| Hemorrhagic | # | # | # | # | # | # | # | # | # | # | # | # |
| Venous Sinus Recanalization | # | # | # | # | # | # | # | # | # | # | # | # |
| Stent Procedures: | | | | | | | | | | | | |
| Intracranial | # | # | # | # | # | # | # | # | # | # | # | # |
| Extracranial | # | # | # | # | # | # | # | # | # | # | # | # |
| Vasospasm: | | | | | | | | | | | | |
| Drug infusion | # | # | # | # | # | # | # | # | # | # | # | # |
| Balloon Dilation | # | # | # | # | # | # | # | # | # | # | # | # |
| Vascular anomalies of the spine [PR II.D.2.h)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Neoplasms of the spine [PR II.D.2.i))] | # | # | # | # | # | # | # | # | # | # | # | # |
| Spinal arteriovenous malformations | # | # | # | # | # | # | # | # | # | # | # | # |
| Spinal dural arteriovenous fistulae | # | # | # | # | # | # | # | # | # | # | # | # |
| Primary & metastatic spinal tumors (intraspinal and vertebral separately) | # | # | # | # | # | # | # | # | # | # | # | # |
| Spinal biopsy and percutaneous interventions, including vertebroplasty | # | # | # | # | # | # | # | # | # | # | # | # |
| Traumatic vascular lesions of the CNS, head, neck, and spine [PR II.D.2.j)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Other | # | # | # | # | # | # | # | # | # | # | # | # |
| Total Major ESNR Procedures | # | # | # | # | # | # | # | # | # | # | # | # |

3. Head and Neck [PR II.D.2.]

|  | **Site #1** | | | **Site #2** | | | **Site #3** | | | **Site #4** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Total** | **Treated Surgically** | **Treated by ENS Approach** | **Total** | **Treated Surgically** | **Treated by ENS Approach** | **Total** | **Treated Surgically** | **Treated by ENS Approach** | **Total** | **Treated Surgically** | **Treated by ENS Approach** |
| Vascular anomalies of the head and neck [PR II.D.2.f)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Maxillofacial vascular malformation | # | # | # | # | # | # | # | # | # | # | # | # |
| Neoplasms of head and neck [PR II.D.2.g)] | # | # | # | # | # | # | # | # | # | # | # | # |
| Epistaxis | # | # | # | # | # | # | # | # | # | # | # | # |

4. Diagnostic

|  | **Site #1** | **Site #2** | **Site #3** | **Site #4** |
| --- | --- | --- | --- | --- |
| Cerebral angiograms procedures | # | # | # | # |
| ICA | # | # | # | # |
| ECA | # | # | # | # |
| Vertebral artery | # | # | # | # |
| Intraoperative | # | # | # | # |
| Venograms | # | # | # | # |
| Spinal angiography | # | # | # | # |
| Arterial balloon occlusion tests | # | # | # | # |
| Physiological functional angiography (including WADA tests) | # | # | # | # |

**Interchange with Residents in Other Specialties**

Describe the opportunities for fellows to participate in research, including opportunities with residents and staff in other related specialties. [PR II.D.3.]

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**Fellow Appointment**

1. Describe the selection process for Endovascular Surgical Neuroradiology fellows. [PR III.A.2.]

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2. If there are training programs in the institution in any of the following areas, provide the data indicated:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **# of Faculty** | **# of Residents** | **# of Subspecialty Fellows** |
| Diagnostic Radiology | # | # | # |
| Neuroradiology | # | # | # |
| Neurological Surgery | # | # | # |
| Neurology | # | # | # |
| Vascular/Stroke Neurology | # | # | # |

1. If the trainee is from a diagnostic radiology background, describe the experience of the radiology trainee in patient care skills, including outpatient evaluation and care of pre- and post-procedure endovascular patients, and management of patients in the neurointensive care environment. [PR III.A.3.d)]

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4. If the trainee is from a neurological surgery background, describe the experience of the neurosurgical trainee in basic radiological skills, including the fundamentals of imaging physics and radiation biology. [PR III.A.4.b.(1)]

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5. If the trainee is from a neurology background, describe the experience of the neurology trainee in basic radiologic skills, including the fundamentals of imaging physics and radiation biology.  
[PR III.A.5.d).(1)]

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**Educational Program**

Briefly describe the planned fellow training and experience in each of the following.

1. Signs and symptoms of disorders amenable to diagnosis and treatment by endovascular surgical neuroradiology techniques [PR IV.A.1.b).(1)]

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1. Physical examinations to evaluate patients with neurological disorders [PR IV.A.1.b).(2)]

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1. Pathophysiology and natural history of these disorders [PR IV.A.1.b).(3)]

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1. Indications for and contraindications to endovascular surgical neuroradiology procedures  
   [PR IV.A.1.b).(4)]

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1. Clinical and technical aspects of endovascular surgical neuroradiology procedures [PR IV.A.1.b).(5)]

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1. Medical and surgical alternatives [PR IV.A.1.b).(6))]

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1. Preoperative and postoperative management of endovascular patients [PR IV.A.1.b).(7)]

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1. Neurointensive care management [PR IV.A.1.b).(8)]

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1. Fundamentals of imaging physics and radiation biology [PR IV.A.1.b).(9)]

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1. Interpretation of neurangiographic studies pertinent to the practice [PR IV.A.1.b).(10)]

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**Formal Teaching Exercises**

1. Enter the schedule of planned formal exercises for the program. The specific title of lectures/sessions is requested. Add rows as needed. [PR II.A.3.g).(2)]

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| --- | --- |
| **Topic** | **Title** |
| Topic | Title |
| Topic | Title |
| Topic | Title |
| Topic | Title |

1. Describe the opportunities fo
2. r fellows to attend and participate in clinical conferences in neuroradiology, neurology and neurological surgery. [PR II.A.3.i).(1)]

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1. List the conferences that will be attended by Endovascular Surgical Neuroradiology fellows.

a) Journal club [PR II.A.3.i)]

b) Morbidity and Mortality [PR II.A.3.j)]

c) Neuropathology conferences [PR II.A.3.i).(1)]

d) Neuroanatomy conferences

e) Neurology or Neurological Surgery conferences [PR II.A.3.i).(1)]

f) Interdepartmental conferences [PR II.A.3.i).(1)]

g) Others (specify):

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1. How is it ensured that the subspecialty program in Endovascular Surgical Neuroradiology will not have an adverse impact, as by dilution of the available clinical material, on the education of the diagnostic radiology, neuroradiology, neurological surgery, and neurology residents in the institution? [PR IV.A.1.d).(1)]

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1. Will fellows be required to maintain documentation of the invasive cases in which they have been the performing proceduralist? How often will the program director review the logs with the fellows?  
   [PR II.A.3.f)]

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1. If there are outside rotations, describe the trainees' responsibilities and level of responsibility during each of the outside assignments.

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**Patient Care and Procedural Skills**

Indicate the settings and activities in which fellows will demonstrate proficiency in each of the following areas of patient care. Also indicate the method used to evaluate competency.

| **Competency Area** | **Settings/Activities** | **Method Used to Evaluate Fellow Competency** |
| --- | --- | --- |
| Providing consultations under the supervision of staff endovascular surgical neuroradiology practitioners [PR IV.A.2.a).(1).(a)] | Settings/Activities. | Evaluation method(s) |
| Performing and analyzing a broad spectrum of endovascular procedures [PR IV.A.2.a).(2).(a)] | Settings/Activities. | Evaluation method(s) |
| Managing patients with neurological disease, performing endovascular surgical neuroradiology procedures, and integrating endovascular surgical neuroradiology therapy into the clinical management of patients [PR IV.A.2.a).(2).(b)] | Settings/Activities. | Evaluation method(s) |
| Performing clinical preprocedure evaluations of patients, and their preliminary diagnostic studies, and consulting with clinicians on other services [PR IV.A.2.a).(2).(c)] | Settings/Activities. | Evaluation method(s) |
| Performing diagnostic and therapeutic endovascular surgical neuroradiology procedures [PR IV.A.2.a).(2).(d)] | Settings/Activities. | Evaluation method(s) |
| Generating procedural reports [PR IV.A.2.a).(2).(e)] | Settings/Activities. | Evaluation method(s) |
| Providing short-term and long-term follow-up care, including neurointensive care [PR IV.A.2.a).(2).(f)] | Settings/Activities. | Evaluation method(s) |

**Medical Knowledge**

1. Indicate the settings and activities in which fellows will develop competency in their knowledge of each of the following areas. Also indicate the method used to evaluate competency.

| **Competency Area** | **Settings/Activities** | **Method Used to Evaluate Fellow Competency** |
| --- | --- | --- |
| **Anatomical and physiologic basic knowledge** | | |
| Arterial and venous angiographic anatomy of the brain, spine, spinal cord, and head and neck [PR IV.A.2.b).(1).(a).(i)] | Settings/Activities. | Evaluation method(s) |
| Collateral circulation [PR IV.A.2.b).(1).(a).(i).(a)] | Settings/Activities. | Evaluation method(s) |
| Dangerous anastomosis [PR IV.A.2.b).(1).(a).(i).(b)] | Settings/Activities. | Evaluation method(s) |
| Cerebral blood flow [PR IV.A.2.b).(1).(a).(i).(c)] | Settings/Activities. | Evaluation method(s) |
| Autoregulation [PR IV.A.2.b).(1).(a).(i).(d)] | Settings/Activities. | Evaluation method(s) |
| Variants of anatomy [PR IV.A.2.b).(1).(a).(i).(e)] | Settings/Activities. | Evaluation method(s) |
| Vascular distributions and supply/drainage [PR IV.A.2.b).(1).(a).(i).(f)] | Settings/Activities. | Evaluation method(s) |
| Related bony and soft tissue anatomy and physiology [PR IV.A.2.b).(1).(a).(ii)] | Settings/Activities. | Evaluation method(s) |
| Vertebral, face, and skull bony anatomy [PR IV.A.2.b).(1).(a).(ii).(a)] | Settings/Activities. | Evaluation method(s) |
| Brain, neck, face, and spine soft tissue anatomy and physiology [PR IV.A.2.b).(1).(a).(ii).(b)] | Settings/Activities. | Evaluation method(s) |
| Ligamentous, articular, and muscular anatomy [PR IV.A.2.b).(1).(a).(ii).(c)] | Settings/Activities. | Evaluation method(s) |
| **Pharmacology of the CNS and vasculature and relevant brain physiology** | | |
| Vasodilators and constrictors [PR IV.A.2.b).(1).(b).(i))] | Settings/Activities. | Evaluation method(s) |
| Agents used in provocative testing [PR IV.A.2.b).(1).(b).(ii)] | Settings/Activities. | Evaluation method(s) |
| Contrast agents [PR IV.A.2.b).(1).(b).(iii)] | Settings/Activities. | Evaluation method(s) |
| Coagulation cascade, including anticoagulants, antiaggregants, and thrombolytics [PR IV.A.2.b).(1).(b).(iv).(a)-(c)] | Settings/Activities. | Evaluation method(s) |
| **Embolic, sclerosing, ablative, and bone stabilization agents** | | |
| Blood pressure control [PR IV.A.2.b).(1).(c).(i)] | Settings/Activities. | Evaluation method(s) |
| Heart rate control [PR IV.A.2.b).(1).(c).(ii)] | Settings/Activities. | Evaluation method(s) |
| Allergic reaction control [PR IV.A.2.b).(1).(c).(iii)] | Settings/Activities. | Evaluation method(s) |
| Infection [PR IV.A.2.b).(1).(c).(iv)] | Settings/Activities. | Evaluation method(s) |
| Stroke risk reduction [PR IV.A.2.b).(1).(c).(v)] | Settings/Activities. | Evaluation method(s) |
| **Technical aspects of endovascular surgical neuroradiology** | | |
| Catheter and delivery systems [PR IV.A.2.b).(1).(d).(i)] | Settings/Activities. | Evaluation method(s) |
| Embolic, sclerosing and stabilizing agents in cerebral, spinal and head and neck embolization [PR IV.A.2.b).(1).(d).(ii)] | Settings/Activities. | Evaluation method(s) |
| Stents, balloons, and revascularization devices [PR IV.A.2.b).(1).(d).(iii)] | Settings/Activities. | Evaluation method(s) |
| Flow controlled navigations and embolization [PR IV.A.2.b).(1).(d).(iv)] | Settings/Activities. | Evaluation method(s) |
| Complications of angiography and embolization [PR IV.A.2.b).(1).(d).(v)] | Settings/Activities. | Evaluation method(s) |
| Collateral network manipulations, flow diversion [PR IV.A.2.b).(1).(d).(vi)] | Settings/Activities. | Evaluation method(s) |
| Electrophysiology [PR IV.A.2.b).(1).(d).(vii)] | Settings/Activities. | Evaluation method(s) |
| Provocative testing [PR IV.A.2.b).(1).(d).(viii)] | Settings/Activities. | Evaluation method(s) |
| Imaging of the vascular system [PR IV.A.2.b).(1).(d).(ix)] | Settings/Activities. | Evaluation method(s) |
| Direct access/therapeutic injection techniques, including biopsy and aspiration [PR IV.A.2.b).(1).(d).(x)] | Settings/Activities. | Evaluation method(s) |

1. Indicate the settings and activities in which fellows will demonstrate knowledge of the classification, clinical presentation, imaging appearance, natural history, epidemiology, hemodynamic and physiologic basis for disease and treatment, indications and techniques for treatment, contraindications for treatment, treatment alternatives, combined therapies, risks of treatment, and complication management for each of the disease states listed below. Also indicate the method(s) that will be used to evaluate competency.

| **Competency Area** | **Settings/Activities** | **Method(s) Used to Evaluate Fellow Competency** |
| --- | --- | --- |
| Arteriovenous malformations and fistulae [PR IV.A.2.b).(2).(a)] | Settings/Activities. | Evaluation method(s) |
| Vascular trauma [PR IV.A.2.b).(2).(b)] | Settings/Activities. | Evaluation method(s) |
| Hemorrhage and epistaxis [PR IV.A.2.b).(2).(c)] | Settings/Activities. | Evaluation method(s) |
| Stroke and cerebral ischemia [PR IV.A.2.b).(2).(d)] | Settings/Activities. | Evaluation method(s) |
| Arteriopathies [PR IV.A.2.b).(2).(e)] | Settings/Activities. | Evaluation method(s) |
| Vertebral fracture and degeneration (PR IV.A.2.b).(2).(f)] | Settings/Activities. | Evaluation method(s) |
| Tumors [PR IV.A.2.b).(2).(g)] | Settings/Activities. | Evaluation method(s) |
| Other vascular malformations and lesions [PR IV.A.2.b).(2).(h)] | Settings/Activities. | Evaluation method(s) |

1. Describe how the program director will ensure that the continuity of care experience is of sufficient duration to ensure that the fellow is familiar with the outcome of all endovascular surgical neuroradiology procedures. [PR IV.A.2.a.(2).(f)]

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**Scholarly Activities**

1. Describe fellow education in the basic principles of research, including how research is conducted, evaluated, explained to patients, and applied to patient care. [PR IV.B.1.]

|  |
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1. How will the program director ensure that fellows participate in scholarly activity? [PR IV.B.2.]

|  |
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1. Describe the educational resources, including faculty, staff, and facilities, that will facilitate fellow involvement in scholarly activity. [PR IV.B.3.]

|  |
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**Night Float**

1. What will be the maximum number of consecutive weeks residents are assigned night float?   
[PR VI.F.6.a)] [ # ] consecutive weeks

2. How many months per year will residents be assigned night float? (PR VI.F.6.a)) [ # ] months/year