Outpatient Antibiotic Handbook

CMH ASP Group

Version 7, last updated 9/7/2023

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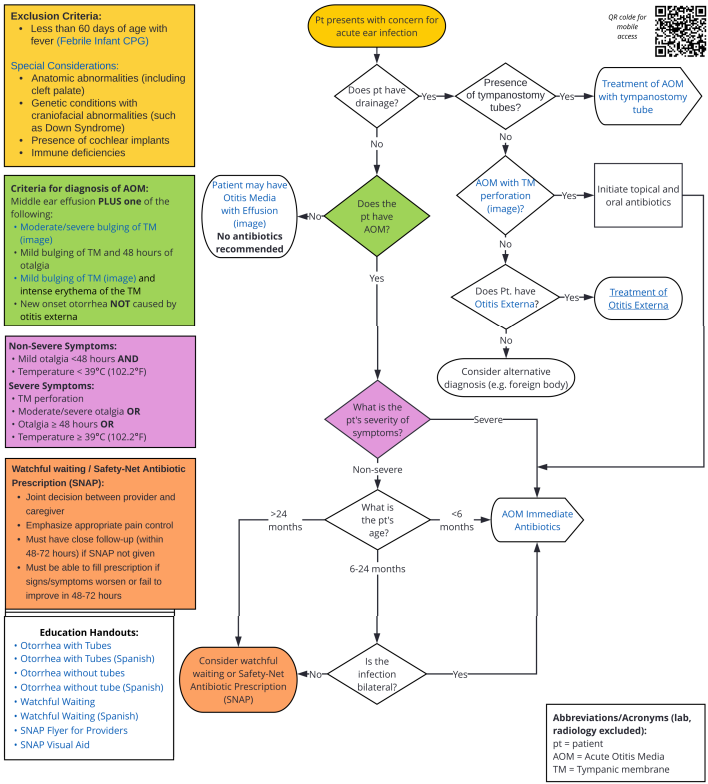
Online version of the handbook is available on the Children's Mercy Antimicrobial Stewardship website

The most updated Children's Mercy clinical practice guidelines and care process models may be accessed on the Evidence Based Practice section of childrensmercy.org. The algorithms included in this handbook may not reflect the most recent edits.

The American Academy of Pediatrics' table listing common pathogens, empiric antibiotic therapy and antibiotic duration for various infections can be accessed in the Redbook.

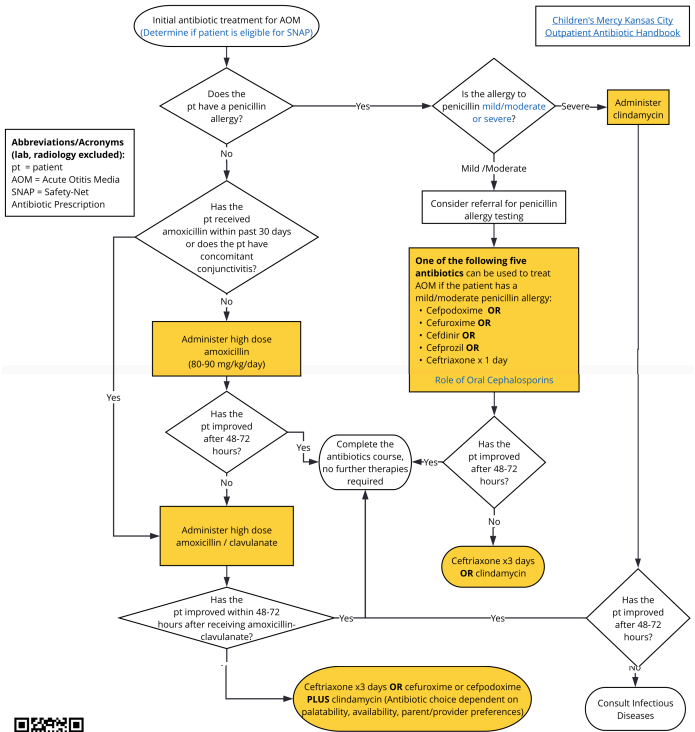
Acute otitis media (AOM) (AAP guideline 2013)[1]

Refer to Children's Mercy Evidence Based Practice Care Process Model for more information on diagnosis and management.



Acute otitis media (AOM) (AAP guideline 2013)[1]

Refer to Children's Mercy Evidence Based Practice Care Process Model for more information on diagnosis and management.



QR code for mobile access

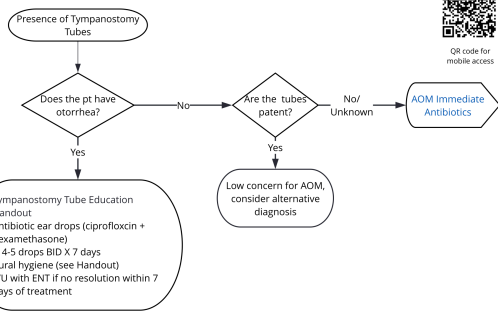
Antibiotic duration for amoxicillin, amoxicillin/clavulanate, cefuroxime, cefdinir, cefpodoxime, cefprozil, and clindamycin:

- <2 years of age **OR** severe AOM **OR** chronic AOM **OR** recurrent AOM **OR** TM perforation = **10 days**
- 2-5 years of age with non-severe symptoms = **7 days**
- ≥6 years of age with non-severe symptoms = **5-7 days**

Acute otitis media (AOM) (AAP guideline 2013)[1]

Refer to Children's Mercy Evidence Based Practice Care Process Model for more information on diagnosis and management.

Education Handouts:
- Otorrhea with Tubes
- Otorrhea with Tubes (Spanish)
- Otorrhea without tubes
- Otorrhea without tube (Spanish)



Abbreviations/Acronyms (lab, radiology excluded):
pt = patient
ENT = Ears, Nose, and Throat
BID = Twice per day

Watchful waiting (WW)/ Safety-Net Antibiotic Prescription (SNAP):

- Joint decision between provider and caregiver
- Must have close follow-up (within 48-72 hours) if SNAP not given
- Must be able to fill antibiotic prescription if signs/symptoms worsen or fail to improve in 48-72 hours from onset of symptoms

NOTE: If using WW/SNAP, please place a comment in prescription instructions to "fill only upon patient/family request"

Antibiotic Recommendations

- Duration:
  - < 2 years OR severe disease = 10 days
  - 2 – 5 years of age = 7 days
  - ≥ 6 years = 5 – 7 days

    NOTE: Recent data suggests 5 days of therapy may be sufficient for children ≥ 2 years with AOM of any severity (Frost et al. J Pediatr. 2020 May; 220:109-115.e1.)

- First line:
  - Amoxicillin 40-50 mg/kg/dose PO BID (max 2000 mg/dose)
- Alternative therapies:
  - If received amoxicillin ≤ 30 days prior **OR** concomitant conjunctivitis:
    - Amoxicillin/clavulanate 40-50 mg/kg/dose (amoxicillin component) PO BID (max 2000 mg amoxicillin/dose)
      NOTE: Refer to amoxicillin/clavulanate dosing table on page 28.
- Mild/moderate penicillin allergy (e.g. rashes including hives):
  - Cefuroxime 250 mg PO BID for children able to swallow pills
    NOTE: Only available in tablet form and should not be crushed.
  - Cefdinir 7 mg/kg/dose PO BID (max 300 mg/dose)
  - Cefpodoxime 5 mg/kg/dose PO BID (max 200 mg/dose)
  - Cefprozil 15 mg/kg/dose PO BID (max 500 mg/dose)
  - Ceftriaxone 50 mg/kg IM/IV qDay x 1-3 days (max 1000 mg/dose)
    NOTE: Risk of penicillin/cephalosporin cross-reactivity extremely low when no shared side chains (beta-lactam side chain chart page 29). Consider referral for penicillin allergy testing.
- Severe penicillin allergy (e.g. anaphylaxis):
  - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose)
- Failure to improve after 48-72 hours of initial antibiotic therapy:
  - Treatment failure with amoxicillin
    - Amoxicillin/clavulanate 40-50 mg/kg/dose (amoxicillin component) PO BID (max 2000 mg amoxicillin/dose)
      NOTE: Refer to amoxicillin/clavulanate dosing table on page 28
  - Treatment failure with amoxicillin/clavulanate:
    - Ceftriaxone 50 mg/kg/dose (max 1000 mg/dose) IM/IV daily x 3 days

      OR
    - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose) **PLUS** one of the following:
      - Cefuroxime 250 mg PO BID for children able to swallow pills
      - Cefpodoxime 5 mg/kg/dose PO BID (max 200 mg/dose)

Otorrhea

- AOM with a perforated tympanic membrane (the following could be considered in addition to systemic antibiotic) **OR** AOM with presence of patent tympanostomy tubes:
  - Ciprodex® (Ciprofloxacin 0.3% - Dexamethasone 0.1%) otic suspension, 4 drops instilled into affected ear twice daily for 7 days for patients >6 months of age

    NOTE: If Ciprodex® on shortage or cost-prohibitive, may use ciprofloxacin ophthalmic 2 drops +/- dexamethasone ophthalmic 2 drops twice daily for 7 days in patients >6 months of age
  - Ofloxacin otic solution, 5 drops into affected ear twice daily for 10 days for children > 6 months of age

- Otitis externa with intact tympanic membrane
  - May use Ciprodex®, ciprofloxacin ophthalmic/dexamethasone ophthalmic or Ofloxacin as noted above

    OR
  - Cortisporin® otic (neomycin-polymyxin B-hydrocortisone otic), 3 drops to affected ear 3 times per day for 7 day

Group A streptococcal pharyngitis (IDSA guidelines 2012)[2]

Refer to Children's Mercy Evidence Based Practice Clinical Practice guideline for more information on diagnosis and management.

NOTE: Streptococcal pharyngitis is uncommon in children <3 years of age and children of any age with viral symptoms

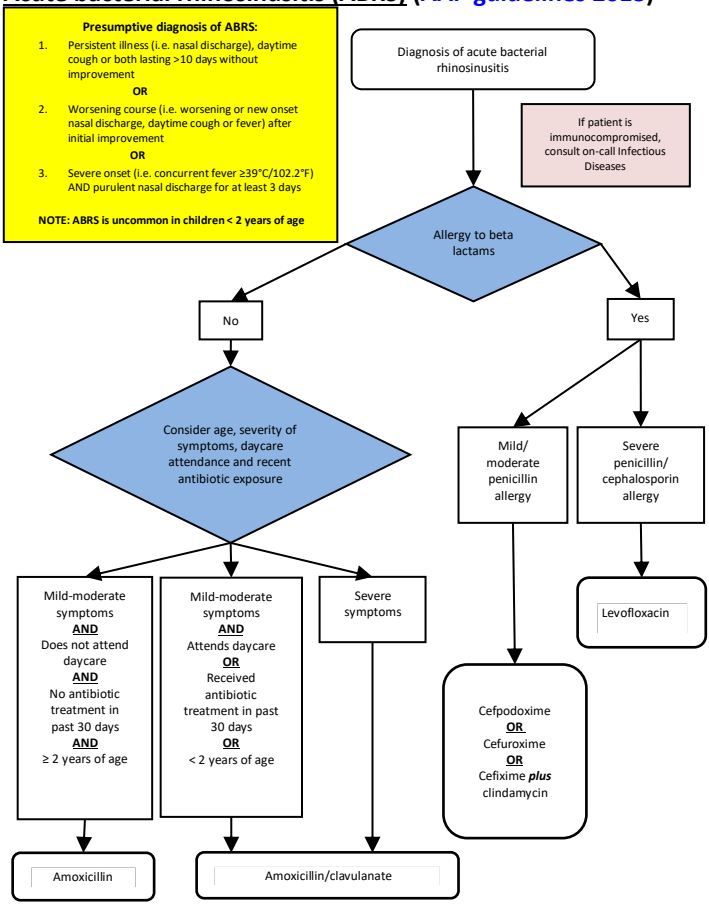
- Duration: varies based on antibiotic used
- First Line:
  - Amoxicillin 50 mg/kg/dose PO qDay (max 1000 mg/day) x 10 days
  - Penicillin G benzathine IM
    - < 27 kg: 600,000 Units x 1 dose
    - ≥ 27 kg: 1.2 million Units x 1 dose
  - Penicillin VK
    - < 27kg: 250 mg PO BID – TID x 10 days
    - ≥ 27 kg: 500 mg PO BID – TID x 10 days
- Mild penicillin allergy (e.g. rashes):
  NOTE: consider referral for penicillin allergy testing
  - Cephalexin 20-25 mg/kg/dose PO BID (max 500 mg/dose) x 10 days
- Severe penicillin allergy (e.g., concern for immediate hypersensitivity reaction such as anaphylaxis):
  - Clindamycin 7 mg/kg/dose PO TID (max 300 mg/dose) x 10 days
  - Azithromycin 12 mg/kg/dose PO qDay (max 500 mg/dose) x 5 days
    NOTE: Azithromycin is not recommended unless patient has severe allergy to penicillin and cephalosporins. Resistance is well known, and treatment failure may occur

Uncomplicated community-acquired pneumonia (IDSA guidelines 2011)[3]

Refer to Children's Mercy Evidence Based Practice Clinical Practice guideline

- Duration: 5 days
  NOTE: Shorter duration of 3 - 5 days may be sufficient based on recent data for patients > 6 months old (Kuitunen et al. Clin Infect Dis. 2023 Feb 8;76(3):e1123-e1128)
- First line:
  - Amoxicillin 40-50 mg/kg/dose PO BID (max 2000 mg/dose)
    NOTE: Amoxicillin/clavulanate provides no additional coverage for *Streptococcus pneumoniae* and is not a recommended first line agent
- Mild penicillin allergy (e.g. rashes including hives)
  NOTE: Risk of penicillin/cephalosporin cross-reactivity extremely low when no shared side chains (beta-lactam side chain chart page 29). Consider referral for penicillin allergy testing.
  - Cefuroxime 250 - 500 mg PO BID for children able to swallow pills
  - Cefpodoxime 5 mg/kg/dose PO BID (max 200 mg/dose)
  - Cefprozil 15 mg/kg/dose PO BID (max 500 mg/dose)
    NOTE: Cefdinir is NOT recommended for empiric treatment of pneumonia because it is less effective against *Streptococcus pneumoniae*. Clindamycin is preferred over cefdinir if the above antibiotics are not available
  - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose)
- Severe penicillin allergy (e.g anaphylaxis)/ cephalosporin allergy:
  - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose)
- Severe penicillin allergy / cephalosporin allergy AND intolerance of clindamycin:
  - Levofloxacin 8-10 mg/kg/dose PO BID (ages 6 months – 5 years) **OR** qDay (≥ 5 years) (max 750 mg/**day**)
- Atypical pneumonia (consider in adolescents with bilateral disease):
  - Azithromycin 10 mg/kg/dose PO qDay on day #1 (max 500 mg/dose), 5 mg/kg/dose PO qDay on days #2-5 (max 250 mg/dose)
    NOTE: Resistance to azithromycin is significant among typical bacterial pathogens, especially *Streptococcus pneumoniae*. For this reason, azithromycin monotherapy for patients with CAP is not routinely recommended.
    NOTE: Levofloxacin and doxycycline are alternatives for atypical coverage and do not require the addition of azithromycin.

Acute bacterial rhinosinusitis (ABRS) (AAP guidelines 2013)[4]



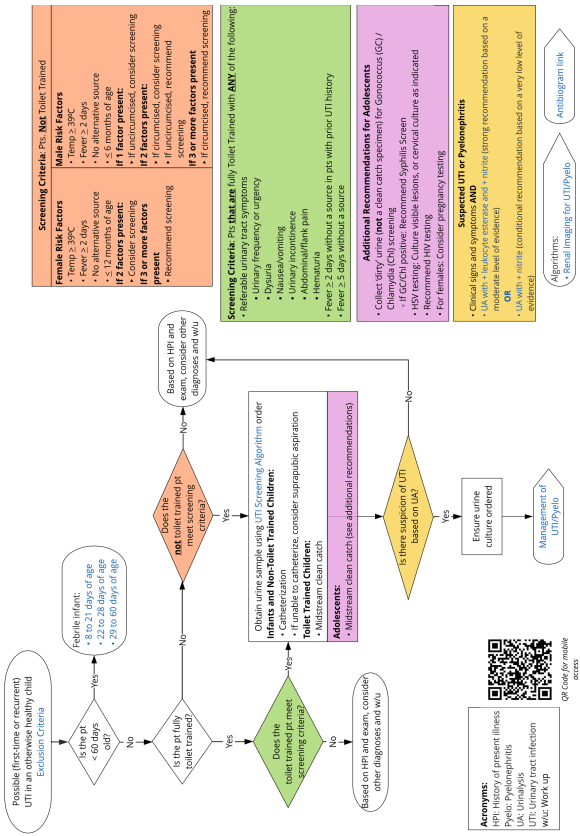
Acute bacterial rhinosinusitis (ABRS) (AAP guidelines 2013)[4]

Refer to algorithm on page 8 for more information on diagnosis of ABRS.

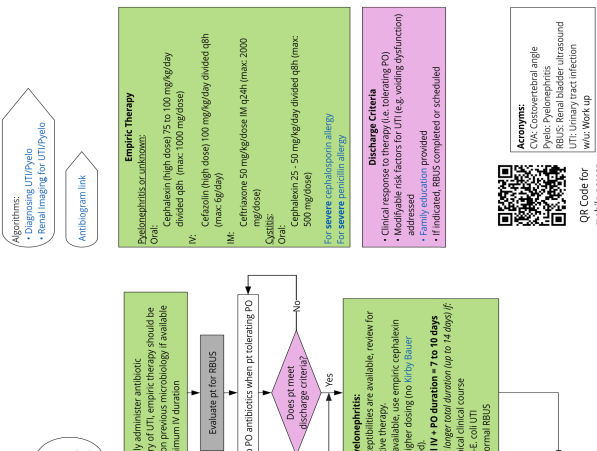
- Treatment
  - Duration: 5-7 days
  - First line:
    - Mild-moderate disease AND patient ≥ 2 years of age AND does not attend daycare AND has not received antibiotics within the past 30 days
      - Amoxicillin 45-50 mg/kg/dose PO BID (max 2000 mg/dose)
        NOTE: In communities with low rates of penicillin non-susceptible *S. pneumoniae*, standard dose amoxicillin may be considered.
    - Severe disease **OR** mild-moderate disease with ANY of the following: <2 years of age, attends daycare, received antibiotics in the past 30 days
      - Amoxicillin-clavulanate 40-50 mg/kg/dose (amoxicillin component) PO BID (max 2000 mg/dose)
        NOTE: Refer to amoxicillin/clavulanate dosing table on page 28
  - Mild penicillin allergy (e.g. rashes including hives):
    NOTE: Risk of penicillin/cephalosporin cross-reactivity extremely low when no shared side chains (beta-lactam side chain chart page 29). Consider referral for penicillin allergy testing.
    - Cefpodoxime 5 mg/kg/dose PO BID (max 200 mg/dose)
    - Cefuroxime 250 mg PO BID for children able to swallow pills
    - Cefixime 4 mg/kg/dose PO BID (max 200 mg/dose) ***PLUS*** Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose)
      NOTE: Some cephalosporins have limited availability or variable insurance coverage
  - Severe penicillin allergy (e.g anaphylaxis) or cephalosporin allergy:
    - Levofloxacin 10 mg/kg/dose PO BID (6 months- 5 years) **OR** qDay (≥5 years) (max 500 mg/**day**)
    - Consider consulting Infectious Diseases physician

    NOTE: per AAP guideline, even patients with a history of serious type 1 immediate reaction to penicillin may be safely treated with cefuroxime and cefpodoxime given low risk of cross-reactivity

Urinary Tract Infection/Pyelonephritis - Diagnosis



Urinary Tract Infection/Pyelonephritis – Management



Cystitis/uncomplicated UTI in children >2 years of age

Refer to Children's Mercy Evidence Based Practice Clinical Practice guideline for more information on diagnosis and management.

NOTE: If history of UTIs, empiric therapy should be based on previous microbiology, if available

- Duration: 3 – 5 days
- First line:
  - Cephalexin 17 mg/kg/dose PO TID (max 500 mg/dose)
- Alternative therapies:
  - Cefixime 8 mg/kg/dose PO qDay (max 400 mg/dose)
- Severe penicillin allergy (e.g. anaphylaxis) or cephalosporin allergy:
  - TMP/SMX 3-6 mg/kg/dose (trimethoprim component) PO BID (max 160 mg TMP/dose)
    NOTE: At CMH, there are increasing rates of *E coli* resistance to TMP/SMX
  - Nitrofurantoin (treatment duration 5-7 days) – ***if cystitis alone***
    - Macrocrystal (Macrodantin® or Furadantin®) 1.25-1.75 mg/kg/dose PO q6h (max 100 mg/dose)
    - Macrocrystal/monohydrate (Macrobid®) 100 mg PO BID (**ADOLESCENTS ONLY)**

NOTE: Avoid cephalexin in patients with severe penicillin allergy (e.g. anaphylaxis) due to same side chains. Other cephalosporins may be tolerated. Refer to beta-lactam side chain chart page 29. Consider referral for penicillin allergy testing.

NOTE: Cefdinir has lower urinary excretion in children than adults, thus recommend not using for pediatric UTIs unless confirmed susceptibilities to oral third generation cephalosporins.

Pyelonephritis (febrile urinary tract infection) in children ≥ 2 months of age (AAP guidelines 2011)[5]

Refer to Children's Mercy Evidence Based Practice Clinical Practice guideline

Evaluate need for admission:

General indications for admission include age < 2 months, ill appearance, poor intake, unable to tolerate oral antibiotic, vomiting, immune compromise, urinary tract obstruction and/or culture-positivity for bacteria known to be resistant to oral antibiotics

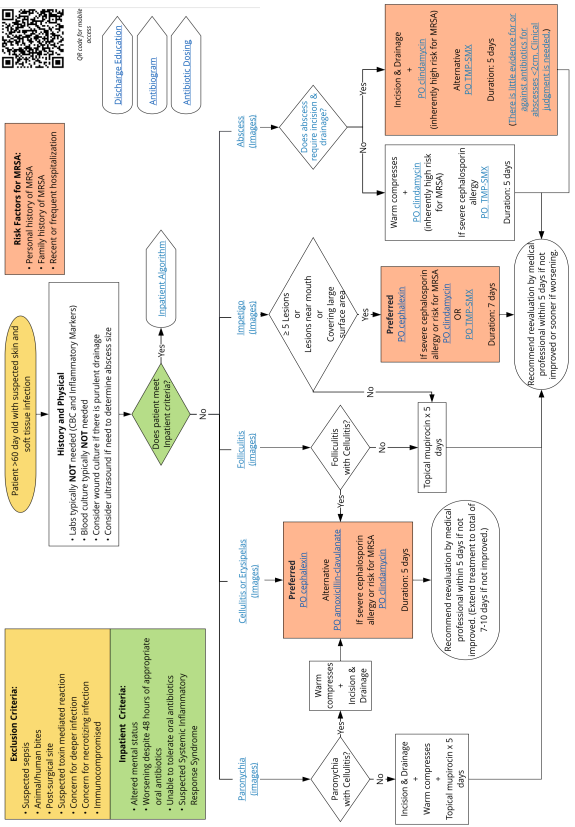
NOTE: If history of UTIs, empiric therapy should be based on previous microbiology if available

- Duration: 7-10 days
  NOTE: Shorter duration of 5 days may be sufficient based on recent data for patients > 2 months old (Zaoutis et al. JAMA Pediatr. 2023 Aug 1;177(8):782-789.)
- First line: Cephalexin 25-33 mg/kg/dose PO TID (max 1000 mg/dose)
- Alternative therapies:
  - Cefixime 8 mg/kg PO q24h (max 400 mg/dose)
- Severe penicillin allergy (e.g. anaphylaxis) or cephalosporin allergy:
  - TMP/SMX 3-6 mg TMP/kg/dose (trimethoprim component) PO BID (max 160 mg TMP/dose)
    NOTE: At CMH, there are increasing rates of *E coli* resistance to TMP/SMX
  - Ciprofloxacin 10 - 20 mg/kg/dose PO BID (max 750 mg/dose)

NOTE: Avoid cephalexin in patients with severe penicillin allergy (e.g. anaphylaxis) due to same side chains. Other cephalosporins may be tolerated. Refer to beta-lactam side chain chart page 29. Consider referral for penicillin allergy testing.

NOTE: Cefdinir has lower urinary excretion in children than adults, thus recommend not using for pediatric UTIs unless confirmed susceptibilities to oral third generation cephalosporins.

Skin and soft tissue infections (IDSA guidelines 2014)[6]



Skin and soft tissue infections (IDSA guidelines 2014)[6]

Refer to Children's Mercy Evidence Based Practice Clinical Practice guideline for more information on diagnosis and management.

- Paronychia
  - Incision and drainage + warm compresses + topical mupirocin TID x 5 days
  - Concurrent cellulitis, refer to cellulitis or erysipelas management
- Folliculitis
  - Topical mupirocin x 5 days
  - Concurrent cellulitis, refer to cellulitis or erysipelas management
- Impetigo
  - Mild cases with less than 5 lesions
    - Topical mupirocin TID x 5 days
  - Extensive: ≥5 lesions, lesions covering large areas of the body, or lesions near the mouth
    - Duration: 7 days
    - First line treatment:
      - Cephalexin 17 mg/kg/dose PO TID (max 500 mg/dose)
    - If risk for MRSA (i.e. personal or family history of MRSA) **OR** severe penicillin/cephalosporin allergy (e.g. anaphylaxis):
      - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)
      - TMP-SMX 4-6 mg/kg/dose (trimethoprim component) PO BID (max 160 mg TMP/dose)

        NOTE: TMP-SMX may not cover group A Streptococcus

- Cellulitis or Erysipelas
  - Duration: 5 days
  - First line:
    - Cephalexin 17 mg/kg/dose PO TID (max 500 mg/dose)
  - Alternative:
    - Amoxicillin-clavulanate 22.5 mg/kg/dose (amoxicillin component) PO BID (max 875 mg/dose)
      NOTE: Refer to amoxicillin/clavulanate dosing table on page 28
  - If risk for MRSA (i.e. personal or family history of MRSA) **OR** severe penicillin/cephalosporin allergy (e.g. anaphylaxis):
    - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)
      NOTE: Clindamycin resistance for *Staphylococcus aureus* and group A Streptococcus has been increasing. Consider selecting an alternative if patient has a history of clindamycin-resistant *Staphylococcus aureus* or changing to a narrow spectrum antibiotic if culture results show MSSA or group A Streptococcus.

- Abscess:
  In addition to incision and drainage with culture:
  - Duration: 5 days
  - First-line treatment with one of the following:
    - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)
      NOTE: Clindamycin resistance for *Staphylococcus aureus* and group A *Streptococcus* has been increasing. Consider selecting an alternative if patient has a history of clindamycin-resistant *Staphylococcus aureus* or changing to a narrow spectrum antibiotic if culture results show MSSA or GAS
    - TMP-SMX 4-6 mg/kg/dose (TMP component) PO BID (max 160 mg TMP/dose)

NOTE: Systemic antibiotics may not be needed for abscesses < 2 cm if incision and drainage is performed.

Periorbital Cellulitis

- Due to differences in management of orbital cellulitis (i.e. postseptal infections), consider more extensive work-up to assess for orbital cellulitis in patients with any of the following:
  - Proptosis
  - Decreased visual acuity
  - Painful/tender and/or restricted eye movements
  - Severe or persistent headache, lethargy, or fever
  - < 1 year of age
  - Unable to perform adequate eye exam

- Duration: 5 - 7 days

- First line if no concern for MRSA:
  - Cephalexin 17 mg/kg/dose PO TID (max 500 mg/dose)
  - Amoxicillin/clavulanate 22.5 mg/kg/dose (amoxicillin component) PO BID (max 875 mg/dose)
    NOTE: Refer to amoxicillin/clavulanate dosing table on page 28

- Mild/moderate penicillin allergy:
  NOTE: Avoid cephalexin in patients with severe penicillin allergy (e.g. anaphylaxis) due to same side chains. Other cephalosporins may be tolerated. Refer to beta-lactam side chain chart page 29. Consider referral for penicillin allergy testing.
  - Cefuroxime 250 – 500 mg PO BID
  - Cefpodoxime 5 mg/kg/dose PO BID (max 400 mg/dose)

- Severe penicillin/cephalosporin allergy (e.g. anaphylaxis) and/or risk factor for MRSA:
  - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)

Animal/human bites[6]

- Duration:
  - Prophylaxis (for moderate to severe wounds with edema or crush injury, puncture wounds or facial bite wounds): 3 days
  - Treatment of infected wound: 5 - 7 days

- First line:
  - Amoxicillin/clavulanate 22.5 mg/kg/dose (amoxicillin component) PO BID (max 875 mg amoxicillin/dose)
    NOTE: Refer to amoxicillin/clavulanate dosing table on page 28

- Penicillin allergy:
  - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose) **PLUS** one of the following:
    - TMP-SMX 5 mg/kg (TMP component) PO BID (max 160 mg TMP/dose)
    - Doxycycline 2.2 mg/kg PO BID (max 100 mg/dose)

NOTE: Consider tetanus and rabies immunizations (discussion with ID)

Dental abscess

Assess for complicated infection (i.e. ill-appearing, signs of deep neck space infection, osteomyelitis of the mandible) as management may differ from what is listed below (e.g. hospital admission, longer duration of antibiotics, etc).

- Duration: 10 days

- First line:
  - Amoxicillin 17 mg/kg/dose PO TID (max 500 mg/dose)

(see next page for alternative therapies if complicated infection, amoxicillin failure, or penicillin allergy)

- Alternative for complicated infections or amoxicillin failure
  - Amoxicillin/clavulanate 25 mg/kg/dose (amoxicillin component) PO BID (max 875 mg amoxicillin/dose)
    NOTE: Refer to amoxicillin/clavulanate dosing table on page 28

- If buccal involvement AND/OR penicillin allergy:
  - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)

Acute lymphadenitis

- Duration: 7 – 10 days

- First line options:
  - Cephalexin 17-25 mg/kg/dose PO TID (max 1000 mg/dose)
  - Amoxicillin/clavulanate 22.5 mg/kg/dose (amoxicillin component) PO BID (max 875 mg amoxicillin/dose)
    NOTE: Consider in cases where oral anaerobes may be involved (e.g. unilateral cervical lymphadenitis in child with poor dental hygiene)
    NOTE: Refer to amoxicillin/clavulanate dosing table on page 28

- If concern for MRSA (i.e. personal or family history of MRSA) AND/OR severe penicillin or cephalosporin allergy (e.g. anaphylaxis):
  - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)

- If concern for *Bartonella henselae* (treatment may shorten duration of adenopathy):
  - Azithromycin 10 mg/kg/dose PO qDay (max 500 mg/dose) x 5 days

Acute bacterial conjunctivitis(AAO 2018)[7]

For conjunctivitis in neonates, refer to the Children's Mercy Evidence Based Practice algorithm.

Most cases of conjunctivitis, both viral and bacterial, are self-limiting and resolve without specific treatment.

Topical antibacterial therapy may result in earlier clinical and microbiological remission if given before day 6 of illness and may reduce transmissibility in children.

For moderate to severe bacterial conjunctivitis (i.e. copious purulent discharge, pain, and marked inflammation of the eye), systemic antimicrobial therapy and conjunctival cultures may be indicated. Possible etiologies may include gonococcal, chlamydial, or *Staphylococcus aureus* infections.

- Duration: 5 days
- Broad spectrum, nontoxic, inexpensive topical antibody therapies:
  - Infants, especially < 2 months:
    - Erythromycin 5 mg/gm ophthalmic ointment: Apply 1 cm ribbon into affected eye 4 times daily
    - Polymyxin B-bacitracin ophthalmic ointment: apply 1.25 cm ribbon to affected eye 4 times daily
  - Children and adolescents
    - Polymyxin B-trimethoprim ophthalmic solution: Instill 1 drop in affected eye 4 times daily
- Alternative topical therapies:
  - Tobramycin 3% ophthalmic solution: Instill 1- 2 drops into the affected eye every 4 hours

    NOTE: Resistance seen with *Streptococcus* species, risk of toxicity to the corneal epithelium and reactive keratoconjunctivitis, especially ≥ 7 days of use, limits utility.
  - Azithromycin 1% ophthalmic solution: Instill 1 drop in the affected eye twice daily (8 – 12 hrs apart) on days 1-2, then 1 drop in the affected eye daily on days 3 – 7

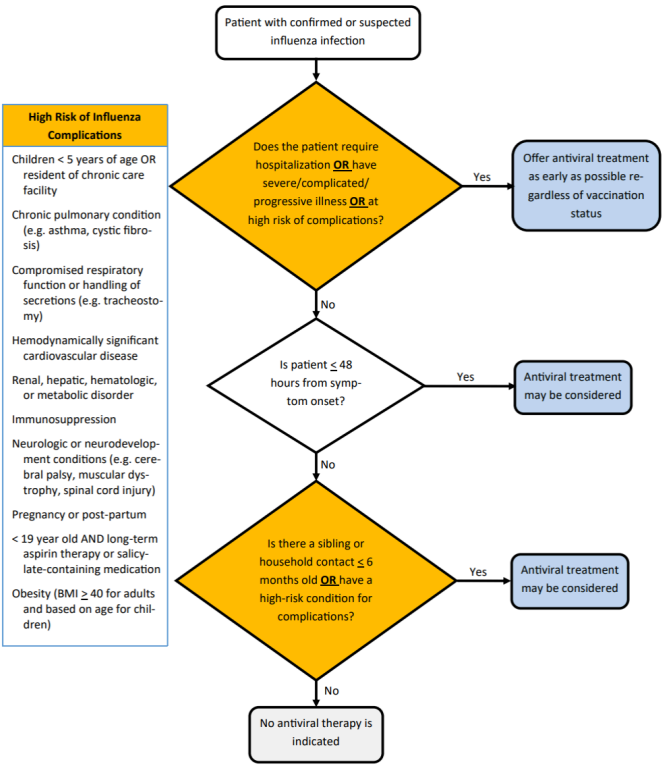
    NOTE: More expensive and challenging to find than other alternatives options. A different agent should be considered for patient ≤ 1 year of age

- If corneal involvement or contact lenses wearer, consider one of the following more expensive alternatives with broader gram-negative coverage:
  - Ciprofloxacin 0.3% ophthalmic drops: instill 1 – 2 drops in affected eye 4 times daily
  - Ofloxacin 0.3% ophthalmic drops: Instill 1 – 2 drops in affected eye 4 times daily

NOTE: Ophthalmic ointments and solutions containing neomycin are usually avoided due to high incidence of allergic sensitization.

Influenza Treatment (AAP 2023 – 2024 Recommendations)[8]

Influenza treatment recommendations are updated annually. Refer to CDC summary for clinicians and AAP recommendations for the most updated information.



Influenza Treatment (AAP 2023 – 2024 Recommendations)[8]

Influenza treatment recommendations are updated annually. Refer to CDC summary for clinicians and AAP recommendations for the most updated information.

- Antiviral treatment options
  - Oseltamivir
    - 1 – 8 months of age: 3 mg/kg/dose PO BID x 5 days
    - Infants ≥ 9 months: 3.5 mg/kg/dose PO BID x 5 days
    - Children ≤ 15 kg: 30 mg PO BID x 5 days
    - Children > 15 to 23 kg: 45 mg PO BID x 5 days
    - Children > 23 to 40 kg: 60 mg PO BID x 5 days
    - Children > 40 kg: 75 mg PO BID x 5 days
  - Zanamivir – ***only*** *for ≥ 7 years of age AND mild-to-moderate disease*
    - Two inhalations (10 mg) twice daily x 5 days

      NOTE: Inhalations on first day should be separated by ≥ 2 hours. Doses spaced by ~12 hours on subsequent days.

      NOTE: Not recommended in patients with chronic respiratory diseases (e.g. asthma, chronic lung disease, etc)
  - Baloxavir marboxil – *only for ≥ 5 years of age*
    - < 20 kg: 2 mg/kg PO one time only
    - 20 – 80 kg: 40 mg PO one time only
    - > 80 kg: 80 mg PO one time only

Influenza Chemoprophylaxis (AAP 2023 – 2024 Recommendations)[8]

Influenza chemoprophylaxis recommendations are updated annually. Refer to CDC summary for clinicians and AAP recommendations for the most updated information.

- Chemoprophylaxis is recommended after known or suspected influenza exposure in the following situations
  - Child at high risk of complications AND ≥ 1 of the following
    - Contraindication to influenza vaccine
    - ≤ 2 weeks after influenza vaccination
    - May not respond with sufficient protective immune responses after influenza vaccination (e.g. immunocompromised)
    - Exposure is a household contact or close contact
  - Family members likely to have ongoing close exposures to vaccinated children at high risk or unvaccinated children ≤ 24 months old

- Antiviral agents for chemoprophylaxis
  - Oseltamivir
    - 3 – 8 months of age: 3 mg/kg/dose PO daily x 7 days
    - Infants ≥ 9 months: 3.5 mg/kg/dose PO daily x 7 days
    - Children ≤ 15 kg: 30 mg PO daily x 7 days
    - Children > 15 to 23 kg: 45 mg PO daily x 7 days
    - Children > 23 to 40 kg: 60 mg daily x 7 days
    - Children > 40 kg: 75 mg PO daily x 7 days
  - Zanamivir - ***only*** *for ≥ 5 years of age*
    - Two inhalations (10 mg) once daily x 7 days
      NOTE: Not recommended in patients with chronic respiratory diseases
  - Baloxavir marboxil – *only for ≥ 5years of age*
    - < 20 kg: 2 mg/kg PO one time only
    - 20 – <80 kg: 40 mg PO one time only
    - ≥ 80 kg: 80 mg PO one time only

Gram Positive Antibiogram for Children's Mercy - 2022 (All Sources)

Children's Mercy Hospitals & Clinics - 2022 Antibiogram
Department of Pathology & Laboratory Medicine- Microbiology Laboratory
2022 Gram Positive Antibiogram (% Susceptible)

Organism	# of isolates tested	Ampicillin	Cefotaxime	Clindamycin	Erythromycin	Gentamicin[3]	Linezolid	Meropenem	Nitrofurantoin[4]	Oxacillin	Penicillin	Penicillin (Oral)	Rifampin[4]	Tetracycline	Tr/Sul[4]	Vancomycin
Enterococcus faecalis	203	99	-	-	-	-	-	99	-	100	-	-	-	-	-	100
All Staphylococcus aureus	1187	-	-	80	54	-	100	-	100	70	0	-	100	95	95	100
MSSA	830	-	-	78	68	-	100	-	100	100	0	-	100	95	97	100
MRSA	357	-	-	86	23	-	100	-	100	0	0	-	100	94	88	100
Staphylococcus epidermidis	175	-	-	44	18	80	100	-	100	33	0	-	100	85	62	100
S. pneumoniae[*]	74	-	-	89	73	-	-	91	-	-	-	73§	-	-	-	100
Meningitis breakpoint		-	86[†]	-	-	-	-	-	-	-	73[‡]	-	-	-	-	-
Non-meningitis breakpoint		-	97[‡]	-	-	-	-	-	-	-	97[‡]	-	-	-	-	-

[*] *S. pneumoniae* % susceptible was calculated using all isolates based on meningitis, nonmeningitis and oral breakpoints.
[#] of *S.pneumoniae* isolates tested: Penicillin=74, Cefotaxime=74, Erythromycin=52, Clindamycin=73, Meropenem=22, Vancomycin=22
[‡] Susceptible breakpoint for *S. pneumoniae* in patients with meningitis is ≤ 0.5 µg/mL for cefotaxime and ≤ 0.06 µg/mL for penicillin
[†] Susceptible breakpoint for *S. pneumoniae* in patients with non-meningitis infections is ≤ 1µg/mL for cefotaxime and ≤ 2 µg/mL for penicillin
[§] Susceptible breakpoint for *S. pneumoniae* is ≤ 0.06 µg/mL for penicillin when penicillin V is administered by the oral route
[3] Used only in combination for synergy and is not adequate therapy by itself.
[4] Antibiotics tested on UTI isolates only: *E. faecalis* (169), *S. aureus* (49), *S. epidermidis* (68)
(-) =No data available

Gram Negative Antibiogram for Children's Mercy - 2022 (All Sources)

Children's Mercy Hospitals & Clinics - 2022 Antibiogram
Department of Pathology & Laboratory Medicine- Microbiology Laboratory

2022 Gram Negative Antibiogram (% susceptible)

Organism	# of isolates tested	Amikacin [1]	Ampicillin	Amp/sulbactam [1]	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Gentamicin	Meropenem [1]	Pip/tazo	Tobramycin	Trimeth/Sulfa
Acinetobacter baumannii complex (includes **ALL** sources)	38	-	-	100	-	-	76	24	100	95	100	-	97	97
Citrobacter freundii (includes **ALL** sources)	30	100	IR	IR	IR	-	87	90	100	90	100	-	90	87
Klebsiella aerogenes^ (includes **ALL** sources)	28 [2]	100	IR	IR	IR	100	79	79	100	96	100	-	96	93
Serratia marcescens (includes **ALL** sources)	84	99	IR	IR	IR	100	100	99	99	100	100	-	92	100
Enterobacter cloacae (Non-urine sources **ONLY**)	92	100	IR	IR	IR	98[b]	90	89	100	100	100	-	100	99
Pseudomonas aeruginosa (Non-Urine sources **ONLY**)	214	98	-	-	-	96	95	-	98	-	96	98	98	-
Escherichia coli* (Non-Urine sources **ONLY)	134	96	51	57	70[a]	88[b]	86	86	83	91	100	95	89	69
Klebsiella oxytoca (Non-Urine sources **ONLY**)	52	100	IR	81	21[a]	90[b]	100	90	100	98	98	-	98	96
Klebsiella pneumoniae* (Non-Urine sources **ONLY)	63	100	IR	85	81[a]	86[b]	90	90	97	94	100	97	94	94
Proteus mirabilis* (Non-Urine sources **ONLY)	16 [2]	100	81	94	5[a]	89[b]	88	88	88	88	100	100	88	75

ESBL positive isolates: *E. coli* (12), *K. pneumoniae* (4), *K. oxytoca* (1)

^ *Klebsiella aerogenes*, formerly named *Enterobacter aerogenes*.

[1] Antibiotics tested on Non-Urine isolates only: *A. baumannii* complex (27), *C. freundii* (9), *K. aerogenes* (13), *S. marcescens* (74).

[2] Please exercise discretion when data are reviewed for species with fewer that 30 isolates.

[a] Cefazolin susceptibility based off Kirby Bauer results.

[b] Cefepime susceptibility based off Kirby Bauer results.

IR = Intrinsic Resistance, (-) = No data available

**E. coli, K. pneumoniae and P. mirabilis* breakpoints differ for urine culture vs. cultures from all other sources. Please contact the Microbiology laboratory for more information.

Gram Negative Antibiogram for Children's Mercy - 2022 (URINE ONLY)

Children's Mercy Hospitals & Clinics - 2022 Antibiogram
Department of Pathology & Laboratory Medicine- Microbiology Laboratory

2022 Gram Negative - URINE ONLY- Antibiogram (% susceptible)

Organism	# of isolates tested	Ampicillin	Amox/clav	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Gentamicin	Nitrofurantoin	Tobramycin	Trimeth/Sulfa
Enterobacter cloacae	37	IR	IR	IR	-	89	86	100	100	46	100	91
Pseudomonas aeruginosa	59	-	-	-	93	97	-	92	-	-	98	-
Escherichia coli	1459	60	83	96	-	98	98	92	94	98	94	79
Klebsiella oxytoca	44	IR	95	18	-	95	93	100	98	95	98	80
Klebsiella pneumoniae	113	IR	92	95	-	96	96	96	95	33	96	83
Proteus mirabilis	84	86	94	98	-	100	100	99	98	IR	98	93

ESBL positive isolates: *E. coli* (55), *K. pneumoniae* (8), *K. oxytoca* (2)

IR = Intrinsic Resistance, (-) = No data available

E. coli, K. pneumoniae and P. mirabilis breakpoints differ for urine culture vs. cultures from all other sources. Please contact the Microbiology laboratory for more information.

Dosing of Amoxicillin-Clavulanate

NOTE: Dosing of amoxicillin-clavulanate (Augmentin™) is based on amoxicillin component. "High dose" of amoxicillin-clavulanate is targeted at providing higher amoxicillin doses to overcome *Streptococcus pneumoniae* resistance while maintaining clavulanate exposure to ≤ 10 mg/kg/day)

General Guidelines for Amoxicillin-Clavulanate Dosage Formulations			
Indication		**< 40 kg**	**≥ 40 kg**
Infection in < 3 months of age	**Formulation**	Suspension: 250 mg-62.5 mg/5mL **OR** 125 mg-31.25mg/5mL	Not applicable
	Usual Dosing	30 mg/kg/day divided twice daily	
"Standard Dose" Less severe infections (≥ 3 months of age)	**Formulation**	Suspension: 400 mg-57mg/5mL	Tablet: 500mg-125mg **OR** 875mg-125mg Suspension: 400 mg-57mg/5mL
	Usual Dosing	25 – 45 mg/kg/day divided twice daily	500 – 875 mg twice daily
"High Dose" Otitis media, pneumonia, sinusitis (≥ 3 months of age)	**Formulation**	**ES** Suspension: 600 mg-42.9mg/5mL	XR Tablet: 1000mg-62.5mg **OR** ES Suspension: 600 mg-42.9mg/5mL
	Usual Dosing	80 – 100 mg/kg/day divided twice or three times daily	2000 mg twice daily 1000 mg three times daily - *using oral suspension only*
**Prescribing practices may deviate from these guidelines depending on clinical factors (e.g. location of infection, bacterial susceptibility, patient characteristics, etc). Please consult a pharmacist or Antimicrobial Stewardship for additional assistance in selecting formulations.			

Antibiotic Allergies: Beta-lactams

For all patients with an antibiotic allergy, recommend clarifying beta-lactam allergy and placing a referral to ID or allergy clinics for de-labeling if patient/family interested.

Beta-lactam antibiotics with similar or identical side chains may be more likely to cross react and should typically be avoided in patients with documented severe allergies (e.g. anaphylaxis).

Selected Beta-lactams with Identical or Similar Side Chains Chart

	Penicillin	Amoxicillin	Cefazolin	Cephalexin	Cefprozil	Cefuroxime	Ceftriaxone	Cefdinir	Cefixime	Cefpodoxime
Penicillin G		X								
Amoxicillin	X			X	X					
Cefazolin										
Cephalexin		X			X					
Cefprozil		X		X						
Cefuroxime							X		X	X
Ceftriaxone						X			X	X
Cefdinir									X	
Cefixime						X	X	X		X
Cefpodoxime						X	X		X	

(X) Risk of cross reactivity due to identical or similar side chains – DO NOT PRESCRIBE

*Adapted from Broyles AD et al. Practical Guidance for the evaluation and management of drug hypersensitivity: specific drugs. *J Allergy Clin Immunol Pract*. 2020; 8(9S):S16-S116. https://doi.org/10.1016/j.jaip.2020.08.006

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Notes:

Do not hesitate to reach out to infectious diseases in case of doubt!
Questions/comments, please email AntimicrobialStewards@cmh.edu
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