حكومة دبي
GOVERNMENT OF DUBAI

هيئة الصحة بدبي
DUBAI HEALTH AUTHORITY

Respiratory tract infections & Antibiotic prescribing Guideline

DHA

2015

Preface

Upper respiratory tract infection is the most common problem dealt with in daily practice. In Dubai, the management of upper respiratory tract infections was done through various different strategies. The following guidelines were established in order to create a unified approach to the management of upper respiratory tract infections. In addition to that, these guidelines were developed to act as guides for clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not necessarily guarantee the best outcome in every case. Every health care provider is responsible for the management of his or her unique patient based on the clinical picture presented by the patient and the management options available locally.

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Acknowledgement

"RESPIRATORY TRACT INFECTION MANAGEMENT & ANTIBIOTIC PRESCRIBING"

These guidelines were established in order to achieve effective respiratory tract infection management as well as increase awareness and prevention. In addition to that, these guidelines aim to improve evidence based approaches especially appropriate antibiotic prescribing.

These guidelines were prepared and approved by the Respiratory Dubai Standard of Care Taskforce.
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J01.2 Acute ethmoidal sinusitis
J01.3 Acute sphenoidal sinusitis
J01.4 Acute pan sinusitis
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J01.9 Acute sinusitis, unspecified

J02 Acute pharyngitis *Include* acute sore throat
J02.0 Streptococcal pharyngitis
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J02.9 Acute pharyngitis, unspecified

J03 Acute tonsillitis
J03.0 Streptococcal tonsillitis
J03.8 Acute tonsillitis due to other specified organisms
J03.9 Acute tonsillitis, unspecified

J06 Acute upper respiratory infections of multiple and unspecified sites
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H66 Suppurative and unspecified otitis media
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Summary of NICE clinical guideline 69

Respiratory tract infections –Antibiotic prescribing guideline (CG 69) by NICE is about prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care

The clinical effectiveness and cost effectiveness of antibiotic management strategies for respiratory tract infections (RTIs) (section 2.2.3)

1. At the first face-to-face contact in primary care, including walk-in centres and emergency departments, adults and children (3 months and older) presenting with a history suggestive of the following conditions should be offered a clinical assessment:

1. acute otitis media
2. acute sore throat/acute pharyngitis/acute tonsillitis
3. common cold
4. acute rhino sinusitis
5. acute cough/acute bronchitis.

The clinical assessment should include a history (presenting symptoms, use of over-the-counter or self-medication, previous medical history, relevant risk factors, relevant comorbidities) and, if indicated, an examination to identify relevant clinical signs.

2. Patients' or parents'/carers' concerns and expectations should be determined and addressed when agreeing the use of the three antibiotic prescribing strategies (no prescribing, backup/delayed prescribing and immediate prescribing).

3. A no antibiotic prescribing strategy or a delayed antibiotic prescribing strategy should be agreed for patients with the following conditions:

1. acute otitis media
2. acute sore throat/acute pharyngitis/acute tonsillitis
3. common cold
4. acute rhino sinusitis
5. acute cough/acute bronchitis.

Depending on clinical assessment of severity, patients in the following subgroups can also be considered for an immediate antibiotic prescribing strategy (in addition to a no antibiotic or a backup/delayed antibiotic prescribing strategy):

1. bilateral acute otitis media in children younger than 2 years
2. acute otitis media in children with otorrhoea
3. acute sore throat/acute pharyngitis/acute tonsillitis when three or more Centor criteria are present.

Centor criteria are: presence of tonsillar exudate, tender anterior cervical lymphadenopathy or lymphadenitis, history of fever and an absence of cough.

4. For all antibiotic prescribing strategies, patients should be given:

1. advice about the usual natural history of the illness, including the average total length of the illness (before and after seeing the doctor):
    1. acute otitis media: 4 days
    2. acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
    3. common cold: 1½ weeks
    4. acute rhino sinusitis: 2½ weeks
    5. acute cough/acute bronchitis: 3 weeks
2. advice about managing symptoms, including fever (particularly analgesics and antipyretics).
3. For information about fever in children younger than 5 years, refer to 'Feverish illness in children' (NICE clinical guideline 47).

5. When the no antibiotic prescribing strategy is adopted, patients should be offered:

1. reassurance that antibiotics are not needed immediately because they are likely to make little difference to symptoms and may have side effects, for example, diarrhoea, vomiting and rash
2. a clinical review if the condition worsens or becomes prolonged.

6. When the backup/delayed antibiotic prescribing strategy is adopted, patients should be offered:

1. reassurance that antibiotics are not needed immediately because they are likely to make little difference to symptoms and may have side effects, for example, diarrhoea, vomiting and rash
2. advice about using the backup/delayed prescription if symptoms are not starting to settle in accordance with the expected course of the illness or if a significant worsening of symptoms occurs
3. advice about re-consulting if there is a significant worsening of symptoms despite using the delayed prescription.

A backup / delayed prescription with instructions can either be given to the patient or left at an agreed location to be collected at a later date.

Identifying those patients with RTIs who are likely to be at risk of developing complications (section 2.3.3)

7. An immediate antibiotic prescription and/or further appropriate investigation and management should only be offered to patients (both adults and children) in the following situations:

1. if the patient is systemically very unwell
2. if the patient has symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intraorbital and intracranial complications)
3. if the patient is at high risk of serious complications because of pre-existing comorbidity. This includes patients with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely
4. if the patient is older than 65 years with acute cough and two or more of the following criteria, or older than 80 years with acute cough and one or more of the following criteria:
    1. hospitalization in previous year
    2. type 1 or type 2 diabetes
    3. history of congestive heart failure
    4. current use of oral glucocorticoids.

Summary tables: RTI infections in primary care

Principles of Treatment

1. This guidance is based on the best available evidence but use professional judgement and involve patients in management decisions.
2. It is important to initiate antibiotics as soon as possible in severe infection.
3. Where an empirical therapy has failed or special circumstances exist, microbiological advice can be obtained from ** ☎ **
4. Prescribe an antibiotic only when there is likely to be a clear clinical benefit.
5. Consider a 'No' or 'Back-up/Delayed', antibiotic strategy for acute self-limiting upper respiratory tract infections1A+.
6. Limit prescribing over the telephone to exceptional cases.
7. Use simple generic antibiotics if possible. Avoid broad spectrum antibiotics (e.g. co-amoxiclav, quinolones and cephalosporins) when narrow spectrum antibiotics remain effective, as they increased risk of Clostridium difficile, MRSA and resistant UTIs.
8. A dose and duration of treatment for adults is usually suggested, but may need modification for age, weight and renal function. Child doses are provided when appropriate and can be accessed through the ☺symbol. In severe or recurrent cases consider a larger dose or longer course. Please refer to BNF for further dosing and interaction information (e.g. interaction between macrolides and statins) if needed and please check for hypersensitivity.
9. Lower threshold for antibiotics in immunocompromised or those with multiple morbidities; consider culture and seek advice.
10. Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations, e.g. fusidic acid).
11. In pregnancy take specimens to inform treatment; where possible avoid tetracyclines, aminoglycosides, quinolones, high dose metronidazole (2 g) unless benefit outweighs risks. Short-term use of nitrofurantoin (at term, theoretical risk of neonatal haemolysis) is not expected to cause fetal problems. Trimethoprim is also unlikely to cause problems unless poor dietary folate intake or taking another folate antagonist eg antiepileptic.
12. This guidance should not be used in isolation, it should be supported with patient information about back-up/delayed antibiotics, infection severity and usual duration, clinical staff education, and audits. Materials are available on the RCGP TARGET website.

ILLNESS	COMMENTS	DRUG	ADULT DOSE Click on ☺ for child doses	DURATION OF TREATMENT
UPPER RESPIRATORY TRACT INFECTIONS1				
Influenza treatment PHE Influenza **For prophylaxis see:** NICE Influenza	**Annual vaccination is essential for all those at risk of influenza**. For otherwise healthy adults antivirals not recommended. **Treat 'at risk' patients**, when influenza is circulating in the community and ideally within 48 hours of onset (do not wait for lab report) or in a care home where influenza is likely. **At risk:** pregnant (including up to two weeks post partum), 65 years or over, chronic respiratory disease (including COPD and asthma) significant cardiovascular disease (not hypertension), immunocompromised, diabetes mellitus, chronic neurological, renal or liver disease, morbid obesity (BMI>=40). Use 5 days treatment with oseltamivir 75mg bd. If resistance to oseltamivir or severe immunosuppression, use zanamivir 10mg BD (2 inhalations by diskhaler for up to 10 days) and seek advice. See PHE Influenza guidance for treatment of patients under 13 years or in severe immunosuppression (and seek advice).			
Acute sore throat CKS	**Avoid antibiotics** as 90% resolve in 7 days without, and pain only reduced by 16 hours[2A+] If Centor score 3 or 4: (Lymphadenopathy; No Cough; Fever; Tonsillar Exudate)[3A-] consider 2 or 3-day delayed or immediate antibiotics[1,A+] or rapid antigen test.[10B+] Antibiotics to prevent Quinsy NNT >4000 [4B-] Antibiotics to prevent Otitis media NNT 200[2A+] 10d penicillin lower relapse *vs* 7d in RCT in <18yrs[8]	phenoxymethylpenicillin[5B-] *Penicillin Allergy:* Clarithromycin	500mg QDS ☺ 1G BD[6A+](QDS when severe[7D]) 250-500mg BD ☺	10 days [8A-] 5 days [9A+]

ILLNESS	COMMENTS	DRUG	ADULT DOSE Click on ☺ for child doses	DURATION OF TREATMENT
Acute Otitis Media *(child doses)* CKS OM NICE feverish children	**Optimise analgesia and target antibiotics** [2,3B-] AOM resolves in 60% in 24hrs without antibiotics, which only reduce pain at 2 days (NNT15) **and does not prevent deafness** [4A+] Consider 2 or 3-day delayed [1A+] or immediate antibiotics for pain relief if: 1. **<2 years** AND bilateral AOM (NNT4) or bulging membrane and ≥ 4 marked symptoms[5-7+] 2. **All ages** with otorrhoea NNT3 [8A+] Abx to prevent Mastoiditis NNT >4000 [9B-]	amoxicillin [10A+] *Penicillin Allergy:* erythromycin [11D]	**Child doses** Neonate 7-28 days: 30mg/kg TDS 1 month-1yr: 125mg TDS 1-5 years: 250mg TDS 5-18 years: 500mg TDS <2 years 125mg QDS 2-8 years 250mg QDS 8-18 years 250-500mg QDS	5 days [13A+] 5 days [13A+]
Acute Otitis Externa CKS OE	First use aural toilet (if available) and analgesia Cure rates similar at 7 days for topical acetic acid or antibiotic +/- steroid [1A+] If cellulitis or disease extending outside ear canal, start oral antibiotics and refer[2A+]	*First Line:* acetic acid 2% *Second Line:* neomycin sulphate with corticosteroid [3A-,4D]	1 spray TDS 3 drops TDS	7 days 7 days min to 14 days max [1A+]

ILLNESS	COMMENTS	DRUG	ADULT DOSE Click on ☺ for child doses	DURATION OF TREATMENT
Acute Rhinosinusitis [5C] CKS RS	**Avoid antibiotics as** 80% resolve in 14 days without; they only offer marginal benefit after 7days NNT15[2,3A+] **Use adequate analgesia** [4B+] Consider 7-day delayed or immediate antibiotic when purulent nasal discharge NNT8 [1,2A+] In persistent infection use an agent with anti-anaerobic activity e.g. co-amoxiclav [6B+]	amoxicillin [4A+,7A] *or* doxycycline *or* phenoxymethylpenicillin[8B+] *For persistent symptoms:* co-amoxiclav [6B+]	500mg TDS ☺ 1g if severe [11D] 200mg stat then100mg OD 500mg QDS ☺ 625mg TDS ☺	7 days [9A+] 7 days 7 days 7 days
LOWER RESPIRATORY TRACT INFECTIONS				
Note: *Low doses of penicillins are more likely to select out resistance[1], we recommend 500mg of amoxicillin. Do **not** use quinolone (ciprofloxacin, ofloxacin) first line due to poor pneumococcal activity.[2B-] Reserve all quinolones (including levofloxacin) for proven resistant organisms.*				
Acute cough bronchitis CKS[6] NICE 69	Antibiotic little benefit if no co-morbidity[1-4A+] **Consider 7d delayed** antibiotic with advice[1,5A] Symptom resolution can take 3 weeks. **Consider immediate antibiotics** if > 80yr and ONE of: hospitalisation in past year, oral steroids, diabetic, congestive heart failure **OR** > 65yrs with 2 of above. **Consider using CRP**[1a,4A] if pneumonia suspected. If CRP<20mg/L no antibiotics, 20-100mg/L delayed, CRP >100mg immediate antibiotics	amoxicillin *or* doxycycline	500mg TDS ☺ 200mg stat then100mg OD	5 days 5 days

GRADING OF GUIDANCE RECOMMENDATIONS

The strength of each recommendation is qualified by a letter in parenthesis	
Study design	**Recommendation grade**
Good recent systematic review of studies	A+
One or more rigorous studies, not combined	A-
One or more prospective studies	B+
One or more retrospective studies	B-
Formal combination of expert opinion	C
Informal opinion, other information	D

GENERAL COMMENTS ON ANTIBIOTICS AND DOSES RECOMMENDED

Clarithromycin:
We recommend clarithromycin as it has less side-effects than erythromycin, greater compliance as twice rather than four times daily, and generic tablets are similar cost. In children erythromycin may be preferable as clarithromycin syrup is twice the cost. Azithromycin may be associated with greater development of resistance than other macrolides. It has a greater half-life in comparison to clarithromycin and erythromycin and this may provide more opportunity for resistant organisms to develop.

See for example Kastner U, Guggenbichler JP. Influence of macrolide antibiotics on promotion of resistance in the oral flora of children. Infection. 2001. Oct 29(5): 251-6. Other studies however dispute this; see for example: Matute AJ, Schurink CA, Krijnen RM, Florijn A, Rozenberg-Arska M, Hoepelman IM. Double-blind, placebo-controlled study comparing the effect of azithromycin with clarithromycin on oropharyngeal and bowel microflora in volunteers. Eur J Clin Microbiol Infect Dis 2002; 21: 427–31.

Amoxicillin and metronidazole:

The Scottish Dental Clinical Effectiveness Programme 2011 and other guidance sometimes recommend doses of 250mg amoxicillin or 200mg metronidazole when antimicrobials are appropriate.
We recommend a higher dose of 500mg amoxicillin and 400mg metronidazole. The rationale for this is when antimicrobials are considered appropriate, it is important to have sufficient concentrations at the site of infection. For β-lactams such as amoxicillin this is time-dependent (i.e. the time period above the MIC) and 500mg TDS amoxicillin is more likely to attain this. For metronidazole, the killing effect is dose-dependent and better the greater the concentrations are above the MIC. AUC/MIC >70 is only attainable against Bacteroides fragilis with a 400mg dose.

ANTIBIOTIC CHILDREN DOSES

Phenoxymethylpenicillin (Penicillin V)
By mouth
Child 1 month–1 year 62.5 mg 4 times daily (increased up to 12.5 mg/kg 4 times daily if necessary)
Child 1–6 years 125 mg 4 times daily (increased up to 12.5 mg/kg 4 times daily if necessary)
Child 6–12 years 250 mg 4 times daily (increased up to 12.5 mg/kg 4 times daily if necessary)
Child 12–18 years 500 mg 4 times daily (increased up to 1 g 4 times daily if necessary)

Clarithromycin
By mouth
Neonate 7.5 mg/kg twice daily

Child 1 month–12 years
Body-weight under 8 kg 7.5 mg/kg twice daily
Body-weight 8–11 kg 62.5 mg twice daily
Body-weight 12–19 kg 125 mg twice daily
Body-weight 20–29 kg 187.5 mg twice daily
Body-weight 30–40 kg 250 mg twice daily

Child 12–18 years 250 mg twice daily, increased if necessary in severe infections to 500 mg twice daily; usual duration 7–14 days

By intravenous infusion into large proximal vein
Child 1 month–12 years 7.5 mg/kg (max. 500 mg) every 12 hours; max duration 5 days (switch to oral route when appropriate)
Child 12–18 years 500 mg every 12 hours; max duration 5 days (switch to oral route when appropriate)

Amoxicillin
By mouth

Neonate 7–28 days 30 mg/kg (max. 125 mg) 3 times daily

Child 1 month–1 year 125 mg 3 times daily; increased if necessary up to 30 mg/kg 3 times daily
Child 1–5 years 250 mg 3 times daily; increased if necessary up to 30 mg/kg 3 times daily
Child 5–12 years 500 mg 3 times daily; increased if necessary up to 30 mg/kg (max. 1 g) 3 times daily
Child 12–18 years 500 mg 3 times daily; in severe infection 1 g 3 times daily

By intravenous injection or infusion

Neonate under 7 days 30 mg/kg every 12 hours; dose doubled in severe infection, community-acquired pneumonia, or salmonellosis
Neonate 7–28 days 30 mg/kg every 8 hours; dose doubled in severe infection, community-acquired pneumonia, or salmonellosis

Child 1 month–18 years
20–30 mg/kg (max. 500 mg) every 8 hours; dose doubled in severe infection

Co-amoxiclav
By mouth
Neonate 0.25 mL/kg of 125/31 suspension 3 times daily

Child 1 month–1 year 0.25 mL/kg of 125/31 suspension 3 times daily; dose doubled in severe infection
Child 1–6 years 5 mL of 125/31 suspension 3 times daily or 0.25 mL/kg of 125/31 suspension 3 times daily; dose doubled in severe infection
Child 6–12 years 5 mL of 250/62 suspension 3 times daily or 0.15 mL/kg of 250/62 suspension 3 times daily; dose doubled in severe infection
Child 12–18 years one 250/125 strength tablet 3 times daily; increased in severe infections to one 500/125 strength tablet 3 times daily

By intravenous injection over 3–4 minutes or by intravenous infusion
Neonate 30 mg/kg every 12 hours
Child 1–3 months 30 mg/kg every 12 hours
Child 3 months–18 years 30 mg/kg (max. 1.2 g) every 8 hours

Common Cold in Children and Adults

Transmission of common cold infections is mostly through hand-to-hand contact rather than droplet spread. Several types of viruses can cause cold symptoms.
Each year, children have up to five colds and adults have two to three colds, leading to time off from school or work and considerable discomfort. Most symptoms resolve within one week, but cough often persists.

Nasal and oral decongestants reduce nasal congestion over three to 10 hours, but we do not know how effective they are for longer-term relief (more than 10 hours).
Antibiotics do not reduce symptoms overall and can cause adverse effects and increase antibiotic resistance.
Antibiotics may improve symptoms after five days compared with placebo in persons with nasopharyngeal culture-positive Haemophilus influenzae, Moraxella catarrhalis, or Streptococcus pneumoniae, but it is difficult to identify which persons may have these infections.
Vitamin C seems unlikely to reduce the duration or severity of cold symptoms compared with placebo.
We do not know whether zinc gel or lozenges, echinacea, steam inhalation, analgesics, or anti-inflammatory drugs reduce the duration of symptoms of colds.
Antihistamines may slightly reduce runny nose and sneezing, but their overall effect seems small. Some antihistamines may cause sedation or arrhythmias.
We found insufficient evidence to assess whether decongestants plus antihistamines are effective in reducing cold symptoms.

What are the effects of treatments for common cold?

Likely to be beneficial	Antihistamines (may improve runny nose and sneezing, no significant difference in overall symptoms)
	Decongestants (norephedrine, oxymetazoline, or pseudoephedrine provides short-term [three to 10 hours] relief of congestive symptoms)
Unknown effectiveness	Analgesics or anti-inflammatory drugs
	Decongestants (insufficient evidence to assess longer-term [more than 10 hours] effects on congestive symptoms)
	Decongestants plus antihistamines
	Echinacea
	Steam inhalation
	Zinc (intranasal gel or lozenges)
Unlikely to be beneficial	Vitamin C
Likely to be ineffective or harmful	Antibiotics

Definition

Common colds are defined as upper respiratory tract infections that affect the predominantly nasal part of the respiratory mucosa.
Because upper respiratory tract infections can affect any part of the mucosa, it is often arbitrary whether an upper respiratory tract infection is called a cold or sore throat (pharyngitis or tonsillitis), sinusitis, acute otitis media, or bronchitis. Sometimes all areas of the mucosa, simultaneously or at different times, are affected during one illness. Symptoms include sneezing, rhinorrhea (runny nose), headache, and general malaise. In addition to nasal symptoms, one-half of patients experience sore throat, and 40 percent experience cough

Etiology and Risk Factors

Transmission of common cold infections is mostly through hand-to-hand contact, with subsequent passage to the nostrils or eyes—rather than, as commonly perceived, through droplets in the air.
Common cold infections are mainly caused by viruses (typically rhinovirus, but also coronavirus, respiratory syncytial virus, metapneumovirus, and others). Often, no infecting organism can be identified.

Prognosis

Common colds are usually short-lived, lasting a few days, with a few lingering symptoms lasting longer. Symptoms peak within one to three days and generally clear by one week, although cough often persists. Although they cause no mortality or serious morbidity, common colds are responsible for considerable discomfort, lost work, and medical costs.

Key Recommendations for Practice

Clinical recommendation	Evidence rating
Antibiotics should not be used for the treatment of cold symptoms in children or adults.	A
Over-the-counter cough and cold medications should not be used in children younger than four years because of potential harms and lack of benefit.	B
Treatment with buckwheat honey, Pelargonium sidoides (geranium) extract (Umcka Coldcare), nasal saline irrigation, vapor rub, or zinc sulfate may decrease cold symptoms in children.	B
Codeine is not effective for cough in adults.	A
Antihistamine monotherapy (sedating and nonsedating) does not improve cold symptoms in adults.	A
Decongestants, antihistamine/decongestant combinations, and intranasal ipratropium (Atrovent) may improve cold symptoms in adults.	B
Nonsteroidal anti-inflammatory drugs reduce pain secondary to upper respiratory tract infection in adults.	A

Clinical recommendation	Evidence rating
Andrographis paniculata (Kalmcold) and P. sidoides may reduce severity and duration of cold symptoms in adults.	B

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.xml.

Colds are self-limited, usually lasting up to 10 days; therefore, management is directed at symptom relief rather than treating the infection. Multiple remedies, including complementary and alternative medicine products, over-the-counter products, and prescription drugs, have been used to prevent and treat cold symptoms.When medications are requested, physicians play an important role in educating patients about the treatment choices.
Many familiar prescription cough and cold medications were removed from the market in early 2011 because the U.S. Food and Drug Administration had not evaluated them for safety, effectiveness, or quality. Physicians should caution patients about over-the-counter and complementary and alternative medicine products because manufacturers are not required to prove claims of therapeutic benefit.

Children

Cold and cough medications are among the top 20 substances leading to death in children younger than five years. In 2008, the U.S. Food and Drug Administration recommended that over-the-counter cough and cold medications be avoided in children younger than two years. After the removal of over-the-counter infant cough and cold medications from pharmacy shelves, the estimated number of emergency department visits for adverse events involving these medications was cut in half for children younger than two years. Manufacturers of these medications have voluntarily modified the product labels to state that they should not be used in children younger than four years.

INEFFECTIVE INTERVENTIONS

Because viruses cause most colds, antibiotics are ineffective.
Low-dose inhaled corticosteroids and oral prednisolone do not improve outcomes in children without asthma.
Echinacea products also are ineffective for treating cold symptoms in children.
There is no evidence to support the use of most over-the-counter cough remedies in children.

Therapies Not Effective for the Common Cold in Children

Therapy	Evidence	Findings
Antibiotics	Cochrane review of four studies	No difference in persistence of symptoms for the common cold or acute purulent rhinitis compared with placebo
Carbocysteine	Cochrane review of three RCTs	No significant difference in cough, dyspnea, or overall general health compared with placebo

Therapy	Evidence	Findings
Dextromethorphan	One cohort study	Not superior to placebo in nocturnal cough or sleep quality in the child or parents
Diphenhydramine (Benadryl)	One cohort study	Not superior to placebo in nocturnal cough or sleep quality in the child or parents
Echinacea purpurea	Cochrane review of two RCTs	No difference in severity of symptoms, peak of symptom severity, number of days of fever, or parental report of severity score compared with placebo
Low-dose inhaled corticosteroids	Cochrane review of two studies	No decrease in the number of episodes requiring oral corticosteroids, emergency department visits, hospital admissions, the frequency of wheezing, or duration of episodes
Oral prednisolone	One RCT of a five-day course	No significant difference in duration of hospitalization, interval between admission and discharge, mean seven-day symptom score reported by a parent, or hospital readmission for wheezing within one month compared with placebo
OTC antihistamines	Cochrane review of two studies	No more effective than placebo for cough
OTC antihistamine with decongestant	Cochrane review of two studies	No more effective than placebo for cough
OTC antitussives	Cochrane review of three studies	No more effective than placebo for cough
OTC antitussive and bronchodilator	Cochrane review of one study	No more effective than placebo for cough
Vitamin C	Not studied in children	—

OTC = over-the-counter; RCT = randomized controlled trial.
Fluids. Caregivers are often advised to increase a child's fluid intake. However, in two case series and a prevalence study, some children with respiratory infections but no signs of dehydration developed hyponatremia with increased fluids.Therefore, extra fluid intake is not advised in children because of potential harm.

EFFECTIVE INTERVENTIONS

Therapies That May Be Effective for the Common Cold in Children

Therapy	Age	Dosing	Duration of treatment
Acetylcysteine	0 to 18 years	Variable	Variable, up to 28 days
High-dose inhaled corticosteroids in children who are wheezing	One to five years	Budesonide (Pulmicort), 1,600 mcg by MDI with nebuhaler or 3,200 mcg by MDI with nebuhaler and face mask, if needed	Until asymptomatic for 24 hours
	One to five years	Beclomethasone, 2,250 mcg daily by MDI	Five days
	One to three years	Budesonide 1,600 mcg by MDI with nebuhaler and face mask for first three days, then 800 mcg for another seven days	Total of 10 days
Honey (buckwheat)	Two to five years	2.5 mL	Once
	Six to 11 years	5 mL	Once
	12 to 18 years	10 mL	Once
Nasal irrigation with saline	Six to 10 years	3 to 9 mL per nostril	Up to three weeks
Pelargonium sidoides (geranium) extract (Umcka Coldcare)	One to 18 years	10 to 30 drops (depending on age)	Seven days

Therapy	Age	Dosing	Duration of treatment
Vapor rub	Two to five years	5 mL	Once
	Six to 11 years	10 mL	Once
Zinc sulfate	One to 10 years	Syrup, 15 mg per 5 mL	10 days

MDI = metered dose inhaler.

PROPHYLAXIS

Therapies That May Be Effective for Common Cold Prophylaxis in Children

Therapy	Age	Dosing	Duration of treatment
Chizukit21	One to three years	5 mL twice daily	12 weeks
	Four to five years	7.5 mL twice daily	12 weeks
Nasal irrigation with saline17	Six to 10 years	3 to 9 mL per nostril three times daily	Nine weeks
Probiotics*22	Three to five years	1 g (1 × 1010 colony-forming units) mixed with 120 mL of 1% milk twice daily	Six months
Vitamin C14	< 12 years	0.2 to 2 g daily	Two weeks to nine months

Therapy	Age	Dosing	Duration of treatment
Zinc sulfate20	One to 10 years	Syrup, 15 mg per 5 mL daily	Seven months
	6.5 to 16 years	Tablet, 10 mg daily	Six days per week for five months

*—*Lactobacillus acidophilus NCFM, alone or combined with Bifidobacterium animalis.*

Adults

INEFFECTIVE INTERVENTIONS

Therapies Not Effective for the Common Cold in Adults

Therapy	Evidence	Findings
Antibiotics	Cochrane review of nine RCTs	No difference in symptoms or purulent rhinitis compared with placebo
Antihistamine monotherapy (sedating and nonsedating)	Cochrane review of three RCTs	No more effective than placebo
	Cochrane review of 32 RCTs	No more effective than placebo
Codeine	Cochrane review of two RCTs	No more effective than placebo for cough
	American College of Chest Physicians	Not recommended
Echinacea angustifolia	RCT with viral challenge	No more effective than placebo for cold symptoms
Intranasal corticosteroids	Two RCTs	No more effective than placebo
Nasal irrigation with hypertonic or normal saline	One RCT28	No more effective than observation

Therapy	Evidence	Findings
Vitamin C	Cochrane review of seven RCTs14	No more effective than placebo for reducing duration or severity of cold symptoms

RCT = randomized controlled trial.

EFFECTIVE INTERVENTIONS

Decongestants With or Without Antihistamines.
Oral or topical decongestants alone seem to be somewhat effective for short-term relief of cold symptoms, compared with placebo. Pseudoephedrine and phenylephrine decrease nasal edema to improve air intake. Although antihistamines do not work as monotherapy, combination medications containing a first-generation antihistamine and decongestant may be slightly beneficial in relieving general symptoms, nasal symptoms, and cough. Combination medications are recommended by the ACCP to treat acute cough.

Anticholinergics, Dextromethorphan, Guaifenesin.
Ipratropium (Atrovent) is the only orally inhaled anticholinergic recommended by the ACCP for cough caused by a common cold, and one study showed that the nasal formulation decreases rhinorrhea and sneezing. Studies of dextromethorphan and guaifenesin for cough are almost evenly split, with some demonstrating benefit and others not.

Nonsteroidal Anti-inflammatory Drugs.
These medications effectively relieve pain from headache, myalgias, and arthralgias experienced during a cold; however, decreased sneezing is the only effect they have on respiratory symptoms. The ACCP has concluded that naproxen (Naprosyn) is beneficial in the treatment of acute cough.

Complementary and Alternative Medicine Products.

CAM Products That May Be Effective for the Common Cold in Adults

Preparation	***Dosing***	***Duration Of Treatment***
Treatment		
Andrographis paniculata (Kalmcold)	200 mg daily	Five days
Echinacea purpurea (solution of pressed juice of aerial parts and alcohol)	4 mL twice daily	Eight weeks
	20 drops every two hours on day 1, then 20 drops three times daily	10 days
Pelargonium sidoides (geranium) extract (Umcka Coldcare)	30 drops three times daily, alcohol root extract	10 days
Zinc acetate or gluconate	Variable (lozenges contain between 4.5 and 23.7 mg of zinc)	As long as symptoms persist

Preparation	*Dosing*	*Duration Of Treatment*
Prophylaxis		
Garlic	Supplement with 180 mg of allicin	12 weeks
Vitamin C	0.25 to 2 g daily	40 days to 28 weeks (generally around three months)

CAM = complementary and alternative medicine

Early use of *Echinacea purpurea* shortens duration and decreases severity of cold symptoms; preparations with the aerial parts versus the flowering parts are most effective. Although dosages and preparations of zinc are not standardized, a Cochrane review showed that starting zinc lozenges (acetate or gluconate) within the first 24 hours of symptom onset reduces the severity and duration of illness. Adverse effects of zinc include bad taste and nausea. Intranasal zinc should not be used because it may result in the permanent loss of smell.

PROPHYLAXIS

Few medications have been shown to be beneficial in preventing the common cold in adults. The prophylactic use of vitamin C does not reduce the incidence of colds, but decreases illness duration by 8 percent. Limited, poor-quality studies of garlic show a decrease in the number of self-reported colds, but no decrease in days to recovery. Adverse effects from garlic included bad odor and skin rash.
Frequent hand washing can reduce the spread of respiratory viruses in all ages and can reduce transmission from children to other household members. In a large meta-analysis, the benefits of antibacterial and nonantibacterial soaps were not significantly different. Benzalkonium chloride–based hand sanitizers that foam and leave a residue have a protective effect against colds. Alcohol hand sanitizers are less effective.

Diagnosis and Treatment of Acute Bronchitis

Cough is the most common symptom bringing patients to the primary care physician's office, and acute bronchitis is usually the diagnosis in these patients. Acute bronchitis should be differentiated from other common diagnoses, such as pneumonia and asthma, because these conditions may need specific therapies not indicated for bronchitis.

Symptoms of bronchitis typically last about three weeks. The presence or absence of colored (e.g., green) sputum does not reliably differentiate between bacterial and viral lower respiratory tract infections.

Viruses are responsible for more than 90 percent of acute bronchitis infections. Antibiotics are generally not indicated for bronchitis, and should be used only if pertussis is suspected to reduce transmission or if the patient is at increased risk of developing pneumonia (e.g., patients 65 years or older).

The typical therapies for managing acute bronchitis symptoms have been shown to be ineffective, and the U.S. Food and Drug Administration recommends against using cough and cold preparations in children younger than six years. The supplement pelargonium may help reduce symptom severity in adults. As patient expectations for antibiotics and therapies for symptom management differ from evidence-based recommendations, effective communication strategies are necessary to provide the safest therapies available while maintaining patient satisfaction.

Cough is the most common symptom for which patients present to their primary care physicians, and acute bronchitis is the most common diagnosis in these patients.1 However, studies show that most patients with acute bronchitis are treated with inappropriate or ineffective therapies.
Although some physicians cite patient expectations and time constraints for using these therapies, recent warnings from the U.S. Food and Drug Administration (FDA) about the dangers of certain commonly used agents underscore the importance of using only evidence-based, effective therapies for bronchitis.

KEY RECOMMENDATIONS FOR PRACTICE

Clinical Recommendation	*Evidence Rating*
Antibiotics should not be used routinely for the treatment of acute bronchitis	B
The following therapies may be considered to manage bronchitis-related symptoms:	
Antitussives (dextromethorphan, codeine, hydrocodone) in patients six years and older	C
Beta-agonist inhalers in patients with wheezing	B
High-dose episodic inhaled corticosteroids	B
Echinacea	B
Pelargonium	B
Dark honey in children	B

Clinical Recommendation	Evidence Rating
The following medicines should not be used to manage bronchitis-related symptoms	
Expectorants	B
Beta-agonist inhalers in patients without wheezing	B
Antitussives in children younger than six years	C

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.xml.

Diagnosis

Acute bronchitis is a self-limited infection with cough as the primary symptom. This infection can be difficult to distinguish from other illnesses that commonly cause cough

Most Common Differential Diagnosis of Acute Cough

- Acute bronchitis
- Allergic rhinitis
- Asthma
- Chronic obstructive pulmonary disease exacerbation
- Common cold
- Congestive heart failure exacerbation
- Gastroesophageal reflux disease
- Malignancy
- Pneumonia
- Post infectious cough
- Postnasal drip
- Sinusitis
- Viral Syndrome

The common cold often causes coughing; however, nasal congestion and rhinorrhea are also usually present, and a cold typically lasts only seven to 10 days. Symptoms of acute bronchitis typically persist for approximately three weeks.
Pneumonia can usually be ruled out in patients without fever, tachypnea, tachycardia, or clinical lung findings suggestive of pneumonia on examination. However, cough may be the only initial presenting symptom of pneumonia in older adults; a lower threshold for using chest radiography should be maintained in these patients.
The presence or absence of colored (e.g., green) sputum does not reliably differentiate between bacterial and viral lower respiratory tract infections.
The causative pathogen for bronchitis is rarely identified. In clinical studies, identification of the causative pathogen occurs in less than 30 percent of cases. Approximately 90 percent of acute bronchitis infections are caused by viruses. Because the yield of viral cultures is typically low and results rarely affect clinical planning, routine serologic testing is not recommended for bronchitis. Testing may be considered for influenza when risk is thought to be intermediate and the patient presents within 36 hours of symptom onset. During peak influenza season, testing is generally not helpful because the pretest probability of influenza is high. Conversely, the positive predictive value is too low to be helpful outside of influenza season.

Most Common Infectious Etiologies of Acute Bronchitis

- Viral
- Adenovirus
- Coronavirus
- Influenza A and B
- Metapneumovirus
- Parainfluenza virus
- Respiratory syncytial virus
- Rhinovirus
- Bacterial
- Bordetella pertussis
- Chlamydia pneumonia
- Mycoplasma pneumonia

Diagnostic testing during outbreaks of bronchitis may also be considered in select clinical scenarios. Mycoplasma pneumonia and Chlamydia pneumonia are bacterial etiologies that can affect young adults. However, trials showing that treatment shortens the course of these infections, even when initiated early, are lacking. Bordetella pertussis, the causative agent in pertussis, can also lead to acute bronchitis. Testing for pertussis should be considered in patients who are unvaccinated; patients with a cough that is paroxysmal, has a "whooping" sound, or has lasted longer than three weeks; and patients who have been exposed to pertussis or unvaccinated persons.

Treatment

Treatment of acute bronchitis is typically divided into two categories: antibiotic therapy and symptom management. Physicians appear to deviate from evidence-based medical practice in the treatment of bronchitis more than in the diagnosis of the condition.

Antibiotics

Because of the risk of antibiotic resistance and of Clostridium difficile infection in the community, antibiotics should not be routinely used in the treatment of acute bronchitis, especially in younger patients in whom pertussis is not suspected. Although 90 percent of bronchitis infections are caused by viruses, approximately two thirds of patients in the United States diagnosed with the disease are treated with antibiotics. Patient expectations may lead to antibiotic prescribing. A survey showed that 55 percent of patients believed that antibiotics were effective for the treatment of viral upper respiratory tract infections, and that nearly 25 percent of patients had self-treated an upper respiratory tract illness in the previous year with antibiotics left over from earlier infections. Studies have shown that the duration of office visits for acute respiratory infection is unchanged or only one minute longer when antibiotics are not prescribed. The American College of Chest Physicians (ACCP) does not recommend routine antibiotics for patients with acute bronchitis, and suggests that the reasoning for this be explained to patients because many expect a prescription.
Clinical data support that antibiotics do not significantly change the course of acute bronchitis, and may provide only minimal benefit compared with the risk of antibiotic use itself.
Although antibiotics are not recommended for routine use in patients with bronchitis, they may be considered in certain situations. When pertussis is suspected as the etiology of cough, initiation of a macrolide antibiotic is recommended as soon as possible to reduce transmission; however, antibiotics do not reduce duration of symptoms.
Antiviral medications for influenza infection may be considered during influenza season for high risk patients who present within 36 hours of symptom onset.
An argument for the use of antibiotics in acute bronchitis is that it may decrease the risk of subsequent pneumonia. In one large study, the number needed to treat to prevent one case of pneumonia in the month following an episode of acute bronchitis was 119 in patients 16 to 64 years of age, and 39 in patients 65 years or older.15
Because of the clinical uncertainty that may arise in distinguishing acute bronchitis from pneumonia, there is evidence to support the use of serologic markers to help guide

antibiotic use. Two trials in the emergency department setting showed that treatment decisions guided by procalcitonin levels helped decrease the use of antibiotics (83 versus 44 percent in one study, and 85 versus 99 percent in the other study) with no difference in clinical outcomes. Another study showed that office-based, point-of-care testing for C-reactive protein levels helps reduce inappropriate prescriptions without compromising patient satisfaction or clinical outcomes.

Symptom Management

Because antibiotics are not recommended for routine treatment of bronchitis, physicians are challenged with providing symptom control as the viral syndrome progresses. Common therapies include antitussives, expectorants, inhaler medications, and alternative therapies. Several small trials and Cochrane reviews help guide therapy for symptom control.

The ACCP guidelines suggest that a trial of an antitussive medication (such as codeine, dextromethorphan, or hydrocodone) may be reasonable despite the lack of consistent evidence for their use, given their benefit in patients with chronic bronchitis. Studies have shown that dextromethorphan is ineffective for cough suppression in children with bronchitis. These data coupled with the risk of adverse events in children, including sedation and death, prompted the American Academy of Pediatrics and the FDA to recommend against the use of antitussive medications in children younger than two years. The FDA subsequently recommended that cough and cold preparations not be used in children younger than six years. Use of adult preparations in children and dosing without appropriate measuring devices are two common sources of risk to young children.

Although they are commonly used and suggested by physicians, expectorants and inhaler medications are not recommended for routine use in patients with bronchitis. Expectorants have been shown to be ineffective in the treatment of acute bronchitis.

Results of a Cochrane review do not support the routine use of beta-agonist inhalers in patients with acute bronchitis; however, the subset of patients with wheezing during the illness responded to this therapy. Another Cochrane review suggests that there may be some benefit to high-dose, episodic inhaled corticosteroids, but no benefit occurred with low-dose, preventive therapy. There are no data to support the use of oral corticosteroids in patients with acute bronchitis and no asthma.

Complementary and Alternative Therapies

Many patients also use nonprescription, alternative medications for relief of their bronchitis symptoms. Studies have assessed the benefits of echinacea, pelargonium, and honey. Trials of echinacea in patients with bronchitis and the common cold have yielded inconsistent results, although studies showing positive results have been modest at best. Several randomized trials have evaluated pelargonium (also known as kalwerbossie, South African geranium, or the folk remedy rabassam) as a therapy for bronchitis. Modest benefits have been noted, primarily in symptom scoring by patients.In one randomized trial, patients taking pelargonium for bronchitis returned to work an average of two days earlier than those taking placebo.
One recent trial examined the effectiveness of dark honey for symptom relief in children with bronchitis compared with dextromethorphan or placebo. Although the authors concluded that symptom scores from patients treated with dark honey were superior to those treated with placebo, the clinical benefit was small.

Reducing Unnecessary Prescribing

Many patients with bronchitis expect medications for symptom relief, and physicians are faced with the difficult task of convincing patients that most medications are ineffective against acute bronchitis.
Careful word selection and communication skills can help reduce antibiotic prescribing. For example, one survey showed that patients would be less dissatisfied after not receiving antibiotics for a "chest cold" or "viral upper respiratory infection" than they would be for "acute bronchitis.
Another study showed that antibiotic prescriptions were reduced by 50 percent when physicians received communication skills training that focused on eliciting patient expectations of illness and antibiotic use, as well as on educating patients about the natural history of bronchitis.

"Pocket" prescriptions or "wait-and-see" prescriptions, which are given to patients with instructions to fill them only if symptoms do not resolve within a specific timeframe, have also been shown to reduce antibiotic use.
Other commonly used methods for addressing patient expectation for antibiotics include providing nonpharmacologic recommendations for symptom management, providing information sheets about viral infections and antibiotics, and ensuring close follow-up by phone or with scheduled appointments.

Methods for Managing Patient Expectations for Medication to Treat Acute Bronchitis Symptoms:

- Define the diagnosis as a "chest cold" or "viral upper respiratory infection"
- Set realistic expectations for symptom duration (about three weeks)
- Explain that antibiotics do not significantly reduce the duration of symptoms, and that they may cause adverse effects and lead to antibiotic resistance
- Explain that many patients would need to be treated with antibiotics to prevent one case of pneumonia
- Consider delayed "pocket" prescription or "wait-and-see" prescription*
- Consider pelargonium to relieve cough in adults

*— *Prescriptions given to patients with instructions to fill them only if symptoms do not resolve within a specific timeframe.*

Diagnosis and Treatment of Pharyngitis

Acute Sore Throat/Acute Pharyngitis/Acute Tonsillitis

Pharyngitis is diagnosed in 11 million patients in U.S. emergency departments and ambulatory settings annually. Most episodes are viral. Group A beta-hemolytic streptococcus (GABHS), the most common bacterial etiology, accounts for 15 to 30 percent of cases of acute pharyngitis in children and 5 to 20 percent in adults.

Among school-aged children, about one in four children with acute sore throat has serologically confirmed GABHS pharyngitis. Forty-three percent of families with an index case of GABHS pharyngitis have a secondary case. Late winter and early spring are peak GABHS seasons. The infection is transmitted via respiratory secretions, and the incubation period is 24 to 72 hours.

Common signs and symptoms of streptococcal pharyngitis include sore throat, temperature greater than 100.4°F (38°C), tonsillar exudates, and cervical adenopathy. Cough, coryza, and diarrhea are more common with viral pharyngitis.

Available diagnostic tests include throat culture and rapid antigen detection testing. Throat culture is considered the diagnostic standard, although the sensitivity and specificity of rapid antigen detection testing have improved significantly.

The modified Centor score can be used to help physicians decide which patients need no testing, throat culture/rapid antigen detection testing, or empiric antibiotic therapy.

Penicillin (10 days of oral therapy or one injection of intramuscular benzathine penicillin) is the treatment of choice because of cost, narrow spectrum of activity, and effectiveness.

Amoxicillin is equally effective and more palatable.

Erythromycin and first-generation cephalosporins are options in patients with penicillin allergy.

Increased group A beta-hemolytic streptococcus (GABHS) treatment failure with penicillin has been reported. Although current guidelines recommend first-generation cephalosporins for persons with penicillin allergy, some advocate the use of cephalosporins in all nonallergic patients because of better GABHS eradication and effectiveness against chronic GABHS carriage.

Chronic GABHS colonization is common despite appropriate use of antibiotic therapy. Chronic carriers are at low risk of transmitting disease or developing invasive GABHS infections, and there is generally no need to treat carriers.

Whether tonsillectomy or adenoidectomy decreases the incidence of GABHS pharyngitis is poorly understood. At this time, the benefits are too small to outweigh the associated costs and surgical risks.

KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	***Evidence***
Use of clinical decision rules for diagnosing GABHS pharyngitis improves quality of care while reducing unwarranted treatment and overall cost.	A
Penicillin is the treatment of choice for GABHS pharyngitis in persons who are not allergic to penicillin.	A
Treatment is not typically indicated in chronic carriers of pharyngeal GABHS.	C

GABHS = group A beta-hemolytic streptococcus.
A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.xml.

Diagnosis of Streptococcal Pharyngitis

Clinical Diagnosis

Because the signs and symptoms of GABHS pharyngitis overlap extensively with other infectious causes, making a diagnosis based solely on clinical findings is difficult. In patients with acute febrile respiratory illness, physicians accurately differentiate bacterial from viral infections using only the history and physical findings about one half of the time.4 No single element of the patient's history or physical examination reliably confirms or excludes GABHS pharyngitis. Sore throat, fever with sudden onset (temperature greater than 100.4° F [38° C]), and exposure to Streptococcus within the preceding two weeks suggest GABHS infection. Cervical node lymphadenopathy and pharyngeal or tonsillar inflammation or exudates are common signs. Palatal petechiae and scarlatiniform rash are highly specific but uncommon; a swollen uvula is sometimes noted. Cough, coryza, conjunctivitis, and diarrhea are more common with viral pharyngitis. The diagnostic accuracy of these signs and symptoms is listed in the following table

History and Physical Examination Findings Suggesting GABHS Pharyngitis

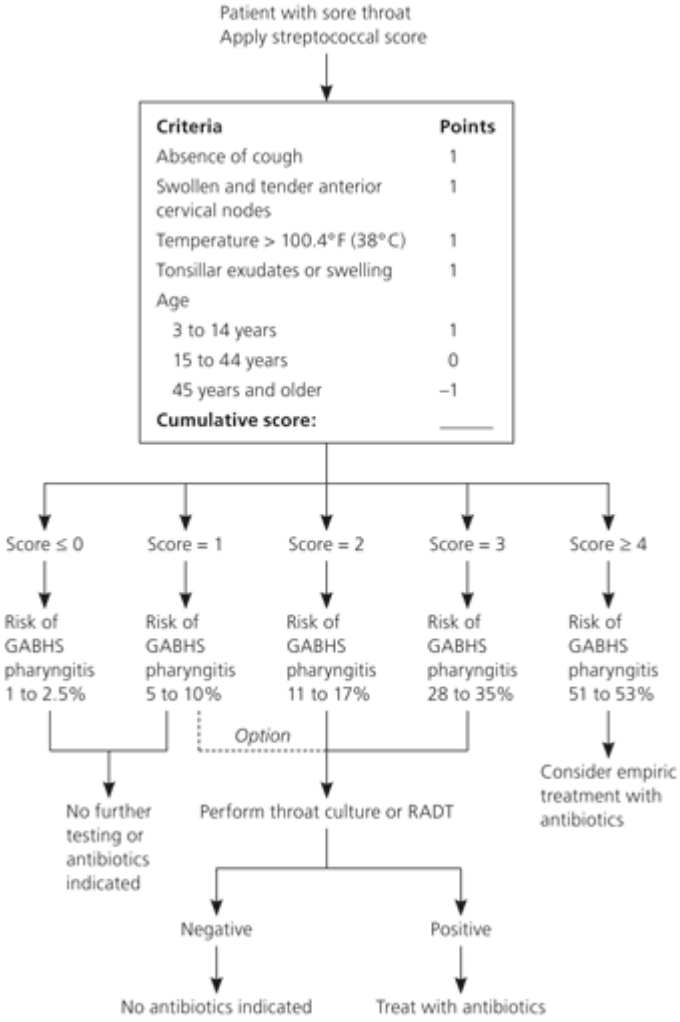
Factor	*Sensitivity (%)*	*Specificity (%)*	*Positive likelihood ratio*	*Negative likelihood ratio*
Absence of cough	51 to 79	36 to 68	1.1 to 1.7	0.53 to 0.89
Anterior cervical nodes swollen or enlarged	55 to 82	34 to 73	0.47 to 2.9	0.58 to 0.92
Headache	48	50 to 80	0.81 to 2.6	0.55 to 1.1
Myalgia	49	60	1.2	0.84
Palatine petechiae	7	95	1.4	0.98
Pharyngeal exudates	26	88	2	0.85
Streptococcal exposure in past two weeks	19	91	2	0.9
Temperature ≥ 100.9° F (38.3° C)	22 to 58	53 to 92	0.68 to 3.9	0.54 to 1.3
Tonsillar exudates	36	85	2.3	0.76
Tonsillar or pharyngeal exudates	45	75	1.8	0.74

GABHS = group A beta-hemolytic streptococcus.

CLINICAL DECISION RULES

The original Centor score uses four signs and symptoms to estimate the probability of acute streptococcal pharyngitis in adults with a sore throat.6 The score was later modified by adding age and validated in 600 adults and children.7,8 The cumulative score determines the likelihood of streptococcal pharyngitis and the need for antibiotics (Figure 19). Patients with a score of zero or 1 are at very low risk for streptococcal pharyngitis and do not require testing (i.e., throat culture or rapid antigen detection testing [RADT]) or antibiotic therapy. Patients with a score of 2 or 3 should be tested using RADT or throat culture; positive results warrant antibiotic therapy. Patients with a score of 4 or higher are at high risk of streptococcal pharyngitis, and empiric treatment may be considered.

Clinical Decision Rule for Management of Sore Throat



Modified Centor score and management options using clinical decision rule. Other factors should be considered (e.g., a score of 1, but recent family contact with documented streptococcal infection). (GABHS = group A beta-hemolytic streptococcus; RADT = rapid antigen detection testing.)

LABORATORY DIAGNOSIS

With correct sampling and plating techniques, a single-swab throat culture is 90 to 95 percent sensitive. RADT allows for earlier treatment, symptom improvement, and reduced disease spread. RADT specificity ranges from 90 to 99 percent. Sensitivity depends on the commercial RADT kit used and was approximately 70 percent with older latex agglutination assays. Newer enzyme-linked immunosorbent assays, optical immunoassays, and chemiluminescent DNA probes are 90 to 99 percent sensitive.

Whether negative RADT results in children and adolescents require confirmatory throat culture is controversial. The American Academy of Pediatrics (AAP) recommends that negative RADT results in children be confirmed using throat culture unless physicians can guarantee that RADT sensitivity is similar to that of throat culture in their practice. False-negative RADT results may lead to misdiagnosis and GABHS spread and, very rarely, to increased suppurative and nonsuppurative complications. Other studies suggest that the sensitivity of newer optical immunoassays approaches that of single-plate throat culture, obviating the need for back-up culture. In many clinical practices, confirmatory throat culture is not performed in children at low risk for GABHS infection. The precipitous drop in rheumatic fever in the United States, significant costs of additional testing and follow-up, and concerns about inappropriate antibiotic use are valid reasons why back-up cultures are not routinely performed.

Streptococcal antibody titers are not useful for diagnosing streptococcal pharyngitis and are not routinely recommended. They may be indicated to confirm previous infection in persons with suspected acute poststreptococcal glomerulonephritis or rheumatic fever. They may also help distinguish acute infection from chronic carrier status, although they are not routinely recommended for this purpose.

Complications of GABHS Pharyngitis

Suppurative

- Bacteraemia
- Cervical lymphadenitis
- Endocarditis
- Mastoiditis
- Meningitis
- Otitis media
- Peritonsillar/retropharyngeal abscess
- Pneumonia

Nonsuppurative

- Post streptococcal glomerulonephritis
- Rheumatic fever

ROLE OF ANTIBIOTICS IN REDUCING COMPLICATIONS

Antibiotics also reduce the incidence of acute rheumatic fever (relative risk reduction = 0.28).24 Although rheumatic heart disease is a major public health issue in low- and middle-income countries (annual incidence of five per 100,000 persons), it has largely been controlled in industrialized nations since the 1950s. It is estimated that 3,000 to 4,000 patients must be given antibiotics to prevent one case of acute rheumatic fever in developed nations.

Rates of acute rheumatic fever and retropharyngeal abscess have not increased following more judicious antibiotic use in children with respiratory infections. Children with GABHS pharyngitis may return to school after 24 hours of antibiotic therapy.

Non–group A beta-hemolytic streptococci (groups C and G) also can cause acute pharyngitis; these strains are usually treated with antibiotics, although good clinical trials are lacking. Fusobacterium necrophorum causes endemic acute pharyngitis, peritonsillar abscess, and persistent sore throat. Untreated Fusobacterium infections may lead to Lemierre syndrome, an internal jugular vein thrombus caused by inflammation. Complications occur when septic plaques break loose and embolize. Empiric antibiotic therapy may reduce the incidence of complications.

ANTIBIOTIC SELECTION

Effectiveness, spectrum of activity, safety, dosing schedule, cost, and compliance issues all require consideration. Penicillin, penicillin congeners (ampicillin or amoxicillin), clindamycin (Cleocin), and certain cephalosporins and macrolides are effective against GABHS.

Based on cost, narrow spectrum of activity, safety, and effectiveness, penicillin is recommended by the American Academy of Family Physicians (AAFP), the AAP, the

American Heart Association, the Infectious Diseases Society of America (IDSA), and the World Health Organization for the treatment of streptococcal pharyngitis.
When patients are unlikely to complete the entire course of antibiotics, a single intramuscular dose of penicillin G benzathine (Bicillin L-A) is an option. A premixed penicillin G benzathine/procaine injection (Bicillin C-R) lessens injection-associated discomfort. Over the past 50 years, no increase in minimal inhibitory concentration or resistance to GABHS has been documented for penicillins or cephalosporins.

Oral amoxicillin suspension is often substituted for penicillin because it tastes better. The medication is also available as chewable tablets. Five of eight trials (1966 to 2000) showed greater than 85 percent GABHS eradication with the use of amoxicillin. Ten days of therapy is standard. Amoxicillin taken once per day is likely as effective as a regimen of three times per day. One randomized controlled trial (RCT) demonstrated comparable symptom relief with once-daily dosing, although like almost all studies of pharyngitis treatment, the trial was not powered to detect nonsuppurative complications. A recent study of children three to 18 years of age showed that once-daily dosing of amoxicillin was not inferior to twice-daily dosing; both regimens had failure rates of about 20 percent. It should be noted that once-daily therapy is not approved by the U.S. Food and Drug Administration (FDA).

Antibiotic Options and Dosages for GABHS Pharyngitis

Drug	***Class of antimicrobial***	***Route of administration***	***Dosage***	***Duration of therapy***	***Cost****
Primary treatment (recommended by current guidelines)					
Penicillin V	Penicillin	Oral	Children: 250 mg two to three times per day	10 days	$4
			Adolescents and adults: 250 mg three to four times per day		
			or		
			500 mg two times per day		
Amoxicillin	Penicillin (broad spectrum)	Oral	Children (mild to moderate GABHS pharyngitis):	10 days	$4
			12.25 mg per kg two times per day		
			or		
			10 mg per kg three times per day		
			Children (severe GABHS pharyngitis): 22.5 mg per kg two times per day		
			or		

Drug	Class of antimicrobial	Route of administration	Dosage	Duration of therapy	Cost*
			13.3 mg per kg three times per day		
			or		
			750 mg (not FDA approved) once per day†		
			Adults (mild to moderate GABHS pharyngitis):		
			250 mg three times per day		
			or		
			500 mg two times per day		
			Adults (severe GABHS pharyngitis): 875 mg two times per day		
Penicillin G benzathine (Bicillin L-A)	Penicillin	Intramuscular	Children: < 60 lb (27 kg): 6.0 × 105 units	One dose	Varies
			Adults: 1.2 × 106 units		
Treatment for patients with penicillin allergy (recommended by current guidelines)					
Erythromycin ethylsuccinate	Macrolide	Oral	Children: 30 to 50 mg per kg per day in two to four divided doses	10 days	$4
			Adults: 400 mg four times per day or 800 mg two times per day		
Erythromycin estolate	Macrolide	Oral	Children: 20 to 40 mg per kg per day in two to four divided doses	10 days	$4
			Adults: not recommended‡		

Drug	Class of antimicrobial	Route of administration	Dosage	Duration of therapy	Cost*
Cefadroxil	Cephalosporin (first generation)	Oral	Children: 30 mg per kg per day in two divided doses Adults: 1 g one to two times per day	10 days	$45
Cephalexin (Keflex)	Cephalosporin (first generation)	Oral	Children: 25 to 50 mg per kg per day in two to four divided doses Adults: 500 mg two times per day	10 days	$4

Note: The following medications are FDA approved, but are not recommended by guidelines for primary GABHS therapy: azithromycin (Zithromax), clarithromycin (Biaxin), cefprozil (Cefzil; second-generation cephalosporin), cefpodoxime (Vantin; third-generation cephalosporin), ceftibuten (Cedax; third-generation cephalosporin), and cefdinir (Omnicef; third-generation cephalosporin).
FDA = U.S. Food and Drug Administration; GABHS = group A beta-hemolytic streptococcus.
**— Average price of generic based on http://www.pharmacychecker.com.*
†— Children four to 18 years of age.
‡— Adults receiving erythromycin estolate may develop cholestatic hepatitis; the incidence is higher in pregnant women, in whom the drug is contraindicated.

Current U.S. treatment guidelines recommend **erythromycin** for patients with penicillin allergy. Gastrointestinal side effects of erythromycin cause many physicians to instead prescribe the FDA-approved second-generation macrolides azithromycin (Zithromax) and clarithromycin (Biaxin). Azithromycin reaches higher concentrations in pharyngeal tissue and requires only five days of treatment. Macrolide resistance is increasing among GABHS isolates in the United States, likely because of azithromycin overuse. Reported GABHS resistance in certain areas of the United States and Canada approaches 8 to 9 percent. Most guidelines recommend reserving erythromycin for patients who are allergic to penicillin.

First-generation oral **cephalosporins** are recommended for patients with penicillin allergy who do not have immediate-type hypersensitivity to betalactam antibiotics. Bacteriologic failure rates for penicillin-treated GABHS pharyngitis increased from about 10 percent in the 1970s to more than 30 percent in the past decade. Several studies suggest that cephalosporins are more effective against GABHS than penicillin. Higher rates of GABHS eradication and shorter courses of therapy that are possible with cephalosporins may be beneficial. One meta-analysis of 35 trials comparing various cephalosporins against penicillin noted significantly more bacteriologic and clinical cures in the cephalosporin group (NNT = 13). However, the poor quality of included studies limited these findings, and results may be skewed because cephalosporins more effectively eradicate GABHS carriage than penicillin does. Although cephalosporins are effective, the shift toward expensive, broad-spectrum second- and third-generation cephalosporin use is increasing. Whether cephalosporins will replace penicillin as primary GABHS therapy remains to be seen.

Guidelines for Treatment

Although GABHS pharyngitis is common, the ideal approach to management remains a matter of debate. Numerous practice guidelines, clinical trials, and cost analyses give divergent opinions. U.S. guidelines differ in whether they recommend using clinical prediction models versus diagnostic testing. Several international guidelines recommend not testing for or treating GABHS pharyngitis at all.

Comparison of GABHS Guidelines

Recommendation	***ACP (endorsed by the CDC and AAFP)***	***AAP***	***IDSA***	***UKNHS***
Screening for acute pharyngitis	Use Centor criteria	Use clinical and epidemiologic findings to assess patient's risk of GABHS (e.g., sudden onset of sore throat, fever, odynophagia, tonsillar erythema, exudates, cervical lymphadenitis, or history of streptococcal exposure)		History and physical examination to establish risk
Diagnostic testing	RADT with Centor score of 2 or 3 only	RADT or throat culture in all patients at risk		None
Back-up culture needed if RADT result negative?	Adults: No	Adults: NA	Adults: No	
	Children: Yes	Children: Yes	Children: Yes	
Who requires antibiotic treatment?	Empiric antibiotics for Centor score of 3 or 4; treat patients with positive RADT result	Positive RADT result or throat culture		Only high-risk and very ill patients
Antibiotic of choice	Oral penicillin V (Veetids; brand no longer available in the United States); intramuscular penicillin G benzathine (Bicillin L-A); oral amoxicillin with equal effectiveness and better palatability in children			Oral penicillin V
Penicillin allergy	Oral erythromycin; cephalosporin (first generation)			Oral erythromycin

AAFP = American Academy of Family Physicians; AAP = American Academy of Pediatrics; ACP = American College of Physicians; CDC = Centers for Disease Control and Prevention; GABHS = group A beta-hemolytic streptococcus; IDSA = Infectious Diseases Society of America; NA = not applicable; RADT = rapid antigen detection testing; UKNHS = United Kingdom National Health Service.

The AAFP, the American College of Physicians (ACP), and the Centers for Disease Control and Prevention recommend using a clinical prediction model to manage suspected GABHS pharyngitis. Guidelines from the IDSA, conversely, state that clinical diagnosis of GABHS pharyngitis cannot be made with certainty, even by experienced physicians, and that diagnostic testing is required. Whereas the Centor algorithm effectively identifies low-risk patients in whom testing is unnecessary, the IDSA is concerned about its relatively low positive predictive value with higher scores (approximately 50 percent) and the risk of overtreatment. The ACP guidelines attempt to prevent inappropriate antibiotic use while avoiding unnecessary testing. Differences in guidelines are best explained by whether emphasis is placed on avoiding inappropriate antibiotic use or on relieving acute GABHS pharyngitis symptoms. Several U.S. guidelines recommend confirmatory throat culture for negative RADT in children and adolescents. This approach is 100 percent sensitive and 99 to 100 percent specific for diagnosing GABHS pharyngitis in children. However, because of improved RADT sensitivity, the IDSA and ACP recently omitted this recommendation for adults. A similar recommendation to omit confirmatory throat culture after negative RADT is likely for children.

Management of Recurrent GABHS Pharyngitis

RADT is effective for diagnosing recurrent GABHS infection. In patients treated within the preceding 28 days, RADT has similar specificity and higher sensitivity than in patients without previous streptococcal infection (0.91 versus 0.70, respectively; $P < .001$). Recurrence of GABHS pharyngitis within one month may be treated using the antibiotics. Intramuscular penicillin G injection is an option when oral antibiotics were initially prescribed.

Chronic Pharyngeal Carriage

Chronic pharyngeal carriage is the persistent presence of pharyngeal GABHS without active infection or immune/inflammatory response. Patients may carry GABHS for one year despite treatment. Chronic carriers are at little to no risk of immune-mediated post-streptococcal complications because no active immune response occurs. Risk of GABHS transmission is very low and is not linked to invasive group A streptococcal (GAS) infections. Unproven therapies such as long-term antibiotic use, treatment of pets, and exclusion from school and other activities have proved ineffective and are best avoided. Carriage of one GABHS serotype does not preclude infection by another; therefore, throat culture or RADT is appropriate when GABHS pharyngitis is suspected. Testing is unnecessary if clinical symptoms suggest viral upper respiratory infection.
Antibiotic treatment may be appropriate in the following persons or situations: recurrent GABHS infection within a family; personal history of or close contact with someone who has had acute rheumatic fever or acute poststreptococcal glomerulonephritis; close contact with someone who has GAS infection; community outbreak of acute rheumatic fever, poststreptococcal glomerulonephritis, or invasive GAS infection; health care workers or patients in hospitals, chronic care facilities, or nursing homes; families who cannot be reassured; and children at risk of tonsillectomy for repeated GABHS pharyngitis. Small RCTs suggest that intramuscular benzathine penicillin combined with four days of oral rifampin (Rifadin) or a 10-day course of oral clindamycin effectively eradicates the carrier state. Oral clindamycin, azithromycin, and cephalosporins are also effective.

Tonsillectomy

The effect of tonsillectomy on decreasing risk for chronic or recurrent throat infection is poorly understood. One trial in children showed that the frequency of recurrent throat infection decreased in the tonsillectomy/adenoidectomy and control groups. The surgical group had one fewer episode of severe GABHS pharyngitis annually; the authors concluded that this small potential benefit did not justify the risks or cost of surgery. A meta-analysis of children and adults with chronic pharyngitis comparing tonsillectomy with nonsurgical treatment was inconclusive. Another retrospective study based on data from the Rochester Epidemiology Project found that children with tonsils are three times more likely to develop subsequent GABHS pharyngitis than those who had undergone tonsillectomies (odds ratio = 3.1; $P < .001$).

Guidelines for the Diagnosis and Management of Rhinosinusitis in Adults

Summary of Recommendations for Rhinosinusitis:

Acute viral Rhinosinusitis
Acute viral rhinosinusitis should be diagnosed in patients with typical symptoms of rhinosinusitis for less than 10 days and in whom symptoms are not worsening (Strong recommendation)
Do not obtain radiographic imaging for acute rhinosinusitis unless a complication or alternative diagnosis is suspected (Recommendation)
Symptomatic relief may be prescribed (Option)

Acute bacterial rhinosinusitis
Management should include pain assessment (Strong recommendation)
Symptomatic relief may be prescribed (Option)
Observation without antibiotic treatment is an option for some patients with mild, uncomplicated illness (Option)
If antibiotic treatment is initiated, amoxicillin should be the first-line therapy (Recommendation)
If the patient does not improve with initial management within seven days of diagnosis, reassess the diagnosis and management options; initiate or change antibiotic therapy (Recommendation)

Chronic and recurrent acute rhinosinusitis
Chronic and recurrent acute rhinosinusitis should be distinguished from other illnesses (Recommendation)
Patients should be assessed for factors that modify management such as allergic rhinitis, cystic fibrosis, immunocompromised state, ciliary dyskinesia, anatomic variations (Recommendation)
Diagnosis should be corroborated and/or underlying causes should be identified (Recommendation)
Nasal endoscopy may be performed during evaluation or diagnosis (Option)
Computed tomography of the paranasal sinuses should be performed during evaluation or diagnosis (Recommendation)
Allergy or immune testing may be performed during evaluation (Option)
Patients should be educated about preventive measures (Recommendation)

Diagnosis
Definitions of Rhinosinusitis Types

Acute rhinosinusitis
Up to four weeks of purulent nasal drainage (anterior, posterior, or both) accompanied by nasal obstruction; facial pain, pressure, or fullness; or both
Purulent nasal discharge is cloudy or colored (opposed to clear secretions that typically accompany viral upper respiratory infection) and may be reported by the patient or seen during physical examination
Nasal obstruction may be reported by the patient as nasal obstruction, congestion, blockage, or stuffiness, or it may be diagnosed on physical examination
Facial pain, pressure, or fullness may involve the anterior face or periorbital region or may manifest with localized or diffuse headache

Viral rhinosinusitis
Acute rhinosinusitis that is presumed to be caused by viral infection; physicians should diagnose viral rhinosinusitis when symptoms or signs of acute rhinosinusitis are present for less than 10 days and symptoms are not worsening

Acute bacterial rhinosinusitis
Acute rhinosinusitis that is presumed to be caused by bacterial infection; physicians should diagnose acute bacterial rhinosinusitis when:
Symptoms or signs of acute rhinosinusitis are present 10 days or more after onset of upper respiratory symptoms
Or
Symptoms or signs of acute rhinosinusitis worsen within 10 days of initial improvement (i.e., double worsening)

Chronic rhinosinusitis
Two or more of the following signs and symptoms lasting 12 weeks or more:
Mucopurulent drainage (anterior, posterior, or both)
Nasal obstruction (congestion)
Facial pain, pressure, or fullness
Decreased sense of smell
and
Inflammation documented by one or more of the following findings:
Purulent mucus or edema in the middle meatus or ethmoid region
Polyps in the nasal cavity or middle meatus
Radiographic imaging shows inflammation of the paranasal sinuses

Recurrent acute rhinosinusitis
Four or more episodes per year of acute bacterial rhinosinusitis without signs or symptoms of rhinosinusitis between episodes
Each episode should meet the diagnostic criteria for acute bacterial rhinosinusitis

Treatment

Viral Rhinosinusitis
Antibiotics are not recommended to treat viral rhinosinusitis because they are ineffective against viral illness and do not directly relieve symptoms. However, physicians may treat symptoms (e.g., prescribing analgesics for pain and antipyretics for fever). Topical or systemic decongestants may provide further relief, although their effects are limited to the nasal cavity. Topical decongestants are more effective than oral decongestants, but physicians usually stop therapy after three days because of the risk of rebound nasal congestion after discontinuation of therapy.

Systemic steroids have not been shown to be effective in patients with viral rhinosinusitis, and weak evidence supports the use of topical nasal steroids. Although antihistamines have been used, no studies have evaluated their effect on viral rhinosinusitis.

Acute Bacterial Rhinosinusitis
Management of acute bacterial rhinosinusitis focuses on pain assessment and may include therapy for pain relief, patient observation, or antibiotic therapy. If the patient fails to improve within seven days of diagnosis, or if symptoms worsen, antibiotic therapy should be initiated or changed.

Pain Relief. An important goal in treating patients with acute bacterial rhinosinusitis is pain relief, and an ongoing assessment of patient discomfort is essential. Severity can be assessed using a pain scale or simple visual analog scale, or by asking the patient to rate the discomfort as mild, moderate, or severe. Acetaminophen or nonsteroidal anti-inflammatory drugs, with or without opioids, are usually effective for mild or moderate discomfort. Oral administration is preferred because of cost and convenience.

Adjunctive treatments such as alpha-adrenergic decongestants, corticosteroids, saline irrigation, and mucolytics may be considered for symptomatic relief in patients with acute bacterial rhinosinusitis. Although the U.S. Food and Drug Administration has not

approved these therapies for acute rhinosinusitis and few studies support their use, physicians may decide to use them based on the individual patient.

Patient Observation. Some randomized controlled trials have shown a high rate of improvement in patients taking placebo; and moderate, incremental benefits in patients taking antibiotics. Therefore, patient observation without antibiotics for up to seven days after diagnosis of acute bacterial rhinosinusitis is an option for patients with uncomplicated, mild illness (i.e., mild pain and a temperature of less than 101°F [38.3°C]); follow-up should be assured. Management is limited to symptom relief during observation. Although illness severity is the main consideration when deciding on observation, other factors include patient preference, age, general health, cardiopulmonary status, and comorbidities.

Antibiotic Therapy. If antibiotic treatment is initiated, amoxicillin should be the first-line therapy because of its safety, effectiveness, low cost, and narrow microbiologic spectrum. Folate inhibitors (e.g., trimethoprim/sulfamethoxazole [Bactrim/Septra]) and macrolide antibiotics are alternatives for patients who are allergic to penicillin.

Antibiotic use within the preceding four to six weeks increases the risk that an antibiotic-resistant bacterium is present. In this case, a different antibiotic, such as a fluoroquinolone or high-dose amoxicillin/clavulanate (Augmentin; 4 g/250 mg per day), should be used. Having a child in the household who attends day care increases the risk of penicillin-resistant Streptococcus pneumoniae infection, for which amoxicillin is an option.

Evidence does not show that longer courses of therapy are more effective than shorter courses. However, adherence rates are generally higher with once-daily dosing and a short duration of therapy.

Chronic or Recurrent Acute Rhinosinusitis

Although patients with chronic rhinosinusitis or recurrent acute rhinosinusitis cannot prevent disease onset, certain practices can reduce the risk of developing initial rhinosinusitis. These practices include good hygiene, such as hand washing, and abstinence from smoking. Secondary prevention, such as saline nasal irrigation and treatment of underlying conditions, can minimize symptoms and exacerbations. It is important for physicians to counsel patients about these measures to control chronic or recurrent acute rhinosinusitis.

Guideline for Diagnosis and Treatment of Otitis Media

Diagnostic criteria for acute otitis media include rapid onset of symptoms, middle ear effusion, and signs and symptoms of middle ear inflammation.
Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis are the most common bacterial isolates from the middle ear fluid of children with acute otitis media. Fever, otalgia, headache, irritability, cough, rhinitis, listlessness, anorexia, vomiting, diarrhea, and pulling at the ears are common, but nonspecific symptoms. Detection of middle ear effusion by pneumatic otoscopy is key in establishing the diagnosis. Observation is an acceptable option in healthy children with mild symptoms. Antibiotics are recommended in all children younger than six months, in those between six months and two years if the diagnosis is certain, and in children with severe infection. High dosage amoxicillin (80 to 90 mg per kg per day) is recommended as first line therapy. Macrolide antibiotics, clindamycin, and cephalosporins are alternatives in penicillin sensitive children and in those with resistant infections. Patients who do not respond to treatment should be reassessed. Hearing and language testing is recommended in children with suspected hearing loss or persistent effusion for at least three months, and in those with developmental problems.
Acute otitis media, a viral or bacterial infection of the middle ear, is the most common infection for which antibiotics are prescribed for children.
Acute otitis media is most common between six and 24 months of age; by age three, more than 80 percent of children have been diagnosed.
Otitis media with effusion is middle ear effusion in the absence of acute infection.
Chronic suppurative otitis media is persistent infection and resultant perforation of the tympanic membrane. This article will review recent evidence, including the evidence-based guideline from the American Academy of Pediatrics and the American Academy of Family Physicians, about the diagnosis and treatment of acute otitis media and otitis media with effusion.

CLINICAL RECOMMENDATION

Diagnosis of acute otitis media requires confirmation of acute onset, identification of signs of middle ear effusion, and evaluation for signs and symptoms of middle ear inflammation.	Evidence C
Antihistamines and decongestants should not be prescribed for children with acute otitis media or otitis media with effusion.	Evidence B
Observation without antibiotic therapy is an option in selected children with acute otitis media.	Evidence B
Amoxicillin at a dosage of 80 to 90 mg per kg per day should be the first-line antibiotic for most children with acute otitis media.	Evidence B
Patients with otitis media who fail to respond to the initial treatment option within 48 to 72 hours should be reassessed to confirm the diagnosis. If the diagnosis is confirmed, antibiotics should be started in patients for whom antibiotics were initially deferred, and a different antibiotic should be prescribed for patients already taking an antibiotic.	Evidence C

Factors Affecting Risk of Acute Otitis Media

Factor	Comments
Age	Maximal incidence between six and 24 months of age; Eustachian tube shorter and less angled at this age. Underdeveloped physiologic and immunologic responses to infection in children
Breastfeeding	Breastfeeding for at least three months is protective; this effect may be associated with position maintained during breastfeeding, suckling movements, and protective factors in breast milk
Daycare attendance*	Contact with multiple children and daycare providers facilitates spread of bacterial and viral pathogens
Ethnicity*	Native American, Alaskan, and Canadian Inuit children have increased incidence
Exposure to cigarette smoke	Increased incidence with cigarette smoke and air pollution, especially if parents smoke
Male sex	Slightly increased incidence
More than one sibling living at home*	Increased risk of antibiotic treatment failure
Pacifier use	Increased incidence
Previous antibiotic use*	Increased risk of antibiotic treatment failure
Previous otitis media*	Increased risk of antibiotic treatment failure
Season*	Increased incidence in fall and winter
Underlying pathology*	Increased incidence in children with allergic rhinitis, cleft palate, Down syndrome

Organisms in Acute and Chronic Suppurative Otitis Media

Organism	Frequency (%)	Comments
Acute otitis media		
Streptococcus pneumoniae*	40 to 50	Most common pathogens are serotypes 19F, 23F, 14, 6B, 6A, 19A, and 9V
Haemophilus influenzae*	30 to 40	Nearly one half produce β-lactamase

Organism	Frequency (%)	Comments
Moraxella catarrhalis*	10 to 15	Most produce β-lactamase
Group A streptococcus*	—	Common in older children. More frequently associated with perforated tympanic membrane and mastoiditis
Staphylococcus aureus*	Rare	More common in chronic infection
Anaerobic organisms	Rare	More common in chronic infection
Gram-negative bacilli	—	In newborns, immunosuppressed patients, and patients with chronic suppurative otitis media
Viruses	Less than 10	Respiratory syncytial virus, adenovirus, rhinovirus, or influenza virus may act in synergy with bacteria. Coinfection with bacteria present in more than 40 percent of children with viral-induced acute otitis media
Other	Rare	Mycoplasma pneumoniae, Chlamydia pneumoniae, Chlamydia trachomatis (in infants younger than six months), Mycobacterium tuberculosis (in developing countries), parasitic infestation (e.g., ascariasis), mycotic infections (e.g., candidiasis, aspergillosis, blastomycosis)
Chronic suppurative otitis media		
Aerobic organisms	—	Pseudomonas aeruginosa, Proteus mirabilis, S. aureus, Streptococcus pyogenes, Escherichia coli, or Klebsiella species
Anaerobic organisms	—	Bacteroides, Peptostreptococcus, or Propionibacterium species

Diagnosis

Diagnostic criteria for acute otitis media include rapid onset of symptoms, middle ear effusion, and signs and symptoms of middle ear inflammation. Nonspecific symptoms of acute otitis media (e.g., fever, headache, irritability, cough, rhinitis, listlessness, anorexia, vomiting, diarrhea, pulling at the ears) are common in infants and young children. Otalgia is less common in children younger than two years and more common in adolescents and adults. Acute otitis media cannot be reliably differentiated from upper respiratory tract infection on the basis of symptoms alone. However, otalgia, ear rubbing or pulling, and parental suspicion of otitis media have positive likelihood ratios (LR+) of 3.0 or more and are moderately useful for ruling in the diagnosis

TYPE	DIAGNOSTIC CRITERIA
Acute otitis media	Acute onset and Middle ear effusion, indicated by bulging tympanic membrane, limited or absent mobility of membrane, air-fluid level behind membrane and Symptoms and signs of middle ear inflammation, indicated by erythema of tympanic membrane or otalgia affecting sleep or normal activity
Persistent acute otitis media	Persistent features of middle ear infection during antibiotic treatment or Relapse within one month of treatment completion
Recurrent acute otitis media	Three or more episodes of acute otitis media within six to 18 months
Otitis media with effusion	Fluid behind the tympanic membrane in the absence of features of acute inflammation
Chronic otitis media with effusion	Persistent fluid behind intact tympanic membrane in the absence of acute infection
Chronic suppurative otitis media	Persistent inflammation of the middle ear or mastoid cavity Recurrent or persistent otorrhea through a perforated tympanic membrane

Usefulness of Clinical Findings and Tests in the Diagnosis of Acute Otitis Media

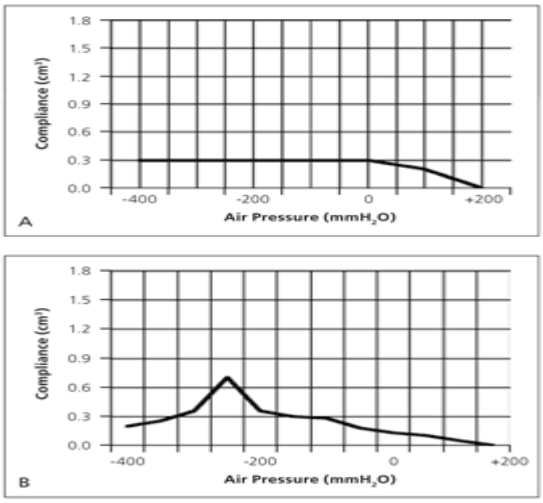
Clinical Feature	*Sensitivity (%)*	*Specificity (%)*	*LR+**	*LR−†*
Signs				
Bulging tympanic membrane	61	97	20.3	0.4
Cloudy tympanic membrane	81	95	16.2	0.2
Impaired mobility of tympanic membrane	98	79	4.7	0.03
Symptoms				
Parental suspicion of otitis media	70	80	3.4	0.4
Pulling at or rubbing the ear	42	87	3.3	0.7
Otalgia	54	82	3.0	0.6
Excessive crying	55	69	1.8	0.7
Rhinitis	75	43	1.3	0.6
Poor appetite	36	66	1.1	1.0
Cough	47	45	0.9	1.2
Fever	40	48	0.8	1.2
Diagnostic methods				
Acoustic reflectometry	65 to 97	85 to 99		
Pneumatic otoscopy	94	81		
Portable tympanometry	89	58		
Professional tympanometry	34 to 94	49 to 94		

LR+ = positive likelihood ratio; LR− = negative likelihood ratio.
**— Higher values indicate a greater likelihood of acute otitis media when the sign or symptom is present.*
†— Lower values indicate a lower likelihood of acute otitis media when the sign or symptom is absent.

PNEUMATIC OTOSCOPY AND OTHER DIAGNOSTIC TESTS

Detection of middle ear effusion by pneumatic otoscopy is key in establishing the diagnosis of acute otitis media. The tympanic membrane normally is convex, mobile, translucent, and intact; a normal color and mobility of the membrane indicate that otitis media is unlikely (negative likelihood ratio [LR−], 0.03).10 A bulging membrane greatly increases the likelihood of otitis media (LR+, 20.3), as do impaired mobility of the membrane (LR+, 4.7) and a distinctly red membrane (LR+, 2.6), albeit to a lesser extent.14

Using pneumatic otoscopy with tympanometry improves the accuracy of diagnosis. The handheld tympanometer records compliance of the tympanic membrane and provides quantitative information on structural function and the presence of middle ear effusion. A flattened tracing with a low static admittance (type B tracing) indicates middle ear effusion; highly negative middle ear pressures (type C tracing) indicate a retracted tympanic membrane; and highly positive peak pressures are consistent with a bulging membrane15 . Acoustic reflectometry detects middle ear fluid by analyzing the spectral gradient of sound reflected off the tympanic membrane.



Sample tympanograms. (A) Results suggest middle ear effusion. (B) Results correlate with retracted tympanic membrane.

Tympanocentesis, followed by aspiration and culture of middle ear fluid samples, is useful in children who are toxic, have failed multiple courses of antibiotics, or have immune deficiencies. Although negative nasopharyngeal cultures correlate well with negative middle ear fluid cultures, they are not routinely recommended.

Chronic suppurative otitis media presents with persistent or recurrent otorrhea through a perforated tympanic membrane (active), or with a dry but permanent perforation of the tympanic membrane (inactive). Other features include thickened granular mucosa, polyps, and cholesteatoma in the middle ear. Aerobic and anaerobic bacteria may enter the middle ear through the perforation. Rarely, Pseudomonas species may cause deep-seated destructive infections of the middle ear and the mastoid cavity. Diagnosis is made by history and examination, including otoscopy. Examination may detect other foci of infection requiring treatment (e.g., nose, paranasal sinuses, lungs, pharynx). Careful cleaning of the ear is useful for visualizing the tympanic membrane and the attic, and for excluding cholesteatoma.

Treatment

Acute Otitis Media

Treatment goals in acute otitis media include symptom resolution and reduction of recurrence. Most children with acute otitis media (70 to 90 percent) have spontaneous resolution within seven to 14 days; therefore, antibiotics should not routinely be prescribed initially for all children. Delaying antibiotic therapy in selected patients reduces treatment-related costs and side effects and minimizes emergence of resistant strains.

Symptomatic Treatment:
Pain management is important in the first two days after diagnosis. Options include acetaminophen (15 mg per kg every four to six hours) and ibuprofen (10 mg per kg every six hours). Antipyrine/benzocaine otic suspension can be used for local analgesia.

Agents Used in the Treatment of Otitis Media

Agent	Dosage	Comments
Antimicrobials*		
Amoxicillin	80 to 90 mg per kg per day, given orally in two divided doses	First-line drug. Safe, effective, and inexpensive
Amoxicillin/clavulanate (Augmentin)	90 mg of amoxicillin per kg per day; 6.4 mg of clavulanate per kg per day, given orally in two divided doses	Second-line drug. For patients with recurrent or persistent acute otitis media, those taking prophylactic amoxicillin, those who have used antibiotics within the previous month, and those with concurrent purulent conjunctivitis
Azithromycin (one dose; Zithromax)	30 mg per kg, given orally	For patients with penicillin allergy. One dose is as effective as longer courses
Azithromycin (three-day course; Zithromax Tripak)	20 mg per kg once daily, given orally	For patients with recurrent acute otitis media
Azithromycin (five-day course; Zithromax Z-pak)	5 to 10 mg per kg once daily, given orally	For patients with penicillin allergy (type 1 hypersensitivity)
Cefdinir (Omnicef)	14 mg per kg per day, given orally in one or two doses	For patients with penicillin allergy, excluding those with urticaria or anaphylaxis to penicillin (i.e., type 1 hypersensitivity)

Agent	Dosage	Comments
Cefpodoxime (Vantin)	30 mg per kg once daily, given orally	For patients with penicillin allergy, excluding those with urticaria or anaphylaxis to penicillin (i.e., type 1 hypersensitivity)
Ceftriaxone (Rocephin)	50 mg per kg once daily, given intramuscularly or intravenously. One dose for initial episode of otitis media, three doses for recurrent infections	For patients with penicillin allergy, persistent or recurrent acute otitis media, or vomiting
Cefuroxime (Ceftin)	30 mg per kg per day, given orally in two divided doses	For patients with penicillin allergy, excluding those with urticaria or anaphylaxis to penicillin (i.e., type 1 hypersensitivity)
Clarithromycin (Biaxin)	15 mg per kg per day, given orally in three divided doses	For patients with penicillin allergy (type 1 hypersensitivity). May cause gastrointestinal irritation
Clindamycin (Cleocin)	30 to 40 mg per kg per day, given orally in four divided doses	For patients with penicillin allergy (type 1 hypersensitivity)
Topical agents†		
Ciprofloxacin/hydrocortisone (Cipro HC Otic)	3 drops twice daily	—
Hydrocortisone/neomycin/polymyxin B (Cortisporin Otic)	4 drops three to four times daily	—
Ofloxacin (Floxin Otic)	5 drops twice daily (10 drops	—

Agent	Dosage	Comments
	in patients older than 12 years)	
Analgesics		
Acetaminophen	15 mg per kg every six hours [corrected]	—
Antipyrine/benzocaine (Auralgan)	2 to 4 drops three to four times daily	—
Ibuprofen (Motrin)	10 mg per kg every six hours	—
Narcotic agents	Variable	May cause gastrointestinal upset, respiratory depression, altered mental status, and constipation

**— these drugs should be given for 10 days, unless otherwise indicated. A five- to seven-day course is an option for patients six years and older. These agents may cause diarrhea, vomiting, abdominal pain, rash, anorexia, and dermatitis.*
†— these drugs should be used for seven to 10 days in patients with chronic suppurative otitis media. Information from references 1, 5, and 25.

Antihistamines may help with nasal allergies, but they may prolong middle ear effusion.
Oral decongestants may be used to relieve nasal congestion.
However, neither antihistamines nor decongestants improve healing or minimize complications of acute otitis media, and they are not routinely recommended.
Corticosteroid use has no benefit in acute otitis media.

Antibiotics.
A meta-analysis of randomized trials found that antibiotics are most beneficial in children younger than two years with bilateral acute otitis media and in children with acute otitis media and otorrhea.
Antibiotics are recommended for all children younger than six months, for those six months to two years of age when the diagnosis is certain, and for all children older than two years with severe infection (defined as moderate to severe otalgia or temperature greater than 102.2° F [39° C]).
Antibiotics may be deferred in otherwise healthy children six months to two years of age with mild otitis in whom the diagnosis is uncertain, and in children older than two years with mild symptoms or in whom the diagnosis is uncertain If this option is chosen, it is mandatory to have a reliable care-giver who will observe the child, recognize signs of serious illness, and be able to access medical care easily.

Antibiotic Selection.
High-dosage amoxicillin (80 to 90 mg per kg per day, divided into two daily doses for 10 days) is recommended as first-line antibiotic therapy in children with acute otitis media.

In children older than six years with mild to moderate disease, a five- to seven-day course is adequate. Amoxicillin is effective, safe, and relatively inexpensive, and it has a narrow microbiologic spectrum.
First-line treatment with amoxicillin is not recommended in children with concurrent purulent conjunctivitis, after antibiotic therapy within the preceding month, in children taking amoxicillin as chemoprophylaxis for recurrent acute otitis media or urinary tract infection, and in children with penicillin allergy.

Cephalosporins may be used in children allergic to penicillin if there is no history of urticaria or anaphylaxis to penicillin. If there is a history of penicillin-induced urticaria or anaphylaxis, a macrolide (e.g., azithromycin [Zithromax], clarithromycin or clindamycin may be used. A single dose of parenteral ceftriaxone (Rocephin, 50 mg per kg) may be useful in children with vomiting or in whom compliance is a concern. Single-dose azithromycin is safe and effective in uncomplicated acute otitis media and compares well with longer courses of azithromycin or other antibiotics.

Persistent Acute Otitis Media.
If there is no clinical improvement within 48 to 72 hours, the patient must be reassessed to confirm the diagnosis, exclude other causes of illness, and initiate antibiotic therapy in those on symptomatic treatment alone.
Patients who are already taking antibiotics should be changed to second-line therapy. Options include high-dose amoxicillin/clavulanate (Augmentin), cephalosporins, and macrolides. Parenteral ceftriaxone administered daily over three days is useful in children with emesis or resistance to amoxicillin/clavulanate. For children who do not respond to second-line antibiotics, clindamycin and tympanocentesis are appropriate options. Although it is not approved for use in children, levofloxacin (Levaquin) is effective in children who have persistent or recurrent acute otitis media.

Computed tomography (CT) is useful if bony extension is suspected. Magnetic resonance imaging is superior to CT in evaluating potential intracranial complications.

Recurrent Acute Otitis Media.
Most children with recurrent acute otitis media improve with watchful waiting. Although antibiotic prophylaxis may reduce recurrence, there are no widely accepted recommendations for antibiotic choice or prophylaxis duration. Minimizing risk factors (e.g., exposure to cigarette smoke, pacifier use, bottle feeding, daycare attendance) decreases recurrence.
Heptavalent pneumococcal vaccine (Prevnar) reduces the incidence of acute otitis media, but it does not reduce recurrence.

Otitis Media with Effusion
Persistent middle ear effusion after resolution of acute otitis media does not indicate treatment failure and requires only monitoring and reassurance. Risk factors for persistent acute otitis media with effusion include hearing loss greater than 30 dB, prior tympanostomy tube placement, adenoid hypertrophy, and onset during summer or fall.

Clinical examination, pneumatic otoscopy, and tympanometry may be performed during the observation period. There is no role for antihistamines and decongestants; adverse effects include insomnia, hyperactivity, drowsiness, behavioral changes, and labile blood pressure. Oral and topical intranasal corticosteroids alone or in combination with an antibiotic produce faster short-term resolution of otitis media with effusion, but there is no evidence of long-term benefit. Autoinflation (i.e., opening the eustachian tube by raising intranasal pressure) is useful in older children with persistent acute otitis media with effusion who are able to perform the Valsalva maneuver.
Children older than two years who have otitis media with effusion and no developmental issues must be seen at three- to six-month intervals until effusion resolves, hearing loss is identified, or structural abnormalities of the tympanic membrane or middle ear are suspected. Hearing and language testing is recommended in patients with suspected hearing loss or persistent effusion for at least three months, or when developmental problems are identified. Children with hearing loss of 20 dB or less who do not have speech, language, or developmental problems can be observed. Those with hearing loss

of 21 to 39 dB can be observed or referred for surgery, and those with hearing loss of 40 dB or more should be referred for surgery.
Tympanostomy with ventilation tube insertion is the preferred initial procedure. Meta-analyses of randomized controlled trials evaluating the effect of ventilation on hearing, effusion duration, language development, cognition, behavior, and quality of life show that benefits in children are marginal at best. Ventilation tubes may be more beneficial in young children in an environment with a high infection load (e.g., children attending daycare) and in older children with hearing loss of 25 dB or greater in both ears for at least 12 weeks. Adenoidectomy may be considered in children who have recurrent otitis media with effusion after tympanostomy (20 to 50 percent of children) if chronic adenoiditis is present or if adenoidal hypertrophy causes nasal obstruction. Tonsillectomy does not improve outcomes. Complications of tympanostomy include transient and persistent otorrhea, tympanosclerosis, atrophy, perforation of the tympanic membrane, and cholesteatoma. A mild conductive hearing loss may also occur as a result of changes in the tympanic membrane. Topical antibiotics (e.g., quinolones, aminoglycosides, polymyxins) are more effective than systemic antibiotics in clearing the infection in patients with chronic suppurative otitis media; topical quinolones are preferred. Nonquinolone antibiotics may produce ototoxicity and vestibular dysfunction, but these complications are unlikely with short-term use. Oral or parenteral antibiotics are useful in patients with systemic sepsis or inadequate response to topical antibiotics. They should be selected on the basis of culture and sensitivity results. Tympanoplasty (using a soft-tissue graft), with reconstruction of the ossicular chain if necessary, is an option in patients with chronic perforation and hearing loss. Mastoidectomy is often recommended for patients with chronic mastoiditis.

Complications

The overall incidence of complications from otitis media is extremely low; infratemporal and intracranial complications occur in one in 100,000 children and in one in 300,000 adults per year. Patients with middle ear effusion may have persistent or fluctuating conductive hearing loss (loss of about 25 dB). Children with chronic middle ear effusion score lower on tests of speech, language, and cognitive abilities. Central perforation of the eardrum may cause chronic infection in the middle ear and mastoid cavity. Acute mastoiditis (i.e., pus in the mastoid air cells) may erode through the bone, forming a subcutaneous collection of pus (Bezold's abscess). Contiguous spread or hematogenous seeding may infect the inner ear, petrous portion of the temporal bone, meninges, and the brain. Mastoiditis and intracranial complications of acute otitis media are more common in developing countries where persons have limited access to medical care.
Mild to moderate conductive hearing loss occurs in one half of children with chronic suppurative otitis media, and extracranial and intracranial complications may also develop. Meningitis is the most serious intracranial complication.

Otitis Media in Adults

Adults make up less than 20 percent of patients presenting with acute otitis media.
H. influenza and S. pneumoniae are common bacterial isolates in these patients. Compared with children, adults more often present with otalgia, ear drainage, diminished hearing, and sore throat. Opacity and redness of the tympanic membrane are equally common in children and adults. Guidelines for antibiotic use are the same in children and adults. Smoking should be discouraged. Nasal and oral steroids may be beneficial in patients with persistent acute otitis media and associated allergies. Adults with unilateral middle ear effusion lasting longer than two months should undergo imaging studies to rule out intracranial neoplasm, especially if the effusion is associated with cranial nerve palsy.

Audit support for respiratory tract infections Antibiotic Prescribing

Clinical criteria for respiratory tract infections – antibiotic prescribing

Criterion 1	**Percentage of adults and children who present with a history suggestive of the following conditions offered a clinical assessment at the first face-to-face contact:** **1. acute otitis media** **2. acute sore throat/acute pharyngitis/acute tonsillitis** **3. common cold** **4. acute rhinosinusitis** **5. acute cough/acute bronchitis**
Exceptions	None
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments
Standard	100%
Definitions	Children are defined as being 3 months or older. The clinical assessment should include a history (presenting symptoms, use of over-the-counter or self medication, previous medical history, relevant risk factors, relevant comorbidities) and, if indicated, an examination to identify relevant clinical signs.
Criterion 2a	**Patients with the following conditions should have a no antibiotic or delayed antibiotic prescribing strategy negotiated:** **1. acute otitis media** **2. acute sore throat/acute pharyngitis/acute tonsillitis** **3. common cold** **4. acute rhinosinusitis** **5. acute cough/acute bronchitis**
Exceptions	A – Those subgroups in Criterion 2b: 1. bilateral acute otitis media in children younger than 2 years 2. acute otitis media in children with otorrhoea 3. acute sore throat/acute pharyngitis/acute tonsillitis when three or more Centor criteria are present
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	None

Criterion 2b	**Patients in the following subgroups can be considered for an immediate antibiotic prescribing strategy (in addition to a no antibiotic prescribing or a delayed antibiotic prescribing strategy), dependent upon clinical severity:** **1. bilateral acute otitis media in children younger than 2 years** **2. acute otitis media in children with otorrhoea** **3. acute sore throat/acute pharyngitis/acute tonsillitis when three or more Centor criteria are present**
Exceptions	B – Patient declines
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	Centor criteria are: presence of tonsillar exudate, tender anterior cervical lymphadenopathy or lymphadenitis, history of fever and an absence of cough.
Criterion 3	**Patients (both adults and children) in the following situations should be offered an immediate prescription and/or further appropriate investigation and management:** **1. if the patient is systemically very unwell** **2. if the patient has symptoms and signs of suggestive of serious illness and/or complications** **3. if the patient is at high risk of serious complications because of pre-existing comorbidity** **if the patient is older than 65 years with acute cough and two or more of the following criteria or older than 80 years with acute cough and one or more of the following criteria:** **1. hospitalisation in previous year** **2. type 1 or type 2 diabetes** **3. history of congestive heart failure** **4. current use of oral glucocorticoids.**
Exceptions	None
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	None

Criterion 4	**When the no antibiotic prescribing strategy is adopted, patients should be offered:** **1. reassurance that antibiotics are not needed immediately** **2. a clinical review if the condition worsens or becomes prolonged.**
Exceptions	None
Settings	Primary care and community settings including general practices, community pharmacies, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	None
Criterion 5	**When the delayed antibiotic prescribing strategy is adopted, patients should be offered:** **1. reassurance that antibiotics are not needed immediately** **2. advice about using the delayed prescription if symptoms do not settle or get significantly worse** **3. advice about re-consulting if symptoms get significantly worse despite using the delayed prescription.**
Exceptions	None
Settings	Primary care and community settings including general practices, community pharmacies, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	None
Criterion 6	**Patients should, regardless of which antibiotic strategy is agreed, be given advice about:** **1. the usual natural history of the illness** **2. managing symptoms, including fever.**
Exceptions	None
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	Advice about the natural history of the illness should include the total length of the illness (before and after seeing the doctor)
Criterion 7	**Percentage of patients offered evidence-based written information about:** **1. their illness or condition** **2. the treatment and care they should be offered, for example, the 'Understanding NICE guidance' booklet** **3. the service providing their treatment and care.**

Exceptions	None
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	Patients should be offered written information to help them make informed decisions about their healthcare. This should cover the condition, treatments and the health service providing care. Information should be available in formats appropriate to the individual, taking into account language, age, and physical, sensory or learning disabilities.
Criterion 8	**Percentage of carers offered evidence-based written information about:** **4. the patient's illness or condition** **5. the treatment and care the patient should be offered, for example, the 'Understanding NICE guidance' booklet** **1. the service providing the patient's treatment and care.**
Exceptions	C – Where there is no carer involved D–- Where sharing information may compromise the patient's confidentiality or wishes
Settings	Primary care and community settings including general practices, NHS walk-in centres, NHS out-of-hours services and primary medical and nursing care provided in emergency departments.
Standard	100%
Definitions	Carers and relatives should have the opportunity to be involved in decisions about the patient's care and treatment, unless the patient specifically excludes them.
Number of criterion replaced:	**Local alternatives to above criteria (to be used where other data addressing the same issue are more readily available)**
Exceptions	
Settings	
Standard	
Definitions	

AUDIT FORM

Complete one form for each patient. For definitions of the standards, please refer to the audit criteria and/or NICE guideline.

Patient identifier:	**Sex:** M / F	**Age:**	**Ethnicity:**

No.		**Standard**	**Yes**	**No**	**NA/ Exceptions**	**NICE guideline ref.**
Assessment and Treatment						
1		Patient presenting with a history suggestive of the following conditions:				1.1.1
	1.1	1. acute otitis media 2. acute sore throat/acute pharyngitis/ acute tonsillitis 3. common cold 4. acute rhinosinusitis 5. acute cough/acute bronchitis	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐		
	1.2 1.3	Was a clinical assessment offered? Did the clinical assessment include: 1. presenting symptoms 2. use of over-the-counter/self medication 3. previous medical history 4. risk factors 5. comorbidities 6. examination to identify relevant clinical signs (Data source: patient records/care pathway)	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐	

No.		Standard	Yes	No	NA/ Exceptions	NICE guideline ref.
2a & 2b	2.1	Was the patient diagnosed with any of the following conditions: 1. acute otitis media 2. acute sore throat/acute pharyngitis/acute tonsillitis 3. common cold 4. acute rhinosinusitis 5. acute cough/acute bronchitis	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	**A**	1.1.3
		Was the patient in any of the following subgroups: 1. bilateral acute otitis media in children younger than 2 years 2. acute otitis media in children with otorrhoea	☐ ☐	☐ ☐	**B**	
		Did the patient have any of the following Centor criteria present: 1. tonsillar exudate 2. tender lymphadenopathy or lymphadenitis 3. history of fever 4. absence of cough	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐		
	2.2	Did the patient agree a: 1. no antibiotic prescribing strategy 2. delayed antibiotic prescribing strategy 3. immediate antibiotic prescribing strategy (Data source: patient records/care pathway)	☐ ☐ ☐	☐ ☐ ☐		

No.		Standard	Yes	No	NA/ Exceptions	NICE guideline ref.
3	3.1	Was the patient in any of the following situations: 1. systemically very unwell ☐ ☐ 2. have symptoms and signs of serious illness ☐ ☐ 3. have symptoms and signs of serious complications ☐ ☐ 4. at high risk of serious complications because of pre-existing comorbidity ☐ ☐ 5. older than 65 years with acute cough ☐ ☐ 6. older than 80 years with acute cough ☐ ☐ Did the patient have any of the following criteria: 1. hospitalisation in previous year ☐ ☐ 2. type 1 or type 2 diabetes ☐ ☐ 3. history of congestive heart failure ☐ ☐ 4. current use of oral glucocorticoids ☐ ☐				1.1.7
	3.2	Was the patient offered: 1. an immediate prescription ☐ ☐ 2. further investigation/management ☐ ☐ (Data source: patient records/care pathway)				
4		Were patients who agreed the no antibiotic prescribing strategy offered:				1.1.5
	4.1 4.2	1. reassurance that antibiotics are not needed immediately ☐ ☐ 2. a clinical review if condition worsens or becomes prolonged ☐ ☐ (Data source: patient records/care pathway)				
5		Were patients who agreed the delayed antibiotic prescribing strategy offered:				1.1.6

No.		Standard	Yes	No	NA/ Exceptions	NICE guideline ref.
	5.1 5.2	1. reassurance that antibiotics are not needed immediately 2. advice about using the delayed prescription if symptoms do not settle or get significantly worse 3. advice about re-consulting if symptoms get significantly worse despite using the delayed prescription (Data source: patient records/care pathway)	☐ ☐ ☐	☐ ☐ ☐		
Specific patient advice						
6	6.1	Was the patient given advice on: 1. the usual natural history of illness 2. managing symptoms, including fever (Data source: patient records/care pathway)	☐ ☐	☐ ☐		1.1.4
Person-centred care						
7		Was the patient offered evidence-based written information about:				Person-centred care
	7.1	1. their illness or condition	☐	☐		
	7.2	2. the treatment and care they should be offered	☐	☐		
	7.3	3. for example, the 'Understanding NICE guidance' booklet	☐	☐		
	7.4	4. the service providing their treatment and care.	☐	☐		
		(Data source: patient records/care pathway)				
8		Were carer(s) offered evidence-based written information about:			**C / D**	Person-centred care

No.		Standard	Yes	No	NA/ Exceptions	NICE guid eline ref.
	8.1	1. the patient's illness or condition	☐	☐		
	8.2	2. the treatment and care the patient should be offered	☐	☐		
	8.3	3. for example, the 'Understanding NICE guidance' booklet	☐	☐		
	8.4	4. the service providing the patient's treatment and care.	☐	☐		
		(Data source: patient records/care pathway)				

REFERENCES

Medicines complete https://www.medicinescomplete.com/

Royal College of General Practitioners - Official Site
TARGET Antibiotics Toolkit
http://www.rcgp.org.uk/clinical-and-research/target-antibiotics-toolkit.aspx

National Institute for Health and Care Excellence-http://www.nice.org.uk/
Respiratory tract infections – antibiotic prescribing: Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care-NICE:
https://www.nice.org.uk/guidance/cg69

Practice Guidelines-AAFP
Guidelines for the Diagnosis and Management of Rhinosinusitis in Adults:
http://www.aafp.org/afp/2007/1201/p1718.html

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http://www.aafp.org/afp/2007/1201/p1650.html#

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http://www.aafp.org/afp/2011/1215/p1390.html

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