

Pediatric Cardiac Anesthesiology Milestones

The Accreditation Council for Graduate Medical Education



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

Pediatric Cardiac Anesthesiology Milestones Work Group

Aditee Ambardekar, MD, MSEd
Nina Deutsch, MD
Laura Edgar, EdD, CAE
Stephanie Grant, MD
Thomas McLoughlin, MD
Mark Stafford Smith, MD
Viviane Nasr, MD, MPH

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American Board of Anesthesiology

Review Committee for Anesthesiology

Understanding Milestone Levels and Reporting

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

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

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

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

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

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

Additional resources are available in the <u>Milestones</u> section of the ACGME website. Follow the links under "What We Do" at <u>www.acgme.org</u>.

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.

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
Selecting a re	sponse box in the] [:	Selecting a response box	x on the line in
middle of a level implies that			between levels indicates	
milestones in that level and in lower levels have been substantially			n lower levels have beer	•
demonstrated	•		demonstrated as well as milestones in the higher	

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Patient Care 1: Peri-Procedural Assessment and Management					
Level 1	Level 2	Level 3	Level 4	Level 5	
Obtains medical and surgical history; performs physical examinations for pediatric cardiac patients	With guidance, identifies disease processes and relevant medical or surgical issues and their implications on anesthetic care for pediatric patients with simple cardiac lesion	Identifies disease processes and relevant medical or surgical issues and their implications on anesthetic care for pediatric patients with simple cardiac lesion	Performs a complete assessment of complex or critically ill pediatric cardiac patients	Independently serves as a consultant to other members of the health care team regarding optimal pre-anesthetic	
Identifies clinical issues relevant to the preparation of pediatric cardiac patients	With guidance, prepares pediatric patients with simple cardiac lesion receiving anesthetic care	Optimizes preparation of pediatric patients with simple cardiac lesion	Optimizes preparation of complex or critically ill children across all age groups	preparation	
Comments: Not Yet Completed Level 1 Not Yet Assessable					

Patient Care 2: Technical/Procedural Skills: Airway Management and Lung Isolation				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes unique characteristics of pediatric cardiac anatomy and airway management in pediatric patients with cardiac lesions	Performs airway management across the age spectrum from neonates to adults with cardiac lesions	Identifies the need for advanced airway management and identifies possible complications with airway management in patients with cardiac lesions	Identifies and corrects problems and complications associated with airway management of complex cardiac patients	Independently identifies and corrects problems and complications of advanced airway management
	Recognizes the need for and complications of lung isolation techniques in pediatric patients with cardiac lesions	Manages lung isolation techniques for pediatric patients with cardiac lesions, with guidance	Manages lung isolation techniques for pediatric patients with cardiac lesions	Independently supervises and provides consultation to other members of the health care team for lung isolation in pediatric patients with cardiac lesions
Comments: Not Yet Completed Level 1 Not Yet Assessable				

Patient Care 3: Technical/Procedural Skills: Vascular Access				
Level 1	Level 2	Level 3	Level 4	Level 5
Performs basic radial artery cannulation procedures	Performs complex radial artery cannulation procedures	Performs arterial cannulation at various locations (e.g., femoral, brachial, axillary)	Performs complex arterial cannulation at various locations (e.g., femoral, brachial, axillary)	Serves as a departmental resource for challenging arterial cannulation procedures
Performs basic right internal jugular central venous cannulation procedures	Performs complex right internal jugular central venous cannulation procedures	Performs central venous cannulation at various locations (e.g., subclavian, left internal jugular, femoral)	Performs complex central venous cannulation at various locations (e.g., subclavian, left internal jugular, femoral)	Serves as a departmental resource for challenging central venous cannulation procedures
Identifies relevant vascular access anatomy and uses ultrasound in vascular access procedures	Interprets ultrasound to optimize technique and reduce complications in vascular access procedures	Independently conducts and interprets complex vascular access ultrasound (e.g., intravenous)	Advises and supervises others with ultrasound for vascular access	Serves as a departmental resource for challenging vascular access ultrasound
Comments: Not Yet Completed Level 1 Not Yet Assessable				

Patient Care 4: Anesthetic Management of Interventional Cardiology Procedures					
Level 1	Level 2	Level 3	Level 4	Level 5	
Differentiates between diagnostic and interventional procedures	Develops anesthetic plan for routine intra- and post- operative management of cardiac patients in the catheterization and electrophysiology laboratories	Conducts intra- and post- operative care for patients with simple cardiac lesions in the catheterization and electrophysiology laboratories	Conducts intra- and post-operative care for patients with complex cardiac lesions in the catheterization and electrophysiology laboratories	Serves as a consultant for complex intra- and post- operative care in the catheterization and electrophysiology laboratories	
Comments: Not Yet Completed Level 1 Not Yet Assessable					

Patient Care 5: Anesthetic Management of Surgical Cardiac Procedures				
Level 1	Level 2	Level 3	Level 4	Level 5
Differentiates anesthetic plan for surgical procedures with and without cardiopulmonary bypass (CPB)	Develops anesthetic plan with consideration of underlying clinical conditions; past medical history; and patient, anesthetic, and surgical risk factors for routine intra- and post-operative management of cardiac patients in the operating room	Conducts intra- and post- operative care for patients with simple cardiac lesions in the operating room	Conducts intra- and post-operative care for patients with complex cardiac lesions in the operating room	Serves as a consultant for complex intra- and post-operative care in the operating room
Recognizes presence of peri-operative cardiopulmonary and hematologic complications	Identifies and manages peri-operative cardiopulmonary and hematologic complications, with direct supervision	Identifies and manages peri-operative cardiopulmonary and hematologic complications, with indirect supervision	Identifies and manages peri-operative cardiopulmonary and hematologic complications	Serves as a consultant to manage peri-operative cardiopulmonary and hematologic complications
Comments: Not Yet Completed Level 1 Not Yet Assessable				

Patient Care 6: Situational Awareness and Crisis Management					
Level 1	Level 2	Level 3	Level 4	Level 5	
Demonstrates vigilance during clinical care	Demonstrates awareness of case flow and developments throughout a procedure	Demonstrates awareness of case flow and developments throughout a procedure, including those outside of one's immediate control, with supervision	Independently demonstrates awareness of case flow and developments throughout a procedure, including those outside of one's immediate control		
Articulates causes of common peri-operative crisis situations	Recognizes crisis situations; calls for help	Anticipates an impending crisis and identifies possible etiologies, with supervision	Independently anticipates an impending crisis and identifies possible etiologies		
Responds to crisis situations as a reliable team member	Participates in management during crisis situations	Initiates management and resolves crisis situations, with supervision	Independently initiates management and resolves crisis situations	Leads the health care team in the management of crisis situations	
Comments: Not Yet Completed Level 1 Not Yet Assessable					

Patient Care 7: Circulatory Support Transitions				
Level 1	Level 2	Level 3	Level 4	Level 5
Discusses the basic principles and indications for CPB	Guides a patient on and off CPB with assistance	Guides a patient on and off routine CPB	Guides a patient on and off complex CPB	Develops policies with the interdisciplinary team to guide institutional CPB protocols
Discusses the basic	Uses available	Integrates available	Integrates available	
principles and indications	hemodynamic data to	hemodynamic and	hemodynamic and	
for circulatory assist	guide a patient onto and	echocardiographic data to	echocardiographic data	
devices	off circulatory assist	guide a patient onto and	to guide a patient onto	
	devices, with assistance	off circulatory assist	and off circulatory assist	
		devices, with assistance	devices	
Comments: Not Yet Completed Level 1				
			Not Yet As	ssessable

Medical Knowledge 1: Foundational Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of cardiac anatomy and physiology and treatment of medical and surgical conditions	Demonstrates knowledge of common medical and surgical disease, treatments, and populations as relates to anesthetic care	Demonstrates knowledge of complex medical and surgical disease, treatments, and populations as relates to anesthetic care	Demonstrates comprehensive knowledge of medical and surgical disease as relates to the full spectrum of a patient's peri-operative care	Demonstrates scientific knowledge of uncommon, atypical, or complex conditions as relates to the full spectrum of a patient's peri-operative care
Comments: Not Yet Completed Level 1 Not Yet Assessable				

Medical Knowledge 2: Pharmacology				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates basic knowledge of pharmacologic principles of inhaled and/or intravenous anesthetic, vasoactive, and inotropic drugs to routine patient management	Demonstrates advanced knowledge of pharmacologic principles of inhaled and/or intravenous anesthetic, vasoactive, and inotropic drugs for management of pediatric patients with cardiac lesions	Demonstrates basic knowledge of pharmacokinetics and pharmacodynamics and selection and dosing of inhaled and/or intravenous anesthetic, vasoactive, and inotropic drugs for management of pediatric patients with cardiac lesions, including indications, contraindications, side effects, and complications	Demonstrates advanced knowledge of pharmacokinetics and pharmacodynamics and selection and dosing of anesthetic, vasoactive, and inotropic drugs for management of pediatric patients with cardiac lesions	Is recognized (through scholarship or education) as an expert resource in advanced understanding of pharmacokinetics and pharmacodynamics of inhaled and/or intravenous anesthetic, vasoactive, and inotropic drugs to management of pediatric patients with cardiac lesions
Comments: Not Yet Completed Level 1 Not Yet Assessable				

Medical Knowledge 3: Cardiovascular Imaging and Monitoring					
Level 1	Level 2	Level 3	Level 4	Level 5	
Interprets data from cardiopulmonary imaging and monitoring to guide routine clinical decisionmaking, with guidance	Interprets data from cardiopulmonary imaging and monitoring to guide routine clinical decision making	Integrates data from cardiopulmonary imaging and monitoring to guide advanced clinical decision making	Integrates data from cardiopulmonary imaging and monitoring, including tools used infrequently outside of cardiothoracic surgery, to guide advanced clinical decision making	Is recognized (through scholarship or education of others) as an expert resource in peri-operative monitoring	
Comments: Not Yet Completed Level 1 Not Yet Assessable					

Systems-Based Practice 1: Patient Safety and Quality Improvement					
Level 1	Level 2	Level 3	Level 4	Level 5	
Demonstrates knowledge of common events that impact patient safety	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 patients' families (simulated or actual)	Discloses patient safety events to patients and patients' 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 departmental quality improvement initiatives	Participates in department 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 level or above	
Comments:	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 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 different disciplines and specialties	Analyzes the process of care coordination and participates 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	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 inequities	Identifies specific population and community health needs and inequities for the local population	Uses institutional 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	Advocates for populations and communities with health care inequities in the peri-operative setting	
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 they 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 transitions of care	Advocates for or leads systems change that enhances high-value, efficient, and effective patient care	
States factors impacting the costs of anesthetic care	Documents anesthetic detail to facilitate accurate billing and reimbursement	Explains the impact of documentation on billing and reimbursement	Practices and advocates for cost-effective patient care	Engages in external activities related to advocacy for costeffective care	
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		
Accesses and uses evidence in routine patient care	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 complex patients	Appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide individualized care	Coaches others to appraise and apply evidence for complex patients and/or participates in the development of guidelines		
Comments:			Not Yet C	ompleted 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) 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 that contribute to performance deficits	Analyzes and acknowledges the factors that 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 Completed Level 1					

Professionalism 1: Professional Behavior and Ethical Principles					
Level 1	Level 2	Level 3	Level 4	Level 5	
Identifies 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 oneself	Coaches others when their behavior fails to meet professional expectations	
Describes when and how to report lapses in professionalism	Takes responsibility for one's own professionalism lapses	Recognizes need to seek help in managing and resolving complex interpersonal situations	Actively solicits help and acts on recommendations to resolve complex interpersonal situations		
Demonstrates knowledge of the ethical principles underlying patient care	Analyzes straightforward situations using ethical principles	Analyzes complex situations using ethical principles	Recognizes and uses resources for managing and resolving ethical dilemmas	Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution	
Comments: Not Yet Completed Level 1					

Professionalism 2: Accountability/Conscientiousness					
Level 1	Level 2	Level 3	Level 4	Level 5	
Responds promptly to requests or reminders to complete tasks	Performs tasks and responsibilities in a timely manner	Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations	Prioritizes tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations		
Takes responsibility for failure to complete tasks	Recognizes situations that may impact one's own ability to complete tasks and responsibilities in a timely manner	Takes responsibility for tasks not completed in a timely manner and identifies strategies to prevent recurrence	Proactively implements strategies to ensure that the needs of patients and their families, teams, and systems are met	Designs and implements an institutional systems approach to ensure timely task completion and shared responsibility	
Comments: Not Yet Completed 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	Lists available resources for personal and professional well-being	With assistance, proposes a plan to promote personal and professional well-being	Independently develops a plan to promote personal and professional well-being	Creates institutional-level interventions that promote colleagues' well-being		
	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: Not Yet Completed Level 1						

This subcompetency is not intended to evaluate a fellow's well-being. Rather, the intent is to ensure that each fellow has the fundamental knowledge of factors that affect well-being, the mechanisms by which those factors affect 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	
Communicates with patients and their families in an understandable and respectful manner	Customizes communication in the setting of personal biases and barriers with patients and patients' families	Explains complex and difficult information to patients and patients' families	Facilitates difficult discussions with patients and patients' families	Mentors others in the facilitation of crucial conversations	
Provides timely updates to patients and patients' families	Actively listens to patients and patients' families to elicit patient preferences and expectations	Uses shared decision- making to make a personalized care plan	Effectively negotiates and manages conflict among patients, patients' families, and the health care team	Mentors others in conflict resolution	
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 or receives consultations	Clearly, concisely, and promptly requests or responds to a consultation	Uses closed-loop communication to verify 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	
Uses language that values all members of the health care team	Communicates information effectively with all health care team members	Adapts communication style to fit team needs	Maintains effective communication in crisis situations	Leads an after-event debrief of the health care team	
Respectfully receives feedback from the health care team	Solicits feedback on performance as a member of the health care team	Communicates concerns and provides feedback to peers and learners	Communicates constructive feedback 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 judicious use of documentation shortcuts	Accurately records information in the anesthetic record for basic cases	Accurately records information in the anesthetic record and communicates complex care decisions for complex cases	Uses medical record functionality to highlight challenges in anesthetic care to facilitate future peri-operative management	Explores innovative uses of the medical record to facilitate peri-operative management	
Safeguards patients' personal health information	Documents required data in formats specified by institutional policy	Appropriately selects direct and indirect forms of communication based on context	Models exemplary written or verbal communication	Guides departmental or institutional policies and procedures around communication	
Communicates through appropriate channels as required by institutional policy	Respectfully communicates concerns about the system	Respectfully communicates concerns about the system and contributes to solutions	Uses appropriate channels to offer clear and constructive suggestions to improve the system	Initiates difficult conversations with appropriate stakeholders to improve the system	
Comments: Not Yet Completed Level 1					