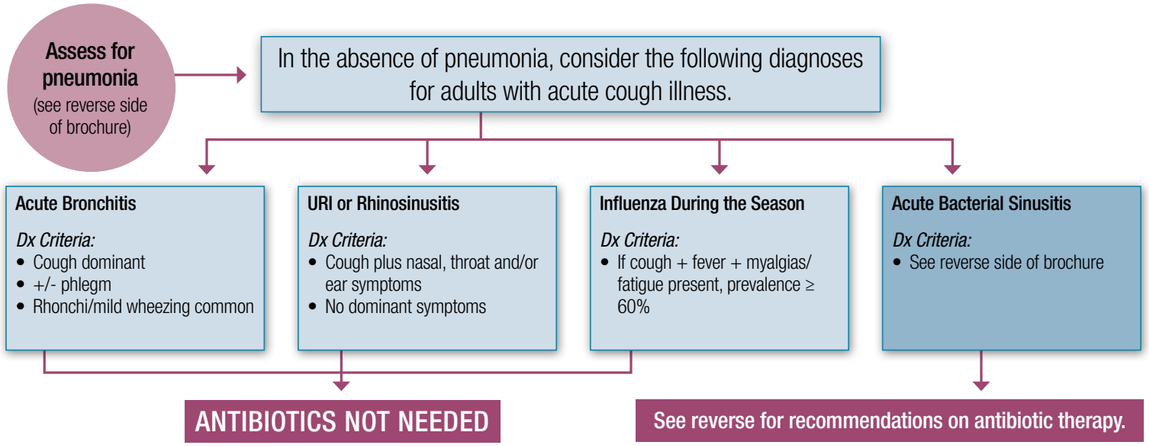
Evidence-Based Management of Acute Respiratory Tract Infections

Repeated studies and meta-analyses have demonstrated no significant benefit from antibiotics in otherwise healthy persons. Antibiotic administration is associated with allergic reactions, C. difficile infection and future antibiotic resistance in the treated patient and the community.



**Adapted from Gonzales R, et al. A cluster randomized trial of decision support strategies for reducing antibiotic use in acute bronchitis. Jama Intern Med. Published online, January 14, 2013. doi:10.1001/jamainternmed.2013.1589*

Educate and Advise Patients

Most patients want a diagnosis, not necessarily antibiotics. Explain to the patient that most bronchitis is a viral illness, and coughs are either viral or reactive airway disease. It is important to emphasize that antibiotics may have serious side effects and may create resistance to antibiotics in the patient or their family. This strategy is associated with equal or superior patient satisfaction.

Set appropriate expectations for the duration of symptoms, e.g., cough may last for up to four weeks.

Give symptomatic relief such as codeine-based cough suppressants, NSAIDS, multi-symptom OTC medications, and possibly bronchodilators if there is any bronchospasm.

Caution patients regarding symptoms (such as high fevers and shortness of breath) that indicate more severe disease.

Reserve the use of quinolones when treating acute bacterial sinusitis, acute bacterial exacerbation of chronic bronchitis, and uncomplicated urinary tract infections for patients who do not have alternative treatment options.

Recommend Vaccination

- Influenza vaccination for all persons >6 months of age, particularly older and younger patients and those with concomitant significant illnesses.
- Pneumococcal vaccination for those with concomitant significant illnesses and all persons ≥65 years old without a pneumococcal vaccine history. Refer to the CMA Foundation's Adult Vaccine Schedule for recommended intervals between the pneumococcal conjugate vaccine (PCV13) and pneumococcal polysaccharide vaccine (PPSV23).
- Pertussis immunization for all pregnant women of any age with each pregnancy, between 27 and 36 weeks (but CAN be given at any time). Prompt vaccination is recommended for those who have or will have close contact with an infant <12 months of age (e.g., parents, grandparents, childcare providers, and healthcare practitioners). For all others vaccinate once during the routine every-10-year tetanus booster.

FOR MORE INFORMATION OR ADDITIONAL MATERIALS, VISIT WWW.AWARE.MD.

Community Acquired Pneumonia:

1. Mandell LA, et al. Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on Management of Community-Acquired Pneumonia in Adults. CID. 2007;44:S27-72.
2. Drugs for Community-Acquired Bacterial Pneumonia. *Med Lett Drugs Ther.* 2007;49(1266):62-64.
3. Kobayashi M, et al. Intervals between PCV13 and PPSV23 vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR.* 2015;64(34):944-7.

Nonspecific URI:

1. Gonzales R, et al. Principles of Appropriate Antibiotic Use for Treatment of Acute Respiratory Tract Infections in Adults: Background, Specific Aims and Methods. *Ann Intern Med.* 2001;134:479-86.
2. Gonzales R, et al. Principles of Appropriate Antibiotic Use for Treatment of Acute Respiratory Tract Infections in Adults: Background. *Ann Intern Med.* 2001;134:490-94.
3. Institute for Clinical Systems Improvement. Health Care Guideline: Diagnosis and Treatment of Respiratory Illness in Children and Adults. Available at: www.icsi.org. Revised January 2013. Accessed August 2014.

Acute Bacterial Sinusitis:

1. The Sinus and Allergy Health Partnership. Antimicrobial Treatment Guidelines for Acute Bacterial Rhinosinusitis. *Otolaryngol Head Neck Surg.* January, Supplement 2004;130:1-45.
2. Chow AW, et al. IDSA Clinical Practice Guideline for Acute Bacterial Rhinosinusitis in Children and *Adults. Clin Infect Dis.* 2012;54(8): e72-e112.
3. Snow V, et al. Principles of Appropriate Antibiotic Use for Acute Sinusitis in Adults: Background. *Ann Intern Med.* 2001;134:498-505.
4. Slavin RG, et al. The Diagnosis and Management of Sinusitis: A Practice Parameter Update. *J Allergy Clin Immunol.* 2005;116:S13-47.

Pharyngitis:

1. Wessels MR. Clinical Practice. Streptococcal Pharyngitis. *NEJM.* 2011; 364:648-55.
2. Gerber GA, et al. Prevention of Rheumatic Fever and Diagnosis and Treatment of Acute Streptococcal Pharyngitis. *Circulation.* 2009;119:1541-1551.

Nonspecific Cough Illnesses/Acute Bronchitis/Pertussis:

1. Gonzales R, et al. Principles of Appropriate Antibiotic Use for Treatment of Acute Respiratory Tract Infections in Adults: Background, Specific Aims and Methods. *Ann Intern Med.* 2001;134:479-86.
2. Gonzales R, et al. Principles of Appropriate Antibiotic Use for Treatment of Uncomplicated Acute Bronchitis: Background. *Ann Intern Med.* 2001;134:521-29.
3. Hooton T. Antimicrobial Resistance: A Plan of Action for Community Practice. *AFP.* 2001;63:1034-39.
4. Wenzel RP, et al. Acute Bronchitis. *NEJM.* 2006;355:2125-30.
5. Centers for Disease Control and Prevention. Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis: 2005 CDC guidelines. *MMWR* 2005;54(No. RR-14):1-16.

Cellulitis and Abscesses:

1. Stevens DL, et al. Practice Guidelines for the Diagnosis and Management of Skin and Soft-Tissue Infections: 2014 Update by the Infectious Diseases Society of America. *Clin Infect Dis* 2014; 59 (2): e10-e52.
2. Swartz MA., Cellulitis. *N Engl J Med* 2004; 350:904-912
3. Liu, et al. Clinical Practice Guidelines by the Infectious Diseases Society of America for the Treatment of Methicillin-Resistant Staphylococcus Aureus Infections in Adults and Children. *Clin Infect Dis* 2011; 52:1-38.

Guidelines Reviewed:

American Academy of Allergy, Asthma & Immunology (AAAAI)
American Academy of Family Physicians (AAFP)
American Academy of Otolaryngology – Head and Neck Surgery
American College of Physicians (ACP)
Centers for Disease Control and Prevention (CDC)
Infectious Diseases Society of America (IDSA)
Institute for Clinical Systems Improvement (ICSI)
Infectious Diseases Society of America / American Thoracic Society (IDSA/ATS)

Acute Infection Guideline Summary

ADULT

2018

Supporting Organizations

Alameda Alliance for Health
Anthem Blue Cross
CalOptima
Care1st Health Plan
Health Net of California
Health Plan of San Joaquin
Inland Empire Health Plan
Kern Health System
L.A. Care Health Plan
Molina Healthcare of California

Endorsing Organizations

American Academy of Pediatrics, California District
California Academy of Family Physicians
California Pharmacists Association
Urgent Care Association of America
Urgent Care College of Physicians

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Education

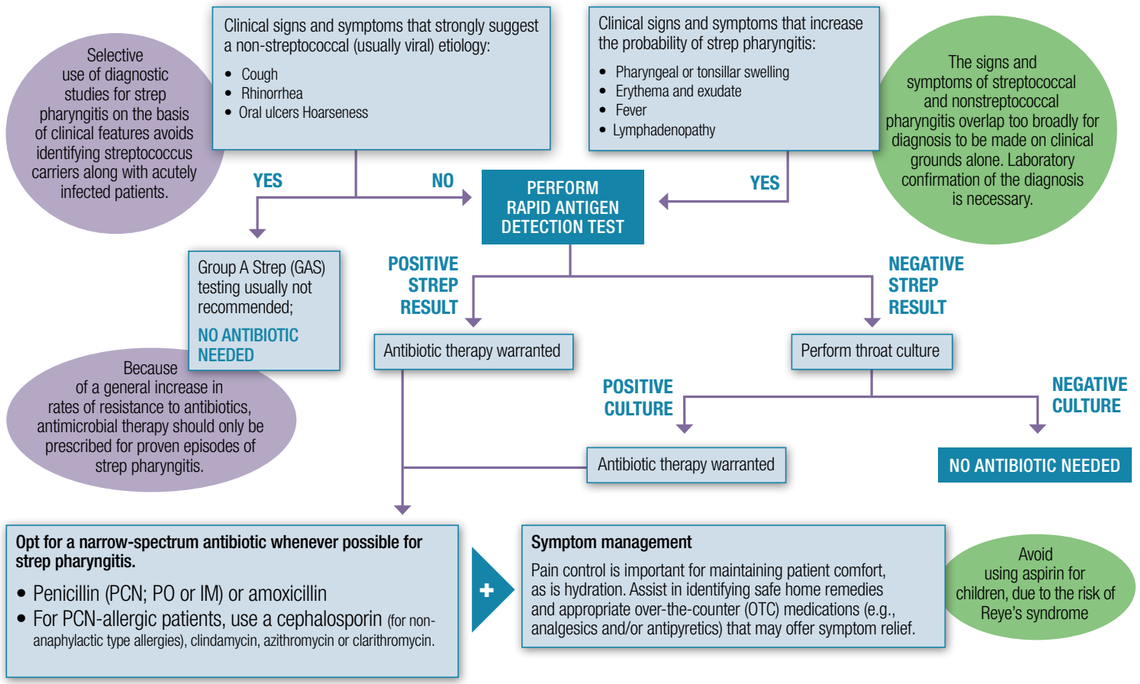
Illness	Indications for Antibiotic Treatment in Adults	Pathogen	Antimicrobial Therapy	Antibiotic	Guidelines Reviewed
Outpatient Community Acquired Pneumonia	***When NOT to Treat with an Antibiotic as an Outpatient:*** Consider inpatient admission if PSI score >90, CURB-65 ≥2, unable to tolerate orals, unstable social situation, or if clinical judgment so indicates. ***When to Treat with an Antibiotic as an Outpatient:*** Perform chest x-ray (CXR) to confirm the diagnosis of pneumonia. Evaluate for outpatient management. Consider pre-existing conditions, calculate Pneumonia Severity Index (PSI ≤90 for outpatient management) or CURB-65 (0 or 1 for outpatient management). Visit www.idsociety.org for more information. Sputum gram stain and culture are recommended if active alcohol abuse, severe obstructive/structural lung disease, or pleural effusion. Pneumococcal vaccination should be done following current ACIP recommendations which have been recently updated. Selective use of PCV 13 (conjugated pneumococcal vaccine) is now recommended in some situations for adults in conjunction with regular pneumococcal vaccine (PPSV23).	*Streptococcus pneumoniae* *Mycoplasma pneumoniae* *Haemophilus influenzae* *Chlamydophila pneumoniae*	**Empiric Therapy:** Healthy with no recent antibiotic use risk factors: macrolide*; consider doxycycline Presence of co-morbidity or antibiotic use within 3 months Respiratory quinolone ß-lactam plus a macrolide* (or doxycycline as an alternative to the macrolide). **Antibiotic Duration:** • Quinolones – 5 days • All other regimens – 7 days	**Antibiotic Choice:** • Macrolide (azithromycin or clarithromycin)* • Doxycycline (alternative to macrolide) **With Comorbidities:** **ß-Lactam Alternatives:** (to be given with a macrolide* or doxycycline) • High dose amoxicillin or amoxicillin-clavulanate • Cephalosporins (cefpodoxime, cefuroxime) **Other Alternative:** • Respiratory quinolone (moxifloxacin, levofloxacin 750mg QD)*	IDSA, ATS, ICSI
Nonspecific URI	***When NOT to Treat with an Antibiotic:*** Antibiotics not indicated; however, nonspecific URI is a major cause of acute respiratory illnesses presenting to primary care practitioners. Patients often present expecting some treatment. Attempt to discourage antibiotic use and explain appropriate non-pharmacologic treatment.	**Viral**	**Not indicated**	Not indicated.	AAFP, ACP, CDC, ICSI
Acute Bacterial Sinusitis	***When NOT to Treat with an Antibiotic:*** Nearly all cases of acute sinusitis resolve without antibiotics. Antibiotic use should be reserved for moderate symptoms that are not improving after 10 days, or that are worsening after 5-7 days, and severe symptoms. ***When to Treat with an Antibiotic:*** Diagnosis of acute bacterial sinusitis may be made in adults with symptoms of acute rhinosinusitis (nasal obstruction or purulent discharge, facial fullness or pain, fever, or anosmia) who have any of the three following clinical presentations: Symptoms lasting >10 days without clinical improvement. Severe illness with high fever (>39°C [102.2° F]) and purulent nasal discharge or facial pain for >3 consecutive days at the beginning of illness Worsening symptoms or signs (new onset fever, headache or increase in nasal discharge) following typical URI that lasted 5-6 days and were initially improving.	**Mainly viral pathogens** *Streptococcus pneumoniae* Nontypeable *Haemophilus influenzae*	**Not indicated** **Antibiotic Duration:** 5 to 7 days Failure to respond after 72 hours of antibiotics: Re-evaluate patient and switch to alternate antibiotic.	**Antibiotic Choice:** • Amoxicillin-clavulanate (875 mg/125 mg po bid) **Alternatives**: • Amoxicillin-clavulanate (high dose 2000 mg/125 mg po bid), doxycycline, respiratory quinolone (levofloxacin, moxifloxacin)* **For ß-Lactam Allergy:** • Doxycycline, respiratory quinolone (levofloxacin, moxifloxacin)*	AAAAI, AAFP, AAO, ACP, CDC, IDSA
Pharyngitis	***When NOT to Treat with an Antibiotic:*** Most pharyngitis cases are viral in origin. The presence of the following is uncommon with Group A Strep, and point away from using antibiotics: conjunctivitis, cough, rhinorrhea, diarrhea, and absence of fever. ***When to Treat with an Antibiotic: Streptococcus pyogenes (Group A Strep)*** Symptoms of sore throat, fever, headache. Physical findings include: Fever, tonsillopharyngeal erythema and exudates, palatal petechiae, tender and enlarged anterior cervical lymph nodes, and absence of cough. Confirm diagnosis with throat culture or rapid antigen detection before using antibiotics.	Routine respiratory viruses *Streptococcus pyogenes*	**Group A Strep:** Treatment reserved for patients with positive rapid antigen detection or throat culture. **Antibiotic Duration:** 10 days	**Antibiotic Choice:** • Penicillin V, benzathine penicillin G, amoxicillin **Alternatives:** • Oral cephalosporins **For ß-Lactam Allergy:** • Azithromycin*, clindamycin, clarithromycin*	ACP, AAFP, CDC, IDSA, ICSI
Nonspecific Cough Illness / Acute Bronchitis / COPD	***When NOT to Treat with an Antibiotic:*** 90% of cases are nonbacterial. Literature fails to support use of antibiotics in adults without history of chronic bronchitis or other co-morbid conditions. ***When to Treat with an Antibiotic:*** Antibiotics not indicated in patients with uncomplicated acute bacterial bronchitis. Sputum characteristics not helpful in determining need for antibiotics. Treatment is reserved for patients with acute bacterial exacerbation of chronic bronchitis and COPD, usually smokers. In patients with severe symptoms, rule out other more severe conditions, e.g., pneumonia. Testing is recommended either prior to or in conjunction with treatment for pertussis. Testing for pertussis is recommended particularly during outbreaks and according to public health recommendations (see below).	Mainly viral pathogens *Chlamydophila pneumoniae* *Mycoplasma pneumoniae* *Moraxella catarrhalis*	**Uncomplicated:** Not Indicated	**Antibiotic Choice:** Not indicated **Chronic COPD:** • Amoxicillin, trimethoprim-sulfamethoxazole (TMP/SMX), doxycycline **Alternatives:** • *Chlamydophila pneumoniae, mycoplasma pneumoniae* - macrolide* (azithromycin or clarithromycin) or doxycycline	AAFP, AC, CDC
Pertussis	Testing for pertussis is recommended particularly during outbreaks and according to public health recommendations, particularly those at high risk – teachers, day care and healthcare workers. Persons with exposure to infants (parents, child care workers or family members) should be vaccinated and tested if they have symptoms. Vaccination per ACIP recommendations is highly encouraged to prevent outbreaks. All pregnant women should be vaccinated during every pregnancy.	*Bordetella pertussis*	Treatment is required for all cases and close contacts or as directed by health officer	**Antibiotic Choice:** • Azithromycin* **Alternatives:** • TMP/SMX	CDC
Skin and Soft Tissue Infections	***Cellulitis*** is almost always secondary to streptococcal species. Treatment can be directed narrowly. ***Abscesses*** are often secondary to Staphylococcus aureus – including methicillin-resistant Staphylococcus aureus (MRSA. The treatment is primarily drainage and this is required for larger abscesses. If surrounding cellulitis, treatment should be broadened to cover MRSA. Cultures should be obtained.	*Streptococcus pyogenes* *Staphylococcus aureus (methicillin sensitive and methicillin resistant)*	Indicated Incision and drainage. If significant associated cellulitis, add antibiotics	**Antibiotic Choice:** **Cellulitis:** Penicillin, cephalexin, dicloxacillin, clindamycin **Abscesses** (if moderate cellulitis/erysipelas or fever): doxycycline TMP/SMX	IDSA
Urinary Tract Infection	Empiric therapy for UTI may be given when urinalysis demonstrates pyuria (positive leukocyte esterase test) or >10 white blood cells (WBCs) per high-power field (25 WBCs per uL) and urine culture obtained through catheterization or suprapubic aspiration. A positive culture consists of >100,000 colony-forming units (CFUs) per mL of a uropathogen. In patients suspected of pyelonephritis, always confirm diagnosis with urine culture and susceptibility test before using antibiotics.	>50% UTIs caused by *Escherichia coli*. Other gram-negative organisms may cause infection including *Klebsiella*, *Proteus* and *Pseudomonas*. Gram-positive pathogens include *Enterococcus* and group *B Streptococcus*, as well as *Staphylococcus*.	**Antibiotic Duration:** Cystitis: 3-5 days Pyelonephritis: 5-14 days	**Antibiotic Choice:** • **Cystitis:** Nitrofurantoin (100mg bid), trimethoprim/sulfamethoxazole (TMP/SMX) • **Pyelonephritis:** fluoroquinolone* (ciprofloxacin, levofloxacin), trimethoprim/sulfamethoxazole (TMP/SMX) **Alternatives:** • **Pyelonephritis:** ceftriaxone, aminoglycoside **For Allergy:** • **Cystitis:** amoxicillin-clavulanate, cefdinir, cefaclor, cefpodoxime-proxetil, fluoroquinolone • **Pyelonephritis:** Oral ß-lactam (less effective) plus initial IV ceftriaxone 1g or IV 24-hour dose aminoglycoside	IDSA

CMA FOUNDATION AWARE — Alliance Working for Antibiotic Resistance Education

**Macrolides and quinolones cause QT prolongation and have an increased risk of cardiac death; Reserve the use of quinolones when treating acute bacterial sinusitis, acute bacterial exacerbation of chronic bronchitis, and uncomplicated urinary tract infections for patients who do not have alternative treatment options.*

Clinician efforts to prescribe appropriately and to educate young patients and their parents/caregivers about antibiotics continue to play a vital role in decreasing resistance levels. Parents/caregivers want their children to feel better soon but often do not understand that sore throat is usually caused by a virus, will not resolve with antibiotics, and that these medications have the potential to do more harm than good.

Confirm a Streptococcal Cause of Pharyngitis BEFORE Prescribing Antibiotics.



Educate, Advise and Assist Patients and Parents/Caregivers.

Viral cause: If rapid strep testing is negative, educate patients and parents/caregivers that the cause (pending possible cultures) is not strep but one of many different viruses, and antibiotics are not necessary. Even with typical symptoms, fewer than 30% of children have strep pharyngitis. Inform parents/caregivers that prior, repeated, or recent strep infection or exposure to someone with strep may increase the chance, but does not adequately confirm a current strep infection.

Value of testing/potential harm of antibiotics: Advise patients and parents/caregivers that rapid tests are highly reliable and allow providers to avoid using unnecessary antibiotics and the associated possible harm (medication side effects and increasing personal and societal antimicrobial resistance).

Signs of worsening: Educate patients and parents/caregivers that, occasionally, whatever the cause of a sore throat and whether antibiotics are prescribed or not, symptoms can worsen. If this is the case, re-evaluation is necessary. If symptoms do not begin to subside in 72 hours, schedule a re-visit for further evaluation.

Illness prevention: Review illness prevention, including good hand and respiratory hygiene. Offer influenza vaccination to children 6 months to 18 years of age. Encourage parents/caregivers and household contacts of children to get vaccinated.

FOR MORE INFORMATION OR ADDITIONAL MATERIALS, VISIT WWW.AWARE.MD.

Otitis Media:

1. Lieberthal AS et al. The Diagnosis and Management of Acute Otitis Media. *Pediatrics* 2013;131:e964–e999.
2. Rosa-Olivares J et al. Otitis media: To treat, to refer, to do nothing: A review for the practitioner. *Pediatr Rev* 2015;36:480-488

Nonspecific Cough Illness/Bronchitis/Pertussis:

1. Centers for Disease Control and Prevention. Recommended antimicrobial agents for the treatment and postexposure prophylaxis of pertussis: 2005 CDC guidelines. *MMWR* 2005;54(No. RR-14):1-16.

Bronchiolitis/Nonspecific URI:

2. Hersh AL, et al. Principles of Judicious Antibiotic Prescribing for Upper Respiratory Tract Infections in Pediatrics. *Pediatrics.* 2013;132:1146-1154.
3. Institute for Clinical Systems Improvement. Health Care Guideline: Diagnosis and Treatment of Respiratory Illness in Children and Adults. Available at: www.icsi.org. Accessed August 2014.
4. Lowry JA et al. Over-the-counter medications: Update on cough and cold preparations. *Pediatr Rev* 2015;36:286-298.

Acute Bacterial Sinusitis:

1. Wald E et al. Clinical Practice Guideline for the Diagnosis and Management of Acute Bacterial Sinusitis in Children Aged 1 to 18 Years. *Pediatrics* 2013;132:e232-e280.
2. Chow A, et. al. IDSA Clinical Practice Guideline for Acute Bacterial Rhinosinusitis in Children and Adults. *Clinical Infectious Diseases.* 2012 Apr;54(8):e72-e112. Epub 2012 Mar 20.
3. DeMuri G, et al. Acute bacterial sinusitis in children. *Pediatr Rev* 2013;34:429-437.

Pharyngitis:

1. Wessels MR. Clinical Practice. Streptococcal Pharyngitis. *NEJM.* 2011;364:648-55.
2. Gerber GA, et al. Prevention of Rheumatic Fever and Diagnosis and Treatment of Acute Streptococcal Pharyngitis. *Circulation.* 2009;119:1541-1551.

Cellulitis and Abscesses:

1. Stevens DL et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis* 2014;59:147-159.

Urinary Tract Infection

1. Subcommittee on Urinary Tract Infection et al. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatr* 2011;128:595-610.
2. Montini G et al. Febrile urinary tract infections in children. *NEJM* 2011;365:239-250.
3. Jackson EC. Urinary tract infections in children: Knowledge updates and a salute to the future. *Pediatr Rev* 2015;36:153-166.

Guidelines Reviewed:

American Academy of Allergy, Asthma & Immunology (AAAAI)
American Academy of Family Physicians (AAFP)
American Academy of Otolaryngology – Head and Neck Surgery
American College of Physicians (ACP)
Centers for Disease Control and Prevention (CDC)
Infectious Diseases Society of America (IDSA)
Institute for Clinical Systems Improvement (ICSI)
Infectious Diseases Society of America / American Thoracic Society (IDSA/ATS)

PEDIATRIC

Acute Infection Guideline Summary

2018

Supporting Organizations

Alameda Alliance for Health
Anthem Blue Cross
CalOptima
Care1st Health Plan
Health Net of California
Health Plan of San Joaquin
Inland Empire Health Plan
Kern Health System
L.A. Care Health Plan
Molina Healthcare of California

Endorsing Organizations

American Academy of Pediatrics, California District
California Academy of Family Physicians
California Pharmacists Association
Urgent Care Association of America
Urgent Care College of Physicians

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Illness	Indications for Antibiotic Treatment in Children	Pathogen	Antimicrobial Therapy	Antibiotic
Otitis Media *Guidelines Reviewed: AAFP, AAP, CDC*	***When NOT to Treat with an Antibiotic:*** Otitis Media with Effusion. Do <u>not</u> prescribe prophylactic antibiotics to reduce the frequency of episodes of Acute Otitis Media (AOM) in children with recurrent AOM. ***When to Treat with an Antibiotic:*** Acute Otitis Media (AOM) 1. Moderate to severe bulging of the tympanic membrane (TM) or new onset of otorrhea not due to acute otitis externa. 2. May diagnose acute otitis media in presence of mild bulging of the TM and recent (less than 48 hours) onset of ear pain (holding, tugging, and rubbing of the ear in a nonverbal child) or intense erythema of the TM. 3. Signs or symptoms of middle-ear inflammation as indicated by either: a. Distinct erythema of the TM or b. Distinct otalgia [discomfort clearly referable to the ear(s) that interferes with or precludes normal activity or sleep] Note: Clinicians should not diagnose AOM in children who do not have middle ear effusion.	*Streptococcus pneumoniae* Nontypeable *Haemophilus influenzae* *Moraxella catarrhalis*	**Severe AOM:** Prescribe antibiotic therapy for AOM in children >6 months of age with severe signs or symptoms (moderate or severe otalgia or otalgia for at least 48 hours or temperature >39°C [102.2°F]). **Non-severe bilateral AOM in young children:** Prescribe antibiotic therapy for bilateral AOM in children 6-23 months of age without severe signs or symptoms (mild otalgia for less than 48 hours and temperature >39°C [102.2°F]) **Non-severe unilateral AOM in young children (6 months to 23 months of age or non-severe AOM (bilateral or unilateral) in older children (24 months or older):** Prescribe antibiotic therapy or offer observation and close follow-up based on joint decision-making with the parent(s)/ caregiver in children without severe signs or symptoms (mild otalgia <48 hours and temperature <39°C [102.2°F]). When observation is used, ensure follow-up and begin antibiotic therapy if the child worsens or fails to improve within 48-72 hours of onset of symptoms. **Analgesics and Antipyretics:** Always assess pain. If pain is present, add treatment to reduce pain. Oral: ibuprofen/acetaminophen (may use acetaminophen with codeine for moderate-severe pain). Topical: benzocaine (>5 years of age). **Antibiotic Duration:** • Younger than 2 years or severe symptoms: 10 days • 2-5 years old with mild to moderate symptoms: 7 days • ≥6 years of age with mild to moderate symptoms: 5-7 days	**Antibiotic Choice:** • If child has not received amoxicillin in the past 30 days or the child does not have concurrent purulent conjunctivitis: high dose amoxicillin (80-90 mg/kg/day) • If the child has received amoxicillin in the last 30 days or has concurrent purulent conjunctivitis, or has a history of recurrent AOM unresponsive to amoxicillin: high dose amoxicillin-clavulanate (80-90 mg/kg/day of amoxicillin component) **Alternatives:** For non-anaphylactic ß-Lactam allergy: cefdinir, cefpodoxime, cefuroxime, ceftriaxone (50 mg/kg IM or IV per day for 1 or 3 days) For severe ß-Lactam allergy: clindamycin Unable to tolerate oral antibiotic: ceftriaxone (50 mg/kg IM or IV per day for 1 or 3 days) **Failure of Initial Therapy:** Reassess the patient if the caregiver reports that the child's symptoms have worsened or failed to respond to the initial antibiotic treatment within 48 to 72 hours and determine whether a change in therapy is needed. If initial therapy has failed: high dose amoxicillin/clavulanate (80-90 mg/kg/day of amoxicillin component), or ceftriaxone (50 mg/kg IM or IV per day for 3 days), or clindamycin with or without cephalosporin (cefdinir, cefixime or cefuroxime)
Nonspecific Cough Illness / Bronchitis / Pertussis *Guidelines Reviewed: AAFP, AAP, CDC*	***When NOT to Treat with an Antibiotic:*** Nonspecific cough illness. ***When to Treat with an Antibiotic:*** Presents with prolonged, unimproving cough (14 days). Clinically differentiate from pneumonia. If pertussis is suspected, appropriate laboratory diagnosis encouraged (culture, PCR). Pertussis should be reported to public health authorities. *Chlamydophila pneumoniae* and *Mycoplasma pneumoniae* may occur in older children (unusual < 5 years of age).	**> 90% of cases caused by routine respiratory viruses** < 10% of cases caused by *Bordetella pertussis*, *Chlamydophila pneumoniae*, or *Mycoplasma pneumoniae*	Antibiotics are generally not indicated. Treatment reserved for *Bordetella pertussis*, *Chlamydophila pneumoniae*, *Mycoplasma pneumoniae*. **Length of Therapy:** 7-14 days (5 days for azithromycin)	**Antibiotic Choice:** • azithromycin, clarithromycin **Alternatives:** • tetracyclines for children > 8 years of age
Bronchiolitis / Nonspecific URI *Guidelines Reviewed: AAFP, AAP, CDC, ICSI*	***When NOT to Treat with an Antibiotic:*** Sore throat, sneezing, mild cough, fever (generally < 102° F / 38.9° C, < 3 days), rhinorrhea, nasal congestion; self-limited (typically 5-14 days).	**> 200 viruses, including rhinoviruses, coronaviruses, adenoviruses, respiratory syncytial virus, enteroviruses (coxsackieviruses and echoviruses), influenza viruses and parainfluenza viruses**	Antibiotics not indicated. Ensure hydration. May advise rest, antipyretics, analgesics, humidifier.	• None
Acute Bacterial Sinusitis *Guidelines Reviewed: AAFP, AAP, CDC, IDSA, SAHP*	***When NOT to Treat with an Antibiotic:*** Nearly all cases of acute sinusitis resolve without antibiotics. Antibiotic use should be reserved for moderate symptoms not improving after 10 days, or that are worsening after 5-6 days, and severe symptoms. ***When to Treat with an Antibiotic:*** Clinicians should make a presumptive diagnosis of acute bacterial sinusitis when a child with an acute URI presents with the following: 1. Persistent illness, ie, nasal discharge (of any quality) or daytime cough or both lasting > 10 days without improvement; OR 2. Worsening course, ie, worsening or new onset of nasal discharge, daytime cough, or fever after initial improvement; OR 3. Severe onset, ie, concurrent fever (temperature ≥ 39°C [102.2°F]) and purulent nasal discharge for at least 3 consecutive days.	**Mainly viral pathogens** *Streptococcus pneumoniae* Nontypeable *Haemophilus influenzae* *Moraxella catarrhalis*	**Clinical Presentation:** Severe onset and worsening course: Antibiotic therapy should be prescribed. **Persistent illness:** Antibiotics should be prescribed OR offer additional outpatient observation for 3 days to children with persistent illness as previously described. **Antibiotic Duration:** Continued for 7 days after the patient becomes free of signs and symptoms (minimum 10 days)	**Antibiotic Choice:** • Patients without increased risk for antibiotic resistant pneumococcal infection: amoxicillin or amoxicillin-clavulanate 45 mg/kg/day of amoxicillin component • Patients with increased risk of antibiotic-resistant pneumococcal infection (in those with severe infection [fever> 39°C, threat of suppurative complications], daycare attendance, <2 years of age, recent hospitalization, antibiotic use within the past month, immunocompromised): amoxicillin-clavulanate high dose (90 mg/kg/day of amoxicillin component **Alternatives:** • For non-anaphylactic ß-lactam allergy: cefdinir, cefuroxime, or cefpodoxime • For severe ß-lactam allergy: levofloxacin • Combination of clindamycin (or linezolid) and cefixime **Failure of Initial Therapy:** • If amoxicillin-clavulanate 45 mg/kg/day used initially, may increase dose to 90 mg/kg/day
Pharyngitis *Guidelines Reviewed: AAFP, AAP, CDC, IDSA, ICSI*	***When NOT to Treat with an Antibiotic:*** Most pharyngitis cases are viral in origin. The presence of the following is uncommon with Group A Strep, and point away from using antibiotics: conjunctivitis, cough, rhinorrhea, and diarrhea. **Confirm diagnosis with throat culture or rapid antigen detection. If rapid antigen detection is negative, obtain throat culture.** ***When to Treat with an Antibiotic: Streptococcus pyogenes (Group A Strep)*** Symptoms and signs: sore throat, fever, headache, tonsillopharyngeal erythema, exudates, palatal petechiae, tender enlarged anterior cervical lymph nodes. Diagnostic studies for Group A Strep are not indicated for children <2 years of age (because acute rheumatic fever is rare in children <3 years old and the incidence of streptococcal pharyngitis and the classic presentation of streptococcal pharyngitis are uncommon in this age group).	**Routine respiratory viruses** *Streptococcus pyogenes*	**Group A Strep: Treatment reserved for patients with positive rapid antigen detection or throat culture.** **Antibiotic Duration:** Generally 10 days (5 days if azithromycin used)	**Antibiotic Choice:** • penicillin V, benzathine penicillin G, amoxicillin **Alternatives:** • For non-anaphylactic ß-Lactam allergy: cephalosporin • For severe ß-Lactam allergy: clindamycin, azithromycin, clarithromycin
Skin and Soft Tissue Infections *Guidelines Reviewed: IDSA*	***Cellulitis*** is almost always secondary to streptococcal species. Treatment can be directed narrowly. ***Abscesses*** are often secondary to Staphylococcus aureus – including methicillin-resistant Staphylococcus aureus (MRSA). The treatment is primarily drainage and this is required for larger abscesses. If surrounding cellulitis, treatment should be broadened to cover MRSA. Cultures should be obtained.	Streptococcus pyogenes Staphylococcus aureus (methicillin sensitive and methicillin resistant)	Indicated Incision and drainage. If significant associated cellulitis, add antibiotics **Antibiotic Duration:** 5-10 days	**Cellulitis only:** cephalexin, clindamycin **Abscess with cellulitis:** trimethoprim-sulfamethoxazole **Alternatives:** linezolid; doxycycline or minocycline may be used for children ≥ 8 years of age
Urinary Tract Infection *Guidelines Reviewed: AAP*	When to treat with an antibiotic: Most children with urinary tract infections (UTIs) are febrile. Empiric therapy for UTI may be given when urinalysis demonstrates pyuria (positive leukocyte esterase test or >5 white blood cells (WBCs) per high-power field (25 WBCs per uL) and urine culture obtained through catheterization or suprapubic aspiration. A positive culture consists of >50,000 colony-forming units (CFUs) per mL of a uropathogen.	>50% UTIs caused by *Escherichia coli*. Other gram-negative organisms may cause infection including *Klebsiella*, *Proteus* and *Pseudomonas*. Gram-positive pathogens include *Enterococcus* and group B *Streptococcus*, as well as *Staphylococcus* in teenage girls.	**Antibiotic Duration:** 7-14 Days	**Antibiotic Choice:** • cephalosporin (cefixime, cefpodoxime, cefprozil, cefuroxime, cephalexin), amoxicillin-clavulanate, trimethoprim-sulfamethoxazole; • Follow- up urine culture and adjust antimicrobial therapy according to sensitivities. • Recommend follow -up with primary care provider to obtain ultrasonogram of kidneys and bladder any time after urinary tract infection is confirmed.

CMA FOUNDATION AWARE — Alliance Working for Antibiotic Resistance Education

This guideline summary is intended for physicians and healthcare professionals to consider in managing the care of their patients for acute infections. While the summary describes recommended courses of intervention, it is not intended as a substitute for the advice of a physician or other knowledgeable health care professional. These guidelines represent best clinical practice at the time of publication, but practice standards may change as knowledge is gained.

Stay Healthy!

1. Wash your hands often to prevent the spread of germs.
2. Get the flu and pneumococcal vaccines.
3. Exercise regularly.
4. Eat healthy foods.
5. Get plenty of sleep at night.

Frequently Asked Questions: Viruses & Antibiotics

What are viruses?

Viruses are germs that can cause infections such as a cold, the flu, and bronchitis. A virus can travel through the air or on your hands and enter your hands when a sick person coughs or sneezes. Your body will try to fight and kill the virus. Getting the flu vaccine can help your body fight the flu. If your body can't kill the virus, then you will start to feel sick in 1-2 days.

What are antibiotics?

Antibiotics are medications that treat infections caused by bacteria. Antibiotics do not kill viruses! Antibiotics do not cure or decrease cold and flu symptoms. Instead, overuse can lead to "antibiotic resistance."

What is antibiotic resistance?

Antibiotic resistance happens when antibiotics lose their power to kill bacteria. This happens when we use antibiotics that are not needed or do not take them exactly as prescribed.

Prevent antibiotic resistance now!

Take antibiotics ONLY when prescribed by your doctor. NEVER share antibiotics or take left-overs. Take ALL your antibiotics when prescribed, even if you start to feel better. Finish ALL your pills and do not save antibiotics.

When will my doctor prescribe antibiotics?

Your doctor, nurse practitioner or physician assistant will evaluate your illness and may do extra lab tests to see if an antibiotic is necessary. If your doctor thinks that you have the flu, he/she may prescribe an antiviral.

ADULT

Feel Better Soon... Without Antibiotics!

For More Information

Alliance Working for Antibiotic Resistance Education: www.aware.md
Centers for Disease Control & Prevention: www.cdc.gov/getsmart
American Board of Internal Medicine Foundation: www.choosingwisely.org
U.S. Department of Health & Human Services: www.flu.gov

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ADULT

The common cold, flu, and most bronchitis are caused by viruses.

Antibiotics do not kill viruses.

Here are some options that may help you feel better...

Symptoms	Home Remedies	Over-the-Counter*	Active Ingredient	Common Brand Names**
All Colds and Viral Infections	• Drink plenty of fluids (like water and clear soup) • Stay home and rest			
Stuffy Nose	• Use a room humidifier • Salt water nose drops or spray	Decongestant: opens up the nasal passages	Oxymetazoline Phenylephrine Pseudoephedrine	Afrin® Neo-Synephrine, Sudafed PE® Sudafed®
Runny Nose	• For red, raw nose, put petroleum jelly or salve on the exterior • Use tissue with lotion	Antihistamine: dries up the mucus	Diphenhydramine Chlorpheniramine Loratadine Clemastine Cetirizine Fexofenadine	Benadryl® Chlor-Trimeton® Claritin®, Alavert® Tavist Allergy® Zyrtec® Allegra®
Dry Cough	• Use a room humidifier • Gargle with warm salt water	Cough suppressant: helps stop cough	Dextromethorphan	Delsym®
Moist Cough	• Drink more fluids	Expectorant: thins mucus, makes it easier to cough up	Guaifenesin Guaifenesin w/ dextromethorphan	Robitussin Chest Congestion®, Mucinex® Robitussin DM®, Mucinex DM®
Sore Throat	• Gargle with warm salt water • Avoid smoke • Drink tea	Throat lozenges: soothes throat (Do not give to children younger than 10 years of age.)	Menthol Benzocaine	Halls®, Vicks®, Luden's®, Cepacol®, Chloraseptic®
Fever / Muscle Aches	• Cool compress on the forehead • Warm compress on sore muscles • Bed rest	Analgesic: pain reliever	Acetaminophen Aspirin (adults over 20) Ibuprofen Naproxen	Tylenol® Anacin®, Bayer®, Bufferin®, Ecotrin® Advil®, Motrin IB®, Nuprin® Aleve®
Itchy, Watery Eyes / Sneezing	• Avoid things you are allergic to or that cause irritation	Antihistamine: dries you up and may relieve itchy eyes	Diphenhydramine Chlorpheniramine Loratadine Clemastine Cetirizine Fexofenadine	Benadryl® Chlor-Trimeton® Claritin, Alavert® Tavist Allergy® Zyrtec® Allegra®
Ear Ache	• Warm compress against the sore ear	Analgesic: pain reliever	Acetaminophen Aspirin (adults over 20) Ibuprofen Naproxen	Tylenol® Anacin®, Bayer®, Bufferin®, Ecotrin® Advil®, Motrin IB®, Nuprin® Aleve®

We would like to thank the Washington State Department of Health for allowing us to adapt this publication.

**Talk to your doctor or a pharmacist if you are pregnant, breastfeeding, or taking other medications before taking over-the-counter medications. Consult your doctor for symptom relief.*

***Brand names are listed as examples and do not imply endorsement. (Also look for generic store brands.)*

Stay Healthy!

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2. Get the flu and pneumococcal vaccines.
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Frequently Asked Questions: Viruses & Antibiotics

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Viruses are germs that can cause infections such as a cold, the flu, and bronchitis. A virus can travel through the air or on your hands and enter your hands when a sick person coughs or sneezes. Your body will try to fight and kill the virus. Getting the flu vaccine can help your body fight the flu. If your body can't kill the virus, then you will start to feel sick in 1-2 days.

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What is antibiotic resistance?

Antibiotic resistance happens when antibiotics lose their power to kill bacteria. This happens when we use antibiotics that are not needed or do not take them exactly as prescribed.

Prevent antibiotic resistance now!

Give your child antibiotics ONLY when prescribed by his or her doctor. NEVER share your child's antibiotics or give your child leftovers. Give ALL your child's antibiotic prescription to him or her, even if your child starts to feel better. Finish ALL of the medication and do not save unfinished antibiotics for future use.

When will my doctor prescribe antibiotics?

Your child's doctor, nurse practitioner or physician assistant will evaluate your child's illness and may do extra lab tests to see if an antibiotic is necessary. If your child's doctor thinks that your child has the flu he/she may prescribe an antiviral.

PEDIATRIC

Feel Better Soon... Without Antibiotics!

For More Information

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PEDIATRIC

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Here are some options that may help your child feel better...

Symptoms	Home Remedies	Over-the-Counter*	Active Ingredient	Common Brand Names**
All Colds and Viral Infections	• Drink plenty of fluids (like water and clear soup) • Stay home and rest	*Over-the-counter cough and cold medications are not recommended for infants and children under 6 years of age. For children over 6 years of age follow dosing instructions.*		
Stuffy Nose	• Use a room humidifier • Salt water nose drops or spray			
Runny Nose	• For red, raw nose, put petroleum jelly or salve on the exterior • Use tissue with lotion			
Dry Cough	• Use a room humidifier • Gargle with warm salt water			
Moist Cough	• Drink more fluids			
Sore Throat	• Gargle with warm salt water • Avoid smoke • Drink tea	Throat lozenges: soothes throat (Do not give to children younger than 10 years of age.)	Menthol Benzocaine	Halls®, Vicks®, Luden's®, Cepacol®, Chloraseptic®
Fever / Muscle Aches	• Cool compress • Warm compress on sore muscles • Bed rest	Fever-reducing pain reliever	Acetaminophen Ibuprofen Naproxen	Tylenol® Advil®, Motrin IB®, Nuprin® Aleve®
Itchy, Watery Eyes / Sneezing	• Avoid things you are allergic to or that cause irritation			
Ear Ache	• Warm compress against the sore ear	Fever-reducing pain reliever	Acetaminophen Ibuprofen Naproxen	Tylenol® Advil®, Motrin IB®, Nuprin® Aleve®

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*Talk to your doctor or a pharmacist if your child is taking other medications before taking over-the-counter medications. Consult your doctor for symptom relief.

**Brand names are listed as examples and do not imply endorsement. (Also look for generic store brands.)

Bronchitis, Colds and Other Cough Illnesses in Adults

Just because you have a cough or bronchitis, does NOT mean you need an antibiotic. Here is why your doctor MAY NOT prescribe antibiotics for you:

More than 90% of coughs (including bronchitis) in adults are caused by VIRUSES. Antibiotics do not kill viruses. Your body will kill the viruses on its own. The cough can last for a few weeks even after the infection is gone.

Taking unnecessary antibiotics may lead to harmful side effects and future antibiotic-resistant infections. You can do something to FEEL better in the meantime.

You CAN:

- Take medicine like acetaminophen (Tylenol®) or ibuprofen (Advil® and Motrin®) for throat pain, headache and/or fever as directed by your doctor.
- Take over-the-counter cough medicines at night to help you sleep. These may make you sleepy or jittery if you take them during the day.
- You should NEVER use someone else's inhaler or medicine. Sometimes when your doctor thinks it will help, he or she may prescribe an inhaler for your cough. This should only be used as *directed by your doctor!* NEVER use leftover antibiotics, yours or anyone else's.
- Drink extra water, juice and clear soups.
- Get plenty of rest.
- Cover your nose and mouth with a tissue when you cough.
- Wash your hands often with soap and warm water or alcohol-based hand gels.

Contact your physician if your symptoms are not improving or worsen.

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Visit our website at: www.aware.md

Bronchitis, Colds and Other Cough Illnesses in Children

Just because your child has a cough or bronchitis, does NOT mean he or she needs antibiotics. Here is why your doctor MAY NOT prescribe antibiotics for your child:

More than 90% of coughs (including bronchitis) in children are caused by VIRUSES. Antibiotics do not kill VIRUSES. Your body will kill the viruses on its own. The cough can last for a few weeks even after the infection is gone.

You can help your child FEEL better in the meantime.

You CAN:

- Give extra water, juice and clear soups to your child.
- Teach your child how to gargle with warm water and salt. Make sure the water is not too hot.
- Limit your child's activity and encourage him or her to rest.
- Apply a cool compress over your child's forehead if he or she has a fever. Use a vaporizer (humidifier) to reduce your child's cough during the night.
- Give children's acetaminophen (like Children's Tylenol®) or children's ibuprofen (like Children's Advil® and Children's Motrin®) for throat pain, headache and/or fever as directed by your or pharmacist. Follow the dosing instructions on the package. Do NOT give your child aspirin.
- Do NOT use someone else's inhaler or medicine for your child. Sometimes when your doctor thinks it will help, he or she may prescribe an inhaler for your child's cough. This should only be used as directed by your doctor!
- Have your child cover their mouth and nose with a tissue when they cough.
- Encourage your child to wash their hands often with soap and warm water or alcohol-based gels.
- NEVER give your child leftover antibiotics, prescribed to him or her or anyone else.
- Over-the-counter cough and cold medications are not recommended for infants and children less than 2 years of age. For children over 2 years of age follow dosing instructions on package.

Remember to give lots of love and hugs to your child!

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Alliance Working for Antibiotic Resistance Education

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RELIEF FOR A COLD OR THE FLU

Most upper respiratory infections are caused by a virus. Antibiotics do not work against a virus.

Name: _____

Date: _____

Diagnosis: _____

RX: CARE YOU CAN DO AT HOME

- Drink more water, juice or soup.
- Get plenty of rest.
- Stay away from cigarette smoke.
- Use saline nose drops or spray.
- For sore throats, gargle with warm salt water.
- Take medicines as prescribed.

RX: TO AVOID A COLD OR THE FLU

- Wash your hands.
- Avoid touching eyes and nose.
- Get flu shots just before flu season.
- Stay away from cigarette smoke.
- Avoid crowds during cold and flu season.
- Clean tables and counters at least once every day.

Medicines and other treatment you may use with instructions:

Medicine/Treatment	Instructions

If you have not improved in _____ days, please call or schedule a return visit to the doctor's office. Remember, a cough can last _____ weeks, even after the infection is gone.

Signature: _____

Phone number: _____

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