Supplemental Guide: Pediatric Surgery

ACGME

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Pediatric Surgery 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: Patient Evaluation and Clinical Decision Making **Overall Intent:** To progressively demonstrate skill acquisition in clinical assessment and develop multidisciplinary treatment plan for pediatric surgery patients	
Milestones	**Examples**
Level 1 *With assistance, integrates information with patient-specific factors to design a succinct diagnostic, work-up, and management plan of a medically uncomplicated neonatal or pediatric surgical patient*	● When a patient presents with abdominal pain, elicits a focused history, performs a physical exam, reviews diagnostic reports, and comes up with a differential diagnosis that includes both medical and surgical problems, with assistance ● Creates a diagnostic and treatment plan for an otherwise healthy patient with abdominal pain
Level 2 *With assistance, integrates information with patient-specific factors to design a succinct diagnostic, work-up, and management plan of a medically complicated neonatal or pediatric surgical patient*	● When a patient presents with an abdominal tumor, elicits a focused history, performs a physical exam, and reviews diagnostic reports and determines need for additional imaging, with assistance ● With assistance, creates a diagnostic and treatment plan for a patient with abdominal tumor
Level 3 *Independently integrates information with patient-specific factors to design a succinct diagnostic, work-up, and management plan of a medically uncomplicated neonatal or pediatric surgical patient*	● For a newborn with vomiting, independently elicits a focused history, performs a physical exam, reviews diagnostic reports, and comes up with a differential diagnosis that includes both medical and surgical problems ● Creates a diagnostic and treatment plan for a newborn with vomiting
Level 4 *Independently integrates information with patient-specific factors to design a succinct diagnostic, work-up, and management plan of a medically complicated neonatal or pediatric surgical patient*	● When a patient presents with a renal mass involving tumor thrombus extending into the inferior vena cava and right atrium, independently elicits a focused history, performs a physical exam, and interprets diagnostic images, reviews reports, and determines need for additional imaging ● Creates a diagnostic and treatment plan for a patient who presents with septic shock
Level 5 *Appraises gaps in literature and proposes research related to diagnostic work-up and multidisciplinary treatment*	● Identifies potential for expanded role of minimally invasive biopsy techniques or chemotherapy reductions strategies in the management of Wilms tumor
Assessment Models or Tools	● Assessment of case-based discussion ● Case-based discussion assessment ● Direct observation ● Medical record (chart) audit ● Mock oral examinations ● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● American Pediatric Surgical Association (APSA). Handbook for Children with Neuroblastoma. https://secureservercdn.net/198.71.233.52/ppf.e7e.myftpupload.com/wp-content/uploads/2020/09/Handbook_Neuroblastoma_Spring2018.pdf. Accessed 2021.

	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● Surgical Council on Resident Education (SCORE). The SCORE Portal. https://www.surgicalcore.org/. Accessed 2021.

Patient Care 2: Intra-Operative Patient Care – Endoscopy Procedural Skills **Overall Intent:** To progressively demonstrate skill acquisition in endoscopic procedures and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Requires active direction to choose and assemble instruments* *Moves forward in diagnostic bronchoscopy and endoscopy only with active direction* *Recognizes intra-operative complications for common procedures*	● Inconsistently recognizes the instrument components of diagnostic rigid bronchoscopy and flexible bronchoscopy based on patient age and indication for procedure ● Requires active direction for diagnostic bronchoscopy and gastrointestinal endoscopy in all ages ● Recognizes potential for airway compromise after endoscopy
Level 2 *Is mostly proficient in choosing and assembling instruments* *Moves forward in therapeutic or interventional procedures with active direction* *With active assistance, manages intra-operative complications for therapeutic and interventional procedures*	● Requires help in selecting and assembling instrumentation for diagnostic and therapeutic bronchoscopy and gastrointestinal endoscopy (removal of foreign bodies) ● Performs therapeutic endoscopic procedures including aerodigestive foreign body removal and esophageal dilation with active direction ● With assistance, manages complications of bronchoscopy for foreign body removal or esophagoscopy for foreign body removal
Level 3 *Is consistent able to choose and assemble instruments for diagnostic bronchoscopy and endoscopy* *Independently moves forward in diagnostic bronchoscopy and endoscopy and refines operative plans as needed* *Independently recognizes, manages, anticipates, and prevents straightforward intra-operative complications*	● Independently assembles instrument components, based on patient age and indication for diagnostic rigid bronchoscopy and rigid esophagoscopy ● Safely and independently performs diagnostic bronchoscopy and gastrointestinal endoscopy in children younger than three years of age, including neonates ● Independently manages airway edema after diagnostic bronchoscopy
Level 4 *Independently chooses and assembles instruments*	● Independently assembles instrument components for removal of an airway foreign body

Independently moves fluidly through therapeutic or interventional procedures and refines operative plans as needed *Independently recognizes, manages, anticipates, and prevents complex intra-operative complications*	● Safely and independently performs removal of airway or esophageal foreign bodies, and esophageal dilation, including management of complications such as perforation ● Recognizes need for multidisciplinary input in complex patients who need bronchoscopy and endoscopy (e.g., patient with recurrent esophageal stenosis) ● Independently manages esophageal perforation during endoscopic esophageal dilation
Level 5 *Independently troubleshoots instrument malfunction and failure* *Independently moves fluidly through the course of rare operations and refines operative plans as needed* *Anticipates and prevents intra-operative complications for rare procedures*	● Performs rare therapeutic endoscopic procedures including peroral endoscopic myotomy (POEM) for achalasia, management of gastrointestinal bleeding such as variceal bleeding or bleeding ulcer ● Anticipates complications from esophageal stent placement
Assessment Models or Tools	● Case-based discussion assessment ● CCC evaluation ● Direct observation ● Mock oral examinations ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● Elfar W, Wakeman D. Lower endoscopy. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829833/all/Lower_Endoscopy?q=endoscopy. Updated 2018. Accessed 2021. ● Endoscopy includes rigid and flexible bronchoscopy, upper endoscopy, and lower endoscopy ● Spitz L, Coran A. *Operative Pediatric Surgery*. 7th ed. Boca Raton, FL: CRC Press; 2013. ISBN:978-1444117158. ● Wakeman D, Elfar W, Warner B, Gander J, Jeziorczak P, Yu DC, Schneider J, Ruiz-Elizalde AR, Grabski D. Upper Endoscopy. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association.

	https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829520/all/Upper_Endoscopy?q=endoscopy. Updated 2018. Accessed 2021. ● SCORE. Module Resources: Pediatric Surgery, Esophagoscopy – Fellowship Level. www.surgicalcore.org/modulecontent.aspx?id=1000184 ● SCORE. Module Resources: Pediatric Surgery, Bronchoscopy – Fellowship Level. www.surgicalcore.org/modulecontent.aspx?id=1000198

Patient Care 3: Intra-Operative Patient Care – Procedural Skills for Minimally Invasive Surgical (MIS) Procedures **Overall Intent:** To progressively demonstrate skill acquisition MIS procedures and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Requires active direction to identify trocar placement and appropriate instrumentation for minimally invasive surgery (MIS)*	● Needs instruction on port placement for video-assisted thoracoscopic surgery (VATS) lobectomy
Moves forward in common operations with active direction only	● With active help performs laparoscopic appendectomy in a small child, laparoscopic pyloromyotomy, or laparoscopic gastronomy tube (G-tube) placement
Recognizes intra-operative complications for common procedures	● Identifies inadequate closure of appendiceal base at appendectomy
Level 2 *Is mostly proficient in ability to identify trocar placement and appropriate MIS instrumentation*	● Chooses adequate port placement for neonatal Nissen but unable to choose adequate port placement for VATS procedure
Moves forward through the course of defined category operations with active direction	● With active help, performs laparoscopic colon resection or pull-through for Hirschsprung disease
With assistance, manages intra-operative complications for defined category procedures	● With assistance, identifies and manages an ischemic or twisted anastomosis created during a laparoscopic case
Level 3 *Is consistently able to identify trocar placement and appropriate MIS instrumentation for common and defined category procedures*	● Independently performs laparoscopic intussusception reduction and determines when bowel resection is needed ● Independently performs laparoscopic appendectomy in perforated appendicitis using appropriate techniques to secure a difficult base
Independently (passive help or supervision only) moves forward in common operations and refines operative plans as needed	● In a patient with spontaneous pneumothorax, independently identifies blebs, and perform blebectomy
Independently recognizes, manages, anticipates, and prevents intra-operative complications for common procedures	● Identifies and manages misplaced gastrostomy tube that obstructs the pylorus

Level 4 *Independently identifies trocar placement in patients with abnormal anatomy/re-operative cases* *Independently (passive help or supervision only) moves forward in defined category operations and refines operative plans as needed* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for defined category procedures*	● Safely enters a body cavity for re-operative surgery by appropriate modification of trocar sites ● Performs intracorporeal suturing ● Independently progresses on laparoscopic duodenal atresia or choledochal cyst ● Independently progresses on thoracoscopic procedures including lung lobectomy and congenital diaphragmatic hernia (CDH) ● Identifies and preserves blood supply to adjacent lobe during thoracoscopic lobectomy
Level 5 *Independently troubleshoots instrument, camera, robotic failure, and modified operative approach* *Independently (passive help or supervision only) moves forward in rare operations and refines operative plans as needed* *Anticipates and prevents intra-operative complications for rare procedures*	● Troubleshoots a stapler misfire during a thoracoscopic lobectomy ● Performs a laparoscopic Whipple procedure in a child ● Avoids tracheobronchial injury during a thoracoscopic repair of esophageal atresia
Assessment Models or Tools	● Case-based discussion assessment ● CCC evaluation ● Direct observation ● Mock oral examinations ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● GlobalcastMD. Pediatric Surgery. https://www.globalcastmd.com/episodes/s/pediatric-surgery. Accessed 2021. ● Holcomb GW III, Rothenberg SS. *Atlas of Pediatric Laparoscopy and Thoracoscopy*. 2nd ed. Cambridge, MA: Elsevier; 2021. ISBN:978-0323694346.

Patient Care 4: Intra-Operative Patient Care – Procedural Skills for Thoracic Cases **Overall Intent:** To progressively demonstrate skill acquisition in thoracic procedures and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Moves forward in common operations with active direction for critical portions of the procedure* *Serves as first assistant for critical portions of defined category operations* *Recognizes intra-operative complications for common operations*	● Safely performs lung wedge biopsy, empyema drainage with active direction ● Assists with patch placement in a straightforward CDH repair ● Recognizes air leak after lung biopsy
Level 2 *Moves fluidly through the entire course of common operations with minimal prompting* *Requires active direction for defined category operations* *With assistance, manages, anticipates, and prevents intra-operative complications for common procedures*	● Safely performs wedge biopsy with minimal direction for attending ● Requires assistance when dissecting/controlling vessels during lobectomy ● With assistance, manages air leak during lung biopsy
Level 3 *Independently (passive help or supervision only) moves fluidly through the course of common operations and refines operative plans as needed* *Moves fluidly through the entire course of defined category operations with minimal prompting* *Independently manages, anticipates, and prevents intra-operative complications for common procedures*	● Independently performs lung biopsy for interstitial lung disease ● Performs straightforward CDH repair with no patch, with minimal assistance ● Independently manages air leak during lung biopsy
Level 4 *Independently (passive help or supervision only) moves fluidly through the*	● Identifies when the gap is too long to complete an anastomosis on a distal tracheoesophageal fistula (TEF) and modifies the operative plan appropriately without prompting

course of defined category operations and refines operative plans as needed *Requires active direction for critical portions of rare operations* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for defined category procedures*	● Requires active direction during critical portion of colon interposition for esophageal replacement ● Prevents compromise of the right middle lobe bronchus while performing a right lower lobectomy ● Recognizes need for a second bar during pectus repair
Level 5 *Independently (passive help or supervision only) moves fluidly through the course of rare operations and refines operative plans as needed* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for rare procedures*	● Properly controls bleeding when pulmonary vein is torn during VATS lobectomy ● Independently plans and performs an esophageal replacement procedure ● Ensures blood vessels are not twisted when performing an esophageal replacement
Assessment Models or Tools	● Case-based discussion assessment ● CCC evaluation ● Direct observation ● Mock oral examinations ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. 2021. ● Kunisaki SM, Santos M, Calkins CM. Pulmonary Resection for Congenital Lesions. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; 2017. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829204/all/Pulmonary_Resection_for_Congenital_Lesions?q=cpam. ● Review of operative video ● Surgical Council on Resident Education (SCORE). The SCORE Portal. https://www.surgicalcore.org/. Accessed 2021. ● Wilson JM. Congenital Diaphragmatic Hernia Repair. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; 2019. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829201/all/Congenital_Diaphragmatic_Hernia_Repair#0.

Patient Care 5: Intra-Operative Patient Care – Procedural Skills for Abdominal Procedures **Overall Intent:** To progressively demonstrate skill acquisition in abdominal procedures and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Moves forward in common operations with active direction for critical portions of the procedure*	● With active help, performs ileocecectomy for Crohn's disease
Serves as first assistant for critical portions of defined category operations	● First assists for porta hepatis dissection during hepatic lobectomy
Recognizes intra-operative complications for common operations	● Recognizes ureteral injury during ileocecectomy for Crohn's disease
Level 2 *Moves fluidly through the entire course of common operations with minimal prompting*	● Performs a routine pediatric inguinal hernia repair with minimal assistance
Requires active direction for defined category operations	● Performs choledochal cyst resection with active direction
With assistance, manages, anticipates, and prevents intra-operative complications for common procedures	● With assistance, anticipates and prevents injury to vas deferens during inguinal hernia repair in a premature infant, and manages tear of inguinal hernia sac
Level 3 *Independently (passive help or supervision only) moves fluidly through the course of common operations and refines operative plans as needed*	● Independently performs ileocectomy for Crohn's disease, and recognizes and manages unanticipated strictures or fistula
Moves fluidly through the entire course of defined category operations with minimal prompting	● Performs duodenal atresia repair or a Ladd's procedure with minimal prompting
Independently manages, anticipates, and prevents intra-operative complications for common procedures	● Independently manages necrotic bowel during intussusception reduction
Level 4 *Independently (passive help or supervision only) moves fluidly through the*	● Independently performs abdominal exploration for neonatal intestinal obstruction

course of defined category operations and refines operative plans as needed *Requires active direction for critical portions of rare operations* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for defined category procedures*	● Performs cloacal exstrophy repair with active direction ● Recognizes preduodenal portal vein during Kasai procedure
Level 5 *Independently (passive help or supervision only) moves fluidly through the course of rare operations and refines operative plans as needed* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for rare procedures*	● Independently moves through a cloacal exstrophy repair ● Identifies, repairs, and manages a rectal injury during a sacrococcygeal teratoma (SCT) resection
Assessment Models or Tools	● Case-based discussion assessment ● CCC evaluation ● Direct observation ● Mock oral examinations ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● Review of operative video ● Surgical Council on Resident Education (SCORE). The SCORE Portal. https://www.surgicalcore.org/. Accessed 2021.

Patient Care 6: Intra-Operative Patient Care – Procedural Skills for Oncology Cases **Overall Intent:** To progressively demonstrate skill acquisition in oncologic procedures and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Moves forward in common operations with active direction for critical portions of the procedure* *Serves as first assistant for critical portions of defined category operations* *Recognizes intra-operative complications for common operations*	● Performs open biopsy of abdominal neuroblastoma or hepatoblastoma with active direction ● Is aware of the optimal incision location and size for abdominal tumor biopsy ● Able to first assist for nephrectomy for Wilms tumor such as incision, exposure of the kidney, lateral dissection ● With assistance, performs pulmonary resection for osteosarcoma metastasis ● Recognizes potential and prepares for significant bleeding during biopsy for neuroblastoma or hepatoblastoma
Level 2 *Moves fluidly through the entire course of common operations with minimal prompting* *Requires active direction for defined category operations* *With assistance, manages, anticipates, and prevents intra-operative complications for common procedures*	● Performs open biopsy of large intraabdominal tumor with passive help ● Performs straightforward Stage I adrenal neuroblastoma or Stage I Wilms tumor resections as primary surgeon with active help ● Uses knowledge of anatomy to recognize potential complications such as renal vein or contralateral renal artery injury during Wilms tumor resection ● Anticipates the need and plans for proximal and distal vascular control in resection of complex neuroblastoma
Level 3 *Independently (passive help or supervision only) moves fluidly through the course of common operations and refines operative plans as needed* *Moves fluidly through the entire course of defined category operations with minimal prompting* *Independently manages, anticipates, and prevents intra-operative complications for common procedures*	● Independently performs biopsy of large abdominal or thoracic tumors ● Independently performs laparoscopic or open ovarian teratoma removal ● Plans and executes a complex operation such as nephrectomy for Stage I and II Wilms tumor with minimal prompting including dissection of vessels and lymph node sampling ● Evaluates a patient with an anterior mediastinal mass and airway compression and develop a plan for a safe biopsy with appropriate anesthesia

Level 4 *Independently (passive help or supervision only) moves fluidly through the course of defined category operations and refines operative plans as needed* *Requires active direction for critical portions of rare operations* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for defined category procedures*	● Performs thoracic neuroblastoma resections independently ● Performs removal of thoracic chest wall tumors with reconstruction independently ● Obtains vascular control of the inferior vena cava and resection of intracaval and renal vein tumor extension with active direction ● Pivots the operative course for Wilms tumor based on unanticipated findings
Level 5 *Independently (passive help or supervision only) moves fluidly through the course of rare operations and refines operative plans as needed* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for rare procedures*	● Plans and obtains vascular control of inferior vena cava tumor extension during a resection of a Wilms tumor independently ● Plans and performs bilateral nephron sparing Wilms tumor resection ● Independently performs neuroblastoma resection for a retroperitoneal tumor encasing in the celiac artery and/or superior mesenteric artery ● Creates a plan (for abdominal and perineal portions), executes the plan, and independently performs a type III sacrococcygeal tumor resection in a newborn
Assessment Models or Tools	● Case-based discussion assessment ● CCC evaluation ● Direct observation ● Mock oral examinations ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery Library: Oncology. https://www.pedsurglibrary.com/apsa/search?st=OSS&catcode=571&q=oncology. Accessed 2021. ● APSA. Surgical Oncology Resources. https://apsapedsurg.org/resources/resources/surgical-oncology-resources/. Accessed 2021. ● Children's Oncology Group (COG). https://www.childrensoncologygroup.org/. Accessed 2021.

	● SCORE. Module Resources: Pediatric Surgery – Fellowship Level. https://www.surgicalcore.org/modules.aspx?f_specialties=Pediatric+Surgery+-+Fellowship+Level. Accessed 2021. ○ Includes modules on neuroblastoma, Wilms tumor, rhabdomyosarcoma, and sacrococcygeal teratoma

Patient Care 7: Intra-Operative Patient Care – Procedural Skills for Other Operations **Overall Intent:** To progressively demonstrate skill acquisition in head, neck, gentitourinary, and anorectal procedures and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Moves forward in common operations with active direction for critical portions of the procedure*	● Performs circumcision on a six-month old male
Serves as first assistant for critical portions of defined category operations	● First assists attending performing cloacal extrophy repair
Recognizes intra-operative complications for common operations	● Recognizes a recurrent laryngeal nerve injury during a thyroidectomy
Level 2 *Moves fluidly through the entire course of common operations with minimal prompting*	● Performs urachal resection with passive help
Requires active direction for defined category operations	● Performs posterior sagittal anorectoplasty (PSARP) for ARM and recto-urethral fistula with active direction ● Manages recurrent laryngeal nerve injury during a thyroidectomy
With assistance, manages, anticipates, and prevents intra-operative complications for common procedures	● Manages bleeding after rectal biopsy
Level 3 *Independently (passive help or supervision only) moves fluidly through the course of common operations and refines operative plans as needed*	● Performs an orchiopexy procedure independently
Moves fluidly through the entire course of defined category operations with minimal prompting	● Performs total thyroidectomy and central neck dissection in three-year-old male with medullary thyroid cancer metastatic to the central neck with passive help
Independently manages, anticipates, and prevents intra-operative complications for common procedures	● Recognizes that the parathyroid gland has become ischemic after thyroidectomy and performs parathyroid autotransplant

Level 4 *Independently (passive help or supervision only) moves fluidly through the course of defined category operations and refines operative plans as needed* *Requires active direction for critical portions of rare operations* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for defined category procedures*	● Performs PSARP for rectovesical fistula independently ● Performs cloacal exstrophy repair with active direction ● Operatively manages urethral injury during PSARP
Level 5 *Independently (passive help or supervision only) moves fluidly through the course of rare operations and refines operative plans as needed* *Independently recognizes, manages, anticipates, and prevents intra-operative complications for rare procedures*	● Independently performs a cloacal exstrophy repair ● Recognizing the high risk of hypoparathyroidism in an infant undergoing a total thyroidectomy for multiple endocrine neoplasia and initiates appropriate pharmacotherapy pre-operatively, intra-operatively, and post-operatively
Assessment Models or Tools	● Case-based discussion assessment ● CCC evaluation ● Direct observation ● Mock oral examinations ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● Spitz L, Coran A. *Operative Pediatric Surgery*. 7th ed. Boca Raton, FL: CRC Press; 2013. ISBN:978-1444117158. ● SCORE. The SCORE Portal. https://www.surgicalcore.org/. Accessed 2021.

Patient Care 8: Tissue Handling of Delicate (Oncologic, Inflamed, and Scarred) and Neonatal Tissue **Overall Intent:** To progressively demonstrate skill acquisition in procedures involving very delicate tissue handing and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *Demonstrates limited skill in handling delicate and neonatal tissue* *Requires prompting to identify appropriate tissue planes*	● Has difficulty managing the sac in a premature infant hernia repair ● Requires substantial guidance to develop the extrapleural plane during esophageal atresia/TEF repair
Level 2 *Demonstrates adequate but inconsistent handling of delicate and neonatal tissue* *Identifies appropriate plane but requires redirection to maintain dissection in the optimal tissue plane*	● Performs an extrapleural dissection but cannot safely dissect the distal fistula during an esophageal atresia repair ● In a stage IV neuroblastoma, needs active direction to start the dissection of the tumor off the vessels ● Requires guidance to safely dissect extrapleural plane during an esophageal atresia repair
Level 3 *Consistently demonstrates careful handling of delicate and neonatal tissue* *Visualizes tissue plane, and identifies and dissects relevant normal anatomy*	● Has difficulty dissecting the tracheoesophageal plane of the upper pouch during an esophageal atresia repair ● Consistently dissects a neuroblastoma off involved vessels ● Safely identifies and dissects the distal pouch during an esophageal atresia repair
Level 4 *Adapts tissue handling based on tissue quality* *Visualizes tissue planes and identifies and dissects relevant abnormal anatomy*	● Constructs an esophageal anastomosis under tension ● Adapts dissection technique and identify the appropriate plane when bleeding occurs during a neuroblastoma resection ● Identifies and mobilizes upper esophageal pouch when it is adherent to the trachea
Level 5 *Demonstrates efficiency and instructs other learners in techniques to identify and manipulate delicate and neonatal tissue in rare procedures* *Develops new instrumentation and techniques for delicate and neonatal tissue*	● Provides feedback on duodenal handling to junior resident/fellow during a laparoscopic pyloromyotomy ● Develops new instrumentation for thoracoscopic esophageal atresia repair
Assessment Models or Tools	● Case-based discussion assessment

	● CCC evaluation ● Direct observation ● Mock oral examinations ● Simulation ● Video based assessment ● Zwisch or SiMPL operative evaluations (written or electronic)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● Spitz L, Coran A. *Operative Pediatric Surgery*. 7th ed. Boca Raton, FL: CRC Press; 2013. ISBN:978-1444117158. ● SCORE. The SCORE Portal. https://www.surgicalcore.org/. Accessed 2021.

Patient Care 9: Post-Operative Care (Short and Long Term) **Overall Intent:** To progressively demonstrate skill acquisition in the management of pediatric patients after surgery and recognize, manage, and prevent short-and long-term complications	
Milestones	**Examples**
Level 1 *With assistance, manages the post-operative course of an uncomplicated neonatal or pediatric surgical patient* *Identifies the rationale for a long-term management*	● With guidance, manages the post-operative course following a PSARP for perineal fistula ● Identifies rationale for long-term multidisciplinary management for Hirschsprung patients
Level 2 *Independently manages the post-operative course of an uncomplicated neonatal or pediatric surgical patient* *Describes a general long-term management plan*	● Independently manages the post-operative course following an uncomplicated intestinal atresia repair ● Describes the general long-term management plan for Hirschsprung patients following a pull-through procedure, including bowel management, and prevention of enterocolitis
Level 3 *With minimal assistance, manages the post-operative course of a complicated neonatal or pediatric surgical patient* *Follows an evidence based long-term management plan*	● With minimal assistance, manages the post-operative course of a patient with complicated surgical necrotizing enterocolitis ● Follows an evidence based long-term management plan for pancreatic fluid collection or CDH
Level 4 *Independently manages the post-operative course of a complicated neonatal or pediatric surgical patient* *Integrates patient- and patient family-specific factors in the construction of an evidence-based long- term management plan*	● Independently manages post-operative course of CDH baby on extracorporeal membrane oxygenation (ECMO) or TEF patient ● Determines if home parenteral nutrition is appropriate for the patient and family or if continued in-patient hospitalization at a rehab facility is more appropriate
Level 5 *Identifies gaps in post-operative management, and creates pathways to address these through quality improvement/research initiatives* *Identifies knowledge gaps in long-term management plans, and creates pathways to*	● Creates pathways for feeding, ventilator care and long-term pulmonary hypertension management for CDH ● Creates comprehensive outpatient bowel management plan for patients with ARM

address these through quality improvement/research initiatives	
Assessment Models or Tools	● Case-based discussion assessment ● Direct observation ● Medical record (chart) review ● Mock orals ● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● SCORE. Module Resources: Pediatric Surgery – Fellowship Level. https://www.surgicalcore.org/modules.aspx?f_specialties=Pediatric+Surgery+-+Fellowship+Level. Accessed 2021.

Patient Care 10: Critical Care **Overall Intent:** To progressively demonstrate skill acquisition in the clinical care of critical ill infants and children and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *With assistance, recognizes a critically ill neonate or child and begins resuscitation*	● With assistance, initiates ventilation strategies for newborn with CDH ● With help from staff members, recognizes critically ill infant with necrotizing enterocolitis (NEC) and initiates initial medical management ● Recognizes signs and symptoms of sepsis from a necrotizing soft tissue infection
Level 2 *Independently recognizes a critically ill neonate or child and begins resuscitation and initial management*	● Identifies that newborn CDH has failure conventional ventilation and seeks assistance with escalating ventilation strategy ● Starts therapies in a septic patient according to Surviving Sepsis Guidelines
Level 3 *With minimal assistance, individualizes ongoing critical care management and assesses the response to therapy*	● Identifies when newborn CDH needs advanced strategies for pulmonary hypertension management ● Independently recognizes findings in a premature neonate with NEC that indicate failure of medical management
Level 4 *Independently individualizes ongoing critical care management and assesses the response to therapy*	● Identifies failure of high-frequency oscillatory ventilation in CDH and need for ECMO ● Understands the risks of reintubation and positive pressure ventilation in a newborn status TEF repair
Level 5 *Implements novel treatments and care pathways for critically ill children*	● Creates/modifies multidisciplinary acute respiratory distress syndrome pathway based on recent data ● Creates/modifies multidisciplinary sepsis pathway based on recent data
Assessment Models or Tools	● Case-based discussion assessment ● Direct observation ● Medical record (chart) review ● Mock orals ● Multisource feedback ● Simulation
Curriculum Mapping	●
Notes or Resources	● APSA. Handbook of Pediatric Surgical Critical Care. https://apsapedsurg.org/wp-content/uploads/2020/09/APSAHandbookofSurgicalCriticalCare_Jun52014.pdf. Accessed 2021. ● APSA. Pediatric Surgery Library: Critical Care. https://www.pedsurglibrary.com/apsa/search?st=OSS&catcode=571&q=critical+care. Accessed 2021. ● APSA. Pediatric Surgical Critical Care Syllabus & Study Guide. https://apsapedsurg.org/wp-content/uploads/2020/10/Critical-Care-Syllabus_Jul2018_FNL.pdf. Accessed 2021.

	● Pandya KA, Puligandla PS. Cardiovascular Physiology and Shock. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. Pediatric Surgery NaT. American Pediatric Surgical Association; Updated 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829023/all/Cardiovascular_Physiology_and_Shock?q=care+critical. Accessed 2021. ● SCORE. Module Resources: Pediatric Surgery – Fellowship Level. https://www.surgicalcore.org/modules.aspx?f_specialties=Pediatric+Surgery+-+Fellowship+Level. Accessed 2021.

Patient Care 11: Trauma Management **Overall Intent:** To progressively demonstrate skill acquisition in the clinical care of traumatically injured infant and children and recognize, manage, and prevent complications	
Milestones	**Examples**
Level 1 *With active direction, provides non-operative management of severely injured infants and children* *Recognizes injuries in infants and children and provides initial operative management*	● With active direction, runs a Level I trauma resuscitation in a six-month-old infant ● Recognizes common signs of non-accidental trauma ● Differentiates which solid organ injuries require non-operative or immediate operative management ● Recognizes normal and abnormal hemodynamic ranges in trauma patients of all ages
Level 2 *With minimal prompting, provides non-operative management of severely injured infants and children* *With active direction, provides operative management of severely injured infants and children*	● With minimal prompting, makes an initial plan for non-operative management of a patient with multisystem injury after injuries have been identified, creating appropriate prioritization of care ● Performs a trauma laparotomy for in a pediatric patient with active direction
Level 3 *Independently provides non-operative management of severely injured infants and children* *With minimal prompting, provides operative management of severely injured infants and children*	● Independently runs a Level I trauma activation in an infant or pediatric patient younger than five years old, prioritizing imaging and consultation for life-threatening injuries ● Independently makes decisions regarding admitting to floor versus intensive care unit (ICU) based on the patient's status ● Independently presents a comprehensive plan for the entire admission of a multiple-system injured patient who requires no surgery including admission status, lab frequency, and activity restrictions ● Performs a trauma laparotomy on a stable pediatric patient with bowel and liver injury
Level 4 *Leads a multidisciplinary team in the ongoing management of severely injured infants and children* *Independently provides operative management of severely injured infants and children*	● Leads multidisciplinary trauma rounds in the ICU ● Manages trauma patient in hemorrhagic shock, increased intracranial pressure ● Independently performs an exploratory laparotomy for trauma in a child with a major vascular injury
Level 5 *Implements novel treatments and care pathways for injured children*	● Leads efforts on public health campaigns such as gun control measures or "Stop the Bleed"

	● Leads a revision of institutional guidelines for admission duration or lab frequency for blunt solid organ injury in children
Assessment Models or Tools	● Case-based discussion assessment ● Direct observation ● Mock orals ● Simulation ● Video performance in trauma bay ● 360-degree monitoring of emergency department, operating room, and/or pediatric ICU staff members (multisource feedback)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● Arbuthnot MK, Duron V, Horton J, Stylianos S, McClellan JM, Do WS, Azarow K, Jafri M, Yonge JD, Naiditch J. Trauma Laparotomy. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; Updated 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829214/all/Trauma_Laparotomy?q=trauma. Accessed 2021. ● Kemp Bohan PM, Azarow K, Jafri M. Penetrating Trauma. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. Pediatric Surgery NaT. American Pediatric Surgical Association; Updated 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829109/all/Penetrating_Trauma?q=trauma. Accessed 2021. ● Price M, Prince JM. Gastrointestinal Trauma. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; Updated 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829090/all/Gastrointestinal_Trauma?q=trauma. Accessed 2021. ● Committee on Trauma. *ATLS Advanced Trauma Life Support: Student Course Manual*. Chicago, IL: American College of Surgeons; 2018. ISBN: 1880696029. . ● Henry S. ATLS 10th edition offers new insights into managing trauma patients. *Bulletin of the American College of Surgeons*. 2018. https://bulletin.facs.org/2018/06/atls-10th-edition-offers-new-insights-into-managing-trauma-patients/. 2021. ● SCORE. Abdominal trauma. In Module Resources: Pediatric Surgery, Trauma Modules – Fellowship Level. https://www.surgicalcore.org/modulecontent.aspx?id=263245 ● SCORE. Nonaccidental injuries. In Module Resources: Pediatric Surgery, Trauma Modules – Fellowship Level. https://www.surgicalcore.org/modulecontent.aspx?id=100026 ● SCORE. Thoracic trauma. In Module Resources: Pediatric Surgery, Trauma Modules – Fellowship Level. https://www.surgicalcore.org/modulecontent.aspx?id=263158

	Note: These modules require a username and password.

Medical Knowledge 1: Anatomy **Overall Intent:** To acquire knowledge in surgical anatomy and implications of anatomic variations	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of surgically relevant normal anatomy*	● Describes normal liver anatomy associated with a liver resection ● Describes vascular anatomy of the lungs associated with pulmonary lobe resection
Level 2 *Demonstrates knowledge of surgically relevant anatomic variations*	● Describes potential aberrant anatomy encountered during liver resection ● Describes vascular anatomy of the chest and neck associated with neuroblastoma resection ● Describes various types of anatomic aberrations associated with intestinal resection
Level 3 *With assistance, identifies surgically relevant anatomic variations and alters patient management accordingly*	● With attending guidance, recognizes aberrant right hepatic artery based on pre-operative imaging and alters procedure accordingly ● With prompting, develops a plan for biopsy in a teenager with a mediastinal mass and airway compression ● Identifies relevant surgical anatomy of the neck while treating a brachial cleft sinus with assistance
Level 4 *Independently identifies surgically relevant anatomic variations and alters patient management accordingly*	● Independently recognizes aberrant right hepatic artery based on pre-operative imaging and articulates alteration in procedure accordingly ● Independently recognizes thoracic neuroblastoma involves artery of Adamkiewicz and adjusts operative procedure accordingly
Level 5 *Leads advanced anatomy discussion at a multidisciplinary conference and/or in operating room*	● Leads a multidisciplinary tumor board discussion about the relevant anatomy associated with a liver resection ● Leads surgery/radiology conference discussion about the relevant anatomy associated with complex central abdominal neuroblastoma
Assessment Models or Tools	● Case-based discussion assessment ● Direct observation ● Literature reviews ● Mock oral examination ● Multisource feedback ● Pediatric Surgery In-Training Examination (PSITE)
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● SCORE. Module Resources: Pediatric Surgery – Fellowship Level. https://www.surgicalcore.org/modules.aspx?f_specialties=Pediatric+Surgery+-

	+Fellowship+Level. Accessed 2021. Note: This resource requires a username and password.

Medical Knowledge 2: Developmental Biology and Neonatal Physiology **Overall Intent:** To incorporate developmental biology and neonatal physiology into multidisciplinary management of pediatric surgery patients	
Milestones	**Examples**
Level 1 *Demonstrates basic knowledge of developmental biology and normal neonatal physiology*	● Demonstrates knowledge of fluid and nutritional requirements in premature infant versus term newborn ● Demonstrates knowledge of embryologic events leading to normal intestinal rotation
Level 2 *Demonstrates comprehensive knowledge of developmental biology and neonatal physiology and relevant clinical implications*	● Explains the timing and physiologic changes associated with transition from fetal to neonatal circulation and its implication for management of pulmonary hypertension in CDH ● Explains the renal physiologic changes that occur after birth and limits of renal function in premature infants ● Directs the workup and physiologic management of neonate with TEF and vertebral defects, anal atresia, cardiac defects, tracheo-esophageal fistula, renal anomalies, and limb abnormalities
Level 3 *With assistance, applies knowledge of developmental biology and neonatal physiology into medical decision making*	● With assistance, manages fluid requirements in premature infant with gastroschisis
Level 4 *Independently incorporates knowledge of developmental biology and neonatal physiology into medical decision making*	● Independently uses the results of prenatal testing to guide decision making and prenatal counseling in a patient
Level 5 *Recommends novel investigations based on knowledge of developmental biology, neonatal physiology, and new and existing therapies*	● Suggests or champions new treatments or trials for treatment of NEC ● Coordinates a multidisciplinary plan for an ex-utero intrapartum treatment (EXIT) procedure
Assessment Models or Tools	● Case-based discussion assessment ● Direct observation ● Mock oral examinations ● Multisource feedback ● PSITE examination
Curriculum Mapping	●
Notes or Resources	● APSA. ExPERT. https://www.pedsurglibrary.com/apsa/cme/ExPERT. Accessed 2021. ● SCORE. Module Resources: Pediatric Surgery – Fellowship Level. https://www.surgicalcore.org/modules.aspx?f_specialties=Pediatric+Surgery+-+Fellowship+Level. Accessed 2021.

Medical Knowledge 3: Pediatrics and Pediatric Surgery **Overall Intent:** To understand the development and physiology of children and its implications for pediatric surgery	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of development and physiology of children*	● Understands the physiologic changes that occur during growth including normal vital signs appropriate for a newborn, toddler, and child ● Describes the growth and developmental milestones in infancy and childhood ● Articulates the different nutritional and metabolic requirements of children at different ages
Level 2 *Demonstrates knowledge of pathophysiology and treatments of patients with common pediatric conditions* *Demonstrates knowledge of pathophysiology and treatments of patients with common pediatric surgical conditions*	● Demonstrates working knowledge of pathophysiology of patients with asthma, gastroesophageal reflux, constipation, sickle cell disease, immune thrombocytopenia (ITP), and Henoch-Schönlein purpura (HSP) ● Understands the differential diagnosis and diagnostic/therapeutic options for gastrointestinal bleeding in children of different ages ● Explains the pathophysiology behind the electrolyte derangements commonly seen in pyloric stenosis ● Discusses the risks and benefits of non-operative and operative management of appendicitis in children with different presentations
Level 3 *Demonstrates basic knowledge of pathophysiology and treatments of patients with defined category pediatric conditions* *Demonstrates basic knowledge of pathophysiology and treatments of patients with defined category pediatric surgical conditions*	● Demonstrates working knowledge of pathophysiology and treatment of patients with pulmonary hypertension, neutropenia due to chemotherapy, and multiple endocrine neoplasia ● Describes the associated conditions and management in a child with complex congenital cardiac disease including malrotation and mesenteric ischemia ● Describes the different medical and surgical treatment options for children with different types of anorectal malformation and ongoing incontinence ● Describes the management of a patient with Hirschsprung disease presenting with a range of symptoms from abdominal distention to septic shock
Level 4 *Demonstrates advanced knowledge of the varying patterns of disease presentation and treatment at different ages for patients with pediatric conditions* *Demonstrates comprehensive knowledge of the varying patterns of disease presentation and*	● Articulates the different presentations of inflammatory bowel disease at different ages and the different medical and surgical treatment options ● Articulates the differences in prognosis of different malignancies in the infant, toddler, and older age groups

treatment at different ages for patients with pediatric surgical conditions	● Discusses treatment options used for intestinal rehabilitation in a patient with short gut syndrome, including intestinal transplantation
Level 5 *Contributes to peer-reviewed literature on the varying patterns of disease presentation, and age-appropriate treatments of patients with pediatric conditions* *Contributes to peer-reviewed literature on the varying patterns of disease presentation, and age-appropriate treatments of patients with pediatric surgical conditions*	● Publishes paper on long-term outcomes of children with anorectal malformations ● Publishes paper on pediatric empyema presentation and treatment in the pediatric patient
Assessment Models or Tools	● Case-based discussion assessment ● Didactic lectures ● Direct supervision ● Mock oral exams ● Multisource feedback ● PSITE
Curriculum Mapping	●
Notes or Resources	● APSA. Pediatric Surgery NaT: Disorders. https://www.pedsurglibrary.com/apsa/index/Pediatric-Surgery-NaT/Disorders. Accessed 2021. ● The Johns Hopkins Hospital, Hughes HK, Kahl LK. *The Harriet Lane Handbook*. 21st ed. Philadelphia, PA: Elsevier; 2018. ISBN:978-0323399555. ● SCORE. Module Resources: Pediatric Surgery – Fellowship Level. https://www.surgicalcore.org/modules.aspx?f_specialties=Pediatric+Surgery+-+Fellowship+Level. Accessed 2021. Note: These modules require a username and password.

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**
Level 1 *Demonstrates knowledge of how to report patient safety events* *Demonstrates knowledge of and describes institutional quality improvement initiatives*	● Lists patient misidentification, wrong-site surgery, or medication errors as common patient safety events ● Describes how to report errors in your environment ● Describes fishbone tool (or other QI tools)
Level 2 *Reports patient safety events through institutional reporting systems (simulated or actual)* *Participates in institutional quality improvement initiatives*	● Reports lack of hand sanitizer dispenser at clinical exam room to the medical director ● Files formal safety event in the hospital reporting system for a near miss event in the operating room ● Participate in an institutional QI initiative to decrease spread of hospital acquired C. diff
Level 3 *Participates in disclosure of patient safety events to patients and patients' families (simulated or actual)* *Demonstrates the skills required to identify, develop, implement, and analyze an institutional quality improvement project*	● Participates in communication with patients/families about a lost pathology specimen ● Participates in project identifying root cause of surgical site infection
Level 4 *Independently (supervision only) discloses patient safety events to patients and patients' families (simulated or actual)* *Creates, implements, and assesses quality improvement initiatives at the institutional level*	● Collaborates with a team to conduct the analysis of surgical error and effectively communicates with patients/families about those events ● Discloses an inappropriate medication dosing error to the family with attending observation only ● Leads a QI project to standardize discharge instructions within the practice
Level 5 *Role models or mentors others in the disclosure of patient safety events* *Creates, implements, and assesses national quality improvement initiatives*	● Assumes a leadership role at the national level for patient safety ● Conducts a simulation for disclosing patient safety events ● Initiates and completes a QI project to improve surgical site infection rates in neonates and publishes the results

Assessment Models or Tools	● Development, implementation, and outcomes of QI projects ● Direct observation from surgical and pediatric faculty members and nurses ● Medical record (chart) audit ● Multisource feedback ● Online training modules ● Simulation
Curriculum Mapping	●
Notes or Resources	● Institute of Healthcare Improvement. http://www.ihi.org/Pages/default.aspx. Accessed 2021. ● Raval MV, Dasgupta R, Kotagal M, Flynn-O'Brien KT, Alexander M, E, J, Alder AC. Quality Improvement. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; Updated 2019. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829492/all/Quality_Improvement. Accessed 2021.

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**
Level 1 *Demonstrates knowledge of care coordination, including transitions of care* *Demonstrates knowledge of the pediatric surgical population health needs and disparities*	● Identifies all involved health care providers throughout the spectrum of the patient's care as members of the team ● Lists the essential components of a sign-out and transitions of care ● Identifies outpatient needs of the family as well as the patient
Level 2 *Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams, including transitions of care* *Identifies specific population health needs and inequities for their local pediatric surgical population*	● Coordinates care with the medical oncologist for consideration of adjuvant care after Wilms resection ● Routinely uses formal transition-of-care process for a stable patient during sign-out with resident and advanced practitioners team ● Identifies that geographic remoteness may be a factor in where and how patients receive their follow up visits, including telehealth
Level 3 *Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams, including transitions of care* *Coordinates with local resources to effectively meet the needs of a pediatric surgical patient population*	● Coordinates multidisciplinary care with gastroenterology, nutrition, social work, and wound care nurse after bowel resection with ileostomy for Crohn's disease ● Routinely utilizes formal transition of care process when transferring a patient to the pediatric or neonatal intensive care unit (PICU or NICU) ● Develops a diagnostic and management plan in anticipation of dehydration from high ostomy output in a geographically remote patient
Level 4 *Role models effective coordination of patient-centered care among different disciplines, including transitions of care* *Participates in changing and adapting individual practice to provide for the needs of specific pediatric surgical populations*	● Leads multidisciplinary team members in developing and executing a plan of care for a multiply injured child ● Lead tumor board discussion of cases ● Leads team in implementing established enhanced recovery plans after surgery
Level 5 *Analyzes the process of care coordination and leads in the design and implementation of improvements, including transitions of care*	● Assists in designing an app to remotely monitor ostomy output ● Assists in designing outreach program for post-discharge recovery

Leads innovations and advocates for pediatric surgical populations with health care inequities	● Leads development of telehealth services for geographically remote pediatric surgical patients ● Starts a Saturday clinic for working parents
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback ● Outcomes of QI projects ● Quality metrics and goals mined from electronic health records (EHR) ● Review of sign-out tools, use and review of checklists
Curriculum Mapping	●
Notes or Resources	● Centers for Disease Control and Prevention (CDC). Population Health Training. https://www.cdc.gov/pophealthtraining/whatis.html. Accessed 2021. ● Kaplan KJ. In pursuit of patient-centered care. *TissuePathology;* 2016. http://tissuepathology.com/2016/03/29/in-pursuit-of-patient-centered-care/#axzz5e7nSsAns. Accessed 2021. ● Skochelak SE, Hawkins RE, Lawson LE, Starr SR, Borkan JM, Gonzalo JD. *AMA Education Consortium: Health Systems Science*. 1st ed. Philadelphia, PA: Elsevier; 2016. ISBN:978-0323461160.

Systems-Based Practice 3: Physician Role in Health Care Systems **Overall Intent:** To understand the fellow's role in the complex health care system and how to optimize the system to improve patient care and the health system's performance	
Milestones	**Examples**
Level 1 *Identifies key components of the complex health care system (e.g., hospital, pediatric rehabilitation facility, finance, personnel, technology, payment systems)*	● Understands the impact of access to outpatient occupational therapy options for a child with feeding difficulties ● Identifies when patient notes do not meet coding and compliance requirements
Level 2 *Describes how components of a complex health care system are interrelated, and how this impacts pediatric surgical patient care*	● Explains that improving patient satisfaction impacts patient compliance ● Takes into consideration a patient's prescription drug coverage when choosing discharge medications ● Recognizes that appropriate documentation can influence the severity of illness determination upon discharge
Level 3 *Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)*	● Ensures that a patient, after proximal ostomy, has an early scheduled follow-up appointment at discharge to evaluate for proper hydration ● Discusses risks and benefits of various surveillance strategies for a 10-year-old boy with FAP when the family has a high out of pocket deductible ● Discusses how enhanced recovery after surgery protocols can decrease length of stay and improve clinical efficiency
Level 4 *Manages various components of the complex health care system to provide efficient and effective patient care and transition of care*	● Leads efforts to provide home care services for patients after discharge ● Works collaboratively to make sure the patient assistance resources are available for a patient with a recent ostomy and limited resources
Level 5 *Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care for the pediatric surgical population*	● Works with community or professional organizations on programs aimed at identifying and decreasing non-accidental trauma ● Works with community or professional organizations on Child Injury Prevention programs ● Improves informed consent process for non-English-speaking patients requiring interpreter services
Assessment Models or Tools	● Development, implementation, and outcomes of QI projects ● Direct observation ● Implemented programs ● Medical record (chart) audit ● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● Agency for Healthcare Research and Quality (AHRQ). Major Physician Measurement Sets. https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/measurementsets.html. Accessed 2021.

	● AHRQ. Measuring the Quality of Physician Care. https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html. Accessed 2021. ● The Commonwealth Fund. Health System Data Center. http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1. Accessed 2021. ● Dzau VJ, McClellan MB, McGinnis JM, et al. Vital directions for health and health care: Priorities from a National Academy of Medicine initiative. *JAMA*. 2017;317(14):1461-1470. https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/. ● The Kaiser Family Foundation. www.kff.org. Accessed 2021. ● The Kaiser Family Foundation: Topic: Health Reform. https://www.kff.org/topic/health-reform/. Accessed 2021. ● Raval MV, Dasgupta R, Kotagal M, Flynn-O'Brien KT, Alexander M, E, J, Alder AC. Quality Improvement. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; Updated 2019. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829492/all/Quality_Improvement. Accessed 2021.

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 *Demonstrates how to access and use the available evidence and how to incorporate the patient's and patient's family's preferences and values into the care of patients*	● Identifies evidence-based guidelines in the treatment of appendicitis, parapneumonic effusion, and other common pediatric surgical diseases ● Demonstrates knowledge of and uses APSA guidelines, Not A Textbook, and the Pediatric Surgery Library (pedsurglibrary.com/apsa)
Level 2 *Articulates clinical questions and elicits the patient's and patient's family's preferences and values to guide evidence-based care*	● In a patient with acute appendicitis, understands and discusses the roles of appendectomy and non-operative management as evidence-based treatment alternatives, and solicits the family perspective
Level 3 *Locates and applies the best available evidence, integrated with the patient's and patient's family's preferences, to the care of patients*	● In a patient with gastroesophageal reflux and need of feeding access, uses best available evidence to determine the optimal surgical approach while integrating the patient's medical status, parental preferences, and family resources
Level 4 *Critically appraises and applies evidence, even in the face of uncertain and/or conflicting evidence, to guide care, tailored to the individual patient and the patient's family*	● Critically reviews the literature to determine the optimal treatment algorithms of laparotomy versus drain for necrotizing enterocolitis
Level 5 *Coaches others to critically appraise and apply evidence for patients and patients' families; and/or participates in the development of guidelines*	● Leads clinical teaching on application of best practices such as at tumor board, journal clubs, or morbidity and mortality rounds ● Identifies unnecessary variability in care and leads an initiative to address it in a Plan-Do-Study-Act (PDSA) cycle
Assessment Models or Tools	● Direct observation ● National Surgical Quality Improvement Program (NSQIP) pediactrics data review ● Outcomes research ● Presentation evaluation ● Program creation
Curriculum Mapping	●
Notes or Resources	● Institutional Review Board (IRB) guidelines ● National Guidelines (e.g., National Comprehensive Cancer Network (NCCN), American Society of Clinical Oncology (ASCO)) ● National Institutes of Health: US National Library of Medicine. PubMed Tutorial. https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html. Accessed 2021. ● Outcomes and Evidence-Based Practice Committee. *PedSurg Resource*. Accessed 2021. https://www.pedsurglibrary.com/apsa/view/PedSurg%20Resource/1884014/all/Outcomes_and_Evidence_Based_Practice_Committee. Accessed 2021.

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; reflect on all domains of practice, personal interactions, and behaviors, and their impact on colleagues and patients (i.e., reflective mindfulness)	
Milestones	**Examples**
Level 1 *Accepts responsibility for personal and professional development by establishing goals* *Identifies the factors that contribute to gap(s) between expectations and actual performance*	● Sets personal goals for fellowship education and training with program director ● Understands that a personal study program is necessary to avoid gaps in knowledge
Level 2 *Demonstrates openness to performance data (feedback and other input) to inform goals* *Analyzes and reflects on the factors that contribute to gap(s) between expectations and actual performance*	● Respectfully receives and integrates feedback from the program director and adjusts clinical practice and technique on an ongoing basis ● When prompted, develops an individual education plan to address their gaps in knowledge based on clinical performance and in-service exams
Level 3 *Seeks performance data episodically with adaptability and humility* *Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance*	● Occasionally asks for feedback from patients, families, faculty members, and clinical team members ● Uses online evaluation app after a procedure (e.g., Zwisch, SIMPL) ● Using educational resources, creates a personal curriculum to reduce gaps in knowledge
Level 4 *Consistently seeks performance data with adaptability and humility* *Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance*	● Consistently solicits and incorporates feedback from patients, families, and faculty and team members to continuously improve clinical practice and techniques ● Using educational resources that include self-assessment to identify and minimize personal gaps in knowledge
Level 5 *Role models consistently seeking performance data with adaptability and humility* *Coaches others on reflective practice*	● Models practice improvement and adaptability ● Mentors more junior learners in developing their individualized learning plans
Assessment Models or Tools	● Direct observation ● Multisource feedback
Curriculum Mapping	●

Notes or Resources	● Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. *Acad Med.* 2009;84(8):1066-74. https://insights.ovid.com/crossref?an=00001888-200908000-00021. ● 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. Acad Med. 2013;88(10):1558-1563. https://insights.ovid.com/article/00001888-201310000-00039. ● Ricca RL, Meier AH. Leadership. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829736/all/Leadership.

Professionalism 1: Professional Behavior and Ethical Principles **Overall Intent:** To model ethical and professional behavior, identify lapses, and use appropriate resources for managing ethical and professional dilemmas	
Milestones	**Examples**
Level 1 *Identifies and describes potential triggers for professionalism lapses and how to report them* *Demonstrates knowledge of the ethical principles underlying the care of cancer patients*	● Understands that being fatigued may increase vulnerability to lapses in professionalism, and that working long hours may blur appropriate personal /professional boundaries with coworkers ● Articulates how the principle of "do no harm" applies to a patient who may not benefit from a laparotomy in the setting of widely metastatic rhabdomyosarcoma
Level 2 *Demonstrates professional behavior in routine situations and takes responsibility for own professionalism lapses* *Analyzes straightforward situations using ethical principles*	● Respectfully approaches a nurse who did not see an order written on morning rounds about the importance of the nasogastric tube for decompression and risk for aspiration ● Identifies and applies ethical principles involved in informed consent
Level 3 *Demonstrates professional behavior in complex or stressful situations* *Analyzes complex situations using ethical principles and recognizes need to seek help in managing and resolving complex ethical situations*	● Appropriately responds to a distraught family member, following an unsuccessful resuscitation attempt of a child ● Facilitates the resolution of professional difference of opinion when treating a complicated patient ● After noticing a colleague's patient-related social media post, reviews policies related to posting of content and seeks guidance for resolution ● Discusses risks and benefits of treatment options for a Jehovah's Witness patient who needs major surgery
Level 4 *Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in oneself and others* *Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed*	● Models respect for patients and promotes the same from colleagues, when a patient has been waiting for an excessively long time to be seen ● When feeling fatigued, the fellow asks for a colleague to take over to prevent a lapse in professionalism ● Understands the differing concepts of patient/family autonomy and futility when determining treatment for a patient with NEC totalis
Level 5 *Coaches others when their behavior fails to meet professional expectations*	● Counsels a resident observed being demeaning to another health care professional

Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution	● Creates a system to improve language translation availability to decrease patient and provider frustrations that lead to unprofessional behavior
Assessment Models or Tools	● Direct observation ● Global evaluation ● Multisource feedback ● Oral or written self-reflection
Curriculum Mapping	●
Notes or Resources	● American Medical Association. Ethics. https://www.ama-assn.org/delivering-care/ethics. Accessed 2021. ● Bynny RL, Paauw DS, Papadakis MA, Pfeil S. *Medical Professionalism Best Practices: Professionalism in the Modern Era*. Aurora, CO: Alpha Omega Alpha Medical Society; 2017. *Medical Professionalism Best Practices: Professionalism in the Modern Era*. Aurora, CO: Alpha Omega Alpha Medical Society; 2017. http://alphaomegaalpha.org/pdfs/Monograph2018.pdf. ● Ethics Committee. *PedSurg Resource*. Updated 2020. https://www.pedsurglibrary.com/apsa/view/PedSurg%20Resource/1884011/all/Ethics_Committee. Accessed 2021. ● Ferreres AR, Angelos P, Singer EA, Gabler Blair P. *Ethical Issues in Surgical Care*. Chicago, IL: American College of Surgeons; 2017. https://www.facs.org/education/division-of-education/publications/ethical-issues-in-surgical-care. ● Levinson W, Ginsburg S, Hafferty FW, Lucey CR. *Understanding Medical Professionalism*. 1st ed. New York, NY: McGraw-Hill Education; 2014. ISBN:978-0071807432. ● Ricca RL, Meier AH. Leadership. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. *Pediatric Surgery NaT*. American Pediatric Surgical Association; Updated 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829736/all/Leadership. Accessed 2021. ● Rowell EE, Fecteau A, Katz AL, Beals D, Weinsheimer R, Sathya C. Ethics. In: Hirschl RR, Powell DD, Waldhausen JJ, eds. Pediatric Surgery NaT. American Pediatric Surgical Association; Updated 2020. https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829247/all/Ethics?q=professionalism. Accessed 2021.

Professionalism 2: Accountability/Conscientiousness **Overall Intent:** To take responsibility for one's own actions and the impact on patients and other members of the health care team	
Milestones	**Examples**
Level 1 *Takes responsibility for failure to complete tasks and responsibilities, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future*	● After multiple reminders to complete case logs, acknowledges and describes mitigation strategies for the future
Responds promptly to requests or reminders to complete tasks and responsibilities	● Responds to request to work hours logs within a reasonable timeframe
Level 2 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations*	● Consistently completes clinical and administrative tasks in a timely manner such as: ○ Documents completion of safety modules ○ Completion of medical records ○ Case preparation ○ Case logs
Recognizes situations that may impact one's own ability to complete tasks and responsibilities in a timely manner	● Before going out of town, completes tasks in anticipation of absence
Level 3 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations*	● Appropriately triages tasks to other members of the clinical team when there are multiple competing needs ● Asks for assistance from other fellows or faculty members, as needed ● Appropriately delegates and follows up on tasks
Proactively implements strategies to ensure that the needs of patients, teams, and systems are met	● In preparation for being out of the office, arranges coverage for assigned clinical tasks on patients and ensures appropriate continuity of care
Level 4 *Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner*	● Recognizes that when the intern omits key patient information during sign-out it can harm care ● Recognizes when the intern is overwhelmed and needs assistance
Level 5 *Takes ownership of system outcomes*	● Recognizes that information is being lost in hand offs and establishes a new hand-off process
Assessment Models or Tools	● Compliance with completion of case and duty hour logs, deadlines, and timelines ● Direct observation ● Global evaluations

	● Multisource feedback ● Self-evaluations and reflective tools
Curriculum Mapping	●
Notes or Resources	● AMA. Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. Accessed 2021. ● Code of conduct from fellow/resident institutional manual ● Expectations of fellowship program regarding accountability and professionalism

Professionalism 3: Well-Being **Overall Intent:** To identify, manage, and seek help for personal and professional well-being for self and others	
Milestones	**Examples**
Level 1 *Recognizes status of personal and professional well-being, with assistance* *Recognizes limits of the team, with assistance*	● After discussion with the attending, acknowledges own emotional response to neonate's terminal diagnosis ● Requests feedback on missed emotional cues after a family meeting ● With prompting, can identify when the team is short-handed to cover the day's clinical responsibilities
Level 2 *Independently recognizes status of personal and professional well-being* *Independently recognizes status of personal and professional well-being of the team*	● Independently identifies and communicates impact of own personal family tragedy ● Recognizes a pattern of missing emotional cues during family meetings and asks for feedback ● Independently recognizes when team is overwhelmed and needs additional clinical resources
Level 3 *With assistance, proposes a plan to optimize personal and professional well-being* *With assistance, proposes a plan to optimize personal and professional well-being of the team*	● With a multidisciplinary team, develops a reflective response to deal with personal impact of difficult patient encounters and disclosures ● Integrates feedback from the multidisciplinary team to develop a plan for identifying and responding to emotional cues during the next family meeting ● Works with an attending surgeon to create a new call schedule that improves work-life balance for the resident members of the team
Level 4 *Independently develops a plan to optimize personal and professional well-being* *Independently develops a plan to optimize personal and professional well-being of the team*	● Independently identifies ways to manage personal stress (e.g., physical activity, seeks counseling) ● Leads a post-cardiac arrest debrief with the team ● Recognizes that team member needs time away to deal with a personal tragedy and proactively coordinates coverage
Level 5 *Coaches others when emotional responses or limitations in knowledge/ skills do not meet professional expectations*	● Assists in organizational efforts to address clinician well-being after patient diagnosis/prognosis/death ● Works with multidisciplinary team to develop a feedback framework for learners around difficult conversations with parents regarding a neonate's terminal diagnosis
Assessment Models or Tools	● Direct observation ● Group interview or discussions for team activities ● Institutional online training modules

	● Self-assessment, reflection, and personal learning plan
Curriculum Mapping	●
Notes or Resources	● ACGME. Well-Being. https://dl.acgme.org/pages/well-being-tools-resources. Accessed 2022. ● Local resources, including Employee Assistance Programs (EAPs) ● SCORE. Professionalism: Delivering Bad News. https://www.surgicalcore.org/index. Accessed 2021.

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication **Overall Intent:** To develop language and behaviors to form constructive relationships with patients, identify and minimize communication barriers; organize and lead communication around shared decision making	
Milestones	**Examples**
Level 1 *Establishes a professional rapport with patients and patients' families and communicates in a clear and understandable manner* *Identifies common barriers to effective communication (e.g., language, disability)*	● Introduces self and faculty member, identifies patient and others in the room, and engages all parties in health care discussion ● Identifies need for trained interpreter with non-English-speaking patients
Level 2 *Establishes a therapeutic relationship in straightforward patient and patient family encounters and compassionately delivers medical information* *Identifies complex barriers to effective communication (e.g., health literacy, cultural differences)*	● Avoids medical jargon and restates patient/family perspective when discussing surgical procedures and diagnoses ● Recognizes the need for handouts with diagrams and pictures to communicate information to a patient who is unable to read
Level 3 *Establishes a therapeutic relationship in challenging patient and patient family encounters and acknowledges uncertainty in alignment of goals* *When prompted, reflects on personal biases while attempting to minimize communication barriers*	● Continues to engage patient and representative family members with disparate goals in the care of a complicated pediatric surgical patient ● After discussion with attending, realizes that she/he has been avoiding family discussion of withdrawal of care given the fellow's recent experience of a death of a child in the family
Level 4 *Uses shared decision making to align patients'/patients' families' values, goals, and preferences with treatment options to make a personalized care plan* *Independently recognizes personal biases while attempting to proactively minimize communication barriers*	● Conducts a family meeting regarding withdrawal of care for a terminally ill child ● Uses patient and parents input to engage palliative care and develop a plan for home hospice in the terminally ill child, aligned with the family's values ● Recognizes when personal treatment preferences diverge from those of the child and/or family

Level 5 *Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships* *Role models self-awareness while identifying a contextual approach to minimize communication barriers*	● Leads a discussion group on personal experience of moral distress ● Develops a curriculum on social justice which addresses unconscious bias ● Serves on a hospital bioethics committee
Assessment Models or Tools	● Direct observation ● Mock oral examination ● Multisource feedback ● Self-assessment including self-reflection exercises
Curriculum Mapping	●
Notes or Resources	● American Academy of Pediatrics. Communicating with Families. https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/HALF-Implementation-Guide/communicating-with-families/Pages/Communicating-with-Families.aspx. Accessed 2021. ● Laidlaw A, Hart J. Communication skills: An essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. *Med Teach*. 2011;33(1):6-8. https://www.tandfonline.com/doi/abs/10.3109/0142159X.2011.531170?journalCode=imte20. ● Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. *Acad Med*. 2001;76(4):390-393. https://journals.lww.com/academicmedicine/Fulltext/2001/04000/Essential_Elements_of_Communication_in_Medical.21.aspx. ● Makoul G. The SEGUE Framework for teaching and assessing communication skills. *Patient Educ Couns*. 2001;45(1):23-34. https://www.sciencedirect.com/science/article/abs/pii/S0738399101001367?via%3Dihub. ● Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in residents. *BMC Med Educ*. 2009; 9:1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2631014/.

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**
Level 1 *Uses language that values all members of the health care team* *Respectfully receives feedback on performance as a member of the health care team*	● When asking for a consultation for a child with post-operative seizure, respectfully relays the pertinent past medical history to the consultants and need for assessment ● Receives consult request for a patient with vague abdominal pain, asks clarifying questions politely ● Respectfully listens to the advanced practice provider concerns that the fellow is being too short with parents during morning rounds
Level 2 *Communicates information clearly with all health care team members* *Solicits feedback on performance as a member of the health care team*	● As a consultant, communicates diagnostic evaluation recommendations clearly and concisely in an organized and timely manner with the primary medical team ● Asks the advanced practice provider and the morning rounding team if personal interactions with parents have improved
Level 3 *Uses active listening to adapt communication style to fit team needs* *Communicates concerns and provides feedback to peers and learners*	● When receiving treatment recommendations from a consulting physician, repeats back the plan to ensure understanding ● After a consultation has been completed, communicates patient care concerns to the emergency medicine team and verifies they have received and understand the recommendations
Level 4 *Coordinates recommendations from different members of the health care team to optimize patient care and maintains effective communication in crisis situations* *Communicates feedback and constructive criticism to superiors*	● Seeks and receives consultation from gastroenterology and interventional radiology regarding a hemodynamically unstable patient with a gastrointestinal bleed and determines best method of addressing bleeding and communicates plan to consultants ● Meets with attending and discusses the attending's teaching style and clarifies the need for more feedback on their performance
Level 5 *Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed* *Facilitates regular health care team-based feedback in complex situations*	● Mediates a conflict resolution between different members of the health care team ● Leads multidisciplinary ECMO rounds and provides feedback to providers from different specialties about their contributions to the discussion
Assessment Models or Tools	● Direct observation ● Global assessment

	● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● Braddock CH, Edwards KA, Hasenberg NM, Laidley TL, Levinson W. Informed decision making in outpatient practice: Time to get back to basics. *JAMA*. 1999;282:2313-2320. https://jamanetwork.com/journals/jama/fullarticle/192233. ● Dehon E, Simpson K, Fowler D, Jones A. Development of the faculty 360. *MedEdPORTAL*. 2015;11:10174. https://www.mededportal.org/doi/10.15766/mep_2374-8265.10174. ● Green M, Parrott T, Cook G. Improving your communication skills. *BMJ.* 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. *Med Teach*. 2013;35(5):395-403. https://www.tandfonline.com/doi/abs/10.3109/0142159X.2013.769677?journalCode=imte20. ● Lane JL, Gottlieb RP. Structured clinical observations: A method to teach clinical skills with limited time and financial resources. *Pediatrics*. 2000;105:973-977. https://pubmed.ncbi.nlm.nih.gov/10742358/. ● Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. *Med Teach*. 2018;21:1-4. https://www.tandfonline.com/doi/abs/10.1080/0142159X.2018.1481499?journalCode=imte20.

Interpersonal and Communication Skills 3: Communication within Health Care Systems **Overall Intent:** To demonstrate effective communication skills within the context of the health care system	
Milestones	**Examples**
Level 1 *Accurately records information in the patient record* *Communicates through appropriate channels as required by institutional policy (e.g., patient safety reports, cell phone/pager usage)*	● Documentation is timely and accurate ● Identifies institutional and departmental communication hierarchy for concerns and safety issues
Level 2 *Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record* *Demonstrates efficient use of appropriate channels to communicate with the health care team*	● Organized and accurate documentation includes clinical reasoning that supports the treatment plan ● Develops documentation templates for the NICU rotation that allows for appropriate sign-out ● When seeing a new consult, efficiently and completely reviews the HER to understand the patient's problem list and past medical and surgical visits in both the inpatient and outpatient setting
Level 3 *Concisely integrates all relevant data from outside systems and prior encounters and reports diagnostic and therapeutic reasoning in the patient record* *Maintains effective and respectful communication during emergent and stressful situations*	● In clinic, sees and evaluates a patient referred with an abdominal mass from a pediatrician, reviews all records from outside hospital, and succinctly documents synthesis of the information in the medical record ● Promptly calls the family about an unplanned reintubation
Level 4 *Communicates clearly, concisely, timely, and in an organized written form, including anticipatory guidance* *Role model for individual communication across the system*	● Documents complex surgical options, including alternatives, for a patient requiring staged repair of long gap esophageal atresia and anticipates potential complications and/or events based on complex anatomy. ● Consultation notes are exemplary and used by the service to teach others
Level 5 *Coaches others to improve written communication*	● Provides constructive criticism to a senior resident on the NICU note ● Identifies inaccuracies in clinical documentation and works with resident to correct

Guides departmental or institutional communication around policies and procedures	● Leads a task force established by the hospital QI committee to develop a plan to improve hand-offs ● Meaningfully participates in a committee to examine communication between the surgical teams and ICU
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● 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. *Teach Learn Med.* 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. *Jt Comm J Qual Patient Saf*. 2006;32(3):167-175. https://www.jointcommissionjournal.com/article/S1553-7250(06)32022-3/fulltext. ● Starmer AJ, Spector ND, Srivastava R, et al. I-pass, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129.2:201-204. https://pediatrics.aappublications.org/content/129/2/201.long?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: Bronchoscopy/Esophagoscopy	
PC2: Esophageal atresia/Tracheoesophageal Fistula (TEF) Repair	
PC3: Inguinal hernia repair on a child less than six months of age	
PC4: Intestinal/duodenal atresia (DA) repair	
PC5: Hirschsprung pull-through	
PC6: Wilms/Neuroblastoma Resection	
PC7: Congenital Diaphragmatic Hernia Repair	
PC8: General Procedure Assessment	PC7: Intra-Operative Patient Care – Procedural Skills for Other Operations
PC9: General Patient Care Assessment	PC1: Patient Evaluation and Clinical Decision Making
	PC2: Intra-Operative Patient Care – Endoscopy Procedural Skills PC3: Intra-Operative Patient Care – Procedural Skills for Minimally Invasive Surgical Procedures PC4: Intra-Operative Patient Care – Procedural Skills for Thoracic Cases PC5: Intra-Operative Patient Care – Procedural Skills for Abdominal Procedures PC6: Intra-Operative Patient Care – Procedural Skills for Oncology Cases PC8: Tissue Handling of Delicate (Oncologic, Inflamed and/or Scarred Tissue) and Neonatal Tissues PC9: Post-Operative Care (Short and Long Term) PC10: Critical Care PC11: Trauma Management
MK1: Medical Knowledge	
MK2: General Knowledge Assessment	MK1: Anatomy MK2: Developmental Biology and Neonatal Physiology MK3: Pediatrics and Pediatric Surgery
SBP1: Healthcare Delivery and Cost	SBP3: Physician Role in Health Care Systems

SBP2: Patient Safety	SBP1: Patient Safety and Quality Improvement
SBP3: Systems-based Documentation	ICS3: Communication within Health Care Systems
	SBP2: System Navigation for Patient-Centered Care
PBLI1: Evidence-based Medicine	PBLI1: Evidence-Based and Informed Practice
PBLI2: Self-directed Learning	PBLI2: Reflective Practice and Commitment to Personal Growth
PROF1: Integrity	PROF1: Professional Behavior and Ethical Principles
PROF2: Recognition of Limits	PROF3: Well-Being
PROF3: Behavior and Respect	PROF1: Professional Behavior and Ethical Principles
PROF4: Leadership	
	PROF2: Accountability/Conscientiousness
ICS1: Collaborator	ICS2: Interprofessional and Team Communication
ICS2: Patient- and Family-centered Care	ICS1: Patient- and Family-Centered Communication

Available Milestones Resources

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

Clinical Competency Committee Guidebook, updated 2020 - https://www.acgme.org/Portals/0/ACGMEClinicalCompetencyCommitteeGuidebook.pdf?ver=2020-04-16-121941-380

Clinical Competency Committee Guidebook Executive Summaries, new 2020 - https://www.acgme.org/What-We-Do/Accreditation/Milestones/Resources - Guidebooks - Clinical Competency Committee Guidebook Executive Summaries

Milestones Guidebook, updated 2020 - https://www.acgme.org/Portals/0/MilestonesGuidebook.pdf?ver=2020-06-11-100958-330

Milestones Guidebook for Residents and Fellows, updated 2020 - https://www.acgme.org/Portals/0/PDFs/Milestones/MilestonesGuidebookforResidentsFellows.pdf?ver=2020-05-08-150234-750

Milestones for Residents and Fellows PowerPoint, new 2020 -https://www.acgme.org/Residents-and-Fellows/The-ACGME-for-Residents-and-Fellows

Milestones for Residents and Fellows Flyer, new 2020 https://www.acgme.org/Portals/0/PDFs/Milestones/ResidentFlyer.pdf

Implementation Guidebook, new 2020 - https://www.acgme.org/Portals/0/Milestones%20Implementation%202020.pdf?ver=2020-05-20-152402-013

Assessment Guidebook, new 2020 - https://www.acgme.org/Portals/0/PDFs/Milestones/Guidebooks/AssessmentGuidebook.pdf?ver=2020-11-18-155141-527

Milestones National Report, updated each Fall - https://www.acgme.org/Portals/0/PDFs/Milestones/2019MilestonesNationalReportFinal.pdf?ver=2019-09-30-110837-587 (2019)

Milestones Bibliography, updated twice each year - https://www.acgme.org/Portals/0/PDFs/Milestones/MilestonesBibliography.pdf?ver=2020-08-19-153536-447

Developing Faculty Competencies in Assessment courses - https://www.acgme.org/Meetings-and-Educational-Activities/Other-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://dl.acgme.org/pages/assessment

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