

Pediatric Empiric Antimicrobial Therapy Recommendations 2024-2025

Anatomic Site/ Diagnosis/ Population	Common Pathogens	Preferred Treatment	Comments
Bone/Joint			
Age ≤ 21 days or Age > 21 days and PMA < 40 weeks	<i>S. aureus</i> , <i>Streptococcus agalactiae</i> , Gram negatives	Oxacillin plus cefotaxime	Hold antimicrobials until culture obtained (non-neonate and non-sepsis). Strongly recommend ID consult Vancomycin should be used empirically in a critically ill patient.
Age > 21 days – 12 weeks and PMA ≥ 40 weeks	<i>S. aureus</i> , <i>Streptococcus agalactiae</i> , Gram negatives	Oxacillin plus ceftriaxone [®]	
Age ≥ 12 weeks	<i>S. aureus</i> , <i>S. pyogenes</i> , <i>Kingella</i>	Cefazolin	
Central Nervous System			
Meningitis			
Age ≤ 21 days or Age > 21 days and PMA < 40 weeks	<i>Streptococcus agalactiae</i> Gram negatives (<i>E. coli</i> , <i>Klebsiella</i> species) <i>Listeria monocytogenes</i>	Ampicillin plus cefotaxime	Strongly recommend ID consult Add ampicillin for <i>Listeria</i> coverage in immunocompromised hosts. Refer to febrile infant pathway for well-appearing febrile infants ≤ 8 weeks of age Add acyclovir for patients presenting with signs and symptoms of encephalitis such as seizure, changes in mental status, or focal neurological signs. Duration <ul style="list-style-type: none"> • <i>Neisseria meningitidis</i> or <i>Haemophilus influenzae</i>: 7 days • <i>Streptococcus pneumoniae</i>: 10 days • Group B <i>Streptococcus</i> (<i>Streptococcus agalactiae</i>): 14 days • Gram-negative bacilli: 21 days • <i>Listeria monocytogenes</i>: ≥ 21 days
Age > 21 days – 23 months and PMA ≥ 40 weeks	<i>S. pneumoniae</i> , <i>N. meningitidis</i> , <i>Streptococcus agalactiae</i> , <i>H. influenzae</i> , <i>E. coli</i>	Ceftriaxone [®] +/- vancomycin	
Age ≥ 2 years	<i>S. pneumoniae</i> , <i>N. meningitidis</i>	Ceftriaxone [®] +/- vancomycin	
Brain Abscess	<i>S. aureus</i> , <i>Viridans</i> Group <i>Streptococcus</i> , <i>Streptococcus anginosus</i> Group, Gram negatives, anaerobes	Ceftriaxone [®] plus vancomycin plus metronidazole	Strongly recommend ID consult
VP Shunt	<i>S. aureus</i> , coagulase (-) <i>Staphylococcus</i> , <i>Diphtheroid</i> , <i>Pseudomonas aeruginosa</i>	Cefepime plus vancomycin	Strongly recommend ID consult
Febrile Neutropenia			
	Gram negatives (<i>P. aeruginosa</i>), Gram positive cocci	Cefepime Refer to ill-appearing oncology/oncologic fever pathway	Add vancomycin empirically if clinical suspicion for Gram-positive infection is high (i.e., known colonization with MRSA, skin/soft tissue infection, etc.) For suspected intra-abdominal infection, typhlitis, perirectal pathology, either add metronidazole to cefepime or consider utilizing piperacillin-tazobactam. Consider meropenem empirically if patient is in septic shock.

Reviewers:

Created by	Department	Creation Date	Version Date
Pediatric Antimicrobial Stewardship	Pediatrics	8/2020	7/2024

<https://www.advocatechildrenshospital.com/healthcare-professionals/peds-pathways>

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Genitourinary			
Cystitis	<i>E. coli</i>	Cephalexin Refer to UTI pathway	For age < 60 days refer to the febrile infant pathway recommendations. For patients with vesicoureteral reflux (VUR), broader antimicrobial may be needed based on patient history. Duration: <ul style="list-style-type: none"> Cystitis: 5 days (beta-lactams) Pyelonephritis: 7 days
Pyelonephritis	<i>E. coli</i>	Ceftriaxone [®] Refer to UTI pathway	
Pelvic inflammatory disease	Usually, polymicrobial <i>Neisseria gonorrhoeae, Chlamydia trachomatis, anaerobes, gram-negative rods, Streptococcus spp.</i>	Ceftriaxone plus metronidazole plus doxycycline	Oral and IV administration of doxycycline and metronidazole provide similar bioavailability. Oral is preferred in patients without severe illness or tubo-ovarian abscess. If IV therapy is initiated, transition from IV to oral after 24-48 hours if clinical improvement.
HEENT			
Acute otitis media	<i>S. pneumoniae, H. influenzae, Moraxella</i>	Amoxicillin Refer to acute otitis media pathway	Duration: <ul style="list-style-type: none"> Age < 2 years: 10 days Age ≥ 2 years: 5 days
Brachial cleft cyst infection	<i>Streptococcus</i> spp., oral anaerobes	Ampicillin/sulbactam	
Cervical lymphadenitis without suspected dental source	<i>S. pyogenes, S. aureus</i>	Cefazolin	Source control shortens duration of antimicrobial therapy
Cervical lymphadenitis with suspected dental source	Oral streptococci and anaerobes	Ampicillin/sulbactam	
Dental infection	<i>Streptococcus</i> spp., oral anaerobes	Ampicillin/sulbactam	
Group A <i>Streptococcus</i> pharyngitis	Group A <i>Streptococcus</i>	Amoxicillin (once daily dosing)	Duration: 10 days
Mastoiditis	<i>S. pneumoniae, S. aureus, H. influenzae, Moraxella</i>	Ceftriaxone [®] If concern for intracranial extension: ceftriaxone plus vancomycin plus metronidazole	Strongly recommend ID consult. In patients with chronic acute otitis media or rapidly progressing severe disease, consider providing anti-pseudomonal coverage with ceftazidime
Orbital cellulitis	<i>S. aureus, S. pyogenes, H. influenzae, S. pneumoniae</i>	Ampicillin/sulbactam If concern for intracranial extension: ceftriaxone plus vancomycin plus metronidazole	Strongly recommend ID consult For patients with a penicillin allergy [‡] , use ceftriaxone [®] plus clindamycin.
Parotitis	<i>S. aureus, viruses</i>	Cefazolin	
Periorbital cellulitis	<i>S. pneumoniae, Moraxella, H. influenzae, S. aureus, S. pyogenes</i>	Ampicillin/sulbactam	Strongly recommend ID consult
Peritonsillar abscess/ Retropharyngeal abscess	<i>S. pyogenes, S. aureus, H. influenzae, oral anaerobes</i>	Ampicillin/sulbactam	Source control shortens duration of antimicrobial therapy For patients with a penicillin allergy [‡] , use ceftriaxone [®] plus clindamycin.
Sinusitis	<i>S. pneumoniae, H. influenzae, Moraxella</i>	Mild-moderate: Amoxicillin Severe: Amoxicillin-clavulanate Refer to sinusitis pathway	Duration: 7 days

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Intra-abdominal			
Appendicitis	Gram negatives + anaerobes	Ceftriaxone plus metronidazole (once daily)	Refer to appendicitis pathway
Cholecystitis	Gram negatives	Ceftriaxone	
Cholangitis	Gram negatives + anaerobes	Ceftriaxone plus metronidazole	
Pancreatitis, acute	Noninfectious	Antibiotic therapy is not recommended	
Pancreatitis, infected necrosis	Gram negatives + anaerobes	Piperacillin-tazobactam	
Peritonitis			
Non-peritoneal catheter-associated	<i>Streptococcus viridans</i> , <i>E. coli</i>	Ceftriaxone	
Peritoneal catheter-associated	<i>Streptococcus viridans</i> , <i>E. faecalis</i> , <i>E. coli</i> , <i>Pseudomonas aeruginosa</i>	Cefepime plus vancomycin	
Lung			
Community-acquired pneumonia, including aspiration pneumonia			<p>ID consult strongly recommended if unusual pathogens are suspected or identified, critically ill, complicated pneumonia, or evidence of lung necrosis</p> <p>* < 3 doses each of PCV13/Hib and/or < 6 months</p> <p>[§]Add vancomycin if clinical suspicion for MRSA or septic shock. If MRSA coverage is initiated, order a nasal MRSA PCR. If nasal MRSA PCR is negative, may discontinue vancomycin.</p> <p>For patients with a penicillin allergy[‡], use ceftriaxone[Ⓞ].</p> <p>Anaerobic coverage should not routinely be added for suspected aspiration pneumonia unless lung abscess or empyema is suspected</p> <p>Duration:</p> <ul style="list-style-type: none"> • Inpatient (non-severe): 5 days • Inpatient (severe) or complicated: case-by-case basis • Atypical: 3 days • Influenza: 5 days
Age ≤ 21 days or Age > 21 days and PMA < 40 weeks	<i>Streptococcus agalactiae</i> Gram negatives (<i>E. coli</i> , <i>Klebsiella</i> species), <i>Listeria monocytogenes</i> – rare	Ampicillin plus cefotaxime	
Age > 21 days and PMA ≥ 40 weeks	Consider <i>C. trachomatis</i> or <i>B. pertussis</i> Viruses <i>S. pneumoniae</i> <i>H. influenzae</i> Consider <i>C. trachomatis</i> or <i>B. pertussis</i> in young infants Consider atypical organisms (<i>Mycoplasma pneumoniae</i> and <i>Chlamydia pneumoniae</i>) in > 5 years old with insidious onset or mild/protracted course	Refer to community-acquired pneumonia pathway . Inpatient (non-severe) & vaccinated: ampicillin Inpatient (non-severe) & undervaccinated*: ceftriaxone [Ⓞ] Inpatient (severe) or complicated: ceftriaxone [Ⓞ] +/- vancomycin [§] Influenza: oseltamivir SARS-CoV2: Refer to pediatric COVID19 treatment guidelines Atypical: azithromycin	
Hospital-acquired and ventilator-associated pneumonia	Gram negatives (<i>P. aeruginosa</i> , <i>E. coli</i> , <i>Enterobacter</i> , <i>Klebsiella</i> species) <i>Staphylococcus aureus</i>	cefepime +/- vancomycin [§]	<p>ID consult strongly recommended if unusual pathogens are suspected or identified, critically ill, complicated pneumonia, or evidence of lung necrosis.</p> <p>[§]If MRSA coverage is initiated, order a MRSA nasal PCR. If nasal MRSA PCR is negative, may discontinue vancomycin.</p>
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Sepsis (excludes NICU)			
Age ≤ 21 days or Age > 21 days and PMA < 40 weeks	<i>Streptococcus agalactiae</i> Gram negatives (<i>E. coli</i> , <i>Klebsiella</i> species), <i>Listeria monocytogenes</i> – rare	Ampicillin plus cefotaxime	Initiate IV antimicrobials when sepsis is a concern after cultures are drawn. Antimicrobials should be administered within 1 hour of suspicion of sepsis. If concern for <i>MRSA</i> or <u>severe sepsis/septic shock</u> , add vancomycin. If concern for HSV, add acyclovir.
Age > 21 days and PMA ≥ 40 weeks (healthy children)	Gram negatives (<i>E. coli</i> , <i>Klebsiella</i> species), <i>S. pneumoniae</i> , <i>Moraxella</i> , <i>H. influenzae</i> , <i>N. meningitidis</i> , <i>S. aureus</i> , <i>S. pyogenes</i>	Ceftriaxone [Ⓞ] +/- vancomycin	If concern for abdominal source, add metronidazole or consider alternative therapy with piperacillin-tazobactam if non-meningitis source. If concern for Toxic Shock Syndrome, add clindamycin.
Age > 21 days and PMA ≥ 40 weeks (high risk children)	Gram negatives (<i>E. coli</i> , <i>Klebsiella</i> species, <i>P. aeruginosa</i>), <i>S. pneumoniae</i> , <i>Moraxella</i> , <i>H. influenzae</i> , <i>N. meningitidis</i> , <i>S. aureus</i> , <i>S. pyogenes</i>	Cefepime +/- vancomycin	High risk children include immunocompromised, febrile neutropenia, short gut, central line, s/p transplant If age ≤ 8 weeks and full term (>37 weeks), refer to febrile infant pathway for well-appearing febrile infants who do not have sepsis. Strongly recommend ID consult.
Skin and Soft Tissue			
Purulent SSTI (e.g., furuncle, carbuncle, abscess)	<i>S. aureus</i> , <i>Streptococcus</i> species	Mild: I&D alone is sufficient; no culture necessary Moderate: I&D + cefazolin Severe: I&D + vancomycin	Mild: No systemic signs or symptoms of infection Moderate: Systemic signs and/or symptoms of infection Severe: Failed I&D plus oral antimicrobials and systemic signs or symptoms of infection
Nonpurulent SSTI (e.g., cellulitis, erysipelas)	<i>Streptococcus</i> species, <i>S. aureus</i>	Mild: cephalixin Moderate: cefazolin	Mild: Typical cellulitis/erysipelas with no focus of purulence Moderate: Typical cellulitis/erysipelas with systemic signs and/or symptoms of infection.
Necrotizing fasciitis	Group A <i>Streptococcus</i> , <i>S. aureus</i> , <i>Clostridium spp.</i>	Vancomycin plus ceftriaxone plus metronidazole plus clindamycin	Emergent surgical intervention and ID consult recommended Broader therapy may be warranted for patients with comorbidities or due to trauma
Staphylococcus scalded skin syndrome	<i>S. aureus</i>	Cefazolin	

*Refer to [MW Region Beta Lactam Allergy and Cross-Reactivity Guideline](#)

ⓄUse ceftriaxone with caution/consider alternative agent in patients > 21 days of age and PMA ≥ 40 weeks with:

- Total serum bilirubin ≥ 5 mg/dL
- Receiving calcium containing IV products
 - Do not administer ceftriaxone and calcium simultaneously in same line

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