Supplemental Guide:
Pediatric Orthopaedic Surgery

ACGME

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Pediatric Orthopaedic 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, including rotation mapping.

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: Foot Pathology **Overall Intent:** To identify, manage, and definitively treat foot deformities of varying complexities with appropriate work-up and interventions including operative and non-operative methods	
Milestones	**Examples**
Level 1 *Obtains a patient history, performs a physical examination, and develops a differential diagnosis for patients across clinical settings*	● Obtains appropriate history, including birth and family medical history ● Performs physical exam including Silfverskiold test and Coleman block testing
Demonstrates surgical skills, assists with procedures, and identifies complications	● Demonstrates basic soft tissue handling, including wound closures
Performs routine splinting and casting and assists in manipulative casting (e.g., clubfoot casting)	● Performs routine splinting and reduction in emergency room for lower extremity fractures and sprains ● Assists with manipulative casting and demonstrate safe cast application techniques
Level 2 *Orders and interprets diagnostic testing and consultations based on patient evaluation*	● Orders appropriate x-rays (weight-bearing) and advanced imaging when necessary (computed tomography (CT) for evaluation of tarsal coalition)
Performs routine procedures and manages complications, with indirect supervision (e.g., Achilles tenotomy, tibialis anterior transfer, simple polydactyly)	● Performs percutaneous Achilles tenotomy, tibialis anterior transfer, or simple polydactyly with indirect supervision
Performs critical steps of manipulative casting, with direct supervision	● Performs molding portion of manipulative casting with direct supervision
Level 3 *Synthesizes a plan to manage patients with straightforward conditions, including non-operative options (e.g., manipulative casting, orthotic prescription)*	● Appropriately counsels family about clubfoot regarding casting, brace wear, recurrence risk and long-term follow-up ● Discusses treatment for cavus foot, recognizes need for further neurological work-up when necessary
Performs routine procedures and manages complications, with oversight and performs complex procedures with indirect supervision (e.g., osteotomy-calcaneal lengthening, bunion correction)	● Performs osteotomies including calcaneal, cueniform, and bunion correction with indirect supervision

Performs critical steps of manipulative casting, with indirect supervision	● Molds manipulative casts with indirect supervision
Level 4 *Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities, including non-operative options* *Independently performs complex procedures and manages complex complications* *Independently performs complex manipulative casting and manages casting complications*	● Develops surgical recommendations for recurrent clubfoot ● Develop treatment recommendations for complex conditions including complex polydactyly, macrodactyly, ectrodactyly etc. ● Counsels families with limb deficiency syndromes on role of limb salvage versus amputation ● Identifies complex club foot and when/when not to cast ● Independently performs clubfoot casting and manipulative casting in complex clubfoot and/or syndromic clubfoot
Level 5 *Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise* *Independently performs advanced procedures (e.g., revision clubfoot release)*	● Develop a clinical pathway to improve documentation of compliance with brace-wear for a patient with club foot ● Independently performs revision clubfoot release
Assessment Models or Tools	● Direct observation ● Multisource feedback ● Sawbone manipulative casting model
Curriculum Mapping	●
Notes or Resources	● Mosca VS. *Principles and Management of Pediatric Foot and Ankle Deformities and Malformations*. Philadelphia, PA: Wolters Kluwer Health; 2014. ISBN:978-1451130454. ● Staheli L. *Clubfoot: Ponseti Management*. 3rd ed. Global Health; 2009. https://storage.googleapis.com/global-help-cdn/2020/07/5e0684b9-help_cfponseti.pdf. 2021.

Patient Care 2: Hip Pathology **Overall Intent:** To identify, manage, and definitively treat pediatric hip pathology of varying complexities with appropriate work \-up and interventions including operative and non-operative methods	
Milestones	**Examples**
Level 1 *Obtains a patient history, performs a physical examination, and develops a differential diagnosis for patients across clinical settings* *Demonstrates surgical skills, assists with procedures, and identifies complications*	● Obtains history including birth history and relevant risk factors for developmental dysplasia of the hip (DDH), slipped capital femoral epiphysis (SCFE), etc. ● Performs physical exam including Ortolani, Barlow maneuvers, and hip abduction ● Identifies femoral nerve palsy during Pavlik harness bracing ● Correctly places a Pavlik harness
Level 2 *Orders and interprets diagnostic testing and consultations based on patient evaluation* *Performs routine/ percutaneous procedures and manages complications, with indirect supervision (e.g., closed reduction and spica casting for developmental dysplasia of the hip [DDH], performance and interpretation of hip arthrogram, percutaneous pinning of slipped capital femoral epiphysis [SCFE])*	● Orders and interprets ultrasounds for DDH (including alpha angle) and radiographs when age appropriate ● Orders appropriate x-rays for SCFE (frog leg lateral) and evaluates skeletal age and risk factors for contra-lateral slip to determine role of prophylactic pinning ● Performs hip arthrogram and interprets radiograph, performs closed reduction and casting for DDH, and percutaneously pin SCFE with indirect supervision
Level 3 *Synthesizes a plan to manage patients with straightforward conditions, including non-operative options (e.g., casting, bracing)* *Performs routine procedures (e.g., pinning) and manages complications, with oversight; performs complex procedures with indirect supervision (e.g., open reduction for DDH, proximal femoral osteotomy)*	● Counsels and develops appropriate follow-up plan for patient DDH including Pavlik harness wear, ultrasound, and routine follow-up ● Counsels and develops appropriate follow-up plan for SCFE including risk of contra-lateral slip, development of avascular necrosis, etc. ● Performs open reduction for DDH and proximal femoral osteotomy with indirect supervision
Level 4 *Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities, including non-operative options*	● Develops a comprehensive plan to manage late presenting DDH requiring femoral and/or acetabular osteotomies ● Appropriately assesses adolescent/young adult hip with instability and/or impingement by obtaining appropriate history, physical exam, and imaging

Independently performs complex procedures and manages complex complications (e.g., acetabular osteotomies- Dega, Pemberton)	● Performs acetabular osteotomies including Dega and Pemberton
Level 5 *Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise* *Independently performs advanced procedures (e.g., Bernese periacetabular osteotomy, surgical hip dislocation, Modified Dunn, multiplanar corrective osteotomy – Imhauser)*	● Develops a guideline for adolescent post-operative protocol for return to sports ● Independently performs advanced hip reconstruction including Bernese periacetabular osteotomy, surgical hip dislocation, modified Dunn, and multiplanar corrective osteotomy (Imhauser)
Assessment Models or Tools	● Direct observation ● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● Flynn JM, Sankar WN, Wiesel SW. *Operative Techniques in Pediatric Orthopaedic Surgery*. 2nd ed. Lippincott Williams & Wilkins; 2015. ISBN:978-1451193084. ● International Hip Dysplasia Institute. Professional Resources. https://hipdysplasia.org/get-involved/orthopedic-surgeons/influential-references/. 2021. ● Kelley SP, Feeney MM, Maddock CL, et al. Erratum: Expert-based consensus on the principles of Pavlik Harness Management of developmental dysplasia of the hip. *JBJS Open Access*. 2019;4(4):e0054. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7722584/. 2021.

Patient Care 3: Lower Extremity Deformity **Overall Intent:** To identify lower extremity deformities and use proper radiograph and clinical analysis in both the skeletally mature and immature patient to develop operative and non-operative plans	
Milestones	**Examples**
Level 1 *Obtains a patient history, performs a physical examination, and develops a differential diagnosis for patients across clinical settings* *Demonstrates surgical skills and assists with procedures*	● Assesses clinical limb alignment normal versus abnormal (genu varus/valgus, Q angle, leg-length discrepancy) ● Understands caregivers' concerns for visit ● Describes the concepts/procedures of guided growth, osteotomies, external versus internal fixation
Level 2 *Orders and interprets diagnostic testing and consultations based on patient evaluation* *Performs routine procedures and identifies complications, with indirect supervision*	● Interprets three-joint standing x-rays including measurements of mechanical axis deviation, medial proximal tibial angle, etc. ● Performs guided growth procedures and assist with more complex osteotomies
Level 3 *Synthesizes a plan to manage healthy patients with straightforward conditions, including non-operative options (e.g., casting, bracing)* *Performs routine procedures (e.g., epiphysiodesis), with indirect supervision; manages complications, with oversight; performs complex procedures (e.g., osteotomies +/- external fixation, lengthening nails), with indirect supervision*	● Harmonizes information from history and physical, imaging, growth prediction to plan for when surgery should be performed versus bracing or observation ● Performs procedures above and manages complications such as infection, over-correction
Level 4 *Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities, including non-operative options* *Independently performs complex procedures and manages complex complications*	● Understands how to manage long-term complications of guided growth, failed osteotomies ● Plans for and performs multi-planar deformity correction due to complex pathology that was not properly treated previously
Level 5 *Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise*	● Conducts research on a deformity cohort to increase understanding in the field

Independently performs advanced procedures, including revisions/complications	● Performs multi-segment, multi-planar deformity correction due to complex pathology that was not properly treated previously
Assessment Models or Tools	● Assessment of pre-operative planning/templating ● Direct observation
Curriculum Mapping	●
Notes or Resources	● Paley DF. *Principles of Deformity Correction*. New York; NY: Springer; 2003. ISBN:978-3540441618. ● Paley DF, Tetsworth K. Mechanical axis deviation of the lower limbs: Preoperative planning of uniapical angular deformities of the tibia or femur. *Clin Orthop Relat Res*. 1992;(280):48-64. https://journals.lww.com/clinorthop/abstract/1992/07000/mechanical_axis_deviation_of_the_lower_limbs_.8.aspx. 2021. ● Template software such as Bone Ninja, Traumacad, etc

Patient Care 4: Spine **Overall Intent:** To understand the core principles of spine pathology and to guide patient management based on severity and skeletal maturity	
Milestones	**Examples**
Level 1 *Obtains a patient history, performs a physical examination, and develops a differential diagnosis for patients across clinical settings* *Demonstrates surgical skills and assists with procedures*	● Sees a 12-year-old female in office setting for scoliosis consultation ○ Asks about menarche, family history of scoliosis, bowel/bladder function ○ Performs appropriate physical exam including inspection, Adams forward bend, leg-length discrepancy, and neurological exam ● Understands the various types of scoliosis (congenital, neuromuscular, syndromic, adolescent idiopathic, juvenile, early onset) and describes them to caregiver in non-medical jargon ● Understands posterior approach to the spine if surgery is indicated
Level 2 *Orders and interprets diagnostic testing and consultations based on patient evaluation* *Performs routine procedures and identifies complications, with direct supervision*	● Orders appropriate films to evaluate for scoliosis and to assess bone age (hand xray, pelvis); measures Cobb angles ● Understands need for advanced imaging (bending films, magnetic resonance imaging [MRI], computerized tomography [CT]) in appropriate patient ● Performs exposure to posterior spine including localizing vertebral levels prior to incision
Level 3 *Synthesizes a plan to manage healthy patients with straightforward conditions, including non-operative options (e.g., bracing, casting, physical therapy)* *Performs routine procedures (e.g., pedicle screw insertion, vertical expandable prosthetic titanium rib [VEPTR] lengthening), with indirect supervision; manages complications, with oversight; performs complex procedures with indirect supervision*	● Harmonizes history and physical, imaging, and growth determination to suggest appropriate therapy and follow-up, which may include observation, serial x-rays, bracing, therapy, nutritional supplementation, surgical intervention ● Performs above exposure and places routine pedicle screws; performs growing instrumentation lengthening ● Identifies intra-operative complications (dural tear); manages simple post-operative complications (dural tear, seromas) ● Assists with growing instrumentation insertion
Level 4 *Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities, including non-operative options* *Independently performs complex procedures and manages complex complications*	● Understands non-adolescent idiopathic scoliosis (neuromuscular, congenital, and syndromic scoliosis) and severe scoliosis requiring pre-operative or intra-operative traction ● Performs above procedures with rod insertion and deformity correction ● Performs procedures of non-routine adolescent idiopathic scoliosis or other scoliosis

Level 5 *Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise* *Independently performs advanced procedures, including revisions/complications*	● Conducts research on scoliosis ● Performs procedures of such as revision fusion ● Performs advanced procedures for high-risk pathology
Assessment Models or Tools	● Direct observation ● Pre-operative templating for fusion levels ● Saw bone pedicle screw placement
Curriculum Mapping	●
Notes or Resources	● Lenke LG, Betz RR, Harms J, et al. Adolescent idiopathic scoliosis: A new classification to determine extent of spinal arthrodesis. *J Bone Joint Surg Am*. 2001;83(8):1169-81. https://journals.lww.com/jbjsjournal/Abstract/2001/08000/Adolescent_Idiopathic_Scoliosis__A_New.6.aspx. 2021. ● Murphy R, Mooney J. The First Generation of Early Onset Scoliosis Care. *JPOSNA.* 2021;*3*(2). https://www.jposna.org/ojs/index.php/jposna/article/view/281. 2021. ● Oetgen ME, Heyer JH, Kelly SM. Scoliosis screening. *J Am Acad Orthop Surg*. 2021;29(9):370-379. https://journals.lww.com/jaaos/Abstract/2021/05010/Scoliosis_Screening.2.aspx. 2021. ● Trobisch PD, Ducoffe AR, Lonner BS, Errico TJ. Choosing fusion levels in adolescent idiopathic scoliosis. *J Am Acad Orthop Surg*. 2013;21(9):519-528. https://journals.lww.com/jaaos/pages/default.aspx. 2021.

Patient Care 5: Trauma **Overall Intent:** To identify, stabilize, and definitively treat traumatic injuries in patients using operative and non-operative techniques	
Milestones	**Examples**
Level 1 *Obtains a patient history, performs a physical examination, and develops a differential diagnosis for patients across clinical settings* *Demonstrates surgical skills, performs reduction and casting, assists with procedures, and identifies complications*	● Obtains a pertinent history to the injury and conducts an extremity-specific exam based on that history ● Synthesizes this information and forms an appropriate differential diagnosis ● Applies a holding cast with good technique with appropriate cast index/three-point mold ● Safely splits casts without causing thermal injury
Level 2 *Orders and interprets diagnostic testing and consultations based on patient evaluation* *Performs routine procedures (e.g., closed reduction and percutaneous pinning), cast wedging/adjustments, and manages complications, with indirect supervision*	● Obtains and reviews appropriate imaging and uses this information to perform an appropriate closed reduction with immobilization ● Performs straightforward closed reduction and percutaneous pinning of a supracondylar humerus fracture ● Identifies fractures amenable to cast wedging and performs this technique appropriately with an acceptable outcome
Level 3 *Synthesizes a plan to manage healthy patients with straightforward conditions, including operative and non-operative options* *Performs routine procedures and manages complications, with oversight; performs complex procedures, with indirect supervision (e.g., open reduction of supracondylar humerus, open reduction of articular fractures)*	● Identifies femur fractures in children younger than three years as suspicious for abuse or neglect ● Diagnoses and appropriately determines and performs surgical management for Monteggia fractures with indirect supervision ● Diagnoses and manages a post-operative septic elbow after a percutaneous pinning ● Sets up fracture table and positions fluoroscopy monitor ● Performs flexible or rigid nailing of long bones with indirect supervision ● Applies spica cast for toddler's femur fracture
Level 4 *Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities, including operative and non-operative options*	● Places temporary external fixation to stabilize open fracture and plans definitive surgery

Independently performs complex procedures and manages complex complications (e.g., staged treatment of open fractures, lawn mower injuries)	● Manages femur fracture in patient with atypical bone such as osteogenesis imperfecta, fibrous dysplasia, or cerebral palsy ● Stabilizes multiple fractures in patient with polytrauma ● Performs a physeal bar resection and interposition graft
Level 5 *Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise* *Independently performs advanced procedures (e.g., operative management of fracture nonunion)*	● Corrects malunion using multiplanar external fixation ● Performs pelvic reduction and fixation
Assessment Models or Tools	● Direct observation ● Pre- and/or post-operative conference ● Pre-operative templating/planning
Curriculum Mapping	●
Notes or Resources	● Flynn JM, Sankar WN, Wiesel SW (eds). *Operative Techniques in Pediatric Orthopaedic Surgery.* 2nd ed. Philadelphia, PA: Wolters Kluwer; 2016. ISBN:978-1451193084. ● Skaggs DL, Kocher M (eds). *Master Techniques in Orthopaedic Surgery: Pediatrics*. 2nd ed. Philadelphia, PA: Wolters Kluwer; 2015. ISBN:978-1451194449.

Patient Care 6: Neuromuscular **Overall Intent:** To develop safe, rational, multidisciplinary treatment plans for patients with neuromuscular conditions	
Milestones	**Examples**
Level 1 *Obtains a patient history, performs a physical examination, and develops a differential diagnosis for patients across clinical settings* *Demonstrates surgical skills, assists with procedures, and identifies complications*	● Identifies regions of spasticity on a physical exam and correlates them with type(s) of cerebral palsy ● Differentiates between motion limitations due to spasticity versus contractures (recommend using "joint level impairment" rather than "motion limitation") ● Demonstrates basic knowledge of bracing interventions ● Performs tendon lengthening
Level 2 *Orders and interprets diagnostic testing and consultations based on patient evaluation* *Performs routine procedures and manages complications, with indirect supervision*	● Orders appropriate lower-extremity bracing for the treatment of joint-level impairment and gait deviation ● Orders spine and hip surveillance films at appropriate intervals ● Performs tendon transfers
Level 3 *Synthesizes a plan to manage patients with straightforward conditions, including operative and non-operative options (e.g., injections, casting, bracing)* *Performs routine procedures and manages complications, with oversight; performs complex procedures, with indirect supervision*	● Anticipates impact of spasticity on outcomes ● Performs tendon transfers in conjunction with osteotomies ● Anticipates post-operative medical complications and contributes to interdisciplinary management ● Uses motion analysis to identify gait deviations and compensations ● Develop treatment plans considering patients' Gross Motor Function Classification System (GMFCS) Level
Level 4 *Synthesizes a comprehensive plan to manage patients with complex conditions and comorbidities, including operative and non-operative options (e.g., addresses multi-level problems simultaneously)* *Independently performs complex procedures and manages complex complications*	● Creates a pre-operative plan to include consideration of spasticity management ● Performs all parts of single-event multilevel surgery procedures ● Manages reported complications associated with bone and soft tissue surgery (loss of proximal femoral fixation, failure of patellar tendon advancement) ● Creates a post-operative rehabilitation plan to include activity progression and bracing

Level 5 *Develops a clinical pathway or guideline for the management of patients based on demonstrated clinical expertise* *Independently performs advanced procedures*	● Implements multidisciplinary pre- and post-operative pathways for the care of the pediatric neuromuscular patient ● Independently performs revision surgery for the treatment of the painful spastic dislocated hip
Assessment Models or Tools	● Direct observation ● Multisource feedback ● Patient conference presentation
Curriculum Mapping	●
Notes or Resources	● Gage JR. *Gait Analysis in Cerebral Palsy*. London, UK: Mac Keith Press, 1991. ISBN:978-0521412773. ● Graham HK, Thomason P, Novacheck TF. Cerebral palsy. In: Weinstein SL, Flynn JM, (eds). *Lovell and Winter's Pediatric Orthopaedics*. 7th ed. Philadelphia, PA: Wolters Kluwer/Lippincott Williams and Wilkins; 2014. ISBN:978-1605478142. ● Shrader MW, Wimberly L, Thompson R. Hip surveillance in children with cerebral palsy. *J Am Acad Orthop Surg*. 2019;27(20):760-768. https://journals.lww.com/jaaos/Abstract/2019/10150/Hip_Surveillance_in_Children_With_Cerebral_Palsy.3.aspx. 2021.

Medical Knowledge 1: Foot Pathology **Overall Intent:** To identify and appropriately treat foot pathology by using physical exam and imaging to guide treatment recommendations for both manipulative casting and surgical techniques	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of physiologic anatomy and interprets imaging* *Demonstrates basic knowledge of surgical and non-surgical interventions*	● When evaluating a new patient with foot pain, correctly identifies location of pain and describes foot position appropriately – equinus/calcaneus, hindfoot varus/valgus, pes planus/cavus, adductus and orders appropriate x-rays ● When a newborn presents with club foot, understands the role of manipulative casting and role for surgical intervention following relapse
Level 2 *Demonstrates knowledge of basic therapeutic approaches based on foot pathology* *Discusses indications and contraindications to surgical and non-surgical interventions*	● For a three-year-old patient with a history of clubfoot, understands indication for tibialis anterior transfer ● For a cavovarus foot deformity, identifies flexible and rigid deformity and discusses the indications and contraindications for soft tissue versus bony reconstruction
Level 3 *Correlates imaging to anatomy and selects treatment* *Demonstrates knowledge of the risks and benefits for surgical and non-surgical interventions*	● Interprets x-rays and advanced imaging (CT scan) when necessary to determine appropriate surgical intervention for a symptomatic tarsal coalition ● For a three-year-old male with recurrent clubfoot, discusses risks and benefits of surgical intervention as well as manipulative casting (e.g., pressure sores) and understands the paradigm shift from early surgical intervention to manipulative casting in clubfoot management and cast complications (pressure sores)
Level 4 *Demonstrates knowledge of advanced therapeutic approaches based on foot pathology* *Anticipates long-term sequela of surgical and non-surgical interventions*	● For a seven-year-old male with recurrent clubfoot, understands advanced surgical options including circumferential releases, midfoot wedge osteotomies and fusion ● Counsels family members appropriately about the natural history of clubfoot, risk of recurrence, and brace management in clubfoot, and develops a long-term follow-up plan
Level 5 *Leads advanced discussion at a multidisciplinary conference and/or in operating room*	● Presents at a national meeting
Assessment Models or Tools	● Direct observation ● Radiographic interpretation
Curriculum Mapping	●
Notes or Resources	● Mosca VS. *Principles and Management of Pediatric Foot and Ankle Deformities and Malformations*. Philadelphia, PA: Wolters Kluwer Health; 2014. ISBN:978-1451130454.

	● Staheli L. *Clubfoot: Ponseti Management*. 3rd ed. Global Health; 2009. https://storage.googleapis.com/global-help-cdn/2020/07/5e0684b9-help_cfponseti.pdf. 2021.

Medical Knowledge 2: Hip Pathology **Overall Intent:** To identify hip pathology in the pediatric patient with use of various radiographic and clinical assessment tools to guide treatment plans based on age and degree of dysplasia	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of pathologic anatomy and interprets imaging* *Demonstrates basic knowledge of surgical and non-surgical interventions*	● When a three-week-old baby girl presents to office after breech presentation: ○ Asks about birth history, family history, other risk factors for DDH ○ Performs physical exams including Barlow, Ortolani, Galeazzi, and range of motion ○ Assesses baby for associated conditions (torticollis, foot deformity, spine deformity) ● Describes normal and pathologic anatomy seen on imaging including alpha angle, femoral head coverage, Shenton's line, Perkin's Line, Hilgenreiner's Line, ● Describes treatment forecast including Pavlik, Rhino bracing, closed reduction, arthrogram, spica, and open reduction
Level 2 *Correlates imaging to development and hip pathology* *Discusses indications and contraindications to surgical and non-surgical interventions*	● Understands difference between hip ultrasound and x-ray and when to use them ● Discusses interventions above based on specific patient case (age at presentation, ability to reduce hip, other comorbidities)
Level 3 *Demonstrates knowledge of basic therapeutic approaches based on hip pathology* *Demonstrates knowledge of the risks and benefits for surgical and non-surgical interventions*	● Discusses an anterior approach, medial approach to open reduction ● Assesses appropriate reduction parameters and stability (interprets arthrogram, CT/MRI) ● Understands the risk of complications based on hip position in spica casting ● Discharges with appropriate safety parameters given a spica cast
Level 4 *Demonstrates knowledge of advanced therapeutic approaches based on hip pathology* *Anticipates long-term sequela of surgical and non-surgical interventions*	● Describes complex reconstruction procedures, including femoral and acetabular osteotomies ● Understands indications and treatment for older patients with neglected DDH (periacetabular osteotomy, etc.)
Level 5 *Leads advanced discussion at a multidisciplinary conference and/or in operating room*	● Submits a paper/poster/podium presentation on hip pathology
Assessment Models or Tools	● Direct observation ● Radiographic interpretation ● Sawbones Training model ● Ultrasound interpretation with or without performing the ultrasound
Curriculum Mapping	●

Notes or Resources	● Julie S, Quinn RH, Murray J, et al. Management of developmental dysplasia of the hip in infants up to six month of age: Intended for use by general pediatricians and referring physicians. *J Am Acad Orthop Surg.* 2019;27(8):e356-e359. https://journals.lww.com/jaaos/Abstract/2019/04150/Management_of_Developmental_Dysplasia_of_the_Hip.4.aspx. 2021. ● Murphy RF, Kim YJ. Surgical management of pediatric developmental dysplasia of the hip. *Journal of the American Academy of Orthopaedic Surgeons.* 2016;24(9):615-625. https://pubmed.ncbi.nlm.nih.gov/27509038/. 2021. ● Scott EJ, Dolan LA, Weinstein SL. Closed Vs. Open reduction/salter innominate osteotomy for developmental hip dislocation after age 18 months: Comparative survival at 45-year follow-up. *J Bone Joint Surg Am*. 2020;102(15):1351-1357. https://journals.lww.com/jbjsjournal/Abstract/2020/08050/Closed_Vs__Open_Reduction_Salter_Innominate.13.aspx. 2021. ● Upasani VV, Bomar JD, Matheney TH, et al. Evaluation of brace treatment for infant hip dislocation in a prospective cohort: Defining the success rate and variables associated with failure. *J Bone Joint Surg Am*. 2016;98(14):1215-1221. https://journals.lww.com/jbjsjournal/Abstract/2016/07200/Evaluation_of_Brace_Treatment_for_Infant_Hip.10.aspx. 2021.

Medical Knowledge 3: Lower-Extremity Deformity **Overall Intent:** To understand physiologic and pathologic lower-extremity alignment and the appropriate evaluation and treatment of deformities	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of anatomy and interprets imaging (e.g., normal development lower extremity alignment – genu valgum/varum, Blounts, Ricketts)* *Demonstrates basic knowledge of surgical and non-surgical interventions*	● Interprets limb alignment films in a child presenting for evaluation of deformity, including physiologic genu yalgum/varum, Blount's disease, and rickets ● Evaluates toddler for in-toeing and identifies femoral anteversion, tibial torsion, and metatarsus adductus as potential sources ● Demonstrates knowledge of guided growth and osteotomies
Level 2 *Correlates imaging to development and lower extremity deformity (e.g., interpretation of limb alignment films and determining bone age)* *Discusses indications and contraindications to surgical and non-surgical interventions*	● Further interprets limb alignment films, including mechanical axis and measurement of joint alignment angles ● Orders and interprets bone age films ● Evaluates adolescent with pathologic genu valgum and estimates growth remaining to determine if patient is a candidate for guided growth versus osteotomy
Level 3 *Demonstrates knowledge of basic therapeutic approaches based on lower extremity deformity (e.g., bracing/orthotics, guided growth, osteotomies)* *Demonstrates knowledge of the risks and benefits for surgical and non-surgical interventions*	● Understands role of bracing/orthotics in lower-extremity deformity ● Discusses the risks of guided growth including anticipating rebound and/or need for overcorrection based on diagnosis
Level 4 *Demonstrates knowledge of advanced therapeutic approaches based on lower extremity deformity (e.g., multi-planar frames, internal lengthening devices)* *Anticipates long-term sequela of surgical and non-surgical interventions*	● Evaluates adolescent with multi-planar deformity and understands indication for multi-planar frames and internal lengthening devices ● Understands risks of limb lengthening procedures (joint subluxation, neurovascular) and develops appropriate intra-operative and follow-up plans to avoid these risks
Level 5 *Leads advanced discussion at a multidisciplinary conference and/or in operating room*	● Presents grand rounds or resident lecture on evaluation of lower-extremity deformity and treatment options
Assessment Models or Tools	● Direct observation

	● Radiographic interpretation
Curriculum Mapping	●
Notes or Resources	● Lincoln TL, Suen PW. Common rotational variations in children. *JAAOS*. 2003;11(5):312-320. https://pubmed.ncbi.nlm.nih.gov/14565753/. 2021. ● Paley DF. *Principles of Deformity Correction*. New York; NY: Springer; 2003. ISBN:978-3540441618. ● White GR, Mencio GA. Genu valgum in children: Diagnostic and therapeutic alternatives. *J Am Acad Orthop Surg*. 1995;3:275. https://pubmed.ncbi.nlm.nih.gov/10795033/. 2021.

Medical Knowledge 4: Spine **Overall Intent:** To understand the pathophysiology of spine disorders to describe proper treatment plans for various pediatric patients	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of anatomy and interprets imaging* *Demonstrates basic knowledge of surgical and non-surgical interventions*	● A 12-year-old female presents to office for scoliosis consultation: ○ Measures Cobb angle ○ Measures some form of skeletal maturity/growth prediction (Risser, Sanders) ○ Understands concepts of bracing and therapy versus spinal fusion
Level 2 *Demonstrates knowledge of pathoanatomy and correlates with imaging* *Discusses indications of surgical and non-surgical interventions*	● Correlates Cobb angle to physical exam and develops appropriate treatment plan ● Combines spinal imaging with growth prediction to execute treatment plan as above ● Discusses proper brace wear, type of physical therapy, posterior spinal fusion
Level 3 *Demonstrates knowledge of basic therapeutic techniques (e.g., posterior sacroiliac fusion [PSIF])* *Demonstrates knowledge of the risks and benefits for surgical and non-surgical interventions*	● Discusses PSIF and common complications of the procedure, including dural tears, wound infection, and neurological injury ● Discusses risks and complications of not treating scoliosis, including progression of curve, cosmetic deformity, pulmonary function
Level 4 *Demonstrates knowledge of advanced therapeutic techniques (e.g., tethering, growing instrumentation)* *Anticipates long-term sequela of surgical and non-surgical interventions*	● Understands more advanced surgical interventions: anterior tethering, growing instrumentation and Mehta casting for early-onset scoliosis, halo traction for severe deformities ● Describes long-term complications: failure of fusion, proximal junctional kyphosis, need for revision, progression into adult deformity
Level 5 *Leads advanced discussion at a multidisciplinary conference and/or in operating room*	● Submits a paper/poster/podium presentation on pediatric spine disorders
Assessment Models or Tools	● Direct observation ● Journal club ● Radiographic exercise
Curriculum Mapping	●

Notes or Resources	● Hassanzadeh H, Nandyala SV, Puvanesarajah V, et al. Serial Mehta Cast Utilization in Infantile Idiopathic Scoliosis: Evaluation of radiographic predictors. *Journal of Pediatric Orthopaedics*. 2017;37(6):387-395. https://journals.lww.com/pedorthopaedics/Abstract/2017/09000/Serial_Mehta_Cast_Utilization_in_Infantile.11.aspx. 2021. ● Lenke LG, Betz RR, Harms J, et al. Adolescent idiopathic scoliosis: a new classification to determine extent of spinal arthrodesis. *J Bone Joint Surg Am*. 2001;83(8):1169-81. https://journals.lww.com/jbjsjournal/Abstract/2001/08000/Adolescent_Idiopathic_Scoliosis___A_New.6.aspx. 2021. ● Trobisch PD, Ducoffe AR, Lonner BS, Errico TJ. Choosing fusion levels in adolescent idiopathic scoliosis. *J Am Acad Orthop Surg*. 2013;21(9):519-528. https://journals.lww.com/jaaos/pages/default.aspx. 2021. ● Williams BA, Matsumoto H, McCalla DJ, et al. Development and initial validation of the Classification of Early-Onset Scoliosis (C-EOS). *J Bone Joint Surg Am*. 2014;96(16):1359-1367. https://journals.lww.com/jbjsjournal/Abstract/2014/08200/Development_and_Initial_Validation_of_the.6.aspx. 2021.

Medical Knowledge 5: Trauma **Overall Intent:** To identify mechanism, severity, and treatment options for traumatic injuries to limit morbidity and maximize function	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of developmental anatomy and interprets imaging* *Demonstrates basic knowledge of surgical and non-surgical interventions*	● Accurately associates mechanisms of elbow trauma to clinical and radiographic injury ● Accurately associates proximal femoral vascular anatomy and risks of femoral nailing
Level 2 *Correlates imaging to development and pathology (e.g., normal physes versus fractures)* *Discusses indications and contraindications to surgical and non-surgical interventions*	● Accurately correlates elbow epiphyseal appearance with patient age ● Discusses the severity of supracondylar humerus fractures and identifies which fractures will benefit from operative intervention and which may be better treated with non-operative intervention
Level 3 *Demonstrates knowledge of basic therapeutic approaches based on pathology (e.g., treatment options based on age, size, and remodeling potential)* *Demonstrates knowledge of the risks and benefits for surgical and non-surgical interventions*	● Identifies treatment options based on age and remodeling potential, e.g., understands acceptable angulation of a long-bone fracture based on age and growth remaining ● Identifies likely outcome for both operative and non-operative management of different types of fractures and discusses this with the patient and family members
Level 4 *Demonstrates knowledge of advanced therapeutic approaches based on pathology (e.g., physeal bar excision indications)* *Anticipates long-term sequela of surgical and non-surgical interventions*	● Teaches a resident about treatment for multiplanar complex fractures, such as a triplane ankle ● Understands when a physeal bar excision is or is not indicated based on the severity of the bar and remaining growth ● Anticipates sequela of physeal damage and the potential for future deformity
Level 5 *Leads advanced discussion at a multidisciplinary conference and/or in operating room*	● Provides a grand rounds-type presentation about a pediatric-specific fracture discussing treatment options and long-term outcomes; can lead a question-and-answer session related to that topic ● Presents paper/poster at national meeting
Assessment Models or Tools	● Direct observation ● Pre-/post-operative conference
Curriculum Mapping	●

Notes or Resources	● Flynn JM, Sankar WN, Wiesel SW. *Operative Techniques in Pediatric Orthopaedic Surgery*. 2nd ed. Lippincott Williams & Wilkins; 2015. ISBN:978-1451193084. ● Vanderhave K, Cho R, Liu, R. What's new in pediatric orthopaedic surgery. *Journal of Bone Joint Surg*. 2020;102(4):275-282. https://journals.lww.com/jbjsjournal/fulltext/2020/02190/what_s_new_in_pediatric_orthopaedic_surgery.1.aspx. 2021.

Medical Knowledge 6: Neuromuscular **Overall Intent:** To identify key features of neuromuscular conditions and understand the natural history and treatment options/indications to maximize function	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of pathologic anatomy and interprets imaging* *Demonstrates basic knowledge of surgical and non-surgical interventions*	● Classifies a patient with cerebral palsy based on anatomic distribution of pathology, type of motor involvement and functional impairment ● Understands indications for hip surveillance ● Discusses bracing and surgical interventions for gastrocnemius spasticity and contractures
Level 2 *Correlates imaging to development and pathology (e.g., interpretation of hip radiographs)* *Discusses indications and contraindications to surgical and non-surgical interventions (e.g., identifies "hips at risk")*	● Measures migration percentage and identifies the hip at risk ● Identifies all components of crouch gait ● Interpretation of hip radiographs including identifying pertinent abnormalities and normal anatomic variation
Level 3 *Demonstrates knowledge of basic therapeutic approaches based on pathology (e.g., describes options for hip preservation versus hip salvage)* *Demonstrates knowledge of the risks and benefits for surgical and non-surgical interventions*	● Correctly identifies patients indicated for surgical intervention of hip subluxation and discusses risks and benefits of soft tissue procedures versus bony intervention ● Orders and interprets films as apart of non-surgical and surgical planning for gait abnormalities (analysis of the elements of crouch gait and neuromuscular flat foot) ● Identifies medical comorbidities (malnutrition, compromised respiratory status, chronic constipation) that increase risk of surgical intervention
Level 4 *Demonstrates knowledge of advanced therapeutic approaches based on multiple diagnostic modalities (e.g., gait analysis: recognizes gait deviations requiring treatment and differentiates these from compensations)* *Anticipates long-term sequela of surgical and non-surgical interventions*	● Correctly identifies risks and benefits of complex surgical intervention for hip subluxation and dislocation with consideration of age, severity, and functional level ● Uses the results of gait analysis (if applicable), physical examination, and imaging to create non-surgical interventions and plans for multilevel surgery ● Identifies joint level impairments and their contributions to gait deviations ● Understands the impact of single-event multilevel surgery procedures on return to pre-operative levels
Level 5 *Leads advanced discussion at a multidisciplinary conference and/or in operating room*	● Independently interprets gait analysis studies (if applicable) and creates appropriate non-operative and operative plans accordingly ● Leads discussion among multiple medical and surgical specialties to optimize the peri-surgical care of the neuromuscular patient

Assessment Models or Tools	● Direct observation ● Multisource feedback ● Patient conference presentations
Curriculum Mapping	●
Notes or Resources	● Graham HK, Thomason P, Novacheck TF. Cerebral palsy. In: Weinstein SL, Flynn JM, (eds). *Lovell and Winter's Pediatric Orthopaedics*. 7th ed. Philadelphia, PA: Wolters Kluwer/Lippincott Williams and Wilkins; 2014. ISBN:978-1605478142. ● Hosseinzadeh P, Baldwin K, Minaie A, Miller F. Management of hip disorders in patients with cerebral palsy. *JBJS Rev*. 2020;8(3):e0148. https://journals.lww.com/jbjsreviews/Abstract/2020/03000/Management_of_Hip_Disorders_in_Patients_with.14.aspx. 2021. ● Shrader MW, Sigh C, McDonald T. Instrumented gate analysis in the care of children with cerebral palsy. *JPOSNA*. 2021;3(1):1-18. https://www.jposna.org/ojs/index.php/jposna/article/view/237. 2021. ● Shrader MW, Wimberly L, Thompson R. Hip surveillance in children with cerebral palsy. *J Am Acad Orthop Surg*. 2019;27(20):760-768. https://journals.lww.com/jaaos/Abstract/2019/10150/Hip_Surveillance_in_Children_With_Cerebral_Palsy.3.aspx. 2021.

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 common patient safety events* *Demonstrates knowledge of how to report patient safety events* *Demonstrates knowledge of basic quality improvement methodologies and metrics*	● Lists patient misidentification or medication errors as common patient safety events ● Identifies medication safety issues in regard to pediatric dosing guidelines ● Describes how to report errors in the local clinical environment ● Knows the systems process for communicating potential medication errors ● Summarizes common home issues: stairs to navigate post-operation, need for further equipment, shower chair, commode, etc.
Level 2 *Identifies system factors that lead to patient safety events* *Reports patient safety events through institutional reporting systems (simulated or actual)* *Describes local quality improvement initiatives*	● Identifies systems factors leading to errors through the multidisciplinary conferences ● Correctly applies a Plan Do Study Act (PDSA) QI project to help eliminate common medication errors in the pediatric population ● Describes root cause analysis process
Level 3 *Participates in analysis of patient safety events (simulated or actual)* *Participates in disclosure of patient safety events to patients and patients' families (simulated or actual)* *Participates in local quality improvement initiatives*	● Prepares for morbidity and mortality (M and M) presentations ● Communicates, under supervision, with caregivers about a medication error ● Participates in protocol with risk management to disclose medication errors
Level 4 *Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)* *Discloses patient safety events to patients and patients' families (simulated or actual)*	● Participates in a QI project to decrease medication error within the pediatric population ● Communicates with caregivers about a medication error

Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project	● Discusses the analysis of a QI project
Level 5 *Actively engages teams and processes to modify systems to prevent patient safety events* *Role models or mentors others in the disclosure of patient safety events* *Creates, implements, and assesses quality improvement initiatives at the institutional or community level*	● Assumes a leadership role at the departmental or institutional level for patient safety ● Conducts a simulation for disclosing patient safety events ● Leads a multidisciplinary QI project
Assessment Models or Tools	● Direct observation ● E-module multiple choice tests ● Hospital safety report audit ● Multisource feedback ● Presentations (M and M, QI) ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● Institute of Healthcare Improvement. http://www.ihi.org/Pages/default.aspx. 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* *Identifies key elements for safe and effective transitions of care and hand-offs*	● Identifies the caregiver, pediatrician, social worker, physical therapists as members of the team ● Lists follow-up of labs, testing, new medications, and consults as essential components of a sign-out
Level 2 *Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional team members* *Performs safe and effective transitions of care/hand-offs in straightforward clinical situations*	● Coordinates transition of care with home care or rehabilitation facility at the time of discharge from the hospital ● Uses a systematic institutional process during routine sign-out
Level 3 *Coordinates care of patients in complex clinical situations effectively using the roles of interprofessional team members* *Performs safe and effective transitions of care/hand-offs in complex clinical situations*	● Coordinates complex care with the social worker for a pediatric patient who lives in a shelter with care giver to ensure appropriate medical aftercare ● Uses institutional protocol when transferring a complex patient to the intensive care unit
Level 4 *Role models effective coordination of patient-centered care among multidisciplinary team members* *Role models and advocates for safe and effective transitions of care/hand-offs*	● Leads team members during inpatient rotations in appropriate consultation with care coordination in disposition of pediatric patient who lives in a shelter with mobility impairment ● Plans for cross-coverage in case of unanticipated absence of a team member
Level 5 *Analyzes the process of care coordination and leads in the design and implementation of improvements* *Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes*	● Creates a multidisciplinary meeting/complex care group to better manage pediatric patients with multiple medical problems ● Develops a protocol (care pathways for various orthopaedic conditions) to streamline complex care coordination
Assessment Models or Tools	● Direct observation ● Multisource feedback

	● Objective structured clinical examination (OSCE) ● 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. Population health training. https://www.cdc.gov/pophealthtraining/whatis.html. 2021. ● Hospitals in Pursuit of Excellence. Preventing Patient Falls: A Systematic Approach from the Joint Commission Center for Transforming Healthcare Project. http://www.hpoe.org/Reports-HPOE/2016/preventing-patient-falls.pdf. 2021. ● Skochelak SE, Hammoud MM, Lomis KD, et al. *AMA Education Consortium: Health Systems Science*. 2nd ed. Elsevier; 2021. ISBN:9780323694629.

Systems-Based Practice 3: Physician Role in Health Care Systems **Overall Intent:** To understand the physician's role in the complex health care system and how to operate effectively within the system to improve patient care	
Milestones	**Examples**
Level 1 *Describes basic health payment systems, including government, private, public, and uninsured care, as well as different practice models*	● Understands the difference between Medicaid, managed Medicaid, private insurance ● Takes into consideration patient's insurance limitations when presenting certain treatment plans (orthotic devices, physical therapy)
Level 2 *Describes how working within the health care system impacts patient care, including billing and coding*	● Identifies coding requirements for clinical documentation ● Explains that improving patient satisfaction potentially improves patient compliance
Level 3 *Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency)*	● Ensures compliance with care pathways to optimize length of stay ● Understands the role of patient education in decreasing readmission rates
Level 4 *Uses shared decision-making in patient care, taking into consideration costs to the patient*	● Ensures proper documentation of qualifying hospital stay prior to discharging a patient to a skilled nursing facility for physical therapy ● Works collaboratively to improve patient assistance resources for a patient with limited resources ● Tailors treatment decisions to patient resources/insurance status (e.g., prescribing a brace versus applying a splint)
Level 5 *Participates in advocacy activities for health policy*	● Works with community or professional organizations to advocate for playground equipment/ park safety measures ● Improves informed consent process for non-English-speaking patients requiring interpreter services ● Performs clinical research that affects health care barriers ● Participates in a peer-to-peer review for insurance approval
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Patient satisfaction data ● Portfolio
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. 2021. ● AHRQ. Measuring the Quality of Physician Care. https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html. 2021.

	● The Commonwealth Fund. Health System Data Center. http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1. 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/. 2021. ● The Kaiser Family Foundation: Topic: Health Reform. https://www.kff.org/topic/health-reform/. 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 available evidence, and incorporate patient preferences and values to the care of straightforward conditions*	● Compares evidence-based guidelines and literature review for treatment of developmental dysplasia of the hip (including Pavlik harness treatment and abduction bracing) and incorporates the patient's preference for treatment while communicating and understanding options
Level 2 *Articulates clinical questions and elicits patient preferences and values to guide evidence-based care*	● Identifies and discusses potential evidence-based treatment options for a patient with a delayed diagnosis of hip dysplasia and/or failure of harness treatment solicits parent perspective
Level 3 *Locates and applies the best available evidence, integrated with patient preference, to the care of complex conditions*	● Obtains, discusses, and applies evidence for the treatment of a patient with hip dysplasia and underlying medical comorbidities (e.g., teratologic hip dislocation, hip dysplasia in children with neuromuscular conditions and myelomenigocele) ● Understands and appropriately uses clinical practice guidelines in making patient care decisions while eliciting patient preferences for operative versus non-operative treatment
Level 4 *Critically appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide care tailored to the individual patient*	● Accesses the primary literature to address controversies in the evolving field of hip preservation and the management of hip dysplasia in the adolescent/young adult
Level 5 *Coaches others to critically appraise and apply evidence for complex conditions, and/or participates in the development of guidelines*	● Leads clinical discussion on application of evidence-based practice for treatment of developmental hip dysplasia ● Develops a DDH ultrasound screening program in accordance to American Academy of Pediatrics guidelines
Assessment Models or Tools	● Core conference participation ● Direct observation ● Oral or written examinations ● Presentation evaluation
Curriculum Mapping	●
Notes or Resources	● International Hip Dysplasia Institute. https://hipdysplasia.org/get-involved/orthopedic-surgeons/influential-references/. 2021. ● Kelley SP, Feeney MM, Maddock CL, et al. Erratum: Expert-based consensus on the principles of Pavlik Harness Management of developmental dysplasia of the hip. *JBJS Open Access*. 2019;4(4):e0054. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7722584/. 2021. ● Schmitz MR, Murtha AS, Clohisy JC, The ANCHOR Study Group. Developmental dysplasia of the hip in adolescents and young adults. *JAAOS*. 2020;28(3):91-101.

	https://journals.lww.com/jaaos/Abstract/2020/02010/Developmental_Dysplasia_of_the_Hip_in_Adolescents.1.aspx. 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 (reflective mindfulness); develop clear objectives and goals for improvement in a learning plan	
Milestones	**Examples**
Level 1 *Accepts responsibility for personal and professional development by establishing goals* *Identifies the strengths, deficiencies, and limitations in one's knowledge and surgical skills*	● Establishes personal goals for clinical rotation during pre-rotation meeting ● Reflects on feedback from patient care team members ● Identifies gaps in knowledge
Level 2 *Demonstrates openness to feedback and other input to inform goals* *Analyzes and reflects on the strengths, deficiencies, and limitations in one's knowledge and expertise to design a learning plan, with assistance*	● Integrates and responds to feedback to adjust clinical performance ● Assesses time management skills and how it impacts timely completion of clinic notes and literature reviews ● Develops individual education plan to improve study skills and knowledge base, with assistance
Level 3 *Responds to feedback and other input episodically, with adaptability and humility* *Creates and implements a learning plan to optimize educational and professional development*	● Uses feedback to modify personal professional development goals ● Creates a comprehensive personal curriculum to improve education, including monitoring and accountability for a study plan
Level 4 *Actively seeks feedback and other input, with adaptability and humility* *Uses ongoing reflection, feedback, and other input to measure the effectiveness of the learning plan, and, when necessary, improves it*	● Asks for feedback from peers, faculty members, and ancillary team members ● Debriefs with the attending and other patient care team members after patient encounter to optimize future collaboration in the care of the patient and family
Level 5 *Role models consistently seeking feedback and other input with adaptability and humility* *Coaches others on reflective practice*	● Models and teaches practice improvement through focused study and reflective feedback ● Develops educational module for collaboration with other patient care team members
Assessment Models or Tools	● Core conference participation ● Direct observation ● Review of learning plan

Curriculum Mapping	●
Notes or Resources	● Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: Practice-based learning and improvement. Acad Pediatr. 2014;14(2 Suppl):S38-S54. https://www.academicpedsjnl.net/article/S1876-2859(13)00333-1/fulltext. 2021. ● 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. 2021. ● 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. 2021.

Professionalism 1: Professional Behavior and Ethical Principles **Overall Intent:** To recognize and address lapses in ethical and professional behavior, demonstrates ethical and professional behaviors, and use appropriate resources for managing ethical and professional dilemmas	
Milestones	**Examples**
Level 1 *Identifies and describes inciting events for professionalism lapses* *Demonstrates knowledge of the ethical principles underlying patient care (e.g., informed consent, surrogate decision making, advanced directives, confidentiality, error disclosure, stewardship of limited resources, and related topics)*	● Identifies fatigue, illness, increased substance/alcohol use and unmanaged stress as contributing factors to professional lapses ● Relates the importance of patient autonomy as it relates to informed consent including the role of surrogates and advance directives ● Understands the impact of disclosing errors in patient care and loss of patient confidentiality
Level 2 *Demonstrates insight into professional behavior in straightforward situations* *Applies ethical principles in straightforward situations and takes responsibility for lapses*	● Understands perceptions created by tone of voice, timing/place of feedback within the health care team during daily patient care activities ● Notifies appropriate people of personal mistakes; does not make excuses ● Accepts responsibility when supervising residents who do not provide appropriate instruction to learners (e.g., wrong labs, splint)
Level 3 *Demonstrates professional behavior in complex situations (e.g., patient refusing treatment, impaired physicians, patients with limited decision-making capacity)* *Integrates ethical principles and recognizes the need to seek help in complex situations*	● Does not attribute blame when discussing adverse outcome with family members or the patient ● Uses respectful, unemotional communication in discussions when resolving conflict within health care team ● Elevates concerns for inappropriate microaggressions to appropriate supervisor. ● Notifies site director or appropriate supervisor after noticing a colleague seems to be impaired
Level 4 *Recognizes situations that may promote professionalism lapses and intervenes to prevent lapses in oneself and others* *Recognizes and uses appropriate resources for managing and resolving ethical dilemmas (e.g., ethics consultations, literature review, risk management/legal consultation)*	● Acts in patient's best interest when collaborating with other health care services to determine appropriate admission service ● Responds to inappropriate microaggressions using Bystander Intervention techniques ● Elevates issues regarding end-of-life decisions to appropriate channels when family or other conflict is evident (e.g., Ethics Committee, legal counsel, risk management)
Level 5 *Coaches others when their behavior fails to meet professional expectations*	● Chooses appropriate setting and tone in discussions with others regarding suboptimal professional behavior

Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution	● Coaches others on bystander intervention skills in response to sexual harassment ● Recognizes source of repetitive conflict between members of health care team and recommends institutional policy to resolve ● Devises materials to aid others in learning to provide informed consent
Assessment Models or Tools	● Direct observation ● Global evaluation ● Multisource feedback ● Oral or written self-reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● American Academy of Orthopaedic Surgeons (AAOS). Code of Medical Ethics and Professionalism for Orthopaedic Surgeons. https://www.aaos.org/contentassets/b5bdb0610ad4411cbe400ce53a2ccdab/code-of-ethics-2013-color-logo.pdf. 2021. ● AAOS. Guide to Professionalism and Ethics in the Practice of Orthopaedic Surgery. https://www.aaos.org/contentassets/b5bdb0610ad4411cbe400ce53a2ccdab/2016-guide-to-professionalism-and-ethics.pdf. 2021. ● ABIM Foundation. American Board of Internal Medicine. Medical professionalism in the new millennium: A physician charter. *Annals of Internal Medicine*. 2002;136(3):243-246. https://annals.org/aim/fullarticle/474090/medical-professionalism-new-millennium-physician-charter. 2021. ● AMA. Ethics. https://www.ama-assn.org/delivering-care/ethics. 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. 2021. ● Domen RE, Johnson K, Conran RM, et al. Professionalism in pathology: A case-based approach as a potential education tool. *Arch Pathol Lab Med.* 2017;141(2):215-219. https://meridian.allenpress.com/aplm/article/141/2/215/132523/Professionalism-in-Pathology-A-Case-Based-Approach. 2021. ● Levinson W, Ginsburg S, Hafferty FW, Lucey CR. *Understanding Medical Professionalism*. 1st ed. New York, NY: McGraw-Hill Education; 2014. ISBN:978-0071807432.

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 *Reliably arrives to clinical activities on time and describes strategies for ensuring timely task completion* *Responds promptly to requests or reminders to complete tasks and responsibilities*	● Completes work hour logs promptly and accurately ● Exhibits punctuality in conference attendance ● Completes documentation in the medical record in a timely and accurate manner ● Completes end-of-rotation evaluations
Level 2 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in straightforward situations* *Completes tasks and responsibilities without reminders*	● Completes administrative tasks, documents safety modules, procedure review, and licensing requirements by specified due date ● Completes tasks before going out of town in anticipation of lack of computer access while traveling
Level 3 *Prioritizes tasks and responsibilities in a timely manner with appropriate attention to detail in complex situations* *Proactively completes tasks and responsibilities to ensure that the needs of patients, teams, and systems are met*	● Notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from other residents or faculty members as needed ● Arranges coverage for assigned clinical tasks in preparation for being out of the office to ensure appropriate continuity of care
Level 4 *Recognizes barriers that may impact one's own and others' ability to complete tasks and responsibilities in a timely manner*	● Recognizes and works to improve personal deficiencies in communication (verbal and electronic documentation) with team members about patient care needs ● Recognizes when multiple residents are unavailable, the outpatient clinic will be negatively affected and appointments delayed
Level 5 *Develops processes to enhance one's own and other's ability to efficiently complete patient care tasks and responsibilities*	● Leads interdisciplinary team to identify problems and specific solutions to develop a process to streamline patient discharges
Assessment Models or Tools	● Compliance with deadlines and timelines ● Direct observation ● Global evaluations ● Multisource feedback ● Self-evaluations and reflective tools ● Simulation
Curriculum Mapping	●

Notes or Resources	● AMA. Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. 2021. ● AAOS. Code of Ethics and Professionalism for Orthopaedic Surgeons. https://www.aaos.org/about/bylaws-policies/ethics-and-professionalism/code/. 2021. ● Code of conduct from fellow/resident institutional manual ● Expectations of residency program regarding accountability and professionalism

Professionalism 3: Well-Being **Overall Intent:** To identify, use, manage, improve, and seek help for personal and professional well-being for self and others	
Milestones	**Examples**
Level 1 *Recognizes the importance of addressing personal and professional well-being (e.g., physical and emotional health, burnout)*	● Acknowledges own response to patient's poor outcome ● Receives feedback on missed emotional cues after a family meeting
Level 2 *Lists available resources for addressing personal and professional well-being* *Describes institutional resources meant to promote well-being*	● Independently identifies and communicates impact of a personal problem ● Can identify graduate medical education counseling services, suicide hotline, and well-being committee representatives available at the institution
Level 3 *Discusses a plan to promote personal and professional well-being with institutional support* *Recognizes which institutional factors affect well-being*	● Develops a reflective response to deal with the personal impact of difficult patient encounters and disclosures with the interdisciplinary team ● Identifies faculty mentors
Level 4 *Independently develops a plan to promote personal and professional well-being* *Describes institutional factors that positively and/or negatively affect well-being*	● Identifies ways to manage personal stress and responses to unexpected patient outcomes, independently ● Discusses useful strategies to improve work-life balance ● Identifies initiatives within the fellowship program to improve well-being
Level 5 *Creates institutional level interventions that promote colleagues' well-being* *Describes institutional programs designed to examine systemic contributors to burnout*	● Assists in organizational efforts to address clinician well-being after patient diagnosis/prognosis/death ● Implements a lasting initiative to improve learner well-being within the program
Assessment Models or Tools	● Direct observation ● Group interview or discussions for team activities ● Individual interview ● Institutional online training modules ● Self-assessment and personal learning plan
Curriculum Mapping	●
Notes or Resources	● This subcompetency is not intended to evaluate a fellow's well-being, but to ensure each fellow has the fundamental knowledge of factors that impact well-being, the mechanisms

	by which those factors impact well-being, and available resources and tools to improve well-being. ● AAOS. Drivers of Burnout Among Orthopaedic Surgeons. https://aaos.org/videos/video-detail-page/21469__Videos. 2021. ● ACGME. "Well-Being Tools and Resources." https://dl.acgme.org/pages/well-being-tools-resources. 2021. ● Ames SE, Cowan JB, Kenter K, Emery S, Halsey D. Burnout in orthopaedic surgeons: A challenge for leaders, learners, and colleagues: AOA critical issues. *J Bone Joint Surg Am.* 2017;99(14):e78. https://journals.lww.com/jbjsjournal/Abstract/2017/07190/Burnout_in_Orthopaedic_Surgeons__A_Challenge_for.12.aspx. 2021. ● Daniels AH, DePasse JM, Kamal RN. Orthopaedic surgeon rurnout: Diagnosis, treatment, and prevention. *J Am Acad Orthop Surg*. 2016;24(4):213-9. https://www.researchgate.net/publication/294918464_Orthopaedic_Surgeon_Burnout_Diagnosis_Treatment_and_Prevention. 2021. ● Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: Personal and professional development. *Acad Pediatr*. 2014 Mar-Apr;14(2 Suppl):S80-97. https://pubmed.ncbi.nlm.nih.gov/24602666/. 2021. ● Local resources, including Employee Assistance

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication **Overall Intent:** To deliberately use language and behaviors to form constructive relationships with patients and family; identify communication barriers including recognizing biasesand health care needs while respecting patient autonomy in communications; organize and lead communication around shared decision making	
Milestones	**Examples**
Level 1 *Demonstrates respect and establishes rapport with patient and caregiver(s) (e.g., situational awareness of language, disability, health literacy level, cultural differences)*	● Introduces self, other health care professionals, faculty member with appropriate titles; identifies patient and others in the room; and engages all parties in health care discussions with sensitivities to patient and family dynamics
Communicates with patients and patient's caregiver(s) in an understandable and respectful manner	● Identifies need for trained interpreters with non-English-speaking patients ● Uses age-appropriate and health literacy-appropriate language
Demonstrates basic understanding of informed consent process	● Outlines basic risks, benefits, and alternatives to surgery
Level 2 *Establishes a therapeutic relationship in straightforward encounters*	● Avoids medical jargon and restates patient/caregiver perspective when discussing a diagnosis and treatment options
Identifies barriers to effective communication (e.g., health literacy, cultural differences)	● Uses patient/caregiver-centered communication when answering questions during the informed consent process ● Recognizes the need for handouts with diagrams and pictures to communicate information to a patient/caregiver who is unable to read
Answers questions about straightforward treatment plans, with assistance	● Discusses risks, benefits, and alternatives of procedure and consults attending or an attending if questions arise that are beyond the fellow's knowledge base ● Uses of receptive body language, eye contact, and posture
Level 3 *Establishes a therapeutic relationship in challenging encounters (e.g., shared decision making)*	● Acknowledges a patient/caregiver's request for an inappropriate diagnostic study or treatment modality and respectfully redirects and initiates a treatment plan using only appropriate studies/treatments
When prompted, reflects on biases while attempting to minimize communication barriers	● Modifies a treatment plan to better suit the needs of a patient and family (e.g., other children, caregiver job status, major life events) ● Respects caregivers' opinions regarding how much information patient is given regarding procedure even if physician disagrees with this philosophy

Counsels the patient and patient's caregiver(s) through decision-making process for straightforward conditions	● Discusses indications, risks, benefits, and alternatives during informed consent for a discussion of expected post-operative outcomes, rehab, etc. ● Recognizes potential biases when providing care
Level 4 *Facilitates difficult discussions to patients and caregiver(s) (e.g., explaining complications, therapeutic uncertainty)* *Recognizes biases and integrates the patient's and patient's caregiver(s)'s viewpoints and autonomy to ensure effective communication* *Counsels patient and their caregiver through decision-making process for complex conditions*	● Counsels representative family members in the care of a patient with complex pathology when most will not be familiar with post-operative care ● Discusses holistic importance of pediatric orthopedic care to ensure best surgical outcomes and manage realistic expectations of patient and caregivers ● Obtains a consent in emergent situations in when caregiver may not be present
Level 5 *Coaches others in the facilitation of difficult conversations* *Mentors others in situational awareness and critical self-reflection* *Counsels the patient and patient's caregiver(s) through decision-making process for uncommon conditions*	● Leads residents in process for obtaining consent for a pediatric procedure from appropriate legal guardian ● Encourages others to understand the importance of taking extra time with pediatric patients and caregivers to ensure communication is complete ● Observes interactions between more junior residents and patients and offers constructive feedback ● Serves on a hospital bioethics committee ● Develops supplemental materials to better inform patients prior to routine pediatric procedures ● Counsels patient's family about treatment options for a congenital deformities
Assessment Models or Tools	● Direct observation ● Self-assessment including self-reflection exercises ● Simulation ● Standardized patients
Curriculum Mapping	●
Notes or Resources	● 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/full/10.3109/0142159X.2011.531170. 2021. ● Makoul G. Essential elements of communication in medical encounters: The Kalamazoo consensus statement. *Acad Med*. 2001;76:390-393. https://pubmed.ncbi.nlm.nih.gov/11299158/. 2021.

	● Project Implicit. https://implicit.harvard.edu/implicit/takeatest.html. 2021. ● 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://bmcmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1. 2021.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication **Overall Intent:** To effectively communicate with the health care team, including other care providers, staff members, and ancillary personnel, in both straightforward and complex situations	
Milestones	**Examples**
Level 1 *Recognizes the value and role of each team member and respectfully interacts with all members of the health care team*	● Answers questions respectfully and patiently for radiology tech regarding x-ray orders understanding that the radiology tech plays in important role in care of the orthopaedic patient ● Receives an emergency department consult for a simple fracture and respectfully takes the patient information ● Accepts nursing staff suggestions and responds to their concerns respectfully
Level 2 *Communicates in a professional and productive manner to facilitate teamwork (e.g., active listening, updates in timely fashion)*	● Communicates with the radiology tech the need for specialized x-ray views in an unstable fracture and assists with limb positioning if requested by the tech ● Communicates with the emergency department physician a diagnosis of evolving compartment syndrome and need for timely optimization and mobilization of the patient to the operating room
Level 3 *Actively recognizes and mitigates communication barriers and biases with health care team members*	● Communicates respectfully with trauma team the prioritization of stabilization in a polytrauma patient with an unstable pelvis fracture, femur fracture, and multiple visceral injuries ● Recognizes the need for respectful communication between services when a conflict arises regarding which service will admit the patient ● Communicates with the anesthesia team when specific parameters are needed prior to an issue arising ● Recognizes when operating room care team members are not focused during a surgical time-out
Level 4 *Facilitates respectful communications and conflict resolution with multidisciplinary health care team members*	● Initiates a multidisciplinary conversation to alleviate conflict around a shared care plan for a patient with unstable pelvis fracture, femur fracture, and multiple visceral injuries ● Attends medical rounds to review consult findings about the possible septic knee and provides education of the medical team about evaluation of a septic joint ● Respectfully calls for complete attention to surgical time out if necessary
Level 5 *Serves as an exemplar of effective and respectful communication strategies*	● Mediates a conflict resolution between different members of the health care team
Assessment Models or Tools	● Direct observation ● Global assessment ● Multisource feedback ● Simulation ● Standardized patient
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(24):2313-2320. https://pubmed.ncbi.nlm.nih.gov/10612318/. 2021. ● Dehon E, Simpson K, Fowler D, Jones A. Development of the faculty 360. *MedEdPORTAL*. 2015;11:10174 http://doi.org/10.15766/mep_2374-8265.10174. 2021. ● Fay D, Mazzone M, Douglas L, Ambuel B. A validated, behavior-based evaluation instrument for family medicine residents. *MedEdPORTAL.* https://www.mededportal.org/doi/10.15766/mep_2374-8265.622. 2021. ● François, J. Tool to assess the quality of consultation and referral request letters in family medicine. *Can Fam Physician*. 2011;57(5), 574–575. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3093595/. 2021. ● Green M, Parrott T, Cook G. Improving your communication skills. *BMJ*. 2012;344. https://www.bmj.com/content/344/bmj.e357. 2021. ● 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://pubmed.ncbi.nlm.nih.gov/23444891/. 2021. ● Lane JL, Gottlieb RP. Structured clinical observations: A method to teach clinical skills with limited time and financial resources. *Pediatrics*. 2000;105(4 Pt 2):973-977. https://pubmed.ncbi.nlm.nih.gov/10742358/. 2021. ● Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. *Med Teach*. 2019;41(7):746-749. https://pubmed.ncbi.nlm.nih.gov/30032720/. 2021.

Interpersonal and Communication Skills 3: Communication within Health Care Systems **Overall Intent:** To effectively communicate across the health care system using the medical record	
Milestones	**Examples**
Level 1 *Accurately records information in the patient record while safeguarding patient personal health information*	● Documents relevant information accurately ● Shreds patient list after rounds; avoids talking about patients in the elevator ● Maintains Health Insurance Portability and Accessibility Act (HIPAA) compliance with all communications
Level 2 *Demonstrates accurate, timely, and efficient use of electronic health record to communicate with health care team members* *Uses appropriate communication methods (e.g., face-to-face, voice, electronic)*	● Documents clinical reasoning in an organized manner that supports the treatment plan ● Develops documentation templates to avoid copy-and-paste errors ● Completes documentation in a timely manner ● Appropriately escalates through chain of command when necessary ● Uses institution authorized methods when texting
Level 3 *Concisely reports diagnostic and therapeutic reasoning while incorporating relevant outside data* *Respectfully initiates communications about concerns in the system*	● Documents a clear rationale for surgical and non-surgical treatment, including risks, benefits, and alternative treatments ● Obtains outside records including prior implant records ● Tells attending about an order set in the EHR with a medication dosing that could result in an error ● Identifies and reports safety near-misses using the hospital reporting system
Level 4 *Independently communicates via written or verbal methods based on urgency and context* *Uses appropriate channels to offer clear and constructive suggestions to improve the system*	● Calls attending with level appropriate assessment and plan for surgical cases, including urgency, implants necessary and room set-up ● Triages and communicates time urgency of treatment of a polytrauma patient ● Works with information technology/sends a help desk ticket to improve an order set or dot phrase
Level 5 *Facilitates improved written and verbal communication of others* *Guides departmental or institutional communication around policies and procedures*	● Holds one-on-one teaching sessions with residents and medical students to improve documentation and hand-off techniques ● Gives grand rounds or resident lectures that includes care models/pathway utilization
Assessment Models or Tools	● Direct observation ● Medical record (chart) review ● Multisource feedback ● Rotation evaluation
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. 2021. ● 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.ncbi.nlm.nih.gov/pubmed/16617948. 2021. ● Starmer AJ, Spector ND, Srivastava R, et al. I-PASS, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129(2):201-204. https://ipassinstitute.com/wp-content/uploads/2016/06/I-PASS-mnemonic.pdf. 2021.

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: Pediatric Orthopaedics Idiopathic Scoliosis	PC4: Spine
PC2: Pediatric Developmental Dysplasia of Hip [DDH] Prior to Walking Age	PC2: Hip Pathology
PC3: Pediatric Orthopaedics Slipped Capital Femoral Epiphysis [SCFE]	PC2: Hip Pathology
PC4: Pediatric Orthopaedic Clubfoot	PC1: Foot Pathology
PC5: Pediatric Orthopaedics Lower Extremity Deformity	PC3: Lower Extremity Deformity
PC6: Pediatric Orthopaedics Cerebral Palsy	PC6: Neuromuscular
	PC5: Trauma
MK1: Pediatric Orthopaedics Idiopathic Scoliosis	MK4: Spine
MK2: Pediatric Developmental Dysplasia of Hip [DDH] Prior to Walking Age	MK2: Hip Pathology
MK3: Pediatric Orthopaedics Slipped Capital Femoral Epiphysis [SCFE]	MK2: Hip Pathology
MK4: Pediatric Orthopaedic Clubfoot	MK1: Foot Pathology
MK5: Pediatric Orthopaedics Lower Extremity Deformity	MK3: Lower Extremity Deformity
MK6: Pediatric Orthopaedics Cerebral Palsy	MK6: Neuromuscular
	MK5: Trauma
SBP1: Systems thinking, including cost-effective practice	SBP3: Physician Role in the Health Care Systems
SBP2: Resident will work in interprofessional teams to enhance patient safety and quality care	SBP1: Patient Safety and Quality Improvement SBP2: System Navigation for Patient-Centered Care
SBP3: Uses technology to accomplish safe health care delivery	ICS3: Communication within Health Care Systems
PBLI1: Self-Directed Learning	PBLI2: Reflective Practice and Commitment to Personal Growth
PBLI2: Locates, appraises, and assimilates evidence from scientific studies to improve patient care	PBLI1: Evidence-Based and Informed Practice
PROF1: Demonstrates compassion, integrity, and respect for others, as well as sensitivity and responsiveness to heterogenous patient populations, including to a variety of	PROF1: Professional Behavior and Ethical Principles

age, culture, religion, disabilities, and sex. Demonstrates knowledge about, respect for, and adherence to the ethical principles relevant to the practice of medicine, remembering in particular that responsiveness to patients that supersedes self-interest is an essential aspect of medical practice	
PROF2: Demonstrates accountability to patients, society, and the profession; demonstrates personal responsibility to maintain emotional, physical, and mental health	PROF2: Accountability/Conscientiousness PROF3: Self-Awareness and Help-Seeking
ICS1: Communication	ICS1: Patient- and Family-Centered Communication
ICS2: Teamwork	ICS2: Interprofessional and Team Communication

Available Milestones Resources

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

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

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

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

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

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

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

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

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

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

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

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

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