



| The use of the following guidelines for empiric therapy should include patient-specific information, including drug allergies 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.                               |          |
| <b>Central Nervous System</b>  |  |   |  |  |                                    |          |
| <a href="#">Bacterial meningitis</a>   | Neonatal   | <i>S. agalactiae</i> (GBS)<br><i>L. monocytogenes</i><br><i>E. coli</i><br><i>Klebsiella spp.</i>           | 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)              | <i>S. agalactiae</i> (GBS)<br><i>L. monocytogenes</i><br>Aerobic gram-negative bacilli (e.g., <i>E. coli</i> , <i>Klebsiella spp.</i> ) <sup>†</sup> | 14-21 days<br>≥ 21 days<br>21 days | (1), (2) |
|  | Ages > 1 month   | <i>S. pneumoniae</i><br><i>N. meningitidis</i><br><i>H. influenzae</i>                                      | Ceftriaxone + Vancomycin   | <i>S. pneumoniae</i><br><i>N. meningitidis</i><br><i>H. influenzae</i>   | 10-14 days<br>7 days<br>7 days     | (1)      |
| Brain abscess  | <i>Streptococcus spp.</i> (e.g., <i>S. anginosus</i> group, <i>S. pneumoniae</i> , <i>S. pyogenes</i> )<br><i>S. aureus</i><br>Enterobacterales spp.<br><i>H. influenzae</i><br><i>Anaerobes</i> (e.g., <i>Bacteroides</i> , <i>Fusobacterium spp.</i> ; <i>Prevotella</i> )<br><i>Citrobacter spp.</i> (typically neonates) | Ceftriaxone + Metronidazole + Vancomycin<br><br>* Pediatric ID, ENT, and Neurosurgical consults recommended | 4 – 6 weeks  |  | (3)                                |          |
| <a href="#">Healthcare-associated meningitis/ventriculitis</a>   | <i>S. aureus</i><br>Coagulase-negative staphylococci (CoNS)<br>Aerobic gram-negative bacilli (including <i>P. aeruginosa</i> , multidrug resistant gram-negative organisms)<br><i>C. acnes</i> (formerly <i>Propionobacterium acnes</i> )  | Cefepime + Vancomycin<br><br>* Pediatric ID consult recommended   | <i>S. aureus</i> or gram-negative bacilli<br>CoNS or <i>C. acnes</i> (minimal CSF pleocytosis, normal CSF glucose)<br>CoNS or <i>C. acnes</i> (significant CSF pleocytosis, low CSF glucose) | ≥ 10-14 days <sup>†</sup><br>≥ 10 days <sup>†</sup><br>≥ 10-14 days <sup>†</sup>   | (4)                                |          |

<sup>†</sup> Longer treatment courses recommended if clinical improvement is delayed or complicated meningitis (e.g. cerebritis, abscess, empyema, encephalomalacia, areas of infarcts)

<sup>†</sup>Days after last positive culture  
 Note: Shunt removal is recommended

| Diagnosis   | Usual Etiology  | Suggested Empiric Therapy  | Usual Duration of Treatment  | Ref.     |            |
|---|---|--|--|----------|------------|
| <b>Ears, Nose, Throat &amp; Respiratory Tract</b> |   |  |  |          |            |
| <a href="#">Acute otitis media (AOM)</a>          | <i>S. pneumoniae</i><br><i>H. influenzae</i><br><i>M. catarrhalis</i>                           | Observation (no antibiotics): Use of symptomatic relief with observation and close follow-up is an option for unilateral AOM in children ≥ 6 months of age with non-severe signs or symptoms (i.e., mild otalgia for less than 48 hours and < 39°C [102.2°F], no otorrhea); initiate antibiotic therapy if the child worsens or fails to improve within 48 to 72 hours of symptoms onset.<br><br>1 <sup>st</sup> line when antibiotic therapy indicated: Amoxicillin (high dose 80-90 mg/kg/day PO divided BID, max 4 gm/day)<br><br>Receipt of Amoxicillin within last 30 days, concurrent conjunctivitis, or persistent symptoms following 48-72hr of 1 <sup>st</sup> line therapy: Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>If penicillin allergy, Cefdinir 14 mg/kg/day divided BID PO | < 2 years or severe symptoms*  | 10 days  | (5)        |
|   |   |  | 2 - 5 years w/ mild-moderate symptoms  | 7 days   |            |
|   |   |  | ≥ 6 years w/ mild-moderate symptoms  | 5-7 days |            |
|   |   |  | * Severe symptoms in all ages include moderate or severe otalgia or otalgia for at least 48 hours or temperature 39°C [102.2°F] or higher. |          |            |
| <a href="#">Cervical lymphadenitis</a>            | Group A -beta hemolytic streptococci<br><i>S. aureus</i> (MSSA)<br>Oral anaerobes               | Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>If Penicillin allergy, Clindamycin  | Uncomplicated or adequate source control:<br>5-10 days (Tailor duration based on resolution of signs and symptoms.)                        |          | (6), (7)   |
|   | <i>S. aureus</i> (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)   |
|   | <i>Mycobacterium tuberculosis</i>   | 4 drugs: RIPE – Rifampin + Isoniazid + Pyrazinamide + Ethambutol<br>*Pediatric ID consult recommended  | ≥ 6 months   |          | (6), (10)  |
|   | <i>Bartonella henselae</i> (uncomplicated cat scratch disease)                                  | Azithromycin<br>*Pediatric ID consult recommended for complicated disease (e.g., osteitis, hepatosplenic disease)  | 5 days   |          | (6)        |
| <b>Epiglottitis</b>                               | <i>H. influenzae</i><br>Beta hemolytic streptococci<br><i>S. pneumoniae</i><br><i>S. aureus</i> | Ceftriaxone<br><br>If septic appearing, consider adding vancomycin   | 7 - 10 days  |          | (11), (12) |

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|---|---|--|--|---|------------------------|
| Malignant otitis externa                                  |   | <i>Pseudomonas spp.</i><br><i>S. aureus</i> (less frequent)  | Cefepime<br><br>If penicillin allergy or step-down oral therapy, ciprofloxacin<br>*Pediatric ID consult recommended  | ≥ 6 weeks (surgical intervention often indicated)   | (13)                   |
|   |   | <i>Aspergillus spp.</i>  | Voriconazole<br>*Pediatric ID consult recommended  | >12 weeks   | (14)                   |
| Mastoiditis   | Acute   | <i>S. pneumoniae</i><br>Beta hemolytic streptococci<br><i>S. aureus</i><br><i>H. influenzae</i><br><i>Fusobacterium spp.</i>                                       | Ampicillin-sulbactam<br><br>Consider Vancomycin if MRSA risk factors<br>Consider transition to oral regimen when clinically appropriate<br>Consider surgical drainage<br>*Pediatric ID consult recommended | 2-4 weeks   | (15),<br>(16),<br>(54) |
|   | Chronic or recurrent AOM  | <i>P. aeruginosa</i><br>Enteric gram-negative bacteria<br><i>S. aureus</i><br><i>S. pneumoniae</i><br>Anaerobes  | Cefepime + Metronidazole + Vancomycin<br>*Pediatric ID consult recommended   | 4 weeks   | (16),<br>(17)          |
| Odontogenic infection                                     | Mild, no abscess  | Polymicrobial;<br>Viridans group streptococci<br><i>Peptostreptococcus</i><br><i>Actinomyces</i><br><i>Lactobacillus spp.</i>                                      | Amoxicillin 45 mg/kg/day divided TID, max 1500 mg/day<br><br>If NPO, Ampicillin<br>If severe beta-lactam allergy, 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><i>Prevotella spp.</i><br><i>Neisseria spp.</i><br><i>Fusobacterium spp.</i>  | Ampicillin-sulbactam<br><br>If Penicillin allergy (non-severe), Cefazolin + Metronidazole<br>If severe beta-lactam allergy, Ciprofloxacin + Metronidazole  | 7 - 10 days or until 3 days after symptom resolution (whichever is longer) with surgical intervention<br>*Consider transition IV to oral in patients without bacteremia if surgically controlled and clinical improving | (47 - 51)              |
|   | Severe, abscess, with no clinical improvement after trialing therapy listed above | <i>Clostridium spp.</i><br><i>Staphylococcus spp.</i><br><i>Eikenella spp.</i><br><b>Caution:</b> Culture results may have poor recovery of all pathogens involved | Cefepime + Metronidazole + Vancomycin<br><br>If severe beta-lactam allergy, Aztreonam + 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><i>S. aureus</i> (MSSA or MRSA)<br>Respiratory anaerobes<br>Kawasaki disease  | Ampicillin-sulbactam<br><br>If penicillin allergy, Ceftriaxone + Clindamycin<br><br>Add Vancomycin for toxic appearing patients pending culture results  | Parapharyngeal or retropharyngeal abscess:<br>14 days<br><br>Submandibular space infections: 2-3 weeks  | (21)                   |

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|-------------|--|---|--|--|--|---------------|
| Pertussis   |  | <i>B. pertussis</i><br><i>B. parapertussis</i>  | Azithromycin<br><br>If Azithromycin contraindicated: Trimethoprim-sulfamethoxazole (TMP/SMX) in children $\geq$ 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)  | Penicillin VK (patients $\leq$ 27 kg: 250 mg 2-3 times/day and patients >27 kg: 500 mg 2-3 times/day<br>OR<br>Amoxicillin 50 mg/kg/day once daily, max 1 gm/day<br><br>Allergic: Cephalexin or Clindamycin or Azithromycin   | 10 days<br><br>[For Azithromycin PO: <u>12 mg/kg/day</u> (max: 500 mg/dose) X 5 days or 20 mg/kg/day (max: 1000 mg/dose) x 3 days]                                   |  | (23),<br>(54) |
|             |  | <i>Arcanobacterium</i>  | Azithromycin   |  |  |               |
| Pneumonia   | Aspiration pneumonia   | <i>Enteric Gram negative Oral flora</i><br><i>Anaerobic bacteria</i>  | Ampicillin<br><br>If not fully immunized or failed Amoxicillin or Ampicillin, Ceftriaxone<br><br>If empyema or lung abscess present, Ampicillin-sulbactam or Ceftriaxone + (Clindamycin or Metronidazole)<br><br>If hospital-acquired aspiration pneumonia, Piperacillin-tazobactam<br><br>Review previous microbiologic history to guide antibiotic selection   | 7 - 10 days  |  | (24),<br>(25) |
|             | <a href="#">Community-acquired pneumonia</a><br>(Ages >3 months) | <i>S. pneumoniae</i><br>Group A streptococci<br><i>S. aureus</i><br>Viruses<br>( <i>M. pneumoniae</i> , <i>C. pneumoniae</i> if school-aged children and adolescents) | PO: Amoxicillin 90 – 100 mg/kg/day PO divided BID or TID, max 4 gm/day<br><br>If not fully immunized, Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>If beta-lactam allergy, see “Clinical Pathways” for alternative enteral agents<br><br>IV: Ampicillin<br><br>Alternative: Ceftriaxone if not fully immunized, abscess or empyema present, or critically ill<br><br>*For patients > 5 years of age, consider addition of Azithromycin [10 mg/kg (max, 500 mg) PO on day 1, then 5 mg/kg (max, 250 mg) daily on days 2-5] for suspected atypical pneumonia | Uncomplicated<br>5 days<br><br>Complicated (parapneumonic effusion or empyema)<br>Prolonged, typically 2-4 weeks   | *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), ( )     |
|             | <a href="#">Hospital-acquired pneumonia</a>                      | <i>S. aureus</i> (MRSA)<br><i>P. aeruginosa</i><br>Gram-negative bacilli<br>( <i>E. coli</i> , <i>Klebsiella</i> , <i>Serratia</i> , <i>Enterobacter</i> )            | [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 <u>7 days</u> of therapy is sufficient in most cases |  | (27)          |

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|---|--|--|---|---------------------------------------|------|
| <a href="#">Sinusitis</a>   | <i>S. pneumoniae</i><br><i>H. influenzae</i><br><i>M. catarrhalis</i><br><i>S. aureus</i> (dental origin)<br>Anaerobes (chronic)     | Uncomplicated, mild infection (age 2 years or older): Amoxicillin (45 mg/kg/day divided BID)<br><br>Moderate/severe infection OR age <2 years OR unimmunized OR daycare attendance OR receipt of antibiotics within last 30 days: Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>If severe Penicillin allergy, Cefdinir<br>If severe cephalosporin allergy, Levofloxacin<br><br>Severe infection requiring hospitalization: Ampicillin-sulbactam | 10 - 14 days or 7 days after patient's symptoms resolve (minimum 10 days)   | (28),<br>(29)                         |      |
| <b>Eye</b>  |  |  |   |                                       |      |
| <b>Orbital cellulitis</b>   | <i>S. pneumoniae</i><br>Streptococci<br><i>S. aureus</i><br><i>H. influenzae</i> (unimmunized)<br><i>M. catarrhalis</i><br>Anaerobes | Ampicillin/sulbactam<br><br>If concern for extension into CNS: Ceftriaxone + Metronidazole + Vancomycin<br><br>*Pediatric ID consult recommended, if complicated   | Uncomplicated: 2-3 weeks<br>Complicated: ID consult<br><br>Transition IV to oral amoxicillin-clavulanate when clinically improved   | (30)                                  |      |
| <b>Preseptal (periorbital) cellulitis</b>   | <i>S. pneumoniae</i><br><i>S. aureus</i><br>Beta hemolytic streptococci<br><i>H. influenzae</i>                                      | PO: Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>IV: Ampicillin-sulbactam<br><br>*If extensive cellulitis or ill appearing patient, consider adding Vancomycin pending culture results   | 7 - 10 days<br><br>Transition IV to oral Amoxicillin-clavulanate when clinically improving  | (31)                                  |      |
| <b>Heart</b>  |  |  |   |                                       |      |
| <a href="#">Endocarditis (bacterial)</a>  | *Pediatric ID consult recommended  |  |   | (32)                                  |      |
| <b>Blood</b>  |  |  |   |                                       |      |
| <b>Sepsis</b>   | Refer to LPCH "Severe Sepsis/Septic Shock Pathway" per the Clinical Pathways and Target Based Care Website                           |  |   |                                       |      |
| <b>Staphylococcal bacteremia</b><br><br>*Pediatric ID consult recommended for <i>S. aureus</i> bacteremia | <i>S. aureus</i> (MSSA or MRSA)<br><i>S. lugdunensis</i>   | Methicillin-sensitive: Cefazolin OR Nafcillin (central line administration preferred)<br><br>Methicillin-resistant: Vancomycin<br><br><i>S. aureus</i> 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.  | Uncomplicated <sup>†</sup>  | 14 days from first negative culture   | (8), |
|   |  |  | Complicated   | 4-6 weeks from first negative culture | (33) |
|   |  |  | <sup>†</sup> 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 |                                       | (34) |
|   | Coagulase Negative Staphylococcus ( <i>S. epidermidis</i> , <i>S. hominis</i> )  | Methicillin-sensitive: Cefazolin OR Nafcillin (central line administration preferred)<br><br>Methicillin-resistant: Vancomycin<br><br>*Longer durations of antibiotic therapy may be required for indwelling hardware or surgical material present. ID consult recommended   | 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   |                                       | (33) |

| Diagnosis   | Usual Etiology   | Suggested Empiric Therapy  | Usual Duration of Treatment  | Ref.        |
|---|--|--|--|-------------|
| <b>GI/GU</b>  |  |  |  |             |
| <p><u><a href="#">C. difficile infection</a></u></p> <p>- CDI <b>episode</b>: More than 3 watery bowel movements in 24 hours and a positive stool test for <i>C. difficile</i> toxin by PCR</p> <p>- CDI <b>recurrence</b>: An episode of CDI occurring within 8 weeks of a previous episode</p> <p><i>In general, only toxin-positive (EIA+) patients benefit from C. difficile treatment.</i></p>   | <p><b>Initial CDI episode and subsequent episodes &gt; 8 weeks apart</b></p>                                       | <p>Vancomycin <b>PO</b> <sup>a,b</sup></p> <p><i>Alternative for NPO: Metronidazole IV</i></p>   | <p>10 days</p> <p>If symptoms have improved but not resolved by 10 days, consider extending treatment duration to 14 days.</p> <p>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.</p> | (35, 58-64) |
|   | <p><b>First CDI recurrence</b></p>   | <p>Vancomycin <b>PO</b> <sup>a,b</sup></p>   |  |             |
|   | <p><b>Second or subsequent CDI recurrence</b></p>  | <p>Vancomycin <b>PO</b> + taper <sup>a,b</sup></p> <p>OR</p> <p>Fidaxomicin (NF) <b>PO</b> x 10 days<sup>a-c</sup></p> <p><i>If fidaxomicin PO 10-day course was used for previous episode:</i></p> <p>Fidaxomicin (NF) <b>PO</b> tapered course <sup>a-c</sup></p> <p>--- <i>Taper should start no later than day 5 of therapy.</i></p> <p><b>For 2+ recurrences:</b> Consider Gastroenterology consult for evaluation of Fecal microbiota transplant (FMT)</p> |  |             |
|   | <p><b>Severe/fulminant CDI (hypotension/shock, ileus, megacolon)</b></p> <p><u><b>Recommend ID consult</b></u></p> | <p>Vancomycin <b>PO</b> <sup>a,b</sup> + Metronidazole <b>IV</b> or <b>PO</b></p> <p>If ileus, consider adding rectal instillation of vancomycin four times daily to regimen. Not appropriate for neutropenic patients.</p> <p>Vancomycin rectal enema:</p> <p>1-3 years: 250mg (50 mL); 4-9 years: 375mg (75 mL); &gt;10 years: 500mg (100 mL)</p>  |  |             |
| <p><sup>a</sup> <b>Dosing: General dosing recommendations are available in the HSM.</b></p> <p><b>Vancomycin PO taper</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p><b>Fidaxomicin (NF) PO:</b></p> <ul style="list-style-type: none"> <li>Standard course: 16 mg/kg BID (max 200 mg/dose) BID x 10 days</li> <li>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.</li> </ul> <p><sup>b</sup> 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).</p> <p><sup>c</sup> <b>Fidaxomicin is non-formulary and requires Pediatric ID approval prior to inpatient use.</b></p> |  |  |  |             |

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|---|--|--|---|--|----------|---------------|---------------------------|---|
| <b>Intra-abdominal infection (including cholecystitis, necrotizing enterocolitis and perforated appendicitis)</b>   | <i>E. coli</i><br><i>Klebsiella spp.</i><br><i>Pseudomonas</i><br><i>Proteus</i><br><i>Enterobacter spp.</i><br>Anaerobes (e.g., <i>B. fragilis</i> )<br>Streptococci<br><i>Enterococcus spp.</i>                                      | Uncomplicated  | Ceftriaxone + Metronidazole   | Uncomplicated/<br>Complicated  | 4-7 days | (36)          |                           |   |
|   |  | Complicated/ healthcare-associated   | ([Cefepime or Ceftazidime or Ciprofloxacin] + Metronidazole ± Ampicillin*) <u>OR</u> Piperacillin-tazobactam <u>OR</u> Meropenem                  |  |          |               | Cholecystitis             | 4-7 days                                  |
|   |  | Necrotizing enterocolitis (NEC)<br>- use vancomycin instead of ampicillin for suspected MRSA or ampicillin-resistant enterococcus  | ([Ampicillin or Vancomycin] + [Gentamicin or Ceftazidime] AND Metronidazole if perforation) <u>OR</u> Piperacillin-tazobactam <u>OR</u> Meropenem |  |          |               | Necrotizing enterocolitis | 7-10 days                                 |
|   |  | Perforated appendicitis <sup>†</sup>   | Piperacillin-tazobactam   |  |          |               | Perforated appendicitis   | 5 days (after appropriate source control) |
| *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.<br><sup>†</sup> <a href="#">LPCH Appendicitis Algorithm</a> |  |  |   |  |          |               |                           |   |
| <b>Traveler's diarrhea</b>  | <i>E. coli</i><br><i>Campylobacter</i><br><i>Salmonella, Shigella</i><br><i>Vibrio cholera</i><br><i>Entamoeba histolytica</i><br><i>Giardia, Blastocystis</i><br><i>Cyclospora,</i><br><i>Cystoisospora</i><br><i>Cryptosporidium</i> | <b>First-line:</b> Azithromycin<br><b>Second-line:</b> Ciprofloxacin (should not be used for traveler's returning from SE Asia due to high prevalence of quinolone-resistant organisms)<br><br><b>*Infants &lt;3 months old, severe disease, or CNS involvement:</b><br>Ceftriaxone<br><b>*Pediatric ID consult recommended</b>  |   | 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: 50 mg/kg IV q12h (max, 2000 mg)<br><b>*Duration dependent on severity of disease</b>   |          | (37),<br>(38) |                           |   |
| <b>Urinary tract infection (UTI)</b>  | <i>E. coli</i><br>Other gram-negative bacteria ( <i>Klebsiella, Enterobacter, Citrobacter</i> )<br><i>Enterococcus spp.</i><br><br>NOTE: Ceftriaxone susceptibility is NOT a surrogate for cefazolin or cefdinir susceptibility        | <u>Cystitis:</u> Nitrofurantoin OR Trimethoprim (TMP)-sulfamethoxazole (SMX)* <u>OR</u> Cephalexin*<br><br><u>Pyelonephritis:</u> PO: Cephalexin*; if beta-lactam allergy, TMP-SMX*; IV: Ceftriaxone*<br><br><b>*Enterococcus spp. are NOT susceptible to cephalosporins or TMP-SMX; usual drug of choice for Enterococcus spp. is Ampicillin (IV) OR Amoxicillin (PO).</b><br><br>Ceftriaxone-resistant <i>E. coli</i> 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 <a href="#">link</a> ). |   | <u>Cystitis</u><br>Nitrofurantoin X 5 days<br>Trimethoprim-sulfamethoxazole X 3 days<br>Cephalexin X 5 - 7 days<br><br><u>Pyelonephritis:</u> 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. |          | (39-41)       |                           |   |
| <b>Sexually transmitted infections</b>  | Chancroid  | < 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  |   |  |          | (42),<br>(43) |                           |   |

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|---|---|---|-----------------------------|------|
| <a href="#">Sexually transmitted infections (cont.)</a> | Chlamydia   | <p>Infants &lt;3 month of age: Erythromycin base ethylsuccinate 12.5 mg/kg PO QID X 14 days</p> <p>Children &lt;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</p> <p>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</p> <p>* Note that Doxycycline is contraindicated in the second and third trimester of pregnancy.</p>   |                             |      |
|   | Genital herpes  | <p><u>1<sup>st</sup> episode:</u><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</p> <p><u>Episodic therapy:</u><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</p> <p><u>Suppressive therapy:</u><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)</p> |                             |      |
|   | Gonorrhea   | <p>Infants &amp; Children ≤45 kg with uncomplicated gonococcal vulvovaginitis, cervicitis, urethritis, pharyngitis, or proctitis: Ceftriaxone 50 mg/kg (max 500 mg) IM once</p> <p>Children &gt;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 beta-lactam allergy, Gentamicin 240 mg IM once + Azithromycin 2 g PO once</p>  |                             |      |
|   | Lymphogranuloma venereum  | Doxycycline 100 mg PO BID X 21 days   |                             |      |
|   | Pelvic inflammatory disease (PID):<br><i>N. gonorrhoeae</i><br><i>C. trachomatis</i><br>Vaginal flora (e.g., anaerobes, <i>G. vaginalis</i> , <i>H. influenzae</i> , enteric Gram-negative rods, GBS)<br><i>M. hominis</i><br><i>U. urealyticum</i><br><i>M. genitalium</i> | <p>Parenteral regimens:<br/>Cefoxitin 40 mg/kg (max 2 g) IV q6hr <b>AND</b> Doxycycline 2 mg/kg (max 100 mg) PO/IV q12hr<br/>or<br/>Clindamycin 13 mg/kg (max 900 mg) IV q8hr <b>AND</b> Gentamicin 2 mg/kg IV X 1, followed by 1.5 mg/kg IV q8hr</p> <p>Oral/IM regimens: Mild-to-moderately severe acute PID<br/>Ceftriaxone 50 mg/kg (max 500 mg; if ≥150 kg, 1g) IM once <b>AND</b> Doxycycline 2mg/kg (max 100 mg) PO BID X 14 days <b>AND</b> Metronidazole 15 mg/kg (max 500 mg) PO BID X 14 days<br/>or<br/>Cefoxitin 40 mg/kg (max 2 g) IM once <b>AND</b> Probenecid 1 g PO once <b>AND</b> Doxycycline 2 mg/kg (max 100 mg) PO BID X for 14 days <b>AND</b> Metronidazole 15 mg/kg (max 500 mg) PO BID X 14 days</p>   |                             |      |



| Diagnosis   |               | Usual Etiology   | Suggested Empiric Therapy  |   | Usual Duration of Treatment   | Ref.          |
|---|---------------|--|--|---|---|---------------|
| <a href="#">Sexually transmitted infections (cont.)</a>     |               | 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 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  |   |   |               |
|   |               | Syphilis   | <u>Congenital syphilis</u><br>*Pediatric ID consult recommended<br><br><u>For Adolescents and Adults</u><br><b>Primary, Secondary, and early latent (latent &lt;1 year) syphilis:</b><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><b>Late latent (latent &gt; 1 year), latent of unknown duration, late cardiovascular, gumma:</b> Benzathine penicillin G 2.4 million units IM X 3 weeks (consider EMLA before IM shot)<br><br><u>Neurosyphilis</u> (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 ID |   |   | (42)          |
|   |               | Trichomoniasis   | 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  |   |   |               |
|   |               | Vaginosis, bacterial   | Metronidazole 15 mg/kg (max 500 mg) PO BID X 7 days <b>OR</b> Metronidazole gel 0.75%, one applicator (5 g) intravaginally once daily X 5 days <b>OR</b> Clindamycin cream 2%, one applicator (5 g) intravaginally at bedtime X 7days  |   |   |               |
| <b>Skin, Soft Tissues, and Skeletal System</b>              |               |  |  |   |   |               |
| Bites, animal or human                                      |               | <i>S. aureus</i><br>Beta hemolytic streptococci (Group A)<br><i>Capnocytophaga canimorsus</i><br><i>Pasteurella</i> (animal)<br><i>Eikenella</i> (human, animal) | 1 <sup>st</sup> line: Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>2 <sup>nd</sup> line: Trimethoprim-sulfamethoxazole + Clindamycin<br><br>IV: Ampicillin-sulbactam<br>If Penicillin allergy, Ceftriaxone + Clindamycin OR Trimethoprim-sulfamethoxazole + Clindamycin  |   | 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  | (44),<br>(45) |
| Bone and joint infections (osteomyelitis, septic arthritis) | Uncomplicated | <i>S. aureus</i><br><i>S. pyogenes</i><br><i>S. pneumoniae</i><br><i>K. kingae</i><br><br>Sickle cell disease:<br><i>Salmonella spp.</i>                         | Uncomplicated  | Cefazolin<br>If penicillin allergy, Clindamycin | Osteomyelitis: 4-6 weeks*<br>Septic arthritis: 2-3 weeks*^<br><br>*Consider enteral transition once CRP down trending, afebrile ≥24hr, negative blood cultures ≥ 48hr, and improved use of affected bone or joint | (46-51)       |
|   |               |  | Complicated/ill-appearing/unimmunized  | Ceftriaxone + Vancomycin                        |   |               |

| Diagnosis  |  | Usual Etiology   | Suggested Empiric Therapy   |   | Usual Duration of Treatment   | Ref. |
|--|--|--|---|---|---|------|
| <b>Bone and joint infections (osteomyelitis, septic arthritis) (cont.)</b> | Complicated bone and joint infections  | <i>S. aureus</i><br><i>S. pyogenes</i><br><i>S. pneumoniae</i><br><i>Kingella spp.</i> (≤4 years)<br>Enterobacterales<br><i>Pseudomonas spp.</i><br>Anaerobes<br><br>Infants (<3mo): GBS, <i>N. gonorrhoea</i><br><br>Sickle cell disease:<br><i>Salmonella spp.</i>                           | Sickle cell disease   | Ceftriaxone<br>If beta-lactam allergy,<br>Ciprofloxacin + Vancomycin                                    | 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 <u>all</u> of the following:<br><ul style="list-style-type: none"> <li>• Infection due to <i>S. aureus</i>, <i>S. pyogenes</i>, <i>S. pneumoniae</i>, or <i>H. influenzae</i> type b</li> <li>• No adjacent osteomyelitis</li> <li>• Rapid clinical improvement</li> <li>• Consistent, progressive decrease in CRP by the end of the first week of treatment</li> </ul> |      |
|  |  |  | Atypical (immunocompromised, infants <3mo, duration of fever and/or pain >48-72hr, involves axial skeleton, presence of hardware) | Discuss with Pediatric ID consult service before start of empiric antibiotic                            |   |      |
|  |  |  | *Pediatric ID consult recommended   |   |   |      |
| <b>Cellulitis</b>  | Group A streptococci (non-purulent)<br><i>S. aureus</i> (purulent)   | <b>Non-purulent</b>  |   | Cellulitis: 5 days<br>Abscess: 5-10 days<br>(Tailor duration based on resolution of signs and symptoms) | (8),<br>(44)  |      |
|  |  | <b>Mild</b>  | Oral: Cephalexin<br>If beta-lactam allergic, Clindamycin  |   |   |      |
|  |  | <b>Moderate</b>  | IV: Cefazolin<br>If beta-lactam allergic, Clindamycin   |   |   |      |
|  |  | <b>Severe</b>  | Vancomycin + Piperacillin-tazobactam  |   |   |      |
|  |  | <b>Purulent/abscess</b>  |   |   |   |      |
|  |  | <b>Moderate*</b>   | Trimethoprim-sulfamethoxazole OR<br>Doxycycline OR Clindamycin  |   |   |      |
|  |  | <b>Severe*</b>   | Vancomycin  |   |   |      |
|  |  | <b>Neonate</b>   |   |   |   |      |
|  |  |  | *Pediatric ID consult recommended   |   |   |      |
|  |  |  | *Incision and drainage recommended  |   |   |      |
| <b>Lymphadenitis</b>   | Group A streptococci<br><i>S. aureus</i>   | <u>Acute unilateral cervical lymphadenitis and moderate symptoms</u> (e.g., fever, ill-appearing, warm and/or tender adenitis)<br>Cephalexin or Amoxicillin-clavulanate (see <a href="#">link</a> )<br><br>If concern for MRSA, Trimethoprim-sulfamethoxazole or Doxycycline can be considered |   | 7 – 14 days depending on clinical response  | (52)  |      |
| <b>Necrotizing fasciitis</b>   | Beta hemolytic streptococci (Group A)<br><i>S. aureus</i><br><i>V. vulnificus</i><br><i>A. hydrophila</i><br>Peptostreptococci<br>Polymicrobial (mixed aerobic-anaerobic microbes) | Vancomycin + Piperacillin-tazobactam + Clindamycin<br>OR<br>Piperacillin-tazobactam + Linezolid<br><br><i>Prompt debridement required</i><br><br>*Pediatric ID consult recommended   |   | Depends on clinical response; duration usually prolonged (4-6 weeks)                                    | (44),<br>(53)   |      |

| Diagnosis                                | Usual Etiology   | Suggested Empiric Therapy          | Usual Duration of Treatment  | Ref.          |
|--|--|------------------------------------|--|---------------|
| <b>Miscellaneous systemic infections</b> |  |                                    |  |               |
| <a href="#">Febrile neutropenia</a>      | <i>Pseudomonas</i><br>Enteric gram-negative bacilli<br><i>Staphylococci spp.</i><br><i>Streptococci spp.</i><br>Yeast  | *Refer to the LPCH F&N Guidelines  |  | (53),<br>(55) |
| <a href="#">Lyme disease</a>             | <i>B. burgdorferi</i><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 4.4 mg/kg per day divided BID (max 200 mg/day) for 10 days<br>OR<br>Amoxicillin 50 mg/kg per day divided TID (max 1.5 g/day) for 14 days<br>OR<br>Cefuroxime 30 mg/kg per day divided BID (max 1g/day) for 14 days | (56),<br>(57) |
|  |  | Isolated Bell's Palsy              | Doxycycline 4.4 mg/kg per day divided 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                          | <b>Initial episode:</b> As for early localized disease with a duration of 28 days  |               |
|  |  |                                    | <b>Recurrent arthritis</b> despite adequate prior oral therapy:<br>Repeat second course of oral antibiotics as above x4 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 4.4 mg/kg per day divided BID (max 200 mg/day) for 14 days  |                                    |  |               |

❖ Please visit the [Antimicrobial Stewardship Program \(ASP\)](#) website located in the Housestaff Manual for more useful resources, including:

- [LPCH antibiogram and antimicrobial dosing quick reference](#)
- [Antimicrobial monitoring](#)
- [Neonatal Intensive Care Unit \(NICU\) late onset sepsis algorithm](#)
- Vancomycin Dosing Guidelines:
  - [Vancomycin Guideline for Neonates and Children](#)
  - [Vancomycin Guideline in Hemodialysis](#)
  - [Initial Vancomycin Dosing Guideline for Surgical Patients up to 1 Week Post-Op](#)
- [Restricted antimicrobials and the appropriate approval process](#)
- [Palivizumab \(Synagis®\) guidelines](#)
- [Surgical prophylaxis guidelines](#)
- [Amoxicillin-clavulanate dosing and formulation selection guide](#)
- Other clinical practice guidelines and clinician education

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