# GUIDELINES FOR INITIAL THERAPY FOR COMMON PEDIATRIC INFECTIONS

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**The use of the following guidelines for empiric therapy should include patient-specific information, including drug allergies** (see Allergy resources and ASP HSM for additional context) **and renal/liver function; decisions should be based on the judgment of the clinician. Definitive therapy should be used when culture results/data are available.**

| Diagnosis | | Usual Etiology | Suggested Empiric Therapy | Usual Duration of Treatment | Ref. |
|---|---|---|---|---|---|
| **Central Nervous System** | | | | | |
| **Bacterial meningitis** | Neonatal | *S. agalactiae* (GBS)<br>*L. monocytogenes*<br>*E. coli*<br>*Klebsiella spp.* | Ampicillin + ceftazidime if < 4 weeks corrected age<br><br>* Pediatric ID consult recommended<br>(consideration in the ddx of neonatal viral infections and/or TORCH infections) | *S. agalactiae* (GBS): 14-21 days<br>*L. monocytogenes*: ≥ 21 days<br>Aerobic gram-negative bacilli (e.g., *E. coli*, *Klebsiella* spp.)[ǂ]: 21 days<br>[ǂ] Longer treatment courses recommended if clinical improvement is delayed or complicated meningitis (e.g., cerebritis, abscess, empyema, encephalomalacia, areas of infarcts) | (1), (2) |
| | Ages > 1 month | *S. pneumoniae*<br>*N. meningitidis*<br>*H. influenzae* | Ceftriaxone + vancomycin | *S. pneumoniae*: 10-14 days<br>*N. meningitidis*: 7 days<br>*H. influenzae*: 7 days | (1) |
| Brain abscess | | *Streptococcus spp.* (e.g., *S. anginosus* group, *S. pneumoniae, S. pyogenes*)<br>*S. aureus*<br>Enterobacterales spp.<br>*H. influenzae*<br>Anaerobes (e.g., *Bacteroides, Fusobacterium spp; Prevotella*)<br>*Citrobacter spp.* (typically neonates) | Ceftriaxone + metronidazole + vancomycin<br><br>* Pediatric ID, ENT, and Neurosurgical consults recommended | 4 – 6 weeks | (3) |
| **Healthcare- associated meningitis/ventriculitis** | | *S. aureus*<br>Coagulase-negative staphylococci (CoNS)<br>Aerobic gram-negative bacilli (including *P. aeruginosa,* multidrug resistant gram-negative organisms)<br>*C. acnes* | Cefepime + vancomycin<br><br>*Pediatric ID consult recommended | *S. aureus* or gram-negative bacilli: ≥ 10-14 days[ǂ]<br>CoNS or *C. acnes* (minimal CSF pleocytosis, normal CSF glucose): ≥ 10 days[ǂ]<br>CoNS or *C. acnes* (significant CSF pleocytosis, low CSF glucose): ≥ 10-14 days[ǂ]<br>[ǂ]Days after last positive culture<br>Note: Shunt removal is recommended | (4) |

| Diagnosis | Usual Etiology | Suggested Empiric Therapy | Usual Duration of Treatment | Ref. |
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| **Ears, Nose, Throat & Respiratory Tract** | | | | |
| Acute otitis media (AOM) | *S. pneumoniae*<br>*H. influenzae*<br>*M. catarrhalis* | Observation (no antibiotics): Observation without antibiotics is an option for children ≥ 6 to 23 months old with non-severe AOM and unilateral infection AND for all children ≥ 24 months with non-severe symptoms.[1,2] Initiate antibiotic therapy if the patient worsens or fails to improve within 48 to 72 hr of symptom onset.<br><br>1st line when antibiotic therapy indicated: Amoxicillin 45 mg/kg/dose BID, max 2 gm/dose<br><br>Recent amoxicillin within last 30 days, history of recurrent AOM unresponsive to amoxicillin, or concurrent purulent conjunctivitis: Amoxicillin-clavulanate (see link)<br><br>*For allergy alternatives, refer to AOM outpatient algorithm* | < 2 years or severe symptoms[1] — 10 days<br>2 - 5 years w/ mild-moderate symptoms — 7 days<br>≥ 6 years w/ mild-moderate symptoms — 5 days<br>1. Severe symptoms in all ages include temperature ≥ 39°C (102.2°F) in the past 48 hrs, moderate to severe otalgia, otalgia for ≥ 48 hours, or TM perforation.<br>2. Patients who are immunocompromised and/or with craniofacial abnormalities should receive immediate antibiotic therapy. | (5) |
| Cervical lymphadenitis | *Streptococcus pyogenes*<br>*S. aureus* (MSSA)<br>Oral anaerobes | Amoxicillin-clavulanate (see link)<br><br>If penicillin or amoxicillin allergy, clindamycin | Uncomplicated or adequate source control:<br>5-10 days (tailor duration based on resolution of signs and symptoms) | (6), (7) |
| | *S. aureus* (MRSA) | Trimethoprim-sulfamethoxazole (oral option)<br>OR<br>Vancomycin (IV only)<br>OR<br>Clindamycin, if susceptible | | (8) |
| | Non-tuberculous mycobacteria (e.g., MAC) | Surgical excision typically curative. Start antimycobacterial therapy only if incomplete or no surgical excision or if recurrent disease. Medical treatment controversial, includes macrolide + (ethambutol AND/OR rifabutin OR rifampin) | If antimycobacterial drugs indicated, duration may require >12 weeks | (6), (9) |
| | *Mycobacterium tuberculosis* | Refer to LPCHS "Drug-Susceptible Tuberculosis Therapy Guideline" (link)<br>*Pediatric ID consult recommended | | (6), (10) |
| | *Bartonella henselae* (uncomplicated cat scratch disease) | Azithromycin<br>*Pediatric ID consult recommended for complicated disease (e.g., osteitis, hepatosplenic disease) | 5 days | (6) |
| **Epiglottitis** | *H. influenzae*<br>*Streptococcus spp.*<br>*S. pneumoniae*<br>*S. aureus* | Ceftriaxone<br><br>If septic appearing, consider adding vancomycin | 7 - 10 days | (11), (12) |
| **Malignant otitis externa** | *Pseudomonas spp.*<br>*S. aureus* (less frequent) | Cefepime<br><br>For oral step-down therapy, ciprofloxacin<br>*Pediatric ID consult recommended | ≥ 6 weeks (surgical intervention often indicated) | (13) |
| | *Aspergillus spp.* | Voriconazole<br>*Pediatric ID consult recommended | >12 weeks | (14) |

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| **Mastoiditis** | Acute | *S. pneumoniae*<br>Beta hemolytic streptococci<br>*S. aureus*<br>*H. influenzae*<br>*Fusobacterium spp.* | Ampicillin-sulbactam<br><br>Ceftriaxone + metronidazole is an option for patients with a history of non-type IV allergy to penicillin or amoxicillin (see Allergy resources and ASP HSM for additional context).<br><br>Consider vancomycin if MRSA risk factors<br><br>Consider transition to oral regimen (e.g., amoxicillin-clavulanate, see link) when clinically appropriate<br><br>Consider surgical drainage<br>*Pediatric ID consult recommended | Uncomplicated: 10 days<br><br>Complicated (including extra- and intracranial complications including subperiosteal abscess or osteomyelitis): 4 weeks | (15), (16), |
| | Chronic or recurrent AOM | *P. aeruginosa*<br>Enteric gram-negative bacteria<br>*S. aureus*<br>*S. pneumoniae*<br>Anaerobes | Cefepime + metronidazole + vancomycin<br>*Pediatric ID consult recommended | 4 weeks | (16), (17) |
| **Odontogenic infection** | Mild, no abscess | Polymicrobial;<br>Viridans group streptococci<br>*Peptostreptococcus*<br>*Actinomyces*<br>*Lactobacillus* spp. | Amoxicillin 15 mg/kg/dose TID, max 500 mg/dose<br><br>If NPO, ampicillin<br>If penicillin or amoxicillin allergic, clindamycin | 7 days or until 3 days after symptom resolution (whichever is longer) with surgical intervention | (18 - 20) |
| | Moderate/severe, abscess | As above and follows:<br>*Prevotella* spp.<br>*Neisseria* spp.<br>*Fusobacterium* spp.<br>*Clostridium* spp.<br>*Staphylococcus* spp.<br>*Eikenella* spp.<br>**Caution**: Culture results may have poor recovery of all pathogens involved | Ampicillin-sulbactam<br><br>If penicillin or amoxicillin allergy (non-type IV), cefazolin + metronidazole (see Allergy resources and ASP HSM for additional context) | 7 - 10 days or until 3 days after symptom resolution (whichever is longer) with surgical intervention<br><br>*Consider transition IV to oral in patients without bacteremia if surgically controlled and clinical improving (e.g., amoxicillin-clavulanate, see link) | (47 - 51) |
| | Severe, abscess, with no clinical improvement after initial therapy | | Cefepime + metronidazole + vancomycin<br><br>*Pediatric ID consult recommended | ≥ 10 days or until 3 days after symptom resolution (whichever is longer) with surgical intervention | |
| **Peritonsillar, parapharyngeal, or retropharyngeal abscess** | | Beta hemolytic streptococci<br>*S. aureus* (MSSA or MRSA)<br>Respiratory anaerobes (e.g., *Fusobacterium*)<br>Kawasaki disease | Ampicillin-sulbactam<br><br>If penicillin or amoxicillin non-type IV allergy, ceftriaxone + metronidazole (see Allergy resources and ASP HSM for additional context)<br><br>Add vancomycin for toxic appearing patients pending culture results | Parapharyngeal or retropharyngeal abscess: 14 days<br><br>Submandibular space infections: 2-3 weeks<br><br>*Consider transition to oral regimen (e.g., amoxicillin-clavulanate, see link) when clinically appropriate | (21) |

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| **Pertussis** | | *B. pertussis*<br>*B. parapertussis* | Azithromycin<br><br>If azithromycin contraindicated: Trimethoprim-sulfamethoxazole (TMP/SMX) in children ≥ 2 months | Azithromycin x 5 days<br>TMP/SMX x 14 days (avoid in children <2 months) | (22) |
| **Pharyngitis** | | Beta hemolytic streptococci (Group A streptococci) | Amoxicillin 50 mg/kg/dose once daily, max 1 gm/dose<br>OR<br>Penicillin VK (patients ≤ 27 kg: 250 mg BID and patients > 27 kg: 500 mg BID)<br><br>*For allergy alternatives, refer to Streptococcal Pharyngitis outpatient algorithm* | Penicillin VK, amoxicillin, clindamycin: 10 days<br>Azithromycin: 5 days<br><br>**GAS resistance to clindamycin and macrolides (e.g., azithromycin) is commonly reported and on the rise. Use of alternatives is discouraged unless absolutely necessary. Consider culture with susceptibility testing if using these alternative agents.* | (23), (54) |
| | | *Arcanobacterium* | Azithromycin | | |
| **Pneumonia** | Aspiration pneumonia | *Enteric Gram negative*<br>*Oral flora*<br>*Anaerobic bacteria* | Ampicillin<br><br>If not fully immunized or failed amoxicillin or ampicillin, ceftriaxone<br><br>If empyema or lung abscess is present, ampicillin-sulbactam or ceftriaxone + (clindamycin or metronidazole)<br><br>If hospital-acquired aspiration pneumonia, piperacillin-tazobactam | 7 - 10 days | (24), (25) |
| | Community-acquired pneumonia<br>(Ages >3 months) | *S. pneumoniae*<br>Group A streptococci<br>*S. aureus*<br>Viruses<br>*M. pneumoniae, C. pneumoniae* if school-aged children and adolescents | PO: Amoxicillin 45 mg/kg/dose BID (max 2 gm/dose)<br><br>If not fully immunized, amoxicillin-clavulanate (see link)<br><br>*For allergy alternatives, refer to "Clinical Pathways" (see link)*<br><br>IV: Ampicillin<br><br>If not fully immunized, abscess or empyema present, or critically ill, ceftriaxone<br><br>*For patients > 5 years of age, consider addition of azithromycin for suspected atypical pneumonia | Uncomplicated: 5 days<br>Complicated (parapneumonic effusion or empyema): Prolonged, typically 2-4 weeks<br><br>*Consider transition IV to oral in patients without bacteremia if clinically improved (as early as 2–3 days after the start of IV therapy) | (26) |
| | Hospital-acquired pneumonia | *S. aureus* (MRSA)<br>*P. aeruginosa*<br>Gram-negative bacilli (*E. coli, Klebsiella, Serratia, Enterobacter*) | [Cefepime OR piperacillin-tazobactam OR meropenem] + vancomycin (guided by results of MRSA nasal swab)<br><br>*Pediatric ID consult recommended | Duration should be guided by improvement in clinical and laboratory parameters, although evidence suggests that 7 days of therapy is sufficient in most cases | (27) |

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| Sinusitis | *S. pneumoniae*<br>*H. influenzae*<br>*M. catarrhalis*<br>*S. aureus* (dental origin)<br>Anaerobes (chronic) | Persistent or worsening sinusitis [a]:<br>Amoxicillin 45 mg/kg/dose BID (max 2 gm/dose) OR<br>22.5 mg/kg/dose BID (max 1750 mg/dose)<br>• Patients with the following risk factors should be treated with high-dose amoxicillin-clavulanate (see link):<br>Age < 2 years, immunocompromised, recent daycare attendance, receipt of antibiotics within the last 30 days.<br>Severe sinusitis[1]: Amoxicillin-clavulanate (see link)<br>*For allergy alternatives, refer to Sinusitis outpatient algorithm*<br>Severe infection requiring hospitalization: Ampicillin-sulbactam | Non-severe: 7 days<br>Severe: 10 days<br>Requiring hospitalization: Min. of 10 days; consider prolonged duration (e.g., intracranial extension).<br>[a] To diagnosis acute bacterial sinusitis, patient must meet at least **one** of the clinical presentation categories*:*<br>- **Persistent illness**: Nasal discharge (of any quality) or daytime cough or both lasting more than 10 days without improvement.<br>- **Worsening course**: Worsening or new onset of nasal discharge, daytime cough, or fever after initial improvement.<br>- **Severe onset:** Concurrent fever (temperature ≥ 39°C/102.2°F) with purulent nasal discharge and/or facial pain at least 3 days. | (28), (29), (65), (66) |
| **Eye** | | | | |
| **Dacrocystitis (neonatal)** | *S. aureus*<br>*S. pneumoniae*<br>Some cases involving gram-negative rods such as *H. influenzae* and *Moraxella sp.* | IV: Ampicillin-sulbactam<br>If post-menstrual age (PMA) > 41 weeks, not hyperbilirubinemic, and not receiving calcium containing IV fluids: Ceftriaxone<br>PO: Amoxicillin-clavulanate (see link), Cephalexin<br>If concern for MRSA, add Vancomycin. | 10 - 14 days | (67) |
| **Orbital cellulitis** | *S. pneumoniae*<br>Streptococci<br>*S. aureus*<br>*H. influenzae* (un-immunized)<br>Anaerobes | Ampicillin/sulbactam<br>If concern for extension into CNS: ceftriaxone + metronidazole + vancomycin<br>*Pediatric ID consult recommended, if complicated | Uncomplicated: 2-3 weeks<br>Complicated: ID consult<br>Transition IV to oral amoxicillin-clavulanate (see link) when clinically improved | (30) |
| **Preseptal (periorbital) cellulitis** | *S. pneumoniae*<br>*S. aureus*<br>Beta hemolytic streptococci<br>*H. influenzae* | PO: Amoxicillin-clavulanate (see link)<br>IV: Ampicillin-sulbactam<br>*If extensive cellulitis or ill appearing patient, consider adding vancomycin pending culture results | 7 - 10 days<br>Transition IV to oral amoxicillin-clavulanate when clinically improving | (31) |
| **Heart** | | | | |
| Endocarditis **(bacterial)** | ***Pediatric ID consult recommended** | | | (32) |
| **Blood** | | | | |
| **Sepsis** | Refer to LPCH "Severe Sepsis/Septic Shock Pathway" per the Clinical Pathways and Target Based Care Website | | | |
| **Staphylococcal bacteremia**<br>*Pediatric ID consult required for *S. aureus* bacteremia per policy. | *S. aureus* (MSSA or MRSA)<br>*S. lugdunensis* | Methicillin-sensitive: Cefazolin OR nafcillin<br>Methicillin-resistant: Vancomycin<br>If history of delayed type IV allergic reaction to penicillin or amoxicillin, or allergy to vancomycin: Daptomycin (MRSA or MSSA)<br>*S. aureus* has a propensity to form biofilms; line removal is strongly recommended. For patients unable to undergo line removal, lock therapy may be considered on a case-by-case basis in conjunction with ID consult (see lock therapy procedure) | Uncomplicated [ǂ]: 14 days from first negative culture<br>Complicated: 4-6 weeks from first negative culture<br>[ǂ] Uncomplicated bacteremia defined by:<br>1) Exclusion of endocarditis<br>2) No implanted prostheses<br>3) Negative blood cultures within 72 hours of antibiotic initiation<br>4) Defervesce within 72 hours of therapy<br>5) No evidence of metastatic sites of infection | (8), (33) (34) |

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<tr><th>Diagnosis</th><th>Usual Etiology</th><th>Suggested Empiric Therapy</th><th>Usual Duration of Treatment</th><th>Ref.</th></tr>
<tr><td>Staphylococcal bacteremia (cont.)</td><td>CoNS (S. epidermidis, S. hominis)</td><td>Methicillin-sensitive: Cefazolin OR nafcillin (central line administration preferred)<br><br>Methicillin-resistant or methicillin-sensitive with history of delayed type IV allergic reaction to penicillin or amoxicillin: Vancomycin<br><br>*Longer durations of antibiotic therapy may be required for indwelling hardware or surgical material present. ID consult recommended.</td><td>Single set with only one positive bottle may be representative of contamination and not require treatment<br>No catheter present: 7 days<br>Catheter removal: 7 days post-removal<br>Catheter retained: 10 days from 1st negative culture</td><td>(33)</td></tr>
<tr><td colspan="5">GI/GU</td></tr>
<tr><td>C. difficile infection (CDI)<br><br>- CDI episode: More than 3 watery bowel movements in 24 hours and a positive stool test for C. difficile toxin by PCR<br><br>- CDI recurrence: An episode of CDI occurring within 8 weeks of a previous episode<br><br>In general, only toxin-positive (EIA+) patients benefit from C. difficile treatment.</td><td colspan="2"><table>
<tr><td>Initial CDI episode and subsequent episodes > 8 weeks apart</td><td>Vancomycin PO [a,b]<br><br>Alternative for NPO: Metronidazole IV</td></tr>
<tr><td>First CDI recurrence</td><td>Vancomycin PO [a,b]</td></tr>
<tr><td>Second or subsequent CDI recurrence</td><td>Vancomycin PO + taper [a,b]<br>OR<br>Fidaxomicin (NF) PO x 10 days[a-c]<br><br>If fidaxomicin PO 10-day course was used for previous episode:<br>Fidaxomicin (NF) PO tapered course [a-c]<br>--- Taper should start no later than day 5 of therapy.<br><br>For 2+ recurrences: Consider Gastroenterology consult for evaluation of fecal microbiota transplant (FMT)</td></tr>
<tr><td>Severe/ fulminant CDI (hypotension/ shock, ileus, megacolon)<br><br><u>Pediatric ID consult recommended</u></td><td>Vancomycin PO [a,b] + metronidazole IV or PO<br><br>If ileus, consider adding rectal instillation of vancomycin four times daily to regimen. Not appropriate for neutropenic patients.<br>Vancomycin rectal enema:<br>1-3 years: 250mg (50 mL); 4-9 years: 375mg (75 mL);<br>>10 years: 500mg (100 mL)</td></tr>
</table></td><td>10 days<br><br>If symptoms have improved but not resolved after 10 days of treatment, consider extending duration to 14 days.<br>Discontinue any potentially offending agents, including antibiotics, as soon as is clinically appropriate. In patients requiring systemic antibiotics during or shortly after CDI treatment, some experts recommend continuing oral vancomycin until completion of systemic antibiotics.<br><br>[a] Dosing: General dosing recommendations are available in the HSM.<br>Vancomycin PO taper<br>• Vancomycin 10 mg/kg (max 125 mg/dose) QID x 10 days, then BID x 7 days, then once daily x 7 days, then daily every 2-3 days x 2-8 weeks.<br>Fidaxomicin (NF) PO:<br>• Standard course: 16 mg/kg BID (max 200 mg/dose) BID x 10 days<br>• Tapered course: 16 mg/kg BID (max 200 mg/dose) BID x 5 days, then 16 mg/kg (max 200 mg/dose) every other day for 20 days.<br><br>[b] Enteral administration of vancomycin or fidaxomicin includes PO and gastric tube administration with either the oral suspension or solid dosage formulations (opening vancomycin capsules or crushing fidaxomicin tablets).<br><br>[c] Fidaxomicin is non-formulary (NF) and requires Pediatric ID approval prior to inpatient use.</td><td>(35, 58-64)</td></tr>
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<tr><th>Diagnosis</th><th>Usual Etiology</th><th>Suggested Empiric Therapy</th><th>Usual Duration of Treatment</th><th>Ref.</th></tr>
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<td>Intra-abdominal infection (including cholecystitis, necrotizing enterocolitis and perforated appendicitis)</td>
<td>E. coli<br>Klebsiella spp.<br>Pseudomonas<br>Proteus<br>Enterobacter spp.<br>Anaerobes (e.g., B. fragilis)<br>Streptococci<br>Enterococcus spp.</td>
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<table>
<tr><td>Uncomplicated</td><td>Ceftriaxone + metronidazole</td></tr>
<tr><td>Complicated/ healthcare-associated</td><td>([Cefepime or ceftazidime or ciprofloxacin] + metronidazole ± ampicillin*) OR piperacillin-tazobactam OR meropenem</td></tr>
<tr><td>Neonatal necrotizing enterocolitis (NEC)<br>- use vancomycin instead of ampicillin for suspected MRSA or ampicillin-resistant Enterococcus</td><td>Piperacillin-tazobactam (see NEC guideline)</td></tr>
<tr><td>Perforated appendicitis[‡]</td><td>Piperacillin-tazobactam</td></tr>
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*Empiric anti-enterococcal therapy is recommended for patients with healthcare-associated intra-abdominal infections, those who have previously received cephalosporins, immunocompromised patients, and those with valvular heart disease or prosthetic intravascular materials.
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<table>
<tr><td>Uncomplicated/ Complicated</td><td>4-7 days</td></tr>
<tr><td>Cholecystitis</td><td>4-7 days</td></tr>
<tr><td>Necrotizing enterocolitis</td><td>7-10 days</td></tr>
<tr><td>Perforated appendicitis</td><td>5 days (after appropriate source control)</td></tr>
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<td>(36)</td>
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<td>Traveler’s diarrhea</td>
<td>E. coli<br>Campylobacter<br>Salmonella, Shigella<br>Vibrio cholera<br>Entamoeba histolytica<br>Giardia, Blastocystis<br>Cyclospora,<br>Cystoisospora<br>Cryptosporidium</td>
<td>First-line: Azithromycin<br>Second-line: Ciprofloxacin (should not be used for traveler’s returning from SE Asia due to high prevalence of quinolone-resistant organisms)<br><br>*Infants <3 months old, severe disease, bacteremia, or CNS involvement: Ceftriaxone<br>*Pediatric ID consult recommended</td>
<td>Azithromycin: 10 mg/kg (max, 500 mg) PO daily X 3 days<br><br>Ciprofloxacin: 15 mg/kg (max, 500 mg) PO BID X 3 days<br><br>Ceftriaxone: 75 mg/kg IV q24h (max, 2000 mg)<br>*Duration dependent on severity of disease</td>
<td>(37), (38)</td>
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<td>Urinary tract infection (UTI)<br><br>Cystitis<br>• NO fever; pyuria; positive urine culture; symptoms (i.e., dysuria, frequency, urgency)<br>Pyelonephritis:<br>• Fever, flank pain, or ill appearing; pyuria; positive urine culture; symptoms (i.e., dysuria, frequency, urgency)</td>
<td>E. coli<br>Other gram-negative bacteria (Klebsiella, Enterobacter, Citrobacter)<br>Enterococcus spp.<br><br>NOTE: Ceftriaxone susceptibility is NOT a surrogate for cefazolin or cefdinir susceptibility</td>
<td>Cystitis: Nitrofurantoin OR trimethoprim (TMP)-sulfamethoxazole (SMX)* OR cephalexin*<br><br>Pyelonephritis: PO: Cephalexin*; if penicillin or amoxicillin allergic, TMP-SMX*; IV: Ceftriaxone*<br><br>*Enterococcus spp. are NOT susceptible to cephalosporins or TMP-SMX; usual drug of choice for Enterococcus spp. is ampicillin (IV) OR amoxicillin (PO).<br><br>Ceftriaxone-resistant E. coli UTI may be treated with antibiotics other than meropenem, such as TMP-SMX PO, ciprofloxacin or levofloxacin, gentamicin IV, nitrofurantoin PO (if cystitis), and alternatively amoxicillin-clavulanate PO (if cystitis) (see link).</td>
<td>Cystitis<br>Nitrofurantoin X 5 days<br>Trimethoprim-sulfamethoxazole X 3 days<br>Cephalexin X 5 - 7 days<br><br>Pyelonephritis: 7 days of therapy is sufficient for children >6 months of age with uncomplicated pyelonephritis who improve within 3 days of starting antibiotics. Complicated pyelonephritis should be treated for 10 days.</td>
<td>(39-41)</td>
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<td rowspan="2">Sexually transmitted infections</td>
<td>Chancroid</td>
<td colspan="2">< 45 kg: Azithromycin 20 mg/kg (max 1g) PO once OR<br>≥ 45 kg: Azithromycin 1 g PO once OR ceftriaxone 250 mg IM once OR ciprofloxacin 500 mg PO BID X 3 days</td>
<td rowspan="2">(42), (43)</td>
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<td>Chlamydia</td>
<td colspan="2">Infants <3 month of age: Erythromycin base ethylsuccinate 12.5 mg/kg PO QID X 14 days<br><br>Children <8 years old: Doxycycline 2 mg/kg (max 100 mg) PO BID X 7 days; Alternative: Azithromycin 20 mg/kg (max 1 g) PO as a single dose<br><br>Children ≥8 years old, adolescents, and adults: Doxycycline* 2 mg/kg (max 100 mg) PO BID X 7 days<br>Alternative: Azithromycin 20 mg/kg (max 1 g) PO once or levofloxacin 500 mg PO daily X 7 days<br>* Note that doxycycline is contraindicated in the second and third trimester of pregnancy.</td>
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| Sexually transmitted infections (cont.) | Genital herpes | 1st episode:<br>PO: Valacyclovir 20 mg/kg (max 1 g) PO BID X 7-10 days OR acyclovir 14 – 27 mg/kg (max 400 mg/dose) PO TID X 7-10 days<br>IV: Acyclovir 5 - 10 mg/kg Q8h, change to PO when appropriate to complete therapy<br>Episodic therapy:<br>Children and Adolescent: Acyclovir 20 mg/kg (max 400 mg) PO TID X 5 days OR valacyclovir 20 mg/kg (max 500 mg) PO BID X 3 days OR valacyclovir 20 mg/kg (max 1 g) PO daily X 5 days<br>If adolescent or adult and HIV negative, can use high-dose acyclovir: Acyclovir 800 mg PO BID X 5 days OR acyclovir 800 mg PO TID X 2 days<br>Suppressive therapy:<br>Valacyclovir 10 mg/kg (max 500 mg) PO BID* OR valacyclovir 20 mg/kg (max 1 g) PO once daily OR acyclovir 20-25 mg/kg (max 400 mg) PO BID; *May be less effective for patients with very frequent recurrences (≥10 episodes per year) | | |
| | Gonorrhea | Infants & Children ≤45 kg with uncomplicated gonococcal vulvovaginitis, cervicitis, urethritis, pharyngitis, or proctitis:<br>Ceftriaxone 50 mg/kg (max 500 mg) IM once<br>Children >45 kg, Adolescents and Adults with uncomplicated gonococcal vulvovaginitis, cervicitis, urethritis, pharyngitis, or proctitis: Ceftriaxone 500 mg IM once (if ≥150 kg, 1g) and if concurrent chlamydial infection has not been excluded, add doxycycline 100 mg BID x 7 days (Alternative: Azithromycin 1g PO once)<br>If delayed type IV allergy to beta-lactams, gentamicin 240 mg IM once + azithromycin 2 g PO once | | |
| | Lymphogranuloma venereum | Doxycycline 100 mg PO BID X 21 days | | |
| | Pelvic inflammatory disease (PID):<br>*N. gonorrhoeae*<br>*C. trachomatis*<br>Vaginal flora (e.g., anaerobes, *G. vaginalis*, *H. influenzae*, enteric Gram-negative rods, *GBS*)<br>*M. hominis*<br>*U. urealyticum*<br>*M. genitalium* | IV:<br>Cefoxitin 40 mg/kg (max 2 g) IV q6hr **AND** doxycycline 2 mg/kg (max 100 mg) PO/IV q12hr<br>or<br>Clindamycin 13 mg/kg (max 900 mg) IV q8hr **AND** gentamicin 2 mg/kg IV X 1, followed by 1.5 mg/kg IV q8hr<br>Oral/IM regimens: Mild-to-moderately severe acute PID<br>Ceftriaxone 50 mg/kg (max 500 mg; if ≥150 kg, 1g) IM once **AND** doxycycline 2mg/kg (max 100 mg) PO BID X 14 days **AND** metronidazole 15 mg/kg (max 500 mg) PO BID X 14 days<br>or<br>Cefoxitin 40 mg/kg (max 2 g) IM once **AND** probenecid 1 g PO once **AND** doxycycline 2 mg/kg (max 100 mg) PO BID X for 14 days **AND** metronidazole 15 mg/kg (max 500 mg) PO BID X 14 days | | |
| | Pubic lice | Permethrin 1% cream rinse or ivermectin 1% lotion; applied (up to 1 tube) to affected areas and washed off after 10 min OR<br>Malathion 0.5% lotion applied to affected areas and washed off after 8–12h OR ivermectin 250 mcg/kg PO once, then repeated 2 weeks later<br>Note that malathion lotion and ivermectin oral are not FDA approved for treatment of public lice | | |

<table>
<tr><th>Diagnosis</th><th>Usual Etiology</th><th>Suggested Empiric Therapy</th><th>Usual Duration of Treatment</th><th>Ref.</th></tr>
<tr><td rowspan="3">Sexually transmitted infections (cont.)</td><td>Syphilis</td><td colspan="2">Congenital syphilis<br>*Pediatric ID consult recommended<br><br>For Adolescents and Adults<br>Primary, Secondary, and early latent (latent <1 year) syphilis:<br>Benzathine penicillin G 2.4 million units/dose as a single dose intramuscularly<br><br>If treatment failure at 6-12 months, benzathine penicillin G 50,000 units/kg IM weekly for three weeks (max 2.4 million units/dose)<br><br>For adolescents and adults (if infant or child, please contact Peds ID):<br>Late latent (latent > 1 year), latent of unknown duration, late cardiovascular, gumma: Benzathine penicillin G 2.4 million units IM weekly X 3 weeks (consider EMLA before IM shot)<br><br>Neurosyphilis (children beyond neonatal period and adolescents)<br>Penicillin G 50,000 units/kg q4-6hr intravenously only (max 24 million units/day) X 10-14 days<br>*If penicillin allergic, consult Pediatric ID</td><td rowspan="3">(42)</td></tr>
<tr><td>Trichomoniasis</td><td colspan="2">Children <45 kg: Metronidazole 15 mg/kg PO TID x 7 days (max: 2 g/day)<br>Children ≥45kg and Adolescents: Metronidazole 2 g PO once OR metronidazole 500 mg PO BID X 7 days</td></tr>
<tr><td>Vaginosis, bacterial</td><td colspan="2">Metronidazole 15 mg/kg (max 500 mg) PO BID X 7 days OR metronidazole gel 0.75%, one applicator (5 g) intravaginally once daily X 5 days OR clindamycin cream 2%, one applicator (5 g) intravaginally at bedtime X 7days</td></tr>
<tr><td colspan="5">Skin, Soft Tissues, and Skeletal System</td></tr>
<tr><td colspan="2">Bites, animal or human</td><td>S. aureus<br>Beta hemolytic streptococci (Group A)<br>Capnocytophaga canimorsus<br>Pasteurella (animal)<br>Eikenella (human, animal)</td><td>Amoxicillin-clavulanate (see link); ampicillin-sulbactam IV if needed<br><br>If penicillin or amoxicillin allergic, trimethoprim-sulfamethoxazole + clindamycin</td><td>Prophylaxis of high-risk bite wound: 3-5 days<br>Cellulitis present: 10-14 days<br>Tenosynovitis: 3 weeks<br>Septic arthritis: 4 weeks<br>Osteomyelitis: 6 weeks</td><td>(44), (45)</td></tr>
<tr><td rowspan="2">Bone and joint infections (osteomyelitis, septic arthritis)</td><td>Uncomplicated</td><td>S. aureus<br>S. pyogenes<br>S. pneumoniae<br>K. kingae (≤4 yr)<br><br>Sickle cell disease:<br>Salmonella spp.</td><td rowspan="2"><table><tr><td>Uncomplicated</td><td>Cefazolin<br>If delayed type IV allergic reaction to penicillin or amoxicillin, clindamycin</td></tr><tr><td>Complicated/ill-appearing/unimmunized</td><td>Ceftriaxone + vancomycin</td></tr><tr><td>Sickle cell disease</td><td>Ceftriaxone</td></tr><tr><td>Atypical (immunocompromised, infants < 3mo, duration of fever and/or pain > 48-72hr, involves axial skeleton, presence of hardware)</td><td>Discuss with Pediatric ID consult service before starting empiric antibiotic</td></tr></table>*Pediatric ID consult recommended</td><td rowspan="2">Osteomyelitis: 4-6 weeks*<br>Septic arthritis: 2-3 weeks*^<br>*Consider enteral transition once CRP down trending, afebrile ≥24hr, negative blood cultures ≥ 48hr, and improved use of affected bone or joint<br>Drainage/debridement recommended<br><br>^Durations as short as 10-14 days may be considered after 2-4 days of IV therapy in patients with all of the following:<br>• Infection due to S. aureus, S. pyogenes, S. pneumoniae, or H. influenzae type b<br>• No adjacent osteomyelitis<br>• Rapid clinical improvement<br>• Consistent, progressive decrease in CRP by the end of the first week of treatment</td><td rowspan="2">(46-51)</td></tr>
<tr><td>Complicated bone and joint infections</td><td>Same as uncomplicated and:<br>Enterobacterales<br>Pseudomonas sp.<br>Anaerobes<br><br>Infants (<3mo): GBS, N. gonorrhea<br><br>Sickle cell disease: Salmonella spp.</td></tr>
</table>

| Diagnosis | Usual Etiology | Suggested Empiric Therapy | Usual Duration of Treatment | Ref. |
|---|---|---|---|---|
| **Cellulitis** | Group A streptococci (non-purulent)<br>*S. aureus* (purulent) | **Non-purulent**<br>**Mild**: Oral: Cephalexin<br>If penicillin or amoxicillin allergic, clindamycin<br>**Moderate**: IV: Cefazolin<br>If delayed type IV allergic reaction to penicillin or amoxicillin, clindamycin<br>**Severe**: Vancomycin + piperacillin-tazobactam<br>If penicillin or amoxicillin allergic, meropenem<br>**Purulent/abscess**<br>**Moderate***: Trimethoprim-sulfamethoxazole OR doxycycline OR clindamycin<br>**Severe***: Vancomycin<br>**Neonate**<br>*Pediatric ID consult recommended<br>*Incision and drainage recommended | Cellulitis: 5 days<br>Abscess: 5-10 days<br>(Tailor duration based on resolution of signs and symptoms)<br><br>*Refer to the Skin and Soft Tissue Infection Clinical Pathway.* | (8), (44) |
| **Lymphadenitis** | Group A streptococci<br>*S. aureus* | Acute unilateral cervical lymphadenitis and moderate symptoms (e.g., fever, ill-appearing, warm and/or tender adenitis):<br>Cephalexin or amoxicillin-clavulanate (see link)<br><br>If concern for MRSA or penicillin or amoxicillin allergy, Trimethoprim-sulfamethoxazole or doxycycline can be considered | 7 – 14 days depending on clinical response | (52) |
| **Necrotizing fasciitis** | Beta hemolytic streptococci (Group A)<br>*S. aureus*<br>*V. vulnificus*<br>*A. hydrophila*<br>Peptostreptococci<br>Polymicrobial (mixed aerobic-anaerobic microbes) | Vancomycin + piperacillin-tazobactam + clindamycin<br>OR<br>Piperacillin-tazobactam + linezolid<br><br>If penicillin or amoxicillin allergic, replace piperacillin-tazobactam with meropenem<br>*Prompt debridement required*<br><br>*Pediatric ID consult recommended | Depends on clinical response; duration usually prolonged (4-6 weeks) | (44), (53) |
| **Miscellaneous systemic infections** | | | | |
| **Febrile neutropenia** | *Pseudomonas*<br>Enteric gram-negative bacilli<br>*Staphylococci spp.*<br>*Streptococci spp.*<br>Yeast | *Refer to the LPCH F&N Guidelines | | (54), (55) |

| Diagnosis | Usual Etiology | Suggested Empiric Therapy | Usual Duration of Treatment | Ref. |
|---|---|---|---|---|
| Lyme disease | *B. burgdorferi*<br><br>*Pediatric ID consult recommended<br><br>*Doxycycline is safe in children <8 years of age as long as duration does not exceed 21 days. Doxycycline has not been well studied in children < 8 years for durations >21 days | Early localized, erythema migrans | Doxycycline 2.2 mg/kg BID (max 200 mg/day) for 10 days<br>OR<br>Amoxicillin 16.7 mg/kg TID (max 1.5 g/day) for 14 days<br>OR<br>Cefuroxime 15 mg/kg BID (max 1g/day) for 14 days | (56), (57) |
| | | Isolated Bell's Palsy | Doxycycline 2.2 mg/kg BID (max 200 mg/day) for 14 days.<br>*Amoxicillin and cefuroxime have not been studied for the treatment of Lyme Bell's Palsy | |
| | | Arthritis | **Initial episode:** As for early localized disease with a duration of 28 days | |
| | | | **Recurrent arthritis** despite adequate prior oral therapy:<br>Repeat second course of oral antibiotics as above X 4 weeks<br>OR<br>Ceftriaxone 50-75 mg/kg (max 2 g) IV once daily for 14-28 days | |
| | | Carditis | Ceftriaxone 50-75 mg/kg once daily for 14-21 days. Can consider transitioning to Doxycycline once patient improving | |
| | | Meningitis, neuroborreliosis | Ceftriaxone 50-75 mg/kg (max 2 g) IV once daily for 14 days<br>OR<br>Doxycycline 2.2 mg/kg BID (max 200 mg/day) for 14 days | |

❖ **Please visit the external Antimicrobial Stewardship Program (ASP) website or internal ASP website located in the Housestaff Manual for more useful resources, including:**

- LPCH antibiogram and antimicrobial dosing quick reference
- Surgical prophylaxis guidelines
- Other clinical practice guidelines and clinician education

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