

Treatment of the Common Cold

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The common cold is a viral illness that affects persons of all ages, prompting frequent use of over-the-counter and prescription medications and alternative remedies. Treatment focuses on relieving symptoms (e.g., cough, nasal congestion, rhinorrhea). Dextromethorphan may be beneficial in adults with cough, but its effectiveness has not been demonstrated in children and adolescents. Codeine has not been shown to effectively treat cough caused by the common cold. Although hydrocodone is widely used and has been shown to effectively treat cough caused by other conditions, the drug has not been studied in patients with colds. Topical (intranasal) and oral nasal decongestants have been shown to relieve nasal symptoms and can be used in adolescents and adults for up to three days. Antihistamines and combination antihistamine/decongestant therapies can modestly improve symptoms in adults; however, the benefits must be weighed against potential side effects. Newer non-sedating antihistamines are ineffective against cough. Topical ipratropium, a prescription anticholinergic, relieves nasal symptoms in older children and adults. Antibiotics have not been shown to improve symptoms or shorten illness duration. Complementary and alternative therapies (i.e., Echinacea, vitamin C, and zinc) are not recommended for treating common cold symptoms; however, humidified air and fluid intake may be useful without adverse side effects. Vitamin C prophylaxis may modestly reduce the duration and severity of the common cold in the general population and may reduce the incidence of the illness in persons exposed to physical and environmental stresses. (*Am Fam Physician* 2007;75:515-20, 522. Copyright © 2007 American Academy of Family Physicians.)

► Patient information:

A handout on the common cold, written by the authors of this article, is provided on page 522.

► See related editorial on page 476.

Acute upper respiratory infection is the second most common diagnosis in physician offices¹ and the most common discharge diagnosis in emergency departments.² A survey revealed that almost one fourth of U.S. adults had taken a cough or cold medication with or without a sedating antihistamine in the preceding week.³ Prevention of colds and influenza and “immune boosting” were among the top 10 reasons participants took vitamins and herbal supplements.³ A survey conducted by the Centers for Disease Control and Prevention showed that, in 1991, two thirds of three-year-olds had taken cough or cold medicine in the preceding 30 days.⁴ Because colds are common presentations in physician offices, and cough and cold remedies are used almost universally, it is important that physicians know the evidence (*Table 1*⁵⁻⁹ and *Table 2*^{5,6,10}) that supports or refutes the use of these medications.¹¹

The literature on the common cold is extensive, but it is inconsistent in its rigor. Among the numerous studies, the clinical

definition often is unclear or variable, natural and experimental colds are evaluated, and age ranges are sometimes broad and variable. Furthermore, the number of participants often is small, interventions vary from individual to combination medications, compliance often is not addressed, single or multiple symptom outcomes are used, and outcomes are subjectively reported in some studies and objectively reported in others. Not surprisingly, there is great heterogeneity among the results. These limitations in the literature limit the ability to make confident and specific recommendations about treatments. For clinical purposes, the literature on traditional pharmacologic treatment is best summarized by making separate recommendations for cough alone and for congestion and rhinorrhea. For complementary and nonpharmacologic treatments, the literature addresses more global outcomes.

Epidemiology and Clinical Presentation

The common cold is caused by various respiratory viruses, most commonly a rhinovirus.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendation</i>	<i>Evidence rating</i>	<i>References</i>
Antibiotics are not recommended for treatment of the common cold in children or adults.	A	14, 15
Dextromethorphan (Delsym) is a treatment option for adults with cough caused by the common cold.	B	5, 19
Topical (intranasal) or oral nasal decongestants, used for up to three days, is a treatment option for adolescents and adults.	B	7, 8, 30
Topical ipratropium (Atrovent) is a treatment option for nasal congestion in children older than six years and in adults, although it is expensive.	B	9
Codeine (Robitussin AC) and other narcotics, dextromethorphan (Delsym), antihistamines, and combination antihistamine/decongestants are not recommended to treat cough or other cold symptoms in children.	B	5-7, 10, 17
Older first-generation antihistamines and combination antihistamine/decongestants are treatment options for cough and cold symptoms in adults if the benefits outweigh the adverse effects.	B	6
Among available complementary treatments, vitamin C prophylaxis may decrease the severity and duration of cold symptoms; however, vitamin C, zinc, and Echinacea are not recommended for active treatment.	B	31-34, 36

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, see page 453 or <http://www.aafp.org/afpsort.xml>.

Adults have an average of two to four episodes annually, and young children may have as many as six to eight episodes. A common cold is characterized by sore throat, malaise, and low-grade fever at onset. These symptoms resolve within a few days and are followed by nasal congestion, rhinorrhea, and cough within 24 to 48 hours after onset of the first symptoms. The second set of symptoms are what prompt most patients to see a physician for relief.¹ Symptoms usually peak around day 3 or 4 and begin to resolve by day 7.¹² Nasal discharge, appearing at the peak of illness, can become thick and purulent and may be misdiagnosed as a bacterial sinus infection.¹³

Traditional Pharmacologic Therapy

Because there are no effective antivirals to cure the common cold and few effective measures to prevent it, treatment should focus on symptom relief. The most commonly used treatments include over-the-counter antihistamines, decongestants, cough suppressants, and expectorants. These treatments can be used alone or in combination.

Although a cold is a viral illness, antibiotics often are inappropriately prescribed to patients, even when bacterial complications (e.g., pneumonia, bacterial sinusitis) are not present. Studies of antibiotics for the treatment of the common cold focus on cure rate, symptom persistence, prevention of secondary bacterial complications, and adverse effects. Systematic reviews have shown

that antibiotics have no role in the treatment of the common cold.^{14,15} This is because antibiotics are ineffective at reducing symptom duration or severity and because of the risk of adverse gastrointestinal effects, cost of treatment, and increased resistance of bacteria to antibiotics.^{14,15}

COUGH

A Cochrane review showed that there is a lack of good evidence to determine the effectiveness of any over-the-counter product at reducing the frequency or severity of cough in children or adults.⁵ Some authors explicitly recommend against the use of these medications.^{16,17} The American College of Chest Physicians guideline does not recommend centrally acting cough suppressants (e.g., codeine [Robitussin AC], dextromethorphan [Delsym]) for cough secondary to upper respiratory tract infection.¹⁸

Despite these conclusions, two of the three studies included in the Cochrane review suggest that dextromethorphan provides a modest clinical benefit.^{5,19} One of these studies (a meta-analysis) showed a reduction in the frequency and severity of cough for persons 18 years or older without significant adverse effects.¹⁹ The average treatment difference was 12 to 17 percent in favor of dextromethorphan for cough bouts, cough components, and cough effort.¹⁹

One study included in the Cochrane review showed

that combination antihistamine/decongestant medications have a modest benefit but with significantly increased adverse effects. In contrast, newer-generation, nonsedating antihistamines do not effectively reduce cough.¹⁸ Because of the conflicting evidence, physicians must weigh the risks and benefits of dextromethorphan or combination antihistamine/decongestant medications (Table 3^{11,20}).

No medication available in the United States has been shown to effectively treat cough in children.^{5,10} Although clinical trials have reported a low incidence of minor

adverse effects, anecdotal reports of serious adverse effects and dosing errors have prompted the American Academy of Pediatrics and other experts to caution against the use of these preparations in children.²¹⁻²⁴

There also is little evidence to support the use of codeine and its derivative hydrocodone (Hycodan) to relieve cough caused by the common cold in adults and children.⁵ One small study of codeine use in children²⁵ and two small studies in adults^{26,27} failed to show a benefit. Hydrocodone commonly is prescribed for suppression of cold-related acute cough. There are no studies of hydrocodone use in patients with the common cold, although the drug's effectiveness has been demonstrated in patients with other conditions.^{28,29}

TABLE 1
Overview of the Evidence for Cold Therapies in Adults

Therapy	Study findings
Cough (one Cochrane review [17 studies])⁵	
Antihistamine/decongestant combination	Two studies: one showed benefit with unfavorable side effects; one showed no benefit
Antihistamines	Three studies: no benefit
Codeine (Robitussin AC)	Two studies: no benefit
Dextromethorphan (Delsym)	Three studies: two showed benefit; one showed no benefit
Dextromethorphan plus salbutamol*	One study: limited benefit with unfavorable side effects
Guaifenesin (Mucinex)	Two studies: one showed benefit; one showed no benefit
Moguisteine*	One study: very limited benefit
Mucolytic (e.g., Bisolvon linctus*)	One study: benefit
Congestion and rhinorrhea (two Cochrane reviews [30 studies]^{6,7}; two RCTs^{8,9})	
Antihistamine/decongestant combination	Seven studies: five showed some benefit for nasal obstruction; two showed no benefit Six studies: five showed some benefit for rhinorrhea; one showed no benefit
Antihistamines	Five studies: no benefit for nasal obstruction Seven studies: benefit for rhinorrhea (first-generation antihistamines only)
Intranasal ipratropium (Atrovent)	One study: benefit
Oral or topical decongestants (single dose)	Four studies: benefit for nasal obstruction
Oral decongestants (repeated doses)	Two studies: one showed benefit for nasal obstruction; one showed no benefit

RCT = randomized controlled trial.

*—Not available in the United States.

Information from references 5 through 9.

NASAL CONGESTION AND RHINORRHEA

Several mechanisms can cause cold-related nasal congestion and rhinorrhea.¹² Although these mechanisms differ from those that cause allergy-related symptoms, antihistamines remain a popular therapy for the common cold.

Although some randomized controlled trials (RCTs) of older first-generation antihistamines have shown positive results for certain end points, a Cochrane review concluded that antihistamines do not alleviate cold-related sneezing or nasal symptoms to a clinically significant degree and do not affect subjective improvement in children or adults.⁶ Even if a slight clinical benefit exists, there are risks and adverse effects, especially with first-generation antihistamines.¹¹ Therefore, antihistamine monotherapy is not recommended for children and should be used cautiously in adults.

Although a first-generation oral antihistamine and decongestant combination may have some effect on nasal obstruction, rhinorrhea, and sneezing in adolescents and adults, studies generally are of poor quality, and effects are small and may not be clinically significant. Antihistamine/decongestant treatment has not been shown to benefit young children.⁶

Two systematic reviews have examined the use of nasal decongestants.^{7,30} The reviews included four trials that studied the short-term benefits of a single-

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dose topical (intranasal) or oral decongestant and one trial that studied the effects of repeated dosing. The single-dose decongestant had a moderate short-term benefit for adolescents and adults with nasal congestion. Although a repeated dose of oral pseudoephedrine (Sudafed) over five days had no benefit,^{7,30} another clinical trial showed that a 60-mg dose repeated four times a day over three days improved nasal airway resistance and subjective scores in adults.⁸ Given these findings, the use of topical or oral decongestants for a few days is reasonable and consistent with standard practice. Studies of single-ingredient decongestants have not included children younger than 12 years, and there have been anecdotal reports of serious toxicity in young children using oral decongestants.²³

Finally, a recent study supports the use of topical ipratropium (Atrovent) for rhinorrhea caused by perennial rhinitis and the common cold.⁹ However, it is expensive, requires a prescription, and is approved only for children older than six years.

Complementary and Alternative Therapies

Nontraditional complementary and alternative therapies used for the common cold include Echinacea, vitamin C, zinc, and humidified air and fluid intake.

ECHINACEA

A Cochrane review concluded that, despite some studies that showed benefit, there is no solid evidence that Echinacea products effectively treat or prevent the common cold.³¹ The review cited concerns about publication bias (i.e., positive studies were more likely to be published), poor study quality, and variability of study results.³¹

Two well-conducted studies showed no benefit from *Echinacea angustifolia* root³² or the aerial portion of *Echinacea purpurea*.³³ Because three species are available for medical use, plant parts used and extraction methods differ, and some preparations contain additional ingredients, it is difficult to make specific product or dosage recommendations.

VITAMIN C

A Cochrane review showed that taking 200 mg or more of vitamin C daily does not significantly decrease symptom severity or duration when initiated after the onset of cold symptoms.³⁴

Data regarding prophylactic use of vitamin C are more varied. Thirty trials involving 9,676 cold episodes showed a statistically significant decrease in illness duration with vitamin C taken before onset of symptoms: an 8 percent decrease (95% confidence interval [CI], 3 to 13 percent) in adults and a 13.5 percent decrease (95% CI, 5 to 21 percent) in children.³⁴ Likewise, 15 trials involving 7,045 cold episodes demonstrated a decrease in severity scores and in days confined to the home.³⁴ Vitamin C did not decrease the incidence of cold in the general population. However, a subgroup of six trials involving runners, skiers, and soldiers participating in subarctic exercises demonstrated a 50 percent relative reduction in the risk of developing a cold (95% CI, 32 to 62 percent).³⁴

ZINC

The use of zinc has been shown to inhibit viral growth, and an RCT suggested that zinc could reduce the duration of cold symptoms.³⁵ However, this has not been substantiated in subsequent RCTs.³⁶ Specifically, four of eight subsequent trials showed no benefit, and the other four may have been biased by the patients' ability to recognize the adverse effects of zinc.³⁶ Because of these inconsistent study results, zinc cannot be recommended.

TABLE 2

Overview of the Evidence for Cold Therapies in Children

Therapy	Study findings
Cough (Cochrane review [seven studies]⁵; one RCT¹⁰)	
Antihistamines	Two studies: no benefit
Antihistamine/decongestant combination	Two studies: no benefit
Codeine plus guaifenesin (Robitussin AC)	One study: no benefit
Dextromethorphan (Delsym)	Two studies: no benefit
Dextromethorphan plus guaifenesin (Robitussin DM)	One study: no benefit
Dextromethorphan plus salbutamol*	One study: no benefit
Mucolytic (e.g., Letosteine*)	One study: benefit
Other combinations	One study: no benefit
Congestion and rhinorrhea (Cochrane reviews [four studies]⁶)	
Antihistamines	Two studies (one using astemizole†): benefit
Antihistamine/decongestant combination	Two studies: no benefit
Decongestants	No studies

RCT = randomized controlled trial.

*—Not available in the United States.

†—Withdrawn from U.S. market in 1999.

Information from references 5, 6, and 10.

TABLE 3
Adverse Effects Associated with Cold Therapies

Therapy	Adverse effects
Antihistamines	Arrhythmia, blurred vision, dizziness, dry mouth, hallucinations, heart block, paradoxical excitability, respiratory depression, sedation, tachycardia, urinary retention
Decongestants	Oral: agitation, anorexia, dysrhythmia, dystonic reactions, headache, hypertension, irritability, nausea, palpitations, seizure, sleeplessness, tachycardia, vomiting Topical: drying of nasal membranes, nosebleeds, rebound nasal congestion
Dextromethorphan (Delsym)	Confusion, excitability, gastrointestinal disturbances, irritability, nervousness, sedation

NOTE: Adverse effects may be more significant in young children and older adults.

Information from references 11 and 20.

HUMIDIFIED AIR AND FLUID INTAKE

Studies of Rhinotherm (an apparatus that delivers humidified air at a controlled temperature of about 104 to 116.6°F [40 to 47°C]) have had conflicting results despite using similar equipment and methodology.³⁷ Because of these inconsistent results and the lack of universal access to this equipment, Rhinotherm cannot be recommended. However, except for the theoretical risks associated with fluid intake,³⁸ humidified air and fluid intake are considered benign and possibly beneficial for the relief of common cold symptoms.¹¹

DATA SOURCES: For this article, the authors searched the Cochrane Database of Systematic Reviews, Medline (1996 to 2005), the Cochrane Registry of Clinical Trials (2003 to 2005), BMJ's *Clinical Evidence Concise*, the National Guidelines Clearinghouse, the Institute for Clinical Systems Improvement, the Database of Abstracts of Reviews of Effectiveness, and EMBASE (2001 to 2005). The search was limited to English-language systematic reviews and randomized controlled trials, and recommendations were limited to products available in the United States.

Members of various family medicine departments develop articles for "Clinical Pharmacology." This is one in a series coordinated by Allen F. Shaughnessy, Pharm.D., and Andrea E. Gordon, M.D., Tufts University Family Medicine Residency, Malden, Mass.

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Author disclosure: Nothing to disclose.

REFERENCES

- Woodwell DA, Cherry DK. National ambulatory medical care survey: 2002 summary. *Adv Data* 2004;346:1-44.
- McCaig LF, Burt CW. National hospital ambulatory medical care survey: 2002 emergency department summary. *Adv Data* 2004;340:1-34.
- Kaufman DW, Kelly JP, Rosenberg L, Anderson TE, Mitchell AA. Recent patterns of medication use in the ambulatory adult population of the United States: the Slone survey. *JAMA* 2002;287:337-44.
- Kogan MD, Pappas G, Yu SM, Kotelchuck M. Over-the-counter medication use among US preschool-age children. *JAMA* 1994;272:1025-30.
- Schroeder K, Fahey T. Over-the-counter medications for acute cough in children and adults in ambulatory settings. *Cochrane Database Syst Rev* 2004;(4):CD001831.
- Sutter AI, Lemiengre M, Campbell H, Mackinnon HF. Antihistamines for the common cold. *Cochrane Database Syst Rev* 2003;(3):CD001267.
- Taverner D, Latte J, Draper M. Nasal decongestants for the common cold. *Cochrane Database Syst Rev* 2004;(3):CD001953.
- Eccles R, Jawad MS, Jawad SS, Angello JT, Druce HM. Efficacy and safety of single and multiple doses of pseudoephedrine in the treatment of nasal congestion associated with common cold. *Am J Rhinol* 2005;19:25-31.
- Hayden FG, Diamond L, Wood PB, Korts DC, Wecker MT. Effectiveness and safety of intranasal ipratropium bromide in common colds. A randomized, double-blind, placebo-controlled trial. *Ann Intern Med* 1996;125:89-97.
- Paul IM, Yoder KE, Crowell KR, Shaffer ML, McMillan HS, Carlson LC, et al. Effect of dextromethorphan, diphenhydramine, and placebo on nocturnal cough and sleep quality for coughing children and their parents. *Pediatrics* 2004;114:E85-90. Accessed July 25, 2006, at: <http://pediatrics.aappublications.org/cgi/content/full/114/1/e85>.
- Montauk SL. Appropriate use of common OTC analgesics and cough and cold medications. Leawood, Kan.: American Academy of Family Physicians, 2002. Accessed July 24, 2006, at: <http://www.aafp.org/afp/otcmonograph/index.html>.
- Heikkinen T, Jarvinen A. The common cold. *Lancet* 2003;361:51-9.
- American Academy of Pediatrics. Subcommittee on Management of Sinusitis and Committee on Quality Improvement. Clinical practice guideline: management of sinusitis [Published corrections appear in *Pediatrics* 2001;108:A24, *Pediatrics* 2002;109:40]. *Pediatrics* 2001;108:798-808.
- Arroll B, Kenealy T. Antibiotics for the common cold and acute purulent rhinitis. *Cochrane Database Syst Rev* 2005;(3):CD000247.
- Fahey T, Stocks N, Thomas T. Systematic review of the treatment of upper respiratory tract infection. *Arch Dis Child* 1998;79:225-30.
- Schroeder K, Fahey T. Systematic review of randomised controlled trials of over the counter cough medicines for acute cough in adults. *BMJ* 2002;324:329-31.
- Schroeder K, Fahey T. Should we advise parents to administer over the counter cough medicines for acute cough? Systematic review of randomised controlled trials. *Arch Dis Child* 2002;86:170-5.
- Irwin RS, Baumann MH, Bolser DC, Boulet LP, Braman SS, Brightling CE, et al. American College of Chest Physicians. Diagnosis and

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- management of cough executive summary: ACCP evidence-based clinical practice guidelines. *Chest* 2006;129(1 suppl):15-23S.
19. Pavesi L, Subburaj S, Porter-Shaw K. Application and validation of a computerized cough acquisition system for objective monitoring of acute cough: a meta-analysis. *Chest* 2001;120:1121-8.
 20. Kelly LF. Pediatric cough and cold preparations. *Pediatr Rev* 2004;25:115-23.
 21. Gadowski A. Rational use of over-the-counter medications in young children. *JAMA* 1994;272:1063-4.
 22. Gadowski A, Horton L. The need for rational therapeutics in the use of cough and cold medicine in infants. *Pediatrics* 1992;89(4 pt 2):774-6.
 23. Gunn VL, Taha SH, Liebelt EL, Serwint JR. Toxicity of over-the-counter cough and cold medications. *Pediatrics* 2001;108:E52. Accessed July 25, 2006, at: <http://pediatrics.aappublications.org/cgi/content/full/108/3/e52>.
 24. American Academy of Pediatrics. Committee on Drugs. Use of codeine- and dextromethorphan-containing cough remedies in children. *Pediatrics* 1997;99:918-20.
 25. Taylor JA, Novack AH, Almquist JR, Rogers JE. Efficacy of cough suppressants in children. *J Pediatr* 1993;122(5 pt 1):799-802.
 26. Eccles R, Morris S, Jawad M. Lack of effect of codeine in the treatment of cough associated with acute upper respiratory tract infection. *J Clin Pharm Ther* 1992;17:175-80.
 27. Freestone C, Eccles R. Assessment of the antitussive efficacy of codeine in cough associated with common cold. *J Pharm Pharmacol* 1997;49:1045-9.
 28. Homsí J, Walsh D, Nelson KA, Sarhill N, Rybicki L, Legrand SB, et al. A phase II study of hydrocodone for cough in advanced cancer. *Am J Hosp Palliat Care* 2002;19:49-56.
 29. Stolz D, Chhajed PN, Leuppi JD, Brutsche M, Pflimlin E, Tamm M. Cough suppression during flexible bronchoscopy using combined sedation with midazolam and hydrocodone: a randomised, double blind, placebo controlled trial. *Thorax* 2004;59:773-6.
 30. Del Mar C, Glasziou P. Upper respiratory tract infection. *Clin Evid* 2003;10:1747-56.
 31. Linde K, Barrett B, Wölkart K, Bauer R, Melchart D. Echinacea for preventing and treating the common cold. *Cochrane Database Syst Rev* 2006;(1):CD000530.
 32. Turner RB, Bauer R, Woelkart K, Hulseley TC, Gangemi JD. An evaluation of *Echinacea angustifolia* in experimental rhinovirus infections. *N Engl J Med* 2005;353:341-8.
 33. Yale SH, Liu K. *Echinacea purpurea* therapy for the treatment of the common cold: a randomized, double-blind, placebo-controlled clinical trial. *Arch Intern Med* 2004;164:1237-41.
 34. Douglas RM, Hemila H, D'Souza R, Chalker EB, Treacy B. Vitamin C for preventing and treating the common cold. *Cochrane Database Syst Rev* 2004;(4):CD000980.
 35. Eby GA, Davis DR, Halcomb WW. Reduction in duration of common colds by zinc gluconate lozenges in a double-blind study. *Antimicrob Agents Chemother* 1984;25:20-4.
 36. Marshall I. Zinc for the common cold. *Cochrane Database Syst Rev* 1999;(2):CD001364.
 37. Singh M. Heated, humidified air for the common cold. *Cochrane Database Syst Rev* 2004;(2):CD001728.
 38. Guppy MP, Micksan SM, Del Mar CB. "Drink plenty of fluids": a systematic review of evidence for this recommendation in acute respiratory infections. *BMJ* 2004;328:499-500.