Supplemental Guide: Hand Surgery

March 2022
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This document provides additional guidance and examples for the Hand Surgery Milestones. This is not designed to indicate any specific requirements for each level, but to provide insight into the thinking of the Milestone Work Group.

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information.

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

Additional tools and references, including the Milestones Guidebook, Clinical Competency Committee Guidebook, and Milestones Guidebook for Residents and Fellows, are available on the Resources page of the Milestones section of the ACGME website.
### Patient Care 1: Traumatic Bone and Joint Injury

**Overall Intent:** To perform core procedures for fractures and dislocations including development of an operative plan and managing complications

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Develops a treatment plan for simple fractures and dislocations, with assistance | • Appropriately orders basic imaging studies for wrist and hand fractures  
• Describes basic understanding of relevant reduction method and appropriate fixation technique (percutaneous/open, external fixation, screw, plate, nail)  
• Demonstrates proper technique in closed reduction and splint application, with assistance  
• Demonstrates proper patient positioning and accurately marks incision  
• Displays atraumatic soft tissue handling with superficial dissection and closure  
• Demonstrates proper technique in drilling and screw placement  
• Explains radiation exposure mitigation factors  
• Exhibits proper technique in sterile dressing and relevant splint application  
• Demonstrates competence in neurological assessment  
• Explains examples of typical post-operative neurological and vascular deficits, including compartment syndrome and method for reporting  
• Identifies pin tract infection/wound dehiscence and reports appropriately  
• Identifies potential narcotic misuse/dependence and describes appropriate method for reporting |
| Performs simple fracture and dislocation procedures, with assistance        | • Appropriately interprets basic imaging studies  
• Explains rationale for method of fracture fixation, incorporating concepts of absolute and relative stability  
• Describes appropriate surgical approach (volar/dorsal/mid-axial)  
• Describes equipment needs for procedure and institutional protocol to ensure availability  
• Describes short-term rehabilitation plan  
• Performs closed reduction of core fractures (phalangeal, metacarpal, distal radius)  
• Performs provisional operative reduction of core fractures with assistance  
• Exhibits competence in percutaneous pin placement with direction  
• Demonstrates appropriate analysis of fluoroscopic imaging  
• Demonstrates ability to progress through deeper layers of exposure with minimal trauma to extensor mechanism  
• Identifies proper starting point for cannulated screw fixation for a scaphoid fracture  
• Demonstrates proper plate selection and application for extra-articular fractures |
| Identifies patients with abnormal post-operative course                     |                                                                                                                                              |
| **Level 2** Develops a treatment plan for simple fractures and dislocations |                                                                                                                                              |
| Performs simple fracture and dislocation procedures                        |                                                                                                                                              |
**Manages simple complications**

- Identifies and independently initiates treatment of neurovascular deficits with attention to splint, limb position, compartment pressure measurements
- Appropriately identifies wound dehiscence and presents treatment plan including decision making regarding local wound care, antibiotics, and potential need for surgical debridement and repeat closure
- Initiates management plan for narcotic misuse/dependence

**Level 3 Develops a treatment plan for moderately complex fractures and dislocations**

- Appropriately interprets advanced imaging studies (computerized tomography (CT), magnetic resonance imaging (MRI))
- Develops a comprehensive surgical plan for a simple articular fracture to include surgical approach, imaging (type and orientation), detailed method of reduction and fixation, instrumentation, and contingency plans
- Includes a comprehensive plan for post-operative care including digital motion, hand use, and indications for formal hand therapy
- Confirms availability of necessary equipment

**Performs moderately complex fracture and dislocation procedures**

- Demonstrates proper closed or percutaneous reduction of simple intra-articular fracture
- Performs lag screw fixation and neutralization plate application independently
- Demonstrates proper pin placement, drilling, and screw insertion for non-displaced scaphoid waist fracture
- Explains proper soft tissue management and debridement of open fractures
- Independently applies uniplanar external fixator
- Describes proper fabrication of dynamic phalangeal external fixator
- Performs hand and forearm fasciotomy with assistance

**Identifies and formulates a plan for complications requiring surgical management**

- Identifies associated patient and soft tissue factors that may delay or modify surgical approach
- Accurately identifies associated soft tissue injuries (nerve, tendon) and proposes management
- Identifies intra-operative complications (loss of reduction, screw penetration) and describes basic treatment plan
- Initiates treatment plan for early post-operative infection without assistance

**Level 4 Develops treatment plan for complex fractures and dislocations**

- Incorporates the concept of prioritization in the mangled hand, including staged reconstruction
- Develops comprehensive contingency plans for intra-operative complications, including potential neurovascular injury and fixation failure
- Describes algorithm for management of irreducible dislocations
- Describes sources of autogenous bone graft in cases of bone loss
<table>
<thead>
<tr>
<th>Performs complex fracture and dislocation procedures</th>
<th>Performs surgical management for routine complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Performs surgical management for routine complications</td>
</tr>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Develops a surgical plan for osteotomy in management of malunion</td>
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<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Develops a surgical plan for osteotomy in management of malunion</td>
</tr>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Develops a surgical plan for surgical management of scaphoid nonunion</td>
</tr>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Develops a surgical plan for surgical management of early loss of fixation</td>
</tr>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Describes the indications for and technique of hemi-hamate arthroplasty</td>
</tr>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Describes the indications for and technique of hemi-hamate arthroplasty</td>
</tr>
<tr>
<td>• Performs complex fracture and dislocation procedures</td>
<td>• Independently performs surgical approach, reduction, and fixation of fractures associated with bone loss</td>
</tr>
</tbody>
</table>

**Level 5** Develops a treatment plan for complex revision, malunion, nonunion, and dislocation procedures

- Develops a surgical plan for osteotomy in management of malunion
- Develops a surgical plan for osteotomy in management of malunion
- Develops a surgical plan for surgical management of scaphoid nonunion
- Develops a surgical plan for surgical management of early loss of fixation
- Describes the indications for and technique of hemi-hamate arthroplasty
- Describes the indications for the Masquelet technique

**Performs complex revision, malunion, nonunion, and dislocation procedures**

- Independently performs surgical approach, reduction, and fixation of fractures associated with bone loss
<table>
<thead>
<tr>
<th>Performs surgical management for complex complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Independently performs advanced reduction techniques (dynamic external fixation, bridge plating, distraction devices)</td>
</tr>
<tr>
<td>• Performs appropriate osteotomy for distal radius and phalangeal malunion</td>
</tr>
<tr>
<td>• Performs hemi-hamate arthroplasty for unreconstructable proximal interphalangeal (PIP) fracture-dislocations</td>
</tr>
<tr>
<td>• Capable of managing combined injuries (e.g., associated tendon, ligament, bone loss)</td>
</tr>
<tr>
<td>• Performs arthroscopic assisted reduction of wrist fractures/ intra articular fracture</td>
</tr>
<tr>
<td>• Implements a plan for revision internal fixation following fixation failure</td>
</tr>
<tr>
<td>• Performs arthrodesis for unsalvageable fractures/dislocations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Models or Tools</th>
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<tbody>
<tr>
<td>• Direct observation</td>
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<td>• Multisource feedback</td>
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<tr>
<td>• O Score (link in resources)</td>
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<tr>
<td>• Zwisch scale (link in resources)</td>
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<table>
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<tr>
<th>Curriculum Mapping</th>
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<table>
<thead>
<tr>
<th>Notes or Resources</th>
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<tbody>
<tr>
<td>• Operating room standards list/ safe fluoroscopy list</td>
</tr>
</tbody>
</table>
### Patient Care 2: Soft Tissue Trauma

**Overall Intent:** To perform core and advanced procedures for management of soft tissue trauma, including developing an operative plan and managing complications.

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** <br>Develops a treatment plan for simple soft tissue procedures, with assistance | • Identifies extent and depth of laceration, burn, or other injury  
• Identifies the type of tendon injury and level  
• Performs simple soft tissue procedures, with assistance  
• Identifies extent and depth of laceration, burn, or other injury  
• Identifies the type of tendon injury and level  
• Identifies patients with abnormal recovery  
• Identifies extent and depth of laceration, burn, or other injury  
• Identifies the type of tendon injury and level  
• Performs extensor tendon repair, with assistance  
• Performs extensor tendon repair, with assistance  |
| **Level 2** <br>Develops a treatment plan for simple soft tissue procedures | • Same as Level 1, but more independence in performing simple procedures and managing complications  
• Performs simple soft tissue procedures  
• Performs extensor tendon repair without assistance  
• Performs flexor tendon repair outside of zone 2  
• Performs irrigation and debridement of flexor tenosynovitis or fight bite  
• Manages simple complications  
• Manages wound dehiscence  
• Manages tendon adhesions non-operatively  |
| **Level 3** <br>Develops a treatment plan for moderately complex soft tissue procedures | • Identifies more complex injuries including multiple injured structures, polytrauma, delayed presentation, or situations requiring staged reconstruction such as a mangled hand  
• Performs moderately complex soft tissue procedures  
• Performs skin grafts including split and/or full thickness  
• Performs flexor tendon repair in zone 2  
• Performs local hand flaps  
• Identifies and formulates a plan for complications requiring surgical management  
• Manages deep soft tissue infections such as thenar space, horseshoe abscess  
• Formulates a plan for complications such as graft loss or tendon rupture  |
| **Level 4** <br>Develops treatment plan for complex soft tissue procedures | • Identifies more complex injuries including multiple injured structures, polytrauma, delayed presentation, or situations requiring staged reconstruction such as a mangled hand  
• Identifies and formulates a plan for complications requiring surgical management  
• Performs complex soft tissue procedures  
• Performs skin grafts including split and/or full thickness  
• Performs flexor tendon repair in zone 2  
• Performs local hand flaps  
• Identifies and formulates a plan for complications requiring surgical management  
• Manages deep soft tissue infections such as thenar space, horseshoe abscess  
• Formulates a plan for complications such as graft loss or tendon rupture  |

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| Performs complex soft tissue procedures | Performs two-stage flexor tendon reconstruction  
Perform regional flap coverage  
Performs vascular repair  
Manages necrotizing fasciitis  
Manages complications such as flap necrosis |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs surgical management for routine complications</td>
<td>Develops a treatment plan for toe transfer, hand transplant, complex reconstruction after burn, replantation, microsurgery, and/or hypothenar hammer syndrome</td>
</tr>
</tbody>
</table>
| Level 5 Develops a treatment plan for complex trauma, microsurgery, tendon reconstruction, and revision soft tissue procedures | Performs microsurgical or free flap reconstruction  
Performs vascular reconstruction with intercalary graft  
Performs tendon transfer  
Manages complications such as ischemia, venous congestion, flap, or digit necrosis |
| Performs complex microsurgical reconstruction and tendon transfers | Direct observation  
Multisource feedback  
Hand Society’s Surgical Training and Educational Platform (STEP) |
| Performs surgical management for complex complications | Assessment Models or Tools |
| Curriculum Mapping | |
[https://www.assh.org/hande/s/](https://www.assh.org/hande/s/).  
[www.microsurgeon.org](http://www.microsurgeon.org).  
## Patient Care 3: Arthritis

**Overall Intent:** To perform core and advanced procedures for arthritis, including developing an operative plan and managing complications

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1 Develops a treatment plan for simple arthritis conditions, with assistance** | - Appropriately orders basic imaging studies for wrist and hand arthritis  
- Develops a nonoperative treatment plan including splinting, therapy, injections, medications, with assistance  
- Describes the indications for arthroplasty and arthrodesis |

**Performs simple arthritis procedures, with assistance** | - Performs intra-articular injection, with assistance  
- Applies appropriate splint, with assistance  
- Writes appropriate hand therapy prescription |

**Identifies patients with abnormal post-operative course** | - Identifies complications following intra-articular injection  
- Identifies wound dehiscence during wound check and reports appropriately |

| **Level 2 Develops a treatment plan for simple arthritis conditions** | - Appropriately interprets basic imaging studies  
- Orders appropriate advanced imaging studies  
- Describes various internal fixation techniques for arthrodesis |

**Performs simple arthritis procedures** | - Performs uncomplicated arthritis procedures, including:  
  - Distal interphalangeal (DIP) arthrodesis  
  - Thumb (MP) arthrodesis  
  - PIP arthrodesis |

**Manages simple complications** | - Identifies wound dehiscence at post-operative appointment and presents a treatment course including local wound care, a decision about antibiotics and assesses the need for surgical debridement  
- Describes work-up for suspected infection |

| **Level 3 Develops a treatment plan for moderately complex arthritis conditions** | - Appropriately interprets advanced imaging studies  
- Appropriately selects arthrodesis or arthroplasty as the procedure of choice and describes surgical approach |

**Performs moderately complex arthritis procedures** | - Performs moderately complicated arthritis procedures including:  
  - Distal ulna resection  
  - Partial wrist fusion and partial carpal fusion  
  - Small joint and wrist arthroscopic debridement  
  - Total wrist fusion |
<table>
<thead>
<tr>
<th>Level 4</th>
<th>Develops treatment plan for complex arthritis conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs complex arthritis procedures</td>
<td>Describes implant arthroplasty options and relative indications for each</td>
</tr>
<tr>
<td>Performs surgical management for routine complications</td>
<td>Performs complex arthritis procedures, including:</td>
</tr>
<tr>
<td></td>
<td>○ MP and joint (PIP) joint arthroplasty</td>
</tr>
<tr>
<td></td>
<td>○ Total wrist arthroplasty (DRUJ or radiocarpal)</td>
</tr>
<tr>
<td></td>
<td>○ Ulnar head replacement</td>
</tr>
<tr>
<td></td>
<td>Performs debridement and implant retention for early post-operative infection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 5</th>
<th>Develops a treatment plan for complex revision, arthritis procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs complex revision arthritis procedures</td>
<td>Describes the surgical options in the management of arthritis associated with severe bone loss or infection</td>
</tr>
<tr>
<td>Performs surgical management for complex complications</td>
<td>Performs complex revision arthritis procedures, without assistance, including:</td>
</tr>
<tr>
<td></td>
<td>○ Revision of implant arthroplasty</td>
</tr>
<tr>
<td></td>
<td>○ Revision of pseudarthrosis after fusion attempt</td>
</tr>
<tr>
<td></td>
<td>○ Revision for failed basal joint arthroplasty</td>
</tr>
<tr>
<td></td>
<td>Performs staged revision for infected implant arthroplasty</td>
</tr>
</tbody>
</table>

**Assessment Models or Tools**
- Direct observation
- Multisource feedback

**Curriculum Mapping**

**Notes or Resources**
# Patient Care 4: Nerve

**Overall Intent:** To perform core and advanced procedures to a variety of nerve pathologies, including compression, injury, or tumor

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Develops a treatment plan for simple nerve conditions, with assistance | ● Diagnoses, plans, and performs treatment with assistance for common compressive neuropathies or nerve injuries, such as carpal tunnel syndrome, cubital tunnel syndrome, or digital nerve lacerations  
● Appropriately prescribes non-surgical and surgical treatments, such as splints, anti-inflammatory medications, injections, or surgery  
Performs simple nerve procedures, with assistance  
Identifies patients with abnormal post-operative course |
| Performs simple nerve procedures, with assistance | ● Performs carpal tunnel release, ulnar nerve decompression, digital nerve repair, with assistance  
● Identifies wound healing issues or neuroma formation |
| **Level 2** Develops a treatment plan for simple nerve conditions | ● Same as Level 1, more independence including management of complications  
Performs simple nerve procedures  
Manages simple complications |
| Performs simple nerve procedures | ● Performs carpal tunnel release, ulnar nerve decompression, digital nerve repair  
● Manages wound dehiscence |
| **Level 3** Develops a treatment plan for moderately complex nerve conditions | ● Diagnoses less common compressive neuropathies, such as radial tunnel or pronator syndrome, as well as more proximal/mixed nerve injuries and nerve tumors  
● Uses appropriate diagnostic tools such as electromyography, ultrasound, MRI, and biopsy  
● Develops a treatment plan for major peripheral nerve lacerations and neuromas in the upper extremity  
● Appropriately prescribes hand therapy for nerve injuries  
Performs moderately complex nerve procedures |
| Performs moderately complex nerve procedures | ● Performs major peripheral nerve repairs, nerve grafting, and regenerative peripheral nerve interface procedures  
● Performs carpal tunnel revision surgery  
● Performs decompression for less common neuropathies, such as radial tunnel or pronator syndrome  
Identifies and formulates a plan for complications requiring surgical management |
| Identifies and formulates a plan for complications requiring surgical management | ● Identifies and manages issues such as neuroma or neuropraxia |
| **Level 4** Develops treatment plan for complex nerve conditions | ● Grades complex nerve injuries such as crush or avulsion, including injury to the brachial plexus, and plans treatment at the appropriate time (acute versus delayed) |
| **Performs complex nerve procedures** | ● Develops a treatment plan for brachial plexus, chronic nerve palsies  
● Plans and performs primary reconstruction or distal nerve transfers, understands the role of tendon transfers in complex nerve injuries  
● Performs neuroma treatment with targeted muscle regeneration  
● Performs revision ulnar nerve  
● Prescribes hand therapy, occupational therapy, and orthotics for complex nerve injuries |
| **Performs surgical management for routine complications** |  |
| **Level 5** Develops a treatment plan for complex revision nerve procedures | ● Manages failed nerve reconstructions with revision with or without graft, or distal nerve transfers |
| **Performs complex revision nerve procedures** | ● Plans and performs nerve transfers for prosthetic control in upper extremity amputations (targeted muscle reinnervation)  
● Performs complex revision decompression |
| **Performs surgical management for complex complications** | ● Manages chronic nerve pain with therapy, pharmacologic and non-pharmacologic treatment, and surgery |

**Assessment Models or Tools**  
● Direct observation  
● Multisource feedback

**Curriculum Mapping**  
●

**Notes or Resources**  
### Patient Care 5: Elective (Acquired and Congenital)

**Overall Intent:** To effectively evaluate and manage patients with common acquired and/or congenital conditions

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Develops a treatment plan for simple elective conditions, with assistance | ● Has a basic understanding of conservative and surgical management of conditions such as trigger finger, ganglion cyst, and first dorsal compartment tenosynovitis, etc.  
● Performs simple elective procedures, with assistance  
● Identifies patients with abnormal post-operative course |
| **Level 2** Develops a treatment plan for simple elective conditions | ● Appropriately indicates and counsels patients on conservative and surgical management for conditions such as trigger finger, ganglion cyst excision, first dorsal compartment tenosynovitis  
● Performs simple elective procedures  
● Manages simple complications |
| **Level 3** Develops a treatment plan for moderately complex elective conditions | ● Appropriately indicates and counsels patients on conservative and surgical management for mucous cyst excision with soft tissue advancement, giant cell tumor tendon sheath excision, enchondroma care, management of deep space infections, and flexor tenosynovitis  
● Performs moderately complex elective procedures  
● Identifies and formulates a plan for complications requiring surgical management |
| **Level 4** Develops treatment plan for complex elective conditions | ● Performs surgery such as mucous cyst excision with soft tissue advancement, giant cell tumor tendon sheath excision, enchondroma care, management of deep space infections and flexor tenosynovitis, and percutaneous needle aponeurotomy/collagenase injections, with minimal to no assistance  
● Correctly identifies complications such as wound and deep space infections that will not resolve with conservative management |
|                                                                            | ● Develops treatment plan for conditions such as stiff finger or the spastic upper extremity |
| Performs complex elective procedures | Performs surgery such as fasciectomy for Dupuytren’s disease and tenolysis, contracture releases, and arthrodesis, as well as tendon transfers for the stiff finger and spastic upper extremity |
| Performs surgical management for routine complications | Safely manages wound issues and deep space infections surgically when necessary |
| Level 5 Develops a treatment plan for complex revision elective procedures | Appropriately indicates and counsels patients/parents for conservative and surgical management of complex/complicated congenital anomalies, recurrent Dupuytren’s disease |
| Performs complex revision elective procedures | Performs surgery such as revision fasciectomy for Dupuytren’s disease, pollicization, and other complex/complicated congenital cases |
| Performs surgical management for complex complications | Safely manages any complications that may arise from elective surgery |

**Assessment Models or Tools**
- Direct observation
- Multisource feedback

**Curriculum Mapping**

**Notes or Resources**
### Medical Knowledge 1: Clinical Decision Making

**Overall Intent:** To analyze and synthesize medical knowledge to apply critical reasoning to clinical decision making, appropriately prioritizing diagnoses and using diagnostic tests

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Articulates a methodology for clinical reasoning</td>
<td>● Presents a patient complaining of hand/wrist pain, including relevant musculoskeletal symptoms and activity history after interviewing the patient</td>
</tr>
</tbody>
</table>
| Identifies resources to direct clinical decisions                          | ● Investigates medical record for ancillary treatments including physical and/or occupational therapies, bracing, injections  
● Orders appropriate basic imaging studies for the involved hand/wrist                                                                     |
| **Level 2** Demonstrates clinical reasoning to determine treatment goals   | ● Prioritizes common-to-rare differential diagnoses for hand/wrist pain relevant to patient history and exam  
● Interprets plain radiographs to determine presence of acute and/or chronic conditions                                                   |
| Selects and prioritizes relevant resources based on scenario to inform decisions | ● Relates the potential findings seen on plain radiographs (e.g., fracture, arthritis, malalignment)  
● Applies the appropriate use criteria to an individual patient                                                                         |
| **Level 3** Synthesizes information to make clinical decisions for straightforward conditions | ● Prioritizes a broad differential diagnosis for the presentation of hand/wrist pain but quickly focus differential based on history and exam  
● Orders appropriate adjunct plain radiographs or ancillary studies such as ultrasound, electrodiagnostic studies, CT, or MRI |
| Integrates evidence-based information to inform diagnostic decision-making for straightforward conditions | ● Describes the appropriate clinical practice guidelines to guide non-operative and surgical decision making for distal radius fracture  
● Uses the clinical examination and appropriate additional studies to make a preliminary diagnosis of distal radius fracture and a preliminary treatment plan |
| **Level 4** Efficiently synthesizes information and integrates reflection to make clinical decisions for complex conditions | ● Adjusts surgical plan to incorporate type of fracture, energy of injury, and concomitant injuries  
● Considers patient factors including age and patient needs in the need for continued conservative versus operative management |
| Integrates evidence-based information to inform diagnostic decision-making for complex conditions | ● Incorporates clinical practice guidelines into clinical/radiologic findings to develop a comprehensive surgical and rehabilitation plan  
● Uses current evidence, shared decision making, and other resources to decide the most appropriate treatment plan for a distal radius fracture |
| **Level 5 Incorporates clinical reasoning to improve care pathways** | ● Demonstrates knowledge of the interlinked effects of age, surgical versus conservative treatment, and rehabilitation protocols, and applies them to appropriate patient populations and specific patient needs  
● Understands the methodology for applying appropriate use criteria |
| Assessment Models or Tools | ● Case-based discussions  
● Medical record (chart) audit  
● Multisource feedback  
● Preceptor encounters  
● Reflection |
| Curriculum Mapping | ● |
# Medical Knowledge 2: Anatomy and Physiology of Hand Conditions

**Overall Intent:** To apply knowledge of pathoanatomy and pathophysiology to patient care

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Identifies anatomy and pathophysiology of straightforward conditions | ● Properly identifies nerve, vessel, and tendon injuries associated with a hand laceration  
● Describes the various cord patterns in Dupuytren’s disease  
● Accurately interprets x-rays in osteoarthritis |
| **Level 2** Demonstrates knowledge of pathoanatomy, disease classification systems, and natural history for straightforward conditions | ● Describes the radiographic features of inflammatory arthritis  
● Describes the classification systems for scapholunate advanced collapse and scaphoid nonunion advanced collapse  
● Describes the typical clinical and electrodiagnostic findings in various stages of carpal and cubital tunnel syndrome |
| **Level 3** Applies knowledge of pathoanatomy and pathophysiology to explain the effects of surgical or non-surgical treatment on patient outcomes for straightforward conditions | ● Explains the etiology of swan neck and boutonnière deformities resulting from trauma  
● Explains the etiology of swan neck and boutonnière deformities resulting from inflammatory arthritis  
● Describes the secondary deformity patterns resulting from metacarpal and phalangeal malunion |
| **Level 4** Applies knowledge of pathoanatomy and pathophysiology to treatment options and patient outcomes for complex conditions | ● Describes the typical clinical and electrodiagnostic findings in brachial plexus injury  
● Applies understanding of spasticity patterns in cerebral palsy and traumatic brain injury to inform treatments |
| **Level 5** Disseminates knowledge on the varying patterns of disease presentation, natural history, and treatment options | ● Identifies appropriate patient resources and educates patient about condition  
● Develops and presents hand-related lectures to residents and physician extenders  
● Publishes review article on hand-related subject |

**Assessment Models or Tools**

- Direct observation
- Hand self-assessment examination
- Objective structured clinical examination (OSCE)
- Radiographic and MRI interpretations

**Curriculum Mapping**

- 

**Notes or Resources**

### Medical Knowledge 3: Diagnostics

**Overall Intent:** To understand the indications and appropriate interpretation of diagnostic tests in upper extremity pathology

<table>
<thead>
<tr>
<th><strong>Milestones</strong></th>
<th><strong>Examples</strong></th>
</tr>
</thead>
</table>
| **Level 1** Gathers and reports basic diagnostic test results | ● Demonstrates ability to locate pertinent diagnostic results from the medical chart  
  ● Synthesizes pertinent positives and negatives from the report of the diagnostic tests such as from wrist MRIs, CT scans, and electromyography |
| **Level 2** Describes indications for standard diagnostic testing | ● Understands appropriate timing and indications for ordering diagnostic testing including radiographs with specific views, CTs, MRIs, electromyography, ultrasounds, and angiography  
  ● Demonstrates understanding of when to order follow-up electromyography when following nerve recovery  
  ● Demonstrates understanding of indication for follow-up CT scan when following scaphoid fracture healing  
  ● Demonstrates understanding of the use of pre-operative CT scans for complex fracture patterns such as distal radius, elbow, and scaphoid fractures |
| **Level 3** Prioritizes, orders, and interprets straightforward diagnostic tests | ● Independently orders and interprets radiographs for common hand and upper extremity pathology  
  ● Orders and interprets appropriate specialized radiographic views when indicated: hyper pronated view for thumb carpometacarpal joint (CMC) arthritis, Bora view for fourth/fifth CMC joint, clenched fist view for scapholunate ligament injury, etc. |
| **Level 4** Prioritizes, orders, and interprets complex diagnostic studies | ● Independently orders and interprets CT scans, MRIs, electromyography, ultrasounds, angiography, etc. for both common AND complex upper extremity pathologies:  
  ○ Angiography for upper extremity vascular disorders  
  ○ CT scan for scaphoid or elbow fractures  
  ○ Electromyography/nerve conduction study for brachial plexus pathology  
  ○ MRI for wrist and elbow injuries  
  ○ Ultrasound for nerve compressive pathology  
  ○ |
| **Level 5** Uses complex diagnostic approaches in novel situations | ● Uses electromyography/nerve conduction study to assess for available nerve transfer or tendon transfer options for patients with complex brachial plexus pathology  
  ● Performs independent ultrasound assessment of nerve healing, neuroma formation, compressive pathology  
  ● Orders and interprets magnetic resonance (MR) neurography for complex nerve pathology  
  ● Uses angiography to plan complex revascularization procedures and flap procedures |

**Assessment Models or Tools** | ● Assess and interpret diagnostics during educational sessions |
| Curriculum Mapping | ● Direct observation of imaging interpretation and integration into patient care pathways  
|                    | ● Explain and justify diagnostic decisions in case discussion and patient rounds |
### Overall Intent:
To initiate, monitor, and individualize patient rehabilitation for both common, complex, and revision upper extremity pathologies.

### Milestones

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1**  | Lists the indications for basic rehabilitation | • Identifies patients who would benefit from rehabilitation including those with recent traumas or surgical interventions  
  • Indicates patients for non-operative rehabilitation for common upper extremity pathologies including lateral epicondylitis |
| **Level 2**  | Describes different forms of rehabilitation for bone, joint, tendon, and nerve | • Describes rehabilitation protocols for common upper extremity pathologies including distal radius fractures, thumb CMC arthroplasty, nerve repair, lateral epicondylitis (both non-operative and operatively treated) |
| **Level 3**  | Prioritizes, orders, and interprets individualized rehabilitation, including multimodal rehabilitation protocol for common pathologies | • Initiates, monitors, and adjusts rehabilitation programs for common pathologies including:  
  o Most elective surgeries such as thumb CMC arthroplasty, subtotal palmar fasciectomy, small joint arthroplasty  
  o Standard fracture care including distal radius and metacarpal fractures  
  • Adjusts length of immobilization and/or initiates therapeutic interventions including dynamic or static progressive splinting depending on patient condition and state of recovery |
| **Level 4**  | Prioritizes, orders, and interprets individualized rehabilitation, including multimodal rehabilitation protocol for complex pathologies | • Initiates, monitors, and adjusts rehabilitation programs for complex pathologies including:  
  o Standard tendon and nerve transfers  
  o Patients with inflammatory arthritis  
  o Complex carpal fracture patterns (greater arc injuries)  
  o Combined trauma to the extremity with involvement of multiple systems requiring modification of standard rehabilitation pathways  
  • Integrates adjunctive therapeutic interventions including ultrasound, muscular stimulation, iontophoresis, or phonophoresis when appropriate to generate an individualized program |
| **Level 5**  | Prioritizes, orders, and interprets rehabilitation after complex revision surgery | • Initiates, monitors, and adjusts rehabilitation programs for complex revision pathologies including:  
  o Revision scaphoid fracture fixation  
  o Revision soft tissue coverage  
  o Revision tendon repair or reconstruction (two-stage)  
  o Revision total wrist arthroplasty and finger joint arthroplasties  
  • Generates individualized rehabilitation programs for revision surgeries |

### Assessment Models or Tools
• Assess and interpret rehabilitation plans during educational sessions  
• Direct observation of rehabilitation integration and management during the initial non-operative and post-operative phases of patient care  
• Explain and justify rehabilitation plan during case discussion and patient rounds
<table>
<thead>
<tr>
<th>Curriculum Mapping</th>
<th>●</th>
</tr>
</thead>
</table>
| Notes or Resources | ● Cannon NM (ed). *Diagnosis and Treatment Manual for Physicians & Therapists*. 5th ed.  
● Indiana Hand to Shoulder Center; 2020. [https://www.diagnosisandtreatmentmanual.com/](https://www.diagnosisandtreatmentmanual.com/) |
### Systems-Based Practice 1: Patient Safety and Quality Improvement

**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>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1 Demonstrates knowledge of common patient safety events</strong></td>
<td>● Lists patient misidentification or medication errors as common patient safety events</td>
</tr>
<tr>
<td>Demonstrates knowledge of how to report patient safety events</td>
<td>● Describes how to report errors in the institution</td>
</tr>
<tr>
<td>Demonstrates knowledge of basic quality improvement methodologies and metrics</td>
<td>● Describes fishbone tool</td>
</tr>
<tr>
<td><strong>Level 2 Identifies system factors that lead to patient safety events</strong></td>
<td>● Understands that a lack of hand sanitizer dispenser at each clinical exam room may lead to increased infection rates</td>
</tr>
<tr>
<td>Reports patient safety events through institutional reporting systems (simulated or actual)</td>
<td>● Reports lack of hand sanitizer dispenser at each clinical exam room to the medical director</td>
</tr>
<tr>
<td>Describes local quality improvement initiatives (e.g., infection rate, smoking cessation)</td>
<td>● Summarizes protocols resulting in decrease perioperative infections</td>
</tr>
<tr>
<td><strong>Level 3 Participates in analysis of patient safety events (simulated or actual)</strong></td>
<td>● Prepares for morbidity and mortality presentations</td>
</tr>
<tr>
<td>Participates in disclosure of patient safety events to patients and their families (simulated or actual)</td>
<td>● Through simulation, communicates with patients/families about an intra-operative fracture</td>
</tr>
<tr>
<td>Participates in local quality improvement initiatives</td>
<td>● Participates in a project identifying the root cause of rooming inefficiency</td>
</tr>
<tr>
<td><strong>Level 4 Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)</strong></td>
<td>● Collaborates with a team to conduct the analysis of a wrong-side surgery and can effectively communicate with patients/families about those events</td>
</tr>
<tr>
<td>Discloses patient safety events to patients and their families (simulated or actual)</td>
<td>● Participates in the completion of a QI project to improve referrals to bone health for patients with distal radius fractures within the practice, including assessing the problem,</td>
</tr>
<tr>
<td>Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project</td>
<td>articulating a broad goal, developing a SMART (Specific, Measurable, Attainable, Relevant, Time-bound) objective plan, and monitoring progress and challenges</td>
</tr>
<tr>
<td>Level 5 Actively engages teams and processes to modify systems to prevent patient safety events</td>
<td>● Assumes a leadership role at the departmental or institutional level for patient safety</td>
</tr>
<tr>
<td>Role models or mentors others in the disclosure of patient safety events</td>
<td>● Conducts a simulation for disclosing patient safety events</td>
</tr>
<tr>
<td>Creates, implements, and assesses quality improvement initiatives at the institutional or community level</td>
<td>● Initiates and completes a QI project to improve county referrals to bone health for patients with distal radius fractures in collaboration with the county health department and shares results with stakeholders</td>
</tr>
<tr>
<td>Assessment Models or Tools</td>
<td>● Direct observation</td>
</tr>
<tr>
<td></td>
<td>● E-module multiple choice tests</td>
</tr>
<tr>
<td></td>
<td>● Medical record (chart) audit</td>
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<tr>
<td></td>
<td>● Multisource feedback</td>
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<td>● Portfolio</td>
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<tr>
<td></td>
<td>● Reflection</td>
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<tr>
<td></td>
<td>● Simulation</td>
</tr>
<tr>
<td>Curriculum Mapping</td>
<td></td>
</tr>
<tr>
<td>Notes or Resources</td>
<td>● Institute of Healthcare Improvement website. <a href="http://www.ihi.org/Pages/default.aspx">http://www.ihi.org/Pages/default.aspx</a>. Note: Includes multiple choice tests, reflective writing samples, and more</td>
</tr>
</tbody>
</table>
## 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>
</tr>
</thead>
</table>
| **Level 1** Demonstrates knowledge of care coordination | ● Identifies the primary care provider for a geriatric patient with an insufficiency fracture home health nurse, physical therapist, and social workers as members of the team  
● 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 transition of care with home intravenous antibiotic therapy at the time of discharge from the hospital  
● Ensures post-hospitalization appointments are scheduled and therapeutic aftercare is coordinated |
| Performs safe and effective transitions of care/hand-offs in straightforward clinical situations | ● Uses a systematic institutional process during routine sign-out |
| **Level 3** Coordinates care of patients in complex clinical situations effectively using the roles of interprofessional team members | ● Coordinates complex care with the social worker for a homeless patient to ensure appropriate medical aftercare |
| Performs safe and effective transitions of care/hand-offs in complex clinical situations | ● Uses institutional protocol when transferring a replantation patient to the intensive care unit (ICU) |
| **Level 4** Teaches 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 who needs therapeutic aftercare  
● Teaches physician assistants, more junior residents, and others |
| Advocates for safe and effective transitions of care/hand-offs | ● Plans for cross-coverage in case of unanticipated absence of a team member |
| **Level 5** Analyzes the process of care coordination and leads in the design and implementation of improvements | ● Leads a community outreach program to design and implement a lawnmower/snowblower safety plan  
● Develops a protocol (care pathways for various hand surgery conditions) to improve transitions to long-term care facilities |
| **Assessment Models or Tools** | ● Direct observation |
| Curriculum Mapping |  ● Multisource feedback  
● OSCE  
● Quality metrics and goals mined from electronic health records (EHR)  
● Review of sign-out tools, use and review of checklists |
|-------------------|---------------------------------------------------|
# 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>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **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 medical treatment of osteoarthritis |
| **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  
• Understands the impact of health plan coverage on hand therapy access for individual patients |
| **Level 3** Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency) | • Monitors length of stay to ensures compliance with care pathways  
• Increases patient education to decrease readmission rates |
| **Level 4** Uses shared decision-making in patient care, taking into consideration costs to the patient | • Ensures proper documentation of qualifying hospital stay prior to discharging a patient to a skilled nursing facility for physical therapy  
• Works collaboratively to improve patient assistance resources for a patient with a recent amputation and limited resources  
• Tailors treatment decisions to patient resources/insurance status (e.g., prescribing a brace versus applying a splint) |
| **Level 5** Participates in advocacy activities for health policy | • Works with community or professional organizations to advocate for playground equipment safety measures  
• 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
- Portfolio

### Curriculum Mapping
- 

### Notes or Resources


### 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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</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Demonstrates how to access and use available evidence, and incorporate patient preferences and values to the care of a straightforward condition</td>
<td>• Identifies American Academy of Orthopaedic Surgeons Clinical Practice Guidelines for treatment of a distal radius fracture; compares to the patient's preference for treatment while communicating and understanding options</td>
</tr>
<tr>
<td><strong>Level 2</strong> Articulates clinical questions and elicits patient preferences and values to guide evidence-based care</td>
<td>• Identifies and discusses potential evidence-based treatment options for a patient with a displaced distal radius fracture and solicits patient perspective on activity level and needs</td>
</tr>
</tbody>
</table>
| **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 displaced distal radius fracture and co-existing diabetes and coronary artery disease.  
• Understands and appropriately uses clinical practice guidelines in making patient care decisions while eliciting patient preferences for operative versus non-operative treatment |
| **Level 4** Critically appraises and applies evidence, even in the face of uncertainty and conflicting evidence, to guide care tailored to the individual patient | • Accesses the primary literature to identify alternative treatments for a displaced distal radius fracture based on bone quality. (e.g., external versus internal fixation versus closed reduction and pinning versus cast treatment) |
| **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 displaced distal radius fractures.  
• Develops an osteoporosis screening and referral protocol as part of a multidisciplinary team |

**Assessment Models or Tools**

- Core conference participation
- Direct observation
- Oral or written examinations
- Presentation evaluation

**Curriculum Mapping**

- National organization guidelines, e.g., American Academy of Orthopaedic Surgeons, American Osteopathic Association,
- Various academic journals, e.g., *Journal of the American Academy of Orthopaedic Surgeons, Journal of Hand Surgery, HAND*)
## Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth

**Overall Intent:** To seek clinical performance information with the intent to improve care; 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>Milestones</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td><strong>Level 1</strong> Accepts responsibility for personal and professional development by establishing goals</td>
<td>● Sets a study plan for the ASSH Self-Assessment exam&lt;br&gt;● Reflects on feedback from patient care team members</td>
</tr>
<tr>
<td>Identifies the strengths, deficiencies, and limitations in one’s knowledge and expertise</td>
<td>● Completes a self-assessment&lt;br&gt;● Identifies gaps in knowledge</td>
</tr>
<tr>
<td><strong>Level 2</strong> Demonstrates openness to feedback and other input to inform goals</td>
<td>● Integrates and responds to feedback to adjust clinical performance&lt;br&gt;● Assesses time management skills and how it impacts timely completion of clinic notes and literature reviews&lt;br&gt;● Develops individual education plan to improve study skills and knowledge base, with assistance&lt;br&gt;● Reflects on self-assessment and adapts study plan</td>
</tr>
<tr>
<td>Analyzes and reflects on the strengths, deficiencies, and limitations in one’s knowledge and expertise to design a learning plan, with assistance</td>
<td></td>
</tr>
<tr>
<td><strong>Level 3</strong> Responds to feedback and other input episodically, with adaptability and humility</td>
<td>● Uses feedback to modify personal professional development goals&lt;br&gt;● Creates a comprehensive personal curriculum to improve education, including monitoring and accountability for a study plan</td>
</tr>
<tr>
<td>Creates and implements a learning plan to optimize educational and professional development</td>
<td></td>
</tr>
<tr>
<td><strong>Level 4</strong> Actively seeks feedback and other input with adaptability, and humility</td>
<td>● Asks for feedback from peers, faculty members, and ancillary team members&lt;br&gt;● 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 members&lt;br&gt;● Uses results from the ASSH Self-Assessment exams to modify the study plan to address deficiencies</td>
</tr>
<tr>
<td>Uses ongoing reflection, feedback, and other input to measure the effectiveness of the learning plan, and when necessary, improves it</td>
<td></td>
</tr>
<tr>
<td><strong>Level 5</strong> Role models consistently seeking feedback and other input with adaptability and humility</td>
<td>● Models and teaches practice improvement through focused study and reflective feedback&lt;br&gt;● Develops educational module for collaboration with other patient care team members</td>
</tr>
<tr>
<td>Coaches others on reflective practice</td>
<td>● Core conference participation</td>
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<tr>
<td>Assessment Models or Tools</td>
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Hand Surgery Supplemental Guide
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<tr>
<th>Curriculum Mapping</th>
<th>Notes or Resources</th>
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</table>
| ● Direct observation  
● Multisource feedback  
## 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 or deficiencies | • Identifies fatigue, illness, increased substance/alcohol use and unmanaged stress as contributing factors to professional lapses  
• Relates the importance of patient autonomy as it relates to informed consent including the role of surrogates and advance directives  
• Understands the impact of disclosing errors in patient care and loss of patient confidentiality |

*Demonstrates knowledge of the ethical principles underlying patient care (e.g., informed consent, surrogate decision-making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related topics)*

| **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 who do not provide appropriate instruction to learners (e.g., wrong labs, splint) |

*Applies ethical principles in straightforward situations and takes responsibility for lapses*

| **Level 3** Demonstrates professional behavior in complex situations | • Does not attribute blame when discussing adverse outcome with family members or the patient  
• Uses respectful, unemotional communication in discussions when resolving conflict within health care team  
• Notifies site director or appropriate supervisor after noticing a colleague seems to be impaired |

*Applies ethical principles and recognizes the need to seek help in complex situations*

| **Level 4** Recognizes situations that may promote professional deficiencies and intervenes to prevent lapses in oneself and others | • Acts in patient’s best interest when collaborating with other health care services  
• Responds to inappropriate racial or gender microaggressions  
• 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) |

*Recognizes and uses appropriate resources for managing and resolving ethical dilemmas (e.g., ethics consultations, literature review, risk management/legal consultation)*

| **Level 5** Coaches others when their behavior fails to meet professional expectations | • Chooses appropriate setting and tone in discussions with others regarding suboptimal professional behavior  
• Recognizes source of repetitive conflict between members of health care team and recommends institutional policy to resolve |

*Level 5** Coaches others when their behavior fails to meet professional expectations
<table>
<thead>
<tr>
<th>Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution</th>
<th>• Devises materials to aid others in learning to provide informed consent</th>
</tr>
</thead>
</table>
| Assessment Models or Tools | • Direct observation  
• Global evaluation  
• Multisource feedback  
• Oral or written self-reflection  
• Simulation |
| Curriculum Mapping | • |
### Professionalism 2: Accountability/Conscientiousness

**Overall Intent:** To take responsibility for one’s own actions and the impact on patients and other members of the health care team

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Level 1** Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations | ● Completes work hour logs without prompting  
● Has timely attendance at conferences  
● Completes medical records in a timely fashion  
● Completes end-of-rotation evaluations  |
| Responds promptly to requests or reminders to complete tasks and responsibilities | |
| **Level 2** Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations | ● Completes administrative tasks, documents safety modules, procedure review, and licensing requirements by specified due date  
● Triages and addresses both patient and institutional responsibilities while on call  
● Before going out of town, completes tasks in anticipation of lack of computer access while traveling  |
| Identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future | |
| **Level 3** Delegates some tasks or responsibilities in routine situations | ● Notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from residents, other fellows, or faculty members as needed  
● In preparation for being out of the office, arranges coverage for assigned clinical tasks and ensures appropriate continuity of care  |
| Recognizes situations that may impact one’s own or others’ ability to complete tasks and responsibilities in a timely manner in routine situations | |
| **Level 4** Delegates some tasks or responsibilities in complex or stressful situations | ● Takes responsibility for inadvertently omitting key patient information during sign-out and professionally discusses with the patient, family members, and interprofessional team  
● Manages complex patient care scenarios including a replantation surgery by being able to delegate tasks to the care team to optimize patient care  
● When a call case runs into the next day, anticipates conflicts and adjusts responsibilities accordingly through notifying the care team or delegating responsibilities  |
| Recognizes situations that may impact one’s own or others’ ability to complete tasks and responsibilities in a timely manner in complex or stressful situations | |
| **Level 5** Teaches concepts of or counsels others on accountability or conscientiousness in the workplace | ● Educates new members of the team on importance of communication with the social worker to prevent delays in discharge  |
| On a departmental or system-wide level, advocates to improve systems that ensure patients’ needs are met within the hospital, upon discharge, and in follow-up | ● Participates in or leads quality improvement projects focused on systems issues that impact patient care |
| Assessment Models or Tools | ● Compliance with deadlines and timelines  
● Direct observation  
● Global evaluations  
● Multisource feedback  
● Self-evaluations and reflective tools  
● Simulation |
| Curriculum Mapping | ● |
| Notes or Resources | ● Code of conduct from fellow 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 own response to patient’s poor outcome  
● Receives feedback on missed emotional cues after a family meeting  
● Lists how to integrate best practices for improving well-being into their career |
| **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 family tragedy  
● Lists resources both within and outside of their institution that could promote wellness  
● Lists graduate medical education (GME) counseling services, suicide hotline information, 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  
● Discusses plans for integration of wellness focused activities to their practice  
● Identifies faculty mentors |
| **Level 4** Independently develops a plan to promote personal and professional well-being  
*Describes institutional factors that positively and/or negatively affect well-being* | ● Independently identifies ways to manage personal stress and responses to unexpected patient outcomes  
● Independently initiates a personal wellness plan  
● Identifies initiatives within the fellowship program to improve well-being |
| **Level 5** Creates institutional level interventions that promote colleagues’ well-being  
*Describes institutional programs designed to examine systemic contributors to burnout* | ● Assists in organizational efforts to address clinician well-being after patient diagnosis/prognosis/death  
● Implements a lasting initiative to improve fellow well-being within the program  
● Models a balanced lifestyle that prioritizes wellness |

**Assessment Models or Tools**
- Direct observation
- Group interview or discussions for team activities
- Individual interview
- Institutional online training modules
- Self-assessment and personal learning plan

**Curriculum Mapping**

**Notes or Resources**
- This subcompetency is not intended to evaluate a resident’s well-being, but to ensure each resident 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 Programs
### 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>
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<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>
<tr>
<td>Communicates with patients and their families in an understandable and respectful manner</td>
<td>• Identifies need for trained interpreter with non-English-speaking patients</td>
</tr>
<tr>
<td>Demonstrates basic understanding of the informed consent process</td>
<td>• Uses age-appropriate and health literacy-appropriate language</td>
</tr>
<tr>
<td></td>
<td>• Outlines basic risks, benefits, and alternatives to surgery</td>
</tr>
<tr>
<td><strong>Level 2</strong> Establishes a therapeutic relationship in straightforward encounters</td>
<td>• Uses patient-centered communication when answering questions during the informed consent process</td>
</tr>
<tr>
<td>Identifies barriers to effective communication (e.g., health literacy, cultural differences)</td>
<td>• Recognizes the need for handouts with diagrams and pictures to communicate information to a patient who is unable to read</td>
</tr>
<tr>
<td>Answers questions about straightforward treatment plans, with assistance</td>
<td>• Discusses risks, benefits, and alternatives to fixation of simple fracture and seeks an attending if questions arise that are beyond the fellow’s knowledge base</td>
</tr>
<tr>
<td></td>
<td>• Uses of receptive body language, eye contact, and posture</td>
</tr>
<tr>
<td><strong>Level 3</strong> Establishes a therapeutic relationship in challenging encounters (e.g., shared decision-making)</td>
<td>• Avoids medical jargon and restates patient perspective when discussing a diagnosis and treatment options of a simple fracture or hand condition</td>
</tr>
<tr>
<td>When prompted, reflects on personal biases while attempting to minimize communication barriers</td>
<td>• Acknowledges a patient’s request for an inappropriate diagnostic study and respectfully redirects and initiates a treatment plan using only appropriate studies</td>
</tr>
<tr>
<td>Counsels patients through the decision-making process for straightforward conditions</td>
<td>• Modifies a treatment plan to achieve patient’s goal; e.g., after an active middle-aged patient states a desire to continue heavy weightlifting despite scapholunate advanced collapse wrist and physician bias about lifting activities on wrist pain and arthritis</td>
</tr>
<tr>
<td></td>
<td>• Discusses indications, risks, benefits, and alternatives during informed consent for a distal radius fracture including a discussion of short- and long-term patient functional outcomes</td>
</tr>
<tr>
<td>Level 4</td>
<td>Facilitates difficult discussions to patients and their families, (e.g., explaining complications, therapeutic uncertainty)</td>
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<tr>
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<tr>
<td>Recognizes biases and integrates the patient’s viewpoint and autonomy to ensure effective communication</td>
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<tr>
<td>Counsels patients through the decision-making process for complex conditions</td>
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</tr>
<tr>
<td>● Counsels representative family members in the care of a patient with dementia and a distal radius fracture when some family members desire surgery and others do not</td>
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</tr>
<tr>
<td>● Discusses an active elderly patient’s goal of strength training after total wrist arthroplasty despite personal bias and risks of lifting activities on a wrist replacement; includes identification of risks, benefits, and long-term effects of heavy lifting and a treatment plan to achieve the patient’s goal</td>
<td></td>
</tr>
<tr>
<td>● Discusses indications, risks, benefits, and alternatives during informed consent for distal radius fracture with multiple medical conditions, dementia, and high risk of death associated with surgical or non-surgical treatment, including ambiguous outcomes</td>
<td></td>
</tr>
<tr>
<td>● Obtains a consent in emergent situations in a polytrauma patient and documents appropriately</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 5</th>
<th>Coaches others in the facilitation of difficult conversations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentors others in situational awareness and critical self-reflection</td>
<td></td>
</tr>
<tr>
<td>Counsels patients through the decision-making process for uncommon conditions</td>
<td></td>
</tr>
<tr>
<td>● Leads an OSCE for obtaining informed consent in distal radius fracture patients with dementia</td>
<td></td>
</tr>
<tr>
<td>● Encourages others to take the Implicit Bias Test (link in Resources) and leads a discussion about impact of implicit bias in residency</td>
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</tr>
<tr>
<td>● Observes interactions between residents and patients and offers constructive feedback</td>
<td></td>
</tr>
<tr>
<td>● Serves on a hospital bioethics committee</td>
<td></td>
</tr>
<tr>
<td>● Develops supplemental materials to better inform patients prior to arthroplasty</td>
<td></td>
</tr>
<tr>
<td>● Counsels patient’s family about treatment options for a congenital hand deformity</td>
<td></td>
</tr>
</tbody>
</table>

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

**Curriculum Mapping**
# 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 health care team** | • Answers questions respectfully and patiently for a radiology tech regarding x-ray orders, understanding the radiology tech plays in important role in care of the hand surgery patient  
  • Receives an emergency department consult for a simple fracture and respectfully takes the patient information |
| **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 and assists with limb positioning if requested by the tech  
  • Communicates with the emergency department physician a diagnosis of evolving compartment syndrome and the 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 amputated upper extremity, dysvascular hand, 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 |
| **Level 4 Facilitates respectful communications and conflict resolution with the multidisciplinary health care team** | • Organizes a multidisciplinary conversation to alleviate conflict following treatment of a patient with an amputated upper extremity part, dysvascular hand, unstable pelvis fracture, femur fracture, and multiple visceral injuries  
  • Attends medical rounds to review consult findings about the possible deep space infection of the hand and provides education of the medical team about evaluation of a hand infections |
| **Level 5 Exemplar of effective and respectful communication strategies** | • Mediates a conflict resolution between different members of the health care team |

**Assessment Models or Tools**

- Direct observation
- Global assessment
- Multisource feedback
- Simulation

**Curriculum Mapping**


<table>
<thead>
<tr>
<th>Milestones</th>
<th>Examples</th>
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</thead>
</table>
| **Level 1** Accurately records information in the patient record while safeguarding patient personal health information | ● Documents relevant information accurately  
● Shreds patient list after rounds; avoids talking about patients in the elevator  
● Maintains Health Insurance Portability and Accountability 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-authored 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 a mangled extremity or amputated part including risks, benefits, and alternatives  
● Obtains outside records including prior implant records  
● Tells attending about an order set in the EHR with a medication dosing that could result in an error  
● Identifies and reports safety near-misses using the hospital reporting system |
| 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 mangled upper extremity or amputated part including surgical priorities and implants/supplies/instruments needed  
● 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 |
| Guides departmental or institutional communication around policies and procedures |                                                                                                                                 |
| Assessment Models or Tools                                                | ● Direct observation  
● Medical record (chart) review  
● Multisource feedback  
● Rotation evaluation |
<table>
<thead>
<tr>
<th>Curriculum Mapping</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>
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</thead>
<tbody>
<tr>
<td>PC1: Acquired Conditions</td>
<td>PC5: Elective (Acquired and Congenital)</td>
</tr>
<tr>
<td>PC2: Arthritis</td>
<td>PC3: Arthritis</td>
</tr>
<tr>
<td>PC3: Congenital</td>
<td>PC5: Elective (Acquired and Congenital)</td>
</tr>
<tr>
<td>PC4: Nerve</td>
<td>PC4: Nerve</td>
</tr>
<tr>
<td>PC5: Trauma: Bone, Joint</td>
<td>PC1: Traumatic Bone and Joint Injury</td>
</tr>
<tr>
<td>PC6: Soft Tissue Trauma, Infections</td>
<td>PC2: Soft Tissue Trauma</td>
</tr>
<tr>
<td>PC7: Tendon</td>
<td>No match</td>
</tr>
<tr>
<td>MK1: Acquired Conditions</td>
<td>No match</td>
</tr>
<tr>
<td>MK2: Arthritis</td>
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</tr>
<tr>
<td>No match</td>
<td>MK1: Clinical Decision Making</td>
</tr>
<tr>
<td>No match</td>
<td>MK2: Anatomy and Physiology of Hand Conditions</td>
</tr>
<tr>
<td>No match</td>
<td>MK3: Diagnostics</td>
</tr>
<tr>
<td>No match</td>
<td>MK4: Rehabilitation</td>
</tr>
<tr>
<td>No match</td>
<td>SBP2: System Navigation for Patient-Centered Care</td>
</tr>
<tr>
<td>PBLI1: The ability to investigate and evaluate the care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning</td>
<td>PBLI1: Evidence-Based and Informed Practice PBLI2: Reflective Practice and Commitment to Personal Growth</td>
</tr>
<tr>
<td>PROF1: Ethics and Values</td>
<td>PROF1: Professional Behavior and Ethical Principles</td>
</tr>
<tr>
<td>No match</td>
<td>PROF3: Self-Awareness and Help-Seeking</td>
</tr>
<tr>
<td></td>
<td>PROF2: Accountability/Conscientiousness</td>
</tr>
</tbody>
</table>
| ICS1: Interpersonal and Communication Skills | ICS1: Patient- and Family-Centered Communication  
ICS2: Interprofessional and Team Communication  
ICS3: Communication within Health Care Systems |
Available Milestones Resources

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

**Milestones Guidebooks:** [https://www.acgme.org/milestones/resources/](https://www.acgme.org/milestones/resources/)
- Assessment Guidebook
- Clinical Competency Committee Guidebook
- Clinical Competency Committee Guidebook Executive Summaries
- Implementation Guidebook
- Milestones Guidebook

**Milestones Guidebook for Residents and Fellows:** [https://www.acgme.org/residents-and-fellows/the-acgme-for-residents-and-fellows/](https://www.acgme.org/residents-and-fellows/the-acgme-for-residents-and-fellows/)
- Milestones Guidebook for Residents and Fellows
- Milestones Guidebook for Residents and Fellows Presentation
- Milestones 2.0 Guide Sheet for Residents and Fellows

**Milestones Research and Reports:** [https://www.acgme.org/milestones/research/](https://www.acgme.org/milestones/research/)
- Milestones National Report, updated each fall
- Milestones Predictive Probability Report, updated each fall
- Milestones Bibliography, updated twice each year


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

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


Remediation Toolkit - [https://dl.acgme.org/courses/acgme-remediation-toolkit](https://dl.acgme.org/courses/acgme-remediation-toolkit)

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