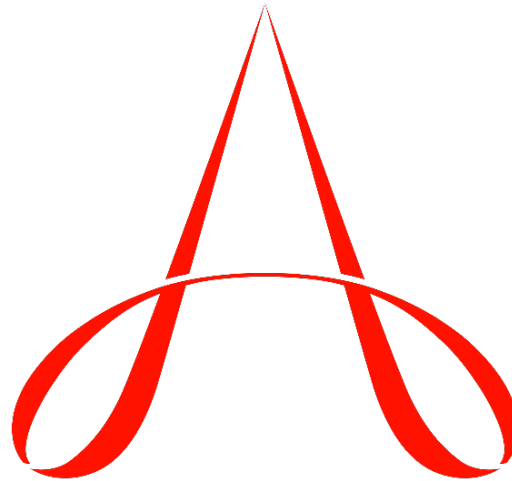




Supplemental Guide: Pediatric Anesthesiology



A C G M E

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Pediatric Anesthesiology Milestones. This is not designed to indicate any specific requirements for each level, but to provide insight into the thinking of the Milestone Work Group.

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information.

Review this guide with the CCC and faculty members. As the program develops a shared mental model of the Milestones, consider creating an individualized guide (Supplemental Guide Template available) with institution/program-specific examples, assessment tools used by the program, and curricular components.

Additional tools and references, including the Milestones Guidebook, Clinical Competency Committee Guidebook, and Milestones Guidebook for Residents and Fellows, are available on the [Resources](#) page of the Milestones section of the ACGME website.

Patient Care 1: Pediatric Pre-Anesthetic Patient Evaluation, Assessment, and Preparation Overall Intent: To demonstrate the necessary skills to gather and interpret all relevant data in preparation for surgery; to determine necessary optimization and to assign risk stratification in the pre-operative period	
Milestones	Examples
Level 1 <i>Conducts and interprets a history and physical examination, with direct supervision</i>	<ul style="list-style-type: none"> • Reviews patient's chart and identifies the presence of dyspnea and decreased exercise tolerance in preparation for spinal fusion secondary to scoliosis • Obtains a basic history in a patient for scoliosis and identifies dyspnea and decreased exercise tolerance as comorbidities • Performs general physical examination in preparation for a spinal fusion
Level 2 <i>Conducts a focused history and physical examination, with indirect supervision</i>	<ul style="list-style-type: none"> • During a chart review, seeks blood gases, electrocardiogram, and chest x-ray, as appropriate • While obtaining patient history, additional information related to shortness of breath and decreased exercise tolerance is elucidated (e.g., cannot walk up two flights of stairs, shortness of breath or chest pain with exertion) • In addition to the standard cardiopulmonary and airway exams, identifies signs of poor pulmonary function secondary to spine curvature
Level 3 <i>Identifies comorbidities on a history and physical examination that may require further evaluation, with indirect supervision</i>	<ul style="list-style-type: none"> • Discovers poor respiratory compliance and effort and refers patient to a pulmonologist for optimization • Recognizes the risk of poor pulmonary function and post-operative respiratory complications based on poor exercise tolerance • Identifies abnormal heart sounds and decreased breath sounds on physical exam that may be consistent with elevated right-sided pressures and/or restrictive lung disease
Level 4 <i>Independently identifies concerning history and physical exam findings that require further evaluation</i>	<ul style="list-style-type: none"> • Reviews x-ray to calculate the Cobb angle and associated risk of elevated right heart pressures and restrictive lung disease • Considers that low exercise tolerance and dyspnea is suggestive of right-sided heart failure and suggests an echocardiogram to evaluate • Correlates physical exam findings suggestive of right-sided heart failure and recommends further work-up from cardiology
Level 5 <i>Independently identifies a previously undiagnosed condition</i>	<ul style="list-style-type: none"> • Auscultates a heart murmur and independently identifies a diagnosis of mitral valve prolapse
Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation • Medical record (chart) review • Multisource feedback • Objective structured clinical examination (OSCE) • Simulation
Curriculum Mapping	<ul style="list-style-type: none"> •

Notes or Resources	<ul style="list-style-type: none">• Entwistle M, Patel D. Scoliosis surgery in children. <i>Continuing Education in Anaesthesia Critical Care & Pain</i>. 2006;6(1):13-16.• Soundararajan N, Cunliffe M. Anaesthesia for spinal surgery in children. <i>British Journal of Anaesthesia</i>. 2007; 99(1): 86-94.• Von Ungern-Sternberg B and Habre W. Pediatric anesthesia – potential risks and their assessment: part II. <i>Pediatric Anesthesia</i> 2007;14(4)311-20. doi:10.1111/j.1460-9592.2006.02098.x.• Wellis V. Preoperative assessment. In: <i>Guidelines for Anesthetic Management of Spine Fusion and SSEP Monitoring</i>. n.d. https://ether.stanford.edu/library/pediatric_anesthesia/anesthetic%20techniques/guideline-spine.pdf. Accessed 2022.• Von Ungern-Sternberg B and Habre W. Pediatric anesthesia – potential risks and their assessment: part 1. <i>Pediatric Anesthesia</i>. 2007;14(4)311-20. doi:10.1111/j.1460-9592.2006.02097.x.
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Patient Care 2: Technical Skills – Airway Management	
Overall Intent: To demonstrate appropriate assessment skills, patient and equipment preparation, decision making, and technical management for uncomplicated and complicated pediatric airways	
Milestones	Examples
<p>Level 1 <i>Performs basic pediatric airway assessment</i></p> <p><i>Prepares age-/size-appropriate equipment for an uncomplicated pediatric/neonatal airway</i></p>	<ul style="list-style-type: none"> ● Keeping in mind the patient’s age, assesses a patient’s airway pre-operatively , including patient history and prior medical record documentation about airway management and physical examination ● Understands that some children (e.g., infants) cannot generally have a Mallampati score assessment ● Selects age-appropriate direct (or video) laryngoscope blade and endotracheal tube as part of operating room setup ● Ensures availability of appropriate backup/emergency equipment (e.g., size-appropriate supraglottic airway, airway bougie)
<p>Level 2 <i>Uses the airway exam and identifiable risk factors to formulate a patient-specific plan</i></p> <p><i>Manages an uncomplicated pediatric/neonatal airway</i></p>	<ul style="list-style-type: none"> ● Devises a safe and rational plan to manage the normal pediatric airway ● Performs manual ventilation for a healthy pediatric/neonatal patient ● Performs both direct and video laryngoscopy in infants and children ● Appropriately uses airway adjuncts (e.g., oropharyngeal airway) to aid with mask ventilation, as needed
<p>Level 3 <i>Devises airway management plans that address contingencies, with supervision</i></p> <p><i>Prepares and incorporates advanced equipment in the management of a complicated airway, with supervision</i></p>	<ul style="list-style-type: none"> ● With faculty member input, develops a multi-part plan to manage an anticipated pediatric difficult airway (i.e., what to do if “Plan A” fails) ● Devises a safe and rational plan to manage the abnormal/difficult (planned or unplanned) pediatric or neonatal airway ● Selects and prepares a size-appropriate fiberoptic bronchoscope for intubation of the pediatric/neonatal airway ● Successfully places an endotracheal tube in a child using fiberoptic intubation with minimal faculty member intervention ● States several advanced airway techniques and explains when each may be best utilized
<p>Level 4 <i>Independently devises airway management plans that address contingencies</i></p>	<ul style="list-style-type: none"> ● Independently develops a multi-part plan for management of an anticipated pediatric difficult airway (i.e., what to do if “Plan A” fails)

<p><i>Independently prepares and incorporates advanced equipment in the management of a complicated airway</i></p>	<ul style="list-style-type: none"> ● Independently (or with minimal supervision) performs safe fiberoptic intubation of a child with a complicated or difficult airway ● Performs fiberoptic intubation via supraglottic airway in children with both normal and abnormal airways ● Independently manages airway emergencies outside of the operating room ● Responds appropriately to aid with management for airway emergencies outside of the operating room
<p>Level 5 <i>Collaborates with the interdisciplinary team to develop an airway plan for a complex pediatric airway</i></p> <p><i>Functions as an expert in an airway crisis for complicated airways</i></p>	<ul style="list-style-type: none"> ● Works with otolaryngology and other experts for advance preoperative planning for neonates and children with known complex airways undergoing planned non-airway surgery ● Teaches airway workshops/lectures for national meetings as an expert consultant
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● OSCE ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● Abouleish AE, Leib ML, Cohen NH. ASA [American Society of Anesthesiologists] provides examples to each ASA physical status class. <i>ASA Monitor</i>. 2015;79:38-49. https://monitor.pubs.asahq.org/article.aspx?articleid=2434536. ● ASA. ASA Physical Status Classification System. https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system. Accessed 2020. ● Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, et al. Practice guidelines for management of the difficult airway: An updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. <i>Anesthesiology</i>. 2013;118:251-270. https://anesthesiology.pubs.asahq.org/article.aspx?articleid=1918684.

Patient Care 3: Technical Skills – Pediatric Vascular Access (including Peripheral, Arterial, and Central Lines) Overall Intent: To obtain needed vascular access in pediatric patients, with or without ultrasound guidance	
Milestones	Examples
Level 1 <i>Obtains vascular access in older children and adolescents</i>	<ul style="list-style-type: none"> • Selects appropriate size catheter for a given vessel and needs of the case • Demonstrates aseptic technique • Is successful with palpable and visible targets, 22 gauge or larger • Defers to another medical professional for further attempts, when warranted
Level 2 <i>Obtains vascular access in neonates, with guidance</i>	<ul style="list-style-type: none"> • Evaluates all extremities to select most appropriate vessel before attempting • Verbalizes rationale for central access • Successful with visible targets down to 24 gauge
Level 3 <i>Obtains difficult vascular access, with guidance</i>	<ul style="list-style-type: none"> • Uses adjuncts to assist in vein identification (vein finders, etc.) • Demonstrates thoughtful planning to minimize attempts • Places an awake intravenous (IV) in an uncooperative or anxious child • Selects most appropriate ultrasound probe and technique
Level 4 <i>Independently obtains difficult vascular access</i>	<ul style="list-style-type: none"> • Successfully obtains access in patients with history of or presumed difficult access (history of prematurity, congenital heart disease, vasculopathy, morbid obesity, etc.)
Level 5 <i>Functions as an expert for vascular access</i>	<ul style="list-style-type: none"> • Instructs others in the use of ultrasound-guidance for difficult access
Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation • Simulation
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Bennett, J, Cheung, M, Intravenous access in children, <i>Paediatrics and Child Health</i>. 2020; 30(6). doi.org/10.1016/j.paed.2020.03.008. • Naik, V, Mantha, SSP, Rayani, BK, Vascular access in children. <i>Indian Journal of Anaesthesia</i>. 2019 63(9). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6761776/?report=reader. • Schindler, E, Schears, GJ, Hall, S, Yamamoto, T, Ultrasound for vascular access in pediatric patients. <i>Pediatric Anesthesia</i>, 2012;22(10). https://onlinelibrary.wiley.com/doi/full/10.1111/pan.12005. https://doi.org/10.1111/pan.12005 • Scott-Warren, VL, Morley, RB, Paediatric vascular access. <i>BJA Education</i>. 2015;15(4). https://www.bjaed.org/article/S2058-5349(17)30147-6/fulltext DOI:https://doi.org/10.1093/bjaceaccp/mku050.

Patient Care 4: Technical Skills – Pediatric Regional (Peripheral and Neuraxial) Anesthesia Overall Intent: To appropriately use regional anesthesia techniques in the care of surgical and obstetric patients	
Milestones	Examples
<p>Level 1 <i>Describes anatomy relevant to regional anesthesia</i></p> <p><i>Prepares a patient and the equipment for common regional anesthesia techniques</i></p> <p><i>Describes potential complications of regional anesthesia</i></p>	<ul style="list-style-type: none"> ● Describes sacral anatomy for the placement of a caudal epidural ● Describes the innervation of the lower extremity ● Describes the anatomy of the abdominal musculature for transversus abdominal plane (TAP) block ● Appropriately positions patient for a caudal epidural and considers the use of ultrasound to assist in neuraxial block placement ● Appropriately positions patient for a femoral nerve block and prepares ultrasound to perform the block ● Describes the signs and symptoms of local anesthetic toxicity
<p>Level 2 <i>Describes indications and contraindications for regional anesthesia</i></p> <p><i>Performs regional anesthesia techniques, with direct supervision</i></p> <p><i>Recognizes and manages complications of regional anesthesia, with direct supervision</i></p>	<ul style="list-style-type: none"> ● Selects appropriate regional anesthetic technique for genitourinary surgery (lumbar versus caudal epidural, single shot versus catheter placement); cancels block when family/patient refuses or anatomy precludes placement (i.e., deep sacral dimple and concern for spina bifida occulta) ● Selects appropriate regional anesthetic technique for orthopaedic surgery ● Performs caudal epidural with or without ultrasound-guidance, with direct supervision ● Uses physical exam (sensory and motor) to diagnose failed epidural or failed peripheral nerve block and provides an alternative pain management plan
<p>Level 3 <i>Develops a patient- and procedure-specific regional anesthesia plan, with supervision</i></p> <p><i>Performs regional anesthesia techniques, with indirect supervision</i></p> <p><i>Recognizes and manages complications of regional anesthesia, with indirect supervision</i></p>	<ul style="list-style-type: none"> ● Develops a plan for a lumbar epidural for use intra-operatively and post-operatively, with supervision ● Places a lumbar epidural in a pediatric patient, with indirect supervision ● Describes American Society of Regional Anesthesia and Pain Medicine (ASRA) guidelines for managing anticoagulation medications prior to regional and neuraxial anesthesia and considers management if an epidural hematoma occurs

<p>Level 4 <i>Independently develops a patient- and procedure-specific regional anesthesia plan</i></p> <p><i>Independently performs regional anesthesia techniques</i></p> <p><i>Independently recognizes and manages complications of regional anesthesia</i></p>	<ul style="list-style-type: none"> ● Independently, develops a regional anesthesia/analgesia plan for a pediatric patient with complex medical history and/or chronic pain ● Independently performs and troubleshoots thoracic epidural placement ● Independently diagnoses inadvertent dural puncture, assesses alternatives, and participates in patient/family discussion
<p>Level 5 <i>Serves as a consultant on advanced or difficult regional techniques</i></p> <p><i>Develops institutional protocol for using regional anesthesia and managing complications</i></p>	<ul style="list-style-type: none"> ● Assists colleagues with placement of an epidural catheter in complex situations such as a morbidly obese pediatric patient or a patient with scoliosis ● Collaborates with other health care team members to develop regional anesthesia-/analgesia-specific pathways for surgical procedures
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● OSCE ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ASRA. Education. https://www.asra.com/education. Accessed 2020. ● Chiao, FB, A new approach to an old technique: caudal ultrasound. <i>SPA News</i>. 2015;28(2). http://www3.pedsanesthesia.org/newsletters/2015summer/caudalultrasound.html. ● The New York School of Regional Anesthesia (NYSORA). https://www.nysora.com/. Accessed 2020.

Patient Care 5: Peri-Operative Planning for Pediatric Patients Overall Intent: To develop and implement a patient/procedure-specific anesthetic plan	
Milestones	Examples
Level 1 <i>Formulates an anesthetic plan for an uncomplicated patient or procedure</i>	<ul style="list-style-type: none"> • Formulates a peri-operative pain management plan for a healthy patient undergoing a Nuss procedure for a pectus excavatum deformity
Level 2 <i>Develops an anesthetic plan for a healthy patient undergoing uncomplicated procedures</i>	<ul style="list-style-type: none"> • Plans for a general anesthetic with endotracheal intubation for a healthy patient undergoing a Nuss procedure for a pectus excavatum deformity
Level 3 <i>Develops an anesthetic plan for patients with well-controlled comorbidities or undergoing complicated procedures</i>	<ul style="list-style-type: none"> • Plans for a general anesthetic with endotracheal intubation for a patient with past medical history of well controlled moderate persistent asthma undergoing a Nuss procedure for a pectus excavatum deformity and modifies a basic anesthetic with ways to optimize oxygenation and ventilation during the procedure and mitigate bronchospasm in the peri-operative period • Formulates a plan for a general anesthetic for a patient with past medical history of severe motion sickness (includes pre-operative, intra-operative medication management and post-operative medicine)
Level 4 <i>Develops an anesthetic plan for patients with multiple, uncontrolled comorbidities, and undergoing complicated procedures</i>	<ul style="list-style-type: none"> • Plans for a general anesthetic with endotracheal intubation for a patient with past medical history of poorly controlled moderate-severe asthma and von Willebrand disease (vWD) undergoing a Nuss procedure for a pectus excavatum deformity • Describes peri-operative measures to prevent and manage asthma exacerbation including intra-operative laryngospasm or bronchospasm • Reviews vWD history and plans appropriate pre-operative IV placement and timely desmopressin acetate (DDAVP) administration • Considers blood product administration intra-operatively and collaborates with blood bank for timely availability
Level 5 <i>Develops a peri-, intra-, and post-operative plan for a medically complex patient as the leader of a collaborative team of specialists</i>	<ul style="list-style-type: none"> • Plans for a general anesthetic and endotracheal intubation for a patient with past medical history of poorly controlled severe asthma, and Noonan syndrome with pulmonary valve stenosis undergoing a Nuss procedure for a pectus excavatum deformity • Coordinates and collaborates with cardiology to develop a clear peri-operative testing and evaluation and uses this information to develop a clear, safe anesthetic and disposition in consultation with other specialties
Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation • Medical record (chart) review • Multisource feedback • OSCE
Curriculum Mapping	<ul style="list-style-type: none"> •

Notes or Resources	<ul style="list-style-type: none">● Mavi J, Moore D. Anesthesia and analgesia for pectus excavatum surgery <i>Anesthesiology Clinics</i>. 2014 Mar;32(1):175-84.● Patvardhan C and Martinez G. Anesthetic consideration for pectus repair surgery. <i>J Vis Surg</i>. 2016;2(76). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5638090/.● Rick, ME. Von Willebrand disease (VWD): Treatment of major bleeding and major surgery. UpToDate. https://www.uptodate.com/contents/von-willebrand-disease-vwd-treatment-of-major-bleeding-and-major-surgery accessed 2022● Valenti F et al. Anesthetic management for pediatric correction of pectus excavatum with NUSS technique. <i>Pediatric Anesthesia and Critical Care Journal</i> 2014;2(2):90-92.
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Patient Care 6: Peri-Operative Management for Pediatric Patients Overall Intent: To develop and implement a patient/procedure-specific anesthetic plan	
Milestones	Examples
Level 1 <i>Implements an anesthetic plan for a healthy pediatric patient undergoing uncomplicated procedures</i>	<ul style="list-style-type: none"> ● Implements a peri-operative pain management plan for a healthy patient undergoing a Nuss procedure for a pectus excavatum deformity ● Implements a peri-operative pain management plan for an infant undergoing inguinal hernia repair
Level 2 <i>Implements an anesthetic plan for an uncomplicated procedure in a neonate</i>	<ul style="list-style-type: none"> ● Implements an anesthetic plan for a neonate/infant with pyloromyotomy (including stomach decompression, rapid sequence induction (RSI), avoidance of opioids)
Level 3 <i>Implements an anesthetic plan for pediatric patients with comorbidities for uncomplicated procedures</i>	<ul style="list-style-type: none"> ● Implements an anesthetic plan for a patient with Fontan physiology for endoscopy (considers Nothing by Mouth (NPO) status, IV placement, sympathetic stimulation with airway manipulation) ● Considers developmental delay and need for inhalation versus IV induction
Level 4 <i>Implements an anesthetic plan for pediatric patients with comorbidities for complicated procedures</i>	<ul style="list-style-type: none"> ● Discusses with cardiology and neurological surgery teams a patient with repaired Fontan for craniotomy and implements a clear, safe perioperative plan including disposition
Level 5 <i>Implements a peri-, intra-, and post-operative plan for a medically complex patient as the leader of a collaborative team of specialists</i>	<ul style="list-style-type: none"> ● Directs discussions with orthopedic, genetics, and hematology teams for a patient with past medical history of mitochondrial disorder, vWD, and severe autism for spinal fusion ● Implements a clear peri-operative plan including IV placement for pre-operative DDAVP administration, peri-operative blood product administration, and post-operative ICU disposition
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Medical record (chart) review ● Multisource feedback ● OSCE
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● Adler AC, Nathan AT. Perioperative considerations for the Fontan patient requiring noncardiac surgery. <i>Anesthesiol Clin</i>. 2020;38(3):531-543. doi: 10.1016/j.anclin.2020.04.001. Epub 2020 Jul 16. PMID: 32792182. https://pubmed.ncbi.nlm.nih.gov/32792182/. ● American Pain Society. http://ampainsoc.org/. Accessed 2020. ● Hsieh, VC, Krane EJ, Morgan PG. Mitochondrial disease and anesthesia. <i>Journal of Inborn Errors of Metabolism and Screening</i>. 2017. https://doi.org/10.1177/2326409817707770.

- Ko, RR, Anesthesia for pyloromyotomy in infants
<https://www.uptodate.com/contents/anesthesia-for-pyloromyotomy-in-infants> accessed 1/2022
- MDCalc. Morphine Milligram Equivalents (MME) Calculator.
<https://www.mdcalc.com/morphine-milligram-equivalents-mme-calculator>. Accessed 2020.

Patient Care 7: Situational Awareness and Crisis Management Overall Intent: To recognize and respond to the dynamic milieu of the operating room environment	
Milestones	Examples
<p>Level 1 <i>Demonstrates vigilance during clinical care</i></p> <p><i>Articulates causes of common peri-operative crisis situations</i></p> <p><i>Responds to crisis situations as a reliable team member</i></p>	<ul style="list-style-type: none"> ● Limits personal electronic devices use to calculating fluids, medication doses, or other patient care activities in the operating room ● Demonstrates continuous survey of the environment that includes monitors and surgical field ● Outlines differential diagnosis for upper airway obstruction in a pediatric patient ● Actively seeks ways to assist in care of the trauma patient or emergent add on case such as a craniotomy
<p>Level 2 <i>Demonstrates awareness of clinical care and developments throughout a procedure</i></p> <p><i>Recognizes crisis situations; calls for help</i></p> <p><i>Participates in management during crisis situations</i></p>	<ul style="list-style-type: none"> ● Informs attending of somatosensory evoked potential (SSEP)/motor evoked potential (MEP) changes during spinal fusion and considers appropriate changes in anesthetic management ● Identifies unintended extubation during an endoscopy and immediately calls for help ● Establishes large-bore IV access in the care of the trauma patient ● Sets up ultrasound and obtains supplies for arterial line placement in an emergent situation
<p>Level 3 <i>Demonstrates awareness of clinical care and developments throughout a procedure, including those outside of one's immediate control, with supervision</i></p> <p><i>Anticipates an impending crisis and identifies possible etiologies, with supervision</i></p> <p><i>Initiates management and resolves crisis situations, with supervision</i></p>	<ul style="list-style-type: none"> ● Informs attending of excessive blood loss and changes in vital signs, urinary output; considers differential diagnosis (hypovolemia, blood disorder, foley displacement, hypocalcemia etc.) requiring changes in the anesthetic plan ● Recognizes progressive hypercarbia and hyperthermia in a pediatric patient undergoing bilateral osteotomies; considers differential diagnoses such as malignant hyperthermia (MH) and reviews MH protocol for timely implementation ● Coordinates blood product administration for a neonate ● Coordinates and implements MH protocol for suspected MH event in a pediatric patient undergoing bilateral osteotomies, with supervision

<p>Level 4 <i>Independently demonstrates awareness of clinical care and developments throughout a procedure, including those outside of one's immediate control</i></p> <p><i>Independently anticipates an impending crisis and identifies possible etiologies</i></p> <p><i>Independently initiates management and resolves crisis situations</i></p>	<ul style="list-style-type: none"> ● Recognizes subtle signs of hypovolemia and blood loss (persistent tachycardia, decreased urinary output, hypotension) in a pediatric patient undergoing bilateral osteotomies ● Recognizes progressive bradycardia and hypotension in a trisomy 21 patient with congenital heart disease and considers structural and physiologic etiologies (i.e., uncorrected versus corrected heart disease, reduced sympathetic activity, vasodilatory effect of potent volatile anesthetic) ● In a trisomy 21 patient with congenital heart disease and progressive bradycardia and hypotension, adjusts anesthetic and administers appropriate sympathomimetic/pressor to avoid cardiac arrest ● Independently activates MH protocol and coordinates both intra-operative management (directs Malignant Hyperthermia Association of the United States (MHAUS) communication, lines, dantrolene administration, etc.) and post-operative disposition
<p>Level 5 <i>Leads the health care team in the management of crisis situations</i></p>	<ul style="list-style-type: none"> ● In the setting of conflicting opinions, recognizes an MH event (or acute surgical blood loss) and leads crisis response (i.e., difficult airway, MH protocol, massive transfusion protocol)
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Multisource feedback ● OSCE ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● Anesthesia Patient Safety Foundation. Distractions in the Operating Room: An Anesthesia Professional's Liability? https://www.apsf.org/article/distractions-in-the-operating-room-an-anesthesia-professionals-liability/. Accessed 2020. ● Athlos Academies. Top 10 Takeaways from Crucial Conversations. https://athlosacademies.org/top-10-takeaways-from-crucial-conversations/. Accessed 2020. ● Malignant Hyperthermia Association of the United States. Managing a Crisis. https://www.mhaus.org/healthcare-professionals/managing-a-crisis/. Accessed 2022. ● McIlvaine WB. Situational awareness in the operating room: a primer for the anesthesiologist. <i>Seminars in Anesthesia Perioperative Medicine and Pain</i>. 2007;26:167-172. doi:10.1053/j.sane. ● UpToDate. Massive Blood Transfusion. https://www.uptodate.com/contents/massive-blood-transfusion. Accessed 2021.

Medical Knowledge 1: Foundational Knowledge of Pediatric Anesthesiology	
Overall Intent: To demonstrate knowledge of both common and complex medical and surgical diseases as related to the peri-operative care of neonates and children	
Milestones	Examples
Level 1 <i>Demonstrates knowledge of normal anatomic and physiologic features of pediatric patients, from neonates to adolescents</i>	<ul style="list-style-type: none"> ● Understands the unique features of the neonatal airway as compared to the adult airway ● States the differences in flow of blood for patients with persistent fetal circulation ● Understands implications of differences in physiology between neonates and adults (e.g., oxygen consumption, fluid management, maximal allowable blood volume) ● Performs post-operative nausea and vomiting risk stratification and mitigation across different age groups
Level 2 <i>Demonstrates knowledge of common medical and surgical conditions in pediatric patients, from neonates to adolescents</i>	<ul style="list-style-type: none"> ● Describes basic physiology of pediatric diseases/conditions such as (examples are not meant to be mandatory requirements or a comprehensive list): <ul style="list-style-type: none"> ○ Acute leukemia ○ Adolescent idiopathic scoliosis ○ Cardiac septal defects (acyanotic) ○ Epilepsy ○ Esophageal foreign body ○ Hypospadias ○ Obstructive hydrocephalus ○ Pyloric stenosis ○ Sepsis ○ Sleep-disordered breathing ○ Strabismus ○ Testicular torsion ○ Tetralogy of Fallot ● States the fundamental steps of common pediatric surgical procedures such as: <ul style="list-style-type: none"> ○ Adenotonsillectomy ○ Exploratory laparoscopy ○ Exploratory laparotomy ○ Hypospadias repair ○ Posterior spinal fusion ○ Thoracotomy ○ Upper and lower gastroenterology endoscopy ○ Ventriculoperitoneal shunt placement
Level 3 <i>Demonstrates comprehensive knowledge of common medical and surgical</i>	<ul style="list-style-type: none"> ● Demonstrates advanced knowledge of, and/or teaching about, the anesthetic implications of common pediatric diseases requiring surgery such as those shown in Level 2

<p><i>conditions in pediatric patients and related anesthetic considerations</i></p>	<ul style="list-style-type: none"> ● Demonstrates full understanding of the anesthetic considerations of each step of common pediatric surgical procedures such as those shown in Level 2
<p>Level 4 <i>Demonstrates comprehensive knowledge of complex medical and surgical conditions in pediatric patients and related anesthetic considerations</i></p>	<ul style="list-style-type: none"> ● States the underlying physiology and advanced anesthetic implications of complex pediatric diseases requiring surgery, including for patients in emergent settings, such as (examples not intended to be comprehensive): <ul style="list-style-type: none"> ○ Acute liver failure ○ Acute respiratory distress syndrome ○ Airway foreign body ○ Anterior mediastinal mass ○ Complex or cyanotic congenital heart disease ○ Intracranial hypertension ○ Myocarditis with severely diminished heart function ○ Open globe ophthalmic injury ○ Pediatric traumatic brain injury ○ Severe pulmonary hypertension ○ Severe septic shock
<p>Level 5 <i>Serves as an expert consultant for children with complex and/or uncommon physiology and related anesthetic and surgical considerations</i></p>	<ul style="list-style-type: none"> ● Serves as an expert anesthesiology care consultant for a multidisciplinary team caring for patients with complex conditions such as those shown in Level 4, or for uncommon situations such as: <ul style="list-style-type: none"> ○ Anterior mediastinal mass with cardiorespiratory compromise ○ Cannulation for extracorporeal membrane oxygenation ○ Cardiopulmonary arrest in children
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case based discussion ● Direct observation ● Mock oral examinations ● Pediatric Anesthesiology In training exam ● Performance on question banks
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● The American Board of Anesthesiology. Initial Certification in Anesthesiology. http://www.theaba.org/PDFs/BASIC-Exam/Basic-and-Advanced-ContentOutline. Accessed 2020.

Medical Knowledge 2: Clinical Reasoning	
Overall Intent: To develop an organized systematic approach to analyzing clinical scenarios while minimizing the impact of clinical reasoning errors	
Milestones	Examples
Level 1 <i>Accurately describes basic elements of a clinical scenario</i>	<ul style="list-style-type: none"> ● Presents a focused patient history (history of asthma, cough, and rhinorrhea) and findings on physical exam (wheezing and SpO2 95 percent) using appropriate terminology; summarizes findings with a concise impression (acute asthma exacerbation in the setting of an upper respiratory infection)
Level 2 <i>Analyzes simple (or common) clinical scenarios using an organized, systematic approach with direct guidance</i> <i>Retrospectively recognizes clinical reasoning errors, with guidance</i>	<ul style="list-style-type: none"> ● Identifies an acute increase in airway pressure immediately after intubation with upsloping end tidal carbon dioxide (CO₂) tracing and listens to lung sounds as part of evaluation ● Fails to treat peri-operative pain in an infant with a weight-appropriate dose of an opioid due to fear that any dose could lead to apnea, but recognizes the clinical reasoning error with guidance (omission bias) ● Focuses on troubleshooting a monitoring cable and probe assuming they are faulty in response to a decrease in SpO₂, but fails to rule out mainstem intubation or analyze the ventilator; recognizes the clinical reasoning error with guidance (confirmation bias)
Level 3 <i>Analyzes simple (or common) clinical scenarios using an organized, systematic approach, with indirect guidance</i> <i>Retrospectively recognizes clinical reasoning errors independently</i>	<ul style="list-style-type: none"> ● Lists mucus plugging, mainstem intubation, and pneumothorax as possible etiologies in a patient with increased airway pressure, desaturation, and diminished breath sounds in one lung ● Independently recognizes fixation error by identifying dehydration and excessive blood loss as the cause of persistent intra-operative hypotension after first attributing it to a single bolus of propofol
Level 4 <i>Independently analyzes complex clinical scenarios using an organized, systematic approach</i> <i>Identifies and actively avoids clinical reasoning errors</i>	<ul style="list-style-type: none"> ● In response to hypoxemia/hypotension in an infant with pulmonary hypertension, sequentially progresses from least invasive interventions (intravenous fluid optimization, adequate analgesia, euthermia, appropriate ventilator changes, etc.) to more invasive (inotropic support, inhaled nitric oxide, ECMO, etc.) ● Routinely investigates multiple etiologies of a change in a patient's clinical status before making a conclusion or succumbing to bias ● Without prompting, discusses with faculty members previous errors in reasoning and develops strategies to avoid these in future cases
Level 5 <i>Teaches others how to analyze complex clinical scenarios using an organized, systematic approach</i>	<ul style="list-style-type: none"> ● Develops and teaches algorithms for use by residents/fellows for diagnosis and management of elevated peak airway pressures associated with hypoxemia ● Develops a simulation-based curriculum for teaching clinical reasoning

<p><i>Models and teaches approaches to avoid clinical reasoning errors</i></p>	<ul style="list-style-type: none"> • Hosts a resident/fellow quality improvement (QI) conference and shares past errors to help educate peers
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Multisource feedback • Self-assessment • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Graber ML, Franklin N, Gordon R. Diagnostic error in internal medicine. <i>Archives of Internal Medicine</i>. 2005;165(13):1493-1499. https://www.researchgate.net/publication/298348382_Diagnostic_Error_in_Internal_Medicine. Accessed 2020. • Kempainen RR, Migeon MB, Wolf FM. Understanding our mistakes: A primer on errors in clinical reasoning. <i>Med Teach</i>. Mar;2003;25(2):177-181. https://pubmed.ncbi.nlm.nih.gov/12745527/. Accessed 2020. • Mamede S, Schmidt HG, Penaforte JC. Effects of reflective practice on the accuracy of medical diagnosis. <i>Medical Education</i>. 2008;42(5):468-475. https://www.ncbi.nlm.nih.gov/pubmed/18412886. 2020. • Norman GR, Monteiro SD, Sherbino J, Ilgen JS, Schmidt HG, Mamede S. The causes of errors in clinical reasoning: cognitive biases, knowledge deficits, and dual process thinking. <i>Academic Medicine</i>. 2017;92(1):23-30. https://journals.lww.com/academicmedicine/Fulltext/2017/01000/The_Causes_of_Errors_in_Clinical_Reasoning_13.aspx. Accessed 2020. From the article: Types and examples of reasoning error: More than 40 forms of cognitive error have now been described, and several texts and articles explore these in depth using narrative case studies. Tables 1 and 2 define the commonest errors in diagnostic and management reasoning and provide examples. Many error types are inter-related, and more than one can feature in a patient's care. Importantly, deficiencies in medical knowledge are rarely responsible for diagnostic errors, with premature acceptance of the most favoured diagnosis being highly prevalent (up to 90%) and independent of level of expertise. Similarly, cognitive resistance to altering past habits and mindsets has a much more prominent role than ignorance in errors of management reasoning. • Stiegler MP, Tung A. Cognitive processes in anesthesiology decision making. <i>Anesthesiology</i>. 2014;120(1):204-217. https://anesthesiology.pubs.asahq.org/article.aspx?articleid=1918006. Accessed 2020.

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Systems-Based Practice 1: Patient Safety and Quality Improvement (QI)	
Overall Intent: To engage in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals; to conduct a QI project	
Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge of common events that impact patient safety</i></p> <p><i>Demonstrates knowledge of how to report patient safety events</i></p> <p><i>Demonstrates knowledge of basic quality improvement methodologies and metrics</i></p>	<ul style="list-style-type: none"> ● Lists patient misidentification or medication errors as common patient safety events ● Explains how to report errors in own health system ● Describes fishbone tool
<p>Level 2 <i>Identifies system factors that lead to patient safety events</i></p> <p><i>Reports patient safety events through institutional reporting systems (simulated or actual)</i></p> <p><i>Describes departmental quality improvement initiatives</i></p>	<ul style="list-style-type: none"> ● Identifies a recent change to the transfusion requisition form that did not include space for two-person verification to avoid an error ● Identifies that a regional anesthesia consent form does not include laterality ● Reports lack of compliance with antibiotic administration through departmental or institutional reporting systems ● Summarizes protocols to decrease surgical site infections
<p>Level 3 <i>Participates in analysis of patient safety events (simulated or actual)</i></p> <p><i>Participates in disclosure of patient safety events to patients and patients' families (simulated or actual)</i></p> <p><i>Participates in department quality improvement initiatives</i></p>	<ul style="list-style-type: none"> ● Assimilates patient data, evaluates the root cause, and presents the findings of a patient safety event ● During an OSCE, communicates with patients and their families about a medication administration error ● Participates in a root cause analysis of duplicate acetaminophen administration in post-anesthesia care unit (PACU)
<p>Level 4 <i>Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)</i></p> <p><i>Discloses patient safety events to patients and patients' families (simulated or actual)</i></p>	<ul style="list-style-type: none"> ● Collaborates with a team to conduct the analysis of intra-operative antibiotic administration errors and presents suggested policy and electronic health record (EHR) design changes at a department meeting ● Discusses with patient (and/or family) an inadvertent double-dose of acetaminophen administration given to them due to hand-off error

<p><i>Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project</i></p>	<ul style="list-style-type: none"> • Initiates and develops a resident QI project to improve peri-operative hand-offs and presents findings to the department
<p>Level 5 <i>Actively engages teams and processes to modify systems to prevent patient safety events</i></p> <p><i>Role models or mentors others in the disclosure of patient safety events</i></p> <p><i>Creates, implements, and assesses quality improvement initiatives at the institutional level or above</i></p>	<ul style="list-style-type: none"> • Assumes a leadership role at the departmental or institutional level for patient safety • Conducts a simulation for disclosing patient safety events • Initiates and completes a QI project to improve disclosure of serious adverse events to patients and families and shares results with stakeholders
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • E-module multiple choice tests • Multisource feedback • OSCE • Reflection • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Anesthesia Patient Safety Foundation. Patient Safety Initiatives. https://www.apsf.org/patient-safety-initiatives/. 2020. • Hagerman N, Varughese A et al. Quality and safety in pediatric anesthesia: How can guidelines, checklists and initiatives improve outcome. Current Opinions in Anesthesiology. 2014. June 27 (3):323-9. • Institute of Healthcare Improvement. http://www.ihl.org/Pages/default.aspx. 2020.

Systems-Based Practice 2: System Navigation for Patient-Centered Care	
Overall Intent: To effectively navigate the health care system, including the interdisciplinary team and other care providers; to adapt care to a specific patient population to ensure high-quality patient outcomes	
Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge of care coordination</i></p> <p><i>Identifies key elements for safe and effective transitions of care and hand-offs</i></p> <p><i>Demonstrates knowledge of population and community health needs and inequities</i></p>	<ul style="list-style-type: none"> ● For a critically ill trauma patient, identifies the surgeons, anesthesiologists, nurses, social workers, and pediatric intensive care unit (PICU) pharmacist as members of the team ● Lists the essential components of a standardized tool for sign-out, care transition, and hand-offs ● Identifies that inpatients may have different needs than ambulatory patients; identifies barriers to discharge home for ambulatory patients ● Identifies barriers in refilling medications for members of underserved populations
<p>Level 2 <i>Coordinates care of patients in routine clinical situations effectively using the roles of interprofessional team members</i></p> <p><i>Performs safe and effective transitions of care/hand-offs in routine clinical situations</i></p> <p><i>Identifies specific population and community health needs and inequities for the local population</i></p>	<ul style="list-style-type: none"> ● Coordinates care with the PACU and primary medical team on arrival to PACU ● Routinely uses a standardized tool for a stable patient during PACU sign-out ● Identifies challenges in communicating with patients with communication barriers (e.g., non-English-speaking patients and families; hearing, visual, or cognitive impairment)
<p>Level 3 <i>Coordinates care of patients in complex clinical situations effectively using the roles of interprofessional team members</i></p> <p><i>Performs safe and effective transitions of care/hand-offs in complex clinical situations</i></p> <p><i>Uses institutional resources effectively to meet the needs of a patient population and community</i></p>	<ul style="list-style-type: none"> ● Works with the patient, family, and members of the peri-operative team to coordinate the care of a patient with a do-not-resuscitate order ● Routinely uses a standardized tool when transferring a patient to and from the PICU ● Follows institutional guidelines to provide safe care for a Jehovah’s Witness patient undergoing scoliosis surgery
<p>Level 4 <i>Role models effective coordination of patient-centered care among different disciplines and specialties</i></p>	<ul style="list-style-type: none"> ● During ICU rounds, leads team members in approaching consultants to review cases/recommendations and arranges multidisciplinary rounds for the team

<p><i>Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems</i></p> <p><i>Participates in changing and adapting practice to provide for the needs of specific populations</i></p>	<ul style="list-style-type: none"> ● Prior to rotating off the PICU service, proactively informs the incoming fellows about a plan of care for a patient awaiting a liver transplant with multiple studies pending ● Assists in the design of protocols for discussing and managing blood product usage in patients who refuse blood products for religious reasons
<p>Level 5 <i>Analyzes the process of care coordination and participates in the design and implementation of improvements</i></p> <p><i>Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes</i></p> <p><i>Advocates for populations and communities with health care inequities in the peri-operative setting</i></p>	<ul style="list-style-type: none"> ● Develops a program to arrange for pre-operative assessment of medically fragile children ● Devises a protocol to improve transitions from PICU to step down or monitored unit ● Leads development of telehealth support services for a community hospital PICU ● Partners with the multidisciplinary health care team to create an innovative approach to support disadvantaged patients in refilling medications
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Medical record (chart) audit ● Multisource feedback ● OSCE ● Quality metrics and goals mined from EHRs ● Review of sign-out tools, use and review of checklists
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● Centers for Disease Control and Prevention (CDC). Population Health Training in Place Program (PH-TIPP). https://www.cdc.gov/pophealthtraining/whatis.html. 2020. ● Kaplan KJ. In pursuit of patient-centered care. March 2016. http://tissuepathology.com/2016/03/29/in-pursuit-of-patient-centered-care/#axzz5e7nSsAns. 2020. ● Lockman J, Schwartz A et al. Working to define professionalism in pediatric anesthesia: a qualitative study of domains of the expert pediatric anesthesiologist as valued by interdisciplinary stakeholders. <i>Pediatric Anesthesia</i>. 2017. Feb;27 (2): 137-146. ● Skochelak SE, Hawkins RE, Lawson LE, Starr SR, Borkan JM, Gonzalo JD. <i>AMA Education Consortium: Health Systems Science</i>. 1st ed. Philadelphia, PA: Elsevier; 2016. https://commerce.ama-assn.org/store/ui/catalog/productDetail?product_id=prod2780003. 2020.

Systems-Based Practice 3: Physician Role in Health Care Systems	
Overall Intent: To understand the physician’s role in the complex health system and how to optimize the system to improve patient care and the health system’s performance	
Milestones	Examples
Level 1 <i>States factors impacting the costs of anesthetic care</i>	<ul style="list-style-type: none"> ● Explains relative cost of anesthetic medications, monitors, and supplies
Level 2 <i>Describes how components of a complex health care system are interrelated, and how they impact patient care</i> <i>Documents anesthetic detail to facilitate accurate billing and reimbursement</i>	<ul style="list-style-type: none"> ● Prioritizes planning of an MRI for a patient with severe traumatic brain injury prior to discharge to a rehabilitation center ● Ensures anesthetic procedure accurately reflects procedure performed ● Documents all Centers for Medicare and Medicaid Services (CMS)-required components of anesthetic care performed during procedure
Level 3 <i>Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)</i> <i>Explains the impact of documentation on billing and reimbursement</i>	<ul style="list-style-type: none"> ● Ensures that patients with post-operative nausea and vomiting receive adjusted anesthetic plans and adequate prophylaxis to avoid unnecessary hospitalization ● Discusses the necessity of including the ultrasound image for an ultrasound guided procedure to receive reimbursement
Level 4 <i>Manages various components of the complex health care system to provide efficient and effective patient care and transitions of care</i> <i>Practices and advocates for cost-effective patient care</i>	<ul style="list-style-type: none"> ● Effectively works with the social work team to ensure interpretive services are available for non-English-speaking patients both pre- and post-operatively ● Effectively plans and implements anesthetic to promote enhanced recovery and rapid discharge
Level 5 <i>Advocates for or leads systems change that enhances high-value, efficient, and effective patient care</i> <i>Engages in external activities related to advocacy for cost-effective care</i>	<ul style="list-style-type: none"> ● Works with peri-operative teams to develop and implement enhanced recovery protocols for surgical service lines ● Improves informed consent process for non-English-speaking patients requiring interpreter services
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Medical record (chart) audit ● Patient satisfaction data ● Portfolio
Curriculum Mapping	<ul style="list-style-type: none"> ●

Notes or Resources

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Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice Overall Intent: To incorporate evidence and patient values into clinical practice	
Milestones	Examples
Level 1 <i>Accesses and uses evidence in routine patient care</i>	<ul style="list-style-type: none"> ● Reviews the most recent guidelines for post-operative nausea and vomiting, and applies it in routine pediatric patient care
Level 2 <i>Articulates clinical questions and elicits the patient's and patient's family's preferences and values to guide evidence-based care</i>	<ul style="list-style-type: none"> ● In a patient needing inguinal hernia repair, discusses options for peri-operative pain management including a caudal epidural, and solicits family's preferences
Level 3 <i>Locates and applies the best available evidence, integrated with the patient's and patient's family's preference, to the care of complex patients</i>	<ul style="list-style-type: none"> ● Obtains evidence, discusses family preferences, and applies integrated decisions for the peri-operative blood product management of a Jehovah's Witness pediatric patient undergoing spinal fusion
Level 4 <i>Appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide individualized care</i>	<ul style="list-style-type: none"> ● Accesses the primary literature to discuss current evidence about anesthesia and the developing brain and guides peri-operative care ● Reviews primary literature regarding DNR status in pediatric patients, discusses ethical considerations with specialties involved and hospital ethics committee (when applicable), and applies integrated decisions in the peri-operative setting
Level 5 <i>Mentors others to appraise and apply evidence for complex patients and/or participates in the development of guidelines</i>	<ul style="list-style-type: none"> ● Leads seminars/presentations on evidence regarding anesthesia and the developing brain ● Reviews evidence and develops processes to lower environmental contamination and decrease waste in the operating room and perioperative arena ● As part of a team, develops airway protocols and rapid response teams for hospitals
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Oral or written examinations ● Oral presentations ● Research and quality improvement projects
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● Axelrod D, Bell C, Feldman J, et al. Greening the Operating Room and Perioperative Arena: Environmental Sustainability for Anesthesia Practice, American Society for Anesthesiologists. https://www.asahq.org/about-asa/governance-and-committees/asa-committees/committee-on-equipment-and-facilities/environmental-sustainability/greening-the-operating-room. Accessed 2022. ● Gan T, Kumar B, Sergio B, et al. Fourth consensus guidelines for the management of postoperative nausea and vomiting. <i>Anesthesia & Analgesia</i>. 2020; 131(2): 411-448. doi: 10.1213/ANE.0000000000004833 https://journals.lww.com/anesthesia-analgesia/fulltext/2020/08000/fourth_consensus_guidelines_for_the_management_of.16.aspx.

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Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth Overall Intent: To seek clinical performance information with the intent to improve care; to reflect on all domains of practice, personal interactions, and behaviors, and their impact on colleagues and patients (reflective mindfulness); to develop clear objectives and goals for improvement in some form of a learning plan	
Milestones	Examples
<p>Level 1 <i>Accepts responsibility for personal and professional development by establishing goals</i></p> <p><i>Identifies the factors that contribute to performance deficits</i></p> <p><i>Actively seeks opportunities to improve</i></p>	<ul style="list-style-type: none"> ● Completes self-reflective goals prior to meeting with the program director ● Identifies gaps in knowledge of pediatric developmental milestones ● Identifies that fatigue, stressors, and perceived life-work imbalance contribute to performance deficits ● Asks for feedback from patients, families, and patient care team members ● Uses institutional provided resources to balance personal/professional commitments and obligations
<p>Level 2 <i>Demonstrates openness to performance data (feedback and other input) to inform goals</i></p> <p><i>Analyzes and acknowledges the factors that contribute to performance deficits</i></p> <p><i>Designs and implements a learning plan, with prompting</i></p>	<ul style="list-style-type: none"> ● Integrates feedback to adjust peri-operative management of patients with history of post-operative nausea and vomiting ● Integrates feedback to adjust pain medications administered in the PACU ● Assesses time management skills and how they impact turnovers and on-time starts ● When prompted, develops and implements individual education plan to improve evaluation of patients at risk for post-operative nausea and vomiting
<p>Level 3 <i>Seeks performance data episodically, with adaptability and humility</i></p> <p><i>Institutes behavioral change(s) to improve performance</i></p> <p><i>Independently creates and implements a learning plan</i></p>	<ul style="list-style-type: none"> ● Obtains chart data to determine incidence of post-operative nausea and vomiting in own patients, in association with administered post-operative nausea and vomiting preventative medications ● Obtains chart data (in own patients) to determine adequate pain management in PACU reflecting surgical procedure performed ● Uses focused evidence-based literature to improve evaluation of patients at risk for post-operative nausea and vomiting ● Implements strategies that improve behaviors such as trust, interdependence, genuineness, empathy, risk, team building, and success

<p>Level 4 <i>Intentionally seeks performance data consistently, with adaptability and humility</i></p> <p><i>Considers alternatives to improve performance</i></p> <p><i>Integrates performance data to adapt the learning plan</i></p>	<ul style="list-style-type: none"> ● Requests a quarterly chart audit (of own patients) to determine adequate peri-operative use of pain medications (e.g., NSAIDs, acetaminophen, opioids, other adjuncts) and alters practice accordingly ● After patient encounter, debriefs with the attending and other patient care team members to optimize future collaboration in the care of the patient and family ● Based on audit of incidence of post-operative nausea and vomiting in own patients, identifies knowledge gaps and reads current practice guidelines to improve care
<p>Level 5 <i>Role models consistently seeking performance data with adaptability and humility</i></p> <p><i>Models reflective practice</i></p> <p><i>Facilitates the design and implementation of learning plans for others</i></p>	<ul style="list-style-type: none"> ● Shares instances of near misses with more junior learners ● Shares own performance gaps and adapted plan with other learners ● Identifies and shares strategies to improve ultrasound guided peripheral and central access placement based on previously received feedback ● Assists residents in developing their individualized learning plans
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Review of learning plan ● Multisource Feedback
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: practice-based learning and improvement. <i>Acad Pediatr.</i> 2014;14:S38-S54. https://pubmed.ncbi.nlm.nih.gov/24602636/. ● Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. <i>Academic Medicine.</i> 2009;84(8):1066-1074. https://journals.lww.com/academicmedicine/fulltext/2009/08000/Measurement_and_Correlates_of_Physicians_Lifelong.21.aspx. ● Lockspeiser TM, Schmitter PA, Lane JL, Hanson JL, Rosenberg AA, Park YS. Assessing residents' written learning goals and goal writing skill: validity evidence for the learning goal scoring rubric. <i>Academic Medicine.</i> 2013;88(10):1558-1563. https://journals.lww.com/academicmedicine/fulltext/2013/10000/Assessing_Residents_Written_Learning_Goals_and.39.aspx. ● Reed S, Lockspeiser TM, Burke A, et al. Practical suggestions for the creation and use of meaningful learning goals in graduate medical education. <i>Academic Pediatrics.</i> 2016;16(1):20-24. https://www.academicpedsjnl.net/article/S1876-2859(15)00333-2/pdf.

- CDC Pediatric Developmental Milestones
<https://www.cdc.gov/ncbddd/actearly/milestones/index.html>

Professionalism 1: Professional Behavior and Ethical Principles	
Overall Intent: To recognize and address lapses in ethical and professional behavior, demonstrate ethical and professional behaviors, and use appropriate resources for managing ethical and professional dilemmas	
Milestones	Examples
<p>Level 1 <i>Describes when and how to report lapses in professionalism and demonstrates insight into professional behavior in routine situations</i></p> <p><i>Demonstrates knowledge of the ethical principles underlying patient care</i></p>	<ul style="list-style-type: none"> ● Describes the impact of fatigue on clinical performance ● Recognizes the impact of personal “bias” on patient care ● Identifies fatigue and lists available resources to mitigate impact from fatigue ● Describes institutional safety reporting systems to report “near miss” and other safety events or process problems ● Articulates how the principle of “do no harm” applies when a learning opportunity exists to perform a procedure (e.g., regional block placement) on a patient who does not require the procedure ● Discusses the basic principles underlying ethics (e.g., beneficence, nonmaleficence, justice, autonomy) and professionalism (e.g., professional values and commitments), and how they apply in various situations (e.g., informed consent process)
<p>Level 2 <i>Uses insight into professional behavior to take responsibility in professionalism lapses, as well as to identify potential areas for self-improvement</i></p> <p><i>Analyzes complex situations using ethical principles</i></p>	<ul style="list-style-type: none"> ● Respectfully approaches a trainee who is late for duty about the importance of being on time ● Maintains patient confidentiality in public situations ● Notifies a supervisor in a timely way when unable to fulfill a responsibility ● Identifies and applies ethical principles involved in informed consent when the trainee is unclear of known risks ● Identifies an appropriate surrogate for patients who are unable to consent for themselves ● Obtains assent when age-appropriate for pediatric patients
<p>Level 3 <i>Demonstrates professional behavior in complex or stressful situations</i></p> <p><i>Recognizes need to seek help in managing and resolving complex interpersonal situations</i></p>	<ul style="list-style-type: none"> ● Appropriately responds to a distraught family member, following a peri-operative complication ● Appropriately leads conversations in the operating room during stressful situations such as acute blood loss and hemodynamic instability ● After noticing a colleague’s inappropriate social media post, reviews policies related to posting of content and seeks guidance from supervisor ● Reviews Jehovah’s Witness institutional policies and offers options for peri-operative management

<p>Level 4 <i>Serves as a model for professionalism among colleagues; actively solicits help and acts on recommendations to resolve complex interpersonal situations</i></p> <p><i>Recognizes and utilizes resources for managing and resolving ethical dilemmas</i></p>	<ul style="list-style-type: none"> ● Actively solicits the perspectives of others for a peri-operative clinical care management plan ● Models respect for patients and promotes the same from colleagues ● Recognizes and uses ethics consults and risk-management/legal counsel to resolve ethical dilemmas ● De-escalates (and calls for help when needed) in situations involving conflict with staff, patients, or family members ● Obtains institutional guidance on obtaining consent and administering blood transfusion in pediatric Jehovah’s Witness patients who may require transfusion as a life-saving therapy ● Recognizes and appropriately manages situations of medical futility
<p>Level 5 <i>Coaches others when their behavior fails to meet professional expectations</i></p> <p><i>Addresses system-level factors that induce or exacerbate ethical problems or impede their resolution</i></p>	<ul style="list-style-type: none"> ● Coaches others when their behavior fails to meet professional expectations, and creates a performance improvement plan to prevent recurrence ● Identifies and seeks to address system-wide factors or barriers to promoting a culture of ethical behavior through participation in a work group, committee, or taskforce (e.g., ethics committee or an ethics subcommittee, risk management committee, root cause analysis review, patient safety or satisfaction committee, professionalism work group, Institutional Review Board, resident grievance committee)
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation ● Multisource feedback ● Oral or written self-reflection ● OSCE ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ASA. ASA Code of Ethics. https://www.asanet.org/code-ethics. Accessed 2020. ● American Medical Association. Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. Accessed 2020. ● Byyny RL, Papadakis MA, Paauw DS. <i>Medical Professionalism Best Practices</i>. Menlo Park, CA: Alpha Omega Alpha Medical Society; 2015. https://alphaomegaaalpha.org/pdfs/2015MedicalProfessionalism.pdf.

- Domen RE, Johnson K, Conran RM, et al. Professionalism in pathology: a case-based approach as a potential education tool. *Arch Pathol Lab Med.* 2017; 141:215-219. <https://pubmed.ncbi.nlm.nih.gov/27763788/>.
- Levinson W, Ginsburg S, Hafferty FW, Lucey CR. *Understanding Medical Professionalism.* 1st ed. New York, NY: McGraw-Hill Education; 2014.

Professionalism 2: Accountability/Conscientiousness	
Overall Intent: To take responsibility for one’s own actions and their impact on patients and other members of the health care team	
Milestones	Examples
Level 1 <i>Recognizes situations that may impact one’s own ability to complete tasks and responsibilities in a timely manner</i>	<ul style="list-style-type: none"> ● Responds promptly to reminders from program administrator to complete clinical and educational work hour logs and case logs ● Attends conferences and other educational activities on time ● Apologizes to team member(s) for unprofessional behavior without prompting
Level 2 <i>Performs most tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations</i>	<ul style="list-style-type: none"> ● Completes administrative tasks, documents safety modules, procedure review, and licensing requirements by specified due date ● Before going out of town, completes tasks in anticipation of lack of computer access while traveling ● Completes clinical and educational work hour logs and case logs without prompting
Level 3 <i>Takes responsibility for the rare occurrence in which tasks are not completed in a timely manner and identifies strategies to prevent recurrence</i>	<ul style="list-style-type: none"> ● Notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from other trainees or faculty members as needed ● Appropriately notifies day service team about overnight call events during transition of care or hand-off to avoid patient safety issues and compromise of patient care ● Apologizes to team member(s) for unprofessional behavior without prompting, offers restitution if possible and through self-reflection identifies root cause of failure
Level 4 <i>Prioritizes tasks and responsibilities in a timely manner with appropriate attention to detail in even the most complex or stressful situations</i>	<ul style="list-style-type: none"> ● Takes responsibility for inadvertently omitting key patient information during hand-off and professionally discusses with the patient, family and interprofessional team as appropriate ● Follows up with a patient who had an IV infiltration after being discharged from the hospital ● Follows-up on a complex patient in the PICU after surgery
Level 5 <i>Designs and implements an institutional systems approach to ensure timely task completion and shared responsibility</i>	<ul style="list-style-type: none"> ● Coordinates a multidisciplinary team (e.g., to facilitate ICU transfers throughout the institution) ● Leads multidisciplinary team in peri-operative root cause analysis to improve system practices (e.g., around infection control)
Assessment Models or Tools	<ul style="list-style-type: none"> ● Compliance with deadlines and timelines ● Direct observation ● Global evaluations ● Multisource feedback ● Self-evaluations and reflective tools ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●

Notes or Resources	<ul style="list-style-type: none">• ASA. ASA Code of Ethics. https://www.asanet.org/code-ethics. Accessed 2020.• Code of conduct from fellow/resident institutional manual• Expectations of residency program regarding accountability and professionalism
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Professionalism 3: Well-Being	
Overall Intent: To identify, manage, improve, and seek help for personal and professional well-being for oneself and others	
Milestones	Examples
Level 1 <i>Recognizes the importance of addressing personal and professional well-being</i>	<ul style="list-style-type: none"> ● Acknowledges one’s own response to a patient’s terminal diagnosis ● Is receptive to feedback on missed emotional cues after a family meeting ● Discusses well-being concerns and their implications for performance
Level 2 <i>Lists available resources for personal and professional well-being</i> <i>Describes institutional resources that are meant to promote well-being</i>	<ul style="list-style-type: none"> ● Independently identifies and communicates impact of a personal family tragedy ● Completes e-learning modules (or other modality) related to fatigue management ● Demonstrates how to access an institutional crisis line ● Independently identifies the stress of relationship issues, difficult patients, and financial pressures, and seeks help if needed
Level 3 <i>With assistance, proposes a plan to promote personal and professional well-being</i> <i>Recognizes which institutional factors affect well-being</i>	<ul style="list-style-type: none"> ● With the multidisciplinary team, develops a reflective response to deal with personal impact of difficult patient encounters and disclosures ● Identifies institutionally sponsored wellness programs ● Integrates feedback from the multidisciplinary team to develop a plan for identifying and responding to emotional cues during the next family meeting ● With supervision, assists in developing a personal learning or action plan to address factors potentially contributing to burnout or moral injury
Level 4 <i>Independently develops a plan to promote personal and professional well-being</i> <i>Describes institutional factors that positively and/or negatively affect well-being</i>	<ul style="list-style-type: none"> ● Independently identifies ways to manage personal stress both inside and out of the hospital ● Self-assesses and seeks additional feedback on skills responding to emotional cues during a family meeting ● Works to prevent, mitigate, and intervene early during stressful periods in the learner peer group
Level 5 <i>Creates institutional-level interventions that promote colleagues’ well-being</i>	<ul style="list-style-type: none"> ● Assists in organizational efforts to address clinician well-being after an unanticipated patient death or catastrophic diagnosis ● Works with multidisciplinary team to develop a feedback framework for learners around family meetings

<i>Describes institutional programs designed to examine systemic contributors to burnout</i>	<ul style="list-style-type: none"> • Establishes a mindfulness program open to all employees
Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation • Group interview or discussions for team activities • Individual interview • Institutional online training modules • Self-assessment and personal learning plan
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • 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. • ACGME. Well-Being Tools and Resources. https://dl.acgme.org/pages/well-being-tools-resources. Accessed 2022. • Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: personal and professional development. <i>Acad Pediatr.</i> 2014;14(2 Suppl):S80-97. https://linkinghub.elsevier.com/retrieve/pii/S1876-2859(13)00332-X. • Local resources, including employee assistance programs (EAPs)

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication Overall Intent: To deliberately use language and behaviors to form constructive relationships with patients, to identify communication barriers including self-reflection on personal biases, and minimize them in the doctor-patient relationships; to organize and lead communication around shared decision making	
Milestones	Examples
Level 1 <i>Communicates with patients and their families in an understandable and respectful manner</i>	<ul style="list-style-type: none"> ● Introduces self and faculty member; identifies patient, caretakers, and others in the room; and engages all parties in health care discussion ● Uses interpreter services for non-native English speakers
Level 2 <i>Customizes communication in the setting of personal biases and barriers with patients and patients' families</i> <i>Actively listens to patients and patients' families to elicit patient preferences and expectations</i>	<ul style="list-style-type: none"> ● Avoids medical jargon and restates patient/caretaker's perspective when discussing induction options (intravenous versus inhaled) ● Offers parent-present induction, when appropriate, to all caregivers regardless of sociocultural or language background ● Responds to questions regarding the risks of caudal anesthesia techniques
Level 3 <i>Explains complex and difficult information to patients and patients' families</i> <i>Uses shared decision-making to make a personalized care plan</i>	<ul style="list-style-type: none"> ● Discusses the role and implications of endotracheal intubation in a palliative care patient undergoing a palliative procedure ● Following a discussion of the risks and benefits of supplemental caudal anesthesia, elicits family concerns and addresses them appropriately; documents discussion and preference in medical record
Level 4 <i>Facilitates difficult discussions with patients and patients' families</i> <i>Effectively negotiates and manages conflict among patients, patients' families, and the health care team</i>	<ul style="list-style-type: none"> ● Explains the risks of neurocognitive dysfunction to parents of a neonate prior to administration of anesthesia ● Explains to a patient and their family medical reasoning behind canceling their procedure ● Explains causes and treatment of a corneal abrasion during post-operative visits
Level 5 <i>Mentors others in the facilitation of crucial conversations</i> <i>Mentors others in conflict resolution</i>	<ul style="list-style-type: none"> ● Leads a discussion group on personal experience of moral distress ● Develops a residency curriculum on health care disparities which addresses unconscious bias ● Serves on a hospital bioethics committee
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● OSCE ● Self-assessment including self-reflection exercises ● Standardized patients

Curriculum Mapping	•
Notes or Resources	<ul style="list-style-type: none"> • Laidlaw A, Hart J. Communication skills: an essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. <i>Med Teach</i>. 2011;33(1):6-8. https://www.tandfonline.com/doi/full/10.3109/0142159X.2011.531170. • Makoul G. Essential elements of communication in medical encounters: The Kalamazoo consensus statement. <i>Acad Med</i>. 2001;76:390-393. https://pubmed.ncbi.nlm.nih.gov/11299158/. • Makoul G. The SEGUE Framework for teaching and assessing communication skills. <i>Patient Educ Couns</i>. 2001;45(1):23-34. https://pubmed.ncbi.nlm.nih.gov/11602365/. • Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in residents. <i>BMC Med Educ</i>. 2009;9:1. https://bmcmmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication Overall Intent: To effectively communicate with the health care team, including consultants, in both straightforward and complex situations	
Milestones	Examples
<p>Level 1 <i>Respectfully requests or receives consultations</i></p> <p><i>Uses language that values all members of the health care team</i></p> <p><i>Respectfully receives feedback from the health care team</i></p>	<ul style="list-style-type: none"> ● Consults cardiology for a child with new onset, stable arrhythmia that persists post-operatively ● Receives an acute pain consult request, asks clarifying questions politely, and expresses appreciation for the motivation behind the consult request ● Acknowledges the contribution of each member of the patient care team to the patient
<p>Level 2 <i>Clearly, concisely, and promptly requests or responds to a consultation</i></p> <p><i>Communicates information effectively with all health care team members</i></p> <p><i>Solicits feedback on performance as a member of the health care team</i></p>	<ul style="list-style-type: none"> ● Communicates pre-operative plans with the attending anesthesiologist concisely in a timely manner ● Communicates intra-operative events to the surgical staff and attending anesthesiologist clearly and concisely in an organized and timely manner ● Conducts post-operative visits and discusses patient complications with supervising attending while reflecting on personal role in the patient’s care
<p>Level 3 <i>Uses closed-loop communication to verify understanding</i></p> <p><i>Adapts communication style to fit team needs</i></p> <p><i>Communicates concerns and provides feedback to peers and learners</i></p>	<ul style="list-style-type: none"> ● While leading an intra-operative resuscitation, clearly delegates tasks and asks if team members understand their roles ● Asks other members of the health care team to repeat back recommendations to ensure understanding ● When receiving treatment recommendations from an attending physician, repeats back the plan to ensure understanding ● Provides constructive feedback to a medical student during intubation
<p>Level 4 <i>Coordinates recommendations from different members of the health care team to optimize patient care</i></p> <p><i>Maintains effective communication in crisis situations</i></p>	<ul style="list-style-type: none"> ● Collaborates with surgical colleagues to plan for post-operative analgesia in a patient on chronic opioids ● Explains rationale for institution of the massive transfusion protocol during intra-operative hemorrhage

<p><i>Communicates constructive feedback to superiors</i></p>	<ul style="list-style-type: none"> ● Alerts faculty member to a breach in sterility during a line placement ● Cautions faculty member about an imminent medication administration error
<p>Level 5 <i>Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed</i></p> <p><i>Leads an after-event debrief of the health care team</i></p> <p><i>Facilitates regular health care team-based feedback in complex situations</i></p>	<ul style="list-style-type: none"> ● Mediates a conflict resolution between different members of the health care team ● Leads a post-code team debriefing ● Prompts a post-case sign-out after a case requiring a massive transfusion and ICU care
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global assessment ● Medical record (chart) audit ● Multisource feedback ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● AHRQ. Curriculum Materials. https://www.ahrq.gov/teamstepps/curriculum-materials.html. ● Tait AR, Teig MK, Voepel-Lewis T. Informed consent for anesthesia: A review of practice and strategies for optimizing the consent process. <i>Can J Anaesth</i>. 2014;61(9):832-842. https://pubmed.ncbi.nlm.nih.gov/24898765/. ● Dehon E, Simpson K, Fowler D, Jones A. Development of the faculty 360. <i>MedEdPORTAL</i>. 2015;11:10174. https://www.mededportal.org/publication/10174/. ● Green M, Parrott T, Cook G., Improving your communication skills. <i>BMJ</i>. 2012;344:e357. https://www.bmj.com/content/344/bmj.e357. ● Henry SG, Holmboe ES, Frankel RM. Evidence-based competencies for improving communication skills in graduate medical education: a review with suggestions for implementation. <i>Med Teach</i>. 2013;35(5):395-403. https://www.tandfonline.com/doi/full/10.3109/0142159X.2013.769677. ● Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. <i>Med Teach</i>. 2018:1-4. https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1481499.

Interpersonal and Communication Skills 3: Communication within Health Care Systems Overall Intent: To effectively communicate using a variety of methods	
Milestones	Examples
<p>Level 1 <i>Accurately records information in the patient record; demonstrates judicious use of documentation shortcuts</i></p> <p><i>Safeguards patient personal health information</i></p> <p><i>Communicates through appropriate channels as required by institutional policy</i></p>	<ul style="list-style-type: none"> ● Documentation is accurate but may include extraneous information ● Avoids talking about patients in the elevator, public spaces, or on social media ● Identifies institutional and departmental communication hierarchy for concerns and safety issues ● Only uses secure communication modalities when sharing protected health information
<p>Level 2 <i>Accurately records information in the anesthetic record for basic cases</i></p> <p><i>Documents required data in formats specified by institutional policy</i></p> <p><i>Respectfully communicates concerns about the system</i></p>	<ul style="list-style-type: none"> ● Completes all components of the intra-operative record in a timely manner ● Completes intubation note for an urgent ICU intubation using the appropriate template and correct elements ● Correctly uses the institutional system to file a report of a safety issue ● Recognizes that a communication breakdown has happened and respectfully brings the breakdown to the attention of the chief resident or faculty member
<p>Level 3 <i>Accurately records information in the anesthetic record and communicates complex care decisions for complex cases</i></p> <p><i>Appropriately selects direct and indirect forms of communication based on context</i></p> <p><i>Respectfully communicates concerns about the system and contributes to solutions</i></p>	<ul style="list-style-type: none"> ● Documents critical event notes in the medical record concisely and in a timely manner ● Follows-up with a patient’s family in person regarding a difficult intubation ● Provides a written handout to patient/family regarding local regulations for the proper use and disposal of prescribed opioids for post-operative pain ● Provides a written handout on risks of sugammadex and contraception ● Knows when to direct concerns locally, departmentally, or institutionally, (i.e., appropriate escalation)
<p>Level 4 <i>Uses medical record functionality to highlight challenges in anesthetic care to facilitate future peri-operative management</i></p>	<ul style="list-style-type: none"> ● Creates consistently accurate, organized, and concise documentation, frequently incorporating anticipatory guidance

<p><i>Models exemplary written or verbal communication</i></p> <p><i>Uses appropriate channels to offer clear and constructive suggestions to improve the system</i></p>	<ul style="list-style-type: none"> • Creates exemplary pre-operative assessments that are used to teach residents • Talks directly to an emergency department physician (or surgical colleague) about breakdowns in communication to prevent recurrence
<p>Level 5 <i>Explores innovative uses of the medical record to facilitate peri-operative management</i></p> <p><i>Guides departmental or institutional policies and procedures around communication</i></p> <p><i>Initiates difficult conversations with appropriate stakeholders to improve the system</i></p>	<ul style="list-style-type: none"> • Leads a task force established by the hospital QI committee to develop a plan to improve house staff hand-offs • Actively participates in a committee to develop a pandemic disaster response plan • Contacts hospital leadership to discuss ways to improve fellow well-being
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Medical record (chart) audit • Multisource feedback • OSCE • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • APSF. Improving Post Anesthesia Care Unit (PACU) Handoff By Implementing a Succinct Checklist. https://lhitrustfunds.com/wp-content/uploads/2015/07/PACU-handoff.pdf. • Bierman JA, Hufmeyer KK, Liss DT, Weaver AC, Heiman HL. Promoting responsible electronic documentation: validity evidence for a checklist to assess progress notes in the electronic health record. <i>Teach Learn Med.</i> 2017;29(4):420-432. https://www.tandfonline.com/doi/full/10.1080/10401334.2017.1303385. • Haig KM, Sutton S, Whittington J. SBAR: a shared mental model for improving communication between clinicians. <i>Jt Comm J Qual Patient Saf.</i> 2006;32(3):167-175. https://www.jointcommissionjournal.com/article/S1553-7250(06)32022-3/fulltext. • Starmer AJ, et al. I-pass, a mnemonic to standardize verbal handoffs. <i>Pediatrics.</i> 2012;129(2):201-204. https://pediatrics.aappublications.org/content/129/2/201?sso=1&sso_redirect_count=1&nfstatus=401&nftoken=00000000-0000-0000-0000-000000000000&nfstatusdescription=ERROR%3a+No+local+token.

To help programs transition to the new version of the Milestones, the ACGME has mapped the original Milestones 1.0 to the new Milestones 2.0. Indicated below are where the subcompetencies are similar between versions. These are not exact matches but are areas that include similar elements. Not all subcompetencies map between versions. Inclusion or exclusion of any subcompetency does not change the educational value or impact on curriculum or assessment.

Milestones 1.0	Milestones 2.0
PC1: Pre-anesthetic Patient Evaluation, Assessment, and Preparation	PC1: Pediatric Pre-Anesthetic Patient Evaluation, Assessment, and Preparation
PC2: Technical Skills	PC2: Technical Skills – Airway Management PC3: Technical Skills – Pediatric Vascular Access (including peripheral, arterial, and central lines) PC4: Technical Skills – Pediatric Regional (Peripheral and Neuraxial) Anesthesia
PC3: Peri-operative Planning and Management	PC5: Peri-Operative Planning for Pediatric Patients PC6: Peri-Operative Management for Pediatric Patients
No match	PC7: Situational Awareness and Crisis Management
MK1: Knowledge of Biomedical, Epidemiologic, and Developmental Sciences related to Pediatric Anesthesiology	MK1: Foundational Knowledge of Pediatric Anesthesiology
MK2: Knowledge of Clinical and Behavioral Sciences related to Pediatric Anesthesiology	No match
No match	MK2: Clinical Reasoning
SBP1: Interdisciplinary and Transition of Care	SBP2: System Navigation for Patient-Centered Care
SBP2: Incorporation of Patient Safety and Quality Improvement into Clinical Practice	SBP1: Patient Safety and Quality Improvement
SBP3: : Understanding of Health Care Economics: Cost Awareness and Cost-benefit Analysis	SBP3: Physician Role in Health Care Systems
PBL11: Self-directed Learning and Scholarly Activity	PBL11: Evidence-Based and Informed Practice PBL12: Reflective Practice and Commitment to Personal Growth
PBL12: Education of Team Members and Other Health Care Provider	ICS2: Interprofessional and Team Communication
PROF1: Commitment to Institution, Department, and Colleagues	PROF1: Professional Behavior and Ethical Principles PROF2: Accountability/ Conscientiousness
PROF2: Receiving and Giving of Feedback	PBL12: Reflective Practice and Commitment to Personal Growth

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PROF3: Responsibility to Maintain Personal Emotional, Physical, and Mental Health	PROF3: Self-Awareness and Well-Being
ICS1: Communication with Patients and Families	ICS1: Patient and Family-Centered Communication
No match	ICS3: Communication within Health Care Systems

Available Milestones Resources

Milestones 2.0: Assessment, Implementation, and Clinical Competency Committees Supplement, 2021 - <https://meridian.allenpress.com/jgme/issue/13/2s>

Milestones Guidebooks: <https://www.acgme.org/milestones/resources/>

- *Assessment Guidebook*
- *Clinical Competency Committee Guidebook*
- *Clinical Competency Committee Guidebook Executive Summaries*
- *Implementation Guidebook*
- *Milestones Guidebook*

Milestones Guidebook for Residents and Fellows: <https://www.acgme.org/residents-and-fellows/the-acgme-for-residents-and-fellows/>

- *Milestones Guidebook for Residents and Fellows*
- *Milestones Guidebook for Residents and Fellows Presentation*
- *Milestones 2.0 Guide Sheet for Residents and Fellows*

Milestones Research and Reports: <https://www.acgme.org/milestones/research/>

- *Milestones National Report*, updated each fall
- *Milestones Predictive Probability Report*, updated each fall
- *Milestones Bibliography*, updated twice each year

Developing Faculty Competencies in Assessment courses - <https://www.acgme.org/meetings-and-educational-activities/courses-and-workshops/developing-faculty-competencies-in-assessment/>

Assessment Tool: Direct Observation of Clinical Care (DOCC) - <https://dl.acgme.org/pages/assessment>

Assessment Tool: Teamwork Effectiveness Assessment Module (TEAM) - <https://team.acgme.org/>

Improving Assessment Using Direct Observation Toolkit - <https://dl.acgme.org/pages/acgme-faculty-development-toolkit-improving-assessment-using-direct-observation>

Remediation Toolkit - <https://dl.acgme.org/courses/acgme-remediation-toolkit>

Learn at ACGME has several courses on Assessment and Milestones - <https://dl.acgme.org/>