

Treating the Common Cold



FPEN



An Expert Panel Consensus Recommendation for Primary Care Clinicians



Vol 5(4): October 2004

Learning Objectives:

Upon completion of the program, participants should be able to:

1. Review evidence-based research regarding nonprescription cough and cold preparations.
2. Evaluate the usefulness of zinc, vitamin C, and echinacea in managing the symptoms of the common cold.
3. Differentiate the relative value of nonprescription products used to manage the symptoms of cold and cough.

Sponsorship:

Jointly sponsored by the Illinois Academy of Family Physicians/Family Practice Education Network (IAFP/FPEN) and *FnP Associates*.

Credit Designation:

This activity has been reviewed and is acceptable for up to 1.5 Prescribed credits by the American Academy of Family Physicians (AAFP). 1.5 of these credits conform to AAFP criteria for evidence-based Continuing Medical Education (CME) clinical content. Term of approval is for one year from beginning distribution date of October 1, 2004 with option for yearly renewal.

This activity has also been reviewed and approved for 1.8 contact hours by the Washington State Nurses Association. The term of approval is for one year from the beginning distribution date of December 1, 2004.

Accreditation:

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of IAFP/FPEN and *FnP Associates*. The IAFP/FPEN is accredited by the ACCME to provide continuing medical education for physicians. The Washington State Nurses Association is an accredited approver of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation (ANCC).

Support:

This medical education program, *Treating the Common Cold, An Expert Panel Consensus Recommendation for Primary Care Clinicians*, was made possible through an unrestricted educational grant from The Quigley Corporation.

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Introduction

The common cold, or acute upper respiratory tract infection (ARTI), is one of the most common reasons patients visit a primary care clinician and accounts for over 25 million office visits in the United States each year.¹ The economic impact of ARTI is enormous in terms of both medical costs and lost productivity. Treatment costs of the common cold in the ambulatory care setting exceed \$1 billion dollars annually.² Prescription and nonprescription medications add significantly to this cost. Annually, an estimated \$227 million are spent on antibiotics in the treatment of ARTI, and approximately \$2 billion are spent on nonprescription cough and cold products.^{1, 3} Further, 20 million days off work and 22 million days absent from school are attributable to ARTI each year.⁴

Although the common cold is an acute, usually afebrile, self-limited illness, its symptoms cause substantial discomfort, and its management poses a significant burden on the medical community.⁵ Primary care health professionals are faced daily with the questions of if, when, and how best to treat ARTI. Clinicians are often challenged by patients' beliefs and expectations regarding the management of the common cold; such expectations may conflict with the delivery of appropriate medical care.⁶ In addition, clinicians must continually keep abreast of safety and efficacy information regarding the plethora of alternative medications and OTC products available to their patients.

The Illinois Academy of Family Physicians and *FnP Associates* recently convened a multi-disciplinary, expert panel to develop recommendations for the management of acute upper respiratory tract infection—the common cold—in the primary care setting. These recommendations were based on a thorough review of the evidence-based literature regarding the diagnosis and treatment of ARTI. The efficacy and safety of both prescription and nonprescription medications were reviewed with specific focus on alternative cold remedies including zinc, vitamin C, and echinacea.

Epidemiology

Acute upper respiratory tract infection presents seasonally with the incidence increasing through the fall, peaking in the winter months, and falling off in the spring.⁷ Young children commonly experience 5 to 7 colds a year, and some as many as 12.⁸ Adults typically have 2 to 3 colds a year, although those who have frequent contact with young children may have more. Risk factors for the common cold include smoking, poor nutrition, population crowding, sedentary lifestyle, and less diverse social networks.⁹ Day-care attendance is a major risk factor for ARTI in young children, and the frequency of cold episodes increases with the number of children in attendance.^{10, 11} In adults, stress contributes to an increased susceptibility to the common cold.¹² Heavy exercise may lead to an increased risk for ARTI, however moderate exercise is associated with favorable immune system changes that may prevent ARTI.¹³

Etiology and Pathogenesis

Rhinoviruses are the most common cause of ARTI, representing the culprit pathogen in approximately 80% of colds.⁵ Other viral etiologies include coronaviruses, parainfluenza viruses, respiratory syncytial virus, and adenoviruses. The primary route of rhinoviral infection in ARTI is through self-inoculation of the nose or eyes following contact with infected secretions. Rhinoviruses can survive on the hands or on environmental surfaces for several hours and have been detected on the hands of 40% to 90% of cold sufferers.¹⁴ Other modes of infection include transmission of small-particle aerosols that linger in the air after an infected individual sneezes and transmission of large-particle aerosols after he or she coughs.⁷

Acute upper respiratory tract infections develop as cold viruses are transported to the adenoid area in the back of the throat where they bind to intercellular adhesion receptor molecule-1 (ICAM-1), replicate within respiratory epithelial cells, and spread through the nasopharynx region.^{15, 16} The infectious dose of rhinovirus is very small and replication occurs within 8 to 12 hours.^{17, 18} Despite the efficiency of the rhinovirus, symptomatic illness develops in only 75% of infected individuals.^{17, 19}

Symptoms

As the viral infection quickly spreads, the inflammatory cascade is activated. Infected cells signal the production of cytokines and chemokines (e.g., platelet-activating factor, leukotrienes, prostaglandins, and bradykinins) that activate inflammatory and immunocompetent cells.⁹ Clinical symptoms occur within 10 to 12 hours after infection and typically begin with a sore, scratchy throat followed by profuse and watery rhinorrhea, watery eyes, nasal congestion, sneezing, and coughing (Table 1).⁷ As symptoms peak in severity by day 2 or 3, nasal discharge worsens and may become thicker and discolored. This mucopurulent discharge is common with a viral ARTI and does not necessarily indicate the presence of bacteria.²⁰

Other cold symptoms include malaise, fatigue, headache, hoarseness, arthralgia, sinus congestion and pain, ear pressure, fever, and myalgia (Table 1).⁷ A dry, hacking, nonproductive cough may develop and persist into the second week of symptoms. Fever is common in children with ARTI but an infrequent finding in adults. Myalgia, occasionally reported by patients with ARTI, is more typical of influenza. Cold symptoms generally last about 7 to 10 days but can persist for up to 3 weeks.

Common/Early	Other
<ul style="list-style-type: none"> • Sore throat • Rhinorrhea • Watery eyes • Nasal congestion • Sneezing • Coughing • Malaise • Fatigue 	<ul style="list-style-type: none"> • Headache • Hoarseness • Arthralgia • Sinus congestion/pain • Ear pressure • Nonproductive cough • Fever • Myalgia

Differential Diagnosis

Some of the symptoms of the common cold are the same as those associated with other upper respiratory tract infections such as acute bacterial rhinosinusitis (ABRS), allergic rhinitis, and streptococcal pharyngitis. A complete patient history can differentiate symptoms and facilitate an accurate diagnosis. The primary consideration in diagnosing an acute upper respiratory infection is to rule out a more serious illness that would necessitate more aggressive treatment. While a complete review of the complications of the common cold are beyond the scope of this guideline, special patient populations, such as the very young, the elderly, and those with comorbid conditions, are at greatest risk for complications including bacterial superinfection.⁷ An atypical illness course should alert clinicians to investigate further.

Acute Bacterial Rhinosinusitis

Rhinosinusitis is the inflammation of one or more of the paranasal sinuses and adjoining nasal mucosa.²¹ Like the common cold, rhinosinusitis is a frequent reason for seeking medical attention with 35 million cases occurring annually and resulting in 25 million office visits.²² Rhinosinusitis is the fifth most common diagnosis for which antibiotics are prescribed with an associated cost approximating \$310 million a year.^{1, 23} Yet, the most recent treatment guidelines advocate symptomatic management with antimicrobial therapy reserved for patients in whom a bacterial pathogen has been identified or is very likely to exist.²³

Acute bacterial rhinosinusitis presents seasonally like the common cold. It is typically preceded by an ARTI, and the vast majority of these viral infections will resolve within 2 weeks without treatment.²⁴ Bacterial superinfection may occur at any point during the viral illness, but the risk is greater if viral symptoms are unresolved after 10 days. Viral sinusitis is complicated by bacterial infection in roughly 2% of cases.²³ A diagnosis of acute bacterial rhinosinusitis may be made in adults or children with symptoms of viral upper respiratory infection that have not improved after 10 days or have worsened after 5 to 7 days.

The American Academy of Otolaryngology has identified major and minor factors associated with acute bacterial rhinosinusitis and defined combinations of these factors to help the primary care clinician make an accurate diagnosis (Table 2).²³ Major factors include facial pressure and pain, nasal congestion, nasal discharge, hyposmia/anosmia, cough (not due to asthma; in children only), and fever (in ABRS of < 4 weeks duration). Minor factors include headache, halitosis, fatigue, dental pain, cough (in adults), and ear pain or pressure. With a worsening or unresolved illness, the presence of at least 2 major factors or 1 major factor and 2 minor factors defines the diagnosis of ABRS.

Allergic Rhinitis

Allergic rhinitis, a systemic disease triggered by environmental allergens, affects 8% to 16% of U.S. residents.²⁵ The costs associated with medical care and lost productivity related to allergic rhinitis are estimated to exceed a billion dollars each year. In addition, the duration and intensity of the symptoms of allergic rhinitis have a significant negative impact on patients' quality of life.

Allergic rhinitis typically presents in atopic children or adults.⁹ Episodes occur seasonally, timed with the pollination of the offending weed, grass or tree, or perennially, in response to environmental allergens such as dust. Nasal congestion; postnasal drip; repetitive sneezing; profuse, watery rhinorrhea; lacrimation; and pruritis of the eyes, nose, and palate are the most common symptoms (Table 3). Systemic symptoms include fatigue, irritability, and malaise. In addition, clinicians may observe or patients may report any of the following: headache, sore throat, frequent throat clearing, nose picking, grimacing or twitching, coughing, ear pain/pressure, mouth breathing, decreased appetite/hearing/smell, hoarseness, sniffing, and epistaxis.

Table 3 Symptoms of Allergic Rhinitis

Common
<ul style="list-style-type: none"> • Nasal congestion • Postnasal drip • Repetitive sneezing • Watery discharge from nose and eyes • Itching of nose, eyes, and palate
Systemic
<ul style="list-style-type: none"> • Fatigue • Irritability • Malaise

Streptococcal Pharyngitis

Group A β -hemolytic streptococcus (GAS), the leading bacterial cause of acute pharyngitis, accounts for only a small fraction of pharyngitis cases.²⁶ Fewer than 10% of adults and 30% of children with acute pharyngitis have a streptococcal infection.²⁷ However, sore throat is a common reason for patients to visit their primary care clinician or pediatric health care provider; many of these patients or their parents are concerned about streptococcal infection and prevention of rheumatic fever.

GAS pharyngitis ("strep throat") occurs primarily in children aged 5 to 15 years and presents most often in the winter and early spring.²⁸ The clinical presentation of streptococcal pharyngitis is typically characterized by acute

Table 2 Diagnosis of Acute Bacterial Rhinosinusitis

<ul style="list-style-type: none"> • Symptoms worsening after 5-7 days or unresolved after 10 days • Presence of at least 2 major or 1 major and 2 minor factors 	
Major Factors	Minor Factors
<ul style="list-style-type: none"> • Facial pressure/pain • Nasal congestion • Nasal discharge • Hyposmia/Anosmia • Cough (in children) • Fever (acute disease) 	<ul style="list-style-type: none"> • Headache • Halitosis • Fatigue • Dental pain • Cough (in adults) • Ear pain/pressure

pharyngeal pain, dysphagia, and fever, and is commonly accompanied by malaise, headache, nausea, vomiting, and abdominal pain (Table 4). Symptoms of GAS pharyngitis overlap with those of viral pharyngitis and other upper respiratory tract infections, however the presence of rhinorrhea, cough, hoarseness, conjunctivitis, and diarrhea is uncommon and suggestive of a viral etiology. Fever abates within 3 to 5 days, and all symptoms should subside within a week. Because the clinical presentation of GAS pharyngitis does not clearly identify the cause of infection, definitive diagnosis must be based upon a throat swab culture or antigen-detection test.²⁹

Prevention

The predictable arrival of the common cold each winter makes its symptoms all the more annoying and intrusive. Contrary to common beliefs, ingesting large doses of vitamin C or avoiding exposure to cold temperatures or recirculated cabin air on airplanes does not prevent colds.³⁰⁻³² There are, however, strategies the primary care clinician can provide to help patients reduce their risk of infections (Table 6). Eating a balanced diet, getting enough sleep, managing stress, and exercising moderately help the immune system to fend off viral invaders.^{33, 34} Smokers are at increased risk for respiratory infections, so patients should be encouraged to stop smoking, or at least to decrease smoking frequency, and to avoid second-hand smoke whenever possible.

Limiting exposure to cold viruses is another important means of reducing the risk of contracting a cold and is especially important for people with increased susceptibility such as those who suffer from allergies or asthma.³³ Patients should be advised to avoid individuals with cold symptoms if possible. Frequent hand washing and regularly disinfecting surfaces (e.g., countertops, phone receivers, doorknobs) will also help to limit cold viruses from spreading.

Table 4 Symptoms of Streptococcal Pharyngitis

<ul style="list-style-type: none"> • Sore throat • Difficulty Swallowing • Fever • Malaise 	<ul style="list-style-type: none"> • Headache • Nausea/Vomiting • Abdominal pain
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The signs and symptoms of the common cold are compared to acute bacterial rhinosinusitis, allergic rhinitis, and streptococcal pharyngitis in Table 5.

Table 5 Differential Diagnosis of the Common Cold and other Upper Respiratory Conditions

Symptom	Common Cold	ABRS	Allergic Rhinitis	Streptococcal Pharyngitis
Seasonality	Fall, Winter, Spring	Fall, Winter, Spring	Seasonal or Perennial	Winter, Spring
Duration of S/S	Avg. 7 days	> 10 days	Variable	7 days
Sore Throat	Yes	----	Sometimes	Yes
Nasal Discharge	Yes	Yes	Yes	----
Discharge Color	White	Yellow/Green	Clear	N/A
Discharge Consistency	Thin or thick	Thick	Thin, watery	N/A
Nasal Congestion	Yes	Yes	Yes	----
Sneezing	Yes	----	Yes	-----
Cough	Yes	Sometimes	Sometimes	-----
Malaise	Yes	Yes	Sometimes	Yes
Fatigue	Yes	Sometimes	Sometimes	Sometimes
Headache	Sometimes	Sometimes	Sometimes	Sometimes
Myalgia	Sometimes	----	----	Yes†
Fever	Sometimes*	Yes‡	----	Yes
Ear Pain, Pressure	Sometimes	Sometimes	Sometimes	----
Facial Pressure	Sometimes	Yes	----	----
Itching of nose, eyes	Sometimes	----	Yes	----
Dysphagia	Sometimes	----	----	Yes
Hyposmia/Anosmia	----	Yes	Sometimes	----
Halitosis	----	Sometimes	----	----
Dental Pain	----	Sometimes	----	----
Nausea/Vomiting	----	----	----	Yes
Abdominal Pain	----	----	----	Yes

*Fever in ARTI is common in children but atypical in adults.

† Associated with fever.

‡ In acute disease of <2 weeks duration.

Table 6 Preventing the Common Cold**Practice Healthy Habits**

- Eat a balanced diet
- Get sufficient sleep
- Manage stress
- Exercise moderately
- Stop smoking or ↓ frequency
- Avoid second-hand smoke

Limit Exposures

- Avoid contact with infected individuals
- Wash hands frequently
- Disinfect surfaces

Nonpharmacological Therapy

With no cure for the common cold available, the goals of treatment are to alleviate symptoms and avoid complications while the body’s immune system combats the infection. In theory, early symptomatic treatment will yield the best results given the rapid rate at which ARTI occurs.³⁵ There are a number of nonpharmacological measures that patients can employ to help them to manage symptoms and to feel better as the cold runs its course (Table 7).

Table 7 Nonpharmacological Therapies for Treating the Common Cold**Behavioral**

- Adequate hydration
- Smoking cessation or decreased frequency
- Proper nose blowing technique

Therapeutic

- Room air humidification
- Saline gargles or sprays
- External nasal dilator strips
- Bulb syringe and saline drops (young children)

Drinking lots of fluids (≥ eight 8 ounce glasses per day) will maintain hydration, help to loosen mucus, and assist in alleviating congestion.⁹ Alcoholic and caffeinated drinks tend to dehydrate and should be avoided. Water, juice, ginger ale, herbal teas, and broth are good options. Chicken soup, “grandmother’s proverbial cold remedy”, has a mild anti-inflammatory effect that may improve mucociliary clearance.³⁶ There is no need to withhold milk or dairy products, because they do not increase congestion.⁹ Since smoking interferes with the body’s ability to keep bacteria out of the respiratory tract, smokers with a cold should be advised to stop smoking or decrease smoking frequency to help avoid progression to

bacterial superinfection.³³ Although heavy exercise during the course of a cold is not recommended, moderate exercise (e.g., walking) is not harmful, and preliminary data indicate that it may mitigate cold symptoms.^{13, 37}

Blowing the nose is the simplest method of clearing nasal congestion associated with the common cold; however, using proper technique is important in terms of limiting spread of the virus to the ears and sinuses as well as to other individuals.³⁸ Paper facial tissues, used once and discarded, are preferable to cloth handkerchiefs which provide a breeding ground for viruses and bacteria. Patients should be instructed not to close off one nostril, but to blow gently through the open nostril, then repeat on the opposite side. In addition, patients should be advised to avoid blowing too hard as excessive pressure will force mucus into the ears and sinuses. Hands should be washed after handling the nose and tissues to avoid spreading infection.

Increasing environmental humidity with cool-mist humidifiers or vaporizers will help to alleviate nasal congestion.⁹ For adults, warm salt gargles (1 to 3 teaspoons of table salt per 8 ounces of warm tap water) may be recommended to soothe sore throats, and external nasal dilator strips can provide temporary relief of nasal stuffiness. For infants and young children, gentle suctioning of the nasal passages with a bulb syringe and applying saline nose drops can reduce congestion.

Nonprescription Drug Therapy

There are a host of nonprescription medications available to treat the complex of symptoms associated with the common cold including decongestants, antihistamines, antitussives, and expectorants. Single-ingredient products are preferable due to the increased cost, increased drug interaction and side effect potential, risk of duplicative therapy, and limited dosing options associated with combination products (Table 8). Furthermore, fixed-dose combination cough and cold products frequently contain one or more ingredients targeted to treat symptoms that do not exist. Treating the most bothersome cold symptom with a specific single-agent product targeted to relieve that symptom is more

Table 8 Downsides to Combination OTC Cold Therapies

- ↑ Cost
- ↑ Drug/drug interactions
- ↑ Side effects
- Risk of duplicating therapies
- Limited dosing options
- Administration of unnecessary drugs

prudent than trying a “shotgun” fixed-dose approach to alleviate multiple symptoms with a single pill.

Special Patient Populations

OTC cold products should not be used in children younger than 2 years of age, because there are no data to determine appropriate dosing or to support their safety in this population.⁹ Primary care clinicians must educate parents regarding the risk of serious adverse effects that may occur in children under age 2 years who are given nonprescription cold products. If a young child’s cold symptoms warrant pharmacological treatment, clinicians should prescribe only those medications that are FDA-approved for use in children younger than 2 years of age.

Some individuals should refrain from taking nonprescription cold medications without the oversight of a health care professional (Table 9). Exclusions from self-treatment include patients with a fever (oral temperature > 101.5° F), chest pain, or shortness of breath; patients whose symptoms worsen; patients who develop additional symptoms; patients with concurrent underlying chronic cardiopulmonary disease (e.g., asthma), AIDS, or chronic immunosuppressant therapy; and patients who are frail or elderly. In addition, health care professionals should carefully review the product labeling before recommending nonprescription cold medications for young children, the elderly, pregnant women, and those with comorbid conditions.

Decongestants

Decongestants provide temporary relief from nasal stuffiness associated with a cold and are available in intranasal, oral, and ophthalmic formulations.^{9,39} As vasoconstrictors, decongestants restrict blood flow to the nasal passages which in turn reduces mucosal edema and sinusoid vessel engorgement.

Oral Decongestants: Pseudoephedrine is the prototypic oral decongestant; the onset of action is 30 to 60 minutes after the first dose.³⁹ The recommended dosage for adults is 60 mg every 4 to 6 hours as needed not to exceed 240 mg in a 24-hour period. Alternatively, pseudoephedrine may be dosed by weight in adults at a dosage of 4 mg/kg/day in divided doses every 6 hours as needed. Adults using a sustained-release preparation should take 120 mg every 12 hours as needed not to exceed 240 mg a day. Children aged 6 to 12 years should take 1/2 of the adult dose every 6 hours as needed, and children aged 2 to 5 years should receive 1/4 of the adult dose every 6 hours as needed. Oral decongestants in syrup, elixir, or suspension dosage formulations are typically easiest to administer to young children.

Topical Decongestants. Nasal sprays, drops, and inhalers are relatively inexpensive, easy to use, and work rapidly (onset of action 30 seconds to 10 minutes), but patients must be warned that routine use for more than 2 or 3 days causes rebound nasal congestion.³⁹ This warning applies to ophthalmic decongestant formulations as well. Nasal decongestant sprays provide better distribution than nasal drops, and longer-acting sprays such as oxymetazoline and xylometazoline are most frequently employed. Phenylephrine is the prototypic active ingredient in nose drops.

Oral versus Topical. Disadvantages to intranasal delivery include imprecise dosing, contamination of the bottle tip, local irritation, and reduced efficacy in the presence of nasal polyps, enlarged turbinates, or anatomical abnormalities (e.g., septal deviation).⁹ In addition, the medication in nasal inhalers loses efficacy within 2 to 3 months due to dissipation of the active ingredient. Oral decongestants can be used without risk of rebound congestion or local irritation but are less effective despite a longer duration of action.

Contraindications. Systemic oral decongestants are contraindicated in patients with severe, poorly-managed hypertension (HTN) or coronary artery disease (CAD); patients taking monoamine oxidase inhibitors (MAOIs) or those who have taken MAOIs within 14 days of decongestant therapy; and those with hypersensitivity to any of the product components.^{9, 39} Ophthalmic decongestants are contraindicated in patients with glaucoma. In addition to the contraindications identified, decongestants should be used cautiously in patients with hyperthyroidism, diabetes mellitus, coronary heart

Table 9 Use of OTC Cold Therapies in Special Patient Populations	
Excluded from Use	
<ul style="list-style-type: none"> • Children < 2 years of age 	
Exclusions from Self-Treatment	
<ul style="list-style-type: none"> • Fever (> 101.5° F, oral), chest pain, shortness of breath • Worsening or additional symptoms • Chronic cardiopulmonary disease, AIDS, immunosuppressant therapy • Frail, elderly 	
Cautious Use	
<ul style="list-style-type: none"> • Children (> 2 years through adolescence) • Older adults • Pregnant women • Patients with comorbid conditions 	

disease, ischemic heart disease, hypertension, increased intraocular pressure, and prostatic hypertrophy. Topical nasal decongestants have limited systemic effect but should be used with caution in patients with the caveats noted for oral decongestants.

Interactions and Adverse Effects. Drugs that interact with decongestants include MAOIs, methyl dopa, tricyclic antidepressants, and urinary acidifier/alkalinizers.^{9, 39} Adverse effects associated with oral decongestant use include restlessness, nervousness, irritability, jitteriness, insomnia, light-headedness, dizziness, nausea, tremor, headache, tachycardia, irregular heart rate, and elevated blood pressure. Burning, stinging, and dryness of the nose can occur with topical decongestants.

Practice Recommendation: The use of oral and topical nasal decongestants in adults is moderately effective for the short-term relief of congestion from the common cold. Repeated use of decongestants over several days provides no benefit and is not recommended. Use of decongestants in young children with colds is also not recommended.



EBM Source: Taverner D, Latte J, and Draper M. Nasal decongestants for the common cold (Cochrane Review). *The Cochrane Library*, Issue 3, 2004. Chichester, UK: John Wiley & Sons, Ltd.

Strength of Evidence: This systematic review was based on 5 randomized, placebo-controlled studies of single-ingredient oral and topical nasal decongestants involving 286 adults.

Antihistamines

The common cold is not a histamine-mediated process but, rather, an inflammatory condition; therefore, antihistamines are of limited value in treating ARTI.³⁹ Antihistamines should not be used as primary therapy and should be considered only for use in cold sufferers with concomitant allergic rhinitis. Because of the sedating effect of some first-generation antihistamines, the alkylamines (e.g., brompheniramine, chlorpheniramine, triprolidine), or loratadine, which has no anticholinergic activity, should be used in patients with a comorbid allergy and ARTI.⁹

Antihistamine use is contraindicated in patients with hypersensitivity to the specific drug and in lactating mothers.³⁹ Practitioners should use antihistamines cautiously in patients who have glaucoma, prostatic hypertrophy, breathing problems, or chronic bronchitis.⁵ Due to the anticholinergic effects of some antihistamines, the severity of dementia and the risk of falls and fractures can be increased in elderly users of these medications. Practitioners prescribing antihistamines for geriatric patients should start with the lowest, minimum dose and increase gradually. In addition, clinicians should be aware

of the paradoxical excitation that may occur with antihistamine use in some children and in the elderly. Antihistamine drug-drug interactions can occur with central nervous system depressants, MAOIs, phenytoin, ketoconazole, erythromycin, and cimetidine. Adverse effects of antihistamines include drowsiness, dry mouth, nervousness, and dizziness.

Practice Recommendation: The use of single-agent antihistamines in children or adults to treat the symptoms of ARTI is not recommended. Single-agent antihistamines do not alleviate the symptoms of nasal congestion, rhinorrhea, or sneezing associated with the common cold to a clinically significant extent. In addition, first-generation antihistamines cause increased sedation in cold sufferers.



EBM Source: De Sutter AIM, Lemiengre M, Campbell H, and Mackinnon HF. Antihistamines for the common cold. (Cochrane Review). *The Cochrane Library*, Issue 3, 2004. Chichester, UK: John Wiley & Sons, Ltd.

Strength of Evidence: 22 randomized, placebo-controlled studies of single-ingredient antihistamines of varied design were included in this combined analysis.

Antitussives

A productive cough in ARTI is a physiologically beneficial host defense mechanism and should not be suppressed except for short periods to enable sleep. However, the dry, nonproductive cough of a cold can be treated when it interferes with the patient's lifestyle. Antitussives are indicated for cough suppression in ARTI; yet, the data to support the efficacy of codeine and dextromethorphan in suppressing the cough of the common cold are equivocal.^{9, 40, 41} Although typically available by prescription only, codeine-containing cough suppressants are classified as schedule V drugs in some states and are available over-the-counter with personal identification.⁵ However, these products should be avoided due to the abuse potential associated with codeine.

Dextromethorphan is the antitussive agent of choice. It is equipotent with codeine on a mg-for-mg basis, and it has less abuse potential. It also has limited drug interactions and adverse effects and is available in extended-dose and pediatric formulations.³⁹ Cautious use of dextromethorphan is recommended in patients with a high fever, rash, or persistent headache, nausea, or vomiting. Drowsiness and gastrointestinal disturbances occur rarely with dextromethorphan use.

Drug Interactions. Dextromethorphan should not be used in conjunction with MAOIs or within 2 weeks of MAOI administration.³⁹ Concomitant use of dextromethorphan and sibutramine is also not recommended due to the potential for serotonin syndrome.

Table 10 Using Nonprescription Therapies in the Common Cold***Decongestants****Indication**

Temporary relief of nasal stuffiness.

Contraindications

Oral: Severe, poorly managed HTN, CAD, MAOI use, hypersensitivity.

Ophthalmic: Glaucoma.

Cautious Use

In patients with hyperthyroidism, diabetes mellitus, coronary heart disease, ischemic heart disease, hypertension, increased intraocular pressure, and prostatic hypertrophy.

Drug Interactions

MAOIs, methyldopa, tricyclic antidepressants, and urinary acidifier/alkalinizers.

Adverse Effects

Oral: Restlessness, nervousness, irritability, insomnia, dizziness, tremor, headache, tachycardia, and elevated blood pressure.

Intranasal: Rebound congestion with application for > 2-3 days, local irritation.

Antihistamines**Indication**

Relief of rhinorrhea and sneezing. Limited value in ARTI; use only with concomitant allergic rhinitis.

Contraindications

Hypersensitivity and lactation.

Cautious Use

In patients with glaucoma, prostatic hypertrophy, breathing problems, chronic bronchitis, and young or advanced age.

Drug Interactions

CNS depressants, MAOIs, phenytoin, ketoconazole, erythromycin, and cimetidine.

Adverse Effects

Drowsiness, dry mouth, nervousness, and dizziness.

Dextromethorphan**Indication**

Suppression of a dry, nonproductive cough.

Contraindications

MAOI use or within 2 weeks of discontinuing MAOIs.

Cautious Use

In patients with glaucoma, prostatic hypertrophy, breathing problems, chronic bronchitis, a productive cough, and in the elderly.

Drug Interactions

MAOIs, sibutramine, fluoxetine, paroxetine, quinidine, terbinafine, grapefruit/Seville orange juice.

Adverse Effects

Drowsiness, dry mouth, nervousness, and dizziness.

Guaifenesin**Indication**

Facilitate removal of mucus from the upper respiratory tract.

Contraindications

Hypersensitivity or persistent, nonproductive cough (e.g., smokers, asthmatics).

Adverse Effects

Nausea, vomiting, dizziness, headache, and rash.

*Do not exceed recommended dose or dosing frequency with any nonprescription medication.

In addition, the effects of dextromethorphan may increase when given in conjunction with CYP2D6 inhibitors including fluoxetine, paroxetine, quinidine, and terbinafine or with grapefruit juice or Seville orange juice.^{42, 43}

Guaifenesin

An expectorant can be used to help break up mucus in patients with a productive cough associated with a cold, yet

a well-hydrated body, achieved by drinking \geq eight 8-ounce glasses of water daily, will yield the same benefit.⁵ Although a patent upper airway should eliminate a productive cough, the efficacy of expectorants in clearing secretions and providing a clinical benefit remains to be proven.^{39, 44} Guaifenesin is the only FDA-approved expectorant available. It is a component of many OTC products in a variety of formulations and frequently underdosed.⁵ Contraindicated in patients with a

hypersensitivity, guaifenesin should not be used for a persistent, nonproductive cough, i.e., coughs associated with smoking, asthma or emphysema.³⁹ Adverse effects—including nausea, vomiting, dizziness, headache, and rash—occur infrequently.

Antitussive/Expectorant Combinations

Concurrent use of an antitussive and an expectorant or use of an antitussive/expectorant fixed-dose combination product is generally discouraged.³⁹ Expectorants thin respiratory mucus in order to facilitate the removal of secretions, whereas antitussives act to suppress the cough reflex, a homeostatic host defense mechanism. The pharmacological actions of expectorants and antitussives essentially oppose each other, thus their use in combination impedes removal of accumulated respiratory debris and is illogical.

The indications, contraindications, precautions, drug interactions, and adverse effects for decongestants, antihistamines, dextromethorphan, and guaifenesin are outlined in Table 10.

Other Symptomatic Relief

Other nonprescription products available to treat cold symptoms include systemic analgesics, mouth and throat products, and topical rubs (Table 11). In addition, zinc, vitamin C, and echinacea have been evaluated for prophylaxis and treatment of ARTI (Table 12).

Table 11 Other Symptomatic Relief for the Common Cold
Systemic Analgesics
<ul style="list-style-type: none"> Relieve head and body aches. Ibuprofen, naproxen, and acetaminophen are preferred. Avoid aspirin in children.
Mouth and Throat Products
<ul style="list-style-type: none"> Temporary relief of sore throat and irritation. Use at 3-4 hour intervals for ≤ 2 days. Saline gargles are sufficient. Contraindicated with hypersensitivity, sore throat ≥ 7-10 days duration, high fever, rash, severe headache, nausea/vomiting.
Rubs
<ul style="list-style-type: none"> Temporary relief of nasal congestion and cough. Apply rubs in a thick layer on neck and chest and cover loosely up to 3 times/day. Rubs are for external use only; discontinue use with skin irritation.

Systemic analgesics. Systemic analgesics can relieve the head and body aches and feverish feeling associated with the common cold.⁹ Salicyclic acid and aspirin should be avoided in children because of the potential risk of developing Reye’s Syndrome. Ibuprofen, naproxen, and acetaminophen are available without prescription, have good safety profiles, and are generally preferred when use is limited to a 7 to 10 day period. Patients should be advised to read the package labeling of nonprescription medications carefully, because fixed-dose combination cold products designed for multi-symptom relief may contain duplicate ingredients.

Mouth and Throat Products. Demulcents, lozenges, gargles, and sprays provide temporary relief of a sore throat and the irritation of post-nasal drip that are common with a cold.³⁹ Demulcents lubricate the oropharynx and are available in a sugar-free lozenge formulation for patients with diabetes. Medicated lozenges, gargles, and sprays may contain a local anesthetic, typically benzocaine or dyclonine, which have a short duration of action—about 30 minutes. Other ingredients may include antiseptics and counterirritants. These products should be used at 3- to 4-hour intervals and for no more than 2 days. Lozenges promote saliva production and provide a beneficial lubricating effect. OTC gargles and sprays provide no advantage over a homemade saline gargle of 1 to 3 teaspoons of table salt mixed with 8 ounces of warm tap water. Mouth and throat cold remedies should not be used if patients have a history of hypersensitivity, sore throats of greater than 7 to 10 days duration, or concurrent high fever, rash, severe headache, nausea or vomiting.

Rubs. Camphor and menthol, the active counterirritant ingredients in topical rubs, act as modest local anesthetics on the respiratory tract and provide temporary, symptomatic relief of the nasal congestion and cough associated with ARTI.^{5, 39} Topical camphor or menthol can be rubbed on the neck and chest in a thick layer and loosely covered with a warm, dry cloth up to 3 times a day. Rubs are for external use only, and contact with the eyes should be avoided. Rubs should not be applied to irritated skin; and if irritation occurs, the product should be discontinued.

Table 12 Zinc, Vitamin C, and Echinacea for the Common Cold

Zinc

- Results of controlled studies of oral zinc supplement for cold treatment and prophylaxis are variable, but recent trials have been positive.
- Initiate oral zinc within 24 hours of symptom onset.
- Dose: 13 mg to 24 mg every 2 hrs while awake and with symptoms, do not exceed 150 mg daily.
- Intranasal zinc is not recommended.
- Adverse effects: Dysgeusia, stomach upset.

Vitamin C

- High doses (1 gram daily) may have a modest therapeutic effect on the duration of cold symptoms.
- Adverse effects: diarrhea, increased iron absorption, kidney stones, nausea, abdominal cramping, transient colic, and flatulence.

Echinacea

- Current data do not support the use of echinacea to reduce the severity or duration of cold symptoms or to prevent colds, although further investigation is needed.
- Contraindications: Hypersensitivity to the daisy family, autoimmune disease, HIV infection, multiple sclerosis, tuberculosis, young age; pregnancy; and use of immunosuppressive agents.
- Adverse effects: Dyspepsia, headache, and dizziness.

Zinc

Zinc, a naturally occurring element, has demonstrated antiviral effects *in vitro*.⁴⁵ It is also a physiological mitogen that enhances immune function.⁴⁶ The best food sources of zinc are shellfish (e.g., oysters, clams), red meats, and organ meats (e.g., liver). Diets comprised of mostly pasta, fruits, and vegetables are often zinc deficient, and high-fiber foods (e.g., whole-grain cereals) inhibit zinc absorption.⁴⁷ Supplemental oral zinc therapy for the symptomatic relief of ARTI has been evaluated in several studies.⁴⁵

Early study of zinc supplementation to treat the common cold demonstrated a statistically significant reduction in the duration of cold symptoms in zinc recipients as compared to placebo recipients, but subsequent studies yielded mixed results.^{45, 48} Variations in zinc formulations, dosing, and blinding problems were among the confounding factors.⁵ However, studies that failed to show a clinical benefit may have used inactivated zinc lozenges secondary to possible chelating effects of additives such as citric acid, tartaric acid, mannitol, and sorbitol.⁴⁹

A recent randomized, double-blind study demonstrated a reduction in the duration and severity of cold symptoms with the administration of zinc lozenges (one 12.8 mg lozenge every 2 to 3 hours while awake and with cold symptoms) as compared with placebo.⁵⁰ In addition,

McElroy and Miller found a statistically significant reduction in cold symptom duration in adolescents treated with four 13.3 mg zinc gluconate glycine lozenges daily.⁵¹ Prophylactic administration of zinc (one 13.3 mg zinc gluconate glycine lozenge daily) was also associated with a decreased incidence of colds in this population. It is important to note that this study was not blinded and that control patients were identified through retrospective chart review. Further study is needed to evaluate the effects of zinc in treating or preventing the common cold.⁵²

Patients who choose to use zinc supplements should be advised to initiate therapy as soon as possible after the first symptoms of a cold present, ideally within 24 hours of onset.^{5, 53} The usual dosage of zinc gluconate lozenges ranges from 13 mg to 24 mg every 2 hours while awake not to exceed a total daily dosage of 150 mg and treatment may be continued as long as symptoms persist. Oral zinc supplements can cause dysgeusia and stomach upset. Ingesting with food is recommended, but this will decrease absorption.^{5, 54} Intranasal zinc has been temporally associated with a complete or partial loss of smell, and its use is not recommended.⁵⁵

Vitamin C

Vitamin C supplementation does not reduce the incidence of the common cold in the general population.³⁰ However, a meta-analysis of both prophylactic and therapeutic vitamin C intake at relatively high doses (1 gram daily) revealed a modest therapeutic effect on the duration of cold symptoms.⁵⁶ The effect was variable with a mean reduction of a 1/2 day of symptoms per cold episode. Use of high-dose vitamin C to treat colds shortly after symptoms occur does not necessarily reduce cold symptom severity, and further study of the appropriate dosage to achieve benefit is needed.^{30, 57} Primary care clinicians should warn their patients about the potential adverse effects associated with routine ingestion of high-doses of vitamin C including diarrhea, increased iron absorption, kidney stones, nausea, abdominal cramping, transient colic, and flatulence.⁵

Echinacea

A number of clinical studies have suggested that echinacea may be beneficial in treating the common cold; however, these trials used several different echinacea preparations and many had poor methodology.⁵⁸⁻⁶⁰ A herbal remedy derived from a variety of flowering plants, echinacea appears to have a modest immunostimulating effect, although its exact mechanism of action is unknown.⁵ A recent placebo-controlled study by Barrett and colleagues addressed the shortcomings of many earlier trials and found that echinacea did not reduce the severity or duration of cold symptoms.⁶¹ In addition, evidence to support the prolonged use of echinacea for the prevention of ARTI is lacking.⁵⁸ Still, additional study of

the clinical benefit of echinacea for the common cold is warranted.⁶² Echinacea use is contraindicated in patients with a hypersensitivity to flowers in daisy family, autoimmune disease, HIV infection, multiple sclerosis, or tuberculosis.⁵ Children, pregnant women, and those using immunosuppressive agents should avoid echinacea as well. Because echinacea's immunostimulating properties may decline with continued use, it should not be taken for longer than 8 consecutive weeks.⁵⁹ Echinacea is well-tolerated; adverse effects include dyspepsia, headache, and dizziness.

Antibiotics and Common Cold

Antimicrobial therapy for the treatment of acute upper respiratory tract infection is inappropriate, because the etiology of the common cold is almost always viral.⁶³ Although antibiotics are not effective in treating the common cold, about half of patients seen for ARTI will leave their clinician's office with an antibiotic prescription.⁶⁴ This overuse of antibiotics for treating the common cold is widespread and has led to an epidemic rise in antibiotic-resistant bacteria, especially problematic with penicillin-resistant *S. pneumoniae*.^{63, 65}

To decrease inappropriate antibiotic use and control the spread of drug-resistant bacteria, principles for appropriate use of antibiotics in acute upper respiratory infection have been developed (Table 13).^{66, 67} Controlled clinical trials have consistently shown that antimicrobial therapy does not alter the resolution or outcome of ARTI; therefore, antibiotics should not be given for the common cold.^{66, 67} The presence of mucopurulent nasal discharge or sputum is common in patients with acute viral upper respiratory tract infections but is not an indication for antibiotic treatment unless the discharge persists for 10 to 14 days without improvement or other signs of bacterial rhinosinusitis are present.

Table 13 Principles of Appropriate Antibiotic Use for Treatment of the Common Cold in Children and Adults

- Antimicrobial therapy is not recommended for the treatment of ARTI in children or adults.
- Mucopurulent secretions, commonly observed in patients with ARTI, do not predict bacterial infection and are not an indication for antimicrobial therapy.

Patients' unrealistic expectations and demands for antibiotics are reasons why clinicians continue to prescribe antibiotics for acute viral respiratory tract infections.⁶ However, adult patients and parents may be willing to forgo antibiotic therapy and consider alternative treatments for the management of ARTI.⁶⁸ A study of adults symptomatic of ARTI and parents of children symptomatic of ARTI

assessed their expectations for antibiotic prescriptions for their colds or their children's colds. The vast majority of the adults surveyed (85.5%) understood that the cold was self-limited; most (80%) indicated that the primary reason for the office visit was to rule out more serious illness; and over half (57.4%) knew that antibiotic therapy would not hasten the resolution of or cure the cold.

Practice Recommendation: Routine use of antibiotics in the treatment of ARTI in children or adults is not recommended.



EBM Source: Arroll B, Kenealy T. Antibiotics for the common cold and acute purulent rhinitis (Cochrane Review). In: *The Cochrane Library*, Issue 3, 2004. Chichester, UK: John Wiley & Sons, Ltd.

Strength of Evidence: This systematic review by the Cochrane Group included nine randomized trials comparing any antibiotic with placebo in ARTI with less than seven days of symptoms. The overall quality of the trials was variable. A total of 2,157 patients, including children and adults, were analyzed.

Clinicians must realize that patient satisfaction is not contingent upon antibiotic prescriptions and should provide reassurance and education to improve patient understanding of the nature and resolution of viral ARTI.⁶⁹ A simple educational message, in language that is easily understood by the patient, will facilitate this process.⁷⁰ Key points of this message are outlined in Table 14. Figure 1 represents a "prescription" that can be given to patients diagnosed with ARTI or other upper respiratory conditions to further reinforce the message.⁷¹

Table 14 Patient/Parent Educational Message for ARTI Treatment

- Establish the patient/parent baseline knowledge of ARTI. Fill in the blanks, e.g., antibiotics are not effective in ARTI, the illness will resolve over time (7 to 10 days).
- Address the problems associated with inappropriate antibiotic use, i.e., the increased difficulty in managing infections that were easily treated in the past.
- Reassure the patient/parent that the infection has not spread to the lungs or ears and is not a bacterial sinus infection.
- Do not prescribe antibiotics (or any other therapy) inappropriately.
- Support the patient/parent efforts. Review the signs and symptoms of more serious illness and encourage follow up.

Figure 1

Rx	
Name: _____	Date: ___/___/___
Diagnosis:	
<input type="checkbox"/> Cold	<input type="checkbox"/> Sore Throat
<input type="checkbox"/> Flu	<input type="checkbox"/> Middle Ear Fluid
<input type="checkbox"/> Cough	<input type="checkbox"/> Other: _____
You have been diagnosed with a viral illness. Antibiotics do not cure viral infections or lessen the symptoms associated with the illness. If given when not needed, antibiotics can be harmful. The treatments indicated below will help you to feel better while your body's own defenses are fighting the infection.	
General Instructions:	
<input type="checkbox"/> Drink extra fluids, e.g., water, juice, tea, chicken soup.	
<input type="checkbox"/> Use a cool-mist, room air humidifier and/ or saline nasal spray to relieve congestion.	
<input type="checkbox"/> Use ice chips, sprays, or lozenges to relieve sore throat pain.	
Over-the-Counter Medicines:	
<input type="checkbox"/> Nasal congestion: _____	
<input type="checkbox"/> Fever or aches: _____	
<input type="checkbox"/> Cough: _____	
<input type="checkbox"/> Sore throat: _____	
<input type="checkbox"/> Facial pain: _____	
<input type="checkbox"/> Ear pain: _____	
<input type="checkbox"/> Other: _____	
Use nonprescription medicines strictly according to the package instructions or as directed by a health care professional. Stop taking the medication(s) when symptoms resolve.	
Follow Up:	
<input type="checkbox"/> If your symptoms have not improved in ___ days, have worsened within ___ days, if new symptoms occur, or if you have other concerns, please call or return for a recheck.	
<input type="checkbox"/> Other: _____	

Adapted from www.cdc.gov/drugresistance/community.

Conclusions

With a cure for the common cold still elusive, primary care clinicians are routinely faced with challenges surrounding the accurate diagnosis and appropriate clinical management of patients with ARTIs. The nature of rhinoviral illness, simple preventive measures, nonpharmacological symptom relief, proper symptom management with nonprescription drugs, and inappropriate antibiotic use are key educational messages for clinicians to share with their patients with colds. Nonprescription cough and cold products may help with symptom relief, but the use of these products in special patient populations requires medical supervision.

Decongestants, dextromethorphan, and guaifenesin can help to relieve nasal congestion and cough. Primary use of antihistamines in ARTI is only appropriate with concomitant allergic rhinitis. Systemic analgesics, mouth and throat products, and rubs can help to alleviate the aches and pains, throat irritation, and stuffiness associated with a cold. Data supporting the use of zinc and vitamin C for cold prophylaxis and treatment are limited, but there is some positive evidence to support use, and further study is warranted. With the use of any nonprescription cold products, clinicians and patients must be aware of the contraindications, warnings, precautions, drug interactions, and adverse effects associated with their use.

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IAFP Course Evaluation and CME Post-test

Treating the Common Cold

An Expert Panel Consensus Recommendation for Primary Care Clinicians

Sponsorship and Support

This medical education activity is jointly sponsored by the Illinois Academy of Family Physicians/Family Practice Education Network (IAFP/FPEN) and *FnP Associates*.

Credit Designation

This activity has been reviewed and is acceptable for up to 1.5 Prescribed credits by the American Academy of Family Physicians (AAFP). 1.5 of these credits conform to AAFP criteria for evidence-based Continuing Medical Education (CME) clinical content. Term of approval is for one year from beginning distribution date of October 1, 2004 with option for yearly renewal. When reporting CME credit, AAFP members should report total Prescribed and Elective credit earned for this activity. It is not necessary for members to label credit as evidence-based CME Prescribed or Elective for CME reporting purposes. There is no fee for this program.

This Independent Study Activity is approved for 1.8 contact hours in pharmacology by the Washington State Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation. The approval is for one year beginning with the distribution date of December 1 2004. There is no fee for this program.

Learning Objectives

The Illinois Academy of Family Physicians and *FnP Associates* develop educational materials that address the needs of family physicians and nurse practitioners, respectively. An important first step in designing an educational program is to identify the outcomes desired by the learner. Therefore, it is necessary to calculate the education gap—defined as the difference between the targeted learner's current and desired levels of knowledge for a specific topic. The IAFP and FnP Associates systematically survey family physicians and nurse practitioners to determine their educational needs and work with medical experts to address those needs.

The following learning objectives for *Treating of the Common Cold* reflect the areas shown to have the largest educational gaps:

1. Review evidence-based research regarding nonprescription cough and cold preparations.
2. Evaluate the usefulness of zinc, vitamin C, and echinacea in managing the symptoms of the common cold.
3. Differentiate the relative value of the nonprescription products used to manage the symptoms of cold and cough.

Members of the AAFP applying for a CME certificate should complete the test and evaluation forms on the reverse side, and send to:

For a CME certificate, please complete the test and evaluation forms on the reverse side, and send to:

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To receive contact hours in nursing, please go to <http://www.npcentral.net/ce/colds> to complete the registration, course evaluation, and post-test questions. This site will be accessible after December 1, 2004.

IAFP Course Evaluation and CME Post-test

Treating the Common Cold

An Expert Panel Consensus Recommendation for Primary Care Clinicians

Members of the American Academy of Family Physicians who would like to apply for continuing education credit should complete this course evaluation and post-test as outlined. Nurse practitioners who would like to apply for contact hours associated with the completion of this educational activity should complete the evaluation and post-test found at <http://www.npcentral.net/ce/colds>.

The American Medical Association (AMA) accepts AAFP Prescribed Credit as equivalent to AMA Category I credit toward the Physicians Recognition Award (PRA). When applying for the AMA PRA, report these hours as Prescribed Credit. A certificate documenting your participation in this CME activity will be sent to you if your post-test score is 70% or higher. CME applicants are allowed two (2) attempts to earn this score.

Circle one rating for each category.

Strongly agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly disagree = 1

Content was useful, relevant, and timely to my profession	5	4	3	2	1
Material format was clear and informative	5	4	3	2	1
Objectives were met	5	4	3	2	1
Material avoided commercial bias or influence	5	4	3	2	1
Overall, this CME course was beneficial to me	5	4	3	2	1

I studied this medical education program, Treating the Common Cold, An Expert Panel Consensus Recommendation for Primary Care Clinicians, and completed the CME Post-test.

Signature _____ Name (print) _____

Degree _____ Specialty _____

Address _____ City _____ State _____ Zip _____

Phone _____ Email _____

In the space provided, indicate whether each item is True (T) or False (F).

- _____ 1. The presence of thick, discolored mucus in a patient with an acute upper respiratory tract infection is often indicative of bacterial infection.
- _____ 2. Decongestants, both oral and topical, are moderately effective in adults for the short-term relief of nasal congestion associated with the common cold. However, use should be limited 2 to 3 days to avoid rebound nasal congestion.
- _____ 3. Antihistamines are considered primary, nonprescription therapy for treating the symptoms of nasal congestion, rhinorrhea, and sneezing in patients with the common cold.
- _____ 4. Using an expectorant, like guaifenesin, in combination with an antitussive is more effective than using either agent alone to thin and remove excess respiratory secretions.
- _____ 5. Although data to support the use of zinc and vitamin C for cold prophylaxis and treatment are limited, there is some positive evidence to support use.

Thank you for filling out this post-test.

