

# Echinacea

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Author Disclosure  
Ms Charrois and Ms  
Hrudey did not  
disclose any financial  
relationships relevant  
to this article. Dr  
Vohra is an Alberta  
Heritage Foundation  
for Medical Research  
Population Health  
Investigator and  
recipient of a  
Canadian Institute of  
Health Research New  
Investigator Award.

## Introduction

Echinacea has been used for centuries in North American traditional medicine for a variety of conditions and currently is used primarily for the prevention and treatment of upper respiratory tract infections (URTIs). Research results on its efficacy for these indications have been mixed, but few adverse effects have been noted, with the exception of some allergies and rashes.

## Definition and Description

*Echinacea*, also known as purple coneflower, is native to North America. The three species used medicinally most often are *E angustifolia*, *E pallida*, and *E purpurea*. Most clinical studies have focused on *E purpurea*. (1) The properties of commercially available products differ regarding species used, plant part used, extraction method, and whether other plant extracts are included.

## Evidence of Efficacy in Pediatrics

Few systematic reviews have summarized the efficacy of echinacea for the treatment and prevention of URTIs. Other reviews have concluded that there may be efficacy in the treatment but not necessarily in the prevention of URTIs in adults. (2)(3)(4) Because these reviews were not conducted systematically with explicit methods, the results and conclusions are subject to bias.

A recent updated Cochrane systematic review includes results from trials that involved both adults and children for the use of echinacea in the treatment or prevention of the common cold. (5) The results can be summarized as follows:

- Prevention trials with placebo comparison: no difference between groups
- Treatment trials with no treatment comparison: one study had a trend in favor of echinacea; one study had no difference
- Treatment trials with placebo comparison: nine studies had significant effects over placebo, one had a trend in favor of echinacea, and six studies found no difference

The authors concluded that the trials varied in their methods for cold assessment and phytochemical differences in products studied. Most of the included trials had good methodology, and there was some evidence that preparations based on the aerial parts of *E purpurea* might be effective for the treatment of colds in adults. There was not enough evidence to evaluate the effects of other echinacea preparations (including *E angustifolia*) in preventing colds.

Another recent systematic review evaluated the effect of echinacea on the treatment of experimental rhinovirus infection. (6) The authors found that the likelihood of experiencing a clinical cold was 55% higher with placebo than with echinacea (odds ratio 1.55, 95% confidence interval 1.02 to 2.36). Total symptom scores did not differ between placebo and treatment.

In July 2005, a rigorously designed study evaluating the efficacy of highly standardized *E angustifolia* preparations in young adults (mean age,  $20.8 \pm 3.3$  y) documented no significant benefit with *E angustifolia* for preventing or reducing URTI symptoms. (7) Critics of the validity of this study cite problems with the choice of product, the dose, and the timing of treatment initiation. (8)(9)(10)(11) The National Center for Complementary and Alternative Medicine of the National Institutes of Health continues to support

\*On behalf of the American Academy of Pediatrics Provisional Section on Complementary, Holistic, and Integrative Medicine.

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research on echinacea based on the belief that unanswered questions remain regarding which plant part should be used, the differences in *Echinacea* species, and the most effective dose. (12)

Placebo-controlled trials have yet to prove that *E purpurea* is efficacious in treating or preventing colds in children or in reducing the severity of URTI symptoms in children. (13)(14)(15) In a randomized controlled trial of 200 children treated with echinacea versus 207 children receiving placebo, who ranged in age from 2 to 11 years, *E purpurea* reduced the frequency of subsequent URTIs in children. (13) Some 64% of the children who received placebo had more than one URTI compared with 52% in the echinacea group ( $P=0.015$ ). Because this was not the primary endpoint of the study, these results need to be interpreted with caution.

Other trials conducted in children have studied the use of echinacea in combination with other agents. The coadministration of echinacea with antibiotics may enhance the effectiveness of antibiotics in treating streptococcal chronic tonsillitis. (16) The combination of echinacea with propolis (a natural resin created by bees) and vitamin C has shown a significant benefit in preventing colds in children ages 1 to 5 years in a randomized, double-blind, placebo-controlled study. (17) The treatment group had 0.9 episodes per child compared with 1.8 episodes per child in the placebo group ( $P<0.001$ ), which was the primary endpoint. The differences in the number of days with fevers and the total number of illness days also were statistically significant.

Other reported uses for echinacea include prevention and treatment of other viral or bacterial infections; adjuvant therapy for cancer; treatment of chronic fatigue syndrome; and topical application for wound healing, abscesses, burns, and leg ulcers. (18)(19)

## Evidence of Safety

### Adverse Events

In general, echinacea has a good safety profile, with adverse events being uncommon. A recent systematic review of adverse events, including data from Australia, Germany, the United Kingdom, the United States, and the World Health Organization, concluded that the most common adverse effects associated with echinacea are gastrointestinal upset and skin-related reactions. (1) Patients who had atopy and asthma were at higher risk of allergic or anaphylactic reactions. (1)

In the largest randomized, controlled trial of echinacea in children, rashes occurred in 7.1% of children treated with echinacea versus 2.7% for the placebo group. (13) Caution, therefore, is recommended when using

echinacea in children who have atopy and asthma because they are likely to be at higher risk for rash. (1)(13)

### Drug Interactions

To date, no clinically significant drug interactions have been reported. Theoretically, echinacea should not be coadministered with immunosuppressants because of the immunostimulating properties of the herbal. (18)

### Precautions/Contraindications

Persons who have an allergy to the *Asteraceae* plant family, which includes ragweed, chrysanthemum, marigold, and daisy, may be at increased risk for an allergic reaction due to cross-sensitivity. (14) Individuals who have asthma or atopy may be predisposed to allergic reactions with echinacea. (20)

Other possible risks associated with echinacea include a theoretical risk of immunosuppression when used longer than 8 weeks. It is worth noting that although echinacea theoretically should be avoided in patients who have autoimmune diseases, few published case reports exist, with limited causal association. (21)(22)

### Use in Pregnancy and Lactation

There is limited evidence of safety during pregnancy, although Gallo and associates (23) observed a very low risk to the fetus should echinacea be consumed by a mother during the first trimester (ie, organogenesis). The spontaneous abortion rate for the exposed group was 6.3% and the major malformation rate was 4.1% versus 3.4% and 3.5%, respectively, in the control group. Evidence is lacking regarding safety during lactation.

### Pharmacologic Action

Potential active constituents of echinacea preparations include polysaccharides, glycoproteins, alkylamides, and caffeic acid derivatives (echinoacoside, cichoric acid, and cynarin). Because the active component(s) of echinacea has not been identified, standardization of products varies significantly. The constituents in echinacea have demonstrated collagen protecting effects, anti-inflammatory effects, and immunostimulant effects in animals; the immunostimulant effects likely are associated with the polysaccharide component. (24) Limited evidence from human studies also has shown some level of immunostimulation, particularly elevations in phagocytic cell activity. (24)

### Administration/Dosage Forms

Dosage forms of echinacea include tablets, capsules, teas, tinctures, pressed juice, and powdered extract. Although

there are no standard doses, pediatric dosing in clinical trials has been based on either a percentage of adult dosing (50% to 67% of adult dose) or the child's weight. (13)(19) Dosing generally is recommended based on acute versus preventive treatment, with higher, more frequent doses given for acute treatment.

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