

## **Subspecialty Rotation: Pediatric Infectious Diseases (Pediatric ID)**

### **Children's Hospital & Research Center at Oakland**

**Primary Goals for the Pediatric Infectious Diseases rotation are to cover the following topics:**

**1. Immunodeficiency. Understand the role of the general pediatrician in the assessment and management of patients with immunodeficiency. (PC, MK, ICS, PBL)**

1.a. Identify the signs and symptoms of immunodeficiency diseases, and differentiate immunodeficiency from other causes of acute and chronic disease, as well as primary from secondary immunodeficiency disorders.

1.b. Organize immunodeficiency diseases into five pathophysiologic categories (antibody, cellular-mediated, combined, complement, phagocytic) and distinguish etiologic types (e.g., genetic, post-infectious, post-chemotherapy).

1.c. Discuss the indications, clinical significance, and limitations of diagnostic tests and procedures to assess immune function. Interpret the results of tests of: CBC (especially evaluation for age-appropriate ALC and ANC), lymphocyte (T, B, NK cell) number and function, immunoglobulin levels, antibody function, mitogen and antigen assay for lymphocyte function, DTH skin testing, complement levels, and neutrophil assays, as well as laboratory evaluations for secondary immune disorders, such as HIV and CF.

1.d. Demonstrate the initial approach to evaluation, treatment and referral for a child with suspected immunodeficiency.

1.e. Discuss treatment options available for patients with primary immunodeficiency disorders and the potential harm of blood transfusions and vaccines in these patients.

1.f. Understand and develop a treatment plan for a child with immunodeficiency, including pharmacologic management, precautions, and immunizations.

**2. Prevention, Counseling and Screening (Infectious Disease). Understand the role of the pediatrician in preventing infectious diseases, and in counseling and screening individuals at risk for these diseases. (PC, MK, ICS, PL, SBP)**

2.a. Provide routine counseling about infectious disease prevention to all parents and patients, addressing:

1. Common infectious diseases of childhood
2. Routine immunization for the prevention of common childhood infections and illnesses.
3. The role of hand hygiene in preventing the spread of infectious diseases.

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

4. Behaviors that reduce risk of infectious disease transmission and acquisition (e.g., breastfeeding, avoidance of exposure to environmental tobacco smoke, avoidance of crowded settings such as daycare, schools, institutions).
5. Behaviors that may spread HIV, such as unsafe sexual practices, needle sharing and pregnancy.

2.b. Provide counseling to parents/patients with specific infectious diseases about:

1. HIV testing, transmission and followup.
2. TB exposure, expected course, treatment and transmission.
3. Hepatitis B expected course, treatment and transmission.

2.c. Provide routine and appropriate screening for infectious disease processes.

1. Screen for tuberculosis in high risk populations and as schools require.
2. Screen for hepatitis, parasites, and other disease processes in new immigrants as appropriate.
3. Counsel and screen pregnant women and screen newborns for HIV.
4. Screen sexually abused children for sexually transmitted diseases (STDs), such as gonococcus, chlamydia, human immunodeficiency virus, hepatitis B, and syphilis.
5. Screen sexually active adolescents for STDs at health visits.
6. Take measures to prevent Group B streptococcus in newborns
7. List situations in which screening is not appropriate but may be requested (e.g. suspected exposure to bacterial meningitis).

2.d. Educate daycare organizations and providers about policies and methods that decrease the spread of infection in childcare settings, and about unnecessary exclusion policies.

2.e. Discuss with parents how the overuse of antibiotics has contributed to the development of antibiotic-resistant strains of common pathogens, and help them to understand when withholding antibiotic treatment is safe and effective.

**3: Normal Versus Abnormal States as they apply to Infectious Diseases. (MK, PC, ICS, PL)**

3.a. Describe normal variability in body temperature, the factors that regulate body temperature, and use of body temperature to identify infection. Include factors that influence normal core body temperature.

3.b. Explain to parents the significance and appropriate response to fever in children of various ages.

3.c. Compare and contrast different methods used to obtain body temperature, including type of thermometer (glass, digital, infrared radiation, skin strip) and

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement  
ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

measurement sites (axillary, oral, rectal, tympanic, skin).

3.d. Explain the symptoms and physical findings that suggest the presence of an infectious disease.

3.e. Take an exposure history that provides clues to a specific diagnosis (include questions about ill contacts, travel, pets or other animal exposures, occupation, insect bites, and diet).

3.f. Explain the difference between a descriptive diagnosis based on the anatomic syndrome involved (e.g., exudative pharyngitis) and an etiologic diagnosis (e.g., group A streptococcal infection) and the diagnostic studies appropriate for each type.

3.g. Interpret clinical and laboratory tests to identify infectious diseases.

**4: Undifferentiated Signs and Symptoms (Infectious Disease). Evaluate, treat, and/or refer patients with presenting signs and symptoms that may indicate an infectious disease process. (PC,MK, PBL)**

4.a. Create a strategy to evaluate whether the following presenting signs and symptoms are caused by an infectious disease process and describe the diagnostic studies, specific therapy, consultation, or referral needed.

1. Fever
2. Headache
3. Disorientation
4. Anorexia
5. Weight loss
6. Conjunctival redness and drainage
7. Orbital swelling or redness
8. Ear pain, drainage, or protrusion
9. Sore throat
10. Rhinorrhea
11. Cough
12. Tachypnea
13. Sinus pain
14. Tooth pain
15. Facial swelling
16. Stridor

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

17. Shortness of breath
18. Vomiting
19. Diarrhea
20. Abdominal pain
21. Jaundice
22. Dysuria/urinary frequency
23. Hematuria
24. Penile or vaginal discharge
25. Painful or swollen joints
26. Limb pain
27. Limp
28. Skin rash, erythema, or discoloration
29. Adenopathy
30. Hepatomegaly
31. Splenomegaly
32. Apparent life threatening event
33. Stiff neck
34. Hematochezia
35. Seizures
36. Umbilical drainage
37. Chest pain

**5: Common Conditions Not Referred (Infectious Disease). Diagnose and manage infectious disease conditions that do not require referral. (MK, PC, PBL, ICS)**

5.a. Diagnose, explain, and manage the following infectious diseases:

1. Upper respiratory: common cold, pharyngitis, otitis media and externa, sinusitis and facial cellulitis.
2. Oral/pharyngeal: herpetic gingivostomatitis, herpangina, oral thrush (candida), parotitis, parapharyngeal and odontogenic infections and enteroviral enanths.
3. Middle airway: croup syndrome, pertussis.

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement  
ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

4. Lower airway: pneumonia (chlamydial, mycoplasma, bacterial, viral), bronchiolitis, and latent tuberculosis infection.
5. GI tract: esophagitis, enteritides (bacterial, viral, parasitic, antibiotic associated colitis), hepatitis (A, E, G), Helicobacter pylori.
6. Renal: urinary tract infections, differentiating between pyelonephritis and cystitis.
7. Genital: urethritis, vaginitis, epididymitis, orchitis, cervicitis, and uncomplicated pelvic inflammatory disease.
8. CNS: aseptic meningitis, post-varicella encephalitis, and acute cerebellar ataxia associated with varicella.
9. Skin: bacterial (impetigo, cellulitis, furuncles, carbuncles), dermatophytes, candidal dermatitis, infestations (scabies and lice), and viral (common warts, venereal warts, molluscum contagiosum and herpes simplex virus).
10. Eyes: conjunctivitis, blepharitis, hordeolum (sty) and preseptal (periorbital) cellulitis.
11. Parasites: pinworms, Toxocara canis, ascariasis, hookworm, and giardia.
12. Systemic: viral exanthems (measles, varicella, herpes simplex virus, parvovirus, rubella, human herpes virus 6), zoonoses (cat scratch disease), and viruses (infectious mononucleosis syndrome with either Epstein-Barr virus, Cytomegalovirus, or toxoplasma, respiratory syncytial virus disease, influenza, enterovirus, adenovirus).
13. Perinatal: focal infections of the scalp, mastitis, omphalitis, group B strep, and candidal infections.
14. Infants/toddlers: potential occult bacteremia.
15. Adolescents: sexually transmitted diseases (see genital infections).
16. Fever without localizing signs in various age groups.
17. . Fever in patient with underlying disease (e.g., in a patient with congenital heart disease).

**6: Conditions Generally Referred (Infectious Disease). Recognize and initiate therapy in patients with infectious disease conditions that require consultation or referral. (PC, MK, PBL, ICS, SBP)**

6.a. Identify, explain, initially manage, and refer the following infectious diseases:

1. Upper respiratory: mastoiditis.
2. Oral/pharyngeal: peritonsillar, retropharyngeal, and dental abscesses.
3. Middle airway: epiglottitis, bacterial tracheitis, pertussis (symptoms requiring further evaluation and/or admission).

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement  
ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

4. Lower airway: fungal pneumonia, severe or complicated pneumonia, parapneumonic effusion, empyema and lung abscess.
5. Heart: endocarditis, thrombophlebitis, pericarditis, myocarditis, mediastinitis and acute rheumatic fever.
6. GI tract: hepatic abscess, cholangitis/cholecystitis, chronic hepatitis B, C and D, hemolytic uremic syndrome, pancreatitis, appendicitis, peritonitis, and abscess.
7. Renal and perinephric abscesses.
8. Genital: complicated PID and tubo-ovarian abscess.
9. Musculoskeletal: osteomyelitis, septic arthritis, discitis, and pyomyositis.
10. CNS: complicated bacterial meningitis, brain abscess, epidural, subdural and paraspinal abscesses, encephalitis, transverse myelitis, peripheral neuropathies (diphtheria, botulism, tetanus), acute cerebellar ataxia not associated with varicella and Guillain-Barre, acute disseminated encephalomyelitis (ADEM), and partially treated meningitis.
11. Soft tissue: staphylococcal scalded skin, toxic epidermal necrolysis, fasciitis
12. Eyes: orbital cellulitis, keratitis and endophthalmitis.
13. Systemic: zoonoses/arthropod borne disease (brucella, leptospirosis, cat scratch, Ehrlichia, tularemia, Lyme, Rocky Mountain spotted fever) and Kawasaki disease.
14. Intrauterine infections: CMV, rubella, parvovirus B19, syphilis, toxoplasmosis, herpes simplex virus (HSV), and varicella.
15. Other: prenatal exposure to or congenital human immunodeficiency virus, acquired immunodeficiency syndrome, tuberculosis, systemic fungal infections, disseminated gonococcal infection, endotoxin shock, toxic shock, fever of unknown origin, fever and neutropenia, fever in immunocompromised patients.
16. Immunocompromised hosts: acquired immunodeficiency syndrome, chemotherapy, steroid suppression, primary immunodeficiency, and organ or stem cell transplant recipient.
17. Newborn: perinatal herpes, perinatal systemic fungal, varicella, and enteroviral sepsis.

6.b. Identify the role and general scope of practice of infectious diseases; recognize situations where children benefit from the skills of specialists trained in the care of children; and work effectively with these professionals to care for children with infectious diseases.

**7: Human Immunodeficiency Virus (HIV). Recognize, screen for, refer, and co-manage patients with HIV. (PC,MK, ICS, PL, PBL, SBP)**

7.a. Describe the pathophysiology, natural history, presenting signs and symptoms,

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

and associated opportunistic infections in patients with HIV.

7.b. Identify the risk factors for perinatal transmission of HIV, tests for screening and confirmatory diagnosis, and indications for referral, including asymptomatic HIV-infected patients.

7.c. Describe risk factors and symptoms that should prompt testing for HIV infection in neonates, children, and adolescents.

7.d. Review HIV infection, the related risks of opportunistic infections, the use of laboratory parameters (e.g., CD4 counts and viral load measures) to monitor clinical course, general treatment modalities (including chemoprophylaxis), and the common complications and toxicities of anti-HIV medications.

7.e. Identify the indicators for referral of the patient to an infectious disease specialist.

7.f. Demonstrate the ability to obtain proper informed consent for HIV testing, including legal requirements in California.

**8: Use of Antibiotics. Use antibiotics appropriately in managing infections in children.** (PC,MK, PBL)

8.a. When caring for pediatric patients with common infections, determine when and whether drug therapy should be instituted.

8.b. For common infections, demonstrate the ability to select an appropriate antibiotic, dose and route, based on antimicrobial mechanism of action, spectrum of activity, adverse effects, drug interactions, drug penetration, and relative costs.

8.c. For certain common infections, such as otitis media and sinusitis, describe the circumstances when withholding antibiotic treatment may be safe and effective, what precautions should be used when withholding drug therapy, and strategies for achieving parental acceptance of withholding/delaying antibiotics.

8.d. Correctly prescribe antimicrobials based upon knowledge of local susceptibility/resistance patterns for common pathogens.

8.e. Review the role and thought process of the specialist when dealing with patients who have complex or life threatening illnesses, such as the use of static versus bactericidal drugs, drug combinations and synergies, and monitoring patients for toxicity and efficacy.

8.f. Develop familiarity with several reliable resources for information on common antibiotics, resistance patterns and new treatments for infectious diseases, and consistently use current information when prescribing antibiotics.

**9: Immunizations. Use vaccines to prevent common childhood diseases.** (PC,MK, PL, ICS, SBP)

9.a. Describe the currently recommended immunization schedules for preventing infections in children.

9.b. Administer routine immunizations with related counseling that addresses contraindications and common side effects, and obtain informed consent.

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

9.c. Give examples of circumstances justifying special immunizations, such as indications for influenza vaccine and pneumococcal vaccine, and vaccination of infants born to a hepatitis B carrier, immunosuppressed patients and family contacts (including those on steroids), HIV positive children, and children adopted from other countries.

9.d. Identify appropriate referral sources for children traveling internationally who may need additional vaccinations.

9.e. Identify reliable sources for up-to-date information on new vaccines and recommended administration.

9.f. Explain the rationale for routine immunizations to parents who question their necessity.

9.g. Describe current federal laws related to immunization of children and the requisite office documentation (including National Childhood Vaccine Injury Act and Vaccine Adverse Event Reporting System [VAERS]).

9.h. Describe quality control measures for effective office administration of common vaccines.

9.i. Explain effective methods to increase vaccination rates among children.

9.j. Discuss appropriate uses of passive antibodies including intravenous immunoglobulin (IVIG), hepatitis B immune globulin (HBIG), tetanus immune globulin (TIG), rabies immune globulin (RIG), and palivizumab.

9.k. Discuss use of immunization to prevent disease after known exposure to disease (e.g., varicella and measles).

**10: Infection Control. Understand principles of infection control in pediatric care settings.** (SBP, PL, ICS, PC, MK)

10.a. Discuss principles of hospital-based infection control and employee health issues (as addressed by OSHA).

10.b. Explain the three forms of isolation precautions (contact, droplet, and airborne) and discuss which infections require which precaution.

10.c. Describe and follow current guidelines for infectious disease exclusion policies in school and daycare and explain their rationale.

10.d. Identify and manage infections commonly seen in daycare settings.

10.e. Describe effective infection control procedures appropriate for daycare, school, and household settings.

10.f. Identify resources for up-to-date information on infection prevention and treatment for international travellers/adoptees.

10.g. Explain the indications for chemo- and immuno-prophylaxis in common infections (meningitis, hepatitis) including indications for use of gamma globulin and management of chickenpox exposure in the immunosuppressed child.

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement  
ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

10.h. Counsel patients in the prevention of sexually transmitted infections and report confirmed cases to local public health authorities.

10.i. Describe appropriate prophylaxis for persons exposed to certain illnesses (e.g., pertussis, measles, Haemophilus influenzae type B infections, meningococcus, hepatitis A).

10.j. Recognize illnesses potentially associated with outbreaks (e.g., meningococemia, E. coli O157:H7, cholera, measles, and pertussis) and report confirmed or suspected cases to the local public health authorities.

10.k. Recognize illnesses consistent with bioterrorism (e.g., smallpox, anthrax) and report suspected cases to the local public health authorities.

**11: Laboratory Procedures (Infectious Disease). Understand the laboratory methods used in pediatrics relating to the diagnosis and management of infectious diseases in children. [see also TABLE 7.2: Diagnostic and Screening Procedures] (PC, MK)**

11.a. Identify principles of office laboratory testing, including quality assurance and clinical laboratory improvement amendments (CLIA) regulations.

11.b. Identify specific tests available for the diagnosis of various infectious diseases. Know the importance of proper specimen collection and its effect on results, explain the limitations of those tests (sensitivity, specificity, predictive values, cost), and describe the difference between colonization with normal flora, colonization with a potential pathogen, and infection.

11.c. Describe principles of clinical application of rapid diagnostic techniques for common pathogens (e.g., particle agglutination, rapid strep tests, monoclonal FA tests).

11.d. Discuss the principles and clinical application of the following:

1. Serologic tests such as Western immunoblot and enzyme-linked immunosorbent assay (ELISA).
2. Molecular biologic tests including: polymerase chain reaction (PCR), Southern Blot, and in situ hybridization.
3. Susceptibility testing including: minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC), and synergy and antagonism.
4. Antibiotic serum concentrations and serum bactericidal titers
5. Screening test results versus diagnostic test results, and differences in the use and interpretation of such tests.

**12: Professional Competencies in Brief (ID Subspecialty). Demonstrate standards of professional competence while working with patients under the care of a subspecialist.**

Competency 1. Patient Care. Provide family centered patient care that is developmentally and age appropriate, compassionate, and effective for the treatment of health problems and the promotion of health.

1.1: With help of subspecialist, hone skills in identifying key history

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement  
ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

and exam needed to evaluate children presenting with conditions related to this organ system/specialty area.

1.2: Use a logical and appropriate clinical approach to the care of patients presenting for specialty care, applying principles of evidence-based decision-making and problem solving.

1.3: Know general indications for subspecialty procedures and interpret results for families.

Competency 2. Medical Knowledge. Understand the scope of established and evolving biomedical, clinical, epidemiological and social-behavioral knowledge needed by a pediatrician; demonstrate the ability to acquire, critically interpret and apply this knowledge in patient care.

2.1: Critically evaluate current medical information and scientific evidence related to this subspecialty area and modify your knowledge base accordingly.

2.2: At the beginning and end of a rotation or clinical experience, clarify your learning needs related to this subspecialty.

Competency 3. Interpersonal and Communication Skills. Demonstrate interpersonal and communication skills that result in information exchange and partnering with patients, their families and professional associates.

3.1: Talk to family members about sensitive issues that relate to a patient's illness, e.g., coping with the child's altered needs in his/her home setting.

3.2: Communicate effectively with physicians, other health professionals, and health related agencies to create and sustain information exchange and team work for patient care.

3.3: Maintain accurate, legible, timely, and legally appropriate medical records for subspecialty patients in the outpatient and inpatient setting.

Competency 4. Practice-based Learning and Improvement Demonstrate knowledge, skills and attitudes needed for continuous self-assessment, using scientific methods and evidence to investigate, evaluate, and improve one's patient care practice.

4.1: Identify standardized guidelines for diagnosis and treatment of complex diseases and learn the rationale for adaptations that optimize treatment.

4.2: Identify personal learning needs, systematically organize relevant information resources for future reference, and plan for continuing data acquisition if appropriate.

Competency 5. Professionalism. Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity.

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

5.1: Demonstrate personal accountability to the well being of all patients, even when other physicians are primarily responsible for their care, for example, by following up on lab results, writing comprehensive notes, seeking answers to difficult patient care questions, and communicating with primary care physicians.

5.2: Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical and legal principles, and sensitivity to diversity while providing care to children.

Competency 6. Systems-Based Practice. Understand how to practice quality health care and advocate for patients within the context of the health care system.

6.1: Demonstrate sensitivity to the costs of clinical care in this subspecialty setting, and take steps to minimize costs without compromising quality.

6.2: Recognize the limits of one's knowledge and expertise and take steps to avoid medical errors.

6.3: Understand key aspects of health care systems as they apply to care of patients and their families, including cost control, billing, and reimbursement.

6.4: Recognize and advocate for families who need assistance to deal with systems complexities, such as lack of insurance, multiple medication refills, multiple appointments with long transport times, or inconvenient hours of service.

## Procedures

**13. Technical and therapeutic procedures.** Describe the following procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

Abscess: incision and drainage of superficial abscesses [RRC-E]

Abscess: aspiration

Bladder: catheterization [RRC-T]

Conjunctival swab

Lumbar puncture [RRC-T]

Medication delivery: IM/SC/ID

Medication delivery: IV

PPD: placement

Rectal swab

Skin scraping

### ACGME Competencies:

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice

Sterile technique

Suctioning: nares

Thoracentesis [RRC-T]

Throat swab

**14. Diagnostic and screening procedures.** Describe the following tests or procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

PPD: interpretation

Radiologic interpretation: chest x-ray

Radiologic interpretation: sinus films

**ACGME Competencies:**

PC = Patient Care MK = Medical Knowledge PBL = Practice-Based Learning and Improvement

ICS = Interpersonal and communication Skills PL = Professionalism SBP = Systems-Based Practice