# Vascular Neurology Milestones

The Accreditation Council for Graduate Medical Education



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## Vascular Neurology Milestones

The Milestones are designed only for use in evaluation of fellows in the context of their participation in ACGME-accredited residency or fellowship programs. The Milestones provide a framework for the assessment of the development of the fellow in key dimensions of the elements of physician competence in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competency, nor are they designed to be relevant in any other context.

### **Vascular Neurology Milestones Work Group**

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American Board of Psychiatry and Neurology

**Review Committee for Neurology** 

### **Understanding Milestone Levels and Reporting**

This document presents the Milestones, which programs use in a semi-annual review of fellow performance, and then report to the ACGME. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME Competencies organized in a developmental framework. The narrative descriptions are targets for resident/fellow performance throughout their educational program.

Milestones are arranged into levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert fellow in the specialty or subspecialty. For each reporting period, the Clinical Competency Committee will review the completed evaluations to select the milestone levels that best describe each learner's current performance, abilities, and attributes for each subcompetency.

These levels do not correspond with post-graduate year of education. Depending on previous experience, a junior fellow may achieve higher levels early in his/her educational program just as a senior fellow may be at a lower level later in his/her educational program. There is no predetermined timing for a resident to attain any particular level. Fellows may also regress in achievement of their milestones. This may happen for many reasons, such as over scoring in a previous review, a disjointed experience in a particular procedure, or a significant act by the fellow.

Selection of a level implies the fellow substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page vi).

#### **Additional Notes**

Level 4 is designed as a graduation *goal* but *does not* represent a graduation *requirement*. Making decisions about readiness for graduation and unsupervised practice is the purview of the program director. Furthermore, Milestones 2.0 include revisions and changes that preclude using Milestones as a sole assessment in high-stakes decisions (i.e., determination of eligibility for certification or credentialing). Level 5 is designed to represent an expert fellow whose achievements in a subcompetency are greater than the expectation. Milestones are primarily designed for formative, developmental purposes to support continuous quality improvement for individual learners, education programs, and the specialty. The ACGME and its partners will continue to evaluate and perform research on the Milestones to assess their impact and value.

Some milestone descriptions include statements about performing independently. These activities must occur in conformity to ACGME supervision guidelines as described in the Program Requirements, as well as to institutional and program policies. For example, a fellow who performs a procedure independently must, at a minimum, be supervised through oversight.

A Supplemental Guide is also available to provide the intent of each subcompetency, examples for each level, assessment methods or tools, and other available resources. The Supplemental Guide, like examples contained within the Milestones, is designed only to assist the program director and Clinical Competency Committee and is not meant to demonstrate any required element or outcome.

Supplemental Guides and other resources are available on the Milestones page of each specialty section of the ACGME website. On www.acqme.org, choose the applicable specialty under the "Specialties" menu, then select the "Milestones" link in the lower navigation bar.

The diagram below presents an example set of milestones for one subcompetency in the same format as the ACGME Report Worksheet. For each reporting period, a fellow's performance on the milestones for each subcompetency will be indicated by selecting the level of milestones that best describes that fellow's performance in relation to those milestones.

Systems-Based Practice 1: Patient Safety				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of commonly reported patient safety events	Identifies system factors that lead to patient safety events	Participates in analysis of patient safety events	Conducts analysis of patient safety events and offers error prevention strategies	Actively engages teams and processes to modify systems to prevent patient safety events
Demonstrates knowledge of how to report patient safety events	Reports patient safety events through institutional reporting systems	Participates in disclosure of patient safety events to patients and families	Discloses patient safety events to patients and families	Role models or mentors others in the disclosure of patient safety events
Comments:  Not Yet Completed Level 1				
middle of a leve	at level and in lower	between in lower le demonstr	a response box on the levels indicates that mi evels have been substa ated as well as <b>some</b> es in the higher level(s)	lestones antially

Patient Care 1: History				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains a complete, relevant, and organized vascular neurology history	Efficiently obtains a relevant and organized vascular neurology history that differentiates stroke from mimics, and that assesses baseline functioning and disability	Efficiently obtains a relevant and organized vascular neurology history appropriate to the patient's acuity and the clinical setting (e.g., clinic, emergency room)	Consistently obtains a history sufficient to guide the subsequent vascular neurology examination, investigation, and treatment of common and uncommon causes of stroke	Serves as a role model for obtaining a thorough vascular neurologic history
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 2: Vascular Neurological Examination				
Level 1	Level 2	Level 3	Level 4	Level 5
Performs a relevant vascular neurology examination, including administration and scoring the National Institutes of Health Strokes Scale (NIHSS)	Performs a relevant vascular neurology examination incorporating some additional maneuvers appropriate to the patient and to identify stroke mimics	Performs a relevant vascular neurology examination incorporating all maneuvers appropriate to the patient's acuity and the clinical setting	Consistently and efficiently performs a vascular neurology examination to guide and prioritize subsequent investigation and treatment of common and uncommon causes of stroke	Serves as a role model for performing a vascular neurology examination
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 3: Acute Stroke Intervention and Management				
Level 1	Level 2	Level 3	Level 4	Level 5
Treats ischemic stroke patients with intravenous (IV) thrombolysis	Treats complex patients with ischemic stroke with IV thrombolysis, and manages complications	Triages and manages multiple patients with ischemic stroke	Efficiently manages multiple patients with common and uncommon ischemic stroke	Role models efficient triage and management of ischemic and hemorrhagic strokes
Identifies eligibility criteria for endovascular recanalization	Selects candidates for endovascular recanalization and identifies complications	Manages complications of endovascular therapies for acute ischemic stroke		
Identifies type and etiology of hemorrhagic stroke	Initiates medical treatment for hemorrhagic stroke and consults with surgical services as needed	Identifies complications of hemorrhagic stroke	Manages complications of hemorrhagic stroke and identifies candidates for invasive intervention	Implements emerging modalities of diagnosis and treatment for ischemic and hemorrhagic stroke
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 4: Post-Acute Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes post-acute care settings for stroke rehabilitation and resources available for each level of care	Accurately assesses patient's rehabilitative needs and recommends appropriate post-acute care setting	Identifies and initiates management of post- stroke complications	Consistently integrates social determinants of health, community resources, and interdisciplinary medical team members into a	Engages in scholarship or quality improvement initiatives with a focus on post-stroke recovery, transitions of care, or patient reintegration into
Identifies ancillary services involved in post-	Engages interdisciplinary team members to	Engages in comprehensive care for	longitudinal care plan for stroke recovery and	their communities
stroke care and	facilitate stroke	stroke recovery and	secondary prevention	
rehabilitation	rehabilitation	secondary prevention		
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 5: Telestroke/Remote Consultation/Consultation				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes approach to remote consultation by phone or using video conferencing technologies	Efficiently obtains a vascular neurology history to appropriately triage patients	Establishes rapport with patient/family, bedside provider, and/or consulting providers effectively	Conducts stroke consultations using remote consultation technology (emergency room, hospital, or outpatient clinic), and provides assessment, treatment, and management recommendations	Engages in scholarship or quality improvement related to telestroke care
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Medical Knowledge 1: Localization				
Level 1	Level 2	Level 3	Level 4	Level 5
Correlates clinical presentation to specific regions of the nervous system and describes basic vascular neuroanatomy	Localizes vascular lesions to specific arterial territories of the nervous system and demonstrates knowledge of vascular anatomic variations and collaterals	Efficiently localizes vascular lesions to specific arterial and venous territories of the nervous system and demonstrates knowledge of vascular neuroanatomy of the brain, eye, and spinal cord	Demonstrates knowledge of vascular neuroanatomy to localize uncommon syndromes of the brain, eye, and spinal cord	Consistently demonstrates advanced detailed knowledge of vascular neuroanatomy in localizing lesions of the brain, eye, and spinal cord
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Medical Knowledge 2: Formulation					
Level 1	Level 2	Level 3	Level 4	Level 5	
Synthesizes information to develop a differential diagnosis	Efficiently synthesizes information to focus and prioritize the differential diagnosis	Correlates the clinical presentation with presumed etiology	Correlates the atypical presentations of common and uncommon vascular lesions of the brain, eye, and spinal cord with presumed etiology	Serves as a role model for complex diagnostic reasoning	
Comments:			Not Yet Co	ompleted Level 1 ssessable	

Medical Knowledge 3: Multimodal Imaging in Vascular Neurology (e.g., Computed Tomography (CT), Magnetic Resonance (MR), Angiography, Ultrasonography)					
Level 1	Level 2	Level 3	Level 4	Level 5	
Selects imaging protocols based on patient comorbidities and/or provisional diagnosis	Identifies normal and critical imaging findings on vascular and brain MR and CT	Identifies subtle abnormalities on brain and vascular imaging	Selects and interprets multimodality imaging to guide treatment	Interprets emerging imaging modalities for use in patient management	
Comments:			Not Yet C Not Yet A	ompleted Level 1	

Medical Knowledge 4: Diagnostic Investigation in Vascular Neurology				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates general knowledge of diagnostic tests in vascular neurology	Discusses general diagnostic approach appropriate to clinical presentation	Individualizes diagnostic approach to the specific patient	Discusses diagnostic yield and cost-effectiveness of testing	Demonstrates advanced knowledge of diagnostic testing and controversies
Recognizes indications and implications of common diagnostic tests	Interprets results of common diagnostic tests	Recognizes indications and implications of less common testing	Interprets results of less common diagnostic testing	
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Medical Knowledge 5: Ischemic Stroke				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes common causes of stroke and typical risk factors for stroke in older adults	Demonstrates knowledge of common causes of stroke in children and young adults	Demonstrates knowledge of uncommon causes of stroke in older adults	Demonstrates sophisticated knowledge of the pathophysiology of acute brain ischemia and ischemic stroke etiologies	Engages in scholarly activity on ischemic stroke pathophysiology
Demonstrates knowledge of thrombolytic treatment for stroke, and possible complications	Demonstrates knowledge of endovascular treatment for stroke, and possible complications	Demonstrates knowledge of treating patients with stroke and complex comorbidities	Demonstrates sophisticated knowledge of the pharmacology and physiology of treatment options	Engages in scholarly activity on acute management of stroke or secondary stroke prevention strategies
Demonstrates knowledge of pharmacologic stroke preventative strategies for common stroke etiologies	Demonstrates knowledge of pharmacologic stroke preventative strategies for uncommon stroke etiologies	Demonstrates understanding of the indications and limitations for non-acute surgical interventions to prevent stroke	Formulates stroke preventative strategies in complex patients or in those with rare causes of stroke	
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Medical Knowledge 6: Intracerebral Hemorrhage				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of the clinical presentation and common causes, and risk factors for intracerebral hemorrhage	Demonstrates knowledge of uncommon causes and acute complications of intracerebral hemorrhage	Demonstrates knowledge of causes of intracerebral hemorrhage in all patients, including children and young adults	Demonstrates sophisticated knowledge of the pathophysiology of intracerebral hemorrhage	Engages in scholarly activity on intracerebral hemorrhage
Demonstrates knowledge of the importance of emergency intracerebral hemorrhage treatment	Demonstrates knowledge of pharmacologic treatments for intracerebral hemorrhage	Demonstrates understanding of the indications, complications, and limitations of surgical interventions for intracerebral hemorrhage	Demonstrates knowledge of the issues related to the treatment of patients with intracerebral hemorrhage and complex comorbidities, and the complexity of assigning prognosis	
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Medical Knowledge 7: So	ubarachnoid Hemorrhage			
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of the clinical presentation and common causes of, and risk factors for subarachnoid hemorrhage	Demonstrates knowledge of uncommon causes and acute/subacute complications of subarachnoid hemorrhage	Demonstrates knowledge of causes of subarachnoid hemorrhage in all patients, including children and young adults, and the long-term sequelae of subarachnoid hemorrhage	Demonstrates sophisticated knowledge of the pathophysiology of subarachnoid hemorrhage	Engages in scholarly activity on subarachnoid hemorrhage
Demonstrates knowledge of the importance of emergency treatment for subarachnoid hemorrhage and ruptured aneurysms	Demonstrates knowledge of the natural history and management of unruptured aneurysms	Demonstrates knowledge of pharmacologic, surgical, and endovascular treatments for subarachnoid hemorrhage	Demonstrates knowledge of the issues related to the treatment of patients with subarachnoid hemorrhage and complex comorbidities, and the complexity of assigning prognosis	
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Systems-Based Practice 1: Patient Safety				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of commonly reported patient safety events	Identifies system factors that lead to patient safety events	Participates in analysis of patient safety events	Conducts analysis of patient safety events and offers error prevention strategies	Actively engages teams and processes to modify systems to prevent patient safety events
Demonstrates knowledge of how to report patient safety events	Reports patient safety events through institutional reporting systems	Participates in disclosure of patient safety events to patients and families	Discloses patient safety events to patients and families	Mentors others in the disclosure of patient safety events
Comments:	Comments:  Not Yet Completed Level 1			

Systems-Based Practice 2: Quality Improvement in Stroke System of Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of basic quality improvement methodologies and stroke center metrics	Describes local quality improvement initiatives (e.g., door-to-needle times, smoking cessation)	Participates in local quality improvement initiatives	Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project	Creates, implements, and assesses quality improvement initiatives within the stroke system of care
Comments:			Not Yet C	ompleted Level 1

Systems-Based Practice	3: System Navigation for F	Patient-Centered Care		
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of care coordination	Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams	Coordinates care of patients in complex clinical situations, effectively using the roles of their interprofessional teams	Models effective coordination of patient-centered care among different disciplines and specialties	Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes
Performs safe and effective transitions of care/hand-offs in routine clinical situations	Performs safe and effective transitions of care/hand-offs in complex clinical situations	Supervises transitions of care by other team members	Models safe and effective transitions of care/hand-offs within and across health care delivery systems including outpatient settings	
Demonstrates knowledge of population and community health needs and disparities	Identifies specific population and community health needs and inequities for the local population and community	Effectively uses local resources to meet the needs of a patient population and community	Adapts practice to provide for the needs of specific populations	Leads innovations in adapting practice and systems for populations and communities with health care disparities
Comments:			Not Yet C	ompleted Level 1

Systems-Based Practice	4: Physician Role in Healt	h Care Systems		
Level 1	Level 2	Level 3	Level 4	Level 5
Describes basic health care payment systems (e.g., government, private, public, uninsured care) and practice models	Delivers patient-centered care considering the patient's economic constraints	Engages with patients in shared decision making, informed by each patient's payment models	Uses available resources to promote optimal patient care (e.g., community resources, patient assistance resources) considering each patient's payment model	Advocates for systems change that enhances high-value, efficient, and effective patient care
Identifies basic knowledge domains for effective transition to practice (e.g., information technology, legal, billing and coding, financial, personnel)	Demonstrates use of information technology required for medical practice (e.g., electronic health record, documentation required for billing and coding)	Consistently demonstrates timely and accurate documentation, including coding and billing requirements	Implements changes in individual practice patterns in response to professional requirements and in preparation for practice	Educates others to prepare them for transition to practice
Comments:  Not Yet Completed Level 1				

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice					
Level 1	Level 2	Level 3	Level 4	Level 5	
Demonstrates how to access and use available evidence and to incorporate patient preferences and values to care for a routine patient	Articulates clinical questions and elicits patient preferences and values to guide evidence-based care	Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients	Critically appraises and applies evidence, and interprets conflicting evidence to guide care, tailored to the individual patient	Coaches others to critically appraise and apply evidence for complex patients, and/or participates in the development of guidelines	
Comments:	Comments:  Not Yet Completed Level 1				

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth				
Level 1	Level 2	Level 3	Level 4	Level 5
Accepts responsibility for personal and professional development by establishing goals	Demonstrates openness to performance data (feedback and other input) to inform goals	Seeks performance data sporadically, with adaptability and humility	Consistently seeks performance data	Models professionalism by seeking performance data with adaptability and humility
Identifies the factors that contribute to gap(s) between expectations and actual performance	Analyzes and reflects on the factors that contribute to gap(s) between expectations and actual performance	Institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance	Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance	Coaches others on reflective practice
Actively seeks opportunities to improve	Designs and implements a learning plan, with prompting	Independently creates and implements a learning plan	Uses performance data to measure the effectiveness of the learning plan and improves it when necessary	Facilitates the design and implementation of learning plans for others
Comments:  Not Yet Completed Level 1				

Level 1	Level 2	Level 3	Level 4	Level 5
Identifies and describes potential triggers for professionalism lapses and how to report them	Demonstrates insight into professional behavior in routine situations and takes responsibility	Demonstrates professional behavior in complex or stressful situations	Intervenes to prevent professionalism lapses in oneself and others	Coaches others when their behavior fails to meet professional expectations
Demonstrates knowledge of ethical principles related to patient care	Analyzes straightforward situations using ethical principles	Analyzes complex situations using ethical principles	Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed	Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution

Level 1	Level 2	Level 3	Level 4	Level 5
Takes responsibility for failure to complete tasks and responsibilities, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future	Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations	Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations	Recognizes situations in which one's own behavior may impact others' ability to complete tasks and responsibilities in a timely manner	Develops or implements strategies to improve system-wide problems and enable oneself and others to complete tasks and responsibilities in a timely fashion
Responds promptly to requests or reminders to complete tasks and responsibilities	Recognizes situations that may impact one's own ability to complete tasks and responsibilities in a timely manner	Proactively implements strategies to ensure the needs of patients, teams, and systems are met		

Professionalism 3: Well-Being					
Level 1	Level 2	Level 3	Level 4	Level 5	
With assistance, recognizes sense of personal and professional well-being	Independently recognizes status of personal and professional well-being	With assistance, proposes a plan to optimize personal and professional well-being	Independently develops a plan to optimize personal and professional well-being	Coaches others when emotional responses or limitations in knowledge/skills do not meet professional expectations	
Comments:			Not Yet C	ompleted Level 1	

This subcompetency is not intended to evaluate a fellow's well-being. Rather, the intent is to ensure that each fellow has the fundamental knowledge of factors that impact well-being, the mechanism by which those factors impact well-being, and available resources and tools to improve well-being.

Interpersonal and Comm	unication Skills 1: Patient-	and Family-Centered Com	munication	
Level 1	Level 2	Level 3	Level 4	Level 5
Uses language and non- verbal behavior to demonstrate respect and establish rapport	Establishes a therapeutic relationship in straightforward encounters using active listening and clear language	Establishes a therapeutic relationship in challenging patient encounters	Easily establishes therapeutic relationships, with attention to the patient's/patient's family's concerns and context, regardless of complexity of the situation	Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships
Identifies the need to individualize communication strategies based on the patient's/patient's family's expectations and understanding	Communicates compassionately with the patient/patient's family to clarify expectations and verify understanding of the clinical situation	Communicates medical information in the context of the patient's/patient's family's values, uncertainty, and conflict	Uses shared decision making to align the patient's/patient's family's values, goals, and preferences with treatment options	Role models shared decision making in the context of the patient's/patient's family's values, uncertainty, and conflict
Comments:  Not Yet Completed Level 1				

Interpersonal and Communication Skills 2: Barrier and Bias Mitigation					
Level 1	Level 2	Level 3	Level 4	Level 5	
Identifies common barriers to effective patient care (e.g., language, disability)	Identifies complex barriers to effective patient care (e.g., health literacy, cultural differences)	Recognizes personal biases and mitigates barriers to optimize patient care when prompted	Recognizes personal biases and proactively mitigates barriers to optimize patient care	Mentors others on recognition of bias and mitigation of barriers to optimize patient care	
Comments:			Not Yet C	ompleted Level 1	

Level 1	Level 2	Level 3	Level 4	Level 5	
Respectfully requests a consultation	Confirms understanding of consultant recommendations	Clearly and concisely formulates a consultation request	Coordinates recommendations from different members of the health care team to	Role models and facilitates flexible communication strategies that value input from all	
Recognizes the role of a vascular neurology consultant	Respectfully accepts a consultation request	Clearly and concisely responds to a consultation request	optimize patient care	health care team members, resolving conflict when needed	
Uses language that values all members of the health care team	Communicates information effectively with all health care team members	Uses active listening to adapt communication style to fit team needs	Solicits and communicates feedback to other members of the health care team		

Interpersonal and Communication Skills 4: Communication within Health Care Systems						
Level 1	Level 2	Level 3	Level 4	Level 5		
Documents accurate and up-to-date patient information	Demonstrates diagnostic reasoning through organized and timely notes	Communicates diagnostic and therapeutic reasoning	Demonstrates concise, organized written and verbal communication, including anticipatory guidance	Guides departmental or institutional communication policies and procedures		
Communicates in a way that safeguards patient information	Communicates through appropriate channels as required by institutional policy	Selects optimal mode of communication based on clinical context	<b>3</b>			
Comments:  Not Yet Completed Level 1						