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## The Common Cold: Quest for a Cure

### Introduction

The common cold is typically a mild, self-limited viral infection that is characterized by nasal discharge, sneezing, sore throat, cough and hoarseness. The symptoms are usually present from 2 to 14 days and there are very few effective treatments available. Fever, malaise and lacrimation also may be present to various degrees, and one must differentiate the common cold from more serious infections such as pertussis, acute bronchitis, influenza, and bacterial sinusitis. The common cold itself is usually harmless and is very common. It has been estimated that the average adult will develop two to four colds per year and children will develop up to eight (Fiebach & Rastegar, 2003). Due to the frequency of the common cold, various studies have examined the economic burden of the common cold and it is quite striking. Colds account for approximately 40% of lost time from jobs (approximately 23 million days of work per year) and up to 30% of missed school days (Kirkpatrick, 1996). A further study, published in 2003, examined the frequency of viral infections as well as the associated economic impact resulting from viral infections. The authors conducted a nationwide survey of US households between November 3, 2000 and February 12, 2001. Participants were asked to estimate the incidence of non-influenza-related viral respiratory tract infections (VRTI) over the past year. Of the respondents, 72% reported a non-influenza-related VRTI over the past year. Typically, those that reported an illness suffered from 2.5 episodes annually. The authors went on to estimate that approximately 500 million non-influenza-related VRTI episodes occur per year in the US alone. Based on these numbers, the authors concluded that the total economic impact approaches \$40 billion annually (Fendrick, Monto, Nightengale, & Sarnes, 2003).

Due to the frequency in occurrences of the common cold, and its economic impact, it is important to examine treatment options. Unfortunately, therapeutic options for the common cold have not evolved significantly over the past century. A paper published by Bishop in 1904 suggested the use of fever reduction with anti-pyrim (i.e. Tylenol or Aspirin) and the relief of pain and other distressing symptoms by “coryza tablets”, containing a combination of morphia (analgesic), atropia (anti-cholinergic), and caffeine (stimulant) (Bishop, 1904). It is interesting to note that current recommendations are quite similar. Current over the counter remedies may include a combination of acetaminophen (analgesic and anti-pyretic), chlorpheniramine (antihistamine), dextromethorphan (cough suppressant), and phenylephrine (decongestant). The above interventions are largely for symptomatic relief and do not significantly reduce the duration of the illness.

There are, however, certain alternative medications that are readily available over the counter. These include remedies such as Echinacea, Zinc, and Vitamin C. Given the lack of conventional therapeutic options, these remedies offer the possibility of relief from those that suffer from the common cold. The question, however, is whether there is any data to back up the use of

these alternative options or are they simply a modern day snake oil? The following review will cover the basics about the common cold, including factors involved in transmissibility of the virus, as well as a brief review on the basic types of viruses that cause the common cold. The primary focus, however, will be on the evidence behind the use of several over the counter, alternative therapies for the common cold.

## The Common Cold

### *Viral Characteristics*

The common cold is associated with over 200 different subtypes of viruses. Of the various subtypes, the rhinovirus is estimated to cause around 30%-50% of cases, coronavirus around 10-15%, influenza viruses 5%-15%, RSV and parainfluenza around 5% of cases each, with the remainder of cases likely caused by enteroviruses, adenoviruses, metapneumoviruses or in many cases unknown viral subtypes (Heikkinen & Jarvinen, 2003). It is interesting to note that each subtype will present with subtly different symptoms; however, due to a wide overlap of symptoms, it is virtually impossible to ascertain which viral agent is causing an illness based on clinical presentation (see table 1 below) (Kirkpatrick, 1996). There are characteristic seasonal patterns as well for each virus. For example, rhinovirus is more common in early fall and late spring, RSV tends to be more predominant in winter, and parainfluenza 1 and 2 peaks during autumn, while type 3 peaks during late spring. Adenovirus and coronavirus are more common during winter and spring (see figure 1 below) (Kirkpatrick, 1996). It is of limited utility, however, to determine the viral subtype because conventional treatments do not specifically address any subtype, but provide symptomatic relief instead.

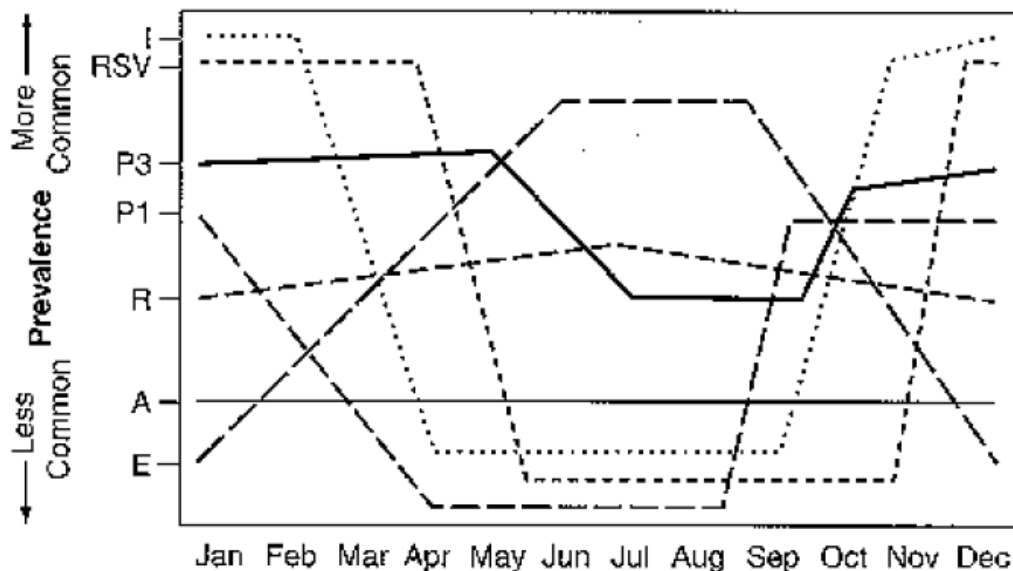


Figure 1. Seasonal prevalence of common cold viruses. I – Influenza; RSV = respiratory syncytial virus; P3 = parainfluenza type 3; P1 = parainfluenza type 1; R = rhinovirus; A = adenovirus; E = enterovirus. (Kirkpatrick, 1996)

**TABLE 1 -- PERCENTAGE OF PATIENTS SHOWING INDIVIDUAL SYMPTOMS WITH EACH COMMON COLD VIRUS. (Kirkpatrick, 1996).**

<b>Virus</b>	<b>Sore Throat (%)</b>	<b>Cough (%)</b>	<b>Rhinitis (%)</b>	<b>Nasal Congestion (%)</b>	<b>Fever (%)</b>	<b>Malaise (%)</b>	<b>Conjunctivitis (%)</b>
Adenovirus	95	80	70	--	70	60	15
Coxsackievirus	65	60	75	--	35	30	30
RSV	90	65	80	95	20	65	--
Echovirus	60	50	99	90	10	45	--
Rhinovirus	55	45	90	90	15	40	10
Coronavirus	55	50	90	90	15	40	10
Parainfluenza	75	50	65	--	30	70	5
All viruses as a group	70	80	95	95	No data	60	No data

The common cold syndrome varies amongst individuals, but typically follows a predictable pattern. Early symptoms may include headache, sneezing, chills, and sore throat. Later symptoms may include nasal discharge, nasal obstruction, cough, and malaise. Overall, the severity of symptoms increases rapidly, with a peak around 2-3 days after infection and a mean duration of symptoms of 7-10 days (Eccles, 2005). Jackson et al. (1958) studied the common cold by exposing otherwise healthy volunteers to nasal secretions obtained from a donor with a cold. They found that the common cold developed in approximately 35%-40% of young adults following a single challenge with an infectious secretion. The incubation period ranged from 24-72 hours and varied based on the source of secretions. The experimental cold was rarely associated with fever and the most severe symptoms were experienced within the first 48 hours of development of the cold (Jackson, Dowling, Spiesman, & Board, 1958).

#### *Transmission and Prevention*

There are three ways in which the common cold can be transmitted from person to person. They include hand contact, small particle aerosols (droplet transmission) and large particle aerosols (e.g. direct hit from a sneeze). The primary, and most successful route of transmission, involves direct spread of the virus from one person to another. This typically involves transmission of the infectious mucoid secretions to the fingers and hands and, ultimately, the nose or eyes of a susceptible recipient. These viruses may remain viable on human skin for up to two hours. A study

was performed that examined the importance of hand-to-hand transmission as well as the importance of clean hands. In this placebo-controlled study, 2% iodine or placebo was applied to the fingers of mothers when a family member had a viral illness. The rate of illness was found to be significantly less in the iodine group as compared to the control group (7% vs. 20%) (Hendley & Gwaltney, 1988).

The importance of patient education in the prevention of the common cold also cannot be underestimated. Lee et al. (2005) examined the transmission of respiratory and GI illnesses among families with children enrolled in daycare. As a secondary analysis, this study also examined predictors of reduced illness transmission in the home. Participants were asked about their beliefs regarding illness transmission for respiratory and GI illnesses. Only two-thirds of respondents believed correctly that contact transmission was important for the spread of colds. Nearly all of the respondents believed that kissing was an efficient means of spreading colds (not a significant factor). The authors also measured secondary transmission rates for respiratory and GI illnesses. It was found that only 22% of participants reported the use of alcohol-based hand gels all, most, or some of the time and only 33% reported always washing their hands after blowing or wiping a nose. Alcohol-based gels were ultimately found to significantly reduce the respiratory illness transmission in the home of those that used them regularly (RR 0.6, 95% CI 0.4-0.9) (Lee, et al., 2005).

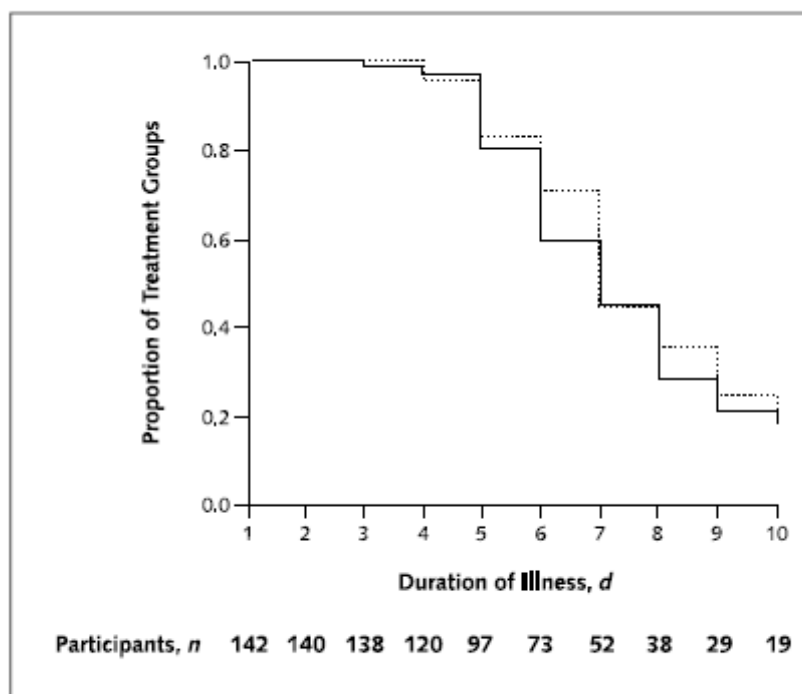
While the three mechanisms described have been shown to be effective means of transmission of the common cold, there are several unproven factors as well. One study examined whether aircraft cabin air recirculation was correlated with transmission of the common cold. Half of the participants flew from San Francisco to Denver aboard an airplane that used recirculated air. The other half of the participants flew aboard a plane that used only fresh air in the cabin. There were no significant differences in the rate of development of the common cold between groups 5 to 7 days after the flight (Zitter, Mazonson, Miller, Hulley, & Balmes, 2002). In addition, it has been found that saliva is not an efficient way to spread the common cold either. One study found that only one of sixteen recipients became infected after a 1.5 minute kiss from an infected person. In addition, symptomatic donors have no detectable virus in their saliva up to 90% of the time (Kirkpatrick, 1996). In addition to there being no significant association between air recirculation and the common cold, exposure to cold climates has not been found to be a significant factor in transmission of the common cold either (Warshauer, Dick, Mandel, Flynn, & Jerde, 1989) (Paul & Freese, 1933).

While the epidemiology, clinical features, and pathophysiology of the common cold are relatively well understood, curative treatment options are still lacking. Progress in identifying something other than symptomatic treatment for the common cold over the past century has been relatively slow. There is currently no FDA approved treatment for the common cold aside from symptomatic treatments. Antibiotics have been shown to be ineffective in reducing the length of the common cold and have a significantly greater amount of adverse events (Arroll & Kenealy, 2005). This has left the market open to alternative therapies to fill in the gap. There are several products on the market that report to reduce the length and severity of the common cold. Some of these remedies include Echinacea, Zinc, and Vitamin C. The following section will review the data about the effectiveness of these treatments.

## Echinacea

Echinacea is a perennial herb that can grow up to 45 cm in height. It is typically found in the middle or eastern United States and is cultivated in Europe as well. While there are several different species of Echinacea, the three main types that are considered to have medicinal properties include *Echinacea purpurea*, *Echinacea angustifolia*, and *Echinacea pallida* (Ashar, 2003). According to the PDR for Herbal Medicines, Echinacea activity is directed toward the nonspecific cellular immune system. “The herb has demonstrated antibacterial, anti-inflammatory, metabolic, immune-system enhancement, infertility, wound healing, antineoplastic, and antiseptic properties, depending on the type of plant species” (Echinacea, 2004). There are myriad clinical trials that have attempted to support this statement; the following section will review some of these trials.

Barrett et al. (2002) performed a randomized, double-blind, placebo controlled trial to assess



The dotted line represents the echinacea group; the solid line represents the placebo group.

**Figure 2. Effect of Echinacea on Illness Duration. Barrett et al (2002)**

bottle containing 132 capsules and was instructed to take 4 capsules per dose six times during the first 24 hours (6 g) followed by three times daily (3 g) each day thereafter until the symptoms resolved. There was no significant difference in cold duration between the Echinacea and placebo group (See Figure 2). Mean duration of placebo group was 5.75 days vs. 6.27 days in the Echinacea group (95% CI, -1.09 to 0.22 days). Nor were there any significant differences in symptom severity between the Echinacea and placebo groups including myalgias, fever, stuffy nose, scratchy throat, cough, sneezing, or sore throat (Barret, Brown, Locken, Maberry, Bobula, & D'Alessio, 2002).

Goel et al. (2004) studied a slightly different form of Echinacea – *Echinacea purpurea*. The authors' purpose was to test the efficacy of a “highly standardized formulation” of Echinacea in

efficacy of dried, encapsulated, whole-plant Echinacea as an early treatment for the common cold. This was a community based trial done at University of Wisconsin. Participants included 148 registered students with early cold symptoms who were randomly assigned to the Echinacea group (n=73) or placebo group (n=75) and followed over a 10 day period. The Echinacea preparation contained a dried mixture of *E. angustifolia* root (50%), *E. purpurea* root (25%), and *E. purpurea* herb (25%). Each participant was given a

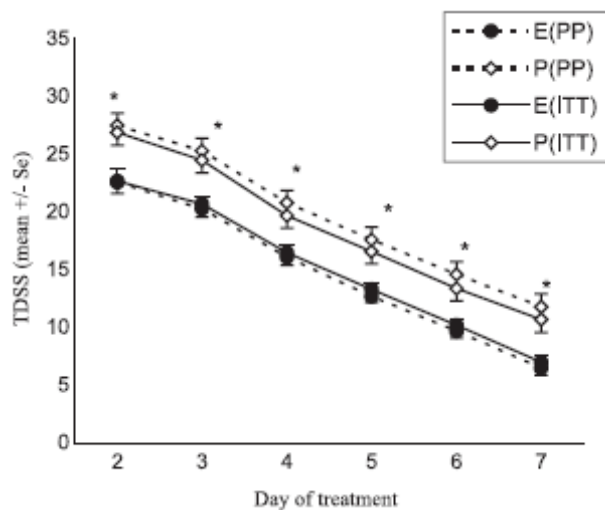


Figure 3. Effect of Echinacea on disease severity. Goel et al (2004)

Symptoms	Echinacea, days (95% CI)	Placebo, days (95% CI)	P
<b>Sore throat</b>			
Per protocol <sup>a</sup>	1.1 (0.6–1.6)	1.8 (1.3–3.1)	<0.05
Intention to treat <sup>b</sup>	1.1 (0.7–1.6)	1.6 (1.2–2.0)	<0.16
<b>Nasal discharge</b>			
Per protocol	1.5 (0.9–2.1)	2.1 (1.6–2.7)	<0.09
Intention to treat	1.4 (0.9–1.9)	1.9 (1.4–2.4)	<0.12
<b>Nasal congestion</b>			
Per protocol	1.6 (1.1–2.2)	2.6 (2.0–3.2)	<0.02
Intention to treat	1.6 (1.0–2.2)	2.3 (1.7–2.9)	<0.10
<b>Cough</b>			
Per protocol	1.2 (0.7–1.7)	0.9 (0.4–1.4)	<0.30
Intention to treat	1.1 (0.7–1.5)	0.8 (0.4–1.2)	<0.30
<b>Tiredness</b>			
Per protocol	2.0 (1.4–2.6)	2.9 (2.3–3.5)	<0.06
Intention to treat	2.1 (1.5–2.7)	2.9 (2.3–3.5)	<0.07
<b>Headache</b>			
Per protocol	0.8 (0.4–1.1)	1.2 (0.8–1.6)	<0.20
Intention to treat	0.8 (0.4–1.1)	1.2 (0.8–1.6)	<0.20
<b>Chills</b>			
Per protocol	0.3 (0.06–0.6)	0.7 (0.4–0.8)	<0.1
Intention to treat	0.3 (0.03–0.6)	0.6 (0.3–0.9)	<0.1

<sup>a</sup>Echinacea n = 54, placebo n = 57.

<sup>b</sup>Echinacea n = 59, placebo n = 69.

Table 2. Duration of symptoms of a cold during treatment with Echinacea or placebo. Goel et al (2004)

average number of colds, and smoking history. Participants were treated with either 100 mg of Echinacea three times daily or placebo until cold symptoms were relieved or until the end of 14 days, whichever came first. There was no significant difference between groups when mean total symptom scores, individual symptoms, or overall time to resolution of symptoms was analyzed (Yale & Liu, 2004).

As can be seen by the previous studies cited, there is considerable variability in the forms of Echinacea available. This has led to difficulty in interpretation. Often, very different doses or forms

reducing the severity and duration of a naturally acquired common cold. In a randomized, double-blind, placebo-controlled trial, 282 subjects between ages 18-65 were randomized to receive either Echinacea or placebo at the onset of the first symptom related to a cold. Similar to the prior study, participants received a relatively high dose of Echinacea on the first day, followed by a slightly lower dose for the subsequent seven days. Severity of symptoms on a 10-point scale and dosing was recorded daily and a sum of the scores was used to calculate total disease severity. In addition to self report, a nurse examined participants on the mornings of days 3 and 8 of their cold. Of the initial 282 volunteers, 128 actually contracted a cold during the study period. Fifty-nine were randomized to receive Echinacea and sixty-nine were randomized to placebo. Overall, the total daily symptom scores were found to be 23.1% lower in the Echinacea group than in placebo ( $p < .03$ ). There was no significant difference, however, in the duration of symptoms of a cold during treatment with Echinacea or placebo (see table 2) (Goel, et al., 2004).

Yale & Liu (2004) also conducted a randomized, double-blinded, placebo-controlled trial which used the freeze-dried pressed juice from the aerial portion of *Echinacea purpurea*. For this study, participants were randomized to either a treatment or placebo group within 24 hours of cold symptom onset. The groups were similar with respect to sex, age, time from symptom onset to enrollment in the study,

of Echinacea are used in different studies. A study published in The New England Journal of Medicine by Turner et al. (2005) attempted to clarify this issue. There were several features that set this study apart from the others. Three different preparations of *Echinacea angustifolia*, with distinct phytochemical profiles, were produced. In addition, volunteers were provided with seven days of “prophylaxis” prior to being inoculated with rhinovirus type 39 and subsequently isolated in hotel rooms for the duration of the study. Study authors examined the effect of Echinacea on infection, symptoms, and inflammatory markers. Overall, there was no difference between groups with respect to any of the mentioned variables. The authors conclude that *Echinacea angustifolia* does not have clinically significant effects on rhinovirus infection or illness (Turner, Bauer, Woelkart, Hulsey, & Gangemi, 2005).

To date, the efficacy of Echinacea appears to be controversial. Some studies document a clinically significant effect of Echinacea on the common cold while others do not support its regular use. A recent meta-analysis published in Lancet Infectious Disease examined 14 unique studies that evaluated the effect of Echinacea on the incidence and duration of the common cold (Shah, Sander, White, Rinaldi, & Coleman, 2007). They concluded that when taken together, current evidence in the literature suggests that Echinacea has a benefit in decreasing the incidence and duration of the common cold (see figure 4). However, they cautioned that large-scale randomized prospective studies are still needed before Echinacea can be endorsed as standard practice for treatment of the common cold. Specifically, variables such as species, quality of preparation and dose of Echinacea, method of cold induction and objectivity of study endpoints need to be better controlled. A recent Cochrane analysis also examined the evidence for the use of Echinacea. The authors concluded that while preparations in clinical trials differed greatly, there was some evidence to support the use of Echinacea, specifically preparations based on the aerial parts, for the early treatment of colds in adults (Linde, Barrett, Wolkart, Bauer, & Melchart, 2007). They also state that beneficial effects of other preparations might exist but have not been shown in “independently replicated, rigorous randomized trials”.

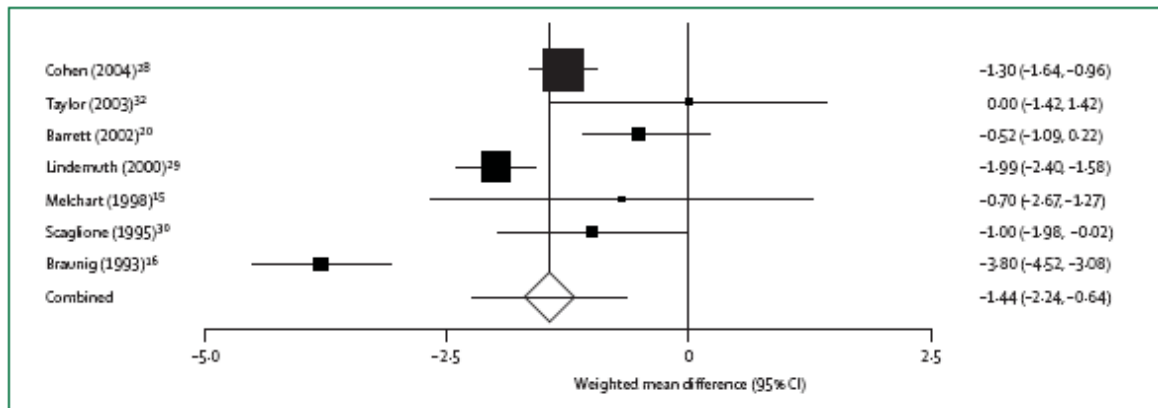


Figure 4. Effect of Echinacea on duration of common cold. Shah et al (2007)

## Zinc

Zinc is an essential trace element and has a wide variety of potential uses. According to the PDR for Herbal Medicines, Zinc supplementation can be used to correct zinc-deficiency, as an astringent to relieve minor eye irritation, for therapy with penicillamine, sickle cell disease, thalassemia, dementia, and the common cold. Cold-Eeze® is a popular zinc supplement that is widely available. Cold-Eeze® claims to reduce the duration of the common cold by up to 3 to 4 days. In addition, they state that other cold remedies only treat symptoms and may cause “unwanted and sometimes dangerous side effects”. The Cold-Eeze® website actually cites various articles published in journals such as *Annals of Internal Medicine*, *American Journal of Therapeutics* and *The Journal of Internal Medical Research* to support their claims. The following section will review the current data on zinc supplementation and explore whether these claims have veracity.

One of the main articles cited was published in the *Annals of Internal Medicine* in 1996 by Mossad et al. Their objective was to test the efficacy of zinc gluconate lozenges in reducing the duration of symptoms caused by the common cold. This was a randomized, double-blind, placebo-controlled study performed at the outpatient department of a large tertiary care center. There were a total of 100 participants enrolled who developed symptoms of the common cold within 24 hours of enrollment. Half of the group received one zinc lozenge every 2 hours while awake, the other half received lozenges that contained an inactive ingredient. Main outcome measures included cough, headache, hoarseness, myalgias, nasal drainage, nasal congestion, scratchy throat, sore throat, sneezing, and fever. The authors determined that a 50% reduction in duration of symptoms would represent a significant clinical effect. The time to resolution of symptoms was significantly shorter in the zinc group as compared to the placebo group (median 4.4 days vs. 7.6 days  $p < 0.001$ ) as illustrated in the Kaplan-Meier curve below. As expected there were significantly more adverse effects related to the zinc group and included nausea and bad taste reactions (Mossad, Macknin, Mendendorp, & Mason, 1996). This article has served as a basis for the Cold-EEZE® claims.

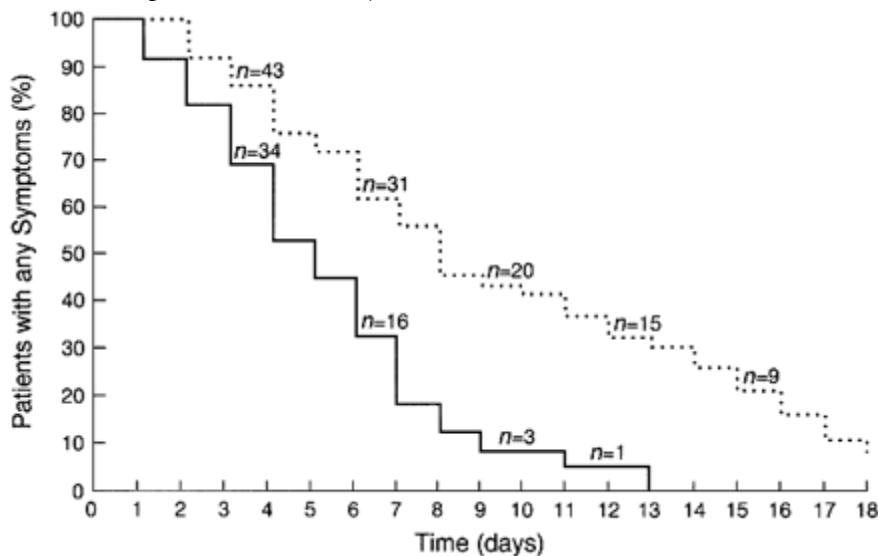


Figure 5. Duration of Cold. Solid Line = zinc, dotted line = placebo. Mossad et al (1996)

Further literature, however, has not necessarily supported these findings. A subsequent study published in JAMA in 1998 examined zinc gluconate lozenges for treating the common cold in children. This was another fairly well designed study that was randomized, double-masked and placebo controlled. The authors enrolled 249 children from grades 1 to 12 in two suburban school districts in Cleveland, Ohio. Participants were enrolled within 24 hours of experiencing at least 2 of the 9 common symptoms of the common cold. Half the group received zinc lozenges, half received placebo. Time to resolution of cold symptoms based on subjective daily symptoms scores similar to that of the prior study was used as the main outcome measure. The authors did not find any difference between the two groups with the median time to resolution of all cold symptoms 9.0 days for placebo group (95% CI 8-9 days) vs. 9.0 days for treatment group (95% CI 7-10 days) ( $p=0.71$ ). As seen in the prior study, slightly more participants in the treatment group experienced at least one adverse effect such as bad taste, nausea, mouth/tongue/throat irritation and diarrhea. This article contradicts the data from the prior study and does not provide support for treating school-aged children with zinc for the common cold (Macknin, Piedmonte, Calendine, Janosky, & Walk, 1998).

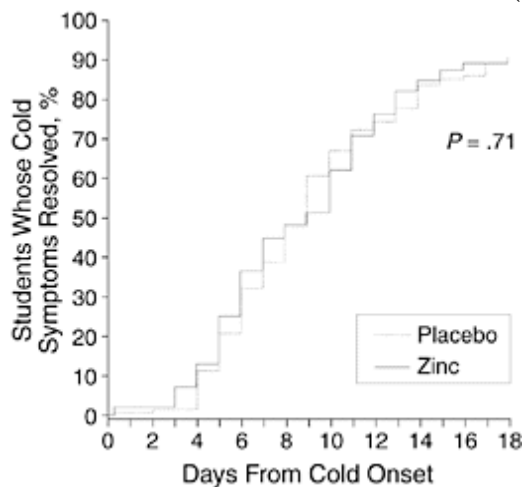


Figure 6. Resolution of symptoms for zinc vs. placebo group. Macknin et al (1998)

Another study examined the effectiveness of Cold-Eeze® lozenges in reducing the duration and symptoms of the common cold in school-aged subjects. This was an open-label clinical trial with no placebo group. A placebo group from a prior retrospective study done by the same authors was used for comparison. A total of 178 children, aged 12 to 18 years, were enrolled with 134 meeting criteria for evaluability of efficacy. This was both a prophylactic and treatment study. Zinc lozenges were administered once daily during the cold season for prophylaxis. For therapeutic purposes, lozenges were given four times daily. The primary outcome measure was treatment effect on cold duration with a secondary measure of the total number of common colds. The average cold duration was  $6.9 \pm 3.1$  days which was significantly shorter than the  $9.0 \pm 3.5$  days found in the control group ( $p < 0.001$ ). Mean number of colds was  $1.28 \pm 1.03$  with zinc lozenge prophylaxis versus  $1.7 \pm 1.9$  without prophylaxis ( $p < 0.05$ ). In contrast to prior studies, no adverse events were reported (McElroy & Miller, 2003).

Zinc also is available as a nasal gel (Zicam), which has come under scrutiny in the press lately. A study published in 2000 examined the effectiveness of zinc nasal gel for treatment of the

common cold. This study was designed similarly to the Mossad et al. (1996) study already discussed. Subjects were recruited at four different sites in the Los Angeles area. 213 participants were enrolled; 108 were randomized to zinc nasal gel, 105 received placebo. Participants who developed cold symptoms within the previous 24 hours were enrolled and they were required to have had at least three of the following symptoms: cough, headache, hoarseness, muscle ache, nasal drainage, nasal congestion, scratchy throat, sore throat, or sneezing. In a double-blind fashion, gels were dispensed and subjects were instructed to spray one dose into each nostril every 4 hours for the duration of symptoms. Symptom charts were used to track the duration and severity of symptoms. Overall, duration of symptoms was 2.3 days ( $\pm 0.9$ ) in the zinc group vs. 9.0 days ( $\pm 2.5$ ) in the control group ( $p < 0.05$ ) (Hirt, Nobel, & Barron, 2000). Participants were also asked to detail any adverse reactions. Almost half of the zinc group complained of a slight tingling or burning sensation, with one-third of those participants enrolled in the placebo arm complaining of a similar symptom. Recent data, however, has cast doubt on the safety of zinc nasal gel. Jafek et al. (2004) published a series of case reports relating intranasal zinc to cases of anosmia. Severe hyposmia or anosmia was reported after the use of intranasal zinc gluconate that in some cases was long lasting and potentially permanent (Jafek, Linschoten, & Murrow, 2004). While the lozenges appear to be relatively safe and potentially effective, the risk of intranasal gel outweighs any potential benefits for its use.

## **Vitamin C**

Thus far, the efficacy of zinc and Echinacea has proven to be controversial at best. While some trials support the use of these herbal medicines for the common cold, the data is mixed. Vitamin C (ascorbic acid) is an essential nutrient, a lack of which is typically associated with scurvy. Vitamin C is a highly effective antioxidant as well as a cofactor for many biochemical reactions. The US RDA recommendation for Vitamin C is 90 mg per daily with a tolerable upper limit of intake of 2,000 mg daily. However, some advocate the use of vitamin C megadoses at levels of up to 1-3 grams daily, especially in the treatment of the common cold. In similar fashion to the other alternative remedies, there is mixed data with respect to the effectiveness of vitamin C on the common cold. There is some evidence that Vitamin C may be used as prophylaxis, but this section will focus on treatment of the acute cold.

Audera et al. (2001) published a double-blind, randomized clinical trial that examined the effectiveness of mega-dose vitamin C in treatment of the common cold. 400 healthy volunteers were included and were instructed to commence medication when they experienced the early symptoms of a cold for four hours. Patients subsequently recorded daily symptoms, doctor visits, and use of other medications. Participants were randomized to receive one of four interventions: vitamin C at a daily dose of 0.03 gm (placebo), 1 gm, 3 gm, or “Bio-C” which contained 3 gm of vitamin C as well as bioflavonoids, rutin, hisperidin, rose hip extract and acerola. Participants recorded daily cold symptoms and rated them on a scale of 1 (mild)-3 (Severe). Patients kept a log until symptoms disappeared or 28 days after the onset of the cold, whichever came first. Duration was defined as onset until the last day of any symptom. There were no significant differences between the groups in either mean duration of symptoms or mean severity scores at days 7, 14, 28 and the authors

concluded that there was no benefit of vitamin C in reducing the severity or duration of cold symptoms (Audera, Patulny, Sander, & Douglas, 2001).

A recent meta-analysis examined several trials that have studied whether vitamin C significantly reduces the length of the common cold. A total of seven trials were examined that involved 3294 respiratory infections. In all trials, vitamin C was initiated after the onset of symptoms; no significant differences were found. In addition, four trial comparisons involved 2753 respiratory episodes that contributed to a meta-analysis of cold severity during therapy and, again, no significant differences were seen (Douglas, Hemila, Chalker, & Treacy, 2007). Vitamin C is a supplement that was studied fairly intensely in the 1970s and the majority of randomized trials were published then. Of the four randomized, placebo-controlled trials that have been done, there is little support for the role of Vitamin C in reducing the duration or severity of the common cold (Karlowski, Chalmers, & Frenkel, 1975) (Tyrrell, Craig, Meada, & White, 1977) (Anderson, Suranyi, & Beaton, 1974).

## **Conclusions**

While there are currently no FDA approved treatments that reduce the duration of the common cold, there is some data that supports the use of zinc and Echinacea in the treatment of the common cold. Overall, the data is fairly mixed, but these two supplements have been found to be relatively safe, with the exception of zinc intranasal gel. It may be reasonable to use zinc and Echinacea in treating the common cold, but further data is needed before an official recommendation can be made. After a thorough review of the literature, it would appear that preventive measures such as hand washing with either soap or an alcohol based cleanser are likely to be the most beneficial to the patient population as a whole.

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