Supplemental Guide: Infectious Disease

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Infectious Disease 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.

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: History and Physical Examination **Overall Intent:** To obtain an appropriate history and perform a comprehensive and targeted physical exam to provide accurate diagnosis	
Milestones	**Examples**
Level 1 *Acquires a foundational history for common infectious diseases and syndromes* *Performs a foundational physical examination*	● Obtains a thorough yet concise internal medicine history ● Performs a thorough yet concise internal medicine physical exam
Level 2 *Acquires a complete history, including specific host and environmental factors* *Performs an examination that elicits common or straightforward infectious diseases and syndromes*	● Reports on recent travel abroad in a patient with fever and a rash ● Examines all central line sites in an intensive care unit (ICU) patient
Level 3 *Acquires a detailed history incorporating pertinent supplemental information* *Performs an examination that elicits uncommon or complicated infectious diseases and syndromes*	● Calls outside laboratory to obtain updated culture data for a transferred patient ● Comments on presence or absence of Osler's nodes on a patient with bloodstream infection, prompting concern for endocarditis
Level 4 *Acquires a tailored history that incorporates epidemiology, past clinical data, and nuances specific for suspected pathogens or syndromes* *Performs a tailored examination that elicits subtle findings of infectious diseases and syndromes*	● In a case of suspected culture-negative endocarditis, reviews outside hospital medical records in detail to determine if antibiotics were administered prior to obtaining cultures ● Notices subtle skin findings in a patient with neutropenic fever, prompting consideration for disseminated fungal infection
Level 5 *Serves as a role model in obtaining a history that identifies subtle details and resolves ambiguity in the patient history* *Serves as a role model who has mastered the art of examination that helps in making a definitive diagnosis*	● Conducts a seminar with junior colleagues focused on subtle history and physical exam findings in patients with uncommon zoonoses
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation

	● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Reflection ● Standardized patients
Curriculum Mapping	●
Notes or Resources	● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015. https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020.

Patient Care 2: Management of Patients with Possible and Proven Infectious Diseases **Overall Intent:** To develop comprehensive management plans for patients with infections	
Milestones	**Examples**
Level 1 *Develops an initial assessment for patients with low-complexity conditions*	● Diagnoses cellulitis while recognizing other possible causes of erythema
Level 2 *Develops initial and follow-up management plans for patients with low-complexity conditions*	● In a patient with purulent cellulitis and no methicillin-resistant staphylococcus aureus (MRSA) risk factors, recommends intravenous (IV) cefazolin followed by an oral option for an appropriate duration with no need for infectious diseases follow-up
Level 3 *Develops an initial and follow-up plan for patients with moderate-complexity conditions and adjusts the plan over the course of clinical care*	● Recommends vancomycin with weekly drug monitoring in a patient with MRSA bacteremia and changes to daptomycin (or other appropriate anti-MRSA drug) in response to drug-induced leukopenia
Level 4 *Develops a comprehensive management plan, including contingency plans for patients with complex conditions*	● Initiates amphotericin B in a patient with disseminated histoplasmosis with the contingency plan to switch to itraconazole in the event of acute kidney injury
Level 5 *Develops customized management plans for all patients, regardless of the complexity of the condition, and incorporating diagnostic uncertainty and cost effectiveness*	● For a patient living with acquired immunodeficiency syndrome (AIDS) who presents with a ring-enhancing lesion in the brain, recommends appropriate empiric treatment for toxoplasmosis; recommends trimethoprim-sulfamethoxazole for treatment if pyrimethamine cannot be obtained at a reasonable price due to market monopoly and recent price increase; has a contingency plan to evaluate for central nervous system lymphoma if lesion does not improve on imaging after two weeks
Assessment Models or Tools	● Assessment of case conference presentations ● Clinical reasoning exercises ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Standardized patients
Curriculum Mapping	●
Notes or Resources	● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015. https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020.

	● Infectious Diseases Society of America. IDSA Practice Guidelines. https://www.idsociety.org/practice-guideline/practice-guidelines/#/date_na_dt/DESC/0/+/. 2020.

Patient Care 3: Consultative Care **Overall Intent:** To provide comprehensive consultation for patients with signs and symptoms of infection	
Milestones	**Examples**
Level 1 *Respectfully responds to a consultation request and conveys recommendations, with supervision* *Recognizes consult acuity and urgency, with supervision*	● Receives consult for patient about to leave against medical advice and discusses with attending who helps fellow provide immediate recommendations to the consulting service
Level 2 *Identifies and clarifies the clinical questions and recommendations for the consultation* *Recognizes consult acuity and urgency independently*	● Fellow calls resident to clarify the clinical question when the initial consult question from another member of the primary team is not clear ● Recognizes urgency of a septic patient in ICU not responding to antibiotics and notifies attending immediately
Level 3 *Seeks and integrates input from different members of the health care team and provides recommendations to the primary team in a clear and timely manner* *Prioritizes workflow in response to consult acuity and urgency*	● Confirms dose adjustment of vancomycin with pharmacist and conveys this to team prior to the next dose ● When paged in the middle of rounds recommends the infectious disease team immediately go to the emergency department to see a returning traveler with fever and rash
Level 4 *Provides comprehensive and prioritized recommendations, including assessment and rationale to all necessary health care team members* *Mobilizes resources to provide care in an urgent situation*	● Provides recommendations on type of testing needed on lymph node biopsy followed by empiric antibiotic treatment, and explains clinical decision to team on rounds ● Assists the primary service in communicating to a surgical service the need for urgent evaluation in a patient with necrotizing fasciitis
Level 5 *Leads the health care team in the provision of effective consultative services across the spectrum of disease complexity and acuity*	● When called about a case of severe malaria overnight, calls pharmacy and Centers for Disease Control (CDC) to provide appropriate treatment, and communicates with the admitting team to provide a contingency plan
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation

	● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Standardized patients
Curriculum Mapping	●
Notes or Resources	● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015. https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020. ● Chang D, Gabriel E. 10 tips for hospitalists to achieve an effective medical consult. *The Hospitalist.* 2015; 7. https://www.the-hospitalist.org/hospitalist/article/122225/10-tips-hospitalists-achieve-effective-medical-consult. 2020.

Medical Knowledge 1: Diagnostic Reasoning **Overall Intent:** To incorporate patient-specific factors in deciding upon diagnostic strategies; recognize progressively more complex and rare diagnoses in appropriate patients and sources of diagnostic error	
Milestones	**Examples**
Level 1 *Integrates patient-specific information to generate a limited differential diagnosis*	● Applies travel history, environmental exposures, medications, and immune status to prioritize the differential diagnosis ● Incorporates sexual history for a patient with proctocolitis
Level 2 *Provides a limited prioritized differential diagnosis using supporting rationale*	● Includes pneumocystis pneumonia, tuberculosis, cryptococcus and endemic mycoses on the differential diagnosis for a patient with human immunodeficiency virus (HIV)/AIDS presenting with subacute cough and a CD4 cell count (i.e., T cell count) less than 100 cells/mm^3 ● Recognizes that tuberculosis, strongyloidiasis, and other chronic infections can be an important part of the differential diagnosis inpatients who have previously lived outside the US in areas endemic for these infections
Level 3 *Formulates a prioritized differential diagnosis; demonstrates the ability to modify a diagnosis based on a patient's clinical course and additional data*	● Places pneumocystis pneumonia lower on the differential diagnosis or a patient with advanced HIV (CD4 less than 100 cells/mm^3) and subacute cough due to the presence of pleural effusions and lymphadenopathy on chest imaging, and a negative B-D-glucan ● Recognizes that an invasive fungal infection has moved higher on the differential diagnosis in a patient with fever and neutropenia who has not defervesced within four to seven days, despite appropriate broad-spectrum antibacterials
Level 4 *Formulates a differential diagnosis to include atypical presentations and uncommon disorders; recognizes sources of diagnostic error*	● In a stem cell transplant recipient with fever and respiratory failure, considers opportunistic infections, drug reactions, graft versus host disease (GvHD) and other non-infectious complications in formulating the differential diagnosis; considers strongyloides hyperinfection syndrome in such a patient with possible prior exposure to strongyloidiasis, despite negative post-transplant serology for this pathogen ● Understands the different types of individual and system factors that lead to diagnostic errors
Level 5 *Formulates a differential diagnosis to include newly recognized and emerging conditions*	● Includes COVID-19 in the differential diagnosis for a patient with fever and unexplained pulmonary embolism ● Includes Zika virus infection in the differential diagnosis for a returning traveler from an endemic region with fever and arthralgias ● Includes *Candida auris* in the differential diagnosis for a patient with candidemia initially reported as *Candida haemulonii* by the lab
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation

	● E-modules ● End-of-rotation evaluations ● Infectious Diseases Society of America (IDSA) in-training examination ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection
Curriculum Mapping	●
Notes or Resources	● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015. https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020. ● UpToDate. https://www.uptodate.com/home. 2020. ● Infectious Diseases Society of America. IDSA Practice Guidelines. https://www.idsociety.org/practice-guideline/practice-guidelines/#/date_na_dt/DESC/0/+/. 2020. ● NEJM Clinical Problem Solving Cases: https://www.nejm.org/medical-articles/clinical-problem-solving ● Anderson JD, Ho VT, Wright KT, Levy BD, Loscalzo J. Parroting lymphoma. *N Engl J Med*. 2020;383:1376-1381. https://www.nejm.org/medical-articles/clinical-problem-solving. 2020.

Medical Knowledge 2: Diagnostic Evaluation **Overall Intent:** To understand and apply appropriate diagnostic evaluation	
Milestones	**Examples**
Level 1 *Demonstrates foundational knowledge of diagnostic evaluation for pathogens*	● Recognizes polymerase chain reaction testing is used to detect some viruses ● Recognizes blood cultures should be collected prior to antibiotic administration ● Understands that a respiratory multiplex polymerase chain reaction test does not provide antimicrobial susceptibility information
Demonstrates foundational knowledge of diagnostic evaluation for clinical syndromes	● Recognizes what tests to order from cerebrospinal fluid to help diagnose meningoencephalitis ● Understands the use and limitations of a white blood cell count when evaluating for infections
Level 2 *Applies knowledge of diagnostic evaluation for common pathogens*	● Justifies the need for serial blood cultures in the management of *Staphylococcus aureus* bacteremia ● Identifies the importance of both direct and indirect serologic testing to diagnose and stage syphilis ● Identifies that a polymerase chain reaction result for mecA indicates methicillin resistance
Applies knowledge of indications for diagnostic evaluation for common clinical syndromes	● Rationalizes the need for an ophthalmology consult for patients with candidemia ● Appropriately recommends when echocardiography is needed in the setting of fever of unknown origin
Level 3 *Applies knowledge of indications for diagnostic evaluation of uncommon pathogens, antimicrobial resistance, and therapeutic drug monitoring*	● Recognizes serology is used to support a diagnosis of suspected brucellosis ● Understands drug levels are indicated to establish therapeutic concentrations in patients being treated with voriconazole for invasive aspergillosis
Applies diagnostic testing in consideration of risks, benefits, and consequences for clinical syndromes	● Discusses risks and benefits of performing a transesophageal echo in a patient with staphylococcal bacteremia and history of prior esophageal perforation
Level 4 *Interprets diagnostic evaluations for pathogens and clinical syndromes, considering performance characteristics, limitations, and nuances*	● Understands that a negative histoplasma urine antigen has different implications for diagnosis of pulmonary versus disseminated histoplasmosis ● Can discuss positive predictive value of a polymerase chain reaction for *Clostridioides difficile* ● Understands how to apply interferon gamma release assays in the evaluation for tuberculosis exposure

Level 5 *Teaches others the nuances of directed diagnostic evaluation for pathogens and clinical syndromes*	● Teaches diagnostic evaluation on rounds to peers, medical students, interprofessional health team members ● Lectures medical students, residents, peers about diagnostic evaluation ● Teaches diagnostic evaluation when providing consultation recommendations
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● IDSA in-training examination ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection
Curriculum Mapping	●
Notes or Resources	● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015. https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020. ● UpToDate. https://www.uptodate.com/home. 2020. ● Infectious Diseases Society of America. IDSA Practice Guidelines. https://www.idsociety.org/practice-guideline/practice-guidelines/#/date_na_dt/DESC/0/+/. 2020. ● Choosing Wisely. https://www.choosingwisely.org/. 2020.

Medical Knowledge 3: Treatment and Therapeutics including Anti-Infectives, Immunoprophylaxis, and Adjunctive Therapies **Overall Intent:** To develop comprehensive treatment plans	
Milestones	**Examples**
Level 1 *Demonstrates foundational knowledge of common anti-infectives, including spectrum of activity, contraindications, and clinical indications*	● Recognizes vancomycin is a primary therapeutic option for the treatment of MRSA bacteremia ● Recognizes penicillin is the drug of choice for the treatment of beta-hemolytic streptococci ● Understands to give steroids before antibiotics for *Streptococcus pneumoniae* meningitis ● Recognizes ertapenem does not have activity against *Pseudomonas aeruginosa* ● Understands to avoid use of Trimethoprim/Sulfamethoxazole (TMP-SMX) in a patient with sulfa allergies ● Understands to avoid live-virus vaccines in immunocompromised patients
Level 2 *Demonstrates knowledge of common anti-infectives, immunoprophylaxis, and adjunctive therapies, including dosing, monitoring, and adverse effects*	● Recognizes fluoroquinolones have a black box warning for causing tendinopathy ● Recognizes need for therapeutic drug monitoring for certain antibiotics, such as vancomycin ● Dose-adjusts renally-cleared antibiotics based on creatinine clearance ● Recognizes when antimicrobial prophylaxis is indicated for various states of immunosuppression
Level 3 *Demonstrates knowledge of common anti-infectives, immunoprophylaxis, and adjunctive therapies, including resistance mechanisms, drug interactions, and relative effectiveness*	● Recognizes that divalent cations impair the absorption of oral fluoroquinolones ● Recognizes the interaction between linezolid and selective serotonin reuptake inhibitors (SSRIs) and potential risk of serotonin syndrome ● Recognizes the need to adjust dosing regimens based on certain drug-drug interactions ● Prescribes integrase inhibitor-based antiretroviral regimens instead of protease inhibitor-based regimens because of improved efficacy and tolerability compared to other regimens ● Uses the HIV genotype result to help guide antiretroviral selection in patients who have resistance
Level 4 *Demonstrates knowledge of uncommon anti-infectives, immunoprophylaxis, and adjunctive therapies, including dosing, monitoring, resistance mechanisms, drug interactions, adverse effects, and relative effectiveness*	● Familiar with recently Food and Drug Administration (FDA)-approved antibiotic options for multidrug-resistant infections ● Recognizes unique adverse effects of recently approved FDA-approved drugs ● Understands the rationale for continuous IV infusions of beta-lactams as related to the property of time-dependent killing ● Uses a carbapenem when expression of the CTX-M gene in an *E. coli* is identified from a blood culture
Level 5 *Teaches others the nuances of anti-infectives, immunoprophylaxis, and adjunctive therapies*	● In a teaching session to the residents, links the class and mechanism of action of a drug to its antimicrobial effect, spectrum of activity, toxicities, and microbial mechanisms that confer resistance to the drug

	● Delivers a teaching session to the clinic nurses on the subtleties of which vaccines can be co-administered versus those that have to be spaced, and how far apart in time ● Teaches the transplant team that close monitoring and dose adjustments in immunosuppression will be required when stopping voriconazole
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● IDSA in-training examination ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection
Curriculum Mapping	●
Notes or Resources	● UpToDate. https://www.uptodate.com/home. 2020. ● Infectious Diseases Society of America. IDSA Practice Guidelines. https://www.idsociety.org/practice-guideline/practice-guidelines/#/date_na_dt/DESC/0/+/. 2020. ● Johns Hopkins Medicine. Johns Hopkins Antibiotic Guide. https://www.hopkinsguides.com/hopkins/index/Johns_Hopkins_ABX_Guide/All_Topics/A. 2020. ● Sanford Guide. Sanford Guide to Antimicrobial Therapy. https://www.sanfordguide.com/. 2020. ● Shapiro R. Transplant infectious diseases guidelines. *The Journal of Clinical and Translational Research*. 2019;33(9). https://www.myast.org/education/publications/infectious-diseases-guidelines-4th-edition. 2020.

Medical Knowledge 4: Infection Control/Prevention, Antimicrobial Stewardship, and Epidemiology **Overall Intent:** To understand and apply principles of infection control/prevention, antimicrobial stewardship, and epidemiology	
Milestones	**Examples**
Level 1 *Demonstrates foundational knowledge of the principles of infection prevention*	● Understands the difference between droplet and airborne precautions
Demonstrates foundational knowledge of the principles of antimicrobial stewardship	● Recognizes that overuse of antimicrobials leads to unnecessary toxicity and resistance ● Dons and doffs personal protective equipment (PPE) appropriately and safely
Level 2 *Implements infection prevention measures for common situations*	● Recommends droplet precautions in cases of suspected *Neisseria meningitidis* meningitis ● Recommends airborne precautions in patients with suspected tuberculosis
Implements antimicrobial stewardship practices for common situations	● Recommends de-escalation from piperacillin-tazobactam to cefazolin in patients with methicillin-susceptible *Staphylococcus aureus* (MSSA) bacteremia ● Recommends cessation of antimicrobials in patients with asymptomatic bacteriuria
Demonstrates basic knowledge of the principles of epidemiology	● Understands the definition of an outbreak ● Understands a case-control study can be used in outbreak investigations
Level 3 *Implements infection prevention measures for uncommon situations*	● Notifies laboratory personnel when sending respiratory samples in suspected coccidioidomycosis evaluations
Implements antimicrobial stewardship practices for uncommon situations	● Discusses with primary teams the nuances of antimicrobial prescribing in patients with terminal illnesses
Practices the basic principles of epidemiology, including identifying and responding to common epidemiological events	● Notifies infection preventionist of cases of hospital-acquired suppurative thrombophlebitis ● Notifies local public health department of cases of suspected Zika virus
Level 4 *Teaches infection prevention practices to health care providers, patients, and the medical community*	● Teaches interdisciplinary team members about limited efficacy of hand sanitizer against spores
Teaches health care providers, patients, and the medical community antimicrobial stewardship practices	● Teaches medical students not to start antibiotics for asymptomatic bacteriuria
Teaches on the epidemiological impact of infectious diseases on population health	● Teaches residents about global impact of diarrhea on pediatric mortality

Level 5 *Demonstrates innovation and leadership in infection prevention practices* *Demonstrates innovation and leadership in antimicrobial stewardship practices* *Leads a team in identifying and responding to epidemiological events*	● Serves as an active member of hospital infection prevention or antimicrobial stewardship committees ● Leads a stewardship project evaluating changes in prescribing practices following implementation of polymerase chain reaction panel for meningitis ● Leads an investigation of a cluster of Stenotrophomonas pneumonia infections in the ICU
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● IDSA in-training examination ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● The Society for Healthcare Epidemiology of America. https://www.shea-online.org/. 2020. ● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015. https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020. ● Infectious Diseases Society of America. IDSA Practice Guidelines. https://www.idsociety.org/practice-guideline/practice-guidelines/#/date_na_dt/DESC/0/+/. 2020.

Medical Knowledge 5: Pathophysiology and Foundational Science **Overall Intent:** To understand and apply principles of pathophysiology and foundational science to infectious diseases problems	
Milestones	**Examples**
Level 1 *Demonstrates basic knowledge of pathophysiological and foundational science pertaining to common infectious diseases and host response*	● Recognizes humoral, cell-mediated, and innate immunity have a role in host response to infections ● Recognizes vertebral osteomyelitis occurs predominantly through hematogenous spread
Level 2 *Demonstrates advanced knowledge of pathophysiological and foundational science concepts pertaining to common infectious diseases and host response*	● Understands how impaired T cell function contributes to development of Pneumocystis pneumonia ● Understands the role of pro-inflammatory cytokines in the pathophysiology of sepsis
Level 3 *Applies advanced knowledge of pathophysiological and foundational science concepts pertaining to common infectious diseases and host response*	● Understands expanded diagnostic evaluation requirements for fever in the setting of tumor necrosis factor (TNF)-alpha inhibitor use ● Understands the reason for prophylactic antifungals in patients with bone marrow transplants
Level 4 *Applies advanced knowledge of pathophysiological and foundational science concepts pertaining to uncommon infectious diseases and host response*	● Describes the unique pathogen characteristics of *Plasmodium falciparum* that contribute to the development of cerebral malaria ● Describes the appropriate immunization and antimicrobial prophylaxis in patients receiving eculizumab
Level 5 *Applies comprehensive knowledge of pathophysiology and foundational science pertaining to new and emerging infectious diseases and issues of host response*	● Relates lessons learned from zoonotic crossover events during the SARS epidemic to novel emerging coronaviruses ● Uses basic science literature to help develop or update protocols for diagnostics and treatments in novel infections or new resistant pathogens
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● IDSA in-training examination ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection
Curriculum Mapping	●
Notes or Resources	● Bennett JE, Dolin R, Blaser MJ. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Elsevier Inc.; 2015.

	https://www.sciencedirect.com/book/9781455748013/mandell-douglas-and-bennetts-principles-and-practice-of-infectious-diseases. 2020. ● Infectious Diseases Society of America. IDSA Practice Guidelines. https://www.idsociety.org/practice-guideline/practice-guidelines/#/date_na_dt/DESC/0/+/. 2020. ● Centers for Disease Control and Prevention. https://www.cdc.gov/. 2020. ● World Health Organization. https://www.who.int/. 2020. ● International Journal of Infectious Disease. https://www.ijidonline.com/. 2020. ● Oxford Academic. Clinical Infectious Diseases. https://academic.oup.com/cid. 2020. ● Riedel S, Morse S, Mietzner T, Miller S. *Jawetz, Melnick & Adelbergs Medical Microbiology*. 28th ed. McGraw Hill; 2019. https://accessmedicine.mhmedical.com/book.aspx?bookID=2629. 2020.

Medical Knowledge 6: Scholarly Activity **Overall Intent:** To engage in and disseminate scholarly work	
Milestones	**Examples**
Level 1 *Identifies areas worthy of scholarly activity*	● Recognizes gaps in currently published literature about infections in patients receiving extracorporeal membrane oxygenation treatment ● Understands importance of conducting rigorous randomized control trials
Level 2 *Plans a scholarly activity*	● Writes a protocol to address a research or clinical question ● Successfully receives institutional review board (IRB) approval for a research study ● Performs comprehensive review of the literature ● Conducts a needs assessment for a quality improvement or educational project
Level 3 *Implements scholarly activity*	● Performs retrospective chart review ● Conducts statistical analysis on data ● Develops a parasite curriculum for internal medicine residents rotating on the infectious disease service
Level 4 *Disseminates independent scholarly work, locally or regionally, that has generated new medical knowledge, educational programs, or process improvement*	● Conducts teaching presentation at local institution ● Presents abstract at regional infectious disease society meeting ● Presents results of quality improvement project at institution patient safety conference
Level 5 *Disseminates independent scholarly work, nationally or internationally, that has generated new medical knowledge, educational programs, or process improvement*	● Publishes research paper in peer-reviewed journal ● Presents abstract at national meeting ● Publishes curriculum on Med Ed Portal
Assessment Models or Tools	● Assessment of case conference presentations ● Assessment of research development plan ● Direct observation ● Review of presentation or publication ● Teaching evaluations
Curriculum Mapping	●
Notes or Resources	● National Library of Medicine. PubMed. https://pubmed.ncbi.nlm.nih.gov/. 2020. ● Association of American Medical Colleges. MedEd Portal. https://www.mededportal.org/. 2020. ● Local graduate-level classes (biostatistics, epidemiology, etc) ● Online modules

Systems-Based Practice 1: Patient Safety **Overall Intent:** To engage in the analysis, prevention, and management of patient safety events	
Milestones	**Examples**
Level 1 *Identifies patient safety events and discloses them to leadership, patients, and/or patients' family members* *Demonstrates knowledge of how to report patient safety events*	● Understands patient misidentification or medication errors are serious patient safety events ● Prevents administration of piperacillin-tazobactam in a patient with serious penicillin allergy ● Describes how to report errors in own clinical environment
Level 2 *Analyzes the factors that contribute to patient safety events* *Reports patient safety events using the health system's reporting mechanism*	● Identifies how lack of isolation signage and equipment may lead to increased infection rates ● Reports empty hand sanitizer dispenser at clinical exam room to appropriate clinic leadership ● Files a patient safety incident report in the hospital's safety reporting system
Level 3 *Offers prevention strategies to mitigate patient safety events*	● Actively participates in morbidity and mortality presentations ● Independently confirms medication allergies during all patient encounters ● Reviews creatinine clearance in each patient before prescribing renally-dosed antibiotics
Level 4 *Participates in efforts to modify systems to prevent patient safety events*	● Leads implementation of an alert in the electronic health record (EHR) to notify physicians about an antibiotic allergy ● Participates in a hospital's hand hygiene campaign
Level 5 *Leads efforts to modify systems to prevent patient safety events*	● Assumes a leadership role at the departmental or institutional level for patient safety ● Conducts a simulation for disclosing patient safety events ● Leads an infection prevention project to reduce transmission of *C. difficile* within the hospital
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Simulation
Curriculum Mapping	●

Notes or Resources	● Institute of Healthcare Improvement. http://www.ihi.org/Pages/default.aspx. 2020. ● Infection Prevention Manual/Guidelines for individual institution ● CDC. Infection Prevention Guidance. https://www.cdc.gov/infectioncontrol/guidelines/index.html. 2020. ● IDSA. Infection Prevention. https://www.idsociety.org/policy--advocacy/infection-prevention-and-control/. 2020.

Systems-Based Practice 2: Quality Improvement **Overall Intent:** To identify quality improvement (QI) needs, and conduct QI interventions in the healthcare environment	
Milestones	**Examples**
Level 1 *Demonstrates basic knowledge of quality improvement methodologies and metrics*	● Describes the fishbone tool ● Describes PDSA (Plan-Do-Study-Act) cycle approach to QI ● Describes relevant QI metrics including hospital rates of central line-associated bloodstream infections, catheter-associated urinary tract infections, ventilator-associated events, etc.
Level 2 *Identifies opportunities for quality improvement projects*	● Uses patient panel management to identify patients with HIV who are not virologically suppressed and who would benefit from intensive adherence counseling and case management ● Identifies opportunity for improving rates of hand hygiene among health care workers
Level 3 *Participates in quality improvement projects*	● Participates in a project to de-escalate inappropriate broad-spectrum antibiotics use ● Participates in a project to increase adherence to guideline recommendations in patients with *S. aureus* bacteremia
Level 4 *Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project*	● Designs, implements and analyzes a QI project to improve human papillomavirus (HPV) vaccination rates within the practice, including assessing the problem, articulating a broad goal, developing a SMART (Specific, Measurable, Attainable, Relevant, Time-bound) objective plan, and monitoring progress and challenges
Level 5 *Leads quality improvement projects*	● Initiates and completes a QI project to improve county HPV vaccination rates in collaboration with the county health department, and shares results with stakeholders
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Multisource feedback ● Multiple choice questions ● Reflection ● Review of quality improvement project ● Simulation
Curriculum Mapping	●
Notes or Resources	● Institute of Healthcare Improvement. http://www.ihi.org/Pages/default.aspx. 2020. ● IDSA. Quality Improvement. https://www.idsociety.org/clinical-practice/quality-improvement/quality-improvement. 2020.

Systems-Based Practice 3: Coordination and Transitions of Care **Overall Intent:** To ensure the safe transition and coordination of care for patients across the entire health care system	
Milestones	**Examples**
Level 1 *Identifies key elements for safe and effective transitions and coordination of care and hand-offs*	● Understands the essential components of sign-out including patient identifiers, active issues and follow-up plan ● Understands the importance of coordinating an interdisciplinary meeting with infectious diseases, cardiology, cardiothoracic surgery, and internal medicine for a patient with endocarditis ● Identifies that patients being discharged on intravenous antibiotics will need periodic laboratory monitoring, enrollment in an outpatient parenteral antibiotic therapy program, and follow-up in the outpatient infectious diseases clinic
Level 2 *Performs safe and effective transitions and coordination of care and hand-offs in routine clinical situations*	● Coordinates care with the infectious diseases clinic at the time of discharge from the hospital ● Conveys pertinent clinical information to the next clinician assuming care of the patient ● Obtains microbiology susceptibility results from the outside hospital from which a patient was transferred
Level 3 *Performs safe and effective transitions and coordination of care/hand-offs in complex clinical situations*	● Works with the social worker to coordinate infectious disease care after discharge for a patient who is homeless ● Conducts an interdisciplinary meeting between infectious diseases, cardiology, cardiac surgery, and internal medicine to coordinate a plan for a patient with endocarditis
Level 4 *Role models and advocates for safe and effective transitions and coordination of care/hand-offs within and across health care delivery systems*	● During inpatient rounds leads team members in approaching other clinicians to review cases/recommendations, and arranges radiology rounds for the team ● Clarifies and explains to the primary medicine team that a patient with pulmonary tuberculosis must have established care and health department follow-up
Level 5 *Improves quality of transitions and coordination of care within and across health care delivery systems to optimize patient outcomes*	● Creates a new sign-out tool using information technology (IT) infrastructure ● Develops a protocol to improve linkage and retention in care for patients with HIV ● Pilots a new initiative involving a daily multidisciplinary huddle in the infectious diseases clinic to improve patient care
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions

	● Reflection ● Review of sign-out tools, use and review of checklists ● Simulation
Curriculum Mapping	●
Notes or Resources	● CDC. Population Health Training in Place Program (PH-TIPP). https://www.cdc.gov/pophealthtraining/whatis.html. 2020. ● Kaplan KJ. In pursuit of patient-centered care. http://tissuepathology.com/2016/03/29/in-pursuit-of-patient-centered-care/#axzz5e7nSsAns. 2020. ● Skochelak SE, Hawkins RE, Lawson LE, Starr SR, Borkan J, Gonzalo JD. *AMA Education Consortium: Health Systems Science*. Elsevier; 2016. ● Agency for Healthcare Research and Quality. Chartbook on Care Coordination. https://www.ahrq.gov/research/findings/nhqrdr/chartbooks/carecoordination/measure1.html. 2020.

Systems-Based Practice 4: Population Health **Overall Intent:** To identify and address health care barriers that impact patients with infectious diseases at the community level	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of population and community health needs*	● Understands that under-insured patients may be unable to afford many antimicrobial options ● Understands the impact of social determinants on health outcomes
Level 2 *Identifies specific population and community health needs for the local population*	● Identifies the lack of access to infectious diseases experts in a community to be an important barrier to care ● Identifies the increased risk of dissemination of coccidioidomycosis among certain ethnic groups ● Identifies low rates of shingles vaccination coverage in the local population
Level 3 *Identifies local resources effectively to meet the needs of a patient population and community*	● Links under-insured patients to federally qualified health centers after discharge ● Identifies county health department sexually transmitted infection clinic as a resource for uninsured patients with gonorrhea infection ● Works with clinic social worker to find resources in the community for substance use disorder treatment
Level 4 *Uses local resources effectively to meet the needs of a patient population and community*	● Enrolls uninsured patient in pharmaceutical-sponsored assistance program to allow access to expensive antimicrobial agents ● Refers women living with HIV to local support group in the community
Level 5 *Leads innovations and advocates for populations and communities with health care needs*	● Creates a community advisory board to provide feedback to HIV clinic leadership on best practices for care
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● Healthy People 2020. Disparities. https://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities. 2020.

Systems-Based Practice 5: Physician Role in Health Care Systems **Overall Intent:** To understand the physician's role in the complex health care system and how to optimize the system to improve patient care	
Milestones	**Examples**
Level 1 *Identifies key components of the health care system* *Describes basic health payment systems*	● Understands the impact of health plan coverage on prescription drugs for individual patients ● Understands that upon hospital discharge patients can receive intravenous (IV) antibiotics at home, at a nursing facility, or at an infusion center ● Understands that Ryan White coverage and the AIDS Drug Assistance Program (ADAP) provides safety net coverage for patients with HIV
Level 2 *Describes how components of a complex health care system are interrelated, and how this impacts patient care* *Delivers care with consideration of each patient's payment model*	● Understands that patients with Medicare as their primary insurance are most likely to have the cost of outpatient IV antibiotics covered at an infusion center or skilled nursing facility rather than at home ● Understands various payment models, including pay-for-performance, pay-for-service, and bundled payments. ● Prescribes levofloxacin instead of moxifloxacin for community-acquired pneumonia because of formulary restrictions
Level 3 *Discusses how individual practice affects the broader system* *Engages with patients in shared decision making, informed by each patient's payment models*	● Discusses the impact of broad-spectrum antibiotic overuse on community-level resistance patterns ● Tailors antibiotic regimen in consideration of patient preferences and insurance coverage
Level 4 *Manages various components of the complex health care system to provide efficient and effective patient care* *Advocates for patient care needs with consideration of the limitations of each patient's payment model*	● Works collaboratively to improve patient assistance resources for a patient with homelessness, substance use disorder, and limited finances ● Prescribes a patient insured primarily by Medicare a once-daily IV antibiotic so that they can receive care by driving from home to an infusion center, rather than undergoing a prolonged skilled nursing facility stay
Level 5 *Advocates for or leads systems change that enhances high-value, efficient, and effective patient care*	● Works with community or professional organizations to advocate for point-of-care HIV testing in the community ● Improves informed consent process for non-English-speaking patients

Actively engaged in influencing health policy through advocacy activities at the local, regional, or national level	● Discusses development of diagnostic test protocols with the microbiology lab aimed at reducing unnecessary diagnostic test ordering ● Organizes and leads the hospital team in a community AIDS walk
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● ACP. Practice Resources. https://www.acponline.org/practice-resources. 2020. ● Agency for Healthcare Research and Quality (AHRQ). The Challenges of Measuring Physician Quality. https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html. 2020. ● AHRQ. Major physician performance sets: https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/measurementsets.html. 2020. ● The Kaiser Family Foundation. www.kff.org. 2020. ● The Kaiser Family Foundation. Topic: health reform. https://www.kff.org/topic/health-reform/. 2020. ● Dzau VJ, McClellan M, Burke S, et al. Vital directions for health and health care: priorities from a National Academy of Medicine Initiative. *NAM Perspectives*. Discussion Paper, National Academy of Medicine, Washington, DC. https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/. 2020. ● The Commonwealth Fund. Health System Data Center. http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1. 2020. ● The Commonwealth Fund. Health Reform Resource Center. http://www.commonwealthfund.org/interactives-and-data/health-reform-resource-center#/f:@facasubcategoriesfacet63677=[Individual%20and%20Employer%20Responsibility. 2020. ● American Board of Internal Medicine. QI/PI Activities. https://www.abim.org/maintenance-of-certification/earning-points/qi-pi-activities.aspx. 2020.

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice **Overall Intent:** To incorporate evidence and patient values into clinical practice	
Milestones	**Examples**
Level 1 *Demonstrates how to access and use available evidence for patient care and elicits patient preferences and values to guide care*	● Identifies evidence-based IDSA guidelines for asymptomatic bacteriuria ● Conducts a PubMed search to identify best practices on retaining patients with HIV in care ● Queries patient's understanding of their infection and their preferences in management
Level 2 *Locates and applies the best available evidence, integrated with patient values and preferences, to the care of patients with common conditions*	● In a patient with endocarditis, identifies and discusses potential evidence-based treatment options according to IDSA guidelines, and solicits patient perspective ● Discusses risks and benefits of latent tuberculosis infection treatment in patient with a positive interferon gamma release assay ● Uses a contemplation ladder to assess patient's readiness to adhere to antiretrovirals
Level 3 *Locates and applies the best available evidence, integrated with patient values and preference, to the care of patients with complex conditions*	● Obtains, discusses, and applies evidence for the treatment of endocarditis in a patient who injects drugs ● In a treatment-experienced patient with HIV and a history of poor adherence, discusses the optimal management strategy with consideration for the patient's preferences
Level 4 *Critically appraises conflicting or ambiguous evidence to guide individualized patient care*	● Discusses the literature on the utility of anal pap smears in patients living with HIV at a division conference ● Leads a journal club discussion to critically appraise and debate the use of suppressive antibiotics for recurrent urinary tract infections (UTIs)
Level 5 *Mentors others to critically appraise and apply evidence*	● Leads clinical teaching on application of best practices in critical appraisal of sepsis criteria ● As part of a team, develops a protocol for antimicrobial prophylaxis following stem cell transplantation
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Multiple choice questions ● Reflection ● Research portfolio ● Simulation
Curriculum Mapping	●

Notes or Resources	● National Institutes of Health. Write Your Application. https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm. 2020. ● U.S. National Library of Medicine. PubMed Tutorial. https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html. 2020. ● Institutional IRB guidelines ● Various journal submission guidelines

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 practice; develop clear objectives and goals for improvement through a learning plan	
Milestones	**Examples**
Level 1 *Identifies personal and professional development goals and recognizes gaps between expectations and actual performance* *Actively seeks opportunities to improve*	● Identifies gaps in knowledge of HIV medication side effects ● Reviews a teaching session on HIV medication side effects ● Discusses challenging clinical cases with colleagues
Level 2 *Demonstrates openness to performance data (feedback and other input), and analyzes and reflects on gaps to inform goals* *Designs and implements a learning plan, with prompting*	● Respectfully receives feedback on interactions with house staff ● Develops a plan based on feedback to improve interactions with house staff
Level 3 *Seeks performance data episodically, with adaptability and humility, and institutes behavioral changes to narrow the gaps between expectations and actual performance* *Independently creates and implements a learning plan*	● In response to feedback, performs a chart audit to determine percentage of their own patient panel living with HIV that receive appropriate vaccinations ● Creates a personal curriculum using web-based resources to improve knowledge on tropical parasites
Level 4 *Intentionally seeks performance data consistently with adaptability and humility, considering alternatives in narrowing the gaps between expectations and actual performance* *Uses performance data to measure the effectiveness of the learning plan and improves it when necessary*	● Completes a quarterly chart audit to ensure documentation of renal function testing for patients on tenofovir disoproxil ● Tracks clinical cases of tuberculosis (TB) seen, recognizes gaps in experiences treating drug-resistant TB, and develops a learning plan for drug-resistant TB ● Adjusts learning plan after receiving in-training examination scores to mitigate knowledge gaps in tropical diseases
Level 5 *Role models commitment to self-improvement and coaches others on reflective practice* *Facilitates the design and implementation of learning plans for others*	● Develops morbidity and mortality conference for infectious diseases division to identify and remediate organizational weaknesses ● Assists first-year fellows in developing their individualized learning plans
Assessment Models or Tools	● Direct observation

	● Reflection ● Semi-annual review
Curriculum Mapping	●
Notes or Resources	● Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: practice-based learning and improvement. *Acad Pediatr.* 2014;14: S38-S54. https://www.academicpedsjnl.net/article/S1876-2859(13)00333-1/fulltext. 2020. ● Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. *Academic Medicine.* 2009;84(8):1066-1074. https://journals.lww.com/academicmedicine/fulltext/2009/08000/Measurement_and_Correlates_of_Physicians__Lifelong.21.aspx. 2020. ● Lockspeiser TM, Schmitter PA, Lane JL, Hanson JL, Rosenberg AA, Park YS. Assessing residents' written learning goals and goal writing skill: validity evidence for the learning goal scoring rubric. *Academic Medicine*. 2013;88(10):1558-1563. https://journals.lww.com/academicmedicine/fulltext/2013/10000/Assessing_Residents__Written_Learning_Goals_and.39.aspx. 2020.

Professionalism 1: Professional Behavior **Overall Intent:** To recognize and address lapses in professional behavior and demonstrate professional behaviors	
Milestones	**Examples**
Level 1 *Demonstrates professional behavior in routine situations*	● Respectfully accepts consultative request by all primary teams, regardless of the reason for consult
Level 2 *Identifies and describes potential personal triggers for professionalism lapses and takes responsibility for one's own professionalism lapses*	● Recognizes that when rounds take longer than is typical they are less conducive to teaching ● Apologizes to consulting team for displaying irritation when paged with non-urgent question at 2 a.m.
Level 3 *Demonstrates a pattern of professional behavior in complex or stressful situations; describes when and where to report professionalism lapses*	● De-escalates an angry patient by listening to the patient's perspective ● Decides to speak face-to-face about a conflict instead of emailing ● Reports to supervisor about an impaired colleague who is missing work ● Reports to the hospital secure line about an unprofessional incident concerning a nurse
Level 4 *Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in oneself and others*	● Develops contingency plan for returning to care with a patient who wishes to be discharged against medical advice ● Recognizes a colleague is becoming frustrated with a learner and discusses it with that colleague
Level 5 *Coaches others when their behavior fails to meet professional expectations*	● Coaches a medical student on considering patient perspectives after the medical student criticizes a patient for injecting drugs
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● American Board of Internal Medicine, ACP-ASIM Foundation, European Federation of Internal Medicine. Medical professionalism in the new millennium: a physician charter. *Ann Intern Med*. 2002;136:243-246. http://abimfoundation.org/wp-content/uploads/2015/12/Medical-Professionalism-in-the-New-Millenium-A-Physician-Charter.pdf. 2020. ● Domen RE, Johnson K, Conran RM, et al. Professionalism in pathology: a case-based approach as a potential education tool. *Arch Pathol Lab Med*. 2017;141:215-219.

	https://www.archivesofpathology.org/doi/10.5858/arpa.2016-0217-CP?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed. 2020. ● Levinson W, Ginsburg S, Hafferty FW, Lucey CR. *Understanding Medical Professionalism*. New York, NY: McGraw-Hill Education; 2014. ● Bynny RL, Paauw DS, Papadakis MA, Pfeil S. *Medical Professionalism. Best Practices: Professionalism in the Modern Era*. Menlo Park, CA: Alpha Omega Alpha Medical Society; 2017. ISBN: 978-1-5323-6516-4

Professionalism 2: Ethical Principles **Overall Intent:** To recognize and address ethical dilemmas and appropriately use resources to do so	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of ethical principles*	● Articulates how the principle of autonomy applies to patients who do not want their images used for teaching or publication
Level 2 *Applies ethical principles to address straightforward situations*	● Applies principle of autonomy by obtaining informed consent from a patient before photographing a rare rash
Level 3 *Analyzes complex situations using ethical principles and identifies the need to seek help in addressing complex situations*	● Offers alternative treatment options for a patient who declines inpatient IV antibiotics, despite that being standard of care
Level 4 *Uses appropriate resources for managing and resolving ethical dilemmas as needed*	● Requests ethics consultation for an incapacitated patient whose family makes a decision that contradicts the patient's previously expressed wishes ● Allocates limited supply of remdesivir to appropriate patients with COVID-19 ● Coordinates with the local public health department to ensure the contacts of a patient recently diagnosed with primary syphilis have been traced, worked up and treated
Level 5 *Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution*	● Creates an endocarditis treatment team that meets regularly to discuss issues that influence decisions on valve replacement surgery for patients with endocarditis and a history of IV drug use ● Sets up anonymous hotline to notify partners of persons diagnosed with sexually transmitted infections to protect both patient privacy and public health
Assessment Models or Tools	● Assessment of case conference presentations ● Direct observation ● E-modules ● End-of-rotation evaluations ● Medical record (chart) audit ● Multisource feedback ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● American Medical Association. Code of Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. 2020.

Professionalism 3: Accountability/Conscientiousness **Overall Intent:** To take responsibility for one's own actions and the impact on patients and other members of the health care team	
Milestones	**Examples**
Level 1 *Performs tasks and responsibilities with prompting*	● Responds to reminders from program administrator to complete work hour logs or end of rotation evaluations ● Attends conferences consistently and on time with prompting/reminders
Level 2 *Recognizes factors that may impact one's own ability to complete tasks and responsibilities in a timely manner and describes strategies for improvement*	● Notifies attending of multiple competing demands on-call, appropriately triages tasks, and asks for assistance from other fellows or faculty members as needed
Level 3 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations*	● In preparation for being out of the office, arranges coverage for assigned clinical tasks on infectious disease patients and ensures appropriate continuity of care ● Is well prepared for scheduled presentations at conferences
Level 4 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations*	● Able to collegially and efficiently complete tasks when asked to cover a sick colleague
Level 5 *Creates strategies to enhance others ability to complete administrative tasks and patient care efficiently*	● Sets up a meeting with the clinic manager to streamline post discharge follow-up in fellow clinic
Assessment Models or Tools	● Compliance with deadlines and timelines ● Direct observation ● End-of-rotation evaluations ● Multisource feedback ● Reflection
Curriculum Mapping	●
Notes or Resources	● Code of conduct from fellow/resident institutional manual ● Expectations of residency program regarding accountability and professionalism

Professionalism 4: Well-Being **Overall Intent:** To recognize the importance of well-being and to identify and use resources for augmenting well-being	
Milestones	**Examples**
Level 1 *Recognizes the importance of addressing personal and professional well-being*	● Engages in required institutional well-being educational activities
Level 2 *Lists available resources for personal and professional well-being* *Describes institutional resources that are meant to promote well-being*	● Appropriately describes the fellowship's policy for staying home when ill ● Aware of counseling resources available to learners ● Engages in fellowship feedback sessions to improve well-being across the program
Level 3 *With assistance, proposes a plan to promote personal and professional well-being* *Recognizes which institutional factors affect well-being*	● Proposes conference presentation dates to avoid conflicts with vacation plans using schedule request ● Requests leave of absence due to uncontrolled depression
Level 4 *Independently develops a plan to promote personal and professional well-being* *Describes institutional factors that positively and/or negatively affect well-being*	● Develops action plans for job search prioritizing professional and personal goals ● Prepares a robust board study schedule to minimize undue stress and anxiety ● Arranges practice sessions with the simulation lab to improve confidence with lumbar punctures
Level 5 *Creates institutional level interventions that promote colleagues' well-being* *Describes institutional programs designed to examine systemic contributors to burnout*	● Works as part of a system committee to address inefficiencies in the EHR ● Advocates with hospital leadership to provide healthier snack options throughout hospital vending machines ● Launches fellowship-wide retreat focused on well-being issues and activities
Assessment Models or Tools	● Fellowship feedback sessions ● Group interview or discussions for team activities ● Individual interview ● Institutional online training modules ● Reflective writing ● Self-assessment and personal learning plan ● Semi-annual evaluation
Curriculum Mapping	●
Notes or Resources	● This subcompetency is not intended to evaluate a fellow's well-being. Rather, the intent is to ensure that each fellow has the fundamental knowledge of factors that affect well-

	being, the mechanisms by which those factors affect well-being, and available resources and tools to improve well-being. ● ACGME. “Well-Being Tools and Resources.” https://dl.acgme.org/pages/well-being-tools-resources. 2020. ● ACP. Physician Well-Being and Professional Fulfillment. https://www.acponline.org/practice-resources/physician-well-being-and-professional-fulfillment. 2020. ● Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: personal and professional development. *Acad Pediatr*. 2014;14(2 Suppl):S80-97. https://www.sciencedirect.com/science/article/abs/pii/S187628591300332X. 2020. ● Journal of Graduate Medical Education. Hot Topics: Remediation. https://jgme.org/page/hottopics/remediation. 2020 ● Journal of Graduate Medical Education. Hot Topics: Resident Well-Being. https://jgme.org/page/hottopics/resident_well_being. 2020. ● 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; to identify communication barriers; to use self-reflection to identify biases and minimize them in the doctor-patient relationships; to organize and lead communication around shared decision making	
Milestones	**Examples**
Level 1 *Uses clear language and non-verbal behavior to demonstrate respect and establish rapport* *Identifies common barriers to effective communication*	● Introduces self and faculty member, identifies patient and others in the room, and engages all parties in health care discussion ● Identifies need for trained interpreter with non-English-speaking patients
Level 2 *Establishes and maintains a therapeutic relationship with the patient using active listening and clear language in straightforward encounters* *Identifies complex barriers to effective communication*	● Uses patient-centered language when discussing vaccinations with hesitant patients ● Prioritizes and sets agenda at the beginning of the appointment for a new patient with HIV ● Recognizes the need for handouts with diagrams and pictures to communicate information to a patient with low literacy
Level 3 *Establishes and maintains a therapeutic relationship using effective communication behaviors in challenging patient encounters* *Adjusts communication strategies based on identified barriers, incorporating patient and caregiver expectations and goals of care*	● Acknowledges patient's request for empiric Lyme disease treatment in context of chronic fatigue, and arranges timely follow-up to align diagnostic plan with goals of care ● In a discussion with the faculty member, acknowledges transference in caring for a patient with sacral osteomyelitis who does not engage in off-loading ● Participates in a family meeting to determine a plan of care for a terminally ill patient who speaks American Sign Language (ASL), and arranges for an ASL interpreter to be present
Level 4 *Establishes and maintains therapeutic relationships using shared decision making, regardless of complexity* *Proactively improves communication by addressing barriers, including patient and biases*	● Continues to engage with and adjust treatment goals of patient with HIV who is not on antiretroviral therapy and regularly engages in condomless sex ● Reflects on bias related to injection drug use and recurrent endocarditis and solicits input from faculty about mitigation of communication barriers when counseling around cessation of substance use
Level 5 *Serves as a role model in establishing respectful, culturally sensitive therapeutic relationships while mitigating communication barriers and engaging in critical self-reflection*	● Leads a group discussion on personal experience of moral distress in caring for a difficult patient ● Develops a residency curriculum on bias ● Serves on a hospital bioethics committee

Assessment Models or Tools	● Direct observation ● End-of-rotation evaluations ● Multisource feedback ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● Laidlaw A, Hart J. Communication skills: an essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. *Med Teach*. 2011;33(1):6-8. https://www.tandfonline.com/doi/full/10.3109/0142159X.2011.531170. 2020. ● Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. *Acad Med*. 2001;76(4):390-393. https://journals.lww.com/academicmedicine/Fulltext/2001/04000/Essential_Elements_of_Communication_in_Medical.21.aspx#pdf-link. 2020. ● Makoul G. The SEGUE Framework for teaching and assessing communication skills. *Patient Educ Couns*. 2001;45(1):23-34. https://www.sciencedirect.com/science/article/abs/pii/S0738399101001367?via%3Dihub. 2020. ● Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in residents. *BMC Med Educ*. 2009;9:1. https://bmcmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1. 2020. ● Harvard. Preliminary Information. https://implicit.harvard.edu/implicit/takeatest.html. 2020.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication **Overall Intent:** To effectively communicate with the health care team, including other consultants, in both straightforward and complex situations	
Milestones	**Examples**
Level 1 *Communicates information effectively in a manner that demonstrates respect for all members of the interprofessional team*	● Receives consult request for a patient with cellulitis, asks clarifying questions politely, and expresses gratitude for the consult ● Acknowledges the contribution of each member of the infectious disease consult team to the patient
Level 2 *Solicits feedback on performance as a member of the health care team and adjusts communication approach to team needs, promoting open and safe communication*	● Asks medical student for feedback on teaching ● Sends a message in EHR to the infectious disease pharmacist to clarify drug dosing recommendations and therapeutic monitoring
Level 3 *Facilitates interprofessional team communication to reconcile conflict and provides constructive feedback to team members*	● Initiates electronic communication among consulting teams to discuss safety of brain biopsy for intracranial lesion ● Reviews rotating resident's infectious disease consult note and provides feedback on the assessment and plan
Level 4 *Leads and facilitates regular interdisciplinary discussions, including in complex and challenging situations*	● Arranges for meeting among consulting teams to discuss possibility of removal of infected prosthesis, including risks and benefits ● Discusses with infectious disease pharmacist regarding use of restricted antibiotic for a septic patient with a history of a multidrug resistant organism, pending antimicrobial susceptibility data
Level 5 *Models and coaches flexible communication strategies that facilitate excellence in interprofessional teamwork*	● Coaches resident member of the infectious disease consult team on discussing recommendations with the team requesting consult
Assessment Models or Tools	● Direct observation ● End-of-rotation evaluations ● Multisource feedback ● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● Green M, Parrott T, Cook G., Improving your communication skills. *BMJ*. 2012;344:e357. https://www.bmj.com/content/344/bmj.e357. 2020. ● Henry SG, Holmboe ES, Frankel RM. Evidence-based competencies for improving communication skills in graduate medical education: a review with suggestions for implementation. *Med Teach*. 2013;35(5):395-403. https://www.tandfonline.com/doi/full/10.3109/0142159X.2013.769677. 2020.

	● Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. *Med Teach*. 2019;41(7):1-4. https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1481499. 2020. ● François J. Tool to assess the quality of consultation and referral request letters in family medicine. *Can Fam Physician*. 2011;57(5):574–575. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3093595/. 2020. ● Fay D, Mazzone M, Douglas L, Ambuel B. A validated, behavior-based evaluation instrument for family medicine residents. *MedEdPORTAL*. 2007. https://www.mededportal.org/doi/10.15766/mep_2374-8265.622. 2020. ● Dehon E, Simpson K, Fowler D, Jones A. Development of the faculty 360. *MedEdPORTAL*. 2015;11:10174. http://doi.org/10.15766/mep_2374-8265.10174. 2020. ● Lane JL, Gottlieb RP. Structured clinical observations: a method to teach clinical skills with limited time and financial resources. *Pediatrics*. 2000;105:973-7. https://pubmed.ncbi.nlm.nih.gov/10742358/. 2020. ● Braddock CH, Edwards KA, Hasenberg NM, Laidley TL, Levinson W. Informed decision making in outpatient practice: time to get back to basics. *JAMA*. 1999;282:2313-2320. https://pubmed.ncbi.nlm.nih.gov/10612318/. 2020.

Interpersonal and Communication Skills 3: Communication within Health Care Systems **Overall Intent:** To effectively communicate using a variety of methods	
Milestones	**Examples**
Level 1 *Accurately documents comprehensive and current information* *Communicates using formats specified by institutional policy to safeguard patient personal health information*	● Documentation of a patient transferred from an outside facility with *Staphylococcus aureus* bacteremia includes relevant blood culture data from the transferring institution ● Shreds patient list after rounds; avoids talking about patients in the elevator ● Exercises care in discussing HIV status of a patient when family present in room
Level 2 *Documents encounter, including clinical reasoning in an organized manner* *Selects direct and indirect forms of communication based on context, with guidance*	● Outlines clinical reasoning behind obtaining brain imaging in an immunocompromised patient with *Nocardia* pulmonary infection ● Develops documentation templates for the inpatient consult rotations ● Pages surgical resident to discuss findings in operating room per infectious disease attending's recommendation
Level 3 *Documents encounter through prioritized and concise yet thorough notes* *Independently selects direct and indirect forms of communication based on context*	● Consultation note on a patient with meningitis of unclear etiology includes prioritized list of diagnostic tests to obtain on cerebrospinal fluid ● Receives notification of positive blood culture on a clinic patient and immediately calls the patient ● Calls health department to obtain historical data about syphilis treatment in patient with a positive *Treponema pallidum* antibody test and negative rapid plasma regain
Level 4 *Concisely documents clinical reasoning, including anticipatory guidance, while satisfying institutional billing needs and compliance* *Models effective written and verbal communication*	● Provides anticipatory guidance on needing to change therapy to amphotericin from fluconazole if lumbar puncture is positive in an immunocompetent patient with cryptococcal pneumonia ● Talks directly to an emergency room physician about breakdowns in communication regarding delay to initiation of antibiotics in patient with sepsis
Level 5 *Coaches others in accurately documenting diagnostic and therapeutic reasoning* *Guides departmental or institutional communication policies and procedures*	● Coaches rotating resident on documentation of timing of follow-up imaging for a patient with an undrained intraabdominal abscess who is being discharged ● Leads a task force established by the hospital QI committee to develop a plan to improve transition of patients requiring IV antibiotics from the inpatient to outpatient setting
Assessment Models or Tools	● Direct observation ● End-of-rotation evaluations ● Multisource feedback

	● Reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● Bierman JA, Hufmeyer KK, Liss DT, Weaver AC, Heiman HL. Promoting responsible electronic documentation: validity evidence for a checklist to assess progress notes in the electronic health record. *Teach Learn Med.* 2017 Oct-Dec;29(4):420-432. ● Starmer, Amy J., et al. I-pass, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129.2:201-204. https://pubmed.ncbi.nlm.nih.gov/22232313/. 2020. ● Haig, K.M., Sutton, S., Whittington, J. SBAR: a shares mental model for improving communications between clinicians. *Jt Comm J Qual Patient Saf*. 2006 Mar;32(3):167-75. https://pubmed.ncbi.nlm.nih.gov/16617948/. 2020.

Available Milestones Resources

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

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

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

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

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

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

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

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

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

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

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

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

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