Supplemental Guide: Orthopaedic Trauma

March 2022
# TABLE OF CONTENTS

## PATIENT CARE

- Polytrauma ................................................................. 5
- Complex Diaphyseal Fracture ........................................ 7
- Periarticular Fractures .................................................. 9
- Pelvic and Acetabular Fractures ....................................... 12
- Soft Tissue ................................................................ 15

## MEDICAL KNOWLEDGE

- Polytrauma ................................................................. 17
- Complex Diaphyseal Fracture ........................................ 19
- Periarticular Fractures .................................................. 21
- Pelvic and Acetabular Fractures ....................................... 24
- Decision Making for Complex Problems ......................... 26

## SYSTEMS-BASED PRACTICE

- Patient Safety and Quality Improvement ....................... 28
- System Navigation for Patient-Centered Care .................. 30
- Physician Role in Health Care Systems ......................... 32

## PRACTICE-BASED LEARNING AND IMPROVEMENT

- Evidence-Based and Informed Practice ......................... 34
- Reflective Practice and Commitment to Personal Growth .. 36

## PROFESSIONALISM

- Professional Behavior and Ethical Principles .................. 38
- Accountability/Conscientiousness .................................. 40
- Well-Being .................................................................. 42

## INTERPERSONAL AND COMMUNICATION SKILLS

- Patient- and Family-Centered Communication ................ 44
- Interprofessional and Team Communication .................... 47
- Communication within Health Care Systems ................... 49

## MAPPING OF MILESTONES 1.0 TO 2.0

- .................................................................................. 51

## RESOURCES

- .................................................................................. 53
Milestones Supplemental Guide

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

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information. A theme in the creation of this version of the Orthopaedic Trauma Milestones was fundamentally asking the question of what differentiates traumatologists from general or non-trauma trained orthopaedists. Another theme is the desire for graduating fellows to be functioning predominantly at the oversight level of supervision by the end of the educational program. As such, the progression of several Milestones is more about the level of supervision than the specific tasks of a subcompetency. Finally, feedback from fellows regarding preparation for the long-term clinical management of patients has led to a specific Medical Knowledge subcompetency on “Decision Making for Complex Problems” germane to orthopaedic trauma.

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

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

Some milestone descriptions include statements about performing independently. This is conditional independence, or the privilege of progressive authority and responsibility, as determined by the program director and faculty based on the needs of the patient and the skills of the fellow. The fellow must still be under the supervision of a faculty member. It is important to use this guide in conjunction with the ACGME specialty-specific Program Requirements. Specific language regarding levels of supervision has been included that is defined through the Program Requirements.
Levels of Supervision:

Direct Supervision
The supervising physician is physically present with the fellow during the key portions of the patient interaction.

Indirect Supervision
The supervising physician is not providing physical or concurrent visual or audio supervision but is immediately available to the fellow for guidance and is available to provide appropriate direct supervision.

 Oversight
The supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered.

The Milestones are not meant to be an inclusive list of knowledge or procedures a fellow may participate in. Both the ACGME and the Orthopaedic Trauma Association (OTA) have lists of core procedures. The OTA list can be found here. There is clearly some mapping of Milestones to certain procedures. For example, fasciotomy and open fracture debridement would be covered under “Patient Care 5: Soft Tissue”; femur/tibia/humeral shaft fractures under “Patient Care 2: Complex Diaphyseal Fractures”; pelvic and acetabular fractures under “Patient Care 4: Pelvic and Acetabular Fractures”; and distal femur/tibial plateau/tibial pilon/talus/calcaneus/periarticular elbow/distal radius under “Patient Care 3: Periarticular Fractures”. The overall intent of any Patient Care or Medical Knowledge Milestone can be applied to the core procedures defined by the ACGME or OTA. Examples in the boxes below should help assist with that application.

Additionally, the subcompetencies for Systems-Based Practice, Practice-Based Learning and Improvement, Professionalism, and Interpersonal and Communication Skills are carried over from the Orthopaedic Surgery Milestones for residents. As each learner is in a new context (generalist to specialist, new patient population, etc.) these skills and behaviors must still be addressed.

These milestones were created to allow for objective measurement of fellows during orthopaedic trauma fellowship. It is the intention of the Milestones group that the examiner should view these milestones as a progression of goals along a spectrum for their fellows, rather than distinct black-and-white criteria for success.”
**Patient Care 1: Polytrauma (Care of Multiply Injured Patient)**

**Overall Intent:** To care for polytrauma patients, which requires patient assessment, laboratory, and image interpretation, understanding of patient physiology, communication with other providers and patients/family, and determining timing and degree of orthopaedic intervention.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Identifies when a patient needs damage control during initial resuscitation, with direct supervision</td>
<td>• Analyzes laboratory-based studies for when a patient does not meet early appropriate care criteria and needs damage control orthopaedics</td>
</tr>
<tr>
<td><strong>Prioritizes management of polytrauma patients, with direct supervision</strong></td>
<td>• Determines order of treatment for orthopedic injuries and discusses with general surgery and neurosurgery their plans for intervention</td>
</tr>
<tr>
<td><strong>Counsels patients on acute diagnosis, with direct supervision</strong></td>
<td>• Describes acute interventions necessary for resuscitation/stabilization of patient to patient/family</td>
</tr>
<tr>
<td><strong>Level 2</strong> Identifies when a patient needs damage control during initial resuscitation, with indirect supervision</td>
<td>• Recognizes the need for damage control orthopaedics versus early appropriate care</td>
</tr>
<tr>
<td><strong>Prioritizes management of polytrauma patients, with indirect supervision</strong></td>
<td>• Applies laboratory-based criteria for early appropriate care criteria and damage control orthopaedics with remote discussion/coaching</td>
</tr>
<tr>
<td><strong>Counsels patients on acute diagnosis and expectations, with indirect supervision</strong></td>
<td>• Determines appropriate order of interventions/procedures with exit points if patient condition changes</td>
</tr>
<tr>
<td><strong>Level 3</strong> Performs damage control procedures, with indirect supervision</td>
<td>• Discusses priority of interventions/procedures with consulting services, patient, and family to determine appropriate timing of orthopaedic intervention</td>
</tr>
<tr>
<td><strong>Determines timing for definitive management, with oversight</strong></td>
<td>• Understands the application and options for damage control orthopaedics procedures</td>
</tr>
<tr>
<td></td>
<td>• Applies pelvic external fixation and other pelvic volume reducing interventions</td>
</tr>
<tr>
<td></td>
<td>• Applies external fixation to long bones or joint-spanning external fixation in critically injured patients</td>
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<tr>
<td></td>
<td>• Assesses patient’s readiness (e.g., lab and physiological parameters) for open pelvic or acetabular surgery</td>
</tr>
<tr>
<td><strong>Counsels patients on short-term prognosis, complications, and expectations, with oversight</strong></td>
<td>● Counsels patients on risks of infection, nerve injury, venous thromboembolism for open acetabular surgery</td>
</tr>
<tr>
<td><strong>Level 4</strong> Independently performs damage control procedures</td>
<td>● Goes into operating room with general surgery in the middle of the night to figure out a complicated/injured pelvis/mangled extremity</td>
</tr>
<tr>
<td>Independently prioritizes and manages complex polytrauma patients through interdisciplinary team care</td>
<td>● Independently prioritizes and treats patients needing damage control orthopaedics management including, but not limited to, external fixation, pelvic binders, wound management</td>
</tr>
<tr>
<td>Independently coordinates simultaneous or staged procedures with multiple services</td>
<td>● Counsels patients on risk of infection, post-traumatic arthritis, heterotopic ossification, and secondary procedures after acetabular surgery</td>
</tr>
<tr>
<td>Independently counsels patients regarding long-term prognosis, potential complications, and need for additional procedure(s)</td>
<td></td>
</tr>
<tr>
<td><strong>Level 5</strong> Independently anticipates changes in patient condition and plans and implements contingencies</td>
<td>● Effectively communicates with anesthesia and switches from one plan to another intra-operatively as patient condition changes</td>
</tr>
<tr>
<td>Independently counsels patients regarding long-term prognosis, potential complications, and need for additional procedure(s); cites the evidence for each</td>
<td>● Cites literature when explaining to patients, points to evidence for the fellow’s actions and decisions</td>
</tr>
<tr>
<td>Counsels patient about expected recovery course and likely outcome for each treatment option with data driven recommendations</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Models or Tools</strong></td>
<td>● Cadaver lab dissection</td>
</tr>
<tr>
<td></td>
<td>● Case based discussion</td>
</tr>
<tr>
<td></td>
<td>● Direct observation</td>
</tr>
<tr>
<td><strong>Curriculum Mapping</strong></td>
<td>●</td>
</tr>
<tr>
<td><strong>Notes or Resources</strong></td>
<td>● Orthopaedic Trauma Association (OTA) Evidence-Based Medicine Article: <a href="https://ota.org/education/evidence-based-medicine-resource-list/general#toc9">https://ota.org/education/evidence-based-medicine-resource-list/general#toc9</a></td>
</tr>
</tbody>
</table>
# Patient Care 2: Complex Diaphyseal Fracture (e.g., Peri-Prosthetic, Open, Bone Loss, Proximal/Distal Thirds)

**Overall Intent:** To care for patients with diaphyseal fractures, which requires patient assessment, image interpretation, fracture classification, choice and performance of approach, application of stable internal fixation, post-operative planning, and management of post-operative complications.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Develops a surgical plan, with direct supervision</td>
<td>• Describes techniques for determining appropriate length, alignment, and rotation of comminuted femoral shaft fracture with prompting</td>
</tr>
<tr>
<td>Demonstrates surgical skills (e.g., reduction and placement of nail) and assists with procedures</td>
<td>• Places K-wires/Shanz pins; drills in direction and locations necessary</td>
</tr>
<tr>
<td>Manages peri-procedural complications, with indirect supervision</td>
<td>• Uses clamp to reduce oblique fracture line, with guidance</td>
</tr>
<tr>
<td></td>
<td>• Obtains starting point for various nailing portals such as piriformis fossa versus greater trochanter</td>
</tr>
<tr>
<td></td>
<td>• Recognizes wound at risk and develops treatment plan, with indirect supervision</td>
</tr>
<tr>
<td></td>
<td>• Recognizes signs of pulmonary complication, orders appropriate evaluation, and discusses management with consulting services</td>
</tr>
<tr>
<td><strong>Level 2</strong> Develops a surgical plan, with indirect supervision</td>
<td>• Proposes plan to verify appropriate restoration of length, alignment, and rotation after long bone nailing</td>
</tr>
<tr>
<td>Performs critical steps of procedures, with direct supervision</td>
<td>• Critical steps include exposure, reduction, provisional fixation, and converting to definitive fixation</td>
</tr>
<tr>
<td>Manages peri-procedural complications with oversight</td>
<td>• Obtains reduction with verbal, but not physical, guidance on various techniques</td>
</tr>
<tr>
<td></td>
<td>• Recognizes wound at risk and develops treatment plan, with oversight</td>
</tr>
<tr>
<td><strong>Level 3</strong> Develops a surgical plan for procedures, including identification of potential challenges and technical complexities, with oversight</td>
<td>• Identifies and describes options to obtain adequate/additional fixation in peri-implant/peri-prosthetic fractures with limited remaining osseous corridors</td>
</tr>
<tr>
<td>Performs critical steps of procedures with indirect supervision</td>
<td>• Manages open fractures and fractures with bone loss leading to segmental defects</td>
</tr>
<tr>
<td>Manages complex intra-operative complications with indirect supervision</td>
<td>• Critical steps include exposure, reduction, provisional fixation, and converting to definitive fixation</td>
</tr>
<tr>
<td></td>
<td>• Identifies fracture propagation or displacement of previously non-displaced fracture line and alters surgical plan/sequence</td>
</tr>
<tr>
<td><strong>Level 4</strong> Independently develops a surgical plan for procedures, including contingencies for complications</td>
<td>• Performs appropriate debridement of open fractures including removing devitalized bone and alters plan based on inter-operative findings</td>
</tr>
</tbody>
</table>
| **Independently performs procedures** | - Independently uses multiple strategies to obtain reduction and fixation in short segment nailing  
- Independently manages massive bone defects intra-operatively  
- Competent in the selection/performance of case-specific bone graft harvesting  
- Independently uses multiple strategies to obtain reduction and fixation in short segment nailing  
- Independently manages massive bone defects intra-operatively  
- Competent in the selection/performance of case-specific bone graft harvesting |
| **Independently manages complex intra-operative complications** | - Identifies fracture propagation or displacement of previously non-displaced fracture line and alters surgical plan/sequence independently  
- Identifies fracture propagation or displacement of previously non-displaced fracture line and alters surgical plan/sequence independently |
| **Level 5 Independently plans complex procedures, including management of peri-operative complications** | - Plans and executes deformity correction procedure after diaphyseal malunion  
- Plans and executes deformity correction procedure after diaphyseal malunion |
| **Independently performs complex revision procedures** | - Manages, evaluates, discusses treatment options, and indicates nonunion repair  
- Manages, evaluates, discusses treatment options, and indicates nonunion repair |
| **Manages long-term complications in the outpatient setting** | - Manages infection, nonunion/malunion, stiffness, post-traumatic osteoarthritis, and ongoing pain  
- Manages infection, nonunion/malunion, stiffness, post-traumatic osteoarthritis, and ongoing pain |
| **Assessment Models or Tools** | - Cadaver lab dissection  
- Case-based discussion  
- Direct observation |
| **Curriculum Mapping** | -  
# Patient Care 3: Periarticular Fractures

**Overall Intent:** To care for patients with periarticular fractures, which requires patient assessment, image interpretation, fracture classification, choice and performance of approach, application of stable internal fixation, post-operative planning, and management of post-operative complications.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Develops a surgical plan, with direct supervision</td>
<td>● Chooses patient position, surgical exposure, reduction, and fixation plan in conversation with faculty surgeon</td>
</tr>
<tr>
<td>Demonstrates surgical skills for simple periarticular fractures and assists with procedures</td>
<td>● Deploys methods for articular visualization (e.g., femoral distractor, external fixation, book open fracture lines) ● Chooses appropriate fixation strategies for articular injuries (e.g., buttress plating for B type fractures)</td>
</tr>
<tr>
<td>Manages peri-procedural complications, with indirect supervision</td>
<td>● Identifies wound at risk and discusses perioperative wound management ● Orders venous thromboembolism scan ● Orders and interprets inflammatory labs when concerned for infection</td>
</tr>
<tr>
<td><strong>Level 2</strong> Develops a surgical plan, with indirect supervision</td>
<td>● Presents choice of patient position, surgical exposure, reduction, and fixation plan to faculty surgeon ● Addresses impact of patient factors on fracture treatment plan</td>
</tr>
<tr>
<td>Independently performs procedures for simple periarticular fractures</td>
<td>● Exposes, reduces, and fixates periarticular fractures with large joint pieces and no impaction</td>
</tr>
<tr>
<td>Manages peri-procedural complications, with oversight</td>
<td>● Discusses fixation failure with patient and treatment options ● Per Level 1, but with oversight instead of indirect supervision</td>
</tr>
<tr>
<td><strong>Level 3</strong> Develops a surgical plan for procedures, including identification of potential challenges and technical complexities, with indirect supervision</td>
<td>● Determines when osteotomy (e.g., olecranon, medial malleolus, lateral tibial plateau) is needed for complex periarticular fractures ● Adjusts surgical tactic based on soft tissue considerations ● Identifies appropriate weight bearing and range of motion recommendations and duration of immobilization for simple injuries</td>
</tr>
<tr>
<td>Performs critical steps of procedures for periarticular fractures with indirect supervision</td>
<td>● Critical steps include exposure, reduction, provisional fixation, and converting to definitive fixation ● Uses femoral distractor to obtain length and joint distraction for visualization when needed</td>
</tr>
</tbody>
</table>
| Manages complex intra-operative complications with indirect supervision | - Performs alternative exposures to reach difficult fracture fragments (e.g., posterior tibial plateau exposures)  
- Manages intra-operative fracture propagation and changes plan for severely poor bone quality |
| --- | --- |
| **Level 4** Independently develops a surgical plan for procedures, including contingencies for complications | - Chooses approach to Glenoid based on fracture pattern  
- Develops complex post-operative management plans (short- and long-term)  
- Competent in the selection/performance of case-specific bone graft harvesting  
- Recognized when weight bearing and range of motion protocols might be adjusted (e.g., relative delay for tenuous wounds, relative acceleration for simple splits with good fixation in health hosts) |
| Independently performs procedures for complex periarticular fractures | - Independently performs open reduction and internal fixation (ORIF) for C-type fracture of the distal femur, proximal tibia, or distal tibia  
- Performs or refers for reverse total shoulder arthroplasty/total elbow arthroplasty in select proximal/distal humerus fractures |
| Independently manages complex intra-operative complications | - Recognizes, identifies, and appropriately consults for intra-operative nerve or arterial injury |
| **Level 5** Independently plans complex procedures, including management of peri-operative complications | - Manages, evaluates, discusses treatment options, and indicates nonunion repair |
| Independently performs complex revision procedures | - Performs intertrochanteric osteotomy for nonunion repair of femoral neck ORIF  
- Performs ankle fusion for pilon that has gone on to post-traumatic osteoarthritis |
| Manages long-term complications in the outpatient setting | - Performs revision nonunion repair for pilon that has had articular union, but metadiaphyseal nonunion with hardware failure and deformity |
| Assessment Models or Tools | - Cadaver lab dissection  
- Case-based discussion  
- Direct observation |
| Curriculum Mapping | - |
| Notes or Resources | - A surgical plan includes recommendations for weight bearing and range of motion  
- Simple versus complex is along the lines of progressively increasing AO Trauma/Orthopaedic Trauma Association classification (e.g., A versus C or C1 versus C3) and other fracture attributes, such as open versus closed, bone loss, etc. There can still be very complicated cases that are, for example, closed A-type injuries, so these are guidelines for thinking and not absolutes |
|   | Apply this Patient Care subcompetency to distal femur/tibial plateau/tibial pilon/talus/calcaneus and glenoid/proximal humerus/periarticular elbow/distal radius. |
**Patient Care 4: Pelvic and Acetabular Fractures**

**Overall Intent:** To care for patients with pelvic and acetabular fractures, which requires patient assessment, image interpretation, fracture classification, choice and performance of approach, application of stable internal fixation, post-operative planning, and management of post-operative complications.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Develops a surgical plan, with direct supervision | - Obtains an accurate history and physical examination  
- Discusses plan for approach (including dealing with structures at risk), reduction, and fixation of elementary acetabular fracture pattern  
- Discusses plan for approach, reduction, and fixation of anteroposterior compression type-2 (APC-2) pelvic ring injury |
| Demonstrates surgical skills for simple pelvic and acetabular fractures, and assists with procedures | - Performs key and critical steps of the Kocher-Langenbeck approach  
- Interprets pelvic fluoroscopy and inserts S1 iliosacral screw in patient without dysmorphism under direct supervision |
| Manages peri-procedural complications, with indirect supervision | - Identifies pertinent post-operative complications related to the surgery and approach (e.g., sciatic nerve injury with foot drop) and relays information to faculty members; discusses plan for treatment (e.g., ankle foot orthosis) |
| **Level 2** Develops a surgical plan, with indirect supervision | - Appropriately assesses soft tissue status  
- Accurately interprets imaging studies  
- Presents/articulates detailed plan for approach, reduction, and fixation of elementary acetabular fracture patterns without communication  
- Presents/articulates plan for approach, reduction, and fixation of lateral compression 1/2 or APC1/2 pelvic ring injury |
| Performs procedures for simple pelvic and acetabular fractures, with indirect supervision | - Performs Kocher-Langenbeck approach, reduces elementary fracture patterns, and applies internal fixation with indirect supervision  
- Performs anterior pelvis/acetabular exposures (e.g., ilioinguinal, Stoppa, lateral window)  
- Independently sets up and interprets pelvic fluoroscopy, plates pubic symphysis, and inserts iliosacral screws in patient without dysmorphism  
- Understands clamp placement and in pelvic/acetabular work  
- Obtains correct fluoroscopic views to evaluate reduction and implant placement |
<p>| Manages peri-procedural complications, with oversight | - Identifies pertinent post-operative complications related to the surgery and approach (e.g., sciatic nerve injury with foot drop) and manages complications (orders ankle foot orthosis) |</p>
<table>
<thead>
<tr>
<th>Level 3</th>
<th>Develops a surgical plan for procedures, including identification of potential challenges and technical complexities, with oversight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recognizes marginal impaction, comminution and articulates need for strategies to address them</td>
</tr>
<tr>
<td></td>
<td>Presents/articulates detailed plan for approach, reduction, and fixation of associated acetabular fracture patterns without communication</td>
</tr>
<tr>
<td></td>
<td>Presents/articulates plan for approach, reduction, and fixation of lateral compression or APC type 3 pelvic ring injuries</td>
</tr>
</tbody>
</table>

**Demonstrates surgical skills of complex pelvic and acetabular fractures, and assists with procedures**

- Performs extensile exposures to acetabulum (e.g., greater trochanter osteotomy, anterior superior iliac spine (ASIS) osteotomy/soft tissue release)
- Utilizes appropriate intra-operative imaging and inserts sacroiliac (SI) screws in patients with dysmorphosis or trans-iliac trans-sacral screws in patients without dysmorphosis
- Applies clamps using safe corridors and effectively uses clamps to achieve reduction
- Correctly interprets fluoroscopic views to evaluate reduction and implant placement
- Controls bleeding from corona mortis with systematic approach (e.g., standard ligation, temporary packing, hemostatic agents)

**Manages complex intra-operative complications with indirect supervision**

- Recognizes marginal impaction, comminution and articulates need for strategies to address them
- Presents/articulates detailed plan for approach, reduction, and fixation of associated acetabular fracture patterns without communication
- Presents/articulates plan for approach, reduction, and fixation of lateral compression or APC type 3 pelvic ring injuries

<table>
<thead>
<tr>
<th>Level 4</th>
<th>Independently develops a surgical plan for procedures, including contingencies for complications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plans front back approaches for complex acetabular injuries</td>
</tr>
<tr>
<td></td>
<td>Plans progression for complex pelvic ring injuries from attempted closed reduction and percutaneous fixation thru open reduction and internal fixation</td>
</tr>
</tbody>
</table>

**Independently performs procedures for complex pelvic and acetabular fractures**

- Performs ORIF of associated acetabular fracture patterns using extensile or combined approaches as needed
- Open reduces and fixes SI joint, anteriorly or posteriorly
- Safely inserts trans-iliac trans-sacral screws in patient with dysmorphosis
- Performs nonunion surgery for failed healing in the anterior pelvic ring (e.g., ramus nonunion)
- Effectively masters the application of clamps and other reduction aides for reduction in and around the pelvis/acetabulum

**Independently manages complex intra-operative complications**

- Recognizes and promptly coordinates care of a critically injured/bleeding patient by understanding when to abort procedure and get vascular/interventional radiology consultation for hemorrhage control; discusses such complications with the patient’s family

<table>
<thead>
<tr>
<th>Level 5</th>
<th>Independently plans complex procedures, including management of peri-operative complications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obtains and constructs three-dimensional plans/models for pelvic deformities and develops surgical tactic for their correction</td>
</tr>
</tbody>
</table>
| **Independently performs complex revision procedures** | • Plans combined pelvic ring and acetabular injuries and discusses pros and cons of fixation sequences  
• Recognizes magnitude of pelvic ring malunion correction, such as need to prepare for front-back/back-front exposures and attendant blood loss  
• Performs conversion total hip arthroplasty for post-traumatic osteoarthritis after acetabular fracture  
• Performs hardware removal and SI joint fusion for failed pelvic ring fixation  
• Understands that pelvic ring injuries can have residual sequelae for years or permanently and manages patient's expectations through counseling and literature support  
• Refers and coordinates care with general surgery for hernias, urology for bladder/erectile dysfunction, or pain management when other methods have been exhausted |
| **Manages long-term complications in the outpatient setting** | |
| **Assessment Models or Tools** | • Cadaver lab dissection  
• Case-based discussion  
• Direct observation |
| **Curriculum Mapping** | |
| **Notes or Resources** | • Simple versus complex along the lines of elementary versus associated types for acetabular fractures and along the lines of progressively greater number in the Young-Burgess classification for pelvic rings. There can be very difficult and complicated cases that are, for example, elementary acetabular fractures or LC-1 pelvic ring injuries, so these are guidelines for thinking and not absolutes.  
• The AO. Acetabulum. AO Surgery Reference website  
  o [https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/acetabulum](https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/acetabulum)  
• Orthopaedic Trauma Association Evidence-Based Medicine Articles:  
## Patient Care 5: Soft Tissue

**Overall Intent:** To respect soft tissue injury in acute orthopaedic trauma and post-traumatic recovery and to identify and provide appropriate care for emergent conditions (e.g., open fracture, vascular injury, compartment syndrome, mangled extremity)

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Performed standard surgical approaches with compromised soft tissue, and adjusts as needed | - Recognizes when surgical incisions should not be made and applies external fixation for soft tissue management  
- Avoids incisions thru compromised soft tissue, selecting alternative exposure or minimally invasive plate osteosynthesis  
- Diagnoses compartment syndrome and posts patient for emergent fasciotomy  
- Recognizes vascular compromise and consults vascular surgery  
- Recognizes when a mangled extremity can lead to systemic compromise (i.e., “life over limb”) |
| Recognizes urgent/emergent soft tissue concerns (e.g., acute compartment syndrome, vascular injury, mangled extremity) and acts/consults appropriately, with oversight | |
| **Level 2** Performs comprehensive debridement of an open fracture and incorporates soft tissue status in fracture management, with indirect supervision | - Performs systematic debridement/irrigation of open fracture  
- Considers external fixation (e.g., rings) as definitive treatment for some fractures with substantial soft tissue injury  
- Performs leg and forearm fasciotomies  
- Obtains plastic surgery consultation for wounds that might need soft tissue coverage  
- Coordinates with vascular surgery the sequence of events for a fracture or dislocation with vascular injury  
- Recognizes need for wound vacuum, bead pouch, or other method of soft tissue management for wounds that are not closable |
| Performs procedures for urgent/emergent soft tissue concerns (e.g., fasciotomy) or impending soft tissue compromise and acquires appropriate consultations, with oversight | |
| **Level 3** Performs comprehensive debridement of an open fracture and incorporates soft tissue status in fracture management, with oversight | - Per Level 2, but with oversight instead of indirect supervision  
- Discusses adjusting surgical tactic based on chronic soft tissue changes  
- Identifies failure of wound healing in outpatient clinic and develops plan for care (e.g., nutrition assessment, wet-to-dry dressing changes, wound care clinic referral, plastics consultation)  
- Recognizes chronic post-operative conditions and challenges with wound healing (e.g., lymphedema, previous burn, or incisions)  
- Understands implications of chronic soft tissue damage on the management of nonunion |
| Recognizes chronic soft tissue concerns, with oversight | |
| **Level 4** Independently obtains adequate soft tissue coverage for complex injuries (e.g., through plastic surgery consultation) | ● Designs surgical tactic for infected nonunion with compromised soft tissue which may include alternative exposures (e.g., posterolateral bone grafting for tib-pro-fib) or discussion with patient about likely need for flap and providing referral to plastic surgery  
● Performs split thickness skin graft or rotational muscle flaps  
● Coordinates with plastic surgery for timely coverage of Type IIIB open fractures |
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<tr>
<td>Independently designs procedures and acquires consultation for patients with chronic soft tissue concerns</td>
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</table>
| **Level 5** Independently performs skin graft and local flap procedures | ● Independently performs split thickness skin graft, rotational muscle flaps, or bipedicle advancement flaps  
● Carries out surgical tactic for infected tibial nonunion with compromised soft tissue |
| Independently performs and coordinates for procedures in patients with chronic soft tissue concerns |  |
| Assessment Models or Tools | ● Cadaver lab dissection  
● Case-based discussion  
● Direct observation |
| Curriculum Mapping |  |
| Notes or Resources | ● The OTA. General. Orthopaedic Trauma Association Evidence-Based Medicine Resource List. [https://ota.org/education/evidence-based-medicine-resource-list/general#toc2](https://ota.org/education/evidence-based-medicine-resource-list/general#toc2)  
### Medical Knowledge 1: Polytrauma (Care of Multiply Injured Patient)

**Overall Intent:** To apply knowledge of pathoanatomy, pathophysiology, indications, and biomechanics to treatment options

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
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| **Level 1** Discusses the basic pathophysiology of the multiply injured patient and identifies appropriate endpoints of resuscitation | ● Discusses hemodynamics (blood pressure, heart rate) and pH/base excess/lactate as measures of resuscitation  
● Understands how head and lung injuries play into care of polytrauma patient  
● Discusses role of ex-fix or plating open fractures in damage control orthopaedics cases |
| **Level 2** Discusses the spectrum of instability of the multiply injured patient and recognizes indications for damage control orthopaedics (DCO) versus early appropriate care (EAC) | ● Chooses damage control orthopaedics when patient is unstable or in extremis  
● Chooses early appropriate care when patient is stable  
● Understands the contribution of pelvic injury to hemodynamic status |
| **Level 3** Demonstrates knowledge of complex pathophysiology of the multiply injured patient and discusses intra-operative markers of patient resuscitation | ● Discusses use of thromboelastography (TEG), urine output, vital signs, presser requirements, vent status, as intra-operative markers  
● Appropriately orders and interprets the use of lactic acid and hemodynamic markers to guide surgical planning and decision making |
| **Level 4** Triages order of injuries to be treated and titrates care based on patient resuscitation and surgical burden | ● Prioritizes pelvis and long bone fractures in polytrauma patients  
● Understands pathophysiology of adult respiratory distress syndrome  
● Demonstrates comprehensive knowledge of current and classic literature |
| **Level 5** Leads discussion about the nuances of polytrauma and functions in the "grey area" | ● Recognizes there is not a one-size-fits-all approach to the care of polytrauma patients  
● Understands the role of orthopaedic physicians in the trauma team and in trauma systems protocol development  
● Performs original research on the management of polytrauma |

**Assessment Models or Tools**

- Case-based discussion
<table>
<thead>
<tr>
<th>Curriculum Mapping</th>
<th>Notes or Resources</th>
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</thead>
</table>
| • Direct observation | • The OTA. General. Orthopaedic Trauma Association Evidence-Based Medicine Reference List. [https://ota.org/education/evidence-based-medicine-resource-list/general#toc9](https://ota.org/education/evidence-based-medicine-resource-list/general#toc9)  
• The OTA. Pelvic Ring. Orthopaedic Trauma Association Evidence-Based Medicine Reference List. [https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/pelvic-ring](https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/pelvic-ring) |
<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
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<tbody>
<tr>
<td><strong>Level 1</strong> Demonstrates knowledge of surgically relevant normal anatomy and interprets imaging</td>
<td>● Identifies length, alignment, and rotation as the goals of diaphyseal fracture care&lt;br&gt;● Identifies and classifies periprosthetic femur fractures&lt;br&gt;● Identifies safe zones for external fixation pins for provisional stabilization&lt;br&gt;● Understands normal and abnormal axial alignment&lt;br&gt;<strong>Discusses absolute surgical indications and types of fixation</strong>&lt;br&gt;● Understands causes of pathologic fractures (e.g., infection, osteoporosis)&lt;br&gt;● Understands bone healing</td>
</tr>
<tr>
<td><strong>Level 2</strong> Demonstrates knowledge of basic surgical approaches based on fracture pattern needs</td>
<td>● Identifies surgical options (bridging versus absolute stability constructs) in the care of diaphyseal fracture patterns and appropriately considers risks of both&lt;br&gt;<strong>Discusses relative surgical indications and types of fixation</strong>&lt;br&gt;● Describes pros and cons of and anatomy at risk for various surgical approaches for reduction and fixation of humeral shaft fractures&lt;br&gt;● Knows fracture and soft tissue classifications (both open and closed)&lt;br&gt;● Demonstrates basic knowledge of the literature regarding diaphyseal fractures</td>
</tr>
<tr>
<td><strong>Level 3</strong> Correlates imaging to surgical anatomy and selects surgical approach</td>
<td>● Correlates imaging studies (computerized tomography (CT), x-ray, magnetic resonance imaging (MRI)) to plan potential surgical challenges, and optimize surgical planning&lt;br&gt;<strong>Adapts absolute and relative surgical indications to a patient’s condition and types of fixation</strong>&lt;br&gt;● Understands difference in surgical morbidity and peri-operative risk in Vancouver B2 fractures in medically ill patients between revision arthroplasty and ORIF and discusses with patient/family&lt;br&gt;● Understands the work-up and treatment of pathologic fracture&lt;br&gt;● Demonstrates knowledge of treatment options for bone loss/defect</td>
</tr>
<tr>
<td><strong>Level 4</strong> Demonstrates knowledge of advanced surgical approaches based on fracture pattern needs</td>
<td>● Appreciates and identifies the use of hybrid fixation techniques (e.g., nail-plate combos)&lt;br&gt;<strong>Anticipates long-term sequela of surgical interventions and types of fixation</strong>&lt;br&gt;● Appreciates the role of dynamization, static locking, and adjuncts to treatment to reduce sequela and need for revision fixation/intervention&lt;br&gt;● Demonstrates comprehensive knowledge of current and classic literature</td>
</tr>
<tr>
<td>Level 5</td>
<td>Leads advanced discussion around treatment nuances and controversies in management and techniques</td>
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<td>● Discusses proximity of neurovascular structures to common surgical landmarks (e.g., peroneal nerve to fibular head) and techniques to protect these structures</td>
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<td>● Performs original research on the management of diaphyseal fractures</td>
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<tr>
<th>Assessment Models or Tools</th>
<th>● Case-based discussion</th>
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<tr>
<td>Curriculum Mapping</td>
<td>● Direct observation</td>
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<td>Notes or Resources</td>
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</table>
## Medical Knowledge 3: Periarticular Fractures

**Overall Intent:** To apply knowledge of pathoanatomy, pathophysiology, indications, and biomechanics to treatment options

<table>
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<th>Milestones</th>
<th>Examples</th>
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</table>
| **Level 1** *Demonstrates knowledge of surgically relevant normal anatomy and interprets imaging* | ● Understands bone and cartilage healing  
● Names and describes approaches to periarticular fractures (e.g., distal femur, tibial plateau, tibial pilon, proximal humerus, distal humerus, distal radius)  
● Classifies fracture patterns based on well-known classification schemes  
● Discusses use of buttress, bridge, neutralization, and compression plate constructs as they might apply to periarticular injuries |
| **Level 2** *Demonstrates knowledge of basic surgical approaches based on fracture pattern needs* | ● Understands potential sequelae of bone and cartilage defects  
● Identifies neurovascular structures at risk for named approaches and understands how to minimize injury to these structures  
● Classifies fracture patterns based on AO Foundation and Orthopaedic Trauma Association (AO/OTA) system (A, B, C) and subclasses C-type injuries; understands and describes lesser-known classification patterns  
● Identifies and understands why certain approaches and modes of fixation may not be the best choice for the patient’s specific fracture pattern  
● Understands the mechanical requirements and implant choices to achieve stable constructs  
● Discusses how some operative interventions might allow patient earlier function (e.g., earlier weight bearing)  
● Demonstrates basic knowledge of the literature regarding periarticular fractures |
| **Level 3** *Correlates imaging to surgical anatomy and selects surgical approach* | ● Recognizes posteromedial shear injury in bicondylar tibial plateau fracture and elects for dual surgical approach (posteromedial and lateral)  
● Chooses anterolateral approach for B-type pilon fracture with Chaput fragment  
● Identifies non-operative treatment for select pilon fractures in patients with pre-existing ankle osteoarthritis or non/minimal ambulators  
● Understands implications of soft tissue injury on fracture care  
● Understands the indications for staged treatment |
| **Level 4** *Demonstrates knowledge of advanced surgical approaches based on fracture pattern needs* | ● Understands nuances of proximal tibia or fibular osteotomy to access aspects of lateral tibial joint surface  
● Recognizes and understands when periarticular nailing is a potential treatment in segmental fractures or compromised soft tissues |
**Anticipates long-term sequela of surgical interventions and types of fixation**
- Recognizes arthroplasty as potential treatment for select periarticular fractures [e.g., reverse total shoulder arthroplasty or total elbow arthroplasty in proximal and distal humerus fractures, respectively]
- Identifies and counsels patients about perioperative complications and outcomes of periarticular fracture surgery (e.g., stiffness and PTOA)
- Recognizes implant prominence as a source of pain in post-operative period and employs strategies to mitigate this
- Demonstrates comprehensive knowledge of current and classic literature

**Level 5 Leads advanced discussion around treatment nuances and controversies in management and techniques**
- Teaches junior learner complex approaches to the proximal tibia or distal tibia pilon (i.e., posteromedial approach to tibial plateau or pilon)
- Understands and expounds on literature regarding periarticular injuries with relation to treatment strategies and discusses this with patients
- Performs original research on the management of periarticular fractures

**Assessment Models or Tools**
- Case based discussion
- Direct observation

**Curriculum Mapping**

**Notes or Resources**
● https://ota.org/education/evidence-based-medicine-resource-list/wrist
### Medical Knowledge 4: Pelvic and Acetabular Fractures

**Overall Intent:** To apply knowledge of pathoanatomy, pathophysiology, indications, and biomechanics to treatment options

<table>
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<tr>
<th>Milestones</th>
<th>Examples</th>
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| **Level 1** Demonstrates knowledge of surgically relevant normal anatomy and interprets imaging | - Understands and interprets basic imaging studies with recognition of relevant anatomic landmarks  
- Understands normal and abnormal pelvic ring alignment  
- Classifies acetabular fracture patterns based on Letournel-Judet description  
- Classifies pelvic ring injuries based on Tile and Young-Burgess descriptions  
- Understands the implications of bone fragility on pelvic and acetabular fractures  
- Identifies basic fixation options for pelvic ring injuries (e.g., percutaneous SI screws) and how these are placed |
| Discusses absolute surgical indications and types of fixation | |
| **Level 2** Demonstrates knowledge of basic surgical approaches based on fracture pattern needs | - Knows the steps of the Kocher-Langenbeck and anterior approaches (e.g., ilioinguinal, Stoppa plus lateral window)  
- Describes osseous fixation pathways for percutaneous pelvic and acetabular fixation  
- Understands the pertinent risks with each exposure  
- Understands indications for operative and non-operative care  
- Clearly describes how to place external fixation and Infix devices for pelvic ring injuries  
- Demonstrates basic knowledge of the literature regarding pelvic and acetabular fractures |
| Discusses relative surgical indications and types of fixation | |
| **Level 3** Correlates imaging to surgical anatomy and selects surgical approach | - Recognizes need for anterior approach, posterior approach, or combined approach depending on fracture pattern, soft tissue injury, etc.  
- Identifies safe osseous corridors for percutaneous screw fixation  
- Discusses controversy of fixation for pelvic ring injuries with associated bladder injury or open abdomen and how to mitigate risk  
- Understands occult pelvic ring instability and steps to obtain a stress exam under anesthesia when warranted |
| Adapts absolute and relative surgical indications to a patient’s condition and types of fixation | |
| **Level 4** Demonstrates knowledge of advanced surgical approaches based on fracture pattern needs | - Describes greater troch osteotomy, ASIS osteotomy/soft tissue release, etc., as ways to increase exposure when needed  
- Understands implications of extended iliofemoral versus combined approaches  
- Recognizes acute total hip arthroplasty as treatment option in select acetabular fractures (e.g., poor bone quality)  
- Knows risk factors for post-traumatic osteoarthritis in acetabular fractures  
- Discusses HO prophylaxis options and the pros/cons of different types |
<p>| Anticipates long-term sequela of surgical interventions and types of fixation | |</p>
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<th>Level 5</th>
<th>Leads advanced discussion around treatment nuances and controversies in management and techniques</th>
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<tr>
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<td>● Demonstrates comprehensive knowledge of current and classic literature</td>
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<td>● Understands steps to deal with pelvic nonunion/malunion</td>
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<td>● Performs original research on the management of pelvic and acetabular fractures</td>
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<th>Assessment Models or Tools</th>
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<td>● Case-based discussion</td>
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<td>● Direct observation</td>
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<tr>
<th>Notes or Resources</th>
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<tbody>
<tr>
<td>● The AO. Acetabulum. AO Surgery Reference website. <a href="https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/acetabulum">https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/acetabulum</a></td>
</tr>
<tr>
<td>● Orthopaedic Trauma Association Evidence-Based Medicine Articles:</td>
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</table>
### Medical Knowledge 5: Decision Making for Complex Problems (e.g., Fracture-Related Infection, Malunion/Nonunion, Peri-Prosthetic Fractures, Post-Traumatic Osteoarthritis, Soft Tissue Issues, Ongoing Pain)

**Overall Intent:** To analyze and synthesize medical knowledge, to apply critical reasoning to clinical decision making, and to appropriately prioritizing diagnoses and use of diagnostic tests to develop a treatment plan

<table>
<thead>
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<th>Milestones</th>
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| **Level 1** Identifies deviation from normal clinical course               | ● Obtains an accurate history and physical examination  
● Recognizes time frame of expected bony union (e.g., six months with lack of bony healing on tibia x-rays may become a nonunion)  
● Understands local and systemic (e.g., smoking, nutrition) causes of fracture nonunion  
● Describes Centers for Disease Control and Prevention (CDC) or fracture-related infection criteria for diagnosing orthopaedic infections  
● Identifies lack of normal progression in range of motion                   |
| **Level 2** Orders and interprets laboratory and imaging findings          | ● Names inflammatory, metabolic, and endocrine labs as elements of nonunion work-up  
● Identifies white blood cell count (WBC), erythrocyte sedimentation rate, and C-reactive protein as classic markers of infection  
● Orders CT scans to evaluate for abscesses or bone healing  
● Recognizes and evaluates multiplanar limb deformity  
● Demonstrates basic knowledge of the literature regarding post-traumatic sequelae |
| **Level 3** Synthesizes information to arrive at diagnosis and treatment plan | ● For peri-prosthetic fractures, recognizes implant stability and bone stock as playing into the treatment algorithm  
● Understands need for non-traditional fixation for peri-prosthetic fractures (e.g., cables, periprosthetic screws, plate outriggers)  
● When choosing arthroplasty for fracture treatment identifies the broken part is the complex side of the arthroplasty  
● Makes diagnosis of infection with CT showing abscess despite normal inflammatory markers  
● Given good clinical response in pain reduction with intra-articular steroid injection, recognizes arthroplasty or arthrodesis as treatment for post-traumatic osteoarthritis  
● Implements strategies to optimize host status  
● Understands non-operative methods to treat fracture nonunion                   |
| **Level 4** Applies best available evidence to diagnosis and treatment     | ● Recognizes that untreated infection is risk for nonunion repair failure, and therefore obtains cultures at time of surgery  
● Understands the controversy in “classic” markers for infection in terms of their diagnostic performance  
● Knows fracture-related infection definition exists, but that validation work remains  
● Understands bone stimulator                                                   |
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<th>Level 5</th>
<th>Adjusts plan based on treatment outcomes</th>
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<td>● Chooses different treatment plan when implant retention and antibiotic suppression fails to treat infection</td>
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<td>● Articulates different strategies for recalcitrant nonunion (e.g., resection and bone transport, amputation)</td>
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<td>● Performs original research on the management of post-traumatic sequelae</td>
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**Assessment Models or Tools**
- Case-based discussion
- Direct observation

**Curriculum Mapping**

**Notes or Resources**
### Systems-Based Practice 1: Patient Safety and Quality Improvement (QI)

**Overall Intent:** To engage in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals; to conduct a QI project

<table>
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<tr>
<th>Milestones</th>
<th>Examples</th>
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</table>
| **Level 1** Demonstrates knowledge of common patient safety events          | ● Lists patient misidentification or medication errors as common patient safety events  
Demonstrates knowledge of how to report patient safety events                | ● Reports lack of sequential suppression devices on patient during surgery or post-operatively  
● Describes how to report errors in the local clinical environment  
● Knows the systems process for communicating potential patient safety events  
Demonstrates knowledge of basic quality improvement methodologies and metrics | ● Summarizes steps in a QI project  
● Uses checklists and briefings to prevent adverse events in health care |
| **Level 2** Identifies system factors that lead to patient safety events     | ● Identifies roles of supports staff members (e.g., medical assistants, clinic and operating room nurses, certified surgical technologists) and how their work contributes to overall patient care  
Reports patient safety events through institutional reporting systems (simulated or actual) | ● Correctly applies a Plan Do Study Act (PDSA) QI project to help minimize narcotic use in a trauma-injured patient  
Describes local quality improvement initiatives                               | ● Describes root cause analysis process |
| **Level 3** Participates in analysis of patient safety events (simulated or actual) | ● Prepares for morbidity and mortality (M and M) presentations  
Participates in disclosure of patient safety events to patients and their families (simulated or actual) | ● Communicates, under supervision, with patients/families about a medication error or surgical complication  
Participates in local quality improvement initiatives                        | ● Participates in protocol with risk management to disclose medication errors or surgical complications |
| **Level 4** Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | ● Collaborates with a team to conduct the analysis of fall occurrences and can effectively communicate with patients/families about those events |
| Discloses patient safety events to patients and their families (simulated or actual) | ● Maintains team situational awareness and promotes “speaking up” with concerns |
| Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | ● Participates in a QI project to improve operating room efficiency |
| Level 5 Actively engages teams and processes to modify systems to prevent patient safety events | ● Assumes a leadership role at the departmental or institutional level for patient safety |
| Role models or mentors others in the disclosure of patient safety events | ● Conducts a simulation for disclosing patient safety events |
| Creates, implements, and assesses quality improvement initiatives at the institutional or community level | ● Recognizes the need for and completes a QI project to decrease patient safety events in collaboration with the institutional administration and shares results with stakeholders |

### Assessment Models or Tools
- Direct observation
- E-module multiple choice tests
- Hospital safety report audit
- Multisource feedback
- Presentations (M and M, QI)
- Reflection
- Simulation

### Curriculum Mapping

### Notes or Resources
### Systems-Based Practice 2: System Navigation for Patient-Centered Care

**Overall Intent:** To effectively navigate the health care system, including the interdisciplinary team and other care providers, to adapt care to a specific patient population to ensure high-quality patient outcomes

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
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</table>
| **Level 1** Demonstrates knowledge of care coordination | • Identifies the primary care provider for a geriatric patient with a hip fracture home health nurse, physical therapist, and social workers as members of the team  
• Identifies need for bone health in geriatric fractures and possible need for long-term osteoporosis management  
• Identifies general surgery trauma, neurosurgical services, and anesthesiologist as integral components of the care of a poly-traumatized patient  
• Lists follow-up of labs, testing, new medications, and consults as essential components of a sign-out |
| Identifies key elements for safe and effective transitions of care and hand-offs | |
| **Level 2** Coordinates care of patients in routine clinical situations, effectively using the roles of interprofessional team members | • Coordinates with general surgery trauma, neurosurgical services, and anesthesiologist for the care of stable patients with traumatic orthopaedic injuries  
• Uses a systematic institutional process during routine sign-out |
| Performs safe and effective transitions of care/hand-offs in straightforward clinical situations | |
| **Level 3** Coordinates care of patients in complex clinical situations, effectively using the roles of interprofessional team members | • Coordinates complex care with the orthopaedic trauma team’s advanced practice providers and social workers/case managers for a homeless patient to ensure appropriate medical aftercare  
• Coordinates with general surgery trauma, Neurosurgical services, and anesthesiologist for the care of unstable patients with traumatic orthopaedic injuries  
• Coordinates with a patient’s primary care physician or geriatrician to initiate osteoporosis management of fragility fractures  
• Uses institutional protocol when transferring a complex patient to the intensive care unit (ICU) |
| Performs safe and effective transitions of care/hand-offs in complex clinical situations | |
| **Level 4** Role models effective coordination of patient-centered care among multidisciplinary teams | • Leads team members during inpatient rotations in appropriate consultation with care coordination in disposition of homeless patient with mobility impairment  
• Participates in a code in the operating room and/or is the primary coordinator in the operating room for the treatment of an emergency polytrauma case  
• Plans for cross-coverage in case of unanticipated absence of a team member |
| Role models and advocates for safe and effective transitions of care/hand-offs | |
| **Level 5** Analyzes the process of care coordination and leads in the design and implementation of improvements | • Leads a community outreach program to design and implement a geriatric fall risk reduction plan  
• Formulates institutional protocols to minimize the risk of perioperative complications seen often in the multiply injured patient (i.e., standardized venous thromboembolism prophylaxis/treatment algorithm)  
• Develops a protocol (care pathways for various orthopaedic conditions) to improve transitions to different level of care (e.g., operating room to ICU, inpatient to long-term care facilities, rehab facilities to outpatient follow-up) |
| Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |  |

**Assessment Models or Tools**  
• Direct observation  
• Multisource feedback  
• Quality metrics and goals mined from electronic health records (her)  
• Review of sign-out tools, use and review of checklists

**Curriculum Mapping**  
•  

**Notes or Resources**  
## Systems-Based Practice 3: Physician Role in Health Care Systems

**Overall Intent:** To understand the physician’s role in the complex health care system and how to operate effectively within the system to improve patient care

<table>
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<tr>
<th>Milestones</th>
<th>Examples</th>
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| **Level 1** Describes basic health payment systems, including government, private, public, and uninsured care, as well as different practice models | ● Articulates the differences between home care, skilled nursing, and long-term care facilities  
● Takes into consideration patient’s prescription drug coverage when recommending prophylaxis for venous thromboembolism  
● Understands the economic challenges of patient care in the health care system |
| **Level 2** Describes how working within the health care system impacts patient care, including billing and coding | ● Identifies coding requirements for clinical documentation  
● Explains that improving patient satisfaction potentially improves patient compliance  
● Recognizes that appropriate comorbidity documentation can influence the severity of illness determination upon discharge as well as reimbursement |
| **Level 3** Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency) | ● Ensures compliance with care pathways to optimize length of stay  
● Understands the role of patient and family education in decreasing readmission rates  
● Uses evidence-based guidelines for cost-effective care |
| **Level 4** Uses shared decision-making in patient care, considering costs to the patient | ● Ensures proper documentation of qualifying hospital stay prior to discharging a patient to a skilled nursing facility for physical therapy  
● Works collaboratively to improve patient assistance resources for a patient with a recent amputation and limited resources  
● Advocates for patient regarding socioeconomic challenges within the health care system  
● Tailors treatment decisions to patient resources/insurance status (e.g., prescribing a brace versus applying a splint) |
| **Level 5** Participates in advocacy activities for health policy | ● Works with community or professional organizations to advocate for trauma systems  
● Improves informed consent process for non-English-speaking patients requiring interpreter services  
● Performs clinical research that affects health care disparities |

**Assessment Models or Tools**
- Direct observation
- Medical record (chart) audit
- Patient satisfaction data

**Curriculum Mapping**
## Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice

**Overall Intent:** To incorporate evidence and patient values into clinical practice

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
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</table>
| **Level 1**                                                                 | Demonstrates how to access and use available evidence, and incorporate patient preferences and values to the care of a straightforward condition | • Compares evidence-based guidelines and literature review for treatment of a given fracture to patient’s preference for treatment while communicating and understanding options  
• Discusses the risks/benefits of nonoperative versus operative treatment with patients  
• Categorizes the study design of a research study  
● Compares evidence-based guidelines and literature review for treatment of a given fracture to patient’s preference for treatment while communicating and understanding options  
● Discusses the risks/benefits of nonoperative versus operative treatment with patients  
● Categorizes the study design of a research study  
Level 2 Articulates clinical questions and elicits patient preferences and values to guide evidence-based care |                                                                                   |                                                                                                                                                                                                                                                                         |
| **Level 2**                                                                 | Articulates clinical questions and elicits patient preferences and values to guide evidence-based care | • Identifies and discusses potential evidence-based treatment options for a patient with a given fracture and solicits patient perspective on activity level and needs (i.e., hemiarthroplasty versus total hip arthroplasty for a displaced femoral neck fracture)  
Level 3 Locates and applies the best available evidence, integrated with patient preference, to the care of complex conditions |                                                                                   |                                                                                                                                                                                                                                                                         |
| **Level 3**                                                                 | Locates and applies the best available evidence, integrated with patient preference, to the care of complex conditions | • Obtains, discusses, and applies evidence for the treatment of a patient with a given fracture and medical comorbidities  
• Understands and appropriately uses clinical practice guidelines in making patient care decisions while eliciting patient preferences for operative versus non-operative treatment (geriatric distal radius fractures)  
Level 4 Critically appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide care tailored to the individual patient |                                                                                   |                                                                                                                                                                                                                                                                         |
| **Level 4**                                                                 | Critically appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide care tailored to the individual patient | • Critically evaluates and uses patient outcomes and literature to improve patient care  
• Critically evaluates information from others, including colleagues, experts, industry representatives, and patients  
• Accesses and applies literature to identify alternative treatments for a given fracture based on clinical scenario (e.g., internal fixation versus arthroplasty versus amputation)  
• Demonstrates a clinical practice that incorporates principles and basic practices of evidence-based practice and information mastery  
Level 5 Coaches others to critically appraise and apply evidence for complex conditions, and/or participates in the development of guidelines |                                                                                   |                                                                                                                                                                                                                                                                         |
| **Level 5**                                                                 | Coaches others to critically appraise and apply evidence for complex conditions, and/or participates in the development of guidelines | • Leads clinical discussion on application of evidence-based practice for treatment of fractures  
• Develops and executes a peer-reviewed research project to address a gap in the literature  
• Obtains a research grant for the institution  
Assessment Models or Tools |                                                                                   | Conference participation  
Direct observation  
Presentation evaluation  
Research committee  
Curriculum Mapping |                                                                                   |                                                                                                                                                                                                                                                                         |
| Notes or Resources                                                         |                                                                                   | American Academy of Orthopaedic Surgeons. OrthoGuidelines.  
https://www.orthoguidelines.org/topic?id=1017&tab=all_guidelines  
                                                                                   |                                                                                   |                                                                                                                                                                                                                                                                         |
- National organization guidelines (e.g., American Osteopathic Association, American Academy of Orthopaedic Surgeons)
- Various journals (e.g., *Journal of the American Academy of Orthopaedic Surgeons, Journal of Orthopaedic Trauma, Journal of Arthroplasty*)
<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Accepts responsibility for personal and professional development by establishing goals | Sets a study and research plan for the year in fellowship  
Identifies the strengths, deficiencies, and limitations in one’s knowledge and expertise  
Identifies gaps in knowledge and what steps are needed to fill these gaps |
| **Level 2** Demonstrates openness to feedback and other input to inform goals | Integrates and responds to feedback to adjust clinical performance  
Articulates professional development goals  
Assesses time management skills and how it impacts timely completion of clinical and academic responsibilities (e.g., education and research)  
Develops individual education plan to improve study skills and knowledge base, with assistance |
| **Level 3** Responds to feedback and other input episodically, with adaptability and humility | Uses feedback to modify personal professional development goals  
Incorporates time-management strategies and stress-reduction techniques (e.g., exercise) to satisfactorily complete all clinical/academic responsibilities  
Creates a comprehensive personal curriculum to improve education, including monitoring and accountability for a study plan |
| **Level 4** Actively seeks feedback and other input, with adaptability and humility | Asks for feedback from peers, faculty members, and ancillary team members  
Designs, conducts, and completes a peer-reviewed research project  
Debriefs with the attending and other patient care team members after patient encounter to optimize future collaboration in the care of the patient and family  
Demonstrates incremental growth from one feedback session to another using Ask-Discuss-Ask-Plan Together (ADAPT) model |
| **Level 5** Role models consistently seeking feedback and other input with adaptability and humility | Models and teaches practice improvement through focused study and reflective feedback  
Consistently teaches more junior learners while remaining a lifetime learner  
Develops educational module for collaboration with other patient care team members |
| Assessment Models or Tools                                                | Conference participation                                                             |

**Overall Intent**: To seek clinical performance information with the intent to improve care; reflects on all domains of practice, personal interactions, and behaviors, and their impact on colleagues and patients (reflective mindfulness); develop clear objectives and goals for improvement in some form of a learning plan.
<table>
<thead>
<tr>
<th><strong>Curriculum Mapping</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Direct observation</td>
</tr>
<tr>
<td>● Review of learning plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Notes or Resources</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● University of Washington. Prepare to ADAPT: A Conversational Approach to Feedback. <a href="https://sites.uw.edu/uwgme/adapt/#:~:text=The%20%E2%80%9CPrepare%20to%20ADAPT%E2%80%9D%20feedback%20framework%20is%20acreation%20of%20intentional%20follow-up%20plan%20for%20improvement">https://sites.uw.edu/uwgme/adapt/#:~:text=The%20%E2%80%9CPrepare%20to%20ADAPT%E2%80%9D%20feedback%20framework%20is%20acreation%20of%20intentional%20follow-up%20plan%20for%20improvement</a>.</td>
</tr>
</tbody>
</table>
### Professionalism 1: Professional Behavior and Ethical Principles

**Overall Intent:** To recognize and address lapses in ethical and professional behavior, demonstrate ethical and professional behaviors, and use appropriate resources for managing ethical and professional dilemmas

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Identifies and describes inciting events for professionalism lapses | - Identifies fatigue, illness, increased substance/alcohol use and unmanaged stress as contributing factors to professional lapses  
- Understands the importance of patient autonomy as it relates to informed consent including the role of surrogates and advance directives  
- Understands the impact of disclosing errors in patient care and loss of patient confidentiality  
- Consistently demonstrates behavior that conveys caring, honesty, and genuine interest in patients and families  
- Recognizes the diversity of patient populations with respect to gender, age, culture, race, religion, disabilities, sexual orientation, and socioeconomic status |

| **Level 2** Demonstrates insight into professional behavior in straightforward situations | - Understands perceptions created by tone of voice, timing/place of feedback within the health care team during daily patient care activities  
- Notifies appropriate people of personal mistakes; does not make excuses  
- Accepts responsibility when supervising residents, assumes responsibility if oversights or errors are made by learners (e.g., wrong labs, splint) |

| **Level 3** Demonstrates professional behavior in complex situations | - Does not assign blame when discussing adverse outcome or error with family members or the patient  
- Recognizes how own personal beliefs and values impact medical care  
- Uses respectful, unemotional communication in discussions when resolving conflict within health care team  
- Recognizes ethical violations in professional and patient aspects of medical practice |

| **Level 4** Recognizes situations that may promote professionalism lapses and intervenes to prevent lapses in oneself and others | - Acts in patient’s best interest when collaborating with other health care services to determine appropriate admission service  
- Responds to inappropriate racial or gender microaggressions  
- Practices consistent with the American Academy of Orthopaedic Surgeons (AAOS) Standards of Professionalism  
- Elevates issues regarding end-of-life decisions to appropriate channels when family or other conflict is evident (e.g., Ethics Committee, legal counsel, risk management) |

<p>| <strong>Level 2</strong> Applies ethical principles in straightforward situations and takes responsibility for lapses | - |</p>
<table>
<thead>
<tr>
<th>ethics consultations, literature review, risk management/legal consultation</th>
<th>• Notifies site director or appropriate supervisor after noticing a colleague seems to be impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 5 Coaches others when their behavior fails to meet professional expectations</strong></td>
<td>• Chooses appropriate setting and tone in discussions with others regarding suboptimal professional behavior</td>
</tr>
<tr>
<td>Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution</td>
<td>• Recognizes source of repetitive conflict between members of health care team and recommends institutional policy to resolve</td>
</tr>
<tr>
<td>• Devises materials to aid others in learning to provide informed consent</td>
<td></td>
</tr>
</tbody>
</table>

### Assessment Models or Tools

- Direct observation
- Global evaluation
- Multisource feedback
- Oral or written self-reflection
- Simulation

### Curriculum Mapping

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Reliably arrives to clinical activities on time and describes strategies for ensuring timely task completion | ● Completes work hour and case logs promptly  
● Exhibits punctuality in conference attendance  
● Diligent with note writing and chart completion |
| Responds promptly to requests or reminders to complete tasks and responsibilities | ● Completes end-of-rotation evaluations  
● Understands when assistance is needed and is willing to ask for help |
| **Level 2** Performs tasks and responsibilities in a timely manner with appropriate attention to detail in straightforward situations | ● Completes administrative tasks, documents safety modules, procedure review, and licensing requirements by specified due date |
| Completes tasks and responsibilities without reminders | ● Completes tasks before going out of town in anticipation of lack of computer access while traveling  
● Follows up on pending results/requirements without prompting |
| **Level 3** Prioritizes tasks and responsibilities in a timely manner with appropriate attention to detail in complex situations | ● Notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from other fellows/residents or faculty members as needed  
● Recognizes value of humility and respect towards patients and associate staff members |
| Proactively completes tasks and responsibilities to ensure the needs of patients, teams, and systems are met | ● Arranges coverage for assigned clinical tasks in preparation for being out of the office to ensure appropriate continuity of care; discusses patients with covering team members prior to being out of office  
● Assesses application of principles of physician well-being, alertness, delegation, teamwork, and optimization of personal performance to the practice of medicine  
● Demonstrates commitment to provide call coverage |
| **Level 4** Recognizes barriers that may impact others’ ability to complete tasks and responsibilities in a timely manner | ● Takes responsibility for inadvertently omitting key patient information during sign-out  
● Recognizes personal deficiencies in communication with team members about patient care needs  
● Understands skill levels of the team to optimize and delegate level appropriate tasks to streamline care and task completion |
| **Level 5** Develops processes to enhance others’ ability to efficiently complete patient care tasks and responsibilities | ● Leads interdisciplinary team to identify problems and specific solutions to develop a process to streamline patient discharges |
| Assessment Models or Tools | ● Compliance with deadlines and timelines  
● Direct observation |
<table>
<thead>
<tr>
<th>Curriculum Mapping</th>
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<tbody>
<tr>
<td>Notes or Resources</td>
</tr>
</tbody>
</table>

- Global evaluations
- Multisource feedback
- Self-evaluations and reflective tools
- Simulation

**Notes or Resources**

- Code of conduct from fellow/resident institutional manual
- Expectations of fellowship program regarding accountability and professionalism
### Professionalism 3: Well-Being

**Overall Intent:** To identify, use, manage, improve, and seek help for personal and professional well-being for self and others

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1 Recognizes the importance of addressing personal and professional well-being (e.g., physical and emotional health)** | • Acknowledges one’s own response to a patient’s poor outcome  
• Identifies personal physical and emotional boundaries that may impact self or others  
• Receives feedback on missed emotional cues after a family meeting  
• Is aware of the basic principles and aspects of the general maintenance of emotional, physical, mental health, and issues related to fatigue/sleep deprivation |
| **Level 2 Lists available resources for personal and professional well-being**  
Describes institutional resources that are meant to promote well-being | • Independently identifies and communicates impact of a personal conflict  
• Lists GME counseling services, suicide hotline, and well-being committee representatives available at the institution |
| **Level 3 Discusses a plan to promote personal and professional well-being with institutional support**  
Recognizes which institutional factors affect well-being | • Develops a reflective response to deal with personal impact of difficult patient encounters and disclosures with the interdisciplinary team  
• Demonstrates adequate management of personal, emotional, physical, and mental health, and fatigue  
• Identifies faculty mentors  
• Identifies institutional processes and barriers to personal/professional well-being |
| **Level 4 Independently develops a plan to promote personal and professional well-being**  
Describes institutional factors that positively and/or negatively affect well-being | • Identifies ways to manage personal stress and responses to unexpected patient outcomes, independently  
• Assesses application of principles of physician wellness, alertness, delegation, teamwork, and optimization of personal performance to the practice of medicine  
• Identifies initiatives within the fellowship program to improve well-being  
• Generates opportunities / tools that promote the well-being of the team or colleagues |
| **Level 5 Creates institutional-level interventions that promote colleagues’ well-being**  
Describes institutional programs designed to examine systemic contributors to burnout | • Assists in organizational efforts to address clinician well-being after patient diagnosis/prognosis/death  
• Recognizes signs of physician impairment and demonstrates appropriate steps to address impairment in colleagues  
• Implements a lasting initiative to improve fellow well-being within the program |

**Assessment Models or Tools**  
• Direct observation  
• Group interview or discussions for team activities
<table>
<thead>
<tr>
<th>Curriculum Mapping</th>
<th>Notes or Resources</th>
</tr>
</thead>
</table>
| • Individual interview  
• Institutional online training modules  
• Self-assessment and personal learning plan  
| • This subcompetency is not intended to evaluate a fellow’s well-being, but to ensure each fellow has the fundamental knowledge of factors that impact well-being, the mechanisms by which those factors impact well-being, and available resources and tools to improve well-being.  
• Local resources, including Employee Assistance |
## Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication

**Overall Intent:** To deliberately use language and behaviors to form constructive relationships with patients and family; identify communication barriers including recognizing biases, diversity, and health care disparities while respecting patient autonomy in communications; organize and lead communication around shared decision making

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Demonstrates respect and establishes rapport with patients and their families (e.g., situational awareness of language, disability, health literacy level, cultural differences)</td>
<td>- Introduces self and faculty member, identifies patient and others in the room, and engages all parties in health care discussion with sensitivities to patient and family dynamics.</td>
</tr>
</tbody>
</table>
| Communicates with patients and their families in an understandable and respectful manner | - Identifies need for trained interpreter with non-English-speaking patients.  
- Uses age-appropriate and health literacy-appropriate language. |
| Demonstrates basic understanding of the informed consent process | - Successfully communicates basic risks, benefits, and alternatives to surgery. |
| **Level 2** Establishes a therapeutic relationship in straightforward encounters | - Avoids medical jargon and restates patient perspective when discussing a diagnosis and treatment options of a simple fracture. |
| Identifies barriers to effective communication (e.g., health literacy, cultural differences) | - Uses patient-centered communication when answering questions during the informed consent process.  
- Recognizes the need for handouts with diagrams and pictures to communicate information to a patient who is unable to read. |
| Answers questions about straightforward treatment plans, with assistance | - Discusses risks, benefits, and alternatives to fixation of simple fracture and consults more senior learners or an attending if questions arise.  
- Uses receptive body language, eye contact, and posture. |
| **Level 3** Establishes a therapeutic relationship in challenging encounters (e.g., shared decision-making) | - Acknowledges a patient’s request for an inappropriate diagnostic study and respectfully redirects and initiates a treatment plan using only appropriate studies. |
| When prompted, reflects on personal biases while attempting to minimize communication barriers | - Modifies a treatment plan to achieve patient’s goal after a middle-aged patient states a desire to run a marathon despite previous complex periarticular fractures, even though the physician has biases about high-impact activity in early arthritis. |
| Counsels patients through the decision-making process for straightforward conditions | - Discusses indications, risks, benefits, and alternatives during informed consent for a hip fracture including a discussion of patient functional outcomes. |
| **Level 4** Facilitates difficult discussions with patients and their families, (e.g., explaining complications, therapeutic uncertainty) | ● Counsels representative family members in the care of a patient with dementia and a hip fracture when some family members desire surgery and others do not |
| Recognizes biases and integrates a patient’s viewpoint and autonomy to ensure effective communication | ● Discusses a middle-aged patient’s goal to run a marathon after ORIF complex periarticular fracture; includes identification of risks, benefits, and long-term effects of high impact running, and a treatment plan to achieve the patient’s goal |
| Counsels patients through the decision-making process for complex conditions | ● Discusses indications, risks, benefits, and alternatives during informed consent for hip fracture with multiple medical conditions, dementia, and high risk of death associated with surgical or non-surgical treatment, including ambiguous outcomes |
| ● Obtains consent in emergent situations, polytrauma patients and documents appropriately |

| **Level 5** Coaches others in the facilitation of difficult conversations | ● Leads an objective structured clinical exam (OSCE) for obtaining informed consent in hip fracture patients with dementia |
| Mentors others in situational awareness and critical self-reflection | ● Encourages others to take the Implicit Bias Test (link in Resources) and leads a discussion about impact of implicit bias in residency |
| Counsels patients through the decision-making process for uncommon conditions | ● Observes interactions between more junior residents and patients and offers constructive feedback |
| ● Serves on a hospital bioethics committee |
| ● Develops supplemental materials to better inform patients prior to nonunion repair |

**Assessment Models or Tools**  
- Direct observation  
- OSCE  
- Simulation  
- Standardized patients  
- Self-assessment including self-reflection exercises

**Curriculum Mapping**  
- 

**Notes or Resources**  
## Interpersonal and Communication Skills 2: Interprofessional and Team Communication

**Overall Intent:** To effectively communicate with the health care team, including other care providers, staff members, and ancillary personnel, in both straightforward and complex situations.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Recognizes the value and role of each team member and respectfully interacts with all members of the health care team | ● Answers questions respectfully and patiently for radiology tech regarding x-ray orders understanding that the tech plays an important role in care of the orthopaedic patient  
● Respectfully responds and evaluates nursing call related to post-operative pain |
| **Level 2** Communicates in a professional and productive manner to facilitate teamwork (e.g., active listening, updates in timely fashion) | ● Communicates with the radiology tech the need for specialized x-ray views in an unstable fracture and assists with limb positioning if requested by the tech  
● Communicates with the emergency department physician a diagnosis of evolving compartment syndrome and need for timely optimization and mobilization of the patient to the operating room |
| **Level 3** Actively recognizes and mitigates communication barriers and biases with the health care team | ● Communicates respectfully with trauma team the prioritization of stabilization in a polytrauma patient with an unstable pelvis fracture, femur fracture, and multiple visceral injuries  
● Recognizes the need for respectful communication between services when a conflict arises regarding which service will admit the patient  
● Understands the operating room team leadership role and obligations |
| **Level 4** Facilitates respectful communications and conflict resolution with the multidisciplinary health care team | ● Initiates a multidisciplinary conversation to alleviate conflict around a shared care plan for a patient with unstable pelvis fracture, femur fracture, and multiple visceral injuries  
● Attends medical rounds to review consult findings about the possible septic knee and provides education of the medical team about evaluation of a septic joint |
| **Level 5** Exemplar of effective and respectful communication strategies | ● Mediates a conflict resolution between different members of the health care team  
● Develops communication tools for inter-specialty communication |

**Assessment Models or Tools**
- Direct observation
- Global assessment
- Multi-source feedback
- Simulation

**Curriculum Mapping**


## Interpersonal and Communication Skills 3: Communication within Health Care Systems

**Overall Intent:** To effectively communicate across the health care system using the medical record

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
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</table>
| **Level 1** *Accurately records information in the patient record while safeguarding patients’ personal health information* | - Documents relevant information accurately  
- Shreds patient list after rounds; avoids talking about patients in the elevator  
- Maintains Health Insurance Portability and Accessibility Act (HIPAA) compliance with all communications |
| **Level 2** *Demonstrates accurate, timely, and efficient use of the electronic health record to communicate with the health care team* | - Documents clinical reasoning in an organized manner that supports the treatment plan  
- Develops documentation templates to avoid copy-and-paste errors  
- Calls attending if care plan is urgent  
- Uses institution authorized methods when texting |
| *Uses appropriate communication methods (e.g., face-to-face, voice, electronic)* |  
| **Level 3** *Concisely reports diagnostic and therapeutic reasoning while incorporating relevant outside data* | - Documents a clear rationale for surgical treatment of peri-prosthetic hip fracture including risks, benefits, and alternatives  
- Obtains outside records including prior implant records  
- Updates and documents care plans in the chart which accurately reflects treatment plans  
- Identifies and reports safety near-misses using the hospital reporting system |
| *Respectfully initiates communications about concerns in the system* |  
| **Level 4** *Independently communicates via written or verbal methods based on urgency and context* | - Calls attending with assessment and recommends a plan for surgical treatment of a periprosthetic hip fracture including implant choices  
- Triages and communicates time urgency of treatment of a polytrauma patient  
- Works with information technology/sends a help desk ticket to improve an order set or dot phrase |
| *Uses appropriate channels to offer clear and constructive suggestions to improve the system* |  
| **Level 5** *Facilitates improved written and verbal communication of others* | - Holds one-on-one teaching sessions with residents and medical students to improve documentation  
- Gives grand rounds or resident lectures that includes care models/pathway utilization  
- Actively participates in departmental and institutional committees focused on care policies and pathways. |
| *Guides departmental or institutional communication around policies and procedures* |  
| **Assessment Models or Tools** | - Direct observation  
- Medical record (chart) review  
- Multisource feedback  
- Rotation evaluation |
<p>| <strong>Curriculum Mapping</strong> |  |</p>
<table>
<thead>
<tr>
<th>Notes or Resources</th>
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</table>
To help programs transition to the new version of the Milestones, the ACGME has mapped the original Milestones 1.0 to the new Milestones 2.0. Indicated below are where the subcompetencies are similar between versions. These are not exact matches but are areas that include similar elements. Not all subcompetencies map between versions. Inclusion or exclusion of any subcompetency does not change the educational value or impact on curriculum or assessment.

<table>
<thead>
<tr>
<th>Milestones 1.0</th>
<th>Milestones 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC1: Care of multiply injured patient</td>
<td>PC1: Polytrauma</td>
</tr>
<tr>
<td>PC2: Complex Diaphyseal Fracture</td>
<td>PC2: Complex Diaphyseal Fracture</td>
</tr>
<tr>
<td>PC3: Complex Periarticular Fractures</td>
<td>PC3: Periarticular Fractures</td>
</tr>
<tr>
<td>PC4: Nonunion/Malunion</td>
<td>No match</td>
</tr>
<tr>
<td>PC5: Pelvic and Acetabular Fractures</td>
<td>PC4: Pelvic and Acetabular Fractures</td>
</tr>
<tr>
<td>MK1: Care of multiply injured patient</td>
<td>MK1: Polytrauma</td>
</tr>
<tr>
<td>MK2: Complex Diaphyseal Fracture</td>
<td>MK2: Complex Diaphyseal Fracture</td>
</tr>
<tr>
<td>MK3: Complex Periarticular Fractures</td>
<td>MK3: Periarticular Fractures</td>
</tr>
<tr>
<td>MK4: Nonunion/Malunion</td>
<td>MK5: Decision Making for Complex Problems</td>
</tr>
<tr>
<td>MK5: Pelvic and Acetabular Fractures</td>
<td>MK4: Pelvic and Acetabular Fractures</td>
</tr>
<tr>
<td>SBP1: Systems thinking, including cost-effective practice</td>
<td>SBP3: Physician Role in the Health Care Systems</td>
</tr>
<tr>
<td>SBP2: Fellow will work in interprofessional teams to enhance patient safety, quality care, and safe health care delivery</td>
<td>SBP1: Patient Safety and Quality Improvement</td>
</tr>
<tr>
<td>SBP2: Patient will work in interprofessional teams to enhance patient safety, quality care, and safe health care delivery</td>
<td>SBP2: System Navigation for Patient-Centered Care</td>
</tr>
<tr>
<td>PBLI1: Self-directed Learning</td>
<td>PBLI2: Reflective Practice and Commitment to Personal Growth</td>
</tr>
<tr>
<td>PBLI2: Cate, appraise, and assimilate evidence from scientific studies to improve patient care</td>
<td>PBLI1: Evidence-Based and Informed Practice</td>
</tr>
<tr>
<td>PROF1: Compassion, integrity, and respect for others, as well as sensitivity and responsiveness to diverse patient populations, including diversity in gender, age, culture, race, religion, disabilities, and sexual orientation. Knowledge about respect for and adherence to the ethical principles relevant to the practice of medicine, remembering in particular that responsiveness to patients that supersedes self-interest is an essential aspect of medical practice</td>
<td>PROF1: Professional Behavior and Ethical Principles</td>
</tr>
</tbody>
</table>
| PROF2: Accountability to patients, society, and the profession; personal responsibility to maintain emotional, physical, and mental health | PROF2: Accountability/Conscientiousness
PROF3: Self-Awareness and Help-Seeking |
<table>
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<tr>
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<tbody>
<tr>
<td>ICS1: Communication</td>
<td>ICS1: Patient- and Family-Centered Communication</td>
</tr>
<tr>
<td>ICS2: Teamwork</td>
<td>ICS2: Interprofessional and Team Communication</td>
</tr>
<tr>
<td>No match</td>
<td>ICS3: Communication within Health Care Systems</td>
</tr>
</tbody>
</table>
Available Milestones Resources

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

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

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

*Milestones Guidebook*, updated 2020 -

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

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

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

*Implementation Guidebook*, new 2020 -

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

*Milestones National Report*, updated each Fall -

*Milestones Bibliography*, updated twice each year -

*Developing Faculty Competencies in Assessment* courses -
https://www.acgme.org/Meetings-and-Educational-Activities/Other-Educational-Activities/Courses-and-Workshops/Developing-Faculty-Competencies-in-Assessment
Assessment Tool: Direct Observation of Clinical Care (DOCC) - https://dl.acgme.org/pages/assessment

Assessment Tool: Teamwork Effectiveness Assessment Module (TEAM) - https://dl.acgme.org/pages/assessment

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