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Viral infection of the upper respiratory tract causes the common cold, humanity’s most frequent illness.1–4 Acute viral respiratory infections are often categorized as being caused by influenza, the most serious of the viruses, or all others.5–7 Noninfluenza upper respiratory infection (URI), or common cold, accounts for more than 25 million doctor visits and 40 million lost days of school and work each year in the United States alone.8 Total annual economic costs are estimated at approximately $40 billion in the United States, thus making noninfluenza URI the seventh most expensive illness.9 Although colds are often considered a nuisance rather than a major public health threat, even rhinovirus, the least pathogenic of the common cold viruses, causes death among older and immunocompromised patients.10–12 On average, children experience four to six symptomatic colds per year, along with several asymptomatic infections. Day care attendance is a reported risk factor.13,14 For adults, the average is two to three symptomatic colds per year and perhaps one or two asymptomatic infections.15–17 Some people are especially prone to colds; others get them infrequently.18 We do not really know why. Despite numerous investigations, both biologic and psychosocial determinants of susceptibility are poorly understood.19–27

Pathophysiology

As an experienced illness, the common cold is characterized by nasal congestion and drainage, sneezing, sore or scratchy throat, cough, and general malaise.28–30 Cough may or may not be present and tends to occur later in the disease. The cough sometimes lasts for weeks after other symptoms have resolved. The severity of symptoms varies markedly, from barely noticeable to truly debilitating.31 Although true fever is not typical, feelings of feverishness and chilliness are common.32

As an infectious disease, viral URI is characterized by replication of viruses in oral, nasal, and upper respiratory epithelium,33 as well as by activation of local and systemic immune responses.34–36 Viral replication within epithelial cells triggers cytokine-mediated local inflammatory reactions and recruitment of white blood cells. Parasympathetic neural pathways activate and coordinate local responses. Blood vessels dilate and capillaries leak, causing edematous tissue swelling in the nasal passages.37 Mucous glands are activated, leading to copious discharge in some people. Inflammatory changes in the respiratory epithelium persist for days or weeks after viral shedding subsides. Nevertheless, viruses are sometimes cultured from occasional hosts weeks after the initial infection. Activation of inflammatory mechanisms leading to bronchial constriction makes viral URI the most frequent cause of asthma exacerbation.38

Rhinovirus is the single most common etiologic agent, but it accounts for less than half of all URIs.39–41 Other viruses include adenovirus, coronavirus, enterovirus, influenza virus, parainfluenza virus, and respiratory syncytial virus.4,42 Metapneumovirus,43,44 and then bocavirus,45–47 were more recently discovered. Others as yet undiscovered may exist, given that even the best research laboratories fail to identify an etiologic agent in up to one fourth of people with obvious colds. A few bacteria, such as Streptococcus and Haemophilus influenzae, may cause illnesses with symptoms similar to those of the common cold.

Respiratory viruses follow seasonal patterns. Influenza and respiratory syncytial virus infection occur only during the winter months. Rhinovirus URIs tend to occur in the fall and spring. Adenovirus appears year round. Parainfluenza miniepidemics are episodic. Outbreaks of atypical agents, such as the pertussis bacteria (Bordetella pertussis), may further complicate the picture.
Integrative Therapy

No effective cure exists for the common cold. Even the best positive trials report only modest symptomatic benefit and little or no duration benefit.

Exercise

Although moderate regular exercise protects against infection, excess activity such as running a marathon increases the risk of infection temporarily.24–30

Nutrition

Chicken Soup

Hot chicken soup is the epitome of traditional cold remedies and could no doubt be supported by many personal testimonies. Chicken soup as a cold remedy is also somewhat supported by at least two human studies, one reporting inhibited neutrophil chemotaxis51 and the other suggesting increased nasal mucus velocity and decreased nasal airflow resistance.52

Hot Toddy

I have been impressed by the number of people, including several physicians, who have come up after a lecture to tell me that their favorite cold remedy was some form of hot alcoholic beverage, such as a “hot toddy” or hot buttered rum. Although to my knowledge no trials have tested any of these remedies, testimonies of symptomatic benefit should not be totally disregarded. At a societal level, the inverse relationship between moderate regular consumption of alcoholic beverages and the number and severity of colds is well known.23 Those who consume one or two drinks daily have fewer and less severe colds than both those who drink heavily and those who drink not at all. One study found this relationship to be most pronounced for red wine.53 Personally, I like to add a bit of rum to a cup of hot orange juice as a nighttime cold remedy. However, this would be contraindicated in patients with alcohol use disorders, in children, in pregnant women, and in anyone needing to use a motor vehicle or operate hazardous machinery.

Botanicals

Plants have long been used for medicinal purposes.44–47 Those used for upper respiratory tract infections are discussed here.

Andrographis: Andrographis paniculata (also Known as Justicia paniculata)

Andrographis is indigenous to Asia, with traditional use most prominent in India. Of 28 Andrographis species, Andrographis paniculata is most commonly used. According to Ayurvedic tradition, andrographis is attributed many important medicinal properties, including use for constipation, digestion, fever, pain, sore throat, and snake bite, as well as to clean the blood. In the West, andrographis is most commonly used as common cold treatment or preventive.

Various laboratories have reported antimicrobial,48 anti-hyperglyemic,49,50 anti-inflammatory,51 immunomodulatory,52,53 and psychopharmacologic54 effects attributable to andrographide, flavonoids,55 and other phytochemical constituents. At least 8 RCTs have been conducted, with more than 1000 subjects, to test various andrographis derivatives in URIs, including pharyngitis.66–73 Systematic reviews by Coon and Ernst54 and Poolsup et al75 concluded the following:

Collectively, the data suggest that A. paniculata is superior to placebo in alleviating the subjective symptoms of uncomplicated upper respiratory tract infection. There is also preliminary evidence of a preventative effect. A. paniculata may be a safe and efficacious treatment for the relief of symptoms of uncomplicated upper respiratory tract infection; more research is warranted.74

The most recent trial was not included in those reviews, but it also reported positive results.76 Based on published evidence, and with no indications of serious safety concerns, for adults seeking relief from URI symptoms to try andrographis-based cold remedies seems reasonable. Evidence is not sufficient to favor one product over another, any specific dosing regimen, or any particular standardization procedure for phytochemical content. For pregnant women and children, it seems prudent to recommend against use because of the paucity of data from these populations and because of the possible risk of harm.

Dosage and Standardization

Most clinical trials used products standardized to 4% andrographide. One reasonable dose regimen would be a 300-mg tablet, four times daily, for the first few days of a cold.

Precautions

This herb is generally well tolerated. It can, however, cause gastrointestinal distress, urticaria, fatigue, and headache. In high doses, it may cause transient elevation of liver enzymes.

Several trials support the use of Andrographis. This is one to watch.

Astragalus: Astragalus membranaceus; Astragalus mongholicus

Astragalus is an important medicinal plant in traditional Chinese medicine.77 Although dozens, if not hundreds, of reported uses are recognized, astragalus extracts are commonly used for both treatment and prevention of the...
common cold.\textsuperscript{78} Even though some antiviral activity has been reported, immunomodulation is the purported mechanism of action. Indeed, several studies have reported immunostimulating activity from astragalus, from enhanced immunoglobulin production to restoration of lost T-cell activity.\textsuperscript{79–85} Astragalus root contains astragaloside, flavonoids, and saponins, which are thought to be involved in various hypothesized mechanisms of action. Unfortunately, because no human URI trials have been conducted, no clear recommendations can be made for or against use for treatment or prevention of common cold.

**Dosage**
The dose is 4 to 7 g (up to a maximum of 28 g) daily.

**Precautions**
Astragalus is generally well tolerated. Immune suppression can occur with doses greater than 28 g daily.

**Chamomile:** Matricaria chamomilla; Matricaria recutita (German chamomile); Chamaemelum nobile (Roman chamomile)
Chamomile has been used widely as a botanical remedy for centuries for a variety of purposes, including dysmenorrhea, gingivitis, hemorrhoids, infantile colic, indigestion, insomnia, nausea, and vaginitis, as well as topically for numerous skin conditions.\textsuperscript{84} In the United States, chamomile is most often used as a calmative or sedative and for irritable bowel syndrome. However, chamomile is also used for acute respiratory infection, hence it merits inclusion in this discussion. As a remedy for the common cold, chamomile can be taken as herbal tea (i.e., chamomile tea), or the flowering tops can be boiled and the vapors inhaled. One trial testing inhaled vapors from boiling chamomile reported benefit, but the study was of insufficient quality to make firm conclusions.\textsuperscript{85}

**Dosage**
Although this practice has no good supporting evidence, a cup or two of chamomile tea as supportive treatment for the common cold is certainly safe, and it may be beneficial.

**Precautions**
Even though no dose-dependent adverse reactions to chamomile are known, allergic sensitivities, including several cases of anaphylaxis, have been reported.\textsuperscript{86}

**Echinacea:** Echinacea angustifolia; Echinacea purpurea; Echinacea pallida
All dozen species from the genus *Echinacea* are indigenous to North America. Native peoples discovered dozens of medicinal uses for this plant and later transferred their knowledge to European settlers.\textsuperscript{87} In the 1920s, echinacea was introduced into Germany, where it has been popular ever since. Today, in North America, Europe, and elsewhere, echinacea extracts are widely used, especially for prevention and treatment of the common cold.\textsuperscript{86} A considerable body of research exists regarding these uses, including 20 randomized trials with more than 3000 participants, as well as dozens of in vitro and animal studies.\textsuperscript{86–91} Although some consensus exists that echinacea extracts display immunologic activities such as macrophage activation and cytokine expression,\textsuperscript{92–99} investigators disagree about which of many echinacea-derived phytochemicals are involved. Various alkylamides, glycoproteins, polysaccharides and caffeic, cichoric, and caffeic acids are all implicated. Differing extracts from all three species and from various plant parts have shown immunostimulating activity in laboratory models. No head-to-head, dose-finding, or viral load outcome studies have been reported.

Double-blind RCTs testing echinacea extracts for prevention and treatment of the common cold were initially positive, and several European trials reported positive results.\textsuperscript{100–107} More recent trials, including several in North America, reported mixed results, with the higher-quality trials finding no benefit.\textsuperscript{108–112} I myself have directed two trials. Results of the first were flatly negative,\textsuperscript{113} but results of the second trended in positive directions.\textsuperscript{114} A trial using *Echinacea angustifolia* extracts in an induced cold rhinovirus inoculation study found little or no effect.\textsuperscript{115} However, when all three rhinovirus inoculation studies are considered together, the results look more favorable.\textsuperscript{116} In general, systematic reviews tend to be positive.\textsuperscript{117–123} One negative review argued that the positive trial results could have reflected inadvertent unblinding with either placebo effect or participant reporting bias that contributed to false-positive results.\textsuperscript{124} The possibility also exists that studies with negative results went unreported. A comprehensive safety review noted some reported allergic reactions but suggested no dose-dependent adverse effects or major drug interaction concerns.\textsuperscript{125}

Given that echinacea extracts appear safe and that most published trial results remain positive, cautious support of echinacea use for adults, especially those with favorable personal experiences and positive expectations, seems reasonable. My opinion is that echinacea use in children should be discouraged because the only pediatric RCT found no positive effects but did report a slight increase in rash among patients randomized to echinacea.\textsuperscript{126} Although a modest case control study found no adverse effects in pregnancy,\textsuperscript{127} I caution against this use because the theoretical risks are substantive.

**Dosage and Standardization**
Trials with positive results have used differing formulations, with preparations made from leaf and flower of *Echinacea purpurea* used most widely. However, preliminary evidence suggests that alkylamides from roots of *E. purpurea* and *E. angustifolia* may have the best bioavailability and immunostimulating activity.\textsuperscript{128–130} Although no consensus on standardization criteria exists, most experts do agree that echinacea extracts should be used as early as possible in the course of a cold, with multiple doses per day for the first few days of symptoms.

**Elderberry:** Sambucus nigra
Preliminary research suggested that elderberry extracts may have anti-inflammatory and antiviral antinfluenza properties.\textsuperscript{131,132} One Norwegian RCT of 60 volunteers suggested a potential symptom reduction benefit in influenza-like
illness. With only one small limited trial and no good safety data, elderberry extract is probably not ready for widespread use.

**Dosage**

Elderberry fluid extract, 15 mL (1 tablespoon) four times daily, or elderberry extract lozenges (175 mg four times daily), should be taken within the first 48 hours of symptoms.

**Garlic:** *Allium sativum*

Garlic is very widely used as a food and flavoring. Medicinally, garlic has dozens, if not hundreds, of reported uses. The most prominent of these is moderation of cholesterol and other lipids, for which modest beneficial activity has been reasonably established. Use for prevention or treatment of the common cold is fairly widespread but less well researched.

Although in vitro studies have reported antibacterial and antiviral effects, only one relevant human trial has been conducted. Josling reported a trial in which 146 participants were randomized to daily garlic or placebo capsule for 12 weeks. Dramatic between-group differences were observed, with 65 colds in the placebo group and 24 in the garlic group (\(p < .001\)). The average cold duration was 5.0 days among those taking placebo compared with 1.5 days among those taking garlic (\(p < .05\)). Although the study was reported as a double-blind trial, proof of blinding was not provided. The active treatment was “an allicin-containing garlic supplement” dosed at “one capsule daily.” No further information on extraction methods, phytochemical composition, or amount of garlic was provided. Nevertheless, tentative support of garlic use may be reasonable because the risk of side effects is low, cardiovascular benefits are likely, and garlic is tasty.

**Dosage**

Fresh garlic should be used in cooking as much and as often as palatable while keeping in mind positive expectations about cardiovascular and cold prevention benefits.

**Ginseng:** *Panax ginseng, Panax quinquefolium*

Asian (*Panax ginseng*) and American (*Panax quinquefolium*) ginseng are used for many different purposes. The genus name *Panax* chosen by Linnaeus, in fact, derives from the same root word as Panacea, the Greek goddess of healing. The most widespread medical theory supporting the use of ginseng derives from traditional Chinese medicine. Ginseng is thought to have “adaptogenic” attributes, which bring balance, homeostasis, and healing. Evidence for effectiveness of a *P. ginseng* extract in preventing the common cold comes from an Italian trial of 227 people followed for 12 weeks. A series of Canadian studies of a polysaccharide-rich *P. quinquefolium* extract reported immunomodulatory changes. An RCT of 198 older nursing home residents reported reductions in both cold and flu episodes. A second preventive trial using the same formulation among 323 subjects reported a statistically significant 13% difference in incidence in cold and flu episodes during 4 months of observation. The proprietary formula used in this series of research has been approved for use in Canada. In the United States, for prevention-minded people to use small doses of ginseng extracts regularly during cold and flu season seems reasonable, but because evidence is preliminary and safety has not been established, use of ginseng in pregnancy and in children is not advised.

**Dosage**

For prevention during times of high risk, take 100 mg daily. For acute infection, consider 100 mg twice daily for 9 days.

**Precautions**

Ginseng is generally well tolerated. The most common side effect is insomnia. It can also cause tachycardia, palpitations, and hypertension.

**Goldenseal:** *Hydrastis canadensis*

Goldenseal is among the top-selling botanicals in the United States. In addition to cold remedies, *Hydrastis* extracts are found in treatments for allergy and in digestive aids, feminine cleansing products, mouthwash, shampoo, skin lotion, and laxatives. Goldenseal accompanies echinacea in many cold therapies. However, currently no RCTs have evaluated goldenseal either alone or in combination with echinacea. The phytochemical constituent berberine is pharmacologically active and in overdose can cause significant toxicity, including cardiac arrhythmia and death. Goldenseal is contraindicated in pregnancy and lactation. Berberine-rich extracts are included in many traditional Chinese medications. The demand for goldenseal has led to overharvesting and to the substitution of other plants containing berberine or similar compounds. Given these considerations, I do not recommend goldenseal to prevent or treat the common cold.

**Peppermint:** *Mentha piperita*

Peppermint and other members of the mint family are widely used for various medicinal purposes, including coughs and colds, as well as for several gastrointestinal purposes. For treating colds, mint teas and infusions are taken internally; mint oils are applied topically. Peppermint oil is composed primarily of menthol, menthone, and mentyl acetate. Menthol especially has been extracted and included in various topical cold remedies classified as “menthol rubs.” Although neither mint teas nor menthol rubs have been subjected to rigorous RCTs for the common cold, both applications seem reasonable from the perspectives of cost, risk, and potential benefit, at least for adults. More concentrated preparations such as peppermint oil should not be applied to the mucosa of infants or young children because direct inflammatory toxicity can result. Bronchospasm, tongue swelling, and even respiratory arrest have been rarely reported.

**Umckaloabo:** *Pelargonium sidoides*

Various preparations of the South African umckaloabo plant have been used for centuries, following ethnobotanical tradition. Three RCTs in adults (\(N = 746\)) and three RCTs in children (\(N = 819\)) yielded inconsistent yet generally positive findings. Although no dose-dependent adverse effects are known, one published report suggested that allergic reactions may be a relatively frequent problem. Scientific interest in *Pelargonium* is relatively recent, and conclusions to date are tentative, yet this seems a reasonable choice for adults looking for a natural treatment for cough, cold, or bronchitis.

**Dosage**

EPs 7630 is an 11% aqueous ethanolic extract in which 100 g of finished product corresponds to 8 g of extracted plant material. This was the formulation used in the clinical trials,
Nutritional Supplements

Vitamin C: Ascorbic acid
The use of vitamin C for prevention and treatment of the common cold became widespread after twice Nobel laureate Linus Pauling promoted his belief in this therapy in the 1950s and 1960s. By the early 1970s, three major trials conducted in Toronto by T.W. Anderson et al supported some preventive effectiveness. Over the next few decades, more than 30 trials including more than 12,000 participants were reported. Approximately half of these trials reported positive results, far more than would be expected by chance, but not enough to convince the more skeptical scientists. Although no clear consensus exists to explain why some trials found benefit and others did not, tentatively concluding some preventive effectiveness seems reasonable, as noted by a Cochrane Systematic Review: "The consistent and statistically significant small benefits on duration and severity for those using regular vitamin C prophylaxis indicates that vitamin C plays some role in respiratory defense mechanisms."161

Dosage
The evidence supports modest preventive effectiveness for doses of 200 to 500 mg daily. Benefits of larger doses for prevention—or for treatment of new-onset colds—are supported by some trials and systematic reviews, but not by others. Given the generally accepted safety of ascorbic acid at doses up to several grams per day over short periods, cautious support of its use seems reasonable, especially among those with positive experiences and expectations. (Very high doses, such as the 10 g per day that Linus Pauling was reportedly taking up to his death at age 93 in 1994, have not been tested in trials and hence cannot be supported.) Regular intake of vitamin C–rich foods and juices can be enthusiastically supported because greater intake of fresh fruits and vegetables has no known risks and has been associated with many health benefits in dozens of large observational studies.

Precautions
Large doses of vitamin C can cause diarrhea, gastrointestinal distress, nausea, and heartburn.

Zinc
In some ways, the story of zinc for colds is similar to that of vitamin C. Reportedly, the physician George Eby noticed the rapid recovery from URI in a child hospitalized and given zinc for unrelated reasons. This observation was followed by an RCT in 1984 that reported positive results (but had several methodologic flaws). Since then, at least 10 trials with more than 1000 participants have been conducted using various zinc preparations. As with vitamin C, only approximately half the studies had positive results, without clear indications of the reason for this disparity. Because most zinc preparations have a distinctive taste, adequate blinding may be an issue, as more skeptical experts have argued.

Some concerns also exist over adverse effects, such as unpleasant taste and nausea. Although zinc is an essential mineral, with many known protective effects when it is ingested in foods in appropriate doses, the use of relatively high doses during acute illness may or may not carry some risks. Advocates recommend frequent dosing (every 2 to 3 hours) for the first 2 or 3 days of a cold, a dosing regimen that some patients will not find convenient. More recently, nasal zinc preparations have been devised, and three out of four RCTs reported benefits. Issues of specific preparation, dosing, and blinding complicate interpretation of study results. Nasal irritation is common, and loss of sense of smell has been reported. Large, well-designed trials are needed before the benefits of oral or intranasal zinc for the common cold can be said to be proven. My personal recommendation is to support the use of oral or zinc preparations tentatively among those who have experienced benefit or express positive feelings about the treatment, but not to recommend the use of these preparations in children, in women, or in men who have not yet tried it. The U.S. Food and Drug Administration (FDA) has collected more than 100 reports of loss of sense of smell for people using nasal zinc. Zicam has been withdrawn from the market. I recommend that nasal zinc not be used.

Dosage
Zinc gluconate, 9 to 24 mg of elemental zinc, is taken every 2 hours while symptomatic.

Precautions
Zinc can inhibit the absorption of other minerals (copper), and nasal formulations have been associated with loss of smell.

Probiotics
Probiotics are live bacteria that are thought to support healthy gastrointestinal function. Several trials demonstrated benefit for antibiotic-associated diarrhea, and others suggested benefit for irritable bowel syndrome and a few other conditions. Reasonably strong preliminary evidence indicates that probiotics may also prevent or ameliorate URI illness. This evidence comes from several trials testing efficacy for preventing cold and flu illness episodes. One RCT was of older persons, and two involved children. One of these studies was aimed at preventing diarrhea illness, but instead it provided some evidence of cold and flu prevention.

Dosage
In children, prevention of URI was found with a milk product containing Lactobacillus rhamnosus and Lactobacillus GG (in one study) and Lactobacillus acidophilus and Bifidobacterium animalis (in another). The dose is 5 to 10 billion colony-forming units (CFUs) twice daily.
Precautions

Probiotics should be avoided in persons who have compromised immunity.

Nasal Irrigation and Humidification

Nasal Saline

What could be more healthful and therapeutic than a mild saltwater rinse of the nasal cavities? Although saline nasal lavage is a long-standing tradition in many cultures, only fairly recently has Western biomedicine begun to integrate this practice. Several trials with positive results were conducted in people with allergic rhinitis and chronic sinus symptoms, including one trial at the University of Wisconsin Department of Family Medicine in Madison, Wisconsin.

To my knowledge only two RCTs of nasal saline in people with the common cold have been conducted. Adam et al. randomized 140 people to 1 of 3 groups: hypertonic saline, normal tonic saline, or no treatment (two squirts per nostril, three times per day). No significant differences among the groups were found in terms of duration or severity of symptoms. Diamond et al. reported a trial in which 955 participants were randomized to 1 of 3 doses of nasal ipratropium, to the "placebo" saline vehicle, or to no treatment at all. The nasal saline vehicle yielded greater benefit compared with no treatment than did any of the ipratropium doses when compared with each other or with saline.

Dosage

I suggest a mild salt water solution made with warm tap water and just enough salt to make it taste like tears (a half teaspoon of salt in 6 oz of warm water). To instill the solution, the head and neck should be nearly horizontal, with one ear down, and the nose should be positioned over a sink or basin. Using a neti pot (small tea pot) or a bulb syringe, gently pour the saline into the higher nostril. The soothing, cleaning fluids will run through the nasal cavity, coming to the other nostril and to the throat. Spit out any fluids from the mouth, and gently blow the nose with a handkerchief or tissue. Repeat the process with the other ear down. I suggest treatment twice daily for the first few days of a cold (see Chapter 109, Sinus Irrigation).

Hot Moist Air

One widespread traditional cold remedy involves the inhalation of hot moist air, often with a botanical or other additive. As noted earlier, the benefits of inhalation of vapors from chamomile tea were reported in one clinical trial. At least two RCTs suggested significant benefit of nasal inhalation of unadulterated hot moist air. However, two subsequent trials found no benefit. Although recommending humidification when the air is dry and perhaps advocating the inhalation of hot moist air for those who find it comforting seem reasonable, water boils at 100°C, and inhalation of vapors near this temperature may cause significant thermal damage. Be careful.

Dosage

Some patients find it beneficial to add a handful of chamomile flowers or 5 to 10 drops of eucalyptus essential oil to the water. Place the head under a towel, and inhale the steaming vapors for 10 to 15 minutes. Repeat as needed.

Mind-Body Therapy

Placebo, Meaning, and Mind-Body Effects

Since 2000, I have read the reports of hundreds of trials and dozens of systematic reviews of common cold research and have become increasingly convinced of the importance of mind-body effects, otherwise described as placebo or meaning effects. Positive thinking, suggestion, expectancy, and belief in the therapeutic value of a given remedy can be powerful healing forces. Although regular exercise, balanced nutrition, and tobacco cessation are clearly associated with fewer and less severe illness episodes, so too are positive mental health attributes such as a favorable psychological profile and healthful social relationships. Psychological predispositions, especially sociability and a positive emotional style, are predictive of both symptomatic and physiologic outcomes. For the integrative clinician, this means that understanding an individual's belief system may be a crucial part of the therapeutic encounter. If a patient already believes in a safe therapy, reinforcing that belief may enhance the therapeutic response. If a patient is wary of a remedy mentioned, do not press the issue. Remember that reassurance, empathy, empowerment, and positive prognosis can all be usefully employed in the clinical encounter.

Psychosocial Influences

As in virtually all illness, the common cold involves both psychological and physiologic elements and is influenced by social factors. Stress, both acute and chronic, increases risk. In a series of groundbreaking studies, Cohen et al showed that certain psychosocial variables predicted whether volunteers would become infected when they were exposed to rhinovirus. Childhood socioeconomic status, number and quality of social relationships, acute and chronic stress, and negative emotion measured before rhinovirus inoculation all predicted subsequent infection and viral shedding, as well as severity and duration of cold symptoms. Work by other investigators confirmed these findings. Together, these observations suggest that maintenance of psychological and social health (positive attitude, healthy relationships) may be as important as maintenance of physical health (exercise, nutrition, hand washing, smoke avoidance) for preventing colds and moderating symptoms.

Conventional Therapies

Antihistamines

Drugs blocking the effects of histamine have been sold as cold remedies for more than a century, but they have been subjected to less in terms of rigorous RCT research than alternatives such as vitamin C, zinc, and echinacea. Nevertheless, some reasonable evidence indicates modest benefit, in terms of reduction of nasal drainage, for first-generation antihistamines such as diphenhydramine, clemastine fumarate, or chlorpheniramine. These effects appear to result more from anticholinergic mechanisms than from antihistamine effects, however, and second-generation "nonsedating"
antihistamines do not seem to provide benefit. For adults who do not mind the potential sedating or membrane-drying effects, or for patients with an allergic response, a first-generation antihistamine may be a reasonable choice. For children, in whom no positive evidence of benefit in colds exists whatsoever, antihistamines should be reserved for allergic rather than infectious rhinitis.

**Decongestants**

The oral decongestant pseudoephedrine was tested in several clinical trials and appears to have minor benefit in terms of reduction of nasal congestion and drainage. Side effects including anxiety, dizziness, insomnia, and palpitations are fairly common. More worrisome is the potential for elevated blood pressure and cardiac arrhythmia. Phenylpropanolamine, for decades a popular over-the-counter decongestant, was taken off the market after studies suggested increased mortality, especially in older persons.

The topical intranasal decongestant oxymetazoline was shown to decrease nasal airway resistance, as well as mucus production and drainage. Intrasal phenylephrine has been less extensively studied but likely has similar effects. Unfortunately, these proven benefits come at the risk of nasal membrane dryness, discomfort, or nosebleed. These drugs should be used for no more than 4 days because rebound nasal congestion can occur.

**Cough Suppressants**

Dextromethorphan, the active ingredient in cough remedies designated with “DM,” is widely used as an over-the-counter cough suppressant. Codeine and, to a lesser extent, hydrocodone are prescribed for cough. Presumably, these drugs work through similar opioid-mediated mechanisms and as such have side effects including sedation, constipation, and, potentially, respiratory suppression. Although most patients and clinicians agree that these remedies work, considerable debate exists over effect size and mechanism of action, given that little appropriate evidence is available. The best systematic review of cough remedies for children and adults concludes: “There is no good evidence for or against the effectiveness of OTC medicines in acute cough.” Benzatonate (Tessalon Perles) is licensed as a prescription antitussive, but it appears to have been given this indication without any good evidence.

**Anticholinergics**

Ipratropium nasal spray was tested in several high-quality RCTs for amelioration of symptoms of infectious and allergic rhinitis. These trials, including a dose-response trial of 955 patients with community-acquired common cold, suggested a definite benefit in terms of reduced nasal congestion and drainage. Common side effects of these drugs include headache, uncomfortable nasal dryness, and nosebleed.

**Combination Formulas**

The multibillion dollar market in cold remedies is dominated by numerous products containing combination formulas. Loopholes in FDA regulations have allowed pharmaceutical companies to mix various decongestants, antihistamines, analgesics, and antitussives and then market them under a variety of brand names with exaggerated or false claims. Although some evidence of effectiveness from early trials exists for combining a decongestant with an antihistamine, few, if any, of the currently marketed products have been tested in large, well-controlled RCTs. Personally, I recommend against using any combination cold formula, with a possible exception for patients who are convinced that a specific formula works for them. Perhaps most importantly, clinicians and parents should be made aware that no cold formula has ever been proved to work in children. For pain, acetaminophen (paracetamol) may be justified, but in my opinion, virtually nothing else is.

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**PREVENTION PRESCRIPTION**

Eat a nutritious diet with foods rich in vitamin C (fruits and vegetables) and zinc (meat, nuts, cereals, seafood, and pumpkin seeds). Do not smoke. Maintain regular exercise and movement, and be careful not to overstrain. Maintain supportive social relationships. Reduce exposure to people with colds. Reduce stressors, and foster positive emotions. Wash your hands frequently. Obtain an annual influenza vaccine. Vitamin C (200 to 500 mg daily), *Panax ginseng* (100 mg daily), and probiotics have some effectiveness for the prevention of colds and flu.
The therapeutic options for the common cold are summarized here. None of these options are proved beyond reasonable doubt to be safe and effective. Nevertheless, they are all reasonable given the best current evidence of benefit and harm.

**Botanicals**
- Andrographis: 300 mg four times daily as soon as symptoms appear and continued for 3 to 4 days
- Echinacea: No one formulation appears to work better than another. Consider one of the following three to four times daily for the first 3 to 4 days of a cold:
  - 1 to 2 mL of extract in juice or water sublingually
  - 150 to 300 mg powdered extract
  - 1 to 5 mL of tincture (1:5 in ethanol)
- *Pelargonium/umckaloabo*: EPs 7630 is an 11% aqueous ethanolic extract in which 100 g of finished product corresponds to 8 g of extracted plant material. This was the formulation used in the clinical trials but may be difficult to find in the United States. Dosage used in clinical trials:
  - Those older than 12 years old: 30 drops three times daily
  - A 1 × homeopathic formulation is produced by Nature’s Way called *Umcka ColdCare*. The dose is 1 mL of the tincture three to five times a day for those older than 12 years.

**Nutritional Supplements**
- Vitamin C: 500 to 1000 mg three times daily for the first 3 to 4 days of symptoms
- Zinc gluconate or acetate: 23-mg tablets every 2 hours while awake

**Pharmaceuticals**
- First-generation (sedating) antihistamines may decrease nasal congestion, but they may cause drowsiness.
  - Diphenhydramine: 25 to 50 mg every 6 hours
  - Clemastine: 1 to 2 mg two to three times daily as needed
  - Chlorpheniramine: 4 mg every 6 hours
- Intranasal decongestants appear to be effective in decreasing nasal congestion and drainage, but quite often they cause nasal dryness, irritation, or nosebleed, and, rarely, insomnia, palpitations, or elevated blood pressure.
  - Intranasal ipratropium appears to be effective in decreasing nasal congestion and drainage, but it may cause headache, nasal irritation, or nosebleed.
  - Nasal ipratropium 0.03%: two sprays in each nostril two to three times daily. It is also effective for nasal congestion.

**Biomechanical Therapy**
- Hot moist air: Consider adding 5 to 10 drops of eucalyptus oil or chamomile tea to the water, and inhale deeply for 10 to 15 minutes.

**Nasal Irrigation**
- Consider twice daily nasal irrigation with normal or hypertonic saline with a bulb syringe, nasal spray, or neti pot (see Chapter 109, Sinus Irrigation).
  - Astragalus, chamomile, garlic, ginseng, peppermint, and chicken soup are all unproven but probably safe, supportive therapies.
KEY WEB RESOURCES

Department of Family Medicine, University of Wisconsin School of Medicine and Public Health. http://www.fammed.wisc.edu/research/past-projects/nasal-irrigation

Instructions on nasal irrigation available in English and Spanish

Integrative Medicine, Department of Family Medicine, University of Wisconsin School of Medicine and Public Health. http://www.fammed.wisc.edu/sites/default/files/webfm-uploads/documents/outreach/im/ss_andrographis.pdf

Monograph on Andrographis

Integrative Medicine, Department of Family Medicine, University of Wisconsin School of Medicine and Public Health. http://www.fammed.wisc.edu/sites/default/files/webfm-uploads/documents/outreach/im/ss_pelargonium.pdf

Monograph on Pelargonium

National Center for Complementary and Alternative Medicine, National Institutes of Health: http://nccam.nih.gov/news/newsletter/2010_february/coldnflu1.htm

Clinical information on the common cold

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