# Interventional Radiology – Independent Milestones

The Accreditation Council for Graduate Medical Education



Second Revision: December 2019 First Revision: December 2012

## Interventional Radiology - Independent Milestones

The Milestones are designed only for use in evaluation of residents in the context of their participation in ACGME-accredited residency programs. The Milestones provide a framework for the 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.

### <u>Interventional Radiology - Independent Milestones</u>

#### **Work Group**

Debbie Boggs, BA, BSW Jonathan Keung, MD

Keri Conner, DO Colin McCarthy, MD

Laura Edgar, EdD, CAE J Mark McKinney, MD, FSIR, FACR

Gretchen Foltz, MD Rachel Oser, MD

Kelvin Hong, MD Anne Roberts, MD

Claire Kaufman, MD

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

American Board of Radiology

Association of Program Directors in Interventional Radiology

Review Committee for Radiology

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

This document presents the Milestones, which programs use in a semi-annual review of resident 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 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 resident 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 resident may achieve higher levels early in his/her educational program just as a senior resident 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. Residents 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 resident.

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

#### **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 resident 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.

Examples are provided for some milestones within this document. Please note: 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 ACGME supervision guidelines as described in the Program Requirements, as well as to institutional and program policies. For example, a resident who performs a procedure independently must, at a minimum, be supervised through oversight.

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

Supplemental Guides and other resources are available on the Milestones page of each specialty section of the ACGME website. On <a href="https://www.acgme.org">www.acgme.org</a>, choose the applicable specialty under the "Specialties" menu, then select the "Milestones" link in the lower navigation bar.

The diagram below presents an example set of milestones for one 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.

Medical Knowledge 2: Physics, Protocol Selection, and Optimization of Images				
Level 1	Level 2	Level 3	Level 4	Level 5
Discusses the basic physics for imaging and image guided intervention	Demonstrates knowledge of basic medical physics and radiobiology in imaging and image guided intervention	Applies knowledge of basic medical physics and radiobiology to imaging and image guided intervention	Applies physical principles to optimize image quality, including dose reduction strategies	Teaches physical principles to optimize image quality to other specialties
Discusses the protocols and contrast agent/dose for imaging and image guided intervention	Selects appropriate protocols and contrast agent/dose for emergent and routine imaging and image guided intervention	Selects appropriate protocols and contrast agent/dose for complex imaging and image guided intervention	Modifies protocols and contrast agent/dose as determined by clinical circumstances	Develops imaging and image guided intervention protocols
			$\mathbb{R}$	
Comments:			,	ompleted Level 1
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 between levels indication in lower levels have demonstrated as we milestones in the high	ates that milestones been substantially Il as <b>some</b>

Patient Care 1: Reporting				
Level 1	Level 2	Level 3	Level 4	Level 5
Generates reports with appropriate elements for coding	Efficiently generates clear and concise reports that do not require substantive correction	Efficiently generates clear and concise reports that rarely require correction	Generates tailored reports meeting the needs of the care provider and complex interventional reports with appropriate elements for coding	Generates tailored reports meeting the referring subspecialty needs
Describes lexicons and structured reporting	Uses lexicons and structured reporting that do not require substantive correction	Uses lexicons and structured reporting that rarely require correction	Proficiently uses lexicons and structured reporting to provide accurate and timely reports that do not require correction	
Comments:  Not Yet Completed Level 1 Not Yet Assessable				

Level 1	Level 2	Level 3	Level 4	Level 5
Uses electronic health record (EHR) to obtain relevant clinical information	For emergent and routine imaging consultations, delineates the clinical question, obtains appropriate clinical information, uses evidence-based imaging guidelines, and recommends next steps, with assistance	For complex imaging consultations, delineates the clinical question, obtains appropriate clinical information, uses evidence-based imaging guidelines, and recommends next steps, with assistance	Manages imaging consultations independently, taking into consideration cost effectiveness and risk benefit analysis	Provides comprehensive imaging consultation at the expected level of a subspecialist
Comments:				Completed Level 1 Assessable

Patient Care 3: Pre-Procedural Consultation				
Level 1	Level 2	Level 3	Level 4	Level 5
Gathers a complete history and performs a physical	Gathers a focused history and performs a physical	Chooses appropriate pre- procedural laboratory and imaging studies	Adjusts procedural plan based upon pre- procedural laboratory and imaging results	Mentors other learners in the pre-procedural consultation
Formulates a pre- procedural assessment and plan with guidance from a faculty member	Formulates a pre- procedural assessment and plan with minimal guidance from a faculty member	Independently formulates a pre-procedural assessment and plan for common disorders	Independently formulates a pre-procedural assessment and plan for complex disorders	Develops patient care protocols/teaching materials
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 4: Performance of Procedures				
Level 1	Level 2	Level 3	Level 4	Level 5
Performs basic procedures (e.g., paracentesis, thoracentesis, nontargeted biopsy)	Performs advanced basic procedures (e.g., central venous access, targeted superficial biopsy)	Performs moderately complex procedures (e.g., nephrostomy, diagnostic angiography)	Performs complex procedures (e.g., transarterial chemoembolisation therapy [TACE], transjugular intrahepatic portosystemic shunt [TIPS], stent graft)	Develops new techniques or tools
Effectively uses basic image guidance (e.g., visualize needle tip with ultrasound)	Demonstrates basic catheter and wire skills	Integrates catheter and wire skills with imaging of complex anatomy	Integrates catheter and wire skills with advanced imaging guidance and device use	
Comments:				completed Level 1

Patient Care 5: Post-Procedural Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Manages routine post- procedural care with guidance	Manages post-procedural care with minimal guidance	Formulates and implements post-procedural imaging and clinical follow-up for patients after basic procedures	Formulates and implements post-procedural imaging and clinical follow-up for patients after complex procedures	Mentors other learners in post-procedural care and management of complications
Evaluates post- procedural complications	Manages minor post- procedural complications	Manages major post- procedural complications	Anticipates and mitigates post-procedural complications	Develops a clinical pathway or guideline for post-procedural care
Comments:  Not Yet Completed Level 1 Not Yet Assessable				

Medical Knowledge 1: Pathophysiology and Treatment				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology of common conditions	Demonstrates knowledge of pathophysiology and treatment of patients with common conditions	Demonstrates knowledge of pathophysiology and treatment of patients with complex conditions	Demonstrates knowledge of the pathophysiologic changes after treatment	Contributes to peer- reviewed literature on pathophysiology and/or treatment
Comments:				Completed Level 1 Assessable

Medical Knowledge 2: Procedural Anatomy					
Level 1	Level 2	Level 3	Level 4	Level 5	
Identifies normal anatomy during procedures	Identifies anatomic variants during procedures	Articulates the implications of varying anatomy for procedural planning	Identifies post-operative anatomy and its implications for procedures	Develops simulation models or other resources	
Comments:				Completed Level 1	

Medical Knowledge 3: Pharmacology					
Level 1	Level 2	Level 3	Level 4	Level 5	
Demonstrates basic knowledge of the pharmacologic agents used in interventional radiology	Demonstrates knowledge of dosing and drug choice for sedation and other commonly used pharmacologic agents	Demonstrates knowledge of the indications, contraindications, side- effects, and complications of pharmacologic agents	Applies functional knowledge of pharmacology to interventional radiology procedures and periprocedural care	Develops pharmacologic protocols or departmental guidelines	
Comments:			Not Vot C	Completed Level 1	
				ssessable	

Systems-Based Practice 1: Patient Safety				
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 patient 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 families (simulated or actual)	Discloses patient safety events to patients and families (simulated or actual)	Role models or mentors others in the disclosure of patient safety events
Comments:  Not Yet Completed Level 1				

Systems-Based Practice 2: Quality Improvement					
Level 1	Level 2	Level 3	Level 4	Level 5	
Demonstrates knowledge of basic quality improvement methodologies and metrics	Describes local quality improvement initiatives	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 Co	ompleted Level 1	

Systems-Based Practice 3: System Navigation for Patient-Centered Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of care coordination in radiology imaging/procedures	Coordinates care of patients in routine radiology imaging/ procedures effectively using the roles of the interprofessional teams	Coordinates care of patients in complex radiology imaging/ procedures effectively using the roles of the interprofessional teams	Role models effective coordination of patient- centered care among different disciplines and specialties	Analyses the process of care coordination and leads in the design and implementation of improvements
Performs safe and effective transitions of care/hand-offs in basic clinical situations	Performs safe and effective transitions of care/hand-offs in moderately complex clinical situations	Performs safe and effective transitions of care/hand-offs in complex clinical situations	Role models safe and effective transitions of care/hand-offs	Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes
Comments:  Not Yet Completed Level 1				

Systems-Based Practice 4: Multidisciplinary Conferences				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates basic knowledge of how a multidisciplinary conference operates	Attends multidisciplinary conferences	Contributes meaningfully to the multidisciplinary conference	Initiates and presents their own patients at multidisciplinary conference, and is responsible for comprehensive discussion	Leads a multidisciplinary conferences
Comments:			Not Yet C	ompleted Level 1

Systems-Based Practice 5: 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 and advocates for populations and communities with health care inequities
Comments:			Not Yet C	ompleted Level 1

Systems-Based Practice	6: Physician Role in Healtl	n Care Systems		
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies key components of the complex health care system	Describes how components of a complex health care system are interrelated, and how this impacts patient care	Discusses how individual practice affects the broader system	Manages various components of the complex health care system to provide efficient and effective patient care	Advocates for or leads systems change that enhances high-value, efficient, and effective patient care
Describes the mechanisms for reimbursement, including types of payers	States relative cost of common procedures	Describes the technical and professional components of imaging costs	Describes the radiology revenue cycle and measurements of productivity	Participates in health policy advocacy activities
Comments:			Not Yet C	ompleted Level 1

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  Uses fluoroscopy techniques that decrease exposure, with guidance	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 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

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

Level 1	Level 2	Level 3	Level 4	Level 5
Accepts responsibility for professional development by establishing goals	Receptive to performance data and feedback in order to inform goals	Episodically seeks performance data and feedback, with humility and adaptability	Consistently seeks performance data and feedback with humility and adaptability	Coaches other learners to consistently seek performance data and feedback
Identifies factors which contribute to gap(s) between expectations and actual performance	Analyzes and reflects on factors which contribute to gap(s) between expectations and actual performance	Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance	Analyzes effectiveness of behavioral changes where appropriate and considers alternatives in narrowing the gap(s) between expectations and actual performance	Coaches others on reflective practice
Actively seeks opportunities to improve performance	Designs and implements a learning plan, with prompting	Designs and implements a learning plan independently	Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it	Facilitates the design and implements learning plans for others

Professionalism 1: Profe	essional Behavior			
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of expectations for professional behavior and describes how to appropriately report professional lapses	Demonstrates insight into professional behavior in routine situations and takes responsibility for own professionalism lapses	Demonstrates professional behavior in complex or stressful situations and takes responsibility for own professionalism lapses	Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others	Coaches others 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, and stewardship of limited resources	Analyzes straightforward situations using ethical principles	Recognizes need to seek help in managing and resolving complex ethical situations	Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (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 their resolution

Professionalism 3: Acco	untability/Conscientiousne	ess		
Level 1	Level 2	Level 3	Level 4	Level 5
Responds promptly to requests or reminders to complete tasks and responsibilities	Performs tasks and responsibilities in a timely manner to ensure that the needs of patients, teams, and systems are met in routine situations	Performs tasks and responsibilities in a timely manner to ensure that the needs of patients, teams, and systems are met in complex or stressful situations	Recognizes and raises awareness of situations that may impact others' ability to complete tasks and responsibilities in a timely manner	Takes ownership of system outcomes
Comments:			Not Yet C	ompleted Level 1

Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes status of personal and professional well-being, with assistance, and is aware of available resources	Independently recognizes status of personal and professional well-being, and uses available resources when appropriate	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
Recognizes limits in the knowledge/skills of self or team	Independently recognizes limits in the knowledge/skills of self or team and demonstrates appropriate help-seeking behaviors	With assistance, proposes a plan to remediate or improve limits in the knowledge/ skills of self or team	Independently develops a plan to remediate or improve limits in the knowledge/skills of self or team	

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

Interpersonal and Comm	unication Skills 1: Patient-	and Family-Centered Com	munication	
Level 1	Level 2	Level 3	Level 4	Level 5
Uses language and nonverbal behavior to demonstrate respect and establish rapport	Establishes a therapeutic relationship in straightforward encounters using active listening and clear language	Establishes a therapeutic relationship in challenging patient encounters	Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity	Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships
Accurately communicates own role within the health care system	Identifies barriers to effective communication (e.g. language, health literacy, cultural, personal biases)	Identifies personal barriers that hinder effective communication	Actively minimizes communication barriers	Coaches other learners to minimize communication barriers
Organizes and initiates communication with patient/family by clarifying expectations and verifying understanding of the clinical situation	Adjusts communication strategies based on assessment of patient/family expectations and understanding	With guidance, sensitively and compassionately delivers medical information, elicits patient goals and preferences, and acknowledges uncertainty and conflict	Independently uses shared decision making to make a personalized care plan	Coaches other learners in patient/family communications and shared decision making
Comments:			Not Yet C	ompleted Level 1

Level 1	Level 2	Level 3	Level 4	Level 5
Respectfully requests or receives consultations	Clearly and concisely requests or responds to consultations	Checks understanding of recommendations when receiving or providing consultations	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
Uses language that values all members of the interventional team	Communicates information effectively with all interventional team members	Solicits feedback on performance as a member of the interventional team	Coordinates recommendations from different members of the interventional team to optimize patient care	Uses interventional team feedback and recommendations to facilitate quality improvement
Demonstrates knowledge of institutional and national communication guidelines	Communicates emergent findings and/or management options	Communicates non- emergent findings and/or management options where failure to act may adversely affect patient outcome	Independently manages real-time consultations which are tailored to the referring provider	Coaches other learners in tailored communications to referring providers

Level 1	Level 2	Level 3	Level 4	Level 5
Accurately records information in the patient record, safeguarding patient personal health information	Appropriately selects direct (e.g., telephone, inperson) and indirect (e.g., progress notes, text messages) forms of communication based on context	Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record	Achieves written or verbal communication (patient notes, email, etc.) that serves as an example for others to follow	Guides departmental or institutional communication around policies and procedures
Demonstrates knowledge of institutional communications policies	Communicates appropriately as required by institutional policy	Identifies issues in systems communications	Uses appropriate channels to offer clear and constructive suggestions to improve communication systems	Facilitates dialogue regarding systems issues among larger community stakeholders (institution, health care system, field)