



Department of Health and Social Services
Karleen Jackson, Commissioner
Jay Butler, MD, Chief Medical Officer
3601 C Street, Suite 540
Anchorage, Alaska 99503

<http://www.epi.Alaska.gov>

Division of Public Health
Beverly Wooley, Director
Local (907) 269-8000
24 Hour Emergency (800) 478-0084

Editors:
Joe McLaughlin, MD, MPH

Bulletin No. 32 October 24, 2007

Prevention of Varicella Disease through Immunization

Varicella Disease

Varicella is an acute infectious disease caused by varicella zoster virus (VZV), a member of the herpesvirus group. Like other herpesviruses, VZV has the capacity to persist in the body as a latent infection after the primary (first) infection has occurred. Primary infection with VZV results in chickenpox, while herpes zoster (shingles) is the result of recurrent infection.¹

Rash is often the first sign of disease in children, but adults who develop chickenpox may have 1–2 days of fever and malaise prior to rash onset.¹ The rash first appears on the trunk and face, but can spread over the entire body. The blister-like lesions progress in severity before crusting, typically involving between 250–500 itchy vesicles in unvaccinated persons.²

Chickenpox is highly infectious and spreads from person to person by direct contact or through the air from an infected person's cough/sneeze or from aerosolization of virus from skin lesions. It generally takes from 10–21 days after exposure for a person to develop chickenpox. The individual is contagious from 1–2 days before the rash appears and until all blisters have formed scabs.²

Acute varicella is generally mild and self-limited, but it may be associated with complications. In unvaccinated children, chickenpox most commonly causes an illness that lasts 5–10 days. Children usually miss 5 or 6 days of school or childcare and have symptoms such as high fever, severe itching, an uncomfortable rash, and dehydration or headache. About 1 in 10 unvaccinated children who get the disease will have a complication serious enough to visit a health care provider. These complications include bacterial infection of skin lesions, dehydration (from vomiting or diarrhea), pneumonia and encephalitis. Adults, infants, adolescents, and persons whose immune systems have been weakened because of illness or medications are more likely to develop severe illness with serious complications.^{1,2} (Photographs of persons with varicella infection/complications are available for review.^{3,4})

In the pre-vaccine era, varicella was a universal childhood disease in the United States, with peak incidence in the spring and an average annual incidence of 15–16 cases per 1,000 population. An average of 4 million cases was estimated to have occurred annually. Approximately 11,000 persons with varicella required hospitalization each year in the United States; hospitalization rates were ~2–3 per 1,000 cases among healthy children and 8 per 1,000 cases among adults. Death occurred in about one in 60,000 cases.¹

*It is not possible to predict who will have a mild case of chickenpox and who will have a serious or even deadly case of the disease.*² Many of the deaths and complications from chickenpox occurred in previously healthy children and adults. From 1990–1994, about 50 children and 50 adults in the United States died from chickenpox every year; most of these persons were healthy and did not have a medical illness (such as cancer) that placed them at higher risk of getting severe chickenpox.

Vaccine Recommendations and Impact

Varicella vaccine (*Varivax*[®], Merck & Co.) was licensed in the United States in 1995. (*ProQuad*[®], a combination measles-mumps-rubella-varicella vaccine licensed in 2005, is not available through the Alaska Immunization Program.) In the years following vaccine licensure, there has been a significant decline in varicella disease. Since 1996, the number of hospitalizations and deaths from varicella has declined by >90%.¹

Initially, the Advisory Committee on Immunization Practices (ACIP) recommended all children aged 12 months–12 years receive one dose of vaccine, while persons aged ≥13 years were recommended to receive two doses.⁵ The ACIP subsequently updated this guidance to recommend a second dose for children aged 12 months–12 years.⁶

Although a 1-dose regimen was estimated to be 80–85% effective, breakthrough disease (i.e., a case of infection with wild-type VZV occurring >42 days after vaccination) was still occurring in highly vaccinated populations.⁷ Multiple post-licensure investigations have demonstrated the majority of breakthrough varicella cases are significantly milder than cases among unvaccinated children. However, approximately 30% of breakthrough cases are not mild; with clinical features more similar to those in unvaccinated children.⁶ The 2-dose regimen was adopted to further reduce the risk of disease among vaccinated persons.⁷

Varicella Vaccine Requirements for School and Child Care Attendance

In 2001, varicella immunization was required for children attending Alaska child care facilities.⁸ Even with this requirement, the 2006 National Immunization Survey indicated that only 80.4% of Alaska children aged 19–35 months had received at least one dose of varicella vaccine, compared to the national average of 89.3%.⁹ Alaska ranked 45th among all states in varicella vaccine coverage.

The 2007 ACIP update recommended that 2-doses of varicella vaccine be required for all school-aged children,⁶ and the Alaska Department of Education and Early Development has proposed regulations requiring varicella immunization for children in school.¹⁰ The state plans to require two doses of varicella vaccine for children in selected grades. These requirements will be detailed in a subsequent *Epidemiology Bulletin*.

School immunization requirements help ensure high levels of protection in these facilities and high levels of vaccination coverage in the community. This results in less illness and school time missed by children and decreased danger of severe infection among persons who cannot be vaccinated.¹¹

References:

- Centers for Disease Control and Prevention. Epidemiology and prevention of vaccine-preventable diseases. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 10th ed. Washington DC: Public Health Foundation, 2007. Varicella chapter available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/varicella.pdf>
- Centers for Disease Control and Prevention. Varicella Disease Questions and Answers. Available at: <http://www.cdc.gov/vaccines/vpd-vac/varicella/dis-faqs-gen.htm>
- Centers for Disease Control and Prevention. Varicella (chickenpox) photos. Available at: <http://www.cdc.gov/vaccines/vpd-vac/varicella/photos.htm>
- Immunization Action Coalition. Chickenpox (varicella) photos. Available at: <http://www.vaccineinformation.org/varicel/photos.asp>
- Centers for Disease Control and Prevention. Prevention of Varicella. MMWR Recommendations and Reports, Vol. 45, No. RR-11, July 12, 1996. Available at: <http://www.cdc.gov/mmwr/PDF/rr/rr4511.pdf>
- Centers for Disease Control and Prevention. Prevention of Varicella. MMWR Recommendations and Reports, Vol. 56, No. RR-4, June 22, 2007. Available at: <http://www.cdc.gov/mmwr/pdf/rr/rr5604.pdf>
- Immunization Action Coalition. Ask the Experts, Varicella (chickenpox). Available at: http://immunize.org/askexperts/experts_var.asp
- Alaska Section of Epidemiology. New School and Childcare Immunization Requirements for Fall, 2001. *Bulletin* No. 21, December 26, 2000. Available at: http://www.epi.hss.state.ak.us/bulletins/docs/b2000_21.pdf
- Centers for Disease Control and Prevention. Estimated Vaccination Coverage with Individual Vaccines and Selected Vaccination Series Among Children 19-35 Months of Age, US National Immunization Survey, 2006. Available at: http://www2a.cdc.gov/nip/coverage/mis/nis_iap.asp?fmt=v&rpt=tab03_antigen_state&qtr=Q1/2006-Q4/2006
- Alaska Section of Epidemiology. Proposed Changes to School Immunization Requirements. *Bulletin* No. 30, October 24, 2007. Available at: http://www.epi.hss.state.ak.us/bulletins/docs/b2007_30.pdf
- Centers for Disease Control and Prevention. Varicella Vaccine Q&A. Available at: <http://www.cdc.gov/vaccines/vpd-vac/varicella/vac-faqs-clinic.htm>