

Varicella Zoster Virus

- **Herpesvirus (DNA)**
- **Primary infection results in varicella (chickenpox)**
- **Recurrent infection results in herpes zoster (shingles)**
- **Short survival in environment**

Varicella Pathogenesis

- **Respiratory transmission of virus**
- **Replication in nasopharynx and regional lymph nodes**
- **Repeated episodes of viremia**
- **Multiple tissues, including sensory ganglia, infected during viremia**

Varicella Clinical Features

- **Incubation period 14-16 days (range 10-21 days)**
- **Mild prodrome for 1-2 days**
- **Rash generally appears first on head; most concentrated on trunk**
- **Successive crops over several days with lesions present in several stages of development**



Herpes Zoster (Shingles)

- **Reactivation of varicella zoster virus**
- **Can occur years or even decades after illness with chickenpox**
- **Generally associated with normal aging and with anything that causes reduced immunocompetence**
- **Lifetime risk of 20 percent in the United States**
- **Estimated 500,000- 1 million cases of zoster diagnosed annually in the U.S**

Varicella Complications

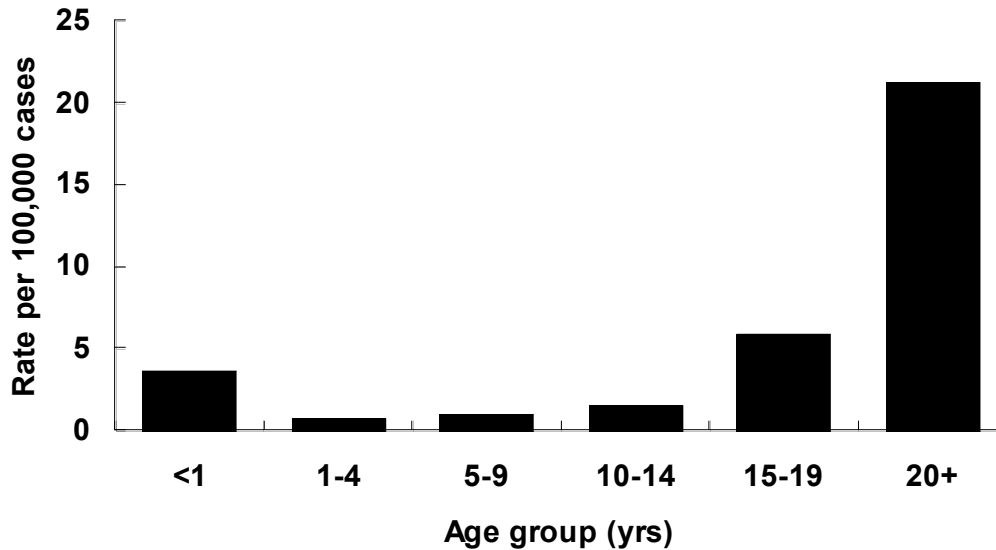
- **Bacterial infection of skin lesions**
- **Pneumonia (viral or bacterial)**
- **Central nervous system manifestations**
- **Reye syndrome**
- **Hospitalization: 2-3 per 1,000 cases**
- **Death: 1 per 60,000 cases**
- **Postherpetic neuralgia (complication of zoster)**

Groups at Increased Risk of Complications of Varicella

- **Persons older than 15 years**
- **Infants younger than 1 year**
- **Immunocompromised persons**
- **Newborns of women with rash onset within 5 days before to 48 hours after delivery**



Varicella Fatality Rate- United States, 1990-1994

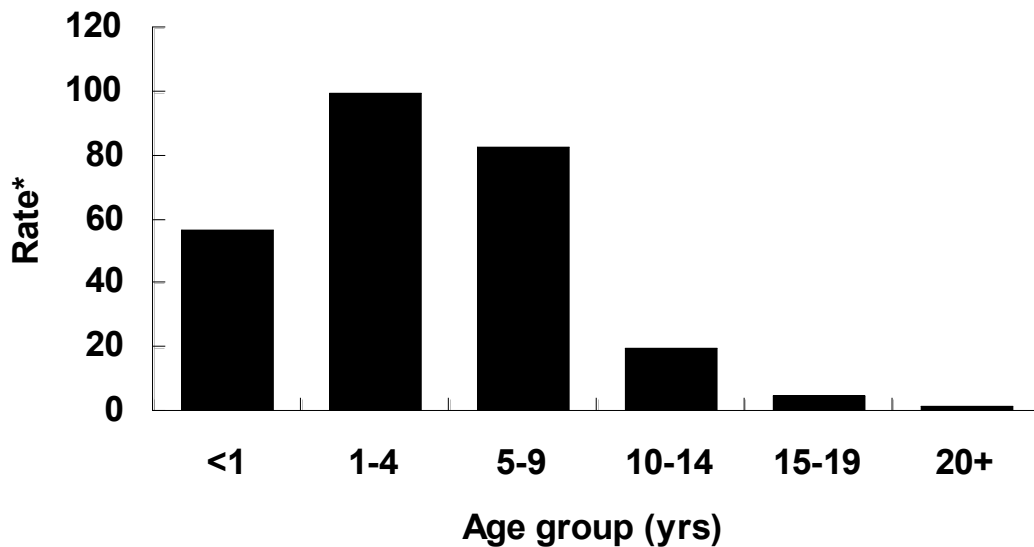


*Deaths per 100,000 cases. Meyer et al, *J Infect Dis* 2000;182:383-90

Varicella Epidemiology

- **Reservoir** Human
- **Transmission** Airborne droplet
Direct contact with lesions
- **Temporal pattern** Peak in winter and early spring (U.S.)
- **Communicability** 1-2 days before to 4-5 days after onset of rash
May be longer in immunocompromised

Varicella Age-Specific Incidence United States, 1990-1994



*Rate per 100,000 population. National Health Interview Survey data

Varicella in the United States

- Increasing proportion of cases are a result of breakthrough infection
- Outbreaks reported in schools with high varicella vaccination coverage
- Persons with breakthrough infection may transmit virus

Herpes Zoster

- **500,000 to 1 million episodes occur annually in the United States**
- **Lifetime risk of zoster estimated to be at least 20%**
- **50% of persons living until age 85 years will develop zoster**

Varicella-Containing Vaccines

- **Varicella vaccine (either alone or w/ MMR)**
 - approved for persons 12 months and older (only through 12 years for MMRV)**
- **Herpes zoster vaccine approved for persons 60 years and older**

(these contain the same vaccine, just different concentrations)

Varicella Vaccine Immunogenicity and Efficacy

- **Detectable antibody**
 - 97% of children 12 months-12 years following 1 dose
 - 99% of persons 13 years and older after 2 doses
- **70%-90% effective against any varicella disease**
- **95%-100% effective against severe varicella disease**

Varicella Breakthrough Infection

- **Immunity appears to be long-lasting for most recipients**
- **Breakthrough disease much milder than in unvaccinated persons**
- **Recent evidence that risk of breakthrough infection increases with time since vaccination***

*Chavez et al. *New Eng J Med* 2007;356:1121-9

Varicella Breakthrough Infection

- **Retrospective cohort study of 115,000 children vaccinated in 2 HMOs during January 1995 through December 1999**
- **Risk of breakthrough varicella 2.5 times higher if varicella vaccine administered less than 30 days following MMR**
- **No increased risk if varicella vaccine given simultaneously or more than 30 days after MMR**

MMWR 2001;50(47):1058-61

Herpes Zoster Vaccine Efficacy

- **Compared to the placebo group the vaccine group had:**
 - 51% fewer episodes of zoster**
 - Lower efficacy for older recipients**
 - Less severe disease**
 - 66% less postherpetic neuralgia**
- **Duration of immunity unknown**

NEJM 2005;352(22):2271-84.

Varicella Vaccine Recommendations Children

- **Routine vaccination at 12-15 months of age**
- **Routine second dose at 4-6 years of age**
- **Minimum interval between doses of varicella vaccine for children younger than 13 years of age is 3 months (otherwise 4 weeks)**

Herpes Zoster Vaccine*

- **Approved for a single dose among persons 60 years and older**
- **May vaccinate regardless of prior history of herpes zoster (shingles)**
- **Persons with a chronic medical condition may be vaccinated unless a contraindication or precaution exists for the condition**

***provisional recommendations as of January 2007**

Varicella Immunity*

- **Written documentation of age-appropriate vaccination**
- **Laboratory evidence of immunity or laboratory confirmation of disease**
- **Born in the United States before 1980**
- **Healthcare provider diagnosis or verification of varicella disease**
- **History of herpes zoster based on healthcare provider diagnosis**

*provisional recommendations as of January 2007

Varicella Vaccine Adverse Reactions

- **Local reactions (pain, erythema)**
 - **19% (children)**
 - **24% (adolescents and adults)**
- **Rash – 3%-4%**
 - **may be maculopapular rather than vesicular**
 - **average 5 lesions**
- **Systemic reactions not common**

Herpes Zoster Vaccine Adverse Reactions

- **Local reactions - 34%**
(pain, erythema)
- **No serious adverse reactions identified**

Varicella-Containing Vaccines Contraindications and Precautions

- **Severe allergic reaction to vaccine component or following a prior dose**
- **Immunosuppression**
- **Pregnancy**
- **Moderate or severe acute illness**
- **Recent blood product**

Varicella-Containing Vaccines Use in Immunocompromised Persons

- **Most immunocompromised persons should receive varicella-containing vaccines**
- **Varicella vaccine may be administered to persons with isolated humoral immunodeficiency**
- **Consider varicella vaccination for HIV-infected children with CD4% of 15% or higher**

Varicella-Containing Vaccine Storage and Handling

- **Store frozen at 5°F (-15°C) or lower at all times**
- **Store diluent at room temperature or refrigerate**
- **Discard if not used within 30 minutes of reconstitution**