Orthopaedic Surgery Milestones

for the Middle East

May 2017

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

Milestones Reporting

This document presents milestones designed for programs to use in semi-annual review of resident performance and reporting to the ACGME-I. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME-I competencies organized in a developmental framework from less to more advanced. They are descriptors and targets for resident performance as a learner moves from entry into their program through graduation.

For each period, review and reporting will involve selecting milestone levels that best describe each resident's current performance and attributes. Milestones are arranged in numbered levels. Tracking from "Critical Deficiencies"/"Level 1" to "Aspirational"/"Level 5" is synonymous with moving from novice to expert in the specialty. These levels do not correspond with time in the educational program. Dependent upon previous education and experience, residents may enter a program at varying points in the Milestones.

Selection of a level implies that the resident substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page v).

Level 1: The resident demonstrates milestones expected of an incoming resident.

Level 2: The resident is advancing and demonstrates additional milestones, but is not yet performing at a mid-residency level.

Level 3: The resident continues to advance and demonstrate additional milestones, consistently including the majority of milestones targeted for residency**.**

Level 4: The resident has advanced so that he or she now substantially demonstrates the milestones targeted for residency. This level is designed as the graduation target.

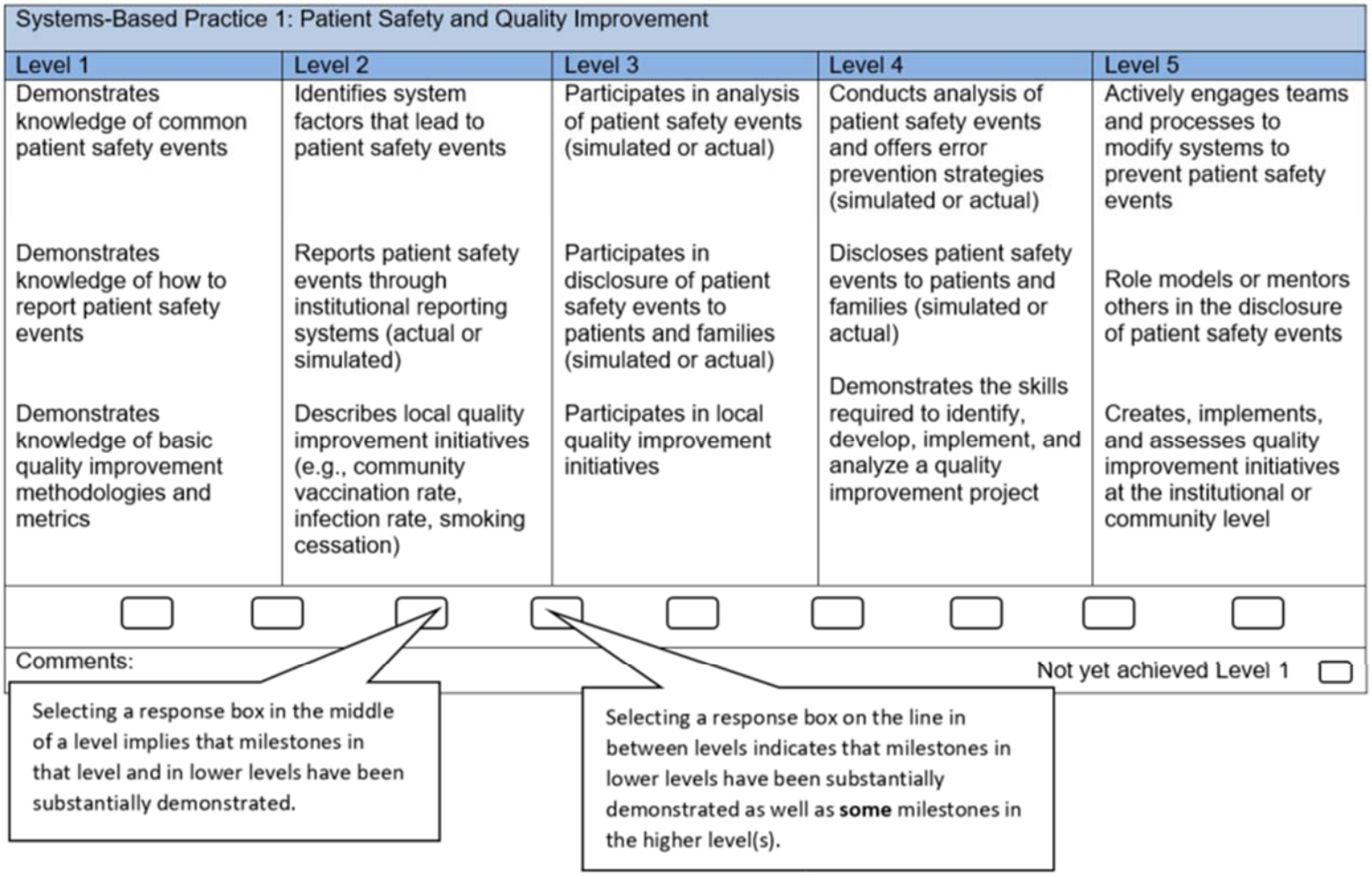
Level 5: The resident has advanced beyond performance targets set for residency and is demonstrating "aspirational" goals, which might describe the performance of someone who has been in practice for several years. It is expected that only a few exceptional residents will reach this level.

Additional Notes

The “Ready for Unsupervised Practice” and “Level 4” Milestones are designed as the graduation *target* and *do not* represent a graduation *requirement*. Making decisions about readiness for graduation is the purview of the program director. Study of Milestones performance data will be required before the ACGME-I and its partners will be able to determine whether milestones in the first four levels appropriately represent the developmental framework, and whether Milestone data overall are of sufficient quality to be used for high-stakes decisions.

Answers to Frequently Asked Questions about Milestones are posted on the ACGME-I website.

The diagram below presents an example set of milestones for one sub-competency in the same format as the ACGME-I Report Worksheet. For each reporting period, a learner's performance on the milestones for each sub-competency will be indicated by selecting the level of milestones that best describes that learner's performance in relation to those milestones.



Patient Care 1: Gathers Information by Interviewing the Patient or Surrogate and Performing a Physical Exam.				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam (e.g., age, gender, history of present illness [HPI], past medical history [PMHx], social history, range of motion, effusion, neurovascular status)	Obtains focused history and performs focused exam (e.g., mechanism of injury, past knee history, past treatments, Lachman, anterior drawer, pivot shift, meniscal pain)	Recognizes concomitant associated injuries (e.g., lateral collateral ligament [LCL], multi ligament, osteochondritis dissecans [OCD], posterior cruciate ligament [PCL], collateral ligaments, posterolateral corner instability, reverse pivot shift)	Performs graft passage and fixation	Performs revision/ transphyseal ACL reconstruction (e.g., hardware removal, outside in drilling techniques)
Appropriately orders basic imaging studies (e.g., knee radiographs)	Appropriately interprets basic imaging studies (e.g., alignment, joint space, patella alignment)	Appropriately orders and interprets advanced imaging studies (e.g., standing views, magnetic resonance imaging [MRI], Second fracture, bone bruising)		
Prescribes non-operative treatments (e.g., range of motion [ROM], weight-bearing [WB] status)	Prescribes and manages non-operative treatment (e.g., closed chain quad strengthening)	Provides complex non-operative treatment (e.g., WB status, bracing as appropriate, vascular studies)		
Provides basic peri-operative management (e.g., neurovascular status, brace, WB status)	Completes pre-operative planning with instrumentation, graft selection and implants	Completes comprehensive pre-operative planning with alternatives		
	Examines injury under anesthesia (e.g., complete ligament examination)	Performs diagnostic arthroscopy, notchplasty, and/or graft harvest		
	Provides post-operative management and	Modifies and adjusts post-operative treatment plan as		Develops unique, complex post-operative management

Lists potential complications (e.g., infection, loss of motion, graft failure, neurovascular compromise)	rehabilitation (e.g., WB status, brace, ROM, quad strength) Capable of diagnosis and early management of complications (e.g., graft failure, tunnel placement)	needed (e.g., loss of knee motion treatment, sport specific drills, return to sport)	Capable of treating complications both intra-operatively and post-operatively (e.g., graft harvest failure, tunnel malposition, chondral injury)	plans Surgically treats complex complications
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 1: Anterior Cruciate Ligament				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to ACL injury (e.g., mechanisms of injury) Correlates anatomic knowledge to imaging findings on basic imaging studies Has knowledge of natural history of ACL injury Demonstrates knowledge of ACL injury anatomy and basic surgical approaches (e.g., ACL bundles)	Understands pathophysiology of concomitant injuries (e.g., secondary restraints of knee [posterior lateral corner {PCL}]) Correlates anatomic knowledge to imaging findings on advanced imaging studies Ability to grade instability (e.g., translations grade and end point) Understands the effects of intervention on natural history of ACL injury Understands alternative surgical approaches (e.g., miniopen, 2 incision) Understands basic pre-surgical planning and templating Understands advantages and disadvantages of graft types	Demonstrates knowledge of current literature and alternative treatments Understands rehabilitation mechanics (e.g., phases of rehabilitation, closed versus open chain exercises) Understands biomechanics of the knee and biomechanics of implant choices	Understands controversies within the field (e.g., graft type, brace treatment, surgical technique and fixation, surgical techniques to include skeletally immature knee) Applies understanding of natural history to clinical decision-making Understands how to prevent/avoid potential complications	Primary author/presenter of original work within the field
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				

Comments:	Not Yet Achieved Level 1 ☐

Patient Care 2: Ankle Arthritis				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and performs focused exam and gait analysis			
Appropriately orders basic imaging studies (e.g., three weight-bearing views)	Appropriately interprets basic imaging studies	Appropriately orders and interprets advanced imaging studies/lab studies		
Prescribes non-operative treatments	Prescribes and manages non-operative treatment (e.g., non-steroidal anti-inflammatory drugs [NSAIDs], steroid injections, brace, rocker bottom shoes)		Provides patient specific non-operative treatment (e.g., diagnostic injections)	
Provides basic peri-operative management (e.g., pre- and post-operative orders, labs, consults)	Completes pre-operative planning with instrumentation and implants	Completes comprehensive pre-operative planning with alternatives		
	Performs one basic surgical approach to the ankle/mid-foot/hind-foot arthritis (e.g., anterior or lateral transfibular)		Capable of performing straight forward ankle/mid-foot/hind-foot reconstruction such as Tarsometatarsal joint arthrodesis, tarsal joint arthrodesis, triple, talonavicular or subtalar joint arthrodesis and ankle fusion (e.g., with minimal deformity or bone defect)	Performs complex surgical approaches and reconstruction to the ankle/mid-foot/hind-foot arthritis (e.g., posterior, posterolateral, posteromedial)
	Provides post-operative management and			Develops unique,

	rehabilitation (e.g., prothrombin time [PT] orders with goals and restrictions)	Modifies and adjusts post-operative treatment plan as needed		complex post-operative management plans
Lists potential complications	Capable of diagnosis and early management of complications (e.g., wound healing problems, infection, deep vein thrombosis [DVT])		Capable of surgically treating simple complications (e.g., incision and drainage [I&D])	Surgically treats complex complications (e.g., nonunion, malunion)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 2: Ankle Arthritis				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to ankle/mid-foot/hind-foot arthritis		Demonstrates knowledge of current literature and alternative treatments (e.g., non-operative, cheilectomy, fusion, replacement, distraction)	Understands controversies within the field	Primary author/presenter of original work within the field
Correlates anatomic knowledge to imaging findings on basic imaging studies (e.g., osteophyte formation, joint narrowing, subchondral cysts and sclerosis)	Correlates anatomic knowledge to imaging findings on advanced imaging studies (e.g., bone loss, articular deformity, subluxation)	Applies general understanding of non-operative treatment options and surgical indications		
Demonstrates basic knowledge of natural history of ankle/mid-foot/hind-foot arthritis	Understands the effects of intervention on natural history of ankle/mid-foot/hind-foot arthritis (e.g., effects of NSAIDs, steroid injections, brace, rocker bottom shoes)		Applies understanding of natural history to clinical decision-making (e.g., considers patient-specific characteristics of disease to select most appropriate treatment)	
Demonstrates knowledge of gait mechanics (e.g., phases of gait) and normal limb alignment	Demonstrates knowledge of abnormal gait mechanics of ankle/mid-foot/hind-foot arthritis (e.g., antalgic gait, circumduction, decreased stance) and abnormal limb alignment and adjacent joint function	Understands abnormal gait mechanics of ankle/mid-foot/hind-foot arthritis (e.g., identifies abnormal gait patterns in patient)	Applies biomechanics to implant and procedure selection	
Demonstrates knowledge of ankle/mid-foot/hind-foot arthritis anatomy and basic surgical approaches (e.g., anterior, lateral-	Understands alternative surgical approaches (e.g., posterior, posterolateral, posteromedial)			

transfibular) Demonstrates knowledge of non-operative treatment options and surgical indications	Understands basic pre-surgical planning and templating Understands non-operative treatment options and surgical indications			
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments: Not Yet Achieved Level 1 ☐				

Patient Care 3: Ankle Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and performs focused exam; recognizes implications of soft tissue injury			
Appropriately orders basic imaging studies	Appropriately interprets basic imaging studies	Appropriately orders and interprets advanced imaging studies (e.g., stress views, computed tomography [CT] scan)	Provides comprehensive assessment of complex fracture patterns on imaging studies (e.g., pilon fracture)	
Prescribes non-operative treatments	Prescribes and manages non-operative treatment	Provides a comprehensive assessment of most fractures on imaging studies	Recognizes indications for and provides non- operative treatment of an unstable fracture (e.g., diabetes, medical comorbidities, non-compliance)	
Provides basic peri-operative management	Completes pre-operative planning with instrumentation and implants	Completes comprehensive pre-operative planning with alternatives		
Splints fracture appropriately	Performs a closed reduction Performs surgical exposure of the lateral malleolus	Performs surgical reduction and fixation of a simple fracture (e.g., lateral or bimalleolar ankle fracture)	Performs surgical reduction and fixation of a moderately complex fracture (e.g., open reduction internal fixation [ORIF] trimalleolar ankle fracture or simple pilon fracture)	Performs surgical reduction and fixation of a full range of fractures and dislocations (e.g., ORIF complex pilon fracture)
	Provides post-operative management and rehabilitation	Modifies and adjusts post-operative treatment plan as needed		Develops unique, complex post-operative management plans
Lists potential complications	Capable of diagnosis and early management of complications	Capable of treating complications both intra-operatively and post-		Surgically treats complex complications (e.g., revision fixation after failed ORIF)

		operatively (e.g., wound breakdown following malleolar fixation)		
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 3: Ankle Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to ankle fractures	Demonstrates ability to describe and classify fractures	Demonstrates knowledge of current literature and alternative treatments	Understands controversies within the field (e.g., syndesmotic fixation, indications and options)	Primary author/presenter of original work within the field
Correlates anatomic knowledge to imaging findings on basic imaging studies	Correlates anatomic knowledge to imaging findings on advanced imaging studies	Understands the effects of intervention on natural history of ankle fractures	Applies understanding of natural history to clinical decision-making	
Demonstrates knowledge of non-operative treatment options and surgical indications	Demonstrates basic knowledge of natural history of ankle fractures	Understands alternative surgical approaches	Understanding of biomechanics and implant choices	
	Demonstrates knowledge of ankle fractures anatomy and basic surgical approaches			
	Understands basic pre-surgical planning and templating			
	Understands implication of open fractures and soft tissue injury			
☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
Comments:			Not Yet Achieved Level 1	☐

Patient Care 4: Carpal Tunnel				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains basic history and performs basic physical exam	Obtains focused history, including identifying night pain, paresthesias			
	Performs median nerve motor/ sensory evaluation (e.g., median nerve [MN] numbness, thumb abduction)	Evaluates other sites of MN compression (e.g., pronator syndrome, cervical radiculopathy)		
	Performs provocative maneuvers (e.g., Tinel, Phalen, MN compression test)			
	Appropriately considers electrodiagnostic test	Interprets electrodiagnostic tests		
	Prescribes non-operative treatments (e.g., night splints, steroid injection when appropriate)		Performs Carpal Tunnel Release (CTR) (e.g., open or endoscopic)	
Lists potential surgical complications (e.g., infection, scar sensitivity, neurovascular injury)	Capable of diagnosing surgical complications (e.g., injury to the median nerve or its branches and vascular injury)		Capable of treating simple complications (e.g., infection, wound healing)	Capable of surgical management of major complications (e.g., injury to superficial arch, ulnar artery, branches of median nerve, or median nerve)
	Provides simple post-operative management and rehabilitation		Capable of performing complex post-operative management (e.g., worsening numbness,	Capable of opposition transfer (e.g., palmaris longus, extensor indicis pollicis [EIP], or flexor digitorum superficialis [FDS])

			worsening pain, additional radiating symptoms)	Capable of performing revision carpal tunnel surgery
☐	☐	☐	☐	☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 4: Carpal Tunnel				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands the anatomy of carpal tunnel/median nerve Understands the normal physiology of the median nerve	Demonstrates knowledge of the differential diagnosis of neuropathic surgery (e.g., pronator syndrome, cubital tunnel, thoracic outlet, cervical radiculopathy) Understands risk factors associated with Carpal Tunnel Syndrome (CTS) (e.g., diabetes, pregnancy, hypothyroidism) Demonstrates knowledge of median nerve motor/ sensory distribution, thumb abduction, thenar numbness, anterior interosseous nerve (AIN) weakness, cervical radiculopathy Understands natural history of CTS Understands the pathophysiology of nerve compression (e.g., increased carpal tunnel pressure, nerve ischemia) Understands surgical options (e.g., open, endoscopic)	Demonstrates knowledge of current literature and alternatives to surgery Understands the capabilities and limitations of electrodiagnostic studies Understands influence of comorbidities Demonstrates knowledge of complications of surgical management (e.g., location of MN with respect to superficial arch, recurrent motor branch, palmar cutaneous branch, Guyon's canal)	Understands controversies within field (e.g., endoscopic versus open, use of electrodiagnostics)	Primary author/presenter of original work within the field
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Comments: Not Yet Achieved Level 1 ☐				

Patient Care 5: Degenerative Spine Conditions				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and performs focused exam; appropriately interprets neurological exam	Extends examination to non-spinal differential diagnostic possibilities (vascular claudication, hip arthritis, etc.)		
Appropriately orders basic imaging studies	Appropriately interprets basic imaging studies	Appropriately orders and interprets advanced imaging studies (magnetic resonance imaging [MRI], myelogram, CT); correlates clinical and imaging findings to form clinical diagnosis		
Prescribes non-operative treatments: NSAIDs, rehabilitation, initiates basic care		Prescribes and manages non-operative treatment: injections, referrals to other professionals	Provides complex non-operative treatment (e.g., individualized care, shared decision making, comprehensive informed consent)	
Recognizes indications for and initiates immediate additional work-up ("Red Flags") or urgent surgical care (progressive deficit, cauda equina syndrome)		Recommends appropriate surgical procedures considering indications and contraindications, risks and benefits for simple cases (e.g., single-level HNP with radiculopathy)	Recommends appropriate surgical procedures considering indications and contraindications, risks and benefits for complex cases (e.g., multi- level stenosis with deformity)	
Provides basic/general peri-operative management		Completes comprehensive pre-operative planning with alternatives and criteria	Completes comprehensive pre-operative planning with alternatives and criteria for acceptable intraoperative	Completes comprehensive pre-operative planning with alternatives and criteria for acceptable intra-operative

		for acceptable intraoperative result for straightforward cases (single-level herniated nucleus pulposus [HNP])	result for complex cases (e.g., multi-level stenosis with deformity) Capable of decorticating for posterolateral fusion, placing grafts	result for highly complex cases (e.g., revision surgery) Capable of performing decompression, posterior lumbar interbody fusion (PLIF), transforaminal lumbar interbody fusion (TLIF), places complex implants (e.g., fusion cages, pedicle screws)
	Assists in exposure for anterior and posterior cervical spine, posterior lumbar spine, performs closure	Capable of performing anterior and posterior cervical, posterior lumbar surgical exposure, assisting with implant placement		
	Provides procedure and patient specific post-operative management and rehabilitation	Modifies and adjusts post-operative treatment plan according to clinical situation (e.g., modifies for comorbid conditions or complications)		Develops unique complex post-operative management plans when indicated
Lists potential complications	Capable of diagnosis and early management of complications	Capable of treating simple complications both intra- and post-operatively (e.g., medical complications, hemostasis)	Capable of surgically treating simple complications (e.g., drainage of hematoma, debridement of infection)	Capable of surgical treatment of complex complications (e.g., revise displaced hardware or graft, durotomy repair)
☐	☐	☐	☐ ☐ ☐ ☐ ☐	☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 5: Degenerative Spine Conditions				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to lumbar and cervical degenerative conditions	Describes specific clinical syndromes of lumbar and cervical degenerative conditions (e.g., radiculopathy from HNP vs. stenosis vs. spondylolisthesis, back pain, cervical radiculopathy, or myelopathy)	Demonstrates knowledge of current literature and alternative treatments	Demonstrates knowledge of controversies within the field (e.g., epidural blocks, arthroplasty vs. fusion, and fusion techniques)	Primary author/presenter of original work within the field
Correlates anatomic knowledge to imaging findings on basic imaging studies (e.g., cervical or lumbar radiographs)	Correlates anatomic knowledge to imaging findings on advanced imaging studies (e.g., MRI, Myelogram/CT)	Demonstrates knowledge of biology of fusion healing	Demonstrates knowledge of cervical and lumbar biomechanics and alterations by decompression or implants	
Demonstrates knowledge of physical exam of cervical and lumbar spine and related neurologic and provocative signs	Demonstrates knowledge of biological theories of pain generation	Demonstrates knowledge of the effects of intervention on natural history of lumbar and cervical degenerative conditions	Demonstrates knowledge of influence of natural history and comorbidity on clinical decision- making	
	Demonstrates knowledge of natural history of lumbar and cervical degenerative conditions	Demonstrates knowledge of alternative surgical approaches, complications of approaches		
	Demonstrates knowledge of anatomic changes resulting from lumbar and cervical degenerative disorders and basic surgical approaches (e.g., anterior cervical, posterior cervical or lumbar)	Demonstrates knowledge of pre-surgical planning and criteria for acceptable intra-operative result for cases of moderate complexity (e.g., spondylolisthesis, multi-		

		level decompression and fusion)		
Demonstrates knowledge of general peri-operative patient care	Demonstrates knowledge of basic pre-surgical planning and criteria for acceptable intra-operative result for simple primary cases (e.g., laminotomy for HNP, single-level anterior cervical discotomy and fusion [ACDF])	Demonstrates knowledge of surgical indications		
	Demonstrates knowledge of non-operative treatment options	Demonstrates knowledge of basic implant choices	Demonstrates knowledge of alternative implant choices/biomaterials	
☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐
Comments:			Not Yet Achieved Level 1	☐

Patient Care 6: Diaphyseal Femur and Tibia Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and performs focused exam			
Appropriately orders basic imaging studies	Appropriately interprets basic imaging studies	Appropriately orders and interprets advanced imaging studies		
Splints fracture appropriately	Prescribes and manages non-operative treatment Performs a closed reduction Performs basic surgical approaches	Provides complex non-operative treatment Performs surgical repair to a simple fracture	Performs surgical repair to a moderately complex fracture (e.g., able to perform intramedullary nailing of segmental femur fracture) Performs alternative surgical approaches for femur and tibia fractures (e.g., open reduction techniques)	Performs surgical repair to a complex fracture (e.g., able to perform intramedullary nail nailing of distal tibia fracture with intraarticular extension)
Provides basic peri-operative management	Completes pre-operative planning with instrumentation and implants	Completes comprehensive pre-operative planning with alternatives		
Assesses for limb perfusion and compartment syndrome	Initiates management of limb reperfusion and compartment syndrome Performs patient positioning for operative fixation (e.g., use of fracture table)	Capable of performing compartment release Effectively uses intraoperative imaging		

	Provides post-operative management and rehabilitation Performs basic open wound management and debridement Recognizes the needs of the polytrauma patient	Modifies and adjusts post-operative treatment plan as needed	Performs complex wound management and debridement (e.g., understands need for consultation for flap coverage) Prioritizes the needs of the polytrauma patient (e.g., timing of long bone fixation, works with consulting teams)	Develops unique, complex post-operative management plans
Lists potential complications	Capable of diagnosis and early management of complications		Capable of treating complications both intraoperatively and post-operatively (e.g., manages post-operative infection)	Surgically treats complex complications (e.g., treats femoral neck fracture identified after femoral nailing)
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Comments:			Not Yet Achieved Level 1 ☐	

Medical Knowledge 6: Diaphyseal Femur and Tibia Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to diaphyseal femur and tibia fractures	Able to describe and classify fractures	Demonstrates knowledge of current literature and alternative treatments	Understands controversies within the field (e.g., initial management of femur fracture in the polytrauma patient)	Primary author/presenter of original work within the field
Correlates anatomic knowledge to imaging findings on basic imaging studies	Correlates anatomic knowledge to imaging findings on advanced imaging studies	Demonstrates knowledge of impact on polytrauma on management of diaphyseal femur and tibia fractures	Applies understanding of natural history to clinical decision-making	
Demonstrates knowledge of medical and surgical comorbidities	Demonstrates knowledge of associated injuries and impact on surgical care (e.g., femoral neck fracture, associated skeletal injuries)	Understands biomechanics and implant choices		
	Demonstrates knowledge of natural history of diaphyseal femur and tibia fractures	Understands the effects of intervention on natural history of diaphyseal femur and tibia fractures		
	Demonstrates knowledge of bone biology, osteoporosis and bone health management			
	Understands implication of open fractures and soft tissue injury	Understands alternative surgical approaches		
	Demonstrates knowledge of diaphyseal femur and tibia fractures anatomy and basic surgical approaches	Recognizes surgical indications in complex fractures and the polytrauma patient		

	Understands basic pre-surgical planning and templating Demonstrates knowledge of non-operative treatment options and surgical indications Demonstrates knowledge of surgical and non- operative complications (e.g., compartment syndrome, fat emboli, infection)			
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments: Not Yet Achieved Level 1 ☐				

Patient Care 7: Distal Radius Fracture (DRF)				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam Orders/interprets basic imaging studies	Obtains focused history and physical, recognizes implications of soft tissue injury (e.g., open fracture, median nerve dysfunction, distal radioulnar joint [DRUJ] instability) Orders/interprets advanced imaging (e.g., CT for comminuted articular fractures)	Performs pre-operative planning with appropriate instrumentation and implants		
Splints fracture appropriately	Recognizes surgical indications (e.g., median nerve dysfunction, instability, articular step off/gap, dorsal angulation, radius shortening) Recognizes stable/unstable fractures (e.g., metaphyseal comminution, volar/dorsal Barton's, die-punch pattern; multiple articular parts) Able to perform a closed reduction and splint appropriately Performs surgical exposure Recognizes/evaluates fragility fractures (e.g., orders appropriate work-	Capable of surgical reduction and fixation of extraarticular fracture	Capable of surgical reduction and fixation of simple intraarticular fractures (e.g., no more than two articular fragments)	Capable of surgical reduction and fixation of a full range of fractures and dislocations (e.g., comminuted or very distal articular fractures, dorsal and volar metaphyseal fractures, greater arc perilunate injuries, Scapholunate ligament injuries)

	up and/or consult)	Interprets diagnostic studies for fragility fractures with appropriate management and/or referral		
Provides basic post-operative management and rehab Lists potential complications (e.g., infections, hardware failure tendon injury, Complex Regional Pain Syndrome [CRPS], carpal tunnel syndrome, malreduction)	Modifies and adjusts post-operative plan when indicated Diagnoses and provides early management of complications		Capable of surgically treating simple complications (e.g., infections, open carpal tunnel release)	Capable of surgically treating complex complications (e.g., osteotomies, revision fixation)
☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 7: Distal Radius Fracture (DRF)				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of anatomy	Demonstrates knowledge of fracture description and soft tissue injury: angulation, displacement, shortening, comminution, shear pattern, articular parts	Demonstrates knowledge of current literature, fracture classifications and therapeutic alternatives	Understands controversies within field: fixation techniques and fracture pattern, correlation between radiographic and functional outcomes in elderly patient	Participates in research in the field with publication
Understands basic imaging	Understands mechanism of injury	Demonstrates knowledge of associated injuries: median nerve injury, scaphoid fracture; scapholunate (SL) ligament injury, triangular fibrocartilage complex (TFCC) injury, elbow injuries		
	Understands biology of fracture healing	Understands natural history of distal radius fracture		
	Understands advanced imaging			
	Understands surgical approaches and fixation tech: percutaneous pinning, volar plating, external fixation, dorsal plating, fragment specific, combinations	Understands biomechanics and implant choices: understand the advantage and disadvantages of different fixation techniques		
☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
Comments:			Not Yet Achieved Level 1 ☐	

Patient Care 8: Adult Elbow Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and basic physical (e.g., age, gender, mechanism of injury, deformity, skin integrity, open/closed injury)	Obtains focused history and physical, recognizes implications of soft tissue injury (e.g., open fracture, compartment syndrome, ligamentous injury) Able to order appropriate imaging studies (e.g., radiographs, CT scan/3D reconstruction)	Performs pre-operative planning with instrumentation and implants (e.g., patient positioning, plates/screws, fluoroscopy)	Performs comprehensive pre-operative planning/alternatives (e.g., use of external fixation, radial head replacement, elbow arthroplasty)	
Splints fracture appropriately	Performs basic surgical approach to elbow fractures Reduces fracture if necessary (e.g., provisional fixation, fluoroscopic checks) Recognizes surgical indications (e.g., fracture displacement, elbow instability, transolecranon injury	Capable of surgical reduction and fixation of a simple fracture (e.g., olecranon fracture)	Capable of surgical reduction and fixation of moderately complex fractures (extraarticular and simple intraarticular distal humerus fracture)	Capable of surgical reduction and fixation of a full range of fractures and dislocations
Provides basic peri-operative management (e.g., post-operative orders, ice, elevation, compression)	Provides post-operative management and rehabilitation (e.g., splinting and ROM therapy)	Provides post-operative management and rehabilitation (e.g., increase ROM as healing progresses, adequate/ proper post- operative x-rays)	Modifies and adjusts post-operative plan as needed (e.g., dynamic/static stretch splinting, revise therapy)	
Lists potential complications (e.g., infection, hardware failure,	Capable of diagnosis and early management of complications (e.g.,		Treats simple complications both intra- and post-operatively (e.g., revise	Understands how to avoid/prevent potential complications

stiffness, reflex sympathetic dystrophy [RSD], neurovascular injury, posttraumatic arthritis)	diagnosis from peri-operative x-rays, recognize infection, recognize fracture displacement/ dislocation)		hardware placement, recognize improper hardware position)	Surgically treats complex complications (e.g., elbow release for stiffness, ID infection, revision hardware failure, nonunion treatment)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 8: Adult Elbow Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of fractures (e.g., olecranon, radial head, coronoid fracture, terrible triad fracture, distal humerus fracture, fracture dislocation)	Understands mechanism of injury and knowledge of fracture classification and soft tissue injury (e.g., olecranon, radial head, coronoid fracture, terrible triad fracture, distal humerus fracture, fracture dislocation)	Demonstrates knowledge of current literature and alternatives (e.g., fracture repair vs. replacement, post-operative stiffness concepts)	Understands controversies within field (e.g., tension band vs. plating olecranon fractures, elbow replacement for elderly distal humerus fractures; radial head repair vs. replacement)	Participates in research in the field with publication
Demonstrates knowledge of anatomy (e.g., elbow joint, radial head, coronoid, olecranon, distal humerus, elbow ligaments)	Understands biology of fracture healing	Understands rehabilitation mechanics (e.g., range of motion therapy, dynamic/static stretch splinting)	Understands how to avoid/prevent potential complications	
		Understands biomechanics and implant choices (e.g., radial head replacement, compression headless screws, elbow replacement types)	Demonstrates knowledge of pathophysiology of elbow stiffness (e.g., intrinsic, extrinsic, hardware placement)	
Understands basic imaging studies	Understands advanced imaging studies (e.g., post-operative x-rays, CT scans for fracture healing) Demonstrates knowledge of imaging studies/lab studies (e.g., radiographs anteroposterior [AP]/lateral/oblique/axial)		Understands post-operative imaging studies/implant positioning	

	Understands surgical approaches (e.g., soft tissue envelope, cutaneous nerves, ulnar nerve treatment)			
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments: Not Yet Achieved Level 1 ☐				

Patient Care 9: Hip and Knee Osteo Arthritis (OA)				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and performs focused exam			
Appropriately orders basic imaging studies	Appropriately interprets basic imaging studies	Appropriately orders and interprets advanced imaging studies (e.g., MRI, CT, nuclear medicine imaging, and advanced radiographs views)		
Prescribes non-operative treatments (e.g., NSAIDs, physical therapy, assistive devices)	Manages non-operative treatment (e.g., NSAIDs, physical therapy, assistive devices, injections)	Appropriately recommends surgical intervention		
Provides basic peri-operative management (e.g., pre- and post-operative assessment)	Completes pre-operative planning with instrumentation and implants (e.g., implant templating, instruments needed)	Completes comprehensive pre-operative planning with alternatives		
	Capable of performing one basic surgical approach to the hip and knee	Capable of surgically treating simple complications (e.g., closed reduction, irrigation, and debridement)	Capable of performing alternative surgical approaches to the hip and knee arthritis Capable of performing primary total hip replacement (THR) and total knee replacement (TKR)	Competently performs two or more approaches to the hip and knee Capable of performing complex primary and simple revision THR and TKR (e.g., hip dysplasia, hip protrusio, valgus knee, loose components,

	Provides post-operative management and rehabilitation (e.g., orders appropriate peri-operative medications and mobilization)	Modifies and adjusts post-operative treatment plan as needed		uniarthroplasty) Develops unique, complex post-operative management plans (e.g., infections, dislocations, neurovascular compromise)
Lists potential complications (e.g., infections, dislocations, thromboembolic disease, peri-prosthetic fracture, neurovascular compromise)	Capable of diagnosis and early management of complications (e.g., infections, dislocations) Assesses for risk of thromboembolic disease	Provides prophylaxis and manages thromboembolic disease	Capable of treating complications both intra- and post-operatively (e.g., peri-prosthetic fractures, infections, instability)	Surgically treats complex complications (e.g., peri-prosthetic fractures, knee instability)
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Medical Knowledge 9: Hip and Knee Osteo Arthritis (OA)				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to hip and knee arthritis	Able to classify disease stage/severity and recognizes implications of disease processes (OA, Femoroacetabular impingement [FAI], inflammatory arthritis, osteonecrosis)	Demonstrates knowledge of current literature and alternative treatments	Understands controversies within the field	Primary author/presenter of original work within the field
	Understands the importance of comorbidities, thromboembolic prophylaxis, infection prevention and diagnosis	Understands biomechanics		
Correlates anatomic knowledge to imaging findings on basic imaging studies	Correlates anatomic knowledge to imaging findings on advanced imaging studies			
Demonstrates some knowledge of natural history of hip and knee arthritis	Understands the effects of intervention on natural history of hip and knee arthritis			
Demonstrates knowledge of hip and knee arthritis anatomy and basic surgical approaches	Understands basic pre-surgical planning and templating	Understands alternative surgical approaches (e.g., non-arthroplasty: arthroscopy, osteotomy)	Applies understanding of natural history to clinical decision-making	
Demonstrates knowledge of non-operative treatment	Understands basic implant choices (e.g., cement and	Understands alternative implant choices/ biomaterials (e.g., alternative bearings,	Understands principles of failure mechanism of THR and TKR (e.g., loosening, fracture,	

options and surgical indications	uncemented fixation, levels of constraint)	unicompartmental approaches)	infection, osteolysis, instability) Understands basic principles of revision THR and TKR	Understands revision THR and TKR implants (e.g., metaphyseal vs. diaphyseal fixation, tapered vs. fully-porous implants)
☐	☐	☐	☐	☐
Comments:			Not Yet Achieved Level 1 ☐	

Patient Care 10: Hip Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and performs focused exam	Completes comprehensive assessment of fracture patterns on imaging studies- recognizes reverse obliquity fractures		
Appropriately orders basic imaging studies	Appropriately interprets basic imaging studies	Interprets diagnostic studies for fragility fractures with appropriate management and/or referral		
Prescribes non-operative treatments	Prescribes and manages non-operative treatment			
Provides basic peri-operative management	Recognizes and evaluates fragility fractures (e.g., orders appropriate workup and/or consult)			
	Interacts with consultants regarding optimal patient management (e.g., timing of surgery, medical management)	Arranges for long-term management of geriatric patients (e.g., management of bone health, discharge planning to long-term care)		
	Completes pre-operative planning with instrumentation and implants	Completes comprehensive pre-operative planning with alternatives		
	Capable of performing a basic surgical approach to	Capable of surgical repairs to a simple	Capable of surgical repair to moderately complex	Capable of surgical repair of complex fractures (e.g.,

	the hip fracture	fracture (e.g., stable intertrochanteric femur fracture, minimally displaced femoral neck fracture)	fractures (e.g., unstable intertrochanteric femur fracture)	open reduction internal fixation of femoral neck fracture)
	Provides post-operative management and rehabilitation	Modifies and adjusts post-operative treatment plan as needed		
Lists potential complications	Capable of diagnosis and early management of complications		Capable of treating complications both intra- and post-operatively (e.g., manages a post-operative infection)	Capable of surgical treatment of complex complications (e.g., revision fixation after failed ORIF, intertrochanteric osteotomy)
	Assesses risk for thromboembolic disease	Provides prophylaxis and manages thromboembolic disease		
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Medical Knowledge 10: Hip Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to hip fracture Correlates anatomic knowledge to imaging findings on basic imaging studies Demonstrates knowledge of non-operative treatment options and surgical indications	Able to describe and classify fractures Correlates anatomic knowledge to imaging findings on advanced imaging studies Demonstrates knowledge of bone biology, osteoporosis and bone health management Demonstrates knowledge of natural history of hip fracture Demonstrates knowledge of hip fracture anatomy and basic surgical approaches Understands basic pre-surgical planning and templating Understands comorbidities and impact on fracture treatment	Demonstrates knowledge of current literature and alternative treatments Understands the effects of intervention on natural history of hip fracture Understands alternative surgical approaches	Understands controversies within the field (e.g., hemiarthroplasty vs. total hip for displaced femoral neck fracture) Applies understanding of natural history to clinical decision making Understands biomechanics and implant choices	Primary author/presenter of original work within the field
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Patient Care 11: Metastatic Bone Lesion				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam (e.g., pain, function, past medical/surgical/social/ family history, review of systems, heart, lungs, extremity exam, including range of motion, strength, sensation, skin changes, tenderness)	Obtains focused history and performs focused exam (e.g., history: specific questions re: past history of cancer or radiation, prior treatments, pre-existing pain, smoking or chemical exposure, constitutional symptoms such as fever; physical exam: notes lymph node involvement, lumps/nodules)			Discusses prognosis and end-of-life care with patients and family
Appropriately orders basic imaging studies (e.g., plain radiographs, including AP/lateral of the lesion joint above and below the lesion)	Appropriately interprets basic imaging studies (e.g., able to describe the radiographic appearance [osteolytic, osteoblastic, etc.])	Appropriately orders and interprets advanced imaging studies/lab studies (e.g., 3D radiographic studies to include CT and MRI, lab studies including role of serum protein electrophoresis [SPEP]/urine protein electrophoresis [UPEP], prostate specific antigen [PSA], other tumor markers)		
Prescribes non-operative treatments (e.g., including protected weight-bearing bracing, no intervention)	Prescribes and manages non-operative treatment (e.g., understands when to have the patient back to clinic for follow-up;	Recommends complex non-operative treatment (radiofrequency ablation [RFA] or cryoablation, bisphosphonates	Recommends appropriate biopsy, including biopsy alternatives and appropriate techniques	Independently performs open biopsy

	understands when to order new radiographic imaging studies)	kyphoplasty or vertebroplasty)	(e.g., understands role of open biopsy vs. needle biopsy)	
Provides basic peri-operative management (e.g., intravenous [IV] antibiotics, IV fluids, DVT prophylaxis, pain control, nutrition)	Completes pre-operative planning with instrumentation and implants	Completes comprehensive pre-operative planning with alternatives Completes pre-operative preparation and consultation (e.g., oncology, radiation oncology, counseling		
	Performs one basic surgical approach to the destructive bone lesion		Capable of performing alternative surgical approaches to the destructive bone lesion (e.g., understands approaches to the hip for prosthetic reconstruction; understands approaches for resection of proximal humerus, distal femur and proximal tibia) Capable of performing prophylactic fixation based on diagnosis and risk (e.g., able to perform prophylactic intramedullary stabilization of femur, prophylactic bipolar hemiarthroplasty of the hip) Capable of performing	Performs endoprosthetic reconstruction for periarticular lesions (options include: megaprosthesis of proximal humerus, proximal femur, distal femur, proximal tibia)

			internal fixation on impending or actual pathologic fractures (e.g., able to perform intramedullary stabilization of pathologic femoral or humeral fracture, bipolar hip hemiarthroplasty for pathologic femoral neck fracture)	
	Provides post-operative management and rehabilitation (e.g., understands weight-bearing issues and role of physical/ occupational therapy [PT/OT])	Modifies and adjusts post-operative treatment plan as needed		Develops unique, complex post-operative management plans
Lists potential complications (e.g., including Infection, wound complications, neurovascular compromise, tumor progression, prosthetic hip dislocation, DVT/ pulmonary embolism [PE], pneumonia)	Capable of diagnosis and early management of complications (e.g., able to diagnose: infection, DVT/PE, wound breakdown, neurovascular compromise, hardware failure)	Capable of treating post-operative complications (e.g., non-operative treatment of: infection, wound breakdown, DVT/PE)	Capable of surgical treatment of infection or wound breakdown	Surgically treats complex complications (e.g., surgical treatment of hardware failure, periprosthetic fracture, progression of disease)
☐	☐	☐	☐	☐	☐	☐	☐	☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 11: Metastatic Bone Lesion				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of normal bone development	Demonstrates knowledge of pathophysiology related to destructive bone lesion (e.g., understands the function of receptor activator of nuclear factor kappa-B ligand [RANKL], osteoprotegerin [OPG] and osteoclasts in the bone turnover in skeletal metastasis)	Demonstrates knowledge of current literature and alternative treatments (e.g., alternative treatments, including external beam radiation, radiofrequency ablation, cryoablation, bisphosphonate use)	Understands controversies within the field (e.g., resection/prosthetic reconstruction vs. intramedullary fixation; short vs. long stem hip reconstruction; bipolar vs. total hip arthroplasty (THA) for hip lesions; resection of solitary bone metastasis)	Primary author/presenter of original work within the field
Correlates anatomic knowledge to imaging findings on basic imaging studies (e.g., plain radiographs)	Correlates anatomic knowledge to imaging findings on advanced imaging studies (e.g., CT scan of chest/abdomen/ pelvis, MRI of spine)	Understands indications for prophylactic fixation (e.g., be aware of at least one scoring system [Mirels, Beals] as well as more nuanced factors [histology, response to treatment, etc.])	Formulates differential diagnosis based on imaging studies	
Demonstrates knowledge of most common sites of metastatic disease and primary sites of disease (e.g., primary sites breast, prostate, lung, kidney, thyroid)	Demonstrates some knowledge of natural history of destructive bone lesion (e.g., understands behavior of various histologies [i.e., lung vs. breast cancer]; understands the different behavior of primary bone sarcoma vs. bone metastasis)	Understands the effects of intervention on natural history of destructive bone lesion	Applies understanding of natural history to clinical decision making (e.g., understands balance of expected lifespan to planned intervention [i.e., complex acetabular reconstruction for patient with widespread lung metastasis and six weeks to live]; develop shared-decision making skills for patient discussions/ interactions)	
	Demonstrates knowledge of destructive bone lesion anatomy and basic surgical	Understands alternative surgical approaches (e.g., understands the role of		

	approaches (e.g., understands the location of neurovascular structures in upper/lower extremities and pelvis; understand basic surgical approach to humeral and femoral nails)	resection/prosthetic replacement vs. intramedullary stabilization depending on location of lesion)		
	Demonstrates knowledge of non-operative treatment options and surgical indications (e.g., understands non-operative options, including protected weight- bearing/radiation of lower extremity lesions, as well as bracing of upper extremity lesion)	Understands role of radiation or medical therapy (vs. surgical options; their use post-operatively; specific role of chemotherapy, hormonal therapy, bisphosphonates for common primary cancers that spread to bone)	Able to perform risk assessment of operative vs. non-operative care (e.g., understands concepts of nutritional status, current function/ activity, medical comorbidities/ American Society of Anesthesiologists [ASA] level)	
	Understands basic pre-surgical planning and templating	Demonstrates knowledge of alternatives for primary sarcoma of bone (e.g., understand role of resection vs. palliative care; understands role of limb salvage vs. amputation)	Understands biomechanics and implant choices (e.g., understands concepts of failure in compression vs. tension; understands the benefit of supplemental methylmethacrylate; understands the pros/cons of plate vs. rod fixation)	
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Patient Care 12: Meniscal Tear				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam (e.g., age, gender, HPI, PMHx, social history, ROM, joint tenderness, effusion, neurovascular status	Obtains focused history and performs focused exam (e.g., McMurray, Steinmann, applies compression)			
Appropriately orders basic imaging studies (e.g., plain film radiographs)	Appropriately interprets basic imaging studies (e.g., standing radiographs as needed, Fairbank changes)	Appropriately orders and interprets advanced imaging studies (e.g., MRI findings)		
Prescribes non-operative treatments	Prescribes and manages non-operative treatment (e.g., quad strength closed chain)	Provides complex non-operative treatment (e.g., concomitant injuries—ligament, fractures)		
	Injects/aspirates knee Examines knee under anesthesia	Capable of performing diagnostic arthroscopy and meniscal debridement	Capable of performing meniscal repair—all techniques open and arthroscopic Capable of performing alternative surgical approaches to a meniscal tear	Capable of performing revision of meniscal repair or meniscal transplant
Provides basic peri-operative management (e.g., neurovascular status, ROM, brace)	Provides post-operative management and rehabilitation (e.g., ROM, quad strength closed chain, WB status)	Modifies and adjusts post-operative treatment plan as needed (e.g., knee arthrofibrosis, continued pain)		

Lists potential complications (e.g., pain, infection, neurovascular injury, loss of motion, degenerative joint disease [DJD])	Capable of diagnosis and early management of complications		Capable of treating complications both intra- and post- operatively	Capable of treating complex complications
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Medical Knowledge 12: Meniscal Tear				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to meniscal tear		Demonstrates knowledge of current literature and alternative treatments	Understands controversies within the field (e.g., repair techniques)	Primary author/presenter of original work within the field
Correlates anatomic knowledge to imaging findings on basic imaging studies (e.g., joint space height, Fairbank changes)	Correlates anatomic knowledge to imaging findings on advanced imaging studies (e.g., tear personality, chondral injury/changes)			
Understands mechanism of injury	Understands biology of meniscal healing	Understands rehabilitation mechanics (e.g., quad strength closed vs. open chain)	Understands how to prevent/avoid potential complications	
Demonstrates some knowledge of natural history of meniscal tear	Understands the effects of intervention on natural history of meniscal tear	Understands biomechanics and implant choices	Applies understanding of natural history to clinical decision-making	
	Demonstrates knowledge of meniscal anatomy and basic surgical approaches	Understands alternative surgical approaches (e.g., repair vs. debridement)		
	Demonstrates knowledge of non- operative treatment options and surgical indications			
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Patient Care 13: Pediatric Septic Hip				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam	Obtains focused history and physical, recognizes findings commonly associated with hip septic arthritis			
Orders appropriate initial imaging and laboratory studies	Orders appropriate advanced imaging studies (e.g., MRI, ultrasound) Interprets basic imaging and laboratory studies	Interprets advanced imaging studies and results of hip aspiration	Assimilates all diagnostic testing and make a decision about the need for surgical drainage	
Provides initial management	Selects appropriate antibiotics	Appropriately orders and capable of performing hip aspiration	Capable of performing hip arthrotomy and drainage	
Lists potential complications	Diagnoses complications (e.g., drug reactions)	Recognizes factors that could predict complications or poor outcome	Capable of treating simple complications; repeat incision for persistent wound drainage, drug reaction	Manages complex complications; late hip dislocation, fracture, osteomyelitis, chondrolysis, avascular necrosis
		Able to develop a basic pre-operative plan	Modifies post-operative plan based on response to treatment (e.g., patient fails to improve post-operatively)	Able to develop a comprehensive pre-operative plan that includes options based on intra-operative findings (e.g., managing dislocated hip)
☐	☐ ☐ ☐	☐ ☐	☐ ☐	☐ ☐

Not Yet Achieved Level 1 ☐

Comments:

Medical Knowledge 13: Pediatric Septic Hip

Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of common presentation of hip septic arthritis	Demonstrates knowledge of pathophysiology of joint damage related to septic arthritis			Participates in research in the field with publication
Demonstrates knowledge of basic hip anatomy	Demonstrates knowledge of the differential diagnosis of the irritable hip	Demonstrates knowledge of the vascular supply in the skeletally immature hip		
	Demonstrates knowledge of basic surgical approach	Demonstrates knowledge of potential complications	Demonstrates knowledge of options and anatomy for surgical approaches	
	Understands natural history and the effects of intervention	Demonstrates knowledge of microbiology and antibiotic choices	Demonstrates knowledge of atypical infecting organisms and management options	
Demonstrates knowledge of basic imaging studies	Demonstrates knowledge of advanced imaging studies			
Demonstrates knowledge of appropriate laboratory studies		Demonstrates knowledge of clinical and laboratory data relevant to differential diagnosis		

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Comments:

Not Yet Achieved Level 1 ☐

Patient Care 14: Rotator Cuff Injury				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical examination (e.g., age, gender, smoker, trauma, night pain, weakness, inspection for atrophy, ROM)	Obtains focused history and performs physical examination (e.g., provocative tests, Neer/Hawkins, O'Briens, lag signs, pseudoparalysis, lift-off, belly press, scapular dyskinesia) Orders basic imaging studies	Interprets basic imaging studies (e.g., rotator cuff tear on MRI, muscle atrophy on MRI, proximal humeral migration on x-ray) Completes pre-operative planning with instrumentation and implants (e.g., patient positioning, arthroscopic equipment, anchors)	Able to order and interpret advanced imaging studies (e.g., tear size, muscle atrophy, labral tears, arthritis, subscapularis tears) Appropriately interprets post-operative imaging studies/implant positioning Completes comprehensive pre-operative planning and alternatives	
	Performs basic surgical approaches and portal placement (e.g., anterior, subacromial, posterior, accessory posterior)	Capable of performing diagnostic arthroscopy, subacromial decompression, distal	Capable of performing rotator cuff repair	Capable of performing complex arthroscopic rotator cuff repairs, revision rotator cuff repair, tendon transfers

	Performs simple shoulder procedures (e.g., subacromial injection) Prescribes non-operative treatment Provides basic post-operative management (e.g., phases of cuff repair rehab, Phase 1-3)	clavicle resection, biceps tenotomy	Modifies and adjusts post-operative rehabilitation plan as needed (e.g., modify for massive cuff repairs, post-operative stiffness)	
Lists surgical complications (e.g., infection, stiffness, RSD, retear)	Diagnoses surgical complications		Treats complications both intra- and post-operatively (e.g., irrigation/ debridement for infections, proper infection treatment protocol, infectious disease consultation)	Surgically treats complex complications (e.g., revision rotator cuff repair with tendon transfer, reverse shoulder replacement for anterosuperior escape)
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Medical Knowledge 14: Rotator Cuff Injury				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands surgical anatomy (e.g., rotator cuff muscles/tendons, deltoid, axillary nerve position, acromion, biceps, labrum)	Demonstrates knowledge of surgical indications (e.g., non-operative management, therapy, injections, rotator cuff repair, subacromial decompression) Demonstrates knowledge of basic surgical approaches and portal placement (e.g., anterior, subacromial, posterior, accessory posterior)	Demonstrates knowledge of current literature and alternatives	Understands controversies within field. Examples: single vs. double row repairs, partial repair of massive tears, suprascapular nerve dysfunction Understands tear pattern, appropriate repair, biceps tenodesis (e.g., L-shaped, concentric, U-shaped, tissue quality, biceps subluxation)	Participates in research in the field with publication cites/teaches junior residents appropriate outcomes studies
	Understands pathophysiology related to rotator cuff injury (e.g., impingement, partial thickness cuff tears, extrinsic versus intrinsic theory of cuff tearing) Understands biology of soft tissue tendon healing	Understands pathophysiology of concomitant injuries (e.g., biceps tendinitis, acromioclavicular joint disease, labral pathology, arthritis) Understands rehabilitation mechanics (e.g., Neer Phase 1-3)	Understands pathophysiology of failed rotator cuff repair (e.g., biology, implant failure, stiffness, infection, smoking, tendon quality, vascularity)	Understands treatments of intra-operative complications (e.g., misalignment of suture anchor, poor exposure, hemostatis, tuberosity fracture, and anchor breakage)
Demonstrates knowledge of basic imaging studies: radiographs (e.g., true AP, axillary, supraspinatus outlet)	Demonstrates knowledge of advanced imaging studies/lab studies (e.g., MRI, ultrasound, CT arthrogram)			

		Understands natural history of rotator cuff disease (e.g., symptomatic vs. asymptomatic cuff tears, impingement, intrinsic versus extrinsic mechanisms) Understands biomechanics and implant choices	Understands end stage rotator cuff tear arthropathy and treatment options	Understands treatment for massive/irreparable tears
☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
Comments:			Not Yet Achieved Level 1 ☐	

Patient Care 15: Pediatric Supracondylar Humerus Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Obtains history and performs basic physical exam (e.g., injury mechanism, radial and ulnar pulse assessment)	Recognizes vascular, nerve or other associated injuries; assess median, radial and ulnar nerves, role of Doppler arterial assessment and perfusion assessment, differentiates anterior interosseous nerve vs. complete median nerve palsy	Recognizes factors that could predict difficult reduction and post-operative complication risk (e.g., abnormal vascular examination, neurological deficits, brachialis sign or severe soft tissue swelling, associated forearm fracture)	Capable of performing a closed reduction and pinning	Manages open fractures and fractures with neurological and vascular complications; open approaches and dissect out vascular and neurological structures, appropriate exposure and debridement for open fractures
Appropriately orders basic imaging studies (e.g., AP and lateral elbow radiographs, oblique views if concern for condylar component)	Appropriately interprets basic imaging studies and recognizes fracture patterns	Appropriately orders and interprets advanced imaging studies		
Prescribes non-operative treatments	Splints or casts fracture appropriately (e.g., flexion less than 90 degrees, accommodates for swelling potential)		Capable of removing obstacles to reduction through closed or open methods (e.g., milking maneuver, open reduction)	
Provides basic peri-operative management	Completes pre-operative planning with instrumentation and implants	Completes comprehensive pre-operative planning with alternatives; recognizes fracture patterns that may preclude lateral entry only pinning or necessitate ORIF		
	Provides post-operative	Modifies and adjusts post-operative treatment plan		

	management and rehabilitation (e.g., cast or splint care, manage swelling, monitor neurological and vascular status, office pin removal) Performs basic management of supracondylar humerus fracture; uncomplicated closed reduction	as needed (e.g., recognizes deviations from typical post-operative course)	 Capable of performing alternative surgical approaches to the supracondylar humerus fracture (e.g., milking maneuver, open approaches)	Develops unique, complex post-operative management plans
Lists potential complications	Capable of diagnosis and early management of complications, including compartment syndrome, pin tract sepsis, cast problems		Capable of surgically treating simple complications (e.g., compartment release, wound problems)	Capable of surgically treating complex complications; revision fixation, malunion (e.g., osteotomy for severe cubitus varus)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Medical Knowledge 15: Pediatric Supracondylar Humerus Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of pathophysiology related to supracondylar humerus fracture (e.g., fall on outstretched hand, extension mechanism most common; fracture occurs initially on tension side with disruption of periosteum and soft tissues on convexity)	Understands the biology of fracture healing (e.g., hematoma formation, inflammation, early soft callus, hard callus, remodeling) and the importance of periosteum and periosteal bone formation in pediatric fractures	Demonstrates knowledge of current literature and alternative treatments (e.g., immobilization for non-displaced fractures; closed reduction and pinning for displaced fractures; alternatives rarely used—olecranon traction for severe swelling)	Understands controversies within the field; indications for reduction of mildly angulated type II fractures, indications/criteria for open reduction in closed fractures; management of perfused pulseless supracondylar fracture	Primary author/presenter of original work within the field
Demonstrates knowledge of elbow anatomy (e.g., ossification centers in growing elbow, bone anatomy, soft tissue anatomy)	Correlates anatomic knowledge to imaging findings on advanced imaging studies (e.g., rare need for arthrogram/MRI to assess articular surface)	Demonstrates knowledge of nerve anatomy relative to pin fixation (e.g., location of ulnar nerve and changes with elbow position; locations of median and radial nerves)	Understands how to avoid/prevent potential complications (e.g., malunion, nerve injury, vascular complications, ischemic contracture, compartment syndrome, pin tract infections)	
Correlates anatomic knowledge to imaging findings on basic imaging studies (e.g., location of fracture, involvement of articular surface or not)	Understands mechanism of injury and fracture classification (e.g., extension vs. flexion types, Gartland classification, elbow hyperextension common in 4-7-year old children)	Understands rehabilitation protocol (e.g., regaining motion over six weeks-to-six months)	Applies understanding of natural history to clinical decision making (e.g., intervention to improve outcome, prevent complications)	
Demonstrates knowledge of non- operative treatment options and surgical indications (e.g., safe casting/splinting principles to minimize risk of compartment	Demonstrates knowledge of natural history of supracondylar humerus fracture (e.g., high incidence malunion in displaced fractures	Understands the effects of intervention on natural history of supracondylar humerus fracture; avoid malunion, Volkmann's ischemic contracture	Understands alternative surgical approaches (e.g., anterior, anteromedial, anterolateral, medial, posterior approaches)	

syndrome/vascular insufficiency)	treated closed, vast majority of nondisplaced fractures and displaced fractures treated with closed reduction and percutaneous pinning [CRPP] function well, and possible vascular injury Demonstrates knowledge of supracondylar humerus fracture anatomy and basic surgical approaches (e.g., direction of displacement and neurological/vascular structures at risk affects choice of approach) Understands basic pre-surgical planning; anticipates obstacles to reduction, understands reduction maneuvers	Understands biomechanics and implant choices (e.g., impact of pin size, pin placement [spread at fracture], fracture pattern/comminution)		
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

Systems-Based Practice 1: Patient Safety and Quality Improvement				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of common patient safety events	Identifies system factors that lead to patient safety events	Participates in analysis of patient safety events (simulated or actual)	Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)	Actively engages teams and processes to modify systems to prevent patient safety events
Demonstrates knowledge of how to report patient safety events	Reports patient safety events through institutional reporting systems (actual or simulated)	Participates in disclosure of patient safety events to patients and families (simulated or actual)	Discloses patient safety events to patients and families (simulated or actual)	Role models or mentors others in the disclosure of patient safety events
Demonstrates knowledge of basic quality improvement methodologies and metrics	Describes local quality improvement initiatives (e.g., community vaccination rate, infection rate, smoking cessation)	Participates in local quality improvement initiatives	Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project	Creates, implements, and assesses quality improvement initiatives at the institutional or community level
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:				Not Yet Achieved Level 1 ☐

Systems-Based Practice 2: System Navigation for Patient-Centered Care				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates knowledge of care coordination	Coordinates care of patients in routine clinical situations effectively utilizing the roles of the interprofessional teams	Coordinates care of patients in complex clinical situations effectively utilizing the roles of their interprofessional teams	Role models effective coordination of patient-centered care among different disciplines and specialties	Analyzes the process of care coordination and leads in the design and implementation of improvements
Identifies key elements for safe and effective transitions of care and handoffs	Performs safe and effective transitions of care/handoffs in routine clinical situations	Performs safe and effective transitions of care/handoffs in complex clinical situations	Role models and advocates for safe and effective transitions of care/handoffs within and across health care delivery systems, including outpatient settings	Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes
Demonstrates knowledge of population and community health needs and disparities	Identifies specific population and community health needs and inequities for their local population	Uses local resources effectively to meet the needs of a patient population and community	Participates in changing and adapting practice to provide for the needs of specific populations	Leads innovations and advocates for populations and communities with health care inequities
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				Not Yet Achieved Level 1 ☐

Systems-Based Practice 3: Physician Role in Health Care Systems				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies components of the complex health care system Describes basic health payment systems, including government, private, public, and uninsured care and different practice models	Describes the physician's role and how the interrelated components of complex health care system impact patient care Delivers care informed by patient specific payment model	Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency) Utilizes shared decision making in patient care, taking into consideration payment models Identifies resources and effectively plans for transition to practice (e.g., information technology, legal, billing and coding, financial, personnel)	Manages the interrelated components of the complex health care systems for efficient and effective patient care Advocates for patient care understanding the limitations of each patient's payment model (e.g., community resources, patient assistance resources) Describes basic elements needed to transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance)	Advocates for or leads change to enhance systems for high value, efficient, and effective patient care Participates in advocacy activities for health policy to better align payment systems with high value care
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Comments:				Not Yet Achieved Level 1 ☐

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates how to access and use available evidence, and incorporate patient preferences and values in order to care for a routine patient	Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care	Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients	Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient	Coaches others to critically appraise and apply evidence for complex patients, and/or participates in the development of guidelines
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments:			Not Yet Achieved Level 1 ☐	

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

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

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

Professionalism 3: Self-Awareness and Help-Seeking				
Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes status of personal and professional well-being, with assistance Recognizes limits in the knowledge/skills of self or team, with assistance	Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self or team Demonstrates appropriate help-seeking behaviors	With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to remediate or improve limits in the knowledge/skills of self or team	Independently develops a plan to optimize personal and professional well-being Independently develops a plan to remediate or improve limits in the knowledge/skills of self or team	Coaches others when emotional responses or limitations in knowledge/skills do not meet professional expectations
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments: Not Yet Achieved Level 1 ☐				

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

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

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