Outpatient Antibiotic Handbook

CMH ASP Group

"Stingabug" by Madalyn, age 8

"Larry" by Carter, age 8

Version 8.1, last updated 11/8/2024

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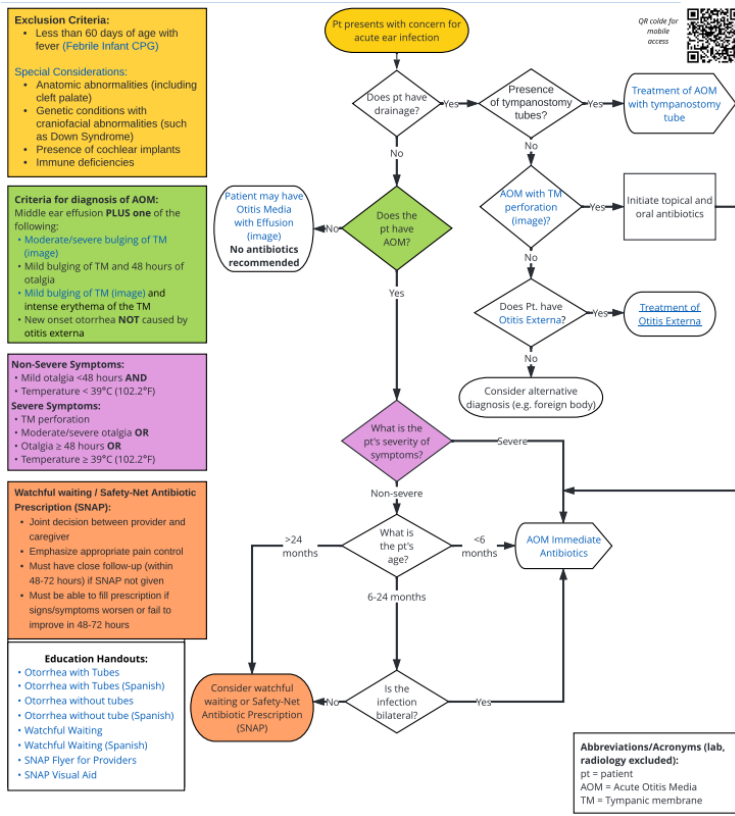
Online version of the handbook is available on the Children's Mercy Antimicrobial Stewardship website

The most updated Children's Mercy clinical pathways may be accessed on the Evidence Based Practice section of childrensmercy.org. The pathways 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 Clinical Pathway for more information on diagnosis and management.



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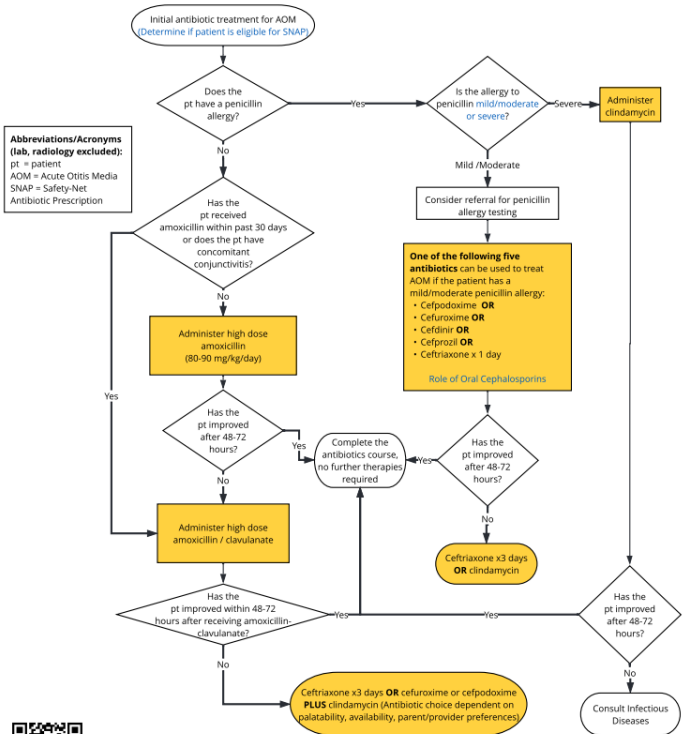

QR code for mobile access

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]

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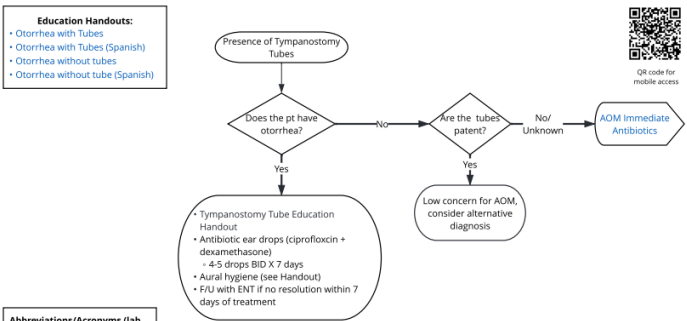


Watchful waiting (WW)/ Safety-Net Antibiotic Prescription (SNAP):

- 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 is likely sufficient for children ≥ 2 years with AOM of any severity (El Feghaly et al. JPIDS. 2024;13(6):238-333)

- 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 30). Consider referral for penicillin allergy testing.
- Severe penicillin allergy (e.g. anaphylaxis):
  NOTE: Cephalosporins with different side chains may be considered in select cases. Refer to the beta-lactam allergy section on page 29 for additional information.
  - 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

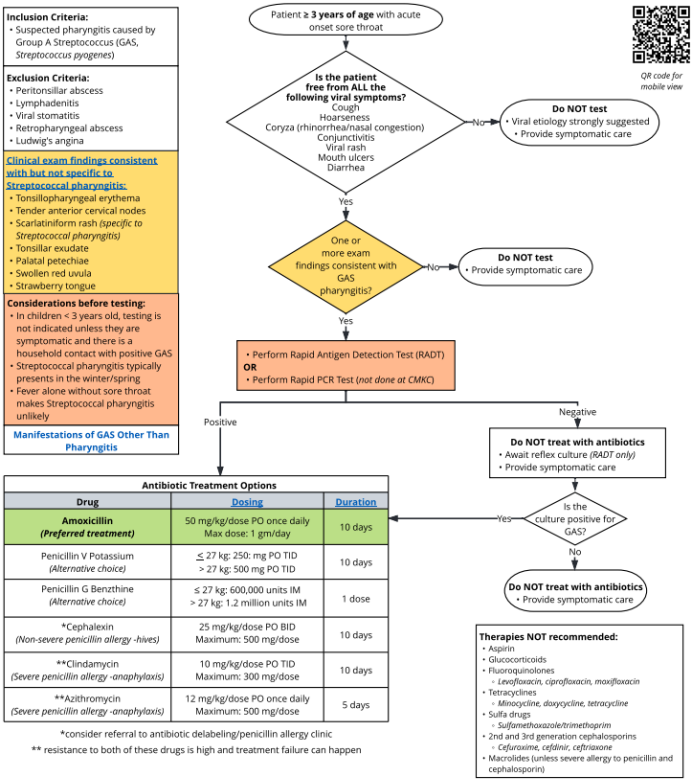
      OR
    - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose) **PLUS** one of the following:
      - Cefuroxime 250 mg PO BID for children able to swallow pills
        NOTE: Only available in tablet form and should not be crushed.
      - Cefpodoxime 5 mg/kg/dose PO BID (max 200 mg/dose)

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
  - 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 once daily for 7 days for children > 6 months of age
  - 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 Pathway for more information on diagnosis and management.



Antibiotic Treatment Options

Drug	Dosing	Duration
Amoxicillin *(Preferred treatment)*	50 mg/kg/dose PO once daily Max dose: 1 gm/day	10 days
Penicillin V Potassium *(Alternative choice)*	≤ 27 kg: 250: mg PO TID > 27 kg: 500 mg PO TID	10 days
Penicillin G Benzthine *(Alternative choice)*	≤ 27 kg: 600,000 units IM > 27 kg: 1.2 million units IM	1 dose
*Cephalexin *(Non-severe penicillin allergy -hives)*	25 mg/kg/dose PO BID Maximum: 500 mg/dose	10 days
**Clindamycin *(Severe penicillin allergy -anaphylaxis)*	10 mg/kg/dose PO TID Maximum: 300 mg/dose	10 days
**Azithromycin *(Severe penicillin allergy -anaphylaxis)*	12 mg/kg/dose PO once daily Maximum: 500 mg/dose	5 days

*consider referral to antibiotic delabeling/penicillin allergy clinic

** resistance to both of these drugs is high and treatment failure can happen

Therapies NOT recommended:
- Aspirin
- Glucocorticoids
- Fluoroquinolones
  - *Levofloxacin, ciprofloxacin, moxifloxacin*
- Tetracyclines
  - *Minocycline, doxycycline, tetracycline*
- Sulfa drugs
  - *Sulfamethoxazole/trimethoprim*
- 2nd and 3rd generation cephalosporins
  - *Cefuroxime, cefdinir, ceftriaxone*
- Macrolides (unless severe allergy to penicillin and cephalosporin)

Given that complications of GAS pharyngitis are rare, the benefit of antibiotic use may not outweigh the risks of therapy in all patients.

NOTE: Streptococcal pharyngitis is uncommon in children <3 years of age and children of any age with viral symptoms. Recurrence is often secondary to re-exposure, poor adherence, or an alternative diagnosis rather that failure of initial antibiotic.

- Duration: 10 days (exception penicillin G benzathine and azithromycin – see below)
- First Line:
  - Amoxicillin 50 mg/kg/dose PO qDay (max 1000 mg/day)
  - Penicillin VK
    - < 27kg: 250 mg PO BID – TID
    - ≥ 27 kg: 500 mg PO BID – TID
  - Penicillin G benzathine IM
    - < 27 kg: 600,000 Units x 1 dose
    - ≥ 27 kg: 1.2 million Units x 1 dose
- Mild penicillin allergy (e.g. rashes) - consider referral for penicillin allergy testing
  - Cephalexin 20-25 mg/kg/dose PO BID (max 500 mg/dose)
- Severe penicillin allergy (e.g. anaphylaxis):

  NOTE: Azithromycin and clindamycin resistance is known to occur and treatment failure may occur. May consider a cephalosporins with different side chains in select cases. Refer to the beta-lactam allergy section on page 29 for additional information
  - Clindamycin 7 mg/kg/dos PO TID (max 300 mg/dose)
  - Azithromycin 12 mg/kg/dose PO qDay (max 500 mg/dose) x 5 days

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

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

- Duration: 3 - 5 days
- First line:
  - Amoxicillin – *consider TID dosing for patients > 25 kg*
    - 40-50 mg/kg/dose PO BID (max 2000 mg/dose)
    - 30 mg/kg/dose PO TID (max 1000 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 30). 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 less effective against *Streptococcus pneumoniae* and NOT recommended for empiric treatment of pneumonia.
  - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose)

- Severe penicillin allergy (e.g anaphylaxis)/ cephalosporin allergy:

  NOTE: Cephalosporins with different side chains may be considered in select cases. Refer to the beta-lactam allergy section on page 29 for additional information.
  - Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose)

- Severe penicillin/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**)

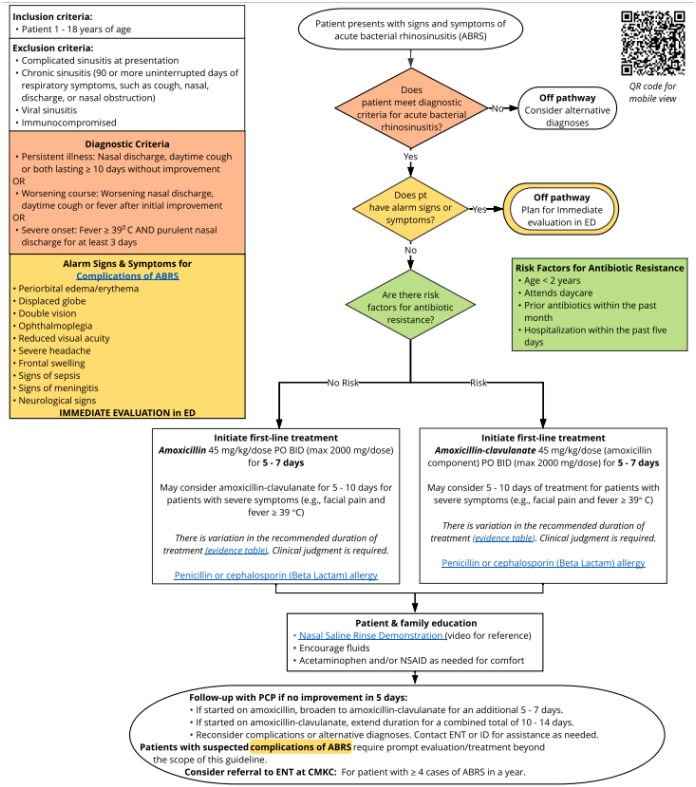
- Atypical pneumonia (consider in adolescents with bilateral disease):
  - Azithromycin 10 mg/kg/dose PO qDay on day #1 (max 500 mg/dose), 5 mg/kg/dose PO qDay on days #2-5 (max 250 mg/dose)

    NOTE: Azithromycin monotherapy is not routinely recommended as resistance is significant among typical bacterial pathogens, especially *Streptococcus pneumoniae*.

    NOTE: Levofloxacin and doxycycline are alternatives for atypical coverage.

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

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



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

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

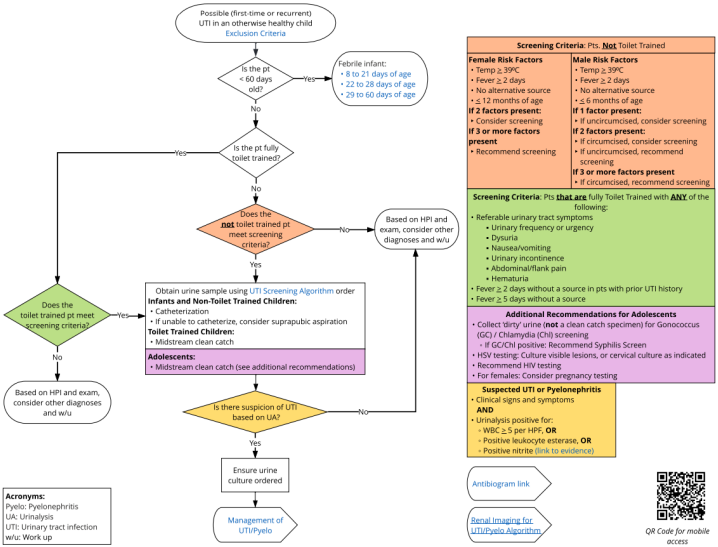
- Treatment
  - Duration: 5 - 7 days
    - May consider 5-10 days if severe symptoms (e.g. facial pain and fever ≥ 39°C)
  - First line:
    - Amoxicillin 45mg/kg/dose PO BID (max 2000 mg/dose)
    - Amoxicillin-clavulanate 45 mg/kg/dose (amoxicillin component) PO BID (max 2000 mg/dose)
      - Preferred if < 2 years old, attends daycare, prior antibiotics within pat month, hospitalization within past 5 days or severe symptoms (e.g. facial pain and fever ≥ 39°C)

        NOTE: Refer to amoxicillin/clavulanate dosing table on page 28 for formulations
  - Mild penicillin allergy (e.g. rashes including hives):
    - 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
    NOTE: Risk of penicillin/cephalosporin cross-reactivity extremely low when no shared side chains (beta-lactam side chain chart page 30). Consider referral for penicillin allergy testing.
  - Mild cephalosporin allergy (e.g. rashes including hives):
    - Amoxicillin or amoxicillin-clavulanate – see above dosing/recommendations.
  - Severe penicillin or cephalosporin allergy (e.g anaphylaxis, severe cutaneous reactions):
    - Levofloxacin 10 mg/kg/dose PO BID (6 months- 5 years) **OR** qDay (≥5 years) (max 500 mg/**day**)
    - Consider consulting Infectious Diseases physician

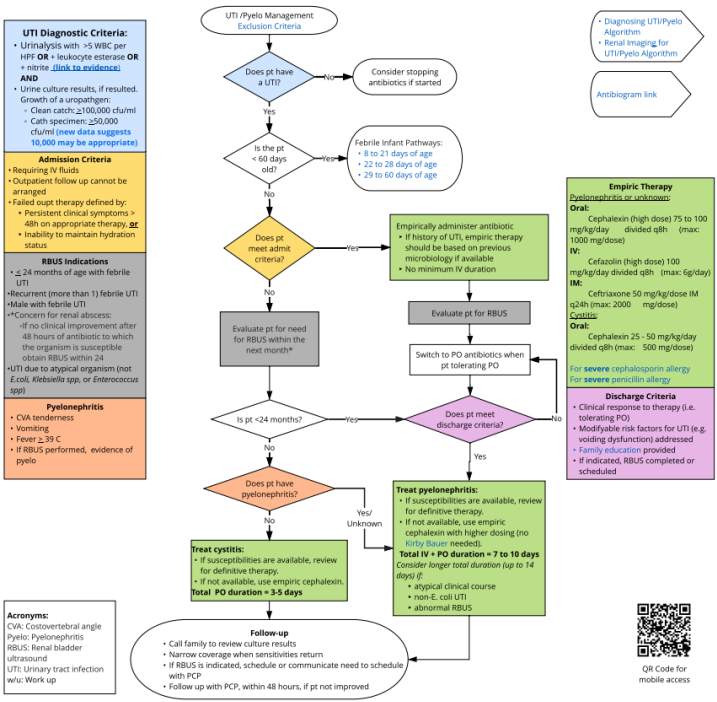
Urinary Tract Infection/Pyelonephritis – Diagnosis

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



Urinary Tract Infection/Pyelonephritis –Management

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



Cystitis/uncomplicated UTI in children >2 years of age

Refer to Children's Mercy Evidence Based Practice Clinical Pathway 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 30. 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 Pathway for more information on diagnosis and management.

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

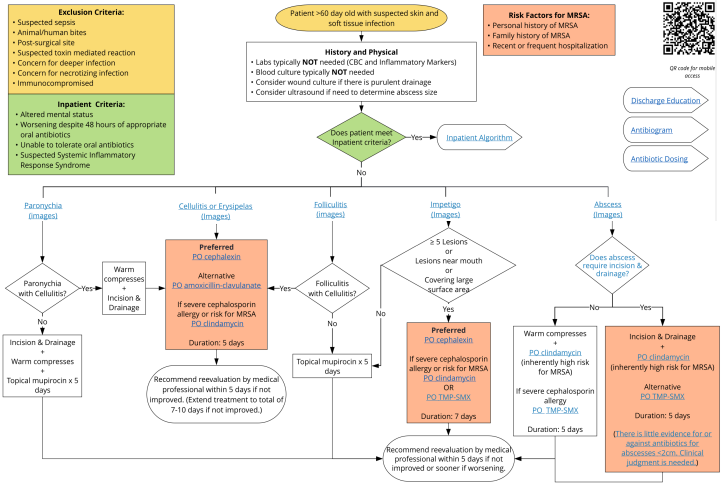
- Duration: 7-10 days
  NOTE: Shorter duration of 5 days is likely sufficient based on recent data for patients > 2 months old (Zaoutis et al. JAMA Pediatr. 2023 Aug 1;177(8):782-789 and Montini et al. Pediatrics. 2024 Jan 1;153(1):e2023062598)
- First line:
  - Cephalexin 25-33 mg/kg/dose PO TID (max 1000 mg/dose)
- Alternative therapies:
  - Cefixime 8 mg/kg PO q24h (max 400 mg/dose)
- Severe penicillin allergy (e.g. anaphylaxis) or cephalosporin allergy:
  NOTE: Cephalosporins with different side chains may be considered in select cases. Refer to the beta-lactam allergy section on page 29 for additional information.
  - 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 30. Consider referral for penicillin allergy testing.

NOTE: Cefdinir has lower urinary excretion in children than adults. Recommend avoiding in pediatric UTIs unless confirmed susceptibilities to oral third generation cephalosporins.

Skin and Soft Tissue Infections (IDSA guidelines 2014)[6]

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



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

Refer to Children's Mercy Evidence Based Practice Clinical Pathway 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 30. 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:
  NOTE: Cephalosporins with different side chains may be considered in select cases. Refer to the beta-lactam allergy section on page 29 for additional information.
  - Clindamycin 10 mg/kg/dose PO TID (max 450 mg/dose)

Animal/human bites[6]

Children's Mercy Evidence Based Practice Clinical Pathway is currently under development

- 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 Clinical Pathway.

Most cases of conjunctivitis, both viral and bacterial, are self-limiting and resolve without specific treatment; national guidelines recommend avoiding use of topical antibiotics in most cases of infectious conjunctivitis.

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
- If topical antibiotics are desired:
  - 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

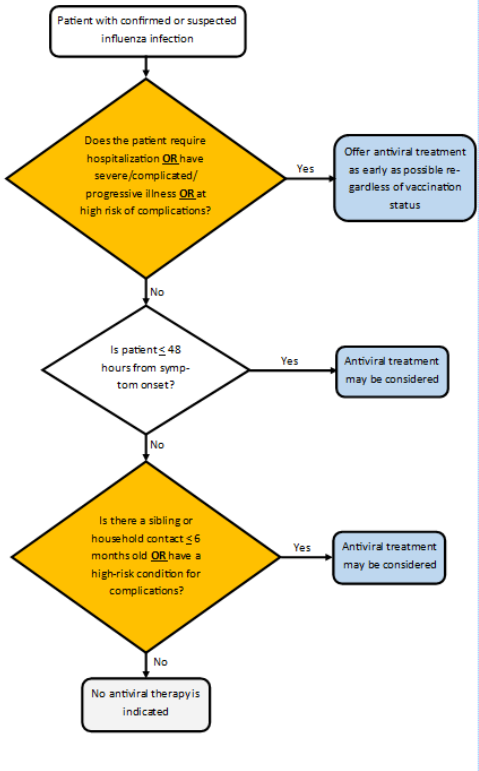
      NOTE: Risk of toxicity to the corneal epithelium and reactive keratoconjunctivitis, especially ≥ 7 days of use.
- If corneal involvement or contact lenses wearer, consider one of the following alternatives with broader gram-negative coverage:
  - Ciprofloxacin 0.3% ophthalmic drops: instill 1 – 2 drops in affected eye 4 times daily
  - Ofloxacin 0.3% ophthalmic drops: Instill 1 – 2 drops in affected eye 4 times daily

Influenza Treatment (AAP 2024 – 2025 Recommendations)[8]

Influenza treatment recommendations are updated annually. Refer to CDC influenza resource page for healthcare professionals and AAP recommendations for the most updated information.

High Risk of Influenza Complications

- Children < 5 years old, especially < 2 years old
- Children born preterm or near-term
- Resident of chronic care facility
- Chronic pulmonary disease (e.g. asthma, cystic fibrosis, bronchopulmonary dysplasia, tracheostomy, etc)
- Hemodynamically significant cardiovascular disease
- Kidney disease (e.g. chronic kidney disease, dialysis)
- Hepatic disease (e.g. chronic liver disease, cirrhosis)
- Hematologic disease (e.g. sickle cell disease, other hemoglobinopathies)
- Metabolic disorders (e.g. diabetes mellitus)
- Immunosuppression (immunosuppressive medications, hematopoietic stem cell transplant, solid organ transplant, congenital and acquired immune deficiency, asplenia)
- Neurologic or neurodevelopment conditions (e.g. cerebral palsy, muscular dystrophy, spinal cord injury)
- Pregnancy and up to 2 weeks post-partum
- < 19 year old AND long-term aspirin therapy or salicylate-containing medication
- Extreme obesity (BMI ≥ 40 for adults or ≥ 95th percentile in children)



Influenza Treatment (AAP 2024 – 2025 Recommendations)[8]

Influenza treatment recommendations are updated annually. Refer to CDC influenza resource page for healthcare professionals and AAP recommendations for the most updated information.

- Antiviral treatment options
  - Oseltamivir – *preferred*
    - Term infant 0 – 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 and adults: 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) at risk of bronchospasm
  - 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

      NOTE: Baloxavir is **not** recommended as monotherapy for treatment of influenza in patients who are severely immunocompromised, pregnant, or breastfeeding.

Influenza Chemoprophylaxis (AAP 2024 – 2025 Recommendations)[8]

Influenza chemoprophylaxis recommendations are updated annually. Refer to CDC influenza resource page for healthcare professionals and AAP recommendations for the most updated information.

- Recommended if antiviral can be **initiated within 48 hours of exposure**.
- 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 - *preferred*
    - 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 and adults: 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 at risk of bronchospasm

  - 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

Gram Positive Antibiogram for Children's Mercy - 2023 (All Sources)

Children's Mercy Hospitals & Clinics - 2023 Antibiogram
Department of Pathology & Laboratory Medicine- Microbiology Laboratory
Gram Positive Antibiogram (% Susceptible)

Organism	# of isolates tested	Ampicillin	Cefotaxime	Clindamycin	Erythromycin	Gentamicin[3]	Linezolid	Meropenem	Ntrofurantoin[4]	Oxacillin	Penicillin	Penicillin (Oral)	Rifampin*	Tetracycline	TrimSulfa	Vancomycin
Enterococcus faecalis	197	99	-	-	-	-	-	-	100	-	99	-	-	-	-	100
All Staphylococcus aureus	1177	-	-	81	56	-	100	-	100	72	0	-	100	93	94	100
MSSA	852	-	-	79	68	-	100	-	100	100	0	-	100	95	96	100
MRSA	325	-	-	85	26	-	100	-	100	0	0	-	100	89	88	100
Staphylococcus epidermidis	123	-	-	52	28		100	-	100	33	0	-	99	85	58	100
S. pneumoniae *	64	-	-	88	58	-	-	93	-	-	-	64§	-	-	-	100
Meningitis breakpoint		-	89†	-	-	-	-	-	-	-	67†	-	-	-	-	-
Non-meningitis breakpoint		-	98‡	-	-	-	-	-	-	-	95†	-	-	-	-	-

*_S. pneumoniae_ % susceptible was calculated using all isolates based on meningitis, nonmeningitis and oral breakpoints.
# of _S.pneumoniae_ isolates tested: Penicillin=64, Cefotaxime=64, Erythromycin=50, Clindamycin=64, Meropenem=14, Vancomycin=14

†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_ (166), _S. aureus_ (45), _S. epidermidis_ (53)

(-) =No data available

Gram Negative Antibiogram for Children's Mercy - 2023 (All Sources)

Children's Mercy Hospitals & Clinics - 2023 Antibiogram
Department of Pathology & Laboratory Medicine- Microbiology Laboratory
Gram Negative Antibiogram (% susceptible)

Organism	# of isolates tested	Amikacin [1]	Ampicillin	Ampicillin/sulbactam [1]	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Gentamicin	Meropenem [1]	Piptazo	Tobramycin	Trimeth/Sulfa
Acinetobacter baumannii complex (includes **ALL** sources)	22 [2]	-	-	89	-	-	86	32	95	82	95	-	-	86
Citrobacter freundii (includes **ALL** sources)	25 [2]	-	IR	IR	IR	-	95	95	100	100	100	-	-	91
Klebsiella aerogenes^ (includes **ALL** sources)	25 [2]	100	IR	IR	IR	100	94	94	100	96	100	-	-	100
Serratia marcescens (includes **ALL** sources)	62	-	IR	IR	IR	100	100	98	100	100	100	-	-	98
Enterobacter cloacae (Non-urine sources **ONLY**)	58	100	IR	IR	IR	100[b]	-	100 [2]	100	96	100	-	-	98
Pseudomonas aeruginosa (Non-Urine sources **ONLY**)	200	-	-	-	-	77 [2]	96	-	92	-	95	87	-	-
Escherichia coli* (Non-Urine sources **ONLY)	84	100	51	-	62[a]	88[b]	88	88	89	90	100	99	-	78
Klebsiella oxytoca (Non-Urine sources **ONLY**)	43	100	IR	-	24*	94[b]	95	92	95	95	100	-	-	92
Klebsiella pneumoniae* (Non-Urine sources **ONLY)	43	100	IR	50 [2]	67[a]	94[b]	93	93	91	93	100	95	-	93
Proteus mirabilis* (Non-Urine sources **ONLY)	12 [2]	-	83	-	17[a]	100[b]	100	100	100	100	100	-	-	90

ESBL positive isolates: *E. coli* (9), *K. pneumoniae* (4), *K. oxytoca* (0)

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

[1] Antibiotics tested on Non-Urine isolates only: *A. baumannii* complex (18), *K. aerogenes* (9).

[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 - 2023 (URINE ONLY)

Children's Mercy Hospitals & Clinics - 2023 Antibiogram												
Department of Pathology & Laboratory Medicine - Microbiology Laboratory												
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	41	IR	IR	IR	-	83	81	98	100	45	-	89
Pseudomonas aeruginosa	68	-	-	-	100	96	-	99	-	-	-	-
**Escherichia coli*	1441	54	66	92	-	96	96	91	91	98	-	76
Klebsiella oxytoca	56	IR	93	27	-	100	95	100	100	95	-	92
**Klebsiella pneumoniae*	109	IR	96	94	-	98	98	97	96	25	-	93
**Proteus mirabilis*	104	88	100	98	-	99	100	100	97	IR	-	90
ESBL positive isolates: *E. coli* (66), *K. pneumoniae* (3), *K. oxytoca* (0)												
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 without increasing clavulanate exposure. Some experts recommend maintaining clavulanate exposure to ≤ 10 mg/kg/day to minimize risk of gastrointestinal adverse effects.

General Guidance 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	875 mg twice daily **OR** 500 mg three times daily
"High Dose" Otitis media, pneumonia, sinusitis – targeting *Streptococcus pneumoniae* (≥ 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 **OR** 1000 mg three times daily - *using oral suspension only*
**Prescribing practices may deviate from this guidance 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[14]

More detailed information around beta-lactam allergies can be found in the "Drug allergy: A 2022 practice parameter update" (Kahn et al. Journal of Allergy and Clinical Immunology, Volume 150, Issue 6, 1333 – 1393).

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

Risk of cross-reactivity across beta-lactams is lower than previously reported. Beta-lactam antibiotics with similar or identical sides chains may carry a higher risk of a cross-reaction occurring, however beta-lactams antibiotics from a different class and no shared side chains may be used without prior testing. Management of patients with beta-lactam allergies can be stratified base on the type of reaction.

Reaction Type	Recommendation
Penicillin allergy	
Non-anaphylactic (e.g. urticaria)	Any cephalosporin can be administered routinely without testing or additional precautions
Anaphylactic	A cephalosporin with no similar or identical side chain can be administered without prior testing
Cephalosporin allergy	
Non-anaphylactic (e.g. urticaria)	A penicillin can be administered without testing or additional precautions
Anaphylactic	Avoid penicillins until skin testing and drug challenge can be completed
Any beta-lactam allergy	
Severe cutaneous adverse reaction (e.g. SJS, DRESS, etc)	Use a non-beta-lactam option

Reference next page for table of beta-lactams with identical or similar side chains

Antibiotic Allergies: Beta-lactams (continued)[14]

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

Managing Infectious Disease in Childcare and Schools (AAP)[15]

Most illnesses do not require exclusion from childcare or school. AAP provides general guideline for temporary exclusion for guidance as well as disease specific guidance for select infections. Children should be excluded for care while illness prevents child from participating comfortably in activities, results in need for care greater than staff members can provide without compromising health and safety of others and poses a risk of spread of harmful disease to others based on specific excludable conditions. Once reasons for exclusion resolve, then the child is eligible for return to care.

The following abbreviated table focuses on any disease specific exclusion and return to care criteria for infectious included in this handbook.

Infection	Disease Specific Exclusion	Return-to-care Criteria
Acute otitis media	No	
Group A streptococcal pharyngitis	Yes	Received an appropriate antibiotic for ≥ 12 hours
Pneumonia	No	
Urinary Tract Infection	No	
Impetigo or Abscess/cellulitis	No – as long as lesions are covered and drainage does not come through the covering to contaminant surfaces	
Bites – human/animal	No	
Dental abscess	No	
Conjunctivitis	No	Antibiotics are **NOT** required to return to care
Influenza	Yes	Afebrile ≥ 24 hours without fever-reducing medicine and able to participate

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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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