ADULT AND PEDIATRIC ANTIBIOTIC PRESCRIBING GUIDELINES

Adult Outpatient Treatment Recommendations 2017: Summary of Guidelines[1]

Acute rhinosinusitis[2-4]

90-98% of cases are viral

Antibiotics may NOT help even if cause is bacterial

Diagnosis	Management

Presentations consistent with acute bacterial sinusitis are:
• Symptoms of acute rhinosinusitis lasting ≥10 days without improvement
• Severe symptoms lasting ≥3 days:
  • Fever ≥39°C (102.2°F)
  • Purulent nasal discharge
  • Facial Pain
• "Double worsening", following a typical URI that lasted 5-6 days with new onset:
  • Fever
  • Headache
  • increased nasal discharge
Sinus radiographs are NOT routinely recommended.
	If bacterial, watchful waiting encouraged for uncomplicated infections with reliable follow-up.
	Evidence-based supportive care:
	• Saline nasal irrigation
	• Intranasal glucocorticoids
	• Oral decongestants when there is Eustachian tube dysfunction
	• OTC analgesics and antipyretics
	Macrolides (such as azithromycin) are NOT recommended due to high levels of *S. pneumoniae* antibiotic resistance (~40%).
	If mild/moderate and no risk factors for resistance:
	• amoxicillin/clavulanate 500/125 mg PO 3x/day or 875/125 mg PO 2x/day x 5-10 days (Some experts recommend amoxicillin.)
	If severe disease or risk factors for resistance (>65 yo, antibiotics within 30 days, recent hosp, ≥10% penicillin non-susceptible *S. pneumoniae*, immunocompromised):
	• amoxicillin/clavulanate 2 g/125 mg PO 2x/day x 7-10 days.
	Penicillin-allergic patients:
	• doxycycline 100 mg PO 2x/day or 200 mg PO 1x/day x5-10 days
	See references for additional treatment options, including re-treatment after initial treatment failure, and other important information.

Acute uncomplicated bronchitis[5-7]

Viruses cause >90% of acute bronchitis

Cough typically lasts 5 days to 3 weeks, up to 6 weeks

Diagnosis	Management
Focus on ruling out pneumonia, which is rare among otherwise healthy adults without abnormal vital signs (heart rate >100 beats/min, respiratory rate >24 breaths/min, or oral temperature >38 °C (100.4°F)) and abnormal lung examination (focal consolidation, egophony, fremitus). Colored sputum does NOT indicate bacterial infection. For most cases, chest radiography is NOT indicated. Promote appropriate antibiotic use by labeling acute bronchitis as a 'chest cold' or 'viral upper respiratory infection'.	Routine treatment of uncomplicated acute bronchitis with antibiotics is NOT recommended, regardless of cough duration. Patients may benefit from symptomatic therapy: • Cough suppressants • Expectorants • First-generation antihistamines • Decongestants Consider pertussis especially with cough paroxysms, post-tussive emesis, or during known outbreaks. See references for additional treatment options, and other important information..

Common cold or non-specific upper respiratory tract infection (URI)[8, 9]

Most adults get 2-4 colds annually

Management
Antibiotic treatment is NOT recommended for non-specific URIs. • OTC analgesics can be given to relieve symptoms • Decongestants combined with a first-generation antihistamine may provide short-term relief of nasal symptoms and cough. • Evidence does NOT support antihistamines (as monotherapy), intranasal corticosteroids, and nasal saline irrigation as effective treatments for cold symptom relief. • Providers and patients must weigh the benefits and harms of symptomatic therapy.

Pharyngitis[7, 10, 11,]

Group A Streptococcus (GAS) is the only common indication for antibiotics

Only 5-10% cases in adults are caused by GAS

Diagnosis	Management
Clinical features alone do NOT distinguish between GAS and viral pharyngitis; a rapid antigen detection test is necessary to establish a GAS pharyngitis diagnosis. Adults with sore throat and 2 (3 if ≥45 yo) or more of the following features should get a rapid test: 1. Lack of cough 2. Tonsillar exudates 3. History of fever 4. Swollen and tender anterior cervical lymphadenopathy Throat cultures after negative rapid test are NOT routinely recommended for adults.	Antibiotic treatment is NOT recommended for patients with negative rapid test results. GAS resistance to clindamycin and azithromycin is increasingly common. First-line therapy for GAS: • penicillin V 250 mg PO 4x/day or 500 mg PO 2x/day x10 days • amoxicillin 1 g PO 1x/day or 500 mg 2x/day x10 days Non-type I penicillin allergy: • cephalexin 500 mg PO 2x/day x10 days • cefadroxil 1 g PO 1x/day x10 days • clindamycin 300 mg PO 3x/day x10 days • azithromycin 500 mg PO 1x/day x5 days • clarithromycin 250 mg PO 2x/day x10 days Immediate type I penicillin allergy: • clindamycin, clarithromycin, or azithromycin as dosed above See references for additional treatment options and other important information.

Acute uncomplicated cystitis[12, 13, 14]

Diagnosis	Management
Nitrites and leukocyte esterase are the most accurate indicators of acute uncomplicated cystitis Antibiotic treatment of asymptomatic bacteriuria is NOT recommended for healthy adults EXCEPT: • pregnant women • before some urological procedures	First-line therapy in healthy non-pregnant, premenopausal women: • nitrofurantoin 100 mg PO 2x/day x5 days (nitrofurantoin is NOT recommended if suspicious for early pyelonephritis) • TMP-SMX 160/800 mg PO (one DS tablet) 2x/day x3 days (where local resistance is <20%) • fosfomycin 3g PO x1 dose Reserve fluoroquinolones (e.g. ciprofloxacin) for situations in which other agents are NOT appropriate. See references for additional treatment options and other important information especially if early pyelonephritis is suspected.

Adult Outpatient References

1. Centers for Disease Control and Prevention. Adult treatment recommendations. Get Smart: Know When Antibiotics Work in Doctor's Offices. 2016 March 4; https://www.cdc.gov/getsmart/community/for-hcp/outpatient-hcp/adult-treatment-rec.html.
2. Rosenfeld RM, Piccirillo JF, Chandrasekhar SS, et al. Clinical practice guideline (updated): adult sinusitis. *Otolaryngol Head Neck Surg.* 2015;152(2 Suppl):S1-39.
3. Chow AW, Benninger MS, Itzhak B, et al. IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults. *Clin Infect Dis.* 2012;54(8):e72-e112.
4. Rosenfeld RM. Clinical practice. Acute sinusitis in adults. *N Engl J Med.* 2016 Sep 8;375(10):962-70.
5. Albert RH. Diagnosis and treatment of acute bronchitis. *Am Fam Physician.* 2010;82(11):1345-50.
6. Kinkade S, Long NA. Acute bronchitis. American Family Physician. 2016 October 1;94(7)560-565.
7. Harris AM, Hicks LA, Qaseem A. Appropriate antibiotic use for acute respiratory tract infection in adults: Advice for high-value care from the american college of physicians and the centers for disease control and prevention. Ann *Intern Med.* 2016, March 15;164(6):425-435.
8. Fashner J, Ericson K, Werner S. Treatment of the common cold in children and adults. *Am Fam Physician.* 2012;86(2):153-159.
9. Pratter MR. Cough and the common cold: ACCP evidence-based clinical practice guidelines. *Chest.* 2006;129(1 Suppl): 72S-74S.
10. Shulman ST, Bisno AL, Clegg HW, et al. Clinical practice guideline for the diagnosis and management of group A streptococcal pharyngitis: 2012 update by the Infectious Diseases Society of America. *Clin Infect Dis.* 2012;55(10): e86-102.
11. Cooper RJ, Hoffman JR, Bartlett JG, et al. Principles of appropriate antibiotic use for acute pharyngitis in adults: Background. *Ann Intern Med.* 2001;134(6):509-17.
12. Gupta K, Hooton TM, Naber KG, et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: A 2010 update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases. *Clin Infect Dis.* 2011;52(5):e103-20.
13. Colgan R, Williams M. Diagnosis and treatment of acute uncomplicated cystitis. *Am Fam Physician.* 2011;84(7):771-6.
14. Nicolle LE, Bradley S, Colgan R, et al. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. Clin Infect Dis. 2005;40:643-54.

Pediatric Outpatient References

1. Centers for Disease Control and Prevention. Pediatric treatment recommendations. Get Smart: Know When Antibiotics Work in Doctor's Offices. 2017 February 1; https://www.cdc.gov/getsmart/community/for-hcp/outpatient-hcp/pediatric-treatment-rec.html
2. Wald ER, Applegate KE, Bordley C, et al. Clinical practice guideline for the diagnosis and management of acute bacterial sinusitis in children aged 1 to 18 years. *Pediatrics.* 2013;132(1):e262-80.
3. Chow AW, Benninger MS, Brook I, et al. IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults. *Clin Infect Dis.* 2012;54(8):e72-e112.
4. Lieberthal AS, Carroll AE, Chonmaitree T, et al. The diagnosis and management of acute otitis media. *Pediatrics.* 2013;131(3): e964-99.
5. Coker TR, Chan LS, Newberry SJ, et al. Diagnosis, microbial epidemiology, and antibiotic treatment of acute otitis media in children: A systematic review. *JAMA.* 2010;304(19):2161-9.
6. Hersh AL, Jackson MA, Hicks LA, et al. Principles of judicious antibiotic prescribing for upper respiratory tract infections in pediatrics. *Pediatrics.* 2013;132(6):1146-54.
7. Shulman ST, Bisno AL, Clegg HW, et al. Clinical practice guideline for the diagnosis and management of group A streptococcal pharyngitis: 2012 update by the Infectious Diseases Society of America. *Clin Infect Dis.* 2012;55(10):e86–102.
8. Fashner J, Ericson K, Werner S. Treatment of the common cold in children and adults. *Am Fam Physician.* 2012;86(2):153-9.
9. Ralston SL, Lieberthal AS, Meissner HC, et al. American Academy of Pediatrics Subcommittee on Diagnosis and Management of Bronchiolitis. Diagnosis and management of bronchiolitis. *Pediatrics.* 2006;118(4):1774-93.
10. Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management, Roberts KB. Urinary tract infection: Clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatrics.* 2011;128(3):595–610.
11. White B. Diagnosis and treatment of urinary tract infections in children. *Am Fam Physician.* 2011;83(4):409-15.

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• Severe symptoms lasting ≥3 days:
  • Fever ≥39°C (102.2°F)
  • Purulent nasal discharge
  • Facial Pain
• "Double worsening", following a typical URI that lasted 5-6 days with new onset:
  • Fever
  • Headache
  • increased nasal discharge
Halitosis, fatigue, headache, decreased appetite, and most physical exam findings are non-specific and do NOT distinguish bacterial from viral causes.
Imaging tests are no longer recommended for uncomplicated cases.
	If bacterial, consider watchful waiting for up to 3 days if NOT severe or worsening and with reliable follow up.
	If mild/moderate and no risk factors for resistance
	• amoxicillin/clavulanate 45 mg/kg/day PO of the amoxicillin component in 2 divided doses (max 1.75 g/day) x10-14 days.
	(Some experts recommend amoxicillin.)
	If severe or risk factors for resistance (age <2yo, daycare, antibiotics within 30 days, recent hosp, under immunized with PCV, ≥10% penicillin non-susceptible *S. pneumoniae*, immunocompromised):
	• amoxicillin/clavulanate 90 mg/kg/day PO of the amoxicillin component in 2 divided doses (max 4g/day) x10-14 days.
	Non-type I penicillin allergy:
	• clindamycin 30-40 mg/kg/day PO in 3 divided doses plus (cefixime 8 mg/kg/day PO in 2 divided doses or cefpodoxime 10 mg/kg/day PO in 2 divided doses) x10-14 days.
	Cannot tolerate oral medication:
	• ceftriaxone 50 mg/kg IM x1 dose then oral antibiotics if improving.
	Macrolides (such as azithromycin) are NOT recommended due to high levels of *S. pneumoniae* antibiotic resistance (~40%).
	See references for more details, additional treatment options, including re-treatment after initial treatment failure, supportive care, and other important information.

Acute otitis media (AOM)[4, 5]

4-10% of children with AOM treated with antibiotics experience adverse effects.

Diagnosis	Management
Definitive diagnosis requires either: • Moderate or severe bulging of tympanic membrane (TM) or new onset otorrhea NOT due to otitis externa. • Mild bulging of the TM AND recent (<48h) onset of otalgia (holding, tugging, rubbing of the ear in a nonverbal child) or intense erythema of the TM. AOM should NOT be diagnosed in children without middle ear effusion (based on pneumatic otoscopy and/or tympanometry). Severe AOM: moderate or severe otalgia or otalgia for ≥48 hours, or temperature ≥39°C (102.2°F).	Treat with antibiotics: • AOM in <6 mo • Age 6-23 mo with bilateral AOM • Severe AOM, regardless of age Consider watchful waiting (if reliable follow-up): • Age 6-23 mo with unilateral AOM • ≥2 yo with unilateral or bilateral AOM If mild/moderate and no risk factors for resistance: • amoxicillin 80-90 mg/kg/day PO in 2 divided doses (max 2 g/dose) If severe or risk factors for resistance (recent beta-lactam therapy, purulent conjunctivitis, or history of recurrent AOM unresponsive to amoxicillin): • amoxicillin/clavulanate 80-90 mg/kg/day and 6.4 mg/kg/day PO, in 2 divided doses (max 2 g/dose) Non-type I penicillin allergy: • cefdinir 14 mg/kg/day PO daily or in 2 divided doses • cefuroxime 30 mg/kg/day PO in 2 divided doses • cefpodoxime 10 mg/kg/day PO in 2 divided dose Duration of treatment: <2 yo or severe symptoms: 10 days 2-5 yo, mild-moderate symptoms: 7 days ≥6 yo, mild-moderate symptoms: 5-7 days See references for more details, additional treatment options, and other important information.

Pharyngitis[6, 7]

During winter and spring, up to 20% of **asymptomatic** children can be colonized with GAS, leading to false positives from rapid-testing and increases in unnecessary antibiotic exposure.

Streptococcal pharyngitis is primarily a disease of children 5-15 yo and is rare in preschool children.

Diagnosis	Management
Clinical features alone do NOT distinguish between GAS and viral pharyngitis. Children with sore throat plus 2 or more of the following features should undergo a rapid test: 1. Lack of cough 2. Tonsillar exudates 3. History of fever 4. Swollen and tender anterior cervical lymphadenopathy 5. Age younger than 15 yo Testing should generally NOT be performed in children younger than 3 yo in whom GAS rarely causes pharyngitis and rheumatic fever is uncommon. In children and adolescents, negative rapid tests should be confirmed with a throat culture; positives do NOT require a follow up culture.	First-line therapy: • amoxicillin 50 mg/kg/day PO (max 1 g/day) daily or in 2 divided doses x 10 days • penicillin V 250 mg PO 2-3x/day (adolescents and adults: 250 mg 4x/day or 500 mg 2x/day) x 10 days Non-type I penicillin allergy: • cephalexin 40 mg/kg/day PO (max 1 g) in 2 divided doses x 10 days • cefadroxil 30 mg/kg/day PO (max 1 g) daily x 10 days • clindamycin 21 mg/kg/day PO (max 900 mg) in 3 divided doses x 10 days • azithromycin 12 mg/kg/day PO (max 500 mg) daily x 5 days • clarithromycin 15 mg/kg/day PO (max 500 mg) in 2 divided doses x 10 days Immediate type I penicillin allergy: • clindamycin, clarithromycin, or azithromycin dosed as above See references for more details, additional treatment options, and other important information.

Common cold or non-specific upper respiratory tract infection (URI) [6, 8]

Colds usually last around 10 days.

Diagnosis	Management
Usually nasal discharge begins as clear and changes throughout the course of the illness. Fever, if present, occurs early in the illness.	Antibiotics are NOT helpful and should NOT be used. Focus on symptomatic relief. OTC cough and cold medications are NOT recommended for use in children younger than 6 yo. These substances are among the top 20 substances leading to death in children <5 yo. Low-dose inhaled corticosteroids and oral prednisolone do NOT improve outcomes in non-asthmatic children. See references for more details, additional treatment options, and other important information.

Bronchiolitis[9]

Diagnosis	Management
Routine laboratory tests and radiologic studies are NOT recommended, but a chest x-ray may be warranted in atypical disease (absence of viral symptoms, severe distress, frequent recurrences, lack of improvement).	Antibiotics are NOT helpful and should NOT be used. Usually patients worsen between 3-5 days, followed by improvement. Nasal suctioning is mainstay of therapy. Unless hospitalized, neither albuterol nor nebulized racemic epinephrine should be administered to infants and children with bronchiolitis. There is no role for corticosteroids, ribavirin, or chest physiotherapy in the management of bronchiolitis. See references for more details, additional treatment options, and other important information.

Urinary tract infections (UTIs)[10, 11]

Diagnosis	Management
In infants, fever and or strong-smelling urine are common. A definitive diagnosis requires both a urinalysis suggestive of infection and at least 50,000 CFUs/mL of a single uropathogen from urine obtained through catheterization or suprapubic aspiration. Diagnosis cannot be made from urine collected in a bag. Urine testing for all children 2-24 mo with unexplained fever is no longer recommended. Urinalysis is suggestive of infection with the presence of pyuria (leukocyte esterase or ≥5 WBCs per high powered field), bacteriuria, or nitrites. Nitrites are NOT a sensitive measure for UTI in children and cannot be used to rule out UTIs.	Initial antibiotic treatment should be based on local antimicrobial susceptibility patterns. Suggested agents: • TMP/SMX 6-12 mg/kg/day of TMP component PO in 2 divided doses • amoxicillin/clavulanate 20-40 mg/kg/day PO of amoxicillin component in 3 divided doses • cefixime 8 mg/kg/day PO daily • cefpodoxime 10 mg/kg/day PO in 2 divided doses • cefprozil 30 mg/kg/day PO in 2 divided doses • cephalexin 50-100 mg/kg/day PO in 4 divided doses Duration of treatment: 7-14 days Antibiotic treatment of asymptomatic bacteriuria in children is NOT recommended. Antibiotic prophylaxis to prevent recurrent UTIs is NOT recommended. See references for more details, additional treatment options, and other important information.

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