

The Vascular and Interventional Radiology Milestone Project

A Joint Initiative of

The Accreditation Council for Graduate Medical Education

and

The American Board of Radiology



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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 resident physician in key dimensions of the elements of physician competency 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 and Interventional Radiology Milestones

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Milestone Reporting

This document presents milestones designed for programs to use in semi-annual review of fellow performance and reporting to the ACGME. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME competencies organized in a developmental framework from less to more advanced. They are descriptors and targets for fellow performance as a fellow moves from entry into fellowship through graduation. In the initial years of implementation, the Review Committee will examine milestone performance data for each program's fellows as one element in the Next Accreditation System (NAS) to determine whether fellows overall are progressing.

For each period, review and reporting will involve selecting milestone levels that best describe a fellow's current performance and attributes. Milestones are arranged into numbered levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert in the subspecialty.

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

Level 1: The fellow demonstrates milestones expected of an incoming fellow.

Level 2: The fellow is advancing and demonstrates additional milestones, but is not yet performing at a mid-fellowship level.

Level 3: The fellow continues to advance and demonstrate additional milestones, consistently including the majority of milestones targeted for fellowship.

Level 4: The fellow has advanced so that he or she now substantially demonstrates the milestones targeted for fellowship. This level is designed as the graduation target.

Level 5: The fellow has advanced beyond performance targets set for fellowship and is demonstrating "aspirational" goals which might describe the performance of someone who has been in practice for several years. It is expected that only a few exceptional fellows will reach this level.

Additional Notes

Level 4 is designed as the graduation *target* and *does not* represent a graduation *requirement*. Making decisions about readiness for graduation is the purview of the fellowship program director. Study of Milestone performance data will be required before the ACGME and its partners will be able to determine whether milestones in the first four levels appropriately represent the developmental framework, and whether Milestone data are of sufficient quality to be used for high-stakes decisions.

Examples are provided with some milestones. Please note that the examples are not the required element or outcome; they are provided as a way to share the intent of the element.

Some milestone descriptions include statements about performing independently. These activities must occur in conformity to the ACGME supervision guidelines, 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.

Answers to Frequently Asked Questions about Milestones are available on the Milestones web page:

<http://www.acgme.org/acqmeweb/Portals/0/MilestonesFAQ.pdf>.

Radiology Subspecialty Assessment tools:

- End-of-Rotation Global Assessment
- Direct observation and feedback
- Reading out with resident
- Review of reports
- Rate of major discrepancies
- Self-Assessment and Reflections/Portfolio
- OSCE/simulation
- Completion of institutional safety modules, BCLS/ACLS
- Case/Procedure Logs, including complications
- Multi-Source Evaluations

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 sub-competency will be indicated by selecting the level of milestones that best describes that fellow's performance in relation to those milestones.

Procedural Skills — Patient Care 2				
Level 1	Level 2	Level 3	Level 4	Level 5
Assists with procedures	Performs routine procedures with assistance	Independently performs routine procedures	Independently performs complex procedures	Teaches other trainees to perform complex procedures
Discusses the indications and potential complications of pharmacological agents (including contrast)	Orders pharmacological agents with assistance	Independently orders pharmacological agents	Teaches other trainees to perform routine procedures	Implements new procedures/programs
Discusses the potential complications of procedures and their management	Recognizes complications and enlists help	Manages complications with assistance	Teaches other trainees and professionals about the use of pharmacological agents	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet rotated <input type="checkbox"/>

Selecting a response box in the middle of a level implies that milestones in that level and in lower levels have been substantially demonstrated.

Selecting a response box on the line in between levels indicates that milestones in lower levels have been demonstrated as well as **some** milestones in the higher level(s).

Non-procedural Care/Consultation — Patient Care 1				
Level 1	Level 2	Level 3	Level 4	Level 5
Performs a comprehensive history and physical Formulates a pre-procedural assessment and plan with routine assistance from a faculty member Obtains informed consent for basic procedures Performs routine post-procedural care with assistance from a faculty member	Performs a focused history and physical Formulates a pre-procedural assessment and plan with minimal assistance from a faculty member Obtains informed consent for more complex procedures Performs routine post-procedural care with minimal assistance from a faculty member	Chooses appropriate peri-procedural laboratory and imaging studies Independently formulates a pre-procedural assessment and plan for common disorders Independently formulates and implements a post-procedural care plan for uncomplicated procedures	Adjusts procedural plan based upon peri-procedural laboratory and imaging results Independently formulates a pre-procedural assessment and plan for less common disorders Independently formulates and implements a post-procedural care plan for complicated/complex procedures	Independently supervises junior learners in the clinical setting Develops patient care protocols/teaching material
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Procedural Skills — Patient Care 2				
Level 1	Level 2	Level 3	Level 4	Level 5
Assists with procedures	Performs routine procedures with assistance	Independently performs routine procedures	Independently performs complex procedures	Teaches other learners to perform complex procedures
Discusses the indications and potential complications of pharmacological agents (including contrast)	Orders pharmacological agents with assistance	Independently orders pharmacological agents	Teaches other learners to perform routine procedures	Implements new procedures/programs
Discusses the potential complications of procedures and their management	Recognizes complications and enlists help	Manages complications with assistance	Teaches other learners and professionals about the use of pharmacological agents	
			Independently manages complications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Safety — Patient Care 3				
Level 1	Level 2	Level 3	Level 4	Level 5
Wears dosimeter at all times Discusses principles of radiation dose reduction, including the programs Image Gently® and Image Wisely® Is Basic Cardiac Life Support (BCLS)-certified	Uses intermittent fluoroscopy during procedures Uses radiation protection devices as appropriate Is Advanced Cardiovascular Life Support (ACLS)-certified	Uses magnification appropriately and judiciously Modifies the fluoroscopy rate during procedures	Minimizes dose to the patient with appropriate collimation and filters Optimizes exposure parameters based upon the individual patient and procedure Counsels and monitors patients, as appropriate, regarding radiation exposure	Serves on an institutional or national committee to write protocols and/or monitor radiation exposure
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Diagnosis and Intervention in Primary Vascular Disease — Medical Knowledge 1				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes normal and common variant arterial and venous anatomy on non-invasive and invasive imaging	Describes pathophysiology of arterial and venous disease	Describes the benefits of and indications for treatment of arterial and venous disease Describes the common complications of treatment of arterial and venous disease	Demonstrates appropriate decision-making for treatment of arterial and venous disease Knows the effects of various treatments of arterial and venous disease Describes appropriate steps to reduce the risk of complications in treatment of arterial and venous disease, as well as how to manage those complications Teaches other learners or professionals aspects of arterial and venous disease and/or therapy	Publishes peer-reviewed, original research on arterial or venous disease Presents original research on arterial or venous disease at a national or international meeting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Transcatheter Therapy – Embolization — Medical Knowledge 2				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes normal and common variant vascular and organ anatomy on non-invasive and invasive imaging	Describes pathophysiology of the target organ	Describes the benefits of and indications for treatment of target organ pathology Describes the various embolic agents and their mechanism of action Describes the common complications of embolic therapy	Demonstrates appropriate decision-making for the treatment of the target organ Chooses appropriate embolic agent/dose Describes appropriate steps to reduce the risk of complications during transcatheter embolization, as well as how to manage those complications Teaches other learners or professionals aspects of embolization materials and/or treatment	Publishes peer-reviewed, original research on embolic material/therapy Presents original research on embolic material/therapy at a national or international meeting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Percutaneous Organ Access and Intervention – Thorax, Peritoneum, Retroperitoneum, GI System, Hepatobiliary System, and GU System — Medical Knowledge 3				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes normal and abnormal anatomy on non-invasive and invasive imaging	Describes pathophysiology and disorders	Describes the benefits of and indications for percutaneous interventions Describes the common complications of percutaneous interventions	Demonstrates appropriate decision-making for percutaneous interventions Describes appropriate steps to reduce the risk of complications during percutaneous interventions, as well as how to manage those complications Teaches other learners or professionals aspects of percutaneous interventions	Publishes peer-reviewed, original research on percutaneous organ access and intervention Presents original research on percutaneous organ access and interventions at a national or international meeting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Quality Improvement (QI) — Systems-based Practice 1				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes specialty-specific QI initiatives Describes the departmental incident/occurrence reporting system	Incorporates specialty-specific QI into clinical practice Participates in the departmental incident/occurrence reporting system	Works in interprofessional teams to enhance patient safety and improve patient care quality	Participates in identifying system errors and implementing potential systems solutions	Leads a team in the design and implementation of a QI project for the program Routinely participates in root cause analysis
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Health Care Economics — Systems-based Practice 2				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes the technical and professional components of imaging costs in the subspecialty division	Understands departmental cost savings initiatives	Understands the revenue cycle	Describes billing and coding of subspecialty-specific exams, and recognizes and corrects incorrect coding Creates reports that contain the elements necessary to support exam coding	Participates in evaluation and re-evaluation of current procedural terminology (CPT) codes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Self-directed Learning — Practice-based Learning and Improvement 1				
Level 1	Level 2	Level 3	Level 4	Level 5
Is aware of personal knowledge and expertise and uses feedback from teachers, colleagues, and patients	Continually seeks and incorporates feedback to improve performance Develops a learning plan and uses published review articles and guidelines Assesses and provides feedback to junior learners	Demonstrates a balanced and accurate self-assessment of competence, and investigates clinical outcomes and areas for continued improvement Selects evidence-based information to answer specific questions	With little external guidance, performs self-directed learning using evidence-based information Develops a process to remain current in knowledge over time Organizes educational activities at the program level	Develops an educational curriculum and assessment tools
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Scholarly Activity — Practice-based Learning and Improvement 2				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates critical thinking skills and understands research design Demonstrates knowledge of basic principles underlying the ethical conduct of research and the protection of human subjects	Critically reviews and interprets the literature with the ability to identify study aims, hypotheses, design, and biases Identifies a faculty mentor and begins a scholarly project	When appropriate, applies the principles of ethics and good clinical practice to the protection of human subjects recruited to participate in research Analyzes data appropriate to project When appropriate, maintains data safety and patient monitoring to ensure continued protection of human subjects	Demonstrates understanding of statistical analyses and epidemiology Presents completed scholarly project to peers for review and critique	Independently plans and executes a research project Explores funding mechanisms on local, regional, and national levels Obtains extramural funding for research study
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Individual — Professionalism 1				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Is an effective health care team member, promoting primacy of patient welfare, patient autonomy, and social justice</p> <p>Demonstrates the following professional behaviors:</p> <ul style="list-style-type: none"> ▪ is truthful ▪ recognizes personal limitations and seeks help when appropriate ▪ recognizes personal impairment and seeks help when needed ▪ responds appropriately to constructive criticism ▪ places needs of patients before self ▪ maintains appropriate boundaries with patients, colleagues, and others ▪ exhibits tolerance and acceptance of diverse individuals and groups 	<p>Actively reflects on personal professional behavior, and discusses professionalism issues as identified in Level 1 with students and/or residents</p>	<p>Is an effective health care team leader, promoting primacy of patient welfare, patient autonomy, and social justice</p>	<p>Serves as a role model for professional behavior as identified in Level 1</p>	<p>Mentors others regarding professionalism and ethics</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Systems — Professionalism 2				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Is an effective health care team member, that demonstrates the following professional behaviors:</p> <ul style="list-style-type: none"> ▪ recognizes the importance and priority of patient care and advocates for patient interests ▪ fulfills work-related responsibilities ▪ maintains patient confidentiality ▪ fulfills Institutional and Program Requirements related to professionalism and ethics ▪ prepares for and attends required conferences 	<p>Recognizes opportunities to improve professionalism in the workplace, and takes part in programs to improve clinical care and professional behavior as identified in Level 1</p>	<p>Is an effective health care team leader, promoting departmental and institutional goals regarding primacy of patient welfare, patient autonomy, and social justice</p>	<p>Serves as a role model for professional behavior as identified in Level 1</p>	<p>Accepts leadership roles in institutional, regional, and national organizations to advance professionalism</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Comments:</p>				<p>Not yet achieved Level 1 <input type="checkbox"/></p>

Effective Communication with Patients, Families, and Caregivers — Interpersonal and Communication Skills 1				
Level 1	Level 2	Level 3	Level 4	Level 5
Exhibits basic communication skills and, with indirect supervision, can effectively communicate patient information	Communicates complex and difficult information, such as medical errors, complications, and adverse events	Working with program faculty members, oversees and teaches junior learners on how to communicate effectively with patients, families, and caregivers	Serves as a role model for effective and compassionate communication for junior learners	Develops models and guidelines for communication, and seeks leadership opportunities in the department and/or in national professional organizations
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>

Effective Communication with Members of the Health Care Team (Written and Oral) — Interpersonal and Communication Skills 2				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Efficiently generates clear and concise reports on common complex cases that do not need substantial faculty member corrections</p> <p>Communicates effectively and professionally in most stressful situations</p>	<p>Efficiently generates clear and concise reports on all cases that do not need substantial faculty member corrections</p> <p>Communicates effectively and professionally in all situations</p> <p>Effectively manages transitions of care and hand-offs</p>	<p>Working with program faculty members, oversees and teaches junior learners on how to generate clear and concise reports</p> <p>Working with program faculty members, oversees and teaches junior learners on how to communicate effectively and professionally</p> <p>Under direct faculty member supervision, organizes departmental and interdisciplinary teaching conferences</p>	<p>Generates tailored reports meeting the specific needs of the referring physicians</p> <p>Serves as a role model for effective and professional communication</p> <p>With minimal faculty member supervision, organizes departmental and interdisciplinary teaching conferences</p>	<p>Develops report templates</p> <p>Independently leads departmental and interdisciplinary teaching conferences</p> <p>Develops models and guidelines for written and oral communications, and seeks leadership opportunities in the department and/or in national professional organizations</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not yet achieved Level 1 <input type="checkbox"/>