

Vascular Surgery Milestones

The Accreditation Council for Graduate Medical Education



Implementation Date: July 1, 2021 Second Revision: April 2021 First Revision: February 2014

Vascular Surgery Milestones

The Milestones are designed only for use in evaluation of fellows in the context of their participation in ACGMEaccredited 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 competence, nor are they designed to be relevant in any other context.

i

Vascular Surgery Milestones Work Group

Faisal Aziz, MD, DFSVS, FACS Anna Boniakowski, MD Luis Cajas, MD Rabih Chaer, MD, MSc Dawn Coleman, MD Allan M. Conway, MD Laura Edgar, CAE, EdD Jeffrey Jim, MD, MPHS Issam Koleilat, MD Jason T. Lee, MD Joanelle Lugo, MD

Katherine McMackin, MD Erica Mitchell, MD, MEd, FACS J. Gregory Modrall, MD Jahan Mohebali, MD Raghu Motaganahalli, MD Jon Orlino, MD Grayson Pitcher, MD, RPVI Indrani Sen, MD Randy Shafritz, MD, FACS, RPVI Matthew R. Smeds, MD, FACS, DFSVS Brigitte K. Smith, MD, MHPE Gabriela Velazquez-Ramirez, MD Linda Wang, MD

ii

The ACGME would like to thank the following organizations for their continued support in the development of the Milestones:

American Board of Surgery

Association of Program Directors in Vascular Surgery

Review Committee for Surgery

Vascular Surgery Board – American Board of Surgery

©2021 Accreditation Council for Graduate Medical Education (ACGME)

All rights reserved except the copyright owners grant third parties the right to use the Vascular Surgery Milestones on a non-exclusive basis for educational purposes.

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.

Additional resources are available in the <u>Milestones</u> section of the ACGME website. Follow the links under "What We Do" at <u>www.acgme.org</u>.

The diagram below presents an example set of milestones for one sub-competency 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	-				
Level 1	Level 2	Level 3		Level 4	Level 5
Demonstrates knowledge of common patient safety events	Identifies system factors that lead to patient safety events	Participate patient safe (simulated	•	Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)	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 (simulated or actual)	of patient s	s in disclosure afety events to d their families or actual)	Discloses patient safety events to patients and their families (simulated or actual)	Role models or mentors others in the disclosure of patient safety events
Comments:				Completed Level 1	
Selecting a	response box in the		Selecting a re	esponse box on the line i	in
middle of a level implies that			between levels indicates that milestones		nes
milestones in that level and in lower				s have been substantially	у
levels have demonstrat	been substantially ed.			as well as some the higher level(s).	

Patient Care 1: Patient Data				
Level 1	Level 2	Level 3	Level 4	Level 5
Elicits and presents a history and performs a vascular examination relevant to the patient's presenting complaint	Orders and interprets diagnostic testing; establishes differential diagnosis	Synthesizes patient data, including diagnostic imaging, to arrive at an organized hierarchical differential diagnosis for basic disease processes, to include primary and secondary treatment options	Synthesizes patient data, including diagnostic imaging, to arrive at an organized hierarchical differential diagnosis for complex disease processes with advanced comorbidities, to include primary and secondary treatment options	Synthesizes patient data, including diagnostic imaging, to arrive at an organized hierarchical differential diagnosis for rare disease processes and variants of complex disease processes
Comments: Not Yet Completed Level 1				

Patient Care 2: Medical Management of Vascular Disease					
Level 1	Level 2	Level 3	Level 4	Level 5	
Describes risk factors for vascular disease	Identifies therapies for risk factor modification	Recognizes endpoints, contraindications, and complications of medical therapy	Formulates a comprehensive plan of medical management for patients with vascular disease, including risk factor modification	Proposes novel medical treatment algorithms based on new literature	
Comments: Not Yet Completed Level 1					

Patient Care 3: Peri-Operative Care					
Level 1	Level 2	Level 3	Level 4	Level 5	
Manages basic peri- operative problems (e.g., fever, pain)	Manages common peri- operative problems (e.g., post-operative myocardial infraction), including ordering and interpretation of supplemental tests when needed	Recognizes and manages complex peri-operative problems, including vascular complications, critical care, and palliative care	Leads team and provides supervision in the evaluation and management of complex peri-operative problems, including vascular complications, critical care, and palliative care	Works with the interdisciplinary care team to develop new pathways to prevent peri-operative vascular complications	
Comments: Not Yet Completed Level 1					

Patient Care 4: Longitudinal Care (e.g., Outpatient Management, Screening, Surveillance)					
Level 1	Level 2	Level 3	Level 4	Level 5	
Describes and recognizes expected longitudinal care, including outpatient management, screening, and surveillance for patients with basic vascular disease	Describes the expected longitudinal care for patients with complex vascular disease	Recognizes the impact of disease progression and complications on the longitudinal care plan	Independently alters longitudinal care based on disease progression, complications, or patient-specific issues	Innovates new aspects of longitudinal care for patients with vascular disease by considering the most updated evidence-based guidelines	
Comments: Not Yet Completed Level 1					

Patient Care 5: Procedural Preparation				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies and orders the tests for standard pre- operative optimization	Interprets clinical data to identify opportunities for pre-operative optimization	Recognizes when procedural plan must change due to patient factors or disease progression identified in pre-operative work-up	Proposes alternative surgical plan due to patient factors or disease progression identified in pre- operative work-up	Proposes novel therapies to address a patient that is not a candidate for standard care
Prepares patient for surgery, including pre- operative orders and diagnostic tests	For basic procedures, ensures necessary imaging, instrumentation, equipment, devices, and medications are available; positions, prepares, and drapes patient appropriately	For intermediate procedures, ensures necessary imaging, instrumentation, equipment, devices, and medications are available; positions, prepares, and drapes patient appropriately	For advanced procedures, ensures necessary imaging, instrumentation, equipment, devices, and medications are available; positions, prepares, and drapes patient appropriately	Develops protocols to improve the procedural preparation process
Comments: Not Yet Completed Level 1				

Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates basic surgical skills and performs basic bedside procedures	Demonstrates respect for tissue, and is developing skill in instrument handling	Handles vascular instruments with increasing efficiency of motion during procedures	Proficiently handles instruments and equipment, uses assistants, guides the conduct of the operation, and makes independent intra- operative decisions; anticipates when assistance is needed	Handles instruments and equipment independently without supervision, guides the conduct of the operation, and makes intra-operative decisions
	Performs basic vascular procedures with limited supervision	Performs basic vascular procedures independently and intermediate vascular procedures with limited supervision	Performs advanced vascular procedures, including troubleshooting and managing complications with limited supervision	Competently teaches intermediate vascular procedures

Patient Care 7: Technical Skills – Endovascular				
Level 1	Level 2	Level 3	Level 4	Level 5
Uses ultrasound to demonstrate anatomy for vascular access	Uses ultrasound to safely obtain percutaneous arterial and/or venous access in most patients	Performs basic and intermediate procedures	Performs advanced endovascular procedures with appropriate wire and catheter skills	Suggests novel endovascular therapies for most complex cases, including troubleshooting and managing endovascular
Recognizes the importance of maintaining wire position during wire and catheter exchanges	Selects wires and catheters and demonstrates basic wire handling techniques and performs most catheter exchanges without losing wire position	Troubleshoots and manages basic procedural challenges	Identifies when to select an alternative access site, wire and catheter technique, or approach to troubleshoot complex procedural challenges	complications
Comments: Not Yet Completed Level 1				

Patient Care 8: Vascular Imaging (e.g., Computed Tomography [CT], Magnetic Resonance [MR], Angiography, Ultrasonography)				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies the various types of imaging modalities	Uses imaging findings to support differential diagnosis and pre- operative plan for basic vascular procedures	Uses imaging findings to support differential diagnosis and pre- operative plan for intermediate vascular procedures	Uses imaging findings to support differential diagnosis, pre-operative plan, and intra-operative decision making for advanced vascular procedures	Implements innovative imaging technology to enhance the care of the patient
	Describes patient factors that influence the imaging modality	Uses complementary information from varying imaging studies	Independently uses multidimensional imaging (e.g., 3-D computed tomography angiography [CTA]) and identifies abnormal findings	Teaches imaging interpretation of multiple modalities
Comments: Not Yet Completed Level 1 Not Yet Assessable				

Medical Knowledge 1: Procedural Rationale (Open Surgical Procedures)					
Level 1	Level 2	Level 3	Level 4	Level 5	
Identifies the need for intervention over medical management	Synthesizes clinical data to choose an open surgical procedure versus endovascular intervention	Develops a specific operative plan for the current clinical situation, understanding alternative surgical options	Adapts management plan for changing clinical situation	Develops new guidelines or innovative applications	
Comments: Not Yet Completed Level 1					

Medical Knowledge 2: Procedural Rationale (Endovascular Interventions)					
Level 1	Level 2	Level 3	Level 4	Level 5	
Identifies the need for intervention over medical management	Synthesizes clinical data to choose an endovascular intervention versus open surgical procedure	Develops a specific endovascular plan for the current clinical situation, understanding device instructions for use and limitations	Adapts management plan for changing clinical situation and understands alternative or off label endovascular options	Develops new guidelines or innovative applications	
Comments: Not Yet Completed Level 1 Not Yet Assessable O 					

Medical Knowledge 3: Procedural Understanding, including Anatomy (Open Surgical Procedures)					
Level 1	Level 2	Level 3	Level 4	Level 5	
Identifies the types of procedures for a patient's pathology Identifies appropriate procedure	Describes procedural sequence and equipment needs, and understands critical decision points of basic procedures	Describes procedural sequence and equipment needs, and understands critical decision points of intermediate procedures	Describes procedural sequence and equipment needs, and understands critical decision points of advanced procedures	Describes or develops an innovative approach in peer-reviewed literature	
Comments:				ompleted Level 1	

Medical Knowledge 4: Pr	ocedural Understanding, i	ncluding Anatomy (Endova	scular Procedures)	
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies the types of procedures for a patient's pathology	Describes procedural sequence and understands critical decision points of basic procedures	Describes procedural sequence and equipment needs, and understands critical decision points of intermediate procedures	Describes procedural sequence and equipment needs, and understands critical decision points of advanced procedures	Describes or develops an innovative approach in peer-reviewed literature
Comments:				completed Level 1

Medical Knowledge 5: In	tra-Operative Crisis Manag	ement		
Level 1	Level 2	Level 3	Level 4	Level 5
Describes potential crises during vascular procedures	Describes intra-operative findings associated with a crisis	Describes appropriate response to a crisis, including imaging and possible interventions	Anticipates patient- specific risk for crisis and describes appropriate treatment algorithm and potential outcomes, including conversion to an alternate procedure	Describes, develops, or publishes an innovative approach or otherwise impacts patient care, delivery, or quality
Comments:				completed Level 1

Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of common patient safety events	Identifies system factors that lead to patient safety events	Participates in analysis of patient safety events (simulated or actual)	Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)	Actively engages teams and processes to modify systems to prevent patien safety events
Demonstrates knowledge of how to report patient safety events	Reports patient safety events through institutional reporting systems (simulated or actual)	Participates in disclosure of patient safety events to patients and their families (simulated or actual)	Discloses patient safety events to patients and their families (simulated or actual)	Role models or mentors others in the disclosure of patient safety events

Systems-Based Practice	2: Quality Improvement			
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of basic quality metrics and quality improvement methodologies	Describes local quality improvement initiatives (e.g., infection rate, 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 at the institutional or community level
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 multidisciplinary care of patients in routine clinical situations effectively using the roles of the interprofessional team members	Coordinates multidisciplinary care of patients in complex clinical situations, including those with barriers to access, effectively using the roles of the interprofessional team members	Role models effective coordination of patient- centered care among different disciplines and specialties	Analyzes the process of care coordination and leads in the design and implementation of improvements
Identifies key elements for safe and effective transitions of care and hand-offs	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	Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems, including outpatient settings	Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes
Comments:			Not Yet C	completed Level 1

Systems-Based Practice	4: Population Health			
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of population and community health needs and disparities	Identifies specific population and community health needs and inequities for their local population	Uses local resources effectively to meet the needs of a patient population and community	Participates in changing and adapting practice to provide for the needs of specific populations	Leads innovations, publishes peer-reviewed paper, or advocates for populations and communities with health care inequities
Comments:			Not Yet C	ompleted Level 1

Systems-Based Practice	5: Physician Role in Health	n Care Systems		
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology)	Describes how components of a complex health care system are interrelated, and understands how this impacts patient care	Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)	Manages various components of the complex health care system to provide efficient and effective patient care and transitions of care	Advocates for or leads systems change that enhances high-value, efficient and effective patient care and transitions of care
Describes basic health payment systems (e.g., government, private, public, uninsured care) and practice models	Delivers care with consideration of each patient's payment model (e.g., insurance type)	Engages with patients in shared decision making, informed by each patient's payment models	Advocates for patient care needs (e.g., community resources, patient assistance resources) with consideration of the limitations of each patient's payment model	Participates in local, regional, or national health policy advocacy activities
	Identifies the need for timely documentation to support billing	Demonstrates use of information technology required for medical practice	Demonstrates core administrative knowledge needed for transition to practice	Proposes changes to patient care or billing practices to improve compliance and reimbursement
Comments:			Not Yet C	ompleted Level 1

©2021 Accreditation Council for Graduate Medical Education (ACGME) All rights reserved except the copyright owners grant third parties the right to use the Vascular Surgery Milestones on a non-exclusive basis for educational purposes

Systems-Based Practice	6: Radiation Safety			
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of the mechanisms of radiation injury and the ALARA ("as low as reasonably achievable") concept	Applies principles of ALARA in daily practice	Accesses resources to determine exam-specific radiation dose information	Communicates the relative risk and benefits of exam-specific radiation exposure to patients and practitioners	Creates, implements, and assesses radiation safety initiatives at the institutional level
Wears lead apron and dosimeter at all times	Uses fluoroscopy techniques that decrease exposure, with guidance Uses radiation protection devices, including shielding, as appropriate, with guidance	Independently uses radiation protection devices, including shielding, as appropriate	Counsels colleagues and allied health staff regarding radiation exposure	Participates in radiation safety education and research
Comments:			Not Yet C	ompleted Level 1

Practice-Based Learning	and Improvement 1: Evide	ence-Based and Informed P	Practice	
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates effective access and use of available evidence to guide routine patient care	Articulates clinical questions and elicits patient preferences and values to guide evidence- based care	Identifies and applies the best available evidence and integrates data to the care of complex patients	Critically appraises and applies evidence, even in the face of uncertainty and 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 peer- reviewed literature or guidelines
Comments:			Not Yet C	ompleted Level 1

Practice-Based Learning	and Improvement 2: Refle	ctive Practice and Commit	nent to Personal Growth	
Level 1	Level 2	Level 3	Level 4	Level 5
Establishes goals for personal and professional development	Identifies opportunities for performance improvement; designs a learning plan	Integrates performance feedback and practice data to develop and implement a learning plan	Revises learning plan based on performance data	Coaches others in the design and implementation of learning plans
Comments:			Not Yet	Completed Level 1

Professionalism 1: Profe	ssional Behavior			
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates insight into professional behavior in routine situations and takes responsibility for own lapses	Identifies and describes potential triggers for professionalism lapses and when to report lapses in professionalism	Demonstrates professional behavior in complex or stressful situations and when to seek help to resolve complex ethical situation	Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in oneself and others	Coaches others when their behavior fails to meet professional expectations
Comments:			Not Yet C	ompleted Level 1

Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of the ethical principles underlying informed consent, surrogate decision making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related topics	Applies ethical principles to straightforward situations	Applies ethical principles to complex situations	Resolves ethical dilemmas using appropriate resources (e.g., ethics consultations, literature review, risk management/legal consultation)	Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede thei resolution

Professionalism 3: Accountability/Conscientiousness				
Level 1	Level 2	Level 3	Level 4	Level 5
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	Takes responsibility for failures, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future	Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner, and proactively implements strategies to ensure the needs of the patient and team are met	Takes ownership of system outcomes and works toward system- level changes
Comments: Not Yet Completed Level 1				

Professionalism 4: Self-Awareness and Help-Seeking					
Level 1	Level 2	Level 3	Level 4	Level 5	
With assistance, recognizes status 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	

Level 1	Level 2	Level 3	Level 4	Level 5
Communicates with patients and their families in an understandable and respectful manner	Customizes communication, in the setting of personal biases and barriers (e.g., age, literacy, cognitive disabilities, cultural differences) with patients and their families	Delivers complex and difficult information to patients and their families	Facilitates difficult discussions specific to patient and patient family's conferences, (e.g., end-of-life, explaining complications, therapeutic uncertainty)	Coaches others in the facilitation of difficult and crucial conversations
Provides timely updates to patients and their families	Actively listens to patients and their families to elicit patient preferences and expectations	Uses shared decision making to make a personalized care plan	Effectively negotiates and manages conflict among patients, their families, and the health care team	Coaches others in conflict resolution

Level 1	Level 2	Level 3	Level 4	Level 5
Uses language that values all members of the health care team	Communicates information effectively and concisely with all health care team members	Uses active listening to adapt communication style to fit team needs	Coordinates recommendations from different members of the health care team to optimize patient care	Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed
Open to feedback on performance as a member of the health care team	Solicits feedback on performance as a member of the health care team	Communicates concerns and provides feedback to peers and learners	Facilitates regular health care team-based feedback in complex situations	Communicates feedback and constructive criticism to superiors

Interpersonal and Communication Skills 3: Communication within Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
Accurately records information in the patient record, including appropriate use of documentation templates	Appropriately selects form and urgency of communication based on context	Demonstrates efficient use of electronic health record (EHR) to communicate with the health care team	Integrates and synthesizes all relevant data from outside systems and prior encounters into the EHR	Guides departmental or institutional communication around policies and procedures
Comments: Not Yet Completed Level 1				