# **Orthopaedic Surgery Milestones**

The Accreditation Council for Graduate Medical Education



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The Milestones are designed only for use in evaluation of residents in the context of their participation in ACGMEaccredited 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.

## **Orthopaedic Surgery Milestones**

#### Work Group

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American Board of Orthopaedic Surgery American Osteopathic Academy of Orthopedic Surgery American Osteopathic Association Council of Orthopaedic Residency Directors 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 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 <u>www.acgme.org</u>, 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.

Practice-Based Learning	and Improvement 2: Refle	ctive Practice and Commit	ment 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 performance data (feedback and other input) in order to form goals	Seeks performance data episodically, with adaptability and humility	Intentionally seeks performance data consistently with adaptability and humility	Role models consistently seeking performance data with adaptability and humility
Identifies the factors which contribute to performance deficits	Analyzes and acknowledges the factors which contribute to performance deficits	Institutes behavioral change(s) to improve performance	Considers alternatives to improve performance	Models reflective practice
Actively seeks opportunities to improve	Designs and implements a learning plan, with prompting	Independently creates and implements a learning plan	Integrates performance data to adapt the learning plan	Facilitates the design and implementation of learning plans for others
Comments:			Not Yet C	ompleted Level 1
middle of a lev milestones in	sponse box in the vel implies that that level and in lower een substantially		Selecting a response box between levels indicates in lower levels have beer demonstrated as well as milestones in the higher	that milestones n substantially <b>some</b>

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Level 1	Level 2	Level 3	Level 4	Level 5
Develops a simple surgical plan, with assistance	Independently develops a simple surgical plan	Independently develops a surgical plan for core procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans and performs complex procedures, including management of peri- operative complications
Demonstrates basic surgical skills (e.g., wound closure) and assists with procedures	Performs surgical approach, with minimal assistance	Performs critical steps of core procedures, with assistance	Independently performs core procedures; performs complex procedures, with assistance	Independently performs critical steps of complex procedures
Identifies and reports	Manages simple	Identifies complex	Develops a plan for	Develops a plan an
simple complications	complications	complications	managing complex complications	implements treatment of complex complications

Level 1	Level 2	Level 3	Level 4	Level 5
Develops a simple surgical plan, with assistance	Independently develops a simple surgical plan	Independently develops a surgical plan for core procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans and performs complex procedures, including management of peri- operative complications
Demonstrates basic surgical skills (e.g., wound closure) and assists with procedures	Performs surgical approach, with minimal assistance	Performs critical steps of core procedures, with assistance	Independently performs core procedures; performs complex procedures, with assistance	
Identifies and reports simple complications	Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	

Level 1	Level 2	Level 3	Level 4	Level 5
Develops a simple surgical plan, with assistance	Independently develops a simple surgical plan	Independently develops a surgical plan for core procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans and performs complex procedures, including management of peri- operative complications
Demonstrates basic surgical skills (e.g., wound closure) and assists with procedures	Performs surgical approach, with minimal assistance	Performs critical steps of core procedures, with assistance	Independently performs core procedures; performs complex procedures, with assistance	
Identifies and reports simple complications	Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	

Patient Care 4: Operative	e Management of Arthrosco	opically Treated Conditions	;	
Level 1	Level 2	Level 3	Level 4	Level 5
Develops a simple surgical plan, with assistance	Independently develops a simple surgical plan	Independently develops a surgical plan for core procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans and performs complex procedures, including management of peri- operative complications
Demonstrates basic surgical skills (e.g., wound closure) and assists with procedures	Performs surgical approach, with minimal assistance	Performs critical steps of core procedures, with assistance	Independently performs core procedures; performs complex procedures, with assistance	
Identifies and reports simple complications	Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	
Comments:				ompleted Level 1

Level 1	Level 2	Level 3	Level 4	Level 5
Develops a simple surgical plan, with assistance	Independently develops a simple surgical plan	Independently develops a surgical plan for core procedures that includes identification of potential challenges and technical complexities	Independently develops a surgical plan for complex procedures, including contingencies for complications	Independently plans and performs complex procedures, including management of peri- operative complications
Demonstrates basic surgical skills (e.g., wound closure) and assists with procedures	Performs surgical approach, with minimal assistance	Performs critical steps of core procedures, with assistance	Independently performs core procedures; performs complex procedures, with assistance	
Identifies and reports simple complications	Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	

Patient Care 6: Evaluatio	n and Management of the A	Adult Orthopaedic Patient		
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains a patient history, performs a physical examination and develops a differential diagnosis for patients across clinical settings	Orders and interprets diagnostic testing and consultations based on patient evaluation	Synthesizes a plan to manage healthy patients with straightforward conditions, including operative and non- operative options	Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities	Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise
Manages patients with straightforward conditions, with direct supervision (e.g., fracture, arthritis)	Manages patients with straightforward conditions, with indirect supervision	Independently manages patients and adapts management plan for changing clinical situation	Leads an orthopaedic team in the management of patients with complex conditions (e.g., periprosthetic femur fractures in the setting of osteoporosis and medical comorbidities, complex elbow instability in the obese patient)	Leads a multidisciplinary team in the management of patients with complex conditions
Recognizes and initiates work-up of emergent conditions (e.g. compartment syndrome, dysvascular limb, cauda equina syndrome)	Formulates and executes a stabilization plan for emergent conditions	Triages management of multiple emergent conditions	Leads an orthopaedic team in the management of emergent conditions (e.g., polytrauma)	
Comments:			Not Yet C Not Yet A	ompleted Level 1

Patient Care 7: Evaluatio	n and Management of the I	Pediatric Orthopaedic Patie	ent	
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains a patient history, performs a physical examination and develops a differential diagnosis for patients across clinical settings	Orders and interprets diagnostic testing and consultations based on patient evaluation	Synthesizes a plan to manage healthy patients with straightforward conditions, including operative and non- operative options	Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities	Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise
Manages patients with straightforward conditions, with direct supervision (e.g., fracture, arthritis)	Manages patients with straightforward conditions, with indirect supervision	Independently manages patients and adapts management plan for changing clinical situation	Leads an orthopaedic team in the management of patients with complex conditions (e.g., persistent spine infection after pedicle screw instrumentation in a malnourished patient)	Leads a multidisciplinary team in the management of patients with complex conditions
Recognizes and initiates work-up of emergent conditions (e.g. compartment syndrome, dysvascular limb, cauda equina syndrome)	Formulates and executes a stabilization plan for emergent conditions	Triages management of multiple emergent conditions	Leads an orthopaedic team in the management of emergent conditions (e.g., polytrauma)	
Comments:			Not Yet Co Not Yet As	ompleted Level 1

Medical Knowledge 1: O	rthopaedic Clinical Decisio	n Making		
Level 1	Level 2	Level 3	Level 4	Level 5
Articulates a methodology for clinical reasoning	Demonstrates clinical reasoning to determine treatment goals	Synthesizes information to make clinical decisions for straightforward conditions	Efficiently synthesizes information and integrates reflection to make clinical decisions for complex conditions	Incorporates clinical reasoning to improve care pathways
Identifies resources to direct clinical decisions	Selects and prioritizes relevant resources based on scenario to inform decisions	Integrates evidence- based information to inform diagnostic decision making for straightforward conditions	Integrates evidence- based information to inform diagnostic decision making for complex conditions	
Comments:				ompleted Level 1

Medical Knowledge 2: A	natomy and Physiology of	Musculoskeletal Condition	S	
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies anatomy and pathophysiology of straightforward conditions	Demonstrates knowledge of pathoanatomy, disease classification systems, and natural history for straightforward conditions	Applies knowledge of pathoanatomy and pathophysiology to explain the effects of surgical or non-surgical treatment on patient outcomes for straightforward conditions	Applies comprehensive knowledge of pathoanatomy and pathophysiology to treatment options and patient outcomes for complex conditions	Contributes to peer- reviewed literature on the varying patterns of disease presentation, natural history, and treatment options
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
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

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 their interprofessional teams	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

Systems-Based Practice	3: Physician Role in Healt	h 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
Comments:			Not Yet C	ompleted Level 1

Practice-Based Learning	and Improvement 1: Evide	ence-Based and Informed P	Practice	
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates how to access and use available evidence, and incorporate patient preferences and values in order to take care of a straightforward condition	Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care	Locates and applies the best available evidence, integrated with patient preference, to the care of complex conditions	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
Comments:			Not Yet C	ompleted Level 1

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 in order 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

Professionalism 1: Profe	ssional Behavior and Ethic	cal Principles		
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies and describes inciting events for professionalism lapses	Demonstrates insight into professional behavior in straightforward situations	Demonstrates professional behavior in complex situations	Recognizes situations that may promote 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 patient care (e.g., informed consent, surrogate decision making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related topics)	Applies ethical principles in straightforward situations and takes responsibility for lapses	Integrates ethical principles and recognizes the need to seek help in complex situations	Recognizes and uses appropriate resources for managing and resolving ethical dilemmas (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
Comments:			Not Yet C	ompleted Level 1

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		
Comments:			Not Yet C	ompleted Level 1

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	Lists available resources for personal and professional well-being	Discusses a plan to promote personal and professional well-being with institutional support	Independently develops a plan to promote personal and professional well-being	Creates institutional level interventions that promote colleagues' well-being
emotional health)	Describes institutional resources that are meant to promote well-being	Recognizes which institutional factors affect well-being	Describes institutional factors that positively and/or negatively affect well-being	Describes institutional programs designed to examine systemic contributors to burnout
Comments:	ended to evaluate a resident's w			ompleted Level 1

This subcompetency is not intended to evaluate a resident's well-being, but to ensure each resident 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 patient and family (e.g., situational awareness of language, disability, health literacy level, cultural)	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 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)	When prompted, reflects on personal biases while attempting to minimize communication barriers	Recognizes biases and integrates 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 patient through decision-making process for straightforward conditions	Counsels patient through decision- making process for complex conditions	Counsels patient through decision-making process for uncommon conditions
Comments:			Not Yet C	ompleted Level 1

Interpersonal and Comm	unication Skills 2: Interpro	fessional and Team Comm	unication	
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	Exemplar of effective and respectful communication strategies
Comments:			Not Yet C	ompleted Level 1

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 electronic health record to communicate with the health care team	Concisely reports diagnostic and therapeutic reasoning while incorporating relevant outside data	Independently communicates via written or verbal methods based on urgency and context	Facilitates improved written and verbal communication of others
	Uses appropriate communication methods (e.g., face-to-face, voice, electronic)	Respectfully initiates communications about concerns in the system	Uses appropriate channels to offer clear and constructive suggestions to improve the system	Guides departmental or institutional communication around policies and procedures