

Orthopaedic Surgery Milestones for Singapore



May 2017

The Orthopaedic Surgery Milestones for the Singapore

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 "Level 1" to "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 “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.

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
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: Not yet achieved Level 1 <input type="checkbox"/>				
<div style="border: 1px solid black; padding: 5px;"> Selecting a response box in the middle of a level implies that milestones in that level and in lower levels have been substantially demonstrated. </div>		<div style="border: 1px solid black; padding: 5px;"> Selecting a response box on the line in between levels indicates that milestones in lower levels have been substantially demonstrated as well as some milestones in the higher level(s). </div>		

Patient Care 1: Anterior Cruciate Ligament (ACL)				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>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)</p> <p>Appropriately orders basic imaging studies (e.g., knee radiographs)</p> <p>Prescribes non-operative treatments (e.g., range of motion [ROM], weight-bearing [WB] status)</p> <p>Provides basic peri-operative management (e.g., neurovascular status, brace, WB status)</p> <p>Lists potential complications (e.g., infection, loss of motion, graft failure, neurovascular compromise)</p>	<p>Obtains focused history and performs focused exam (e.g., mechanism of injury, past knee history, past treatments, Lachman, anterior drawer, pivot shift, meniscal pain)</p> <p>Appropriately interprets basic imaging studies (e.g., alignment, joint space, patella alignment)</p> <p>Prescribes and manages non-operative treatment (e.g., closed chain quad strengthening)</p> <p>Completes pre-operative planning with instrumentation, graft selection and implants</p> <p>Examines injury under anesthesia (e.g., complete ligament examination)</p> <p>Provides post-operative management and rehabilitation (e.g., WB status, brace, ROM, quad strength)</p> <p>Capable of diagnosis and early management of complications (e.g., graft failure, tunnel placement)</p>	<p>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)</p> <p>Appropriately orders and interprets advanced imaging studies (e.g., standing views, magnetic resonance imaging [MRI], second fracture, bone bruising)</p> <p>Provides complex non-operative treatment (e.g., WB status, bracing as appropriate, vascular studies)</p>	<p>Completes comprehensive pre-operative planning with alternatives</p> <p>Performs diagnostic arthroscopy, notchplasty, and/or graft harvest</p> <p>Modifies and adjusts post-operative treatment plan as needed (e.g., loss of knee motion treatment, sport specific drills, return to sport)</p>	<p>Performs graft passage fixation</p>
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Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Medical Knowledge 1: Anterior Cruciate Ligament				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates knowledge of pathophysiology related to ACL injury (e.g., mechanisms of injury)</p> <p>Correlates anatomic knowledge to imaging findings on basic imaging studies</p> <p>Has knowledge of natural history of ACL injury</p> <p>Demonstrates knowledge of ACL injury anatomy and basic surgical approaches (e.g., ACL bundles)</p>	<p>Understands pathophysiology of concomitant injuries (e.g., secondary restraints of knee [posterior lateral corner {PCL}])</p> <p>Correlates anatomic knowledge to imaging findings on advanced imaging studies</p> <p>Ability to grade instability (e.g., translations grade and end point)</p> <p>Understands the effects of intervention on natural history of ACL injury</p> <p>Understands alternative surgical approaches (e.g., miniopen, 2-incision)</p> <p>Understands basic pre-surgical planning and templating</p> <p>Understands advantages and disadvantages of graft types</p>	<p>Demonstrates knowledge of current literature and alternative treatments</p> <p>Understands rehabilitation mechanics (e.g., phases of rehabilitation, closed versus open chain exercises)</p> <p>Understands biomechanics of the knee and biomechanics of implant choices</p>	<p>Understands rehabilitation mechanics (e.g., phases of rehabilitation, closed versus open chain exercises)</p> <p>Understands alternative surgical approaches (e.g., miniopen, 2 incision)</p> <p>Applies understanding of natural history to clinical decision-making</p>	<p>Understands controversies within the field (e.g., graft type, brace treatment, surgical technique and fixation, surgical techniques to include skeletally immature knee)</p> <p>Understands how to prevent/avoid potential complications</p>
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Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Patient Care 2: Ankle Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Obtains history and performs basic physical exam</p> <p>Appropriately orders basic imaging studies</p> <p>Prescribes non-operative treatments</p> <p>Splints fracture appropriately</p> <p>Provides basic peri-operative management</p> <p>Lists potential complications</p>	<p>Obtains focused history and performs focused exam; recognizes implications of soft tissue injury</p> <p>Appropriately interprets basic imaging studies</p> <p>Prescribes and manages non-operative treatment</p> <p>Performs a closed reduction</p> <p>Completes pre-operative planning with instrumentation and implants</p> <p>Performs surgical exposure of the lateral malleolus</p> <p>Provides post-operative management and rehabilitation</p> <p>Capable of diagnosis and early management of complications</p>	<p>Appropriately orders and interprets advanced imaging studies (e.g., stress views, computed tomography [CT] scan)</p> <p>Provides a comprehensive assessment of most fractures on imaging studies</p> <p>Completes comprehensive pre-operative planning with alternatives</p> <p>Performs surgical reduction and fixation of a simple fracture (e.g., lateral or bimalleolar ankle fracture)</p> <p>Modifies and adjusts post-operative treatment plan as needed</p>	<p>Provides comprehensive assessment of complex fracture patterns on imaging studies (e.g., pilon fracture)</p> <p>Recognizes indications for and provides non-operative treatment of an unstable fracture (e.g., diabetes, medical comorbidities, non-compliance)</p> <p>Capable of treating complications both intra-operatively and post-operatively (e.g., wound breakdown following malleolar fixation)</p>	<p>Develops unique, complex post-operative management plans</p> <p>Performs surgical reduction and fixation of a moderately complex fracture (e.g., open reduction internal fixation [ORIF] trimalleolar ankle fracture or simple pilon fracture)</p>
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Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

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

Patient Care 3: Degenerative Spinal Conditions				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Obtains history and performs basic physical exam</p> <p>Appropriately orders basic imaging studies</p> <p>Prescribes non-operative treatments: NSAIDs, rehabilitation, initiates basic care</p> <p>Recognizes indications for and initiates immediate additional work-up ("Red Flags") or urgent surgical care (progressive deficit, cauda equina syndrome)</p> <p>Provides basic/general peri-operative management</p> <p>Lists potential complications</p>	<p>Obtains focused history and performs focused exam; appropriately interprets neurological exam</p> <p>Appropriately interprets basic imaging studies</p> <p>Assists in exposure for anterior and posterior cervical spine, posterior lumbar spine, performs closure</p> <p>Provides procedure and patient specific post-operative management and rehabilitation</p> <p>Capable of diagnosis and early management of complications</p>	<p>Extends examination to non-spinal differential diagnostic possibilities (vascular claudication, hip arthritis, etc.)</p> <p>Appropriately orders and interprets advanced imaging studies (magnetic resonance imaging [MRI], myelogram, CT); correlates clinical and imaging findings to form clinical diagnosis</p> <p>Prescribes and manages non-operative treatment: injections; referrals to other professionals</p> <p>Recommends appropriate surgical procedures considering indications and contraindications, risks and benefits for simple cases (e.g., single-level HNP with radiculopathy)</p> <p>Completes comprehensive pre-operative planning with alternatives and criteria for acceptable intra-operative result for straightforward cases (single-level herniated nucleus pulposus [HNP])</p>	<p>Provides complex non-operative treatment (e.g., individualized care, shared decision making, comprehensive informed consent)</p> <p>Capable of performing posterior lumbar surgical exposure, assisting with implant placement</p> <p>Modifies and adjusts post-operative treatment plan according to clinical situation (e.g., modifies for comorbid conditions or complications)</p> <p>Capable of treating simple complications both intra- and post-operatively (e.g., medical complications, hemostasis)</p>	<p>Recommends appropriate surgical procedures considering indications and contraindications, risks and benefits for complex cases (e.g., multi-level stenosis with deformity)</p> <p>Completes comprehensive pre-operative planning with alternatives and criteria for acceptable intra-operative result for complex cases (e.g., multi-level stenosis with deformity)</p> <p>Capable of decorticating for posterolateral fusion, placing grafts</p> <p>Capable of surgically treating simple complications (e.g., drainage of hematoma, debridement of infection)</p>
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Medical Knowledge 3: Degenerative Spinal Conditions				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates knowledge of pathophysiology related to lumbar and cervical degenerative conditions</p> <p>Correlates anatomic knowledge to imaging findings on basic imaging studies (e.g., cervical or lumbar radiographs)</p> <p>Demonstrates knowledge of physical exam of cervical and lumbar spine and related neurologic and provocative signs</p> <p>Demonstrates knowledge of general peri-operative patient care</p>	<p>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)</p> <p>Correlates anatomic knowledge to imaging findings on advanced imaging studies (e.g., MRI, myelogram/CT)</p> <p>Demonstrates knowledge of biological theories of pain generation</p> <p>Demonstrates knowledge of natural history of lumbar and cervical degenerative conditions</p> <p>Demonstrates knowledge of anatomic changes resulting from lumbar and cervical degenerative disorders and basic surgical approaches (e.g., anterior cervical, posterior cervical or lumbar)</p> <p>Demonstrates knowledge of non-operative treatment options</p>	<p>Demonstrates knowledge of current literature and alternative treatments</p> <p>Demonstrates knowledge of biology of fusion healing</p> <p>Demonstrates knowledge of the effects of intervention on natural history of lumbar and cervical degenerative conditions</p> <p>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])</p>	<p>Demonstrates knowledge of alternative surgical approaches, complications of approaches</p> <p>Demonstrates knowledge of presurgical planning and criteria for acceptable intra-operative result for cases of moderate complexity (e.g., spondylolisthesis, multi-level decompression and fusion)</p> <p>Demonstrates knowledge of surgical indications</p> <p>Demonstrates knowledge of basic implant choices</p>	<p>Demonstrates knowledge of controversies within the field (e.g., epidural blocks, arthroplasty vs. fusion, and fusion techniques)</p> <p>Demonstrates knowledge of cervical and lumbar biomechanics and alterations by decompression or implants</p> <p>Demonstrates knowledge of influence of natural history and comorbidity on clinical decision-making</p> <p>Demonstrates knowledge of alternative implant choices/biomaterials</p>
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Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Patient Care 4: Diaphyseal Femur and Tibia Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Obtains history and performs basic physical exam</p> <p>Appropriately orders basic imaging studies</p> <p>Splints fracture appropriately</p> <p>Provides basic peri-operative management</p> <p>Assesses for limb perfusion and compartment syndrome</p> <p>Lists potential complications</p>	<p>Appropriately interprets basic imaging studies</p> <p>Prescribes and manages non-operative treatment</p> <p>Performs a closed reduction</p> <p>Completes pre-operative planning with instrumentation and implants</p> <p>Performs basic surgical approaches</p> <p>Performs patient positioning for operative fixation (e.g., use of fracture table)</p> <p>Provides post-operative management and rehabilitation</p> <p>Performs basic open wound management and debridement</p> <p>Initiates management of limb reperfusion and compartment syndrome</p> <p>Recognizes the needs of the polytrauma patient</p> <p>Capable of diagnosis and early management of complications</p>	<p>Appropriately orders and interprets advanced imaging studies</p> <p>Provides complex non-operative treatment</p> <p>Completes comprehensive pre-operative planning with alternatives</p> <p>Performs surgical repair to a simple fracture</p> <p>Effectively uses intraoperative imaging</p> <p>Modifies and adjusts post-operative treatment plan as needed</p> <p>Capable of performing compartment release</p>	<p>Performs surgical repair to a moderately complex fracture (e.g., able to perform intramedullary nailing of segmental femur fracture)</p> <p>Performs alternative surgical approaches for femur and tibia fractures (e.g., open reduction techniques)</p> <p>Performs complex wound management and debridement (e.g., understands need for consultation for flap coverage)</p>	<p>Prioritizes the needs of the polytrauma patient (e.g., timing of long bone fixation, works with consulting teams)</p> <p>Capable of treating complications both intraoperatively and post-operatively (e.g., manages post-operative infection)</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Medical Knowledge 4: Diaphyseal Femur and Tibia Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates knowledge of pathophysiology related to diaphyseal femur and tibia fractures</p> <p>Correlates anatomic knowledge to imaging findings on basic imaging studies</p> <p>Demonstrates knowledge of medical and surgical comorbidities</p>	<p>Able to describe and classify fractures</p> <p>Demonstrates knowledge of associated injuries and impact on surgical care (e.g., femoral neck fracture, associated skeletal injuries)</p> <p>Understands implication of open fractures and soft tissue injury</p> <p>Demonstrates knowledge of diaphyseal femur and tibia fractures anatomy and basic surgical approaches</p> <p>Understands basic pre-surgical planning and templating</p> <p>Demonstrates knowledge of non-operative treatment options and surgical indications</p> <p>Demonstrates knowledge of surgical and non-operative complications (e.g., compartment syndrome, fat emboli, infection)</p>	<p>Demonstrates knowledge of impact on polytrauma on management of diaphyseal femur and tibia fractures</p> <p>Understands biomechanics and implant choices</p> <p>Understands the effects of intervention on natural history of diaphyseal femur and tibia fractures</p> <p>Understands alternative surgical approaches</p> <p>Recognizes surgical indications in complex fractures and the polytrauma patient</p>	<p>Demonstrates knowledge of current literature and alternative treatments</p>	<p>Understands controversies within the field (e.g., initial management of femur fracture in the polytrauma patient)</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Patient Care 5: Hip and Knee Osteo Arthritis (OA)				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Obtains history and performs basic physical exam</p> <p>Appropriately orders basic imaging studies</p> <p>Prescribes non-operative treatments (e.g., NSAIDs, physical therapy, assistive devices)</p> <p>Provides basic peri-operative management (e.g., pre- and post-operative assessment)</p> <p>Lists potential complications (e.g., infections, dislocations, thromboembolic disease, peri-prosthetic fracture, neurovascular compromise)</p> <p>Provides prophylaxis and manages thromboembolic disease</p>	<p>Obtains focused history and performs focused exam</p> <p>Appropriately interprets basic imaging studies</p> <p>Manages non-operative treatment (e.g., NSAIDs, physical therapy, assistive devices, injections)</p> <p>Completes pre-operative planning with instrumentation and implants (e.g., implant templating, instruments needed)</p> <p>Capable of performing one basic surgical approach to the hip and knee</p> <p>Provides post-operative management and rehabilitation (e.g., orders appropriate peri-operative medications and mobilization)</p> <p>Capable of diagnosis and early management of complications (e.g., infections, dislocations)</p> <p>Assesses for risk of thromboembolic disease</p>	<p>Appropriately orders and interprets advanced imaging studies (e.g., MRI, CT, nuclear medicine imaging, and advanced radiographs views)</p> <p>Appropriately recommends surgical intervention</p> <p>Completes comprehensive pre-operative planning with alternatives</p> <p>Modifies and adjusts post-operative treatment plan as needed</p> <p>Capable of surgically treating simple complications (e.g., closed reduction, irrigation, and debridement)</p> <p>Is able to employ scoring systems to determine patient reported outcomes</p>	<p>Capable of performing alternative surgical approaches to the hip and knee arthritis</p>	<p>Competently performs two or more approaches to the hip and knee</p> <p>Capable of performing primary total hip replacement (THR) and total knee replacement (TKR)</p> <p>Capable of treating complications both intra- and post-operatively (e.g., peri-prosthetic fractures, infections, instability)</p>
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Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Medical Knowledge 5: Hip and Knee Osteo Arthritis				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates knowledge of pathophysiology related to hip and knee arthritis</p> <p>Correlates anatomic knowledge to imaging findings on basic imaging studies</p> <p>Demonstrates some knowledge of natural history of hip and knee arthritis</p> <p>Demonstrates knowledge of hip and knee arthritis anatomy and basic surgical approaches</p> <p>Demonstrates knowledge of non-operative treatment options and surgical indications</p>	<p>Able to classify disease stage/severity and recognizes implications of disease processes (OA, femoroacetabular impingement [FAI], inflammatory arthritis, osteonecrosis)</p> <p>Understands the importance of comorbidities, thromboembolic prophylaxis, infection prevention and diagnosis</p> <p>Correlates anatomic knowledge to imaging findings on advanced imaging studies</p> <p>Understands the effects of intervention on natural history of hip and knee arthritis</p> <p>Understands basic pre-surgical planning and templating</p>	<p>Demonstrates knowledge of current literature and alternative treatments</p> <p>Understands biomechanics</p> <p>Understands alternative surgical approaches (e.g., non-arthroplasty: arthroscopy; osteotomy)</p> <p>Understands alternative implant choices/biomaterials (e.g., alternative bearings, unicompartamental approaches)</p> <p>Understands basic implant choices (e.g., cement and uncemented fixation, levels of constraint)</p> <p>Patient reported outcomes (scoring systems)</p>	<p>Understands controversies within the field</p> <p>Applies understanding of natural history to clinical decision-making</p> <p>Understands revision THR and TKR implants (e.g., metaphyseal vs. diaphyseal fixation, tapered vs. fully-porous implants)</p>	<p>Understands principles of failure mechanism of THR and TKR (e.g., loosening, fracture, infection, osteolysis, instability)</p> <p>Understands basic principles of revision THR and TKR</p>
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Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Patient Care 6: Hip Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Obtains history and performs basic physical exam</p> <p>Appropriately orders basic imaging studies</p> <p>Prescribes non-operative treatments</p> <p>Provides basic peri-operative management</p> <p>Lists potential complications</p>	<p>Obtains focused history and performs focused exam</p> <p>Appropriately interprets basic imaging studies</p> <p>Prescribes and manages non-operative treatment</p> <p>Recognizes and evaluates fragility fractures (e.g., orders appropriate workup and/or consult)</p> <p>Interacts with consultants regarding optimal patient management (e.g., timing of surgery, medical management)</p> <p>Completes pre-operative planning with instrumentation and implants</p> <p>Capable of performing a basic surgical approach to the hip fracture</p> <p>Provides post-operative management and rehabilitation</p> <p>Capable of diagnosis and early management of complications</p>	<p>Completes comprehensive assessment of fracture patterns on imaging studies; recognizes reverse obliquity fractures</p> <p>Interprets diagnostic studies for fragility fractures with appropriate management and/or referral</p> <p>Arranges for long-term management of geriatric patients (e.g., management of bone health, discharge planning to long-term care)</p> <p>Completes comprehensive pre-operative planning with alternatives</p> <p>Provides prophylaxis and manages thromboembolic disease</p>	<p>Capable of surgical repairs to a simple fracture (e.g., stable intertrochanteric femur fracture, minimally displaced femoral neck fracture)</p> <p>Modifies and adjusts post-operative treatment plan as needed</p>	<p>Capable of surgical repair of moderately complex fractures (e.g., unstable intertrochanteric femur fracture)</p> <p>Capable of treating complications both intra- and post-operatively (e.g., manages a post-operative infection)</p>

	Assesses risk for thromboembolic disease								
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Comments:								Not Yet Achieved Level 1	<input type="checkbox"/>

Medical Knowledge 6: Hip Fracture				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates knowledge of pathophysiology related to hip fracture</p> <p>Correlates anatomic knowledge to imaging findings on basic imaging studies</p> <p>Demonstrates knowledge of non-operative treatment options and surgical indications</p>	<p>Able to describe and classify fractures</p> <p>Correlates anatomic knowledge to imaging findings on advanced imaging studies</p> <p>Demonstrates knowledge of bone biology, osteoporosis and bone health management</p> <p>Demonstrates knowledge of natural history of hip fracture</p> <p>Demonstrates knowledge of hip fracture anatomy and basic surgical approaches</p> <p>Understands basic pre-surgical planning and templating</p> <p>Understands comorbidities and impact on fracture treatment</p>	<p>Demonstrates knowledge of current literature and alternative treatments</p> <p>Understands the effects of intervention on natural history of hip fracture</p>	<p>Applies understanding of natural history to clinical decision making</p> <p>Understands alternative surgical approaches</p>	<p>Understands controversies within the field (e.g., hemiarthroplasty vs. total hip for displaced femoral neck fracture)</p> <p>Understands biomechanics and implant choices</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

Patient Care 7: Rotator Cuff Injury				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Obtains history and performs basic physical examination (e.g., age, gender, smoker, trauma, night pain, weakness, inspection for atrophy, ROM)</p> <p>Lists surgical complications (e.g., infection, stiffness, RSD, retear)</p>	<p>Obtains focused history and performs physical examination (e.g., provocative tests, Neer/Hawkins, O'Briens, lag signs, pseudoparalysis, lift-off, belly press, scapular dyskinesia)</p> <p>Orders basic imaging studies</p> <p>Performs basic surgical approaches and portal placement (e.g., anterior, subacromial, posterior, accessory posterior)</p> <p>Performs simple shoulder procedures (e.g., subacromial injection)</p> <p>Prescribes non-operative treatment</p> <p>Provides basic post-operative management (e.g., phases of cuff repair rehab, Phase 1-3)</p> <p>Diagnoses surgical complications</p>	<p>Interprets basic imaging studies (e.g., rotator cuff tear on MRI, muscle atrophy on MRI, proximal humeral migration on x-ray)</p> <p>Completes pre-operative planning with instrumentation and implants (e.g., patient positioning, arthroscopic equipment, anchors)</p> <p>Capable of performing diagnostic arthroscopy, subacromial decompression, distal clavicle resection, biceps tenotomy</p>	<p>Able to order and interpret advanced imaging studies (e.g., tear size, muscle atrophy, labral tears, arthritis, subscapularis tears)</p> <p>Completes comprehensive pre-operative planning and alternatives</p> <p>Capable of performing rotator cuff repair</p> <p>Appropriately interprets post-operative imaging studies/implant positioning</p>	<p>Modifies and adjusts post-operative rehabilitation plan as needed (e.g., modify for massive cuff repairs, post-operative stiffness)</p> <p>Treats complications both intra- and post-operatively (e.g., irrigation/debridement for infections, proper infection treatment protocol, infectious disease consultation)</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

Medical Knowledge 7: Rotator Cuff Injury				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands surgical anatomy (e.g., rotator cuff muscles/tendons, deltoid, axillary nerve position, acromion, biceps, labrum)</p> <p>Demonstrates knowledge of basic imaging studies: radiographs (e.g., true AP, axillary, supraspinatus outlet)</p>	<p>Demonstrates knowledge of surgical indications (e.g., non-operative management, therapy, injections, rotator cuff repair, subacromial decompression)</p> <p>Demonstrates knowledge of basic surgical approaches and portal placement (e.g., anterior, subacromial, posterior, accessory posterior)</p> <p>Understands pathophysiology related to rotator cuff injury (e.g., impingement, partial thickness cuff tears, extrinsic versus intrinsic theory of cuff tearing)</p> <p>Understands biology of soft tissue tendon healing</p> <p>Demonstrates knowledge of advanced imaging studies/lab studies (e.g.,</p>	<p>Demonstrates knowledge of current literature and alternatives</p> <p>Understands pathophysiology of concomitant injuries (e.g., biceps tendinitis, acromioclavicular joint disease, labral pathology, arthritis)</p> <p>Understands rehabilitation mechanics (e.g., Neer Phase 1-3)</p> <p>Understands biomechanics and implant choices</p> <p>Understands natural history of rotator cuff disease (e.g., symptomatic vs. asymptomatic cuff tears, impingement, intrinsic versus extrinsic mechanisms)</p>	<p>Understands controversies within field (e.g., single vs. double row repairs, partial repair of massive tears, suprascapular nerve dysfunction)</p> <p>Understands end stage rotator cuff tear arthropathy and treatment options</p> <p>Understands tear pattern, appropriate repair, biceps tenodesis (e.g., L-shaped, concentric, U-shaped, tissue quality, biceps subluxation)</p> <p>Understands pathophysiology of failed rotator cuff repair (e.g., biology, implant failure, stiffness, infection, smoking, tendon quality, vascularity)</p>	<p>Understands treatment for massive/irreparable tears</p> <p>Understands treatments of intra-operative complications (e.g., misalignment of suture anchor, poor exposure, hemostatis, tuberosity fracture, and anchor breakage)</p>

May 2017

Orthopaedic Surgery Milestones for Singapore

	MRI, ultrasound, CT arthrogram)								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:								Not Yet Achieved Level 1	<input type="checkbox"/>

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
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

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 hand-offs	Performs safe and effective transitions of care/hand-offs in routine clinical situations	Performs safe and effective transitions of care/hand-offs in complex clinical situations	Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems, 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
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

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

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 incorporates 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
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

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

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

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

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

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

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 Solicits feedback on performance as a member of the health care team	Uses active listening to adapt communication style to fit team needs Communicates concerns and provides feedback to peers and learners		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>

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)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				Not Yet Achieved Level 1 <input type="checkbox"/>