



Entrustable Professional Activities

EPA 4 for Pediatric Infectious Diseases

EPA 4: Management of Pediatric Patients with Complex Medical Problems and a Proven or Suspected Infectious Disease

Supervision Scale for This EPA

1. Trusted to observe only
2. Trusted to execute with direct supervision and coaching
3. Trusted to execute with indirect supervision and discussion of information conveyed for most simple and some complex cases
4. Trusted to execute with indirect supervision but may require discussion of information conveyed for a few complex cases
5. Trusted to execute without supervision

Description of the Activity

A key role for subspecialists is to provide consultation for the medical care of medically complex children with complicated, unusual, enigmatic, and opportunistic infections and those that are critically ill in both hospital and outpatient settings.

Examples of Key Clinical Syndromes

- Short gut, congenital infection, severe neurologic compromise, and chronic organ related disease
- Immune compromised host (e.g., oncologic process, inflammatory bowel disease (IBD), rheumatologic disease, human immunodeficiency virus (HIV) and transplant populations (bone marrow transplant (BMT) and solid organ)

The specific functions which define this EPA include:

1. Obtaining essential information to develop and prioritize a working differential diagnosis of potential infectious diseases with consideration of the chronic disease process
2. Performing a targeted physical exam relevant to the clinical question(s), the chronic disease process(s), and the possible infectious process
3. Utilizing appropriate laboratory tests to confirm or exclude diagnoses
4. Applying knowledge about the epidemiology and pathophysiology of opportunistic, unusual, complicated, and fulminant infections in children with specific immune compromising conditions (primary and acquired immune deficiencies, immune suppression from medications, barrier defects, etc.) to formulate appropriate diagnostic and therapeutic management plans.
5. Choosing **empiric** antimicrobial therapy based on the differential diagnoses, the most likely diagnosis, and the local antibiogram with consideration of a possible need for therapeutic adjustments based on the underlying chronic disease process
6. Developing **targeted** antimicrobial therapy including dosing, duration, and route of administration for specific infectious diseases, considering the underlying chronic disease state, and relevant culture and susceptibility results



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7. Accessing and applying medical literature regarding the patient's infectious process with consideration of how the presence of underlying chronic disease may affect the applicability of the available literature for a specific patient
8. Forging a therapeutic alliance in a collaborative manner with the primary medical and surgical patient team(s) and other consultant teams by advocating infectious disease recommendations to members of the health care team, patients, and families as appropriate
9. Coordinating and leading necessary infectious disease related follow-up care

Judicious Mapping to Domains of Competence

- Patient Care
- Medical Knowledge
- Practice-Based Learning and Improvement
- Interpersonal and Communication Skills
- Professionalism
- Systems-Based Practice
- Personal and Professional Development

Competencies Within Each Domain Critical to Entrustment Decisions

PC 1:	Gathering information
PC 6:	Using optimal clinical judgment
PC 9:	Counseling patients and families
MK 2:	Practicing EBM
ICS 5:	Consultative role
PPD 7:	Demonstrating self-confidence

Context for the EPA

Rationale: Pediatric infectious diseases (ID) specialists are consistently relied upon for their expertise to optimize the diagnosis and treatment of routine and opportunistic infections in medically complex patients, including critically ill patients in both inpatient and outpatient settings.

Scope of Practice: This document is intended to address the scope of knowledge and essential skills that must be mastered by the pediatric ID physician in order to diagnose and treat medically complex patients including patients who are immunocompromised as a result of treatments or underlying disease processes in the inpatient and outpatient settings. The activities detailed in this EPA range from use of specific diagnostic tools to optimize diagnosing the infection to patient and disease specific treatment strategies which may be complicated by the context (e.g., sociodemographics, health literacy) as well as the underlying disease process. The pediatric ID physician often provides clinical care to children with immune compromising conditions, innate disorders of immunity, and other complicated disease processes. Collaboration with other subspecialties and care teams is critical to provide comprehensive patient centered care in these settings.

Curricular Components That Support the Functions of the EPA

1. Obtaining essential information to develop and prioritize a working differential diagnosis of potential infectious diseases with consideration of the chronic disease process



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- Recognizes that the risk of an opportunistic infection is increased in children with immune compromising conditions and or medical complexity (e.g., pneumocystis in bone marrow transplant (BMT) patient).
 - Recognizes the pathogen-specific risk to the patient based on underlying disease process (e.g., BK virus after renal transplant)
 - Demonstrates knowledge of specific infection risks based on underlying disease process (e.g., line-associated bacteremia and short-bowel syndrome)
 - Recognizes that patients with immune compromising conditions and medical complexity are more likely to be infected with drug-resistant pathogens
 - Determines whether the presentation of the infectious process appears to be an acute, subacute, or chronic infection
2. Performing a targeted physical exam relevant to the clinical question(s), the chronic disease process(s), and the possible infectious process
- Distinguishes normal and key abnormal findings relevant to the suspected infectious process on physical exam, keeping in mind that physical exam findings may be subtle or absent in immunocompromised patients (e.g., absence of purulence with neutropenia)
 - Interprets physical exam findings in the context of the patient's history and clinical features of the suspected infectious process
 - Synthesizes physical exam findings into a unified diagnosis when possible, while acknowledging that immune compromised and medically complex patients may exhibit signs/symptoms of more than one infectious disease simultaneously
3. Utilizing appropriate laboratory tests to confirm or exclude diagnoses
- Recognizes that the ideal testing method may be different in an immunocompromised host in comparison to a healthy host (e.g., polymerase chain reaction (PCR) rather than serology to diagnose Epstein Barr Virus (EBV); antigen detection or culture instead of serology to diagnose disseminated histoplasmosis)
 - Prioritizes testing based on the most likely diagnoses and treatable pathogens
 - Analyzes test results within the clinical context of the patient to determine the likelihood of a diagnosis
 - Recognizes higher costs are associated with multiple repeat tests in a short time frame and limited utility of the information provided (e.g., serum PCR testing multiple times in one week)
 - Recommends appropriate laboratory testing based on the specimen type and likelihood of a positive result in an immunocompromised patient
4. Applying knowledge about the epidemiology and pathophysiology of opportunistic, unusual, complicated, and fulminant infections in children with specific immune compromising conditions (primary and acquired immune deficiencies, immune suppression from medications, barrier defects, etc.) to formulate appropriate diagnostic and therapeutic management plans
- Recognizes infections caused by opportunistic pathogens in very-low-birth-weight infants in intensive care units (e.g., coagulase-negative staphylococcus, *Candida* sp.)
 - Identifies the most likely pathogens and the preferred means of diagnosis of opportunistic infections in immune compromised patients (e.g., Human Immunodeficiency Virus (HIV) infection)
 - Understands that asplenic patients are at increased risk of fulminant infections with certain encapsulated organisms (e.g., sickle cell disease and pneumococcus)



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- Knows that patients who receive immune suppressive drugs, including immune modulators, to treat their underlying disease process are at risk for specific infections (e.g., reactivation of histoplasmosis infection with tumor necrosis factor [TNF- α] inhibitors)
 - Identifies the most likely pathogen and type of infection in patients with primary immune deficiencies (e.g., *S. marcescens* in patients with chronic granulomatous disease [CGD])
 - Recognizes the types of infection that patients are most at risk for following BMT or solid organ transplant and the time frame in which they occur
 - Recognizes a new clinical presentation of a known pathogen or a new scenario suggesting a previously unrecognized pathogen/syndrome
5. Choosing **empiric** antimicrobial therapy based on the differential diagnoses, the most likely diagnosis, and the local antibiogram with consideration of a possible need for therapeutic adjustments based on the underlying chronic disease process
- Develops an empiric therapy management plan for common infections including
 - Invasive fungal disease
 - Pneumocystis pneumonia (PCP)
 - EBV-related lymphoproliferative disease
 - Cytomegalovirus (CMV) disease
 - Herpes Simplex Virus (HSV) disease
 - Sepsis
 - Upper respiratory/ lower respiratory infections
 - Central nervous system (CNS) infections (meningitis, brain abscess)
 - Ear, nose and throat (ENT) infections (peritonsillar, retropharyngeal, mastoiditis, acute otitis media)
 - Osteoarticular
 - Lymphoreticular
 - Genitourinary/renal
 - Intraabdominal/intestinal/hepatobiliary
 - Skin/soft tissue/muscle
 - Reproductive/sexually transmitted
 - Cardiovascular/endovascular
 - Ophthalmologic infection
 - Odontogenic infection
 - Systemic syndromes (e.g., systemic inflammatory response syndrome, Tick borne, toxic shock syndrome)
6. Developing **targeted** antimicrobial therapy including dosing, duration, and route of administration for specific infectious diseases, considering the underlying chronic disease state, and relevant culture and susceptibility results
- Knows the local epidemiology and antibiogram to guide empiric therapy for a suspected diagnosis (e.g., cystic fibrosis patients)
 - Uses susceptibility results including MICs to determine definitive therapy and instances when more specific resistance testing should be performed (e.g., colistin susceptibility in the setting of carbapenem resistant *Enterobacteriaceae*, antifungal susceptibilities in the setting of neonatal candidiasis)



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- Uses antimicrobial specific pharmacokinetics (PK)/pharmacodynamics (PD) data along with the patient's underlying disease process to target appropriate therapy (e.g., aminoglycosides in a cystic fibrosis patient)
 - Identifies when combination therapy is needed to adequately treat an infection
 - Knows when transition from parenteral to enteral therapy is not indicated in a medically complex patient (e.g., poor enteral absorption in a short gut patient)
 - Recognizes that treatment may be prolonged or result in chronic suppression in the setting of immune compromise or medical complexity (e.g., chronic suppression with retained infected hardware)
 - Develops an appropriate plan to select antimicrobials in the setting of potential interaction from other medications or certain disease processes (e.g., voriconazole in the setting of vincristine, known seizure disorder and carbapenems)
7. Accessing and applying medical literature regarding the patient's infectious process with consideration of how the presence of underlying chronic disease may affect the applicability of the available literature for a specific patient
- Interprets the grading system for levels of evidence for clinical practice guidelines (e.g., clinical practice guideline for invasive fungal infections).
 - Utilizes the existing literature when available, and when appropriate, extrapolates data from other populations to determine suitable duration of therapy for various infectious disease processes.
 - Acknowledges that in the medically complex patient, evidence may not always be available, and that collaborating with experts in the field may be the only guide to develop the appropriate treatment plan
8. Forging a therapeutic alliance in a collaborative manner with the primary medical and surgical patient team(s) and other consultant teams by advocating infectious disease recommendations to members of the health care team, patients, and families
- Utilizes open and ongoing communication strategies between the primary team, patient, family, and consult team in a culturally competent manner
 - Acts in a collaborative manner with interdisciplinary team members who are also involved in the care of the patient, while recognizing when it is appropriate to advocate for infectious diseases specific recommendations (e.g., mediastinitis in a patient with congenital heart disease)
 - Recognizes diagnoses in which collaboration with another subspecialty is indicated (e.g., ENT in the setting of invasive fungal sinusitis)
 - Participates in or may lead care conferences or team meeting to align patient/family and multidisciplinary teams to optimize care of the patient (e.g., end-of-life/futility of care discussions).
 - Coordinates care that is multidisciplinary, comprehensive, accessible, and patient-centered meeting the medical, social, developmental, behavioral, mental health, educational, and financial needs of the patient and family
 - Demonstrates the ability to maintain a calm and collected manner to optimize communication in highly charged situations
9. Coordinating and leading necessary infectious disease related follow up care
- Coordinates follow up in infectious diseases clinic in conjunction with other scheduled health care visits.
 - Plans and coordinates necessary follow up, including laboratory monitoring and subsequent testing for immunocompromised and medically complex patients (e.g., voriconazole levels and galactomannan testing; monitors neutropenia in the setting of prolonged β -lactam use)



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- Communicates recommendations for ongoing outpatient infectious disease-related therapies with the primary and subspecialty teams, patients, families, home health services, and other health care teams as needed

EPA Authors

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