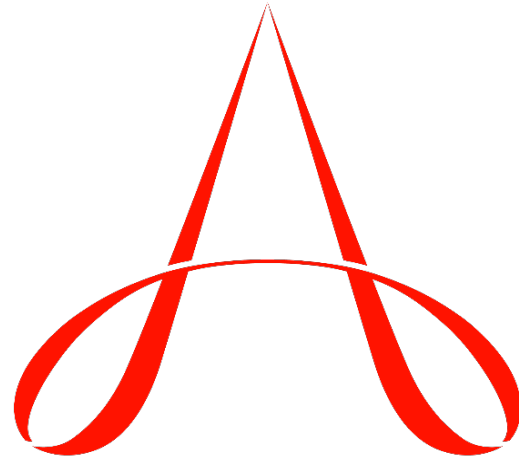




Musculoskeletal Oncology Milestones

The Accreditation Council for Graduate Medical Education



ACGME

Implementation: July 2022
Second Revision: November 2021
First Revision: July 2015

Musculoskeletal Oncology 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 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.

Musculoskeletal Oncology Milestones

Working Group

Joseph Benevenia, MD

Laura Edgar, EdD, CAE

Matthew T. Houdek, MD

Valerae O. Lewis, MD

Corey Montgomery, MD

Andre Spiguel, MD

H. Thomas Temple, MD

Kristy Weber, MD

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

American Board of Orthopaedic Surgery

ACGME Review Committee for Orthopaedic Surgery

Understanding Milestone Levels and Reporting

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

Selection of a level implies the resident/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 resident/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.

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.

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

Medical Knowledge 2: Clinical Research				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes the basics of clinical study design and levels of evidence	Understands the different phases of oncologic clinical research	Demonstrates general knowledge of clinical research design, including Institutional Review Board process	Disseminates scholarly activity through publication or presentation	Designs and develops a clinical trial
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="float: right;"> Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/> </div>				

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 box on the line in between levels indicates that milestones in lower levels have been substantially demonstrated as well as **some** milestones in the higher level(s).

Patient Care 1: Metastatic Bone Lesion				
Level 1	Level 2	Level 3	Level 4	Level 5
Independently develops a simple surgical plan	Independently develops a surgical plan for routine procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications, and coordinates treatment with other specialties	Independently plans complex procedures, including management of peri-operative complications	
Performs surgical approach, with minimal assistance	Performs prophylactic procedures (e.g., prophylactic fixation)	Independently performs routine procedures (e.g., intramedullary nail, plate and cement for pathologic fracture)	Independently performs complex procedures (e.g., endoprosthesis for pathologic fracture)	Independently performs rare procedures (e.g., acetabular)
Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	Develops a plan and implements treatment of complex complications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
				Not Yet Completed Level 1 <input type="checkbox"/>
				Not Yet Assessable <input type="checkbox"/>

Patient Care 2: Benign and Malignant Bone Lesion				
Level 1	Level 2	Level 3	Level 4	Level 5
Independently develops a simple surgical plan	Independently develops a surgical plan for routine procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans complex procedures, including management of peri-operative complications	
Performs a bone biopsy	Performs curettage for benign lesions (e.g., distal femur)	Independently performs routine procedures on bone lesions (e.g., surgical management of intramedullary tumors, reconstruction of a non-aggressive tumor)	Independently performs procedures on complex bone lesions (e.g., acetabular or sacral benign lesion, resection and reconstruction of a distal femur, proximal humerus resections, pediatric tumors, higher level amputations) and coordinates care with the multidisciplinary team	Independently performs rare procedures (e.g., pelvic resection (internal and external hemipelvectomies), sacral tumor resection, forequarter amputation, Tikhoff-Linberg procedures, rotationplasty)
Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	Develops a plan and implements treatment of complex complications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Completed Level 1 <input type="checkbox"/>
				Not Yet Assessable <input type="checkbox"/>

Patient Care 3: Benign and Malignant Soft Tissue Tumor				
Level 1	Level 2	Level 3	Level 4	Level 5
Independently develops a simple surgical plan	Independently develops a surgical plan for routine procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans complex procedures, including management of peri-operative complications	
Performs a soft tissue biopsy	Performs excision of superficial benign soft tissue tumors (e.g., subcutaneous lipoma, Schwannoma excision)	Independently performs routine procedures on deep benign soft tissue tumors (e.g., intermuscular lipoma, atypical lipomatous tumors) and superficial sarcomas	Independently performs procedures on complex soft tissue tumors (e.g., deep soft tissue sarcoma, pediatric soft tissue sarcomas) and coordinates care with the multidisciplinary team	Independently performs rare procedures (e.g., proximal thigh with vascular reconstruction, combined reconstruction, pelvic soft tissue sarcoma)
Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	Develops a plan and implements treatment of complex complications	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Completed Level 1 <input type="checkbox"/> Not Yet Assessable <input type="checkbox"/>

Medical Knowledge 1: Anatomy, Pathophysiology, and Therapeutics				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology and complications of common musculoskeletal conditions	Demonstrates knowledge of pathophysiology and complications of complex musculoskeletal conditions	Synthesizes and applies knowledge of pathophysiology, non-surgical treatments, and complications of complex musculoskeletal conditions	Serves as a resource for knowledge of pathophysiology, non-surgical treatments, and complications of complex musculoskeletal conditions	Advances knowledge of pathophysiology, non-surgical treatments, and complications of complex musculoskeletal conditions
Synthesizes and prioritizes differential diagnoses for common musculoskeletal conditions, with indirect supervision	Synthesizes and prioritizes differential diagnoses for common musculoskeletal conditions	Independently synthesizes and prioritizes differential diagnoses for complex musculoskeletal conditions	Synthesizes and prioritizes differential diagnoses and anticipates potential complications for complex musculoskeletal conditions	Is recognized by peers as an expert in synthesizing and prioritizing differential diagnoses for complex musculoskeletal conditions and anticipating potential complications
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
				Not Yet Completed Level 1 <input type="checkbox"/>
				Not Yet Assessable <input type="checkbox"/>

Medical Knowledge 2: Clinical Research				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes the basics of clinical study design and levels of evidence	Understands the different phases of oncologic clinical research	Demonstrates general knowledge of clinical research design, including Institutional Review Board process	Disseminates scholarly activity through publication or presentation	Designs and develops a clinical trial
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Not Yet Completed Level 1 <input type="checkbox"/>				
Not Yet Assessable <input type="checkbox"/>				

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 their families (simulated or actual)	Discloses patient safety events to patients and their 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 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
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

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 interprofessional team members	Coordinates care of patients in complex clinical situations effectively using the roles of interprofessional team members	Role models effective coordination of patient-centered care among multidisciplinary teams	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 straightforward 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	Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Systems-Based Practice 3: Physician Role in Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
Describes basic health payment systems, including government, private, public, and uninsured care as well as different practice models	Describes how working within the health care system impacts patient care, including billing and coding	Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency)	Uses shared decision-making in patient care, taking into consideration costs to the patient	Participates in advocacy activities for health policy
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Completed Level 1 <input type="checkbox"/>

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, and incorporates patient preferences and values to the care of a straightforward condition	Articulates clinical questions and elicits patient preferences and values to guide evidence-based care	Locates and applies the best available evidence, integrated with patient preference, to the care of a complex condition	Critically appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide care tailored to the individual patient	Coaches others to critically appraise and apply evidence for complex conditions and/or participates in the development of guidelines
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				
Not Yet Completed Level 1 <input type="checkbox"/>				

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 other input to inform goals	Responds to feedback and other input episodically, with adaptability and humility	Actively seeks feedback and other input, with adaptability and humility	Role models consistently seeking feedback and other input with adaptability and humility
Identifies the strengths, deficiencies, and limitations in one's knowledge and expertise	Analyzes and reflects on the strengths, deficiencies, and limitations in one's knowledge and expertise to design a learning plan, with assistance	Creates and implements a learning plan to optimize educational and professional development	Uses ongoing reflection, feedback, and other input to measure the effectiveness of the learning plan and, when necessary, improves it	Coaches others on reflective practice
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Practice-Based Learning and Improvement 3: Mentorship and Teaching				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates self-awareness	Teaches medical students, other residents, and patients in informal settings; develops faculty mentorship for oneself	Teaches health professionals in formal settings (e.g., nursing in-service training, residency teaching conference); mentors medical students	Organizes educational activities at the program level; mentors residents and other health care professionals	Designs and implements clinical rotations, curricula, or learning and assessment tools; models and teaches mentoring to others
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Professionalism 1: Professional Behavior and Ethical Principles				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Identifies and describes inciting events for professionalism lapses</p> <p>Demonstrates knowledge of the ethical principles underlying patient care (e.g., informed consent, surrogate decision making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related topics)</p>	<p>Demonstrates insight into professional behavior in straightforward situations</p> <p>Applies ethical principles in straightforward situations and takes responsibility for lapses</p>	<p>Demonstrates professional behavior in complex situations</p> <p>Integrates ethical principles and recognizes the need to seek help in complex situations</p>	<p>Recognizes situations that may promote professionalism lapses and intervenes to prevent lapses in oneself and others</p> <p>Recognizes and uses appropriate resources for managing and resolving ethical dilemmas (e.g., ethics consultations, literature review, risk management/legal consultation)</p>	<p>Coaches others when their behavior fails to meet professional expectations</p> <p>Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Completed Level 1 <input type="checkbox"/>

Professionalism 2: Accountability/Conscientiousness				
Level 1	Level 2	Level 3	Level 4	Level 5
Reliably arrives to clinical activities on time and describes strategies for ensuring timely task completion	Performs tasks and responsibilities in a timely manner with appropriate attention to detail in straightforward situations	Prioritizes tasks and responsibilities in a timely manner with appropriate attention to detail in complex situations	Recognizes barriers that may impact others' ability to complete tasks and responsibilities in a timely manner	Develops processes to enhance other's ability to efficiently complete patient care tasks and responsibilities
Responds promptly to requests or reminders to complete tasks and responsibilities	Completes tasks and responsibilities without reminders	Proactively completes tasks and responsibilities to ensure that the needs of patients, teams, and systems are met		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Professionalism 3: Well-Being				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes the importance of addressing personal and professional well-being (e.g., physical and emotional health)	Lists available resources for personal and professional well-being Describes institutional resources that are meant to promote well-being	Discusses a plan to promote personal and professional well-being with institutional support Recognizes which institutional factors affect well-being	Independently develops a plan to promote personal and professional well-being Describes institutional factors that positively and/or negatively affect well-being	Creates institutional level interventions that promote colleagues' well-being Describes institutional programs designed to examine systemic contributors to burnout
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

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 well-being, the mechanisms by which those factors impact well-being, and available resources and tools to improve well-being.

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 with patients and their families (e.g., situational awareness of language, disability, health literacy level, cultural differences)	Establishes a therapeutic relationship in straightforward encounters	Establishes a therapeutic relationship in challenging encounters (e.g., shared decision making)	Facilitates difficult discussions to patients and their families, (e.g., explaining complications, therapeutic uncertainty)	Coaches others in the facilitation of difficult conversations
Communicates with patients and their families in an understandable and respectful manner	Identifies barriers to effective communication (e.g., health literacy, cultural differences)	When prompted, reflects on personal biases while attempting to minimize communication barriers	Recognizes biases and integrates the patient's viewpoint and autonomy to ensure effective communication	Mentors others in situational awareness and critical self-reflection
Demonstrates basic understanding of informed consent process	Answers questions about straightforward treatment plans, with assistance	Counsels patients through the decision-making process for straightforward conditions	Counsels patients through the decision-making process for complex conditions	Counsels patients through the decision-making process for uncommon conditions
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Completed Level 1 <input type="checkbox"/>

Interpersonal and Communication Skills 2: Complex Communication Around Serious Illness				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies prognostic communication as a key element for shared decision making	Assesses the patient's family's/caregiver's prognostic awareness and identifies preferences for receiving prognostic information	Delivers basic prognostic information and attends to emotional responses of the patient and patient's family/caregiver(s)	Tailors communication of prognosis according to disease characteristics and trajectory, patient consent, patient's family's needs, and medical uncertainty, and manages intense emotional response	Coaches others in the communication of prognostic information
Identifies the need to assess the patient's/patient's family's expectations and understanding of their health status and treatment options	Facilitates communication with the patient/patient's family by introducing stakeholders, setting the agenda, clarifying expectations, and verifying an understanding of the clinical situation	Sensitively and compassionately delivers medical information; elicits the patient's/patient's family's values, goals, and preferences; and acknowledges uncertainty and conflict, with guidance	Independently 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 in situations with a high degree of uncertainty and conflict	Coaches shared decision-making in communication with the patient/patient's family
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Interpersonal and Communication Skills 3: Interprofessional and Team Communication				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes the value and role of each team member and respectfully interacts with all members of health care team	Communicates in a professional and productive manner to facilitate teamwork (e.g., active listening, updates in timely fashion)	Actively recognizes and mitigates communication barriers and biases with the health care team	Facilitates respectful communications and conflict resolution with the multidisciplinary health care team (e.g., leading sarcoma conference)	Leads respectful communications and conflict resolution with the multidisciplinary health care team
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				

Interpersonal and Communication Skills 4: Communication within Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
Accurately records information in the patient record while safeguarding patient personal health information	Demonstrates accurate, timely, and efficient use of the electronic health record to communicate with the health care team Uses appropriate communication methods (e.g., face-to-face, voice, electronic)	Concisely reports diagnostic and therapeutic reasoning while incorporating relevant outside data Respectfully initiates communications about concerns in the system	Independently communicates via written or verbal methods based on urgency and context Uses appropriate channels to offer clear and constructive suggestions to improve the system	Facilitates improved written and verbal communication of others Guides departmental or institutional communication around policies and procedures
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: <div style="text-align: right;">Not Yet Completed Level 1 <input type="checkbox"/></div>				