

# Should the varicella vaccine be given to all children to prevent chickenpox?

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## \* EVIDENCE-BASED ANSWER

Healthy, unimmunized children who have not had varicella infection should be vaccinated (strength of recommendation: A, based on randomized controlled trials). Use of the vaccine in immunocompromised children is still being studied and has not been approved by the Food and Drug Administration (FDA).

## \* EVIDENCE SUMMARY

Before the introduction of the varicella vaccine, almost 4 million cases of chickenpox occurred each year in the United States, resulting in 11,000 hospitalizations and 100 deaths. (1) Varicella is the leading cause of vaccine-preventable death in children. (2)

In a search of the literature from 1966 to 2000, a systematic review identified 24 randomized controlled trials and 18 cohort studies of varicella vaccination. (3) In children aged 10 months to 14 years, 1 randomized controlled trial found protective efficacy of 100% over 9 months and 98% over 7 years. (4) A second trial showed efficacy of 72% over 29 months. (5) Cohort studies of children report that the vaccine is 84% to 86% effective in preventing varicella and 100% effective in preventing moderate to severe infections. (3)

Cumulative results of all studies show the number needed to vaccinate to prevent 1 case of varicella ranges from 5.5 to 11.8, and the number needed to prevent 1 complicated case ranges from 550 to 1180.

No direct evidence supports or refutes a reduction in varicella mortality or rates of hospitalization due to vaccination. Randomized controlled trials show no increase in rates of fever or rash among those receiving vaccine; however, cohort studies report fever (0%-36%), local injection site reactions (7%-30%), and rash (5%). (3) No clinical trials have shown transmission of vaccine-related varicella zoster virus in immuno-competent patients, and only 3 proven cases of transmission of vaccine virus to susceptible contacts have been documented. (6) Some evidence suggests the incidence of herpes zoster is reduced in immunocompromised vaccine recipients, but long-term observation is needed to assess the effect on healthy recipients. (7)

One concern about the vaccine is that waning immunity over time could result in increased incidence of varicella infection during adulthood. While existing studies document persistence of

antibodies for up to 20 years following immunization, (3) long-term effectiveness should continue to be monitored.

The FDA has not approved this live-virus vaccine for use in pregnant women and immunocompromised persons, including transplant recipients and persons receiving corticosteroid therapy. However, the vaccine has been very well-studied in children with leukemia. A review of these studies found that optimal seroconversion requires 2 sequential vaccine doses (86% efficacy). A rash of varying severity was the predominant adverse event in 20% to 50% of vaccinees. (7) Study of vaccine use in other immunocompromised children has been limited. Early results from a trial in HIV-infected children who were not severely immunocompromised suggests similar tolerance and efficacy compared with children without HIV. (8)

A systemic review of cost-effectiveness of varicella vaccine is based predominantly on mathematical models. (9) These models show societal savings due to decrease in unproductive days for parents, but fail to demonstrate actual healthcare savings.

#### \* RECOMMENDATIONS FROM OTHERS

The American Academy of Pediatrics (AAP), Advisory Committee on Immunization Practices (ACIP), and American Academy of Family Medicine all recommend vaccinating unimmunized children aged 12 months and older who have not had varicella infection, and not vaccinating children with cellular immunodeficiencies. (2,10,11) The AAP suggests the vaccine could be considered for children with acute lymphocytic leukemia and for HIV-infected children with mild or no signs or symptoms. The ACIP guidelines are similar, with the addition that children with impaired humoral immunity may now be vaccinated.

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#### REFERENCES

- (1.) Arvin AM. Varicella vaccine--the first six years. *N Engl J Med* 2001; 344:1007-1009.
- (2.) Centers for Disease Control and Prevention. Prevention of varicella. Update recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 1999; 48(RR-6):1-5.
- (3.) Skull SA, Wang EE. Varicella vaccination--a critical review of the evidence. *Arch Dis Child* 2001; 85:83-90.
- (4.) Weibel RE, Neff BJ, Kuter BJ, et al. Live attenuated varicella vaccine. Efficacy trial in healthy children. *N Engl J Med* 1984; 310:1409-1415.
- (5.) Varis T, Vesikari T. Efficacy of high-titer live attenuated varicella vaccine in healthy young children. *J Infect Dis* 1996; 174(suppl 3):S330-S334.

- (6.) Wise RP, Salive ME, Braun MM, et al. Postlicensure safety surveillance for varicella vaccine. *JAMA* 2000; 284:1271-1279.
- (7.) Gershon AA, LaRussa P, Steinberg S. The varicella vaccine. Clinical trials in immunocompromised individuals. *Infect Dis Clin North Am* 1996; 10:583-594.
- (8.) Levin MJ, Gershon AA, Weinberg A, et al. Immunization of HIV-infected children with varicella vaccine. *J Pediatr* 2001; 139:305-310.
- (9.) Rothberg M, Bennish ML, Kao JS, Wong JB. Do the benefits of varicella vaccination outweigh the risks? A decision-analytical model for policymakers and pediatricians. *Clin Infect Dis* 2002; 34:885-894.
- (10.) American Academy of Family Practice. Periodic Health Examinations. Revision 5.3. Leawood, Kansas: AAFP; 2002.
- (11.) American Academy of Pediatrics. Committee on Infectious Diseases. Varicella vaccine update. *Pediatrics* 2000; 105:136-141.

\* CLINICAL COMMENTARY

Encourage varicella vaccination, except for the immunocompromised

For many parents, vaccination decisions are made based on school district requirements. Varicella zoster vaccine is an exception to that rule. Parents can choose to immunize their child at 12 months or wait and let nature take its course--hopefully before the child starts kindergarten. The major concern with the vaccine has been its long-term efficacy. Although no one knows for sure how long immunity is sustained, studies show that detectable antibodies are present for up to 20 years.

As a parent and physician, my decision to vaccinate my daughter was made after I witnessed an 8-year-old boy in the emergency room with respiratory distress secondary to complications from chickenpox. This experience reinforced for me that chickenpox is a life-threatening disease. The effects of chickenpox include scarring as well as time away from work for parents. I therefore encourage varicella vaccination for my patients, with the only exception being those who are immunocompromised, for whom we have no data.

To the question of whether we should we vaccinate children to prevent chickenpox, I give a resounding "yes."

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