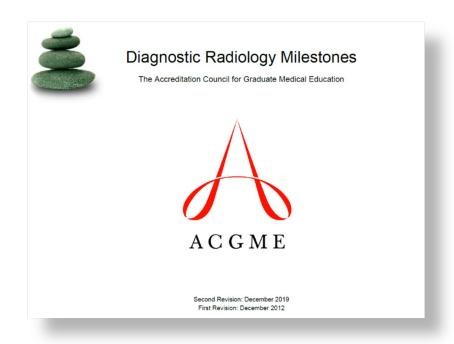
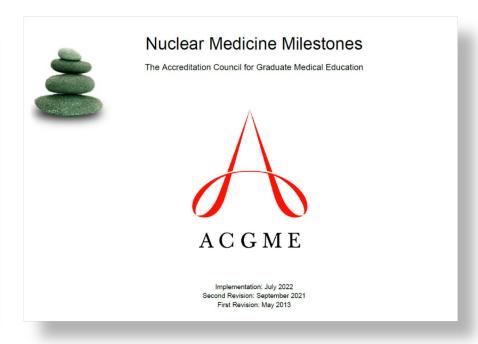
Diagnostic Radiology and Nuclear Medicine (combined) programs must annually report on **each** set of Milestones.







Diagnostic Radiology Milestones

The Accreditation Council for Graduate Medical Education



Second Revision: December 2019 First Revision: December 2012

Diagnostic Radiology 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 residents 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.

Diagnostic Radiology Milestones

Work Group

James Anderson, MD Marco Molina, MD

Kamran Ali, MD Seng Ong, MBBS

Amy Bourgeois, Med Anne Roberts, MD

Lori Deitte, MD Rocky Saenz, DO

Laura Edgar, EdD, CAE Mary Scanlon, MD, FACR

Meaghan Magarik, MD, PhD Ely Wolin, 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 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.

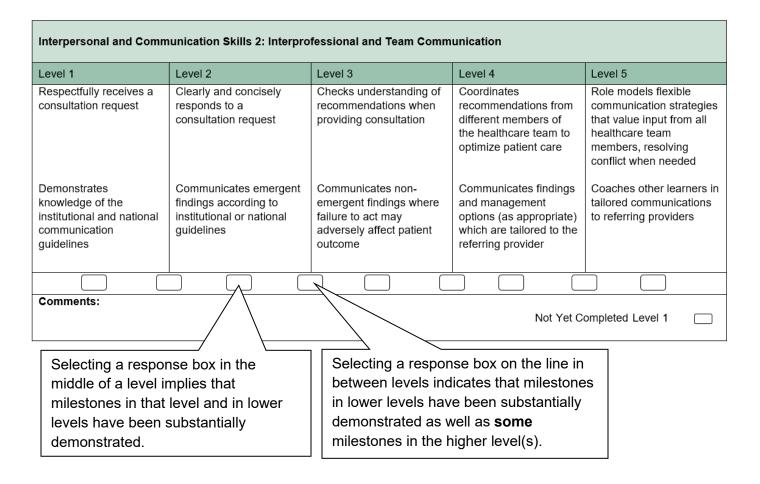
Examples are provided for some milestones within this document. Please note: the examples are not the required element or outcome; they are provided as a way to share the intent of the element.

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



| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--|---|---|--|---|
| Generates reports with appropriate elements for coding | Efficiently generates clear and concise reports which do not require substantive correction | Efficiently generates clear and concise reports which rarely require correction | Generates tailored reports meeting the needs of the care provider | Generates tailored reports meeting subspecialty needs |
| Describes lexicons and structured reporting | Uses lexicons and structured reporting that do not require substantive correction | Uses lexicons and structured reporting which rarely require correction | Proficiently uses lexicons and structured reporting to provide accurate and timely reports which do not require correction | |
| | | | | |

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

2

| Patient Care 3: Image | Interpretation | | | |
|-------------------------------------|--|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Identifies primary imaging findings | Identifies secondary and critical imaging findings and formulates differential diagnoses | Prioritizes differential diagnoses and recommends management options | Provides a single diagnosis with integration of current guidelines to recommend management, when appropriate | Demonstrates expertise and efficiency at a level expected of a subspecialist |
| | | | | |
| Comments: | | | | Completed Level 1 |

| Patient Care 4: Compete | nce in Procedures | | | |
|---|--|--|--|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Discusses the indications for and assists with procedures | Performs procedures, with direct supervision | Competently performs procedures, with indirect supervision | Proficiently and independently performs procedures as expected of a general radiologist | Proficiently and independently performs procedures expected of a subspecialist |
| Discusses potential procedural complications | Recognizes complications of procedures and enlists help | Manages complications of procedures, with supervision | Anticipates and independently manages complications of procedures performed by a general radiologist | Proficiently and independently manages complications of procedures performed by a subspecialist |
| | | | | |
| Comments: | | | | ompleted Level 1 |

| Medical Knowledge 1: D | iagnostic Knowledge | | | |
|---|---|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of imaging anatomy | Applies knowledge of anatomy to make common imaging diagnoses | Applies knowledge of anatomy to make uncommon imaging diagnoses | Proficiently integrates knowledge of anatomic | Proficiently integrates knowledge of anatomic |
| Demonstrates knowledge of pathophysiology of disease processes | Applies knowledge of pathophysiology to make common imaging diagnoses | Applies knowledge of pathophysiology to make uncommon imaging diagnoses | and molecular imaging with pathophysiology to formulate a diagnosis | and molecular imaging with pathophysiology to formulate a diagnosis at the expected level of a subspecialist |
| Demonstrates knowledge of cellular and molecular systems | Applies knowledge of cellular and molecular systems to make common imaging diagnoses | Applies knowledge of cellular and molecular systems to make uncommon imaging diagnoses | | |
| | | | | |
| Comments: | | | | Completed Level 1 |

| Medical Knowledge 2: F | Physics | | | |
|--|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Discusses the basic physics for diagnostic radiology | Demonstrates knowledge of basic medical physics and radiobiology in diagnostic radiology | Applies knowledge of basic medical physics and radiobiology to imaging | Applies physical principles to optimize image quality, including dose reduction strategies | Teaches physical principles to optimize image quality to other specialties |
| | | | | |
| Comments: | | | Not Yet C Not Yet As | ompleted Level 1 |

| Medical Knowledge 3: Pr | rotocol Selection and Conti | rast Agent Selection/Dosin | g | |
|---|--|---|--|----------------------------|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Discusses the protocols and contrast agent/dose for imaging | Selects appropriate protocols and contrast agent/dose for emergent and routine imaging | Selects appropriate protocols and contrast agent/dose for complex imaging | Modifies protocols and contrast agent/dose as determined by clinical circumstances | Develops imaging protocols |
| | | | | |
| Comments: | | | Not Yet C Not Yet A | ompleted Level 1 |

| Medical Knowledge 4: In | maging Technology and Ima | ge Acquisition | | |
|--|--|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Discusses imaging technology and image acquisition | Demonstrates knowledge of basic image acquisition and image processing, and recognizes common imaging artifacts and technical problems | Demonstrates knowledge of instrument quality control and image reconstruction and troubleshoots for artifact reduction | Proficiently optimizes image acquisition and processing in collaboration with the technology/imaging team | Presents or publishes research on imaging technology |
| | | | | |
| Comments: | | | Not Yet C Not Yet A | ompleted Level 1 |

| 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 |
| | | | | |

| Systems-Based Practice | e 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 C | ompleted Level 1 |

| 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 interprofessional teams | Coordinates care of patients in complex radiology imaging/procedures effectively using the roles of 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 safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine 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 to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for their local population | Identifies local resources available to meet the needs of a patient population and community | Participates in adapting the practice to provide for the needs of specific populations (actual or simulated) | Leads innovations and advocates for populations and communities with health care inequities |
| | | | | |

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex healthcare system (e.g., hospital, finance, personnel, technology) | Describes how components of a complex health care system are inter-related, 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 the mechanisms for reimbursement, including types of payors | States relative cost of common procedures | Describes the technical and professional components of imaging costs | Describes the radiology revenue cycle and measurements of productivity (e.g., relative value units) | Participates in health policy advocacy activities |
| | | | | |

| Systems-Based Practice 5: Contrast Agent Safety | | | | |
|--|---|--|--|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of contrast reactions | Recognizes contrast reactions (simulated or actual) | Manages contrast reactions, with supervision (simulated or actual) | Independently manages contrast reactions (simulated or actual) | Leads educational experience in simulation laboratory for contrast reaction |
| | | | | |
| Comments: | | | Not Yet C | ompleted Level 1 |

| Systems-Based Practice 6: Radiation Safety | | | | | |
|--|--|---|---|---|--|
| 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 | Accesses resources to determine exam-specific average radiation dose information | Communicates the relative risk of examspecific radiation exposure to patients and practitioners | Applies principles of ALARA in daily practice | Creates, implements, and assesses radiation safety initiatives at the institutional level | |
| | | | | | |
| Comments: | Comments: Not Yet Completed Level 1 | | | | |

| Systems-Based Practice 7: Magnetic Resonance (MR) Safety | | | | | |
|--|---|---|---|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Demonstrates knowledge of the risks of magnetic resonance imaging (MRI), including safety zones and pre-MR screening | Accesses resources to determine the safety of implanted devices and retained foreign bodies | Communicates MR safety, including implants and retained foreign bodies, to patients and practitioners | Applies principles of MR safety to daily practice | Creates, implements, and assesses MR safety initiatives at the institutional level | |
| | | | | | |
| Comments: | | | Not Yet C | ompleted Level 1 | |

| Systems-Based Practice 8: Informatics | | | | | |
|---|--|---|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Demonstrates familiarity with information systems, including EHR, radiology information system, and picture archiving system | Demonstrates familiarity with information standards in radiology, and describes their roles | Describes approaches to capture and integrate data from radiology examinations into medical decision making | Applies knowledge of information systems, standards, and data to support radiology initiatives, as appropriate | Participates in operational and strategic information systems meetings; applies informatics knowledge to help guide direction and operation of the radiology department | |
| | | | | | |
| Comments: | Comments: Not Yet Completed Level 1 | | | | |

| 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 determine the best imaging examination for a routine patient/diagnosis | Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based imaging | Locates and applies the best available evidence, integrated with patient preferences and values, to the care of complex patients | Critically appraises conflicting evidence to guide care, tailored to the individual patient | Coaches others to critically appraise and apply evidence for complex patients; and/or participates in the development of guidelines | |
| | | | | | |
| Comments: | Comments: Not Yet Completed Level 1 | | | | |

All rights reserved except the copyright owners grant third parties the right to use the Diagnostic Radiology Milestones on a non-exclusive basis for educational purposes.

| 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 adjust 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 |
| | | | | |

| 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 | 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 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 2: Accountability/Conscientiousness | | | | |
|---|---|--|--|------------------------------------|
| 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 using 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, with assistance | 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 | |
| | | | | |

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--|--|---|--|---|
| Accurately communicates own role within the health care system | Identifies barriers to effective communication (e.g., language, health literacy, cultural) | Identifies biases that hinder effective communication | Actively minimizes communication barriers | Coaches other learners to minimize communication barriers |
| Identifies the need to adjust communication strategies based on assessment of patient/family expectations and understanding of their health status and treatment options | Organizes and initiates communication with patient/family by clarifying expectations and verifying understanding of the clinical situation | With guidance, sensitively and compassionately delivers medical information, elicits patient goals and preferences, and acknowledges uncertainty and conflict | Independently, uses shared decision making to align patient goals, and preferences with treatment options to make a personalized care plan | Coaches other learners in shared decision making |
| | | | | |

| Interpersonal and Communication Skills 2: Interprofessional and Team Communication | | | | | |
|--|--|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Respectfully receives a consultation request | Clearly and concisely responds to a consultation request | Checks understanding of recommendations when providing consultation | 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 | |
| Demonstrates knowledge of the institutional and national communication guidelines | Communicates emergent findings according to institutional or national guidelines | Communicates non- emergent findings where failure to act may adversely affect patient outcome | Communicates findings and management options (as appropriate) which are tailored to the referring provider | Coaches other learners in tailored communications to referring providers | |
| | | | | | |
| 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 |
| Demonstrates knowledge of institutional communications policies | Communicates appropriately as required by institutional policy | Communicates systems concerns in a respectful manner | Communicates clear and constructive suggestions to improve systems | Facilitates dialogue regarding systems issues among larger community stakeholders (institution, health care system, field) |
| | | | | |
| Comments: | | | Not Yet C | ompleted Level 1 |



Nuclear Medicine Milestones

The Accreditation Council for Graduate Medical Education



Implementation: July 2022 Second Revision: September 2021 First Revision: May 2013

Nuclear Medicine 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 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.

Nuclear Medicine Milestones Work Group

Yaser Baghdadi, MD, MSc

Jon Baldwin, DO

Bruce Barron, MD

Patrick Colletti, MD

Laura Edgar, EdD, CAE

Mary Beth Farrell, MD

Leonie Gordon, MD

Hyewon Hyun, MD

Thomas Ng, MD, PhD

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

American Board of Nuclear Medicine

Review Committee for Nuclear Medicine

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 vi).

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 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 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.

| Patient Care 1: Diagnostic Planar, SPECT, and PET Imaging: Patient Evaluation, Procedure Selection, Monitoring, and Interpretation | | | | | |
|---|---|---------|--|---|---|
| Level 1 | Level 2 | Level | 3 | Level 4 | Level 5 |
| Performs patient focused assessment and discusses routine nuclear medicine procedures, common indications, and contraindications | Proposes procedure, patient preparation, based on exam request and patient information | routine | s procedures for cases and es protocols, as d | Selects procedures for complex cases and modifies protocols, as needed | Develops or revises protocol(s) for nuclear medicine procedures |
| Recognizes normal physiologic distribution of FDA approved radiopharmaceuticals | Identifies abnormalities in the physiologic distribution and forms a preliminary impression in the context of patient history | and ac | ses completion of curately interprets lures done for plicated cases | Assesses completion of and accurately interprets procedures done for complex or less common cases | Manages the nuclear medicine clinic and acts as a consultant in an interdisciplinary conference |
| | | | | | |
| Comments: | | | | Not Yet C | completed 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. | | | between levels in lower levels demonstrated | sponse box on the lines indicates that miles have been substantias well as some the higher level(s). | tones |

| Patient Care 1: Diagnostic Planar, SPECT, and PET Imaging: Patient Evaluation, Procedure Selection, Monitoring, and Interpretation | | | | |
|--|---|--|---|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Performs patient-focused assessment and discusses routine nuclear medicine procedures, common indications, and contraindications | Proposes procedure and patient preparation based on exam request and patient information | Selects procedures for routine cases and modifies protocols, as needed | Selects procedures for complex cases and modifies protocols, as needed | Develops or revises protocol(s) for nuclear medicine procedures |
| Recognizes normal physiologic distribution of FDA-approved radiopharmaceuticals | Identifies abnormalities in the physiologic distribution and forms a preliminary impression in the context of a patient's history | Assesses completion of and accurately interprets procedures done for uncomplicated cases | Assesses completion of and accurately interprets procedures done for complex or less common cases | Manages the nuclear medicine clinic and acts as a consultant in an interdisciplinary conference |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Patient Care 2: Cardiovascular Nuclear Medicine-Stress Testing: Patient Evaluation and Procedure Monitoring | | | | | |
|---|--|---|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Performs targeted patient evaluation for a range of cardiac stress protocols | Interprets electrocardiogram and monitors stress procedure, and applies criteria for procedure completion or termination | Recognizes and manages common procedure complications and contraindications | Recognizes and manages complex or less common procedure complications | Manages the nuclear cardiology clinic and acts as a consultant in an interdisciplinary conference | |
| | | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | | |

| Patient Care 3: Theranostics: Radioiodine for Benign Thyroid Disease – Patient Evaluation, Procedure Selection, Procedure Performance, and Follow-Up | | | | |
|---|--|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Performs initial patient evaluation and discusses patient preparation, indications, contraindications, guidelines, and radiation safety precautions | Analyzes relevant patient information and confirms patient preparation, pertinent imaging, and therapeutic procedure setup and technique | Formulates the therapeutic plan, performs the procedure, and recommends follow-up strategies for routine clinical situations | Formulates the therapeutic plan, performs the procedure, and recommends follow-up strategies for complicated or less common situations | Acts as an expert consultant for radioiodine theranostics for benign thyroid disease |
| | | | | |
| Comments: | | | | ompleted Level 1 |

| Patient Care 4: Theranostics: Radioiodine for Thyroid Malignancy – Patient Evaluation, Procedure Selection, Procedure Performance, and Follow-Up | | | | |
|--|---|--|--|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Performs initial patient evaluation and discusses patient preparation, indications, contraindications, and radiation safety precautions | Analyzes relevant patient information and confirms patient preparation, pertinent imaging, and therapeutic procedure set-up and technique | Formulates the therapeutic plan, performs the procedure, and recommends follow-up strategies for routine clinical situations | Formulates the therapeutic plan, performs the procedure, and recommends follow-up strategies for complicated or less common situations | Acts as an expert consultant for radioiodine theranostics for thyroid malignancies and acts as a consultant for multidisciplinary conferences |
| | | | | |
| Comments: | | | | ompleted Level 1 ssessable |

| Patient Care 5: Theranos | tics: Parenteral – Patient E | valuation, Procedure Selec | ction, Procedure Performa | ance, and Follow-Up |
|---|--|--|---|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Performs initial patient evaluation and discusses patient preparation, indications, contraindications, and radiation safety precautions | Analyzes relevant patient information and confirms patient preparation, pertinent imaging, therapeutic procedure set-up and technique, and regulatory compliance | Formulates the therapeutic plan, performs the procedure, and recommends follow-up strategies for uncomplicated clinical situations | Formulates the therapeutic plan, performs the procedure, and recommends follow-up strategies for complicated or less common clinical situations | Acts as an expert consultant for parenteral theranostics and acts as a consultant for multidisciplinary conferences |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Medical Knowledge 1: Physiology and Pathophysiology | | | | |
|---|--|---|--|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Describes basic physiology and pathophysiology of common diseases | Identifies physiologic basis for patient preparation and adjunct pharmacologic interventions | Explains imaging findings of common diseases based on knowledge of physiology and pathophysiology | Explains imaging findings of complex and less common diseases based on knowledge of physiology and pathophysiology | Applies knowledge of physiology and pathophysiology to perform meaningful nuclear medicine research, assess and revise (as needed) department protocols for imaging or therapy, or critically assess research in the medical literature |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Medical Knowledge 2: Anatomic Imaging | | | | |
|--|---|---|---|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of basic normal anatomy for imaging | Demonstrates knowledge of normal cross-sectional anatomy, common anatomic variants, and commonly encountered abnormalities | Applies knowledge of anatomy to correlative, functional, and hybrid imaging | Demonstrates knowledge of less common anatomic variants, less common abnormalities, and critical findings | Teaches anatomic imaging to junior residents, medical students, and technologists |
| Demonstrates knowledge of anatomy depicted on commonly obtained imaging views | Obtains common imaging views to depict desired anatomy | Directs technical staff members to obtain common imaging views to depict desired anatomy | Directs technical staff members to acquire images to depict less common anatomical views | Modifies protocols as needed to depict desired anatomy and function |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Medical Knowledge 3: Instrumentation | | | | | |
|--|--|---|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Describes basic image acquisition and image processing | Recognizes common imaging artifacts and technical problems | Demonstrates knowledge of instrument quality control and recognizes unusual and rare artifacts and technique problems | Works with technologist to optimize image acquisition and processing | Modifies institutional protocols, including instrumentation and image acquisition | |
| | | | | | |
| Comments: | | | Not Yet C Not Yet A | ompleted Level 1 | |

| Medical Knowledge 4: Radiopharmaceuticals and Molecular Agents | | | | |
|--|---|---|--|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of common radiopharmaceutical properties | Demonstrates knowledge of common radiopharmacy operations and routine quality control | Demonstrates knowledge of less common radiopharmaceutical properties | Demonstrates knowledge of recently approved radiopharmaceuticals and other molecular agents | Demonstrates knowledge of emerging radiopharmaceuticals that are near Food and Drug Administration (FDA) approval |
| Demonstrates knowledge of appropriate use and normal distribution of common radiopharmaceuticals | Demonstrates knowledge of pathology for common imaging procedures | Demonstrates knowledge of appropriate use, abnormal distribution, and pathology of less common radiopharmaceuticals | Demonstrates knowledge of appropriate use, abnormal distribution, and pathology for recently approved imaging procedures | Conducts research on emerging radiopharmaceuticals |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Medical Knowledge 5: Medical Physics, Mathematics, and Radiation Biology | | | | |
|---|---|--|---|---|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Understands the concepts underlying medical physics pertinent to nuclear medicine | Applies basic medical physics and mathematical principles in clinical nuclear medicine practice | Applies advanced medical physics and mathematical principles in clinical nuclear medicine practice | Functions and converses with the department's medical physicist staff at an advanced level | Serves as an expert on the radiation safety committee |
| Recognizes the importance of radiation/cancer biology in nuclear medicine | Discusses the basic concepts of radiation biology as pertains to nuclear medicine | Applies advanced concepts in radiation biology to clinical nuclear medicine practice | Serves as an expert consultant with both patients and other medical staff members on matters of radiation treatment | |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Systems-Based Practice | e 1: Patient Safety and Qual | ity 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 radiation safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient radiation safety events to patients and their families (simulated or actual) | Discloses patient radiation safety events to patients and their families (simulated or actual) | Role models or mentors others in the disclosure of patient radiation safety events |
| 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 Completed 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 in nuclear medicine imaging and therapies | Coordinates care of patients in routine nuclear medicine imaging and therapies, effectively utilizing the roles of the interprofessional team members | Coordinates care of patients in complex nuclear medicine imaging and therapies, effectively utilizing the roles of the interprofessional team members | 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 safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems, including outpatient settings | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for the 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 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 complex health care system (e.g., hospital, finance, personnel, technology) | Describes how components of a complex health care system are interrelated and impact 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 model | 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 |
| | | | | |
| Comments: Not Yet Completed Level 1 | | | | |

| Systems-Based Practice 4: Radiation Protection, Patient Safety, and Procedural Safety | | | | |
|--|--|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of basic radiation protection concepts and basic procedural safety in nuclear medicine | Demonstrates knowledge of radiation protection concepts in nuclear medicine and correlative imaging | Consistently practices ALARA (as low as reasonably achievable) principle for patients, patients' families, staff members, and the public | Models excellent understanding of radiation protection and/or procedural safety | Participates in Radiation Safety Committee meetings and/or independently manages radiation safety events |
| Demonstrates knowledge of universal precautions, including hand washing and sterile injection technique | Demonstrates knowledge of appropriate use of "time-out" procedure, and how to ensure the right patient has the right study or therapy at the right time in the right setting | Demonstrates knowledge of more complex concepts of procedural safety and contraindications | Demonstrates knowledge of prevention and management of procedural complications for nuclear medicine and correlative imaging studies | Implements new safety procedures and quality control measures impacting patient care |
| | | | | |
| Comments: Not Yet Completed Level 1 Not Yet Assessable | | | | |

| Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice | | | | | |
|---|--|---|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| With assistance, accesses available evidence and practice guidelines for patient care | Independently identifies available evidence and practice guidelines for patient care | Critically appraises evidence and applies to patient care | Applies best available evidence, even in the face of insufficient and/or conflicting information | Coaches others and serves as a role model to apply evidence to patient care 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 |
| Identifies gaps in knowledge and performance | Reflects on the factors that contribute to gaps between expectations and actual performance | Institutes changes to narrow the gaps between expectations and actual performance | Intentionally seeks performance data to narrow the gaps between expectations and actual performance | Role models reflective practice |
| Actively seeks opportunities to improve | Designs and implements a learning plan, with assistance | Independently creates and implements a learning plan | Measures the effectiveness of the learning plan and makes appropriate changes | Facilitates the design and implementation of learning plans for others |
| | | | | |
| Comments: | | | Not Yet C | ompleted Level 1 |

| Professionalism 1: Professional Behavior and Ethical Principles | | | | |
|---|--|--|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Demonstrates knowledge of common ethical principles and potential triggers for professionalism lapses | Analyzes straightforward situations using ethical principles | Manages and resolves complex ethical situations, including personal lapses, with assistance | Intervenes and uses appropriate resources to prevent and manage professionalism lapses and dilemmas in oneself and others | Coaches others when their behavior fails to meet professional expectations |
| Describes when and how to appropriately report professionalism lapses | Recognizes and takes responsibility for one's own professionalism lapses | | | |
| | | | | |
| 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 | Performs tasks in a timely manner or provides notification when unable to complete tasks | Performs tasks in a timely manner with appropriate attention to detail in complex or stressful situations | Takes responsibility in situations that impact the ability of team members to complete tasks and responsibilities in a timely manner | Coaches others in taking responsibility for administrative and clinical care duties | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

| Professionalism 3: Well-Being and Help-Seeking | | | | | |
|---|--|--|---|--|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| Recognizes status of personal and professional well-being, as well as the limits of such knowledge, with assistance | Independently recognizes status of personal and professional well-being, as well as the limits of such knowledge | 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 and role models the continual ability to monitor and address personal and professional well-being | |
| | | | | | |
| Comments: Not Yet Completed Level 1 | | | | | |

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

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|--|--|
| Identifies common barriers to effective communication | Identifies complex barriers to effective communication | Reflects on personal biases while attempting to minimize communication barriers | Proactively improves communication by addressing barriers, including patient and personal bias | Role models communication that addresses barriers |
| Recognizes the need to adjust communication strategies based on context | Verifies patient's/patient's family's understanding of the clinical situation to optimize effective communication | With guidance, uses shared decision making to align the patient's/patient's family's values, goals, and preferences with treatment options to make a personalized care plan | Independently uses shared decision making to make a personalized care plan | Role models shared decision making in patient/patient's family communication, including in situations with a high degree of uncertainty/conflict |
| Learns to obtain informed consent | Obtains informed consent for routine procedures | Obtains informed consent for complex procedures | Teaches junior residents how to obtain informed consent in common clinical and research situations | Addresses informed consent in complex clinical and research situations |
| | | | | |

| Interpersonal and Communication Skills 2: Interprofessional and Team Communication | | | | |
|--|--|--|---|--|
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Uses respectful communication (verbal and non-verbal) with all members of the health care team | Communicates effectively with all health care team members | Adapts communication style within and across heath care teams to ensure mutual understanding | 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 |
| Demonstrates openness to feedback | Is responsive to feedback | Seeks and provides performance feedback | Uses feedback to improve one's own performance and provides actionable feedback to team members | Role models giving and receiving of feedback |
| | | | | |
| 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 | Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record | Concisely reports diagnostic and therapeutic reasoning in the patient record | Communicates clearly, concisely, timely, and in an organized written form, including anticipatory guidance | Role models optimal documentation |
| Safeguards patients' personal health information in communications | Appropriately selects forms of communication based on context | Includes key stakeholders in all communications | Produces written or verbal communication that serves as an example for others to follow | Guides departmental or institutional communication around policies and procedures |
| Comments: Not Yet Completed Level 1 | | | | |