The Interventional Radiology Milestone Project

A Joint Initiative of

The Accreditation Council for Graduate Medical Education
The American Board of Diagnostic Radiology





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The Milestones are designed only for use in evaluation of the resident in the context of their participation in ACGME-accredited residency or fellowship programs. The Milestones provide a framework for assessment of the development of the resident 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.

Interventional Radiology Milestones

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Milestone Reporting

This document presents Milestones designed for programs to use in semi-annual review of resident 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 resident performance as a resident moves from entry into residency through graduation. In the initial years of implementation, the Review Committee will examine Milestone performance data for each program's residents as one element in the Next Accreditation System (NAS) to determine whether residents overall are progressing.

For each period, review and reporting will involve selecting milestone levels that best describe a resident'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 resident substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page v).

- **Level 1:** The resident demonstrates milestones expected of an incoming resident.
- Level 2: The resident is advancing and demonstrates additional milestones, but is not yet performing at a mid-residency level.
- **Level 3:** The resident continues to advance and demonstrate additional milestones, consistently including the majority of milestones targeted for residency.
- **Level 4:** The resident has advanced so that he or she now substantially demonstrates the milestones targeted for residency. This level is designed as the graduation target.
- **Level 5:** The resident has advanced beyond performance targets set for residency 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 residents 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 residency 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 institutional and program policies. For example, a resident who performs a procedure independently must, at a minimum, be supervised through oversight.

Answers to Frequently Asked Questions about the Next Accreditation System and Milestones are posted on the Next Accreditation System section of the ACGME website.

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

evel 1	Level 2	Level 3	Level 4	Level 5
erforms a comprehensive	Performs a focused history	Chooses appropriate peri-	Adjusts procedural plan	Independently supervises
istory and physical	and physical	procedural laboratory and	based upon peri-procedural	junior learners in the clinical
		imaging studies	laboratory and imaging	setting
ormulates a pre-	Formulates a pre-procedural		results	
rocedural assessment and	assessment and plan with	Independently formulates	a	Develops patient care
an with routine guidance	minimal guidance from a	pre-procedural assessmen	t Independently formulates a	protocols/teaching material
om a faculty member	faculty member	and plan for common	pre-procedural assessment	
		disorders	and plan for less common	
btains informed consent	Obtains informed consent for		disorders	
or basic procedures	more complex procedures	Independently formulates		
		and implements post-	Independently formulates	
erforms routine post-	Performs routine post-	procedural imaging and	and implements post-	
rocedural care with	procedural care with minimal	clinical follow-up for paties	nts procedural imaging and	
uidance from a faculty	guidance from a faculty	after basic procedures	clinical follow-up for patient	s
nember	member		after complex procedures	
Comments:	D R C		RO	
oniments.				lot yet achieved Level 1
Selecting a response	onse box in the middle o	ıf	Selecting a response box on the line in between	
a level implies that milestones in that level		I .	levels indicates that milestones in lower levels	
· ·		°'	nave been substantially de	
	els have been substantia	··· <i>y</i>	•	
demonstrated.			some milestones in the hi	gner ievel(s).

PC1 – Diagnostic Radiology: Consultant				
Level 1	Level 2	Level 3	Level 4	Level 5
Uses established	Recommends appropriate	Recommends appropriate	Integrates current research	Participates in research,
evidence-based imaging	imaging of common*	imaging of uncommon*	and literature with	development, and
guidelines, such as	conditions independently	conditions independently	guidelines, taking into	implementation of imaging
American College of			consideration cost	guidelines
Radiology (ACR)			effectiveness and risk-	
Appropriateness	*As defined by the	*As defined by the	benefit analysis, to	
Criteria®	program	program	recommend imaging	
Appropriately uses the				
Electronic Health Record				
to obtain relevant clinical				
information				
Comments: Not yet achieved Level 1				

PC2 – Diagnostic Radiology: Competence in Procedures					
Level 1	Level 2	Level 3	Level 4	Level 5	
Competently performs	Competently performs	Competently performs	Able to competently and	Able to teach procedures	
basic procedures* with guidance Recognizes and	intermediate procedures* Recognizes and manages complications of	advanced procedures* Recognizes and manages complications of	independently perform the following procedures: adult and pediatric 	to junior-level residents	
manages complications of basic procedures	*As defined by the	advanced procedures *As defined by the	fluoro studieslumbar punctureimage-guided venous and arterial access		
*Basic procedures, as defined by each program, include those needed to take independent call	program	program	 hands-on adult and pediatric ultrasound studies drainage of effusions and abscesses image-guided biopsy nuclear medicine I-131 treatments (≤ 33 and > 33 mCi) 		
Comments:	Comments: Not yet achieved Level 1				

PC3 – Diagnostic Radiol	-			
Level 1	Level 2	Level 3	Level 4	Level 5
Contrast Agents:	Contrast Agents:	Contrast Agents:	Contrast Agents:	Contrast Agents:
Recognizes and manages contrast	Describes prophylaxis of contrast reactions and	Describes alternative imaging strategies for	Appropriately counsels patients and referring	Teaches appropriate treatment of contrast
reactions	contrast-induced nephropathy	patients with contrast reactions and management of contrast-induced	providers on prevention and treatment of contrast reactions and contrast-	reactions
Radiation Safety:		nephropathy	induced nephropathy	Radiation Safety:
Describes the	Radiation Safety:			Promotes radiation safety
mechanisms of radiation injury and the ALARA	Accesses resources to determine exam-specific	Radiation Safety:	Radiation Safety:	
("as low as reasonably achievable") concept	average radiation dose information	Communicates the relative risk of exam-specific	Applies principles of Image Gently® and Image	MR Safety:
, ,		radiation exposure to patients and practitioners	Wisely®	Participates in establishing or directing a safe MR program
Magnetic Resonance (MR) Safety:	MR Safety:		MR Safety:	program
Describes risks of	Accesses resources to determine the safety of	MR Safety:	Applies principles of MR	
magnetic resonance	implanted devices and	Communicates MR safety	safety, including safety	
imaging (MRI)	retained metal	of common implants and	zones and pre-MR	
		retained foreign bodies to patients and practitioners	screening	
Comments:	Comments: Not yet achieved Level 1			

PC4 – Interventional Radiology: Non-procedural Care/Consultation and Follow-Up				
Level 1	Level 2	Level 3	Level 4	Level 5
Performs a	Performs a focused history	Chooses appropriate peri-	Adjusts procedural plan	Independently supervises
comprehensive history	and physical	procedural laboratory and	based upon peri-	junior learners in the
and physical		imaging studies	procedural laboratory and	clinical setting
	Formulates a pre-		imaging results	
Formulates a pre-	procedural assessment	Independently formulates a		Develops patient care
procedural assessment	and plan with minimal	pre-procedural assessment	Independently formulates	protocols/teaching
and plan with routine	guidance from a faculty	and plan for common	a pre-procedural	material
guidance from a faculty	member	disorders	assessment and plan for	
member			less common disorders	
	Obtains informed consent	Independently formulates		
Obtains informed	for more complex	and implements post-	Independently formulates	
consent for basic	procedures	procedural imaging and	and implements post-	
procedures	5	clinical follow-up for	procedural imaging and	
Denferme modification	Performs routine post-	patients after basic	clinical follow-up for	
Performs routine post-	procedural care with	procedures	patients after complex	
procedural care with	minimal guidance from a		procedures	
guidance from a faculty member	faculty member			
I I I I I I I I I I I I I I I I I I I				
Comments:	Comments: Not yet achieved Level 1			

PC5 – Interventional Radiology: Procedural Skills				
Level 1	Level 2	Level 3	Level 4	Level 5
Assists with procedures	Performs basic procedures with guidance	Independently performs basic procedures	Independently performs complex procedures	Teaches other learners to perform complex
Discusses the indications				procedures
and potential	Orders pharmacological	Independently orders	Teaches other learners to	
complications of pharmacological agents	agents with guidance	pharmacological agents	perform basic procedures	Implements new procedures/programs
	Recognizes complications	Manages complications	Teaches other learners	
Discusses the potential complications of procedures and their management	and enlists help	with guidance	and professionals about the use of pharmacological agents	
· ·			Independently manages complications	
Comments: Not yet achieved Level 1				

PC6 – Diagnostic and Interventional Radiology: Procedural Radiation Safety				
Level 1	Level 2	Level 3	Level 4	Level 5
Wears lead apron and	Uses fluoroscopy	Independently uses	Communicates benefits	Participates in institutional
dosimeter at all times	techniques that decrease	fluoroscopy techniques that	and risks of radiation to	radiation safety program
	exposure, with guidance	decrease exposure	patients and practitioners	
Demonstrates knowledge				Participates in national
that the use of ionizing	Uses radiation protection	Independently uses	Counsels and monitors	Radiation Safety program
radiation is medically	devices, including	radiation protection	patients, as appropriate,	
indicated	shielding, as appropriate,	devices, including	regarding radiation	
	with guidance	shielding, as appropriate	exposure	
Comments: Not yet achieved Level 1				

Level 1	Level 2	Level 3	Level 4	Level 5
Selects appropriate protocol and contrast agent/dose for basic* imaging, including protocols encountered during independent call Recognizes sub-optimal imaging *As defined by the program	Selects appropriate protocols and contrast agent/dose for intermediate* imaging *As defined by the program	Selects appropriate protocols and contrast agent/dose for advanced* imaging Demonstrates knowledge of physical principles to optimize image quality *As defined by the program	Independently modifies protocols as determined by clinical circumstances Applies physical principles to optimize image quality	Teaches and/or writes imaging protocols

MK2 – Diagnostic Radiology: Interpretation of Examinations				
Level 1	Level 2	Level 3	Level 4	Level 5
Makes core observations, formulates differential diagnoses, and recognizes critical findings Differentiates normal from abnormal	Makes secondary observations, narrows the differential diagnosis, and describes management options	Provides accurate, focused, and efficient interpretations Prioritizes differential diagnoses and recommends management	Makes subtle observations Suggests a single diagnosis when appropriate Integrates current research and literature with guidelines to recommend management	Demonstrates expertise and efficiency at a level expected of a subspecialist Advances the art and science of image interpretation
Comments: Not yet achieved Level 1				

MK3 – Diagnosis and Intervention in Primary Vascular Disease				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes normal and	Describes pathophysiology	Describes the benefits of	Demonstrates appropriate	Teaches other learners or
common variant arterial	of arterial and venous	and indications for	decision making for	professionals aspects of
and venous anatomy on	disease	treatment of arterial and	treatment of arterial and	arterial and venous
non-invasive and		venous disease	venous disease	disease and/or therapy
invasive imaging	Describes therapeutic			
	options for arterial and	Selects appropriate	Describes the effects of	Publishes peer-reviewed,
	venous disease	devices and techniques for	various treatments of	original research on
		arterial and venous	arterial and venous	arterial or venous disease
	Describes the common	interventions	disease	
	complications of treatment			Presents original research
	of arterial and venous	Describes appropriate	Describes the	on arterial or venous
	disease	steps to reduce the risk of	management of	disease at a national or
		complications in treatment	complications of treatment	international meeting
		of arterial and venous	of arterial and venous	
		disease	disease	
Comments:				
Not yet achieved Level 1 ———————————————————————————————————				

MK4 – Transcatheter Therapy – Embolization					
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 various embolic agents and their	Describes the benefits of and indications for treatment of target organ pathology	Demonstrates appropriate decision making for the treatment of the target organ	Teaches other learners or professionals aspects of embolization materials and/or treatment	
	mechanism of action Describes the common complications of embolic therapy	Chooses appropriate embolic agent/dose Describes appropriate steps to reduce the risk of complications of transcatheter embolization	Describes the management of complications of transcatheter embolization	Publishes peer-reviewed, original research on embolic material/therapy Presents original research on embolic material/therapy at a national or international meeting	
Comments:	Comments: Not yet achieved Level 1				

MK5 – Percutaneous Organ Access and Intervention				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes normal and	Describes pathophysiology	Describes the benefits of	Demonstrates appropriate	Teaches other learners or
common variant anatomy	of the target organ	and indications for	decision-making for	professionals aspects of
on non-invasive and		percutaneous interventions	percutaneous	percutaneous
invasive imaging	Describes devices and		interventions	interventions
	techniques for organ access and intervention Describes the common complications of percutaneous interventions	Chooses appropriate devices and techniques for organ access and intervention Describes appropriate steps to reduce the risk of complications during percutaneous interventions	Describes the management of complications of percutaneous organ access and 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
Comments:			Not	yet achieved Level 1

SBP1 – Quality Improvement (QI)					
Level 1	Level 2	Level 3	Level 4	Level 5	
Describes departmental QI initiatives Describes the departmental incident/occurrence reporting system	Incorporates QI into clinical practice Participates in the departmental incident/occurrence reporting system	Identifies and begins a systems-based practice project incorporating QI methodology	Completes a systems- based practice project as required in the ACGME Program Requirements for Interventional Radiology Describes national radiology quality programs (e.g., National Radiology Data Registry, accreditation, peer-review)	Leads a team in the design and implementation of a QI project Routinely participates in root cause analysis or other institutional QI committee or initiative	
Comments: Not yet achieved Level 1					

SBP2 – Health Care Economics				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes the mechanisms for reimbursement, including types of payors	States relative cost of common procedures	Describes the technical and professional components of imaging costs	Describes measurements of productivity (e.g., Relative Value Units [RVUs])	Describes the radiology revenue cycle
Comments:			No	ot yet achieved Level 1

PBLI1 – Self-directed Learning				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates awareness of limits in personal knowledge 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, with guidance	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	Performs self-directed learning using evidence-based information	Develops an educational curriculum and assessment tools
Comments: Not yet achieved Level 1				

PBLI2 – Scholarly Activity					
Level 1 Documents training in critical thinking skills and research design	Level 2 Works with faculty mentors to identify potential scholarly projects	Level 3 Begins scholarly project Analyzes data appropriate to project	Level 4 Completes and presents a scholarly project	Level 5 Independently conducts research and contributes to the scientific literature and/or completes more than one scholarly project Completes an Institutional Review Board (IRB) submission	
Comments:			Not	yet achieved Level 1	

PROF1 – Administrative Tasks				
Level 1 Completes procedure log, performs other assigned and required administrative tasks in a timely fashion, and does not require excessive reminders or follow-up Complies with duty hour regulations and accurately reports duty hours	Promptly attends and participates in conferences, meetings, and other service and educational activities Responds promptly to requests from faculty and departmental staff members	Level 3 Acts as a role model for conference attendance, promptness, and attention to assigned tasks Prepares materials and presents at assigned morbidity and mortality and other conferences	Level 4 Ensures that others under his or her supervision respond appropriately to responsibilities in a timely fashion	Participates in the development or revision of administrative responsibilities
Comments: Not yet achieved Level 1				

PROF2 – Compassion, Integrity, Accountability, and Respect for Self and Others				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates truthfulness, compassion, sensitivity, and responsiveness to patients and families Demonstrates non- discriminatory behavior in all interactions, including diverse and vulnerable populations Consistently	Describes effects of sleep deprivation and substance abuse on performance Demonstrates appropriate steps to address impairment in self Demonstrates participation in risk management and/or	Demonstrates compassionate practice of medicine, even in context of disagreement with patient beliefs Incorporates patients' socio-cultural needs and beliefs into patient care Demonstrates appropriate steps to address impairment in	Mentors others in the compassionate practice of medicine, even in context of disagreement with patient beliefs Mentors others in sensitivity and responsiveness to diverse and vulnerable populations Is a role model for	Engages in scholarly activity regarding professionalism Participates in institutional professionalism committees and activities
demonstrates professional behavior and appearance	institutional compliance education Is an effective health care team member	Is an effective health care team leader	professional behavior	
Comments: Not yet achieved Level 1				

ICS1 – Effective Communication with Patients, Families, and Caregivers				
Level 1	Level 2	Level 3	Level 4	Level 5
Communicates information about imaging and examination results in routine, uncomplicated circumstances	Communicates, with guidance, in challenging circumstances (e.g., cognitive impairment, cultural differences, language barriers, low health literacy) Communicates, with guidance, difficult information such as errors, complications, adverse events, and bad news	Communicates, with minimal guidance, in challenging circumstances (e.g., cognitive impairment, cultural differences, language barriers, low health literacy)	Independently communicates complex and difficult information, such as errors, complications, adverse events, and bad news	Serves as a role model for effective and compassionate communication Develops patient-centered educational materials
Comments: Not yet achieved Level 1				

ICS2 – Diagnostic Radiology: Effective Communication with Members of the Health Care Team				
Level 1	Level 2	Level 3	Level 4	Level 5
Written/Electronic:	Written/Electronic:	Written/Electronic:	Written/Electronic:	Written/Electronic:
Generates accurate reports with appropriate elements required for coding	Efficiently generates clear and concise reports that do not require substantive faculty member correction on basic cases	Efficiently generates clear and concise reports that do not require substantive faculty member correction on increasingly complex cases	Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases	Generates tailored reports meeting the needs of the referring physician Develops templates and report formats
Verbal: Communicates urgent and unexpected findings according to institutional policy and ACR guidelines	Verbal: Communicates findings and recommendations clearly and concisely	Verbal: Communicates appropriately under stressful situations	Verbal: Communicates effectively and professionally in all circumstances	Verbal: Serves as a role model for effective communication Leads interdisciplinary conferences
Comments:			No	t yet achieved Level 1

ICS3 – Interventional Radiology: Effective Communication with Members of the Health Care Team				
Level 1	Level 2	Level 3	Level 4	Level 5
Adheres to transfer-of-care policies Generates accurate procedural reports with appropriate elements required for coding of basic procedures	Effectively participates in transitions of care with guidance Efficiently generates clear and concise procedural reports and patient care documentation on basic procedures that do not require substantive faculty member correction Effectively communicates with intra- and interdisciplinary team members	Effectively manages transitions of care with guidance Efficiently generates clear and concise procedural reports and patient care documentation that do not require substantive faculty member correction on most procedures Effectively communicates with intra- and interdisciplinary team members under stressful situations	Effectively manages transitions of care with minimal guidance Efficiently generates clear and concise procedural reports and patient care documentation that do not require substantive faculty member correction on all procedures Serves as a role model for effective communication in interventional radiology	Independently manages transitions of care Develops models and guidelines for written and oral communications, and seeks leadership opportunities in the department and/or in national professional organizations
Comments:			No	t yet achieved Level 1