

# Pediatric Infectious Disease 7110 Syllabus

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## Contact Information

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## Course Information

### Brief Description of Course

The Infectious Disease rotation is an experience for Medical Students in their fourth year. Through ID consultations in conjunction with faculty, fellows and independent reading, the ID rotation will provide students with a working knowledge of evaluation and management of common infectious disease problems, as well as a working knowledge of areas important to infectious disease, such as immunizations and hospital acquired infections. Students will learn a thoughtful approach to infectious disease problems, including acquiring data, developing a differential diagnosis, obtaining diagnostic tests, and treatment. Students will develop an understanding of the choices, proper uses, adverse effects, and laboratory testing for antibiotics commonly used in pediatric infections.

### Course Goals

As a result of successfully completing this course, students will be able to:

### Required Objectives:

- Understand the role of the pediatrician in preventing infectious diseases, and in counseling and screening individuals at risk for these diseases. **(This is complimentary to the curriculum of the Pediatric Clerkship and outpatient experiences. Most of these topics fall more within general pediatrics)**
  - Provide routine counseling about infectious disease prevention to all parents and patients, addressing:
    - Common infectious diseases of childhood
    - Routine immunization for the prevention of common childhood infections and illnesses
    - The role of hand hygiene in preventing the spread of infectious diseases
    - 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)
    - Behaviors that may spread HIV, such as unsafe sexual practices, needle sharing and pregnancy
  - Provide counseling to parents and patients with specific infectious diseases about: HIV testing, transmission and follow-up TB exposure, expected course, treatment and transmission Hepatitis B expected course, treatment and transmission.
  - Provide routine and appropriate screening for infectious disease processes.
    - Screen for tuberculosis in high-risk populations and as schools require.
    - Screen for hepatitis, parasites, and other disease processes in new immigrants as appropriate.
    - Counsel and screen pregnant women for HIV and screen newborns whose mothers were not tested.
    - Screen sexually abused children for sexually transmitted diseases (STDs), such as *Neisseria gonorrhoea*, *Chlamydia trachomatis*, human immunodeficiency virus, hepatitis B, and syphilis.
    - Screen sexually active adolescents for STDs at health visits.
    - Take measures to prevent Group B strep in newborns.
  - Educate daycare organizations and providers about policies and methods that decrease the spread of infection in child care settings, and about unnecessary exclusion policies.
  - Discuss with parents how the overuse of antibiotics contributes to the development of antibiotic-resistant strains of common pathogens, and help them understand when withholding antibiotic treatment is safe and effective.
- Differentiate between normal and pathologic states related to infectious disease.
  - 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

- Explain to parents the significance and appropriate response to fever in children of various ages.
  - Compare and contrast different methods used to obtain body temperature, including type of thermometer (glass, digital, infrared radiation, skin strip) and measurement sites (axillary, oral, rectal, tympanic, skin).
  - Explain the symptoms and physical findings that suggest the presence of an infectious disease.
    - 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).
    - 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.
    - Interpret clinical and laboratory tests to identify infectious diseases.
  - Create a strategy to evaluate, treat, and/or refer patients with presenting signs and symptoms that may indicate an infectious disease process.
  - Differentiate whether presenting signs and symptoms are caused by an infectious disease process
  - Describe the diagnostic studies, specific therapy, consultation or referral needed.
3. Recognize and manage the following infectious diseases generally not requiring referral
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| <ul style="list-style-type: none"> <li>• Pharyngitis</li> <li>• Otitis Media</li> <li>• Sinusitis</li> <li>• Bronchiolitis</li> <li>• Croup</li> <li>• Cervical adenitis</li> <li>• Pneumonia – uncomplicated</li> <li>• Infectious diarrhea – uncomplicated</li> </ul> | <ul style="list-style-type: none"> <li>• Urinary tract infection – uncomplicated</li> <li>• Neonatal sepsis syndrome</li> <li>• Cellulitis – uncomplicated</li> <li>• Meningitis – viral</li> <li>• Hepatitis – uncomplicated</li> <li>• Septic arthritis – uncomplicated</li> </ul> |
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4. Recognize, initiate management and refer patients with infectious disease conditions that require consultation or referral.
- Identify and initiate treatment for conditions typically treated with consultation
 

<ul style="list-style-type: none"> <li>• Fever of unknown origin</li> <li>• Osteomyelitis – complicated</li> <li>• Septic arthritis – uncomplicated</li> <li>• Pneumonia – complicated</li> <li>• Meningitis – bacterial</li> <li>• Meningitis – neonatal</li> <li>• Meningitis – fungal</li> <li>• Encephalitis</li> <li>• Mastoiditis</li> <li>• Epiglottitis</li> <li>• Bronchiolitis or pneumonia due to RSV in the immunocompromised host</li> <li>• Pneumocystis pneumonia</li> <li>• Pneumonia in an immunosuppressed patient</li> <li>• Infective endocarditis</li> <li>• Myocarditis</li> <li>• Pericarditis</li> <li>• Osteomyelitis</li> <li>• Urinary tract infection – complicated</li> <li>• Sexually transmitted diseases – complicated</li> <li>• Infectious diarrhea – complicated</li> <li>• Hepatitis – complicated</li> <li>• Peritonitis</li> <li>• Cellulitis – complicated</li> <li>• Septic shock</li> <li>• Pediatric HIV/AIDS</li> <li>• Pertussis, severe</li> </ul>	<ul style="list-style-type: none"> <li>• Toxic shock syndromes</li> <li>• Tuberculosis</li> <li>• Systemic fungal infections</li> <li>• Severe common viral infections: measles, varicella etc.</li> <li>• Kawasaki disease</li> <li>• Zoonoses</li> <li>• Chronic Lymphadenopathy</li> </ul>
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- Recognize and refer to specialist care diseases which the general pediatrician must recognize immediately as life threatening.
    - Septic shock
    - Meningococemia
    - Meningitis – bacterial, fungal
    - Encephalitis
    - Epiglottitis
    - Infective endocarditis
    - *Pneumocystis jirovecii* pneumonia
    - Severe childhood viral infections: RSV, HSV, CMV
    - Pneumonia with parapneumonic empyema, multilobar disease
    - Myocarditis, pericarditis
    - Peritonitis
    - Pyelonephritis
    - Rocky Mountain spotted fever
    - Plague
    - Fever in neutropenic child
5. Use antibiotics appropriately in managing infections in children.
    - When caring for pediatric patients with common infections, determine when and whether drug therapy should be instituted.
    - 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 costs.
    - 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.
    - Correctly prescribe antimicrobials based upon knowledge of local susceptibility/resistance patterns for common pathogens.
    - 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 vs. bactericidal drugs, drug combinations and synergies, and monitoring patients for toxicity and efficacy.
    - 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.
    - Know when to stop empiric therapy when tests do not confirm a bacterial infection.
  6. Use antibiotics appropriately in managing infections in children.
    - When caring for pediatric patients with common infections, determine when and whether drug therapy should be instituted.
    - 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 costs.
    - 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.
    - Correctly prescribe antimicrobials based upon knowledge of local susceptibility/resistance patterns for common pathogens.
    - 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 vs. bactericidal drugs, drug combinations and synergies, and monitoring patients for toxicity and efficacy.
    - 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.
    - Know when to stop empiric therapy when tests do not confirm a bacterial infection
  7. Use vaccines to prevent common childhood diseases.
    - Describe the currently recommended immunization schedules for preventing infections in children.
    - Administer routine immunizations with related counseling that addresses contraindications and common side effects, and obtain informed consent.

- 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.
  - Identify appropriate referral sources for children traveling internationally who may need additional vaccinations.
  - Identify reliable sources for up-to-date information on new vaccines and recommended administration.
  - Explain the rationale for routine immunizations to parents who question their necessity.
  - 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]).
  - Describe quality control measures for effective office administration of common vaccines.
  - Explain effective methods to increase vaccination rates among children.
  - 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. Discuss use of immunization to prevent disease after known exposure to disease (e.g., varicella and measles).
8. Understand the laboratory methods used in pediatrics relating to the diagnosis and management of infectious diseases in children.
- Identify principles of office laboratory testing, including quality assurance and clinical laboratory improvement amendments (CLIA) regulations.
  - 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.
  - Describe principles of clinical application of rapid diagnostic techniques for common pathogens (e.g., particle agglutination, rapid strep tests, monoclonal FA tests).
  - Discuss the principles and clinical application of the following:
    - Serologic tests such as Western immunoblot and enzyme-linked immunosorbent assay (ELISA)
    - Molecular biologic tests including: polymerase chain reaction (PCR), Southern Blot, and in situ hybridization
    - Susceptibility testing including: minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC), and synergy and antagonism Antibiotic serum concentrations and serum bactericidal titers
    - Screening test results vs. diagnostic test results, and differences in the use and interpretation of such tests
9. Understand principles of infection control in pediatric care settings.
- Discuss principles of hospital-based infection control and employee health issues (as addressed by OSHA).
  - Explain the three forms of isolation precautions (contact, droplet, and airborne) and discuss which infections require which precaution.
  - Describe and follow current guidelines for infectious disease exclusion policies in school and daycare and explain their rationale.
  - Identify and manage infections commonly seen in day care settings.
  - Describe effective infection control procedures appropriate for day care, school and household settings.
  - Identify resources for up-to-date information on infection prevention and treatment for international travelers/adoptees.
  - Explain the indications for chemo- and immuno-prophylaxis in common infections (meningitis, hepatitis), including indications for use of gamma globulin and management of chicken pox exposure in the immunosuppressed child.
  - Counsel patients in the prevention of sexually transmitted diseases and report confirmed cases to local public health authorities
  - Describe appropriate prophylaxis for persons exposed to certain illnesses (e.g., pertussis, measles, Haemophilus influenzae Type B infections, meningococcus, hepatitis A).
  - Recognize illnesses potentially associated with outbreaks (e.g., meningococemia, E. coli O157:H7, cholera, measles, pertussis) and report confirmed or suspected cases to the local public health authorities.
  - Recognize illnesses consistent with bioterrorism (e.g., smallpox, anthrax) and report suspected

### Optional Objectives:

1. Understand the role of the general pediatrician in the assessment and management of patients with immunodeficiency.
  - 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.
  - Organize immunodeficiency diseases into five pathophysiologic categories (antibody, cellular-mediated, combined, complement, phagocytic) and distinguish etiologic types (e.g., genetic, post-infectious, post-chemotherapy).
  - Discuss the indications, clinical significance and limitations of diagnostic tests and procedures to assess immune function.
  - Interpret the results of the following tests: 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.
  - Demonstrate the initial approach to evaluation, treatment and referral for a child with suspected immunodeficiency.
  - Discuss treatment options available for patients with primary immunodeficiency disorders and the potential harm of blood transfusions and vaccines in these patients.
  - Under supervision of an immunologist, develop a treatment plan for a child with immunodeficiency, including pharmacologic management, precautions, and immunizations.
  
2. Diagnose, explain and manage the following infectious diseases generally not requiring referral
  - **Upper respiratory:** facial cellulitis
  - **Oral/pharyngeal:** herpetic gingivostomatitis, herpangina, oral thrush (candida), parotitis, parapharyngeal and odontogenic infections and enteroviral enanthems
  - **Middle airway:** pertussis
  - **Lower airway:** pneumonia (chlamydial, mycoplasma, bacterial, viral), and latent tuberculosis infection
  - **GI tract:** esophagitis, *Helicobacter pylori*
  - **Renal:** differentiating between pyelonephritis and cystitis
  - **Genital:** urethritis, vaginitis, epididymitis, orchitis, and uncomplicated pelvic inflammatory disease
  - **CNS:** post-varicella encephalitis, and acute cerebellar ataxia associated with varicella
  - **Skin:** bacterial (impetigo, furuncles, carbuncles), dermatophytes, candidal dermatitis, infestations (scabies and lice), and viral (common warts, venereal warts, molluscum contagiosum and herpes simplex virus)
  - **Eyes:** conjunctivitis, blepharitis, hordeolum (sty) and preseptal (periorbital) cellulitis
  - **Parasites:** pinworms, *Toxocara canis*, ascariasis, hookworm and giardia
  - **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)
  - **Perinatal:** focal infections of the scalp, mastitis, omphalitis, Group B strep and candidal infections
  - **Infants/toddlers:** potential occult bacteremia
  - **Adolescents:** sexually transmitted diseases (see genital infections) Fever without localizing signs in various age groups. Fever in patient with underlying disease (e.g., in a patient with congenital heart disease)
  
3. Recognize, explain, initiate therapy and refer patients with infectious disease conditions that require consultation or referral.
  - **Oral/pharyngeal:** peritonsillar, retropharyngeal and dental abscesses
  - **Middle airway:** bacterial tracheitis
  - **Lower airway:** fungal pneumonia, lung abscess
  - **Heart:** thrombophlebitis, mediastinitis and acute rheumatic fever
  - **GI tract:** hepatic abscess, cholangitis/cholecystitis, hemolytic uremic syndrome, pancreatitis, appendicitis, abscess  
Renal and perinephric abscesses
  - **Genital:** complicated PID and tubo-ovarian abscess
  - **Musculoskeletal:** discitis and pyomyositis
  - **CNS:** brain abscess, epidural, subdural and paraspinal abscesses, transverse myelitis, peripheral neuropathies (diphtheria, botulism, tetanus), acute cerebellar ataxia not associated with varicella and Guillain-Barre, acute disseminated encephalomyelitis (ADEM)
  - **Soft tissue:** staphylococcal scalded skin, toxic epidermal necrolysis, fasciitis
  - **Eyes:** orbital cellulitis, keratitis and endophthalmitis
  - **Systemic:** arthropod borne disease (brucella, leptospirosis, cat scratch, Ehrlichia, tularemia, Lyme)
  - **Intrauterine infections:** rubella, parvovirus B19, toxoplasmosis

- **Other:** prenatal exposure to or congenital human immunodeficiency virus, disseminated gonococcal infection, endotoxin shock, fever and neutropenia, fever in immunocompromised patients
  - **Immunocompromised hosts:** chemotherapy, steroid suppression, primary immunodeficiency, and organ or stem cell transplant recipient
  - **Newborn:** perinatal herpes, varicella and enteroviral sepsis. Congenital CMV infection.
  - 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.
4. Human Immunodeficiency Virus (HIV). Recognize, screen for, refer and co-manage patients with HIV.
- Describe the pathophysiology, natural history, presenting signs and symptoms, and associated opportunistic infections in patients with HIV.
  - Identify the risk factors for perinatal transmission of HIV, tests for screening and confirmatory diagnosis, and indications for referral, including asymptomatic HIV infected patients.
  - Describe risk factors and symptoms that should prompt testing for HIV infection in neonates, children and adolescents.
  - 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.

## Course Format & Schedule

### Timeline

	Monday	Tuesday	Wednesday	Thursday	Friday
<b>8:00 AM</b>	Pre-rounding established patients	Morning report Pre-rounding established patients	Pre-rounding established patients	Grand Rounds Pre-rounding	Pre-rounding established patients
<b>9:00 AM</b>	Team rounds with attending	Team rounds with attending	Team rounds with attending	Team rounds with attending	Team rounds with attending  Intern Lecture Series
<b>12:00 PM</b>	ID Noon Conference or Noon Conference	PCMC Clinical Microbiology Lab/ID Rounds	Noon Conference	Noon Conference	Noon Conference
<b>1:00 PM</b>	Consults/Clinic Independent study	Consults Independent study	Consults Independent study	Consults/Clinic Independent study	Consults Independent study
<b>4:00 PM</b>				ID Case conference UUMC 4 <sup>th</sup> floor	

### Educational and Instructional Modalities

#### Role of the Student in this Course

- The student rotating with Pediatric Infectious Diseases will attend the related conferences
  - Ped ID/Clinical Micro. Laboratory Conference (PCMC), Tuesday noon
  - Medicine/Ped ID Case Conference (UUHSC), Thursday PM (as clinical load allows)
- Student will participate in the independent workup of new patient ID consultations
- Student will participate in the follow-up of established patients with daily Pediatric ID rounds with the attending. Students generally "pre-round" on patients before meeting with the attending. Many residents and students prefer to bring these notes to rounds for modification. An ID progress note should include:

- Subjective interim findings
- Objective data and a careful pertinent physical exam
- Pertinent new and pending data relevant to the ID consult
- An assessment and plan. It is very important for the student to think through the data and propose a plan to the attending or fellow. Due to regulatory issues, the attending or resident will have to write the assessment and plan
- Students may have the opportunity to participate in regular ID clinics and Travel Clinic as time allows
- Students will participate in discussions of the telephone consultations we receive every day from physicians in Salt Lake and the intermountain region.
- Students are responsible for using the online resources to read about topics which may not be seen on the inpatient service.
- Students are responsible for completing the evaluation of the rotation and the attendings. We pay close attention to these.
- Motivated students may participate in the publication of worthwhile case reports.

### Required Textbook(s)/Readings

Book Title + ISBN	Author/Publisher/Edition	Appx Cost
<u>Principles and Practice of Pediatric Infectious Diseases</u> , 4 <sup>th</sup> Edition	Long SS, Pickering LK, Prober CG, Editors. Churchill Livingstone, 2002	
<u>Principles and Practice of Infectious Disease</u> , 7 <sup>th</sup> Edition	Mandell, Bennett, and Dolin, Editors. Churchill Livingstone, 2005	
American Academy of Pediatrics, <u>Report of the Committee on Infectious Diseases</u> , 1997 (The Red Book)		
<u>Infectious Diseases of the Fetus and Newborn Infant</u> , 4 <sup>th</sup> Edition	Remington JS and Klein JO, Editors. WB Saunders, 1995	
<u>Textbook of Pediatric Infectious Diseases</u> , 4 <sup>th</sup> Edition	Feigin RD and Cherry JD, Editors. Churchill Livingstone, 2002	

### Additional Resources

#### On-Line Resources/ Reading/ Resource List:

- Useful articles are online in the Resident Research section of the PCMC home page, under Infectious Diseases. These constitute the core readings to cover issues we do not see in consultation.
- Canvas is available for additional educational resources and links.
- IDSA (Infectious Diseases Society of America) Guidelines
- Up-to-date is available on line. It is very useful for quick review before or after seeing a new patient to clarify your thinking
- The Red Book (see below) is available on line, on PDA or hard copy. It should always be consulted about questions of isolation, prophylaxis or vaccination. Every Pediatrician should have one and use it well.

## Assessment & Grading

### Preceptor Evaluations

#### Assessments –

Assessment/Assignment	Due Date	Weight towards Final Grade
Preceptor Evaluations		100%

### Grading System

Students will receive a final letter grade of PASS (P), or FAIL (F) for this course.

PASS: A student who achieves the criteria (grade above 1.7) will be assigned a grade of PASS for the course.

FAIL: A student who fails to achieve the criteria for PASS will be assigned a grade of FAIL for the course.

## Student Feedback

Student feedback is important and helps identify opportunities to improve the course.

At the conclusion of each course, clerkship or rotation medical students are required to complete a summative evaluation. Evaluations are completed electronically and remain confidential.

## Standard Policies

Please refer to the Student Handbook (on the Student Affairs website) for these policies:

- Accommodations**
- Addressing Sexual Misconduct**
- Attendance policy**
- Dress Code**
- Examination and Grading Policies**
- Grade or Score Appeal**
- Professionalism, Roles & Responsibilities**
- Mistreatment**

## Center for Disability & Access Services

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability and Access, 162 Olpin Union Building, 581-5020 (V/TDD). Staff of the Center for Disability and Access will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability and Access.

The Senior Director of the Academic Success Program, Dr. Steven Baumann (1C047B SOM Dean's Office, 587-3671, or [steven.baumann@hsc.utah.edu](mailto:steven.baumann@hsc.utah.edu)), serves as the liaison between the School of Medicine and the Center for Disability and Access.