## Orthopaedic Surgery Milestones

ACGME International, Inc. (ACGME-I)



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## Orthopaedic Surgery Milestones

The Milestones are designed only for use in evaluation of residents and fellows in the context of their participation in ACGME-I-accredited residency and fellowship programs. The Milestones provide a framework for the assessment of the development of the resident or fellow in key dimensions of the elements of physician competence in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competence, nor are they designed to be relevant in any other context.

## **Understanding Milestone Levels and Reporting**

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

Milestones are arranged into levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert resident or 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, more junior residents/fellows may achieve higher levels early in their educational program just as more senior residents/fellows may be at a lower level later in their educational program. There is no predetermined timing for a resident or fellow to attain any particular level. Residents and 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 iv).

## **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 the Milestones as a sole assessment in high-stakes decisions. Level 5 is designed to represent an expert resident or 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. ACGME-I 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. 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 conformance with ACGME-I supervision guidelines as described in the applicable Program Requirements, as well as with 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 more context regarding the intent of each subcompetency, as well as examples for each level, assessment methods or tools, and other resources. The Supplemental Guide, like examples contained within the Milestones, is designed only to assist the program director and Clinical Competency Committee; it is not meant to demonstrate any required element or outcome.

The diagram below presents an example set of milestones for one subcompetency in the same format as the ACGME-I Report Worksheet. For each reporting period, a resident's/fellow's performance on the milestones within each subcompetency will be indicated by selecting the Milestones Level that best describes that individual's performance in relation to those milestones.

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 patien 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 (e.g., community vaccination rate, infection rate, smoking cessation)	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	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.		Selecting a response between levels indicated in lower levels have be demonstrated as well milestones in the high-	es that milestones een substantially as <b>some</b>	

Patient Care 1: Operative Management of Fractures and Dislocations				
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 perioperative 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 simple complications	Manages simple complications	Identifies complex complications	Develops a plan for managing complex complications	Develops a plan and implements treatment of complex complications
Comments:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 2: Operative Management of Soft Tissue Pathology				
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 perioperative 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:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 3: Operative Management of Degenerative, Infectious, and Neoplastic 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 perioperative 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:  Not Yet Completed Level 1 Not Yet Assessable				

Patient Care 4: Operative Management of Arthroscopically 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 perioperative 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:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 5: Operative Management of Pediatric 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 perioperative 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:  Not Yet Completed Level 1  Not Yet Assessable				

Patient Care 6: Evaluation	on 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 (e.g., fracture, arthritis), with direct supervision	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 Completed Level 1 Not Yet Assessable				

Patient Care 7: Evaluation and Management of the Pediatric 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 (e.g., fracture, arthritis), with direct supervision	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 Completed Level 1  Not Yet Assessable				

Medical Knowledge 1: Orthopaedic Clinical Decision 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:  Not Yet Completed Level 1  Not Yet Assessable				

Medical Knowledge 2: A	natomy and Physiology of	Musculoskeletal Conditions	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 Completed Level 1  Not Yet Assessable				

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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 (e.g., community vaccination rate, infection rate, smoking cessation)	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	Coordinates care of patients in routine clinical situations, effectively utilizing the roles of the interprofessional teams	Coordinates care of patients in complex clinical situations, effectively utilizing the roles of the interprofessional teams	Role models effective coordination of patient-centered care among different disciplines and specialties	Analyzes the process of care coordination and leads in the design and implementation of improvements
Identifies key elements for 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
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, skilled nursing facility, finance, personnel, technology)	Describes how components of a complex health care system are interrelated, and how this impacts patient care	Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)	Manages various components of the complex health care system to provide efficient and effective patient care and transition of care	Advocates for or leads systems change that enhances high value, efficient, and effective patient care and transition of care
Describes the principles of cost-effective care	Delivers care with consideration of each patient's payment model	Engages with patients in shared decision making, informed by cost-effective care principles	Advocates for patient care needs (e.g., community resources, patient assistance resources) regardless of ability to pay	Participates in health policy advocacy activities
Comments:  Not Yet Completed 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 routine patient	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 patients	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 patients, and/or participates in the development of guidelines
Comments:  Not Yet Completed Level 1				

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth				
Level 1	Level 2	Level 3	Level 4	Level 5
Accepts responsibility for personal and professional development by establishing goals	Demonstrates openness to performance data (feedback and other input) in order to inform 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 gap(s) between expectations and actual performance	Analyzes and reflects on the 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	Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance	Coaches others on reflective practice
Actively seeks opportunities to improve	Designs and implements a learning plan, with prompting	Independently creates and implements a learning plan	Uses performance data to measure the effectiveness of the learning plan and, when necessary, improves it	Facilitates the design and implementation of learning plans for others
Comments:  Not Yet Completed Level 1				

Professionalism 1: Professional Behavior and Ethical Principles				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies and describes potential triggers for professionalism lapses	Demonstrates insight into professional behavior in routine situations	Demonstrates professional behavior in complex or stressful situations	Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others	Coaches others when their behavior fails to meet professional expectations
Describes when and how to appropriately report professionalism lapses, including strategies for addressing common barriers	Takes responsibility for own professionalism lapses	Recognizes need to seek help in managing and resolving complex ethical situations	Recognizes and utilizes appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature	Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their
Demonstrates knowledge of the ethical principles underlying informed consent, surrogate decision making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related	Analyzes straightforward situations using ethical principles	Analyzes complex situations using ethical principles	review, risk management/legal consultation)	resolution
topics				
Comments:				
Not Yet Completed Level 1				

Professionalism 2: Accountability/Conscientiousness					
Level 1	Level 2	Level 3	Level 4	Level 5	
Takes responsibility for failure to complete tasks and responsibilities, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future	Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations	Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations	Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner	Takes ownership of system outcomes	
Responds promptly to requests or reminders to complete tasks and responsibilities	Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner	Proactively implements strategies to ensure that the needs of patients, teams, and systems are met			
Comments:  Not Yet Completed Level 1					

Professionalism 3: Self-Awareness and Help-Seeking				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes status of personal and professional well-being, with assistance	Independently recognizes status of personal and professional well-being	With assistance, proposes a plan to optimize personal and professional well-being	Independently develops a plan to optimize personal and professional well-being	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	
Comments:  Not Yet Completed Level 1				

Interpersonal and Communication Skills 1: Patient and Family-Centered Communication				
Level 1	Level 2	Level 3	Level 4	Level 5
Uses language and nonverbal behavior to demonstrate respect and establish rapport	Establishes a therapeutic relationship in straightforward encounters using active listening and clear language	Establishes a therapeutic relationship in challenging patient encounters	Easily establishes therapeutic relationships, with attention to patient/ family concerns and context, regardless of complexity	Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships
Identifies common barriers to effective communication (e.g., language, disability) while accurately communicating own role within the health care system	Identifies complex barriers to effective communication (e.g., health literacy, cultural)	When prompted, reflects on personal biases while attempting to minimize communication barriers	Independently recognizes personal biases while attempting to proactively minimize communication barriers	Role models self- awareness while identifying a contextual approach 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 introducing stakeholders, setting the agenda, clarifying expectations, and verifying understanding of the clinical situation	With guidance, sensitively and compassionately delivers medical information, elicits patient/family values, goals, and preferences, and acknowledges uncertainty and conflict	Independently, uses shared decision making to align patient/family values, goals, and preferences with treatment options to make a personalized care plan	Role models shared decision making in patient/family communication, including those with a high degree of uncertainty/conflict
Comments:  Not Yet Completed Level 1				

Interpersonal and Communication Skills 2: Interprofessional and Team Communication				
Level 1	Level 2	Level 3	Level 4	Level 5
Respectfully requests a consultation	Clearly and concisely requests a consultation	Checks own understanding of consultant recommendations	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
Respectfully receives a consultation request	Clearly and concisely responds to a consultation request	Checks understanding of recommendations when providing consultation		
Uses language that values all members of the health care team	Communicates information effectively with all health care team members	Uses active listening to adapt communication style to fit team needs		
	Solicits feedback on performance as a member of the health care team	Communicates concerns and provides feedback to peers and learners	Communicates feedback and constructive criticism to superiors	Facilitates regular health care team-based feedback in complex situations
Comments:  Not Yet Completed Level 1				

Interpersonal and Communication Skills 3: Communication within Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
Accurately records information in the patient record	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	Models feedback to improve others' written communication
Safeguards patient personal health information	Demonstrates accurate, timely, and appropriate use of documentation shortcuts  Documents required data in formats specified by institutional policy	Appropriately selects direct (e.g., telephone, inperson) and indirect (e.g., progress notes, text messages) forms of communication based on context	Achieves written or verbal communication (e.g., patient notes, email) that serves as an example for others to follow	Guides departmental or institutional communication around policies and procedures
Communicates through appropriate channels as required by institutional policy (e.g., patient safety reports, cell phone/pager usage)	Respectfully communicates concerns about the system	Uses appropriate channels to offer clear and constructive suggestions to improve the system	Initiates difficult conversations with appropriate stakeholders to improve the system	Facilitates dialogue regarding systems issues among larger community stakeholders (institution, health care system, field)
Comments:  Not Yet Completed Level 1				