

## ACIP RECOMMENDATIONS FOR USE OF VARICELLA VACCINE

**I**N JULY 1996, guidelines for use of VARIVAX<sup>®</sup> (Merck), the new varicella vaccine, were issued by CDC's Advisory Committee on Immunization Practices (ACIP).<sup>1</sup> VARIVAX, a live, attenuated virus vaccine, was licensed by the FDA in March 1995 for use in healthy persons 12 months of age and older. In this issue we present a condensed version of those recommendations. The complete document includes guidelines for the use of acyclovir and updates relevant to the prophylactic use of varicella zoster immune globulin (VZIG).

### BACKGROUND

Varicella (chickenpox) is a highly contagious disease caused by varicella zoster virus (VZV). Varicella is a systemic illness that usually results in lifetime immunity. In otherwise healthy persons, clinical illness after a second exposure is rare; such illness is more likely to occur among immunocompromised persons. However, as with other viral diseases, reexposure to wild-type varicella often leads to reinfection that boosts antibody titers without causing clinical illness or detectable viremia. VZV remains dormant in sensory-nerve ganglia and may be reactivated at a later time causing herpes zoster (shingles).

Among children, varicella is usually a self-limited disease lasting 4–5 days, characterized by fever, malaise, and a generalized vesicular rash. Adolescents, adults, and immunocompromised persons usually have more severe disease and are at higher risk for complications. Subclinical primary infections are rare.

In addition to the millions of miserable children and parents, more than 9,000 persons are hospitalized annually in the U.S. for complications of varicella, which include bacterial superinfections of skin lesions, pneumonia, dehydration, encephalitis, and hepatitis. Since the link with aspirin use was identified, Reye syndrome, once considered a common complication of varicella, now rarely occurs.

VZV is transmitted from person to person by a) direct contact, droplet, or aerosol from vesicular fluid of skin lesions or b) secretions from the respiratory tract. The virus enters the host through the upper-respiratory tract. The incubation period for varicella is typically 14–16 days (range, 10 to 21 days). Contagiousness usually begins 1–2 days before the onset of rash, ending when all lesions are crusted—typically 4–5 days after rash onset.

### ABOUT THE VACCINE

The varicella virus vaccine licensed in the United States is composed of the Oka strain of live, attenuated VZV. The Oka strain was isolated in Japan in the early 1970s from vesicular fluid in a healthy child who had natural varicella. The virus was attenuated through sequential propagation in cultures of human embryonic lung cells, embryonic guinea pig cells, and human diploid cells (WI-38). The Oka/Merck strain underwent further passage through human diploid cell cultures for a total of 31 passages.

Varicella virus vaccine is lyophilized and must be reconstituted immediately before use. The vaccine does not contain preservatives and can be billed as "organic" for those patients who would be impressed by the use of the carbon atom.

In vaccine trials, the seroconversion rate (gpELISA >0.3 U) after one dose among 6,889 susceptible children 12 months–12 years of age was 97%; with 76% of these children achieving antibody titers  $\geq 5$  U. Antibody persistence measured annually for 4 years after vaccination was consistently high. Six years after vaccination at ages ranging from 1 to 12 years, 35 children had no decrease in antibody titers. In Japan, where similar vaccines have been in use since the 1980s, antibodies to VZV were present in 97% of children 7–10 years after vaccination, and titers were comparable to those in children who had natural varicella infection 7–10 years earlier.

Among persons 13 years of age or older, 78% of vaccinees seroconverted after the first dose of varicella virus vaccine, and 99% seroconverted after a second dose, which was administered 4–8 weeks later. Seroconversion rates did not differ by age within this group. Detectable antibody levels have persisted for at least 1 year in 97% of adolescents and adults who were administered two doses of vaccine 4–8 weeks apart.

In clinical trials, the vaccine has proven to be effective for greater than 10 years in preventing varicella. However, breakthrough infections (i.e., cases of varicella that occur in some vaccinated persons following exposure to wild-type virus) can occur, typically resulting in mild illness.

Available data suggest that healthy children are unlikely to transmit vaccine virus to susceptible contacts, but that risk for transmission from vaccinees who are immunocompromised is higher and may be associated with occurrence of rash following vaccination. In clinical trials, nonlocalized rash developed in 3.8% of children and 5.5% of adolescents and adults (median: five lesions) after the first injection and 0.9% of adolescents and adults after the second injection. A higher risk for transmission of vaccine virus has been documented among leukemic children who develop rash following vaccination.

No data exist regarding postexposure efficacy of the current varicella virus vaccine. Postexposure prophylaxis of children using previous formulations of varicella virus vaccine has been conducted in Japan and the United States, with protective efficacy  $\geq 90\%$  when children were vaccinated within 3 days of exposure.

### RECOMMENDED SCHEDULES

Varicella virus vaccine has been approved for use among healthy children 12 months–12 years of age. Children in this age group should receive one 0.5-ml

dose of vaccine subcutaneously. Children who have a reliable history of varicella are considered immune, and those who do not have such a history or who have an uncertain history of varicella are considered susceptible. Serologic testing of children before vaccination is not warranted.

#### 12-18 Months

All children should be routinely vaccinated at 12-18 months of age. Varicella virus vaccine may be administered to all children at this age — regardless of a history of varicella; however, vaccination is not necessary for children who have reliable histories of varicella. Varicella virus vaccine preferably should be administered routinely to children at the same time as measles-mumps-rubella (MMR) vaccine. Varicella virus vaccine may be administered simultaneously with all of the vaccines recommended for children 12-18 months of age. Simultaneous administration is particularly important when health-care providers anticipate that, because of certain factors (e.g., previously missed vaccination opportunities), a child may not return for subsequent vaccination.

#### 19 Months-12 Years

Varicella vaccine is recommended for all susceptible children by their 13th birthday. After 12 years of age, natural varicella is more severe and complications are more frequent. Recently, ACIP recommended establishing a routine immunization visit at 11-12 years of age to review immunization status and to administer necessary vaccinations. Although vaccine may be administered at any time after 18 months of age, varicella virus vaccine should be administered to

susceptible children during this routine visit.

#### 13 Years or Older

Varicella vaccine is approved for use among healthy adolescents and adults. Because natural VZV infection can be severe in older adolescents and adults, varicella immunity is desirable in these age groups. Two 0.5-ml doses of vaccine should be administered, subcutaneously, 4-8 weeks apart.

Persons who have reliable histories of varicella are considered immune. Those who do not have such histories are considered susceptible and can be tested to determine immune status or can be vaccinated without testing. Because 71%-93% of adults who do not have a reliable history of varicella are actually immune, serologic testing before vaccination is likely to be cost effective for these ages. Priority should be given to vaccination of susceptible adolescents and adults who are at high risk for exposure and for transmitting disease, including:

- persons who have close contact with persons at high risk for serious complications (e.g., health-care workers and family contacts of immunocompromised persons).
- persons in the following groups who are at high risk for exposure: a) Persons who live or work in environments in which transmission of VZV is likely (e.g., schools or day care centers). b) Persons who live or work in environments in which varicella transmission can occur (e.g., college students, inmates and staff of correctional institutions, and military personnel). c) Nonpregnant women of

childbearing age. Vaccination of women who are not pregnant — but who may become pregnant in the future — will reduce the risk for VZV transmission to the fetus. Immunity can be assessed at any routine health-care visit or in any setting in which vaccination history is reviewed (e.g., upon college entry). Women should be asked if they are pregnant and advised to avoid pregnancy for 1 month following each dose of vaccine. d) International travelers.

- Vaccination of other susceptible adolescents and adults is desirable and may be offered during routine health-care visits.

#### VFC AVAILABILITY

Providers enrolled in the Vaccine for Children Program (you know who you are) can order VARIVAX for their eligible patients who are: 1) 12-18 months old, 2) 11 or 12 years old and have no history of chickenpox (for administrative purposes you must select only one age cohort), or 3) household contacts of persons are high risk of complications from VZV. For more information, contact your VFC representative.

#### REFERENCE

1. CDC. Prevention of varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1996; 45:1-36.

#### Corrigendum

AS SEVERAL readers have delighted in pointing out, a recent graph (Jan. 7, 1997) illustrating abortion rates was mislabeled. To be consistent with the text and reality, the ordinate axis should read "abortions/1,000 [15-44-year-old] women." Our disgust at starting the year in such a fashion is profound.