

Interventional Cardiology Milestones

The Accreditation Council for Graduate Medical Education



Second Revision: December 2020 First Revision: October 2014

Interventional Cardiology Milestones

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 fellow in key dimensions of the elements of physician competence in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competency, nor are they designed to be relevant in any other context.

Interventional Cardiology Milestones Work Group

Vishal Arora, MD

Noel Cardenas, FACHE

Creighton Don, MD, PhD

Laura Edgar, CAE, EdD

Beau Hawkins, MD

Tarek Helmy, MD

Nkechinyere Ijioma, MBBS

Peter Monteleone, MD

James Tcheng, MD

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

American Board of Internal Medicine

Review Committee for Internal Medicine

Society for Cardiovascular Angiography and Interventions

Understanding Milestone Levels and Reporting

This document presents the Milestones, which programs use in a semi-annual review of fellow performance, and then report to the ACGME. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME Competencies organized in a developmental framework. The narrative descriptions are targets for resident/fellow performance throughout their educational program.

Milestones are arranged into levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert fellow in the specialty or subspecialty. For each reporting period, the Clinical Competency Committee will review the completed evaluations to select the milestone levels that best describe each learner's current performance, abilities, and attributes for each subcompetency.

These levels *do not* correspond with post-graduate year of education. Depending on previous experience, a junior fellow may achieve higher levels early in his/her educational program just as a senior fellow may be at a lower level later in his/her educational program. There is no predetermined timing for a resident to attain any particular level. Fellows may also regress in achievement of their milestones. This may happen for many reasons, such as over scoring in a previous review, a disjointed experience in a particular procedure, or a significant act by the fellow.

Selection of a level implies the fellow substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page 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 fellow whose achievements in a subcompetency are greater than the expectation. Milestones are primarily designed for formative, developmental purposes to support continuous quality improvement for individual learners, education programs, and the specialty. The ACGME and its partners will continue to evaluate and perform research on the Milestones to assess their impact and value.

Some milestone descriptions include statements about performing independently. These activities must occur in conformity to ACGME supervision guidelines as described in the Program Requirements, as well as to institutional and program policies. For example, a fellow who performs a procedure independently must, at a minimum, be supervised through oversight.

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

Supplemental Guides and other resources are available on the Milestones page of each specialty section of the ACGME website. On www.acgme.org, 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 subcompetency in the same format as the ACGME Report Worksheet. For each reporting period, a fellow's performance on the milestones for each subcompetency will be indicated by selecting the level of milestones that best describes that fellow's performance in relation to those milestones.

| Systems-Based Practice 1: Patient Safety and Quality Improvement | | | | | |
|---|---|--|--|---|---|
| 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 patient safety (simulated or | events | 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 of patient safe patients and (simulated or | ety events to families | Discloses patient safety events to patients and families (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes quality improvement initiatives at the institutional or departmental level | Participates in improvement the institution departmental | initiatives at al or | 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 Completed Level 1 | | | | | |
| | | 1 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. | | | between le in lower le demonstra | a response box on the evels indicates that mevels have been substated as well as some in the higher level(s) | ilestones antially |

| Patient Care 1: Pre-Procedural Care and Procedural Selection | | | | | | |
|--|---|--|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | | |
| Lists indications, risks, and benefits for straightforward procedures | With direct supervision, identifies the indications, risks, and benefits to individualized patient care | With guidance, selects procedures based on indications, risks, and benefits to individualized patient care | Independently selects procedures based on indications, risks, and benefits to individualized patient care | Demonstrates advanced decision making in complex clinical scenarios and procedural selection | | |
| Lists prerequisite diagnostic testing and optimal medical | With direct supervision, evaluates diagnostic testing and optimizes | With guidance, evaluates diagnostic testing and optimizes medical | Independently evaluates diagnostic testing and optimizes | Demonstrates advanced decision making in managing complex | | |
| management strategies | medical management | management | medical management | clinical scenarios | | |
| Comments: | Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | | |

| Patient Care 2: Technical Skills for Percutaneous Intervention | | | | | | |
|--|--|---|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | | |
| With direct supervision, performs straightforward procedures (e.g., angioplasty, stenting) | With guidance, performs straightforward procedures (e.g., invasive imaging, mechanical support) | Independently performs straightforward procedures (e.g., invasive imaging, mechanical support) | Independently performs complex procedures (e.g., atherectomy, bifurcation left main intervention) | Demonstrates superior technical skill in the most complex, high-risk procedures | | |
| With direct supervision, performs basic clinical management in straightforward situations | With guidance, demonstrates intra- procedural decision making, composure, and clinical and complication management in straightforward situations | Independently demonstrates intra- procedural decision making, composure, and clinical and complication management in straightforward situations | Independently demonstrates intra- procedural decision making, composure, and clinical and complication management in complex situations | Demonstrates advanced leadership in the complex catheterization laboratory environment | | |
| | | | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | | | |

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
|---|---|---|--|---|--|
| Evaluates for post- procedural issues | Manages straightforward care and issues | Manages complex care and issues | Anticipates issues and manages complex post-procedural care | Develops a clinical pathway or guideline for management of complex post-procedural issues | |
| With direct supervision, optimizes patient care in the outpatient setting | With guidance, optimizes straightforward care of patients in the outpatient setting | With guidance, optimizes complex care of patients in the outpatient setting | Independently optimizes patient care in the outpatient setting | Implements strategies for advancing multidisciplinary care | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |
| | | | Not Yet A | | |

Patient Care

| The fellow is der | nonstrating | satisfactory development of the knowledge, skill, and attitudes/behaviors needed to advance in the training | | | | | |
|-------------------|--|--|--|--|--|--|--|
| program. The fel | llow is dem | onstrating a learning trajectory that anticipates the achievement of competency for unsupervised practice that | | | | | |
| includes the deli | ncludes the delivery of safe, effective, patient-centered, timely, efficient, and fair care. | | | | | | |
| | | | | | | | |
| Yes | No | _Conditional on Improvement | | | | | |

| Medical Knowledge 1: Anatomy and Physiology | | | | | |
|---|---|---|---|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Identifies normal anatomy during procedures | Identifies anatomic variants during procedures | Identifies the implications of varying anatomy for procedural planning | Identifies therapeutic options targeted to complex anatomy | Demonstrates a command of medical knowledge regarding rare anatomic variants | |
| Demonstrates knowledge of pathophysiology of straightforward conditions | Demonstrates knowledge of pathophysiology of complex conditions | Demonstrates knowledge of pathophysiology and treatment of patients with straightforward conditions | Demonstrates knowledge of pathophysiology and treatment of patients with complex conditions | Contributes to peer- reviewed literature on pathophysiology and/or treatment | |
| | | | | | |
| Comments: | | | | completed Level 1 | |

| Medical Knowledge 2: Pharmacology | | | | | | |
|--|---|---|---|---|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | | |
| Demonstrates basic knowledge of pharmacologic agents | Demonstrates knowledge of selection and dosing of commonly used pharmacologic agents | Demonstrates knowledge of the indications, contraindications, side effects, and complications of pharmacologic agents | Integrates knowledge of pharmacology into procedures and peri- procedural care | Develops pharmacologic protocols or departmental guidelines | | |
| | | | | | | |
| Comments: | Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | | |

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
|--|--|--|---|--|--|
| Identifies commonly used devices | Demonstrates knowledge of commonly used devices, techniques, and outcomes | Demonstrates knowledge of the indications, contraindications, side effects, and complications of commonly used devices, techniques, and outcomes | Integrates knowledge of devices, techniques, and outcomes into procedures and peri- procedural care | Achieves a superior level of knowledge to effectively teach others about devices, techniques, and outcomes | |
| | | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | | |

includes the delivery of safe, effective, patient-centered, timely, efficient, and fair care.

| Systems-Based Practice 1: Patient Safety and Quality Improvement | | | | | |
|---|---|--|---|---|--|
| 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 | |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes quality improvement initiatives at the institutional or departmental level | Participates in quality improvement initiatives at the institutional or departmental level | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level | |
| | | | | | |
| Comments: | | | Not Yet C | ompleted Level 1 | |

| Systems-Based Practice 2: System Navigation for Patient-Centered Care | | | | | |
|---|---|---|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations, effectively using the roles of the interprofessional teams | Coordinates care of patients in complex clinical situations, effectively using the roles of the interprofessional teams | Role models effective coordination of patient-centered care among different disciplines and specialties | Analyzes the process of care coordination and leads in the design and implementation of improvements | |
| Identifies key elements for effective transitions of care | Performs effective transitions of care in routine clinical situations | Performs effective transitions of care in complex clinical situations | Role models and advocates for effective transitions of care within and across health care delivery systems | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes | |
| | Demonstrates general knowledge of barriers to adherence of care | Identifies barriers to adherence of care to specific populations | Adapts practice to address barriers to adherence of care | Leads innovations and advocates for populations with health care barriers | |
| | | | | | |
| Comments: | Comments: Not Yet Completed Level 1 | | | | |

| Systems-Based Practice 3: Physician Role in Health Care Systems | | | | | |
|--|---|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Identifies key components of the health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology) | 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 (e.g., length of stay, readmission rates, clinical efficiency) | Manages various components of the complex health care system to provide efficient and effective patient care and transition of care | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care | |
| Describes basic health payment systems, (e.g., government, private, public, uninsured care) and practice models | Delivers care with consideration of each patient's payment model (e.g., insurance type) | Engages with patients in shared decision making, informed by each patient's payment models | Advocates for patient care needs (e.g., community resources, patient assistance resources) with consideration of the limitations of each patient's payment model | Participates in health policy advocacy activities | |
| | Demonstrates essential skills for documentation required for independent practice (e.g., electronic health record, documentation required for billing and coding) | Seeks knowledge in non- clinical topics needed for independent practice (e.g., malpractice insurance, government regulation, compliance) | Applies knowledge in non-clinical topics needed for independent practice | Educates others in non- clinical topics to prepare them for independent practice | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

| Systems-Based | Practice |
|---------------|----------|
|---------------|----------|

| The fellow is dem | onstrating | satisfactory development of the knowledge, skill, and attitudes/behaviors needed to advance in the training |
|--------------------|-------------|--|
| program. The fello | ow is demo | onstrating a learning trajectory that anticipates the achievement of competency for unsupervised practice that |
| includes the deliv | ery of safe | , effective, patient-centered, timely, efficient, and fair care. |
| | • | |
| Yes | No | Conditional on Improvement |
| | - | • |

| Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice | | | | | |
|---|---|--|---|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Demonstrates how to access and use available evidence to manage a patient with cardiovascular disease | Articulates clinical questions and elicits patient preferences to guide evidence-based care | Locates and applies the best available evidence to the care of patients with cardiovascular disease while integrating patient preference | Critically appraises and applies available, potentially conflicting evidence to guide care of an individual patient | Develops initiatives to educate others to critically appraise and apply evidence for complex patients and/or participates in the development of guidelines | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

| Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth | | | | | |
|--|---|---|---|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Accepts responsibility for personal and professional development by establishing goals | Demonstrates openness to feedback and performance data in order to form goals | Occasionally seeks feedback and performance data with adaptability and humility | Systematically seeks feedback and performance data with adaptability and humility | Coaches others to seek feedback and performance data | |
| Acknowledges limits and gaps between expectations and performance; demonstrates self-awareness | Analyzes the factors which contribute to limits and gaps; demonstrates appropriate help-seeking behaviors | Creates and implements a learning plan | Uses performance data to assess learning plan and improves it when necessary | Facilitates the design and implementation of learning plans for others | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

Practice-Based Learning and Improvement

The fellow is demonstrating satisfactory development of the knowledge, skill, and attitudes/behaviors needed to advance in the training program. The fellow is demonstrating a learning trajectory that anticipates the achievement of competency for unsupervised practice that includes the delivery of safe, effective, patient-centered, timely, efficient, and fair care.

| | | - | | |
|------|-----|--------------|---------|---------------------|
| Yes | No | Conditional | on Im | nrovement |
| 1 00 | 110 | Contaitional | O11 111 | ipi o v oi i ioi it |

| Professionalism 1: Professional Behavior and Ethical Principles | | | | | |
|---|---|---|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Identifies and describes potential triggers for professionalism lapses | Demonstrates insight into professional behavior in routine situations | Demonstrates professional behavior in complex or stressful situations | Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others | Coaches others when their behavior fails to meet professional expectations | |
| Demonstrates knowledge of ethical principles (e.g., informed consent, advance directives, confidentiality, patient autonomy) | Applies knowledge of ethical principles to routine situations | Recognizes need to seek help in managing and resolving complex ethical situations | Uses appropriate resources for managing and resolving ethical dilemmas (e.g., ethics consultations, risk management) | Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

| Professionalism 2: Accountability/Conscientiousness | | | | |
|--|---|---|--|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Takes responsibility for failure to complete tasks and responsibilities, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future | Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations | Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations | Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner | Engages with the system to improve outcomes |
| Recognizes the principles of conflict of interest in relationships with industry and other entities | Recognizes personal potential conflicts with industry | Seeks assistance in managing personal relationships with industry and other entities to minimize bias and undue influence in practice | Identifies, discloses, and manages relationships with industry and other entities to minimize bias and undue influence in practice | |
| | | | | |
| Comments: Not Yet Completed Level 1 | | | | |

| Professionalism 3: Self-Awareness and Well-Being | | | | | |
|---|---|--|---|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Recognizes the importance of personal and professional well-being | Independently recognizes status of personal and professional well-being | With assistance, proposes a plan to optimize personal and professional well-being | Independently develops a plan to optimize personal and professional well-being | Participates in a system change to improve well-being in self and others | |
| | | | | | |
| Comments: | Comments: Not Yet Completed Level 1 | | | | |
| Professionalism The fellow is demonstrating satisfactory development of the knowledge, skill, and attitudes/behaviors needed to advance in the training program. The fellow is demonstrating a learning trajectory that anticipates the achievement of competency for unsupervised practice that includes the delivery of safe, effective, patient-centered, timely, efficient, and fair care. Yes No Conditional on Improvement | | | | | |

| Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication | | | | | |
|--|--|--|---|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Demonstrates respect and establishes rapport in patient encounters | Establishes a therapeutic relationship in routine patient encounters | Establishes a therapeutic relationship in challenging patient encounters, with guidance | Independently establishes a therapeutic relationship in challenging patient encounters | Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships | |
| Knows barriers to effective communication (e.g., language, disability, health literacy) | Identifies barriers to effective communication in patient encounters | Attempts to minimize communication barriers, including reflection on any biases | Proactively minimizes communication barriers and independently manages biases | Role models self- awareness to minimize communication barriers | |
| Identifies the need to adjust communication strategies to achieve shared decision making | Organizes and initiates communication with patient/family to facilitate shared decision making | Uses shared decision making to implement a personalized care plan, under guidance | Independently, uses shared decision making to implement a personalized care plan | Role models shared decision making | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

| Interpersonal and Communication Skills 2: Interprofessional and Team Communication | | | | |
|--|---|---|---|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Respectfully receives a consultation request | Respectfully and thoroughly completes consultations with effective documentation and communication in common cases, with direct supervision | Completes consultations with effective documentation and communication in common cases, with indirect supervision | Completes consultations with effective documentation and communication in complex cases | |
| Uses language that values all members of the health care team | Communicates information effectively with all health care team members | Adapts communication style to fit team needs | Coordinates recommendations from different members of the health care team to optimize patient care | Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed |
| | Participates in team- based discussions to optimize team performance | Initiates team-based discussions to optimize team performance | Facilitates team-based discussions to optimize team performance | Facilitates regular health care team-based feedback in complex situations |
| | | | | |
| Comments: Not Yet Completed Level 1 | | | | |

| Interpersonal and Communication Skills 3: Communication within Health Care Systems | | | | | |
|---|--|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Accurately records information in the patient record and safeguards patient personal health information | Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record Identifies appropriate communication channels (e.g., cell phone/ pager usage, medical record, email) as required by | Concisely reports diagnostic and therapeutic reasoning in the patient record Respectfully communicates concerns about the system | Independently communicates timely information in a written format and verbally when appropriate Uses appropriate channels to offer clear and constructive suggestions to improve the system | Models written communication to improve others' performance Guides departmental or institutional communication around policies and procedures | |
| | institutional policy | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

Interpersonal and Communication Skills

The fellow is demonstrating satisfactory development of the knowledge, skill, and attitudes/behaviors needed to advance in the training program. The fellow is demonstrating a learning trajectory that anticipates the achievement of competency for unsupervised practice that includes the delivery of safe, effective, patient-centered, timely, efficient, and fair care.

| | | - | | |
|------|-----|--------------|---------|---------------------|
| Yes | No | Conditional | on Im | nrovement |
| 1 00 | 110 | Contaitional | O11 111 | ipi o v oi i ioi it |

Overall Clinical Competence

| This rating represents the assessment of the fellow's development of overall clinical competence during this year of training: | |
|--|--|
| | Superior: Far exceeds the expected level of development for this year of training |
| | _Satisfactory: Always meets and occasionally exceeds the expected level of development for this year of training |
| | Conditional on Improvement: Meets some developmental milestones but occasionally falls short of the expected level of development for this year of training. An improvement plan is in place to facilitate achievement of competence appropriate to the level of training. |
| | Unsatisfactory: Consistently falls short of the expected level of development for this year of training. |