# The Interventional Radiology Milestone Project

A Joint Initiative of

The Accreditation Council for Graduate Medical Education

The American Board of Diagnostic Radiology



February 2016

## The Interventional Radiology Milestone Project

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**

Chair: Vicki Marx, MD

### **Working Group**

Brad Carra, MD Felicia Davis, MHA Laura Edgar, EdD, CAE Jennifer Gould, MD Kelvin Hong, MD John Kaufman, MD, MS Mark McKinney, MD Daniel Siragusa, MD

### **Advisory Group**

James C. Anderson, MD Louis Ling, MD

### **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.

PC4 - Interventional Radiology: Non-procedural Care/Consultation and Follow-Up				
Level 1	Level 2	Level 3	Level 4	Level 5
Performs a comprehensive	Performs a focused history	Chooses appropriate per	i- Adjusts procedural plan	Independently supervises
history and physical	and physical	procedural laboratory an		junior learners in the clinical
-	<b>.</b>	imaging studies	laboratory and imaging	setting
Formulates a pre-	Formulates a pre-procedural		results	
procedural assessment and	assessment and plan with	Independently formulate		Develops patient care
plan with routine guidance	minimal guidance from a	pre-procedural assessme		protocols/teaching material
from a faculty member	faculty member	and plan for common	pre-procedural assessment	
		disorders	and plan for less common	
Obtains informed consent	Obtains informed consent for		disorders	
for basic procedures	more complex procedures	Independently formulate		
		and implements post-	Independently formulates	
Performs routine post-	Performs routine post-	procedural imaging and	and implements post-	
procedural care with	procedural care with minimal	clinical follow-up for pati	ents procedural imaging and	
guidance from a faculty	guidance from a faculty	after basic procedures	clinical follow-up for patients	
member	member		after complex procedures	
Comments:				
		_		
Selecting a resp	onse box in the middle o	f	Selecting a response box c	on the line in between
a level implies th	at milestones in that leve	el	levels indicates that milesto	ones in lower levels
			have been substantially de	monstrated as well as
	els have been substantia		•	
demonstrated.			some milestones in the hig	ner level(s).

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

Level 1	Level 2	Level 3	Level 4	Level 5	
Competently performs basic procedures* with guidance Recognizes and manages complications of basic procedures	Competently performs intermediate procedures* Recognizes and manages complications of intermediate procedures	Competently performs advanced procedures* Recognizes and manages complications of advanced procedures	<ul> <li>Able to competently and independently perform the following procedures:</li> <li>adult and pediatric fluoro studies</li> <li>lumbar puncture</li> </ul>	performs ocedures*Able to competently and independently perform the following procedures:Able to teach to junior-leve to junior-leve following procedures:and manages s of ocedures• adult and pediatric fluoro studies•	Able to teach procedures to junior-level residents
*Basic procedures, as defined by each program, include those needed to take independent call	*As defined by the program	*As defined by the program	<ul> <li>and arterial access</li> <li>hands-on adult and pediatric ultrasound studies</li> <li>drainage of effusions and abscesses</li> <li>image-guided biopsy</li> <li>nuclear medicine I-131 treatments (≤ 33 and &gt; 33 mCi)</li> </ul>		

Level 1	Level 2	Level 3	Level 4	Level 5
Contrast Agents:	Contrast Agents:	Contrast Agents:	Contrast Agents:	Contrast Agents:
Contrast Agents.	Contrast Agents.	Contrast Agents.	Contrast Agents.	Contrast Agents.
Recognizes and	Describes prophylaxis of	Describes alternative	Appropriately counsels	Teaches appropriate
manages contrast	contrast reactions and	imaging strategies for	patients and referring	treatment of contrast
reactions	contrast-induced	patients with contrast	providers on prevention	reactions
	nephropathy	reactions and management	and treatment of contrast	
		of contrast-induced	reactions and contrast-	
Radiation Safety:		nephropathy	induced nephropathy	Radiation Safety:
Describes the	Radiation Safety:			Promotes radiation safety
mechanisms of radiation	Accesses resources to			
injury and the ALARA	determine exam-specific	Radiation Safety:	Radiation Safety:	
("as low as reasonably	average radiation dose	Communicates the relative	Applies principles of	MR Safety:
achievable") concept	information	risk of exam-specific	Image Gently® and Image	-
		radiation exposure to	Wisely®	Participates in establishing
		patients and practitioners		or directing a safe MR
Magnetic Resonance	MR Safety:			program
(MR) Safety:	Accesses resources to		MR Safety:	
Describes risks of	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	screening	
		patients and practitioners		
		·		
Comments:			No	t yet achieved Level 1

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		clinical follow-up for	procedural imaging and	
	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	faculty member			
member				
Comments:				

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
Discusses the notantial	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	
management			Independently manages complications	
Comments: Not yet achieved Level 1				

PC6 – Diagnostic and Interventional Radiology: Procedural Radiation Safety				
PC6 – Diagnostic and int	erventional Radiology: Proc	cedural Radiation Salety		
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	ogy: Protocol Selection and	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
Comments: Not yet achieved Level 1				

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:	Comments: Not yet achieved Level 1				

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

MK4 – Transcatheter The	erapy – 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:			Not ye	t achieved Level 1

MK5 – Percutaneous Organ Access and Intervention				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes normal and common variant anatomy on non-invasive and invasive imaging	Describes pathophysiology of the target organ Describes devices and techniques for organ access and intervention Describes the common complications of percutaneous interventions	Describes the benefits of and indications for percutaneous interventions Chooses appropriate devices and techniques for organ access and intervention Describes appropriate steps to reduce the risk of complications during percutaneous interventions	Demonstrates appropriate decision-making for percutaneous interventions Describes the management of complications of percutaneous organ access and interventions	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
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:	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:			Nc	ot yet achieved Level 1	

_evel 1	Level 2	Level 3	Level 4	Level 5
Demonstrates awareness of limits in personal knowledge and uses feedback from eachers, 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

PBLI2 – Scholarly Activity					
Level 1 Documents training in	Level 2 Works with faculty mentors	Level 3 Begins scholarly project	Level 4 Completes and presents a	Level 5 Independently conducts	
critical thinking skills and research design	to identify potential scholarly projects	Analyzes data appropriate to project	scholarly project	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				
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	Level 2 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	Level 5 Participates in the development or revision of administrative responsibilities
Comments:			No	t 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	Describes effects of	Demonstrates	Mentors others in the	Engages in scholarly
truthfulness,	sleep deprivation and	compassionate practice	compassionate practice	activity regarding
compassion, sensitivity,	substance abuse on	of medicine, even in	of medicine, even in	professionalism
and responsiveness to	performance	context of disagreement	context of disagreement	
patients and families		with patient beliefs	with patient beliefs	Participates in
	Demonstrates			institutional
Demonstrates non-	appropriate steps to	Incorporates patients'	Mentors others in	professionalism
discriminatory behavior	address impairment in	socio-cultural needs and	sensitivity and	committees and
in all interactions,	self	beliefs into patient care	responsiveness to	activities
including diverse and			diverse and vulnerable	
vulnerable populations	Demonstrates	Demonstrates	populations	
	participation in risk	appropriate steps to		
Consistently	management and/or	address impairment in	Is a role model for	
demonstrates	institutional compliance	colleagues	professional behavior	
professional behavior	education	le en effective heelth		
and appearance	Is an effective health	Is an effective health		
		care team leader		
	care team member			
Comments:			Not y	vet achieved Level 1

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

Level 2	Level 3	Level 4	Level 5
Written/Electronic:	Written/Electronic:	Written/Electronic:	Written/Electronic:
Efficiently generates clear	Efficiently generates clear	Efficiently generates clear	Generates tailored report
and concise reports that do	and concise reports that do	and concise reports that	meeting the needs of the
not require substantive	not require substantive	do not require substantive	referring physician
faculty member correction on basic cases	faculty member correction on increasingly complex cases	faculty member correction on all cases	Develops templates and report formats
Verbal:		Verbal:	Verbal:
Communicates findings	Verbal:	Communicates effectively	
and recommendations clearly and concisely	Communicates appropriately under	and professionally in all circumstances	Serves as a role model for effective communication
	stressful situations		Leads interdisciplinary
			conferences
			$\neg \qquad \bigcirc$
	Efficiently generates clear and concise reports that do not require substantive faculty member correction on basic cases <b>Verbal:</b> Communicates findings and recommendations	Efficiently generates clear and concise reports that do not require substantive faculty member correction on basic casesEfficiently generates clear and concise reports that do not require substantive faculty member correction on increasingly complex casesVerbal: Communicates findings and recommendations clearly and conciselyVerbal: Communicates appropriately under	Efficiently generates clear and concise reports that do not require substantive faculty member correction on basic casesEfficiently generates clear and concise reports that do not require substantive faculty member correction on increasingly complex casesEfficiently generates clear and concise reports that do not require substantive faculty member correction on all casesEfficiently generates clear and concise reports that do not require substantive faculty member correction on increasingly complex casesEfficiently generates clear and concise reports that do not require substantive faculty member correction on all casesVerbal: Communicates findings and recommendations clearly and conciselyVerbal: Communicates appropriately underVerbal: Communicates and professionally in all circumstances

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:			Nc	ot yet achieved Level 1