Varicella and Varicella Vaccine

衛生署 疾病管制局
中區傳染病防治醫療網
王任賢 指揮官

Varicella

- **Acute viral illness**
- **Zoster described in premedieval times**
- **Varicella not differentiated from smallpox until end of 19th century**
- **Infectious nature demonstrated in 1875**

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**
- **Generally appear first on head; most concentrated on trunk**
- **Successive crops (2-4 days) of pruritic vesicles**

Herpes Zoster

- **Reactivation of varicella zoster virus**
- **Associated with:**
  - **aging**
  - **immunosuppression**
  - **intrauterine exposure**
  - **varicella at <18 month of age**

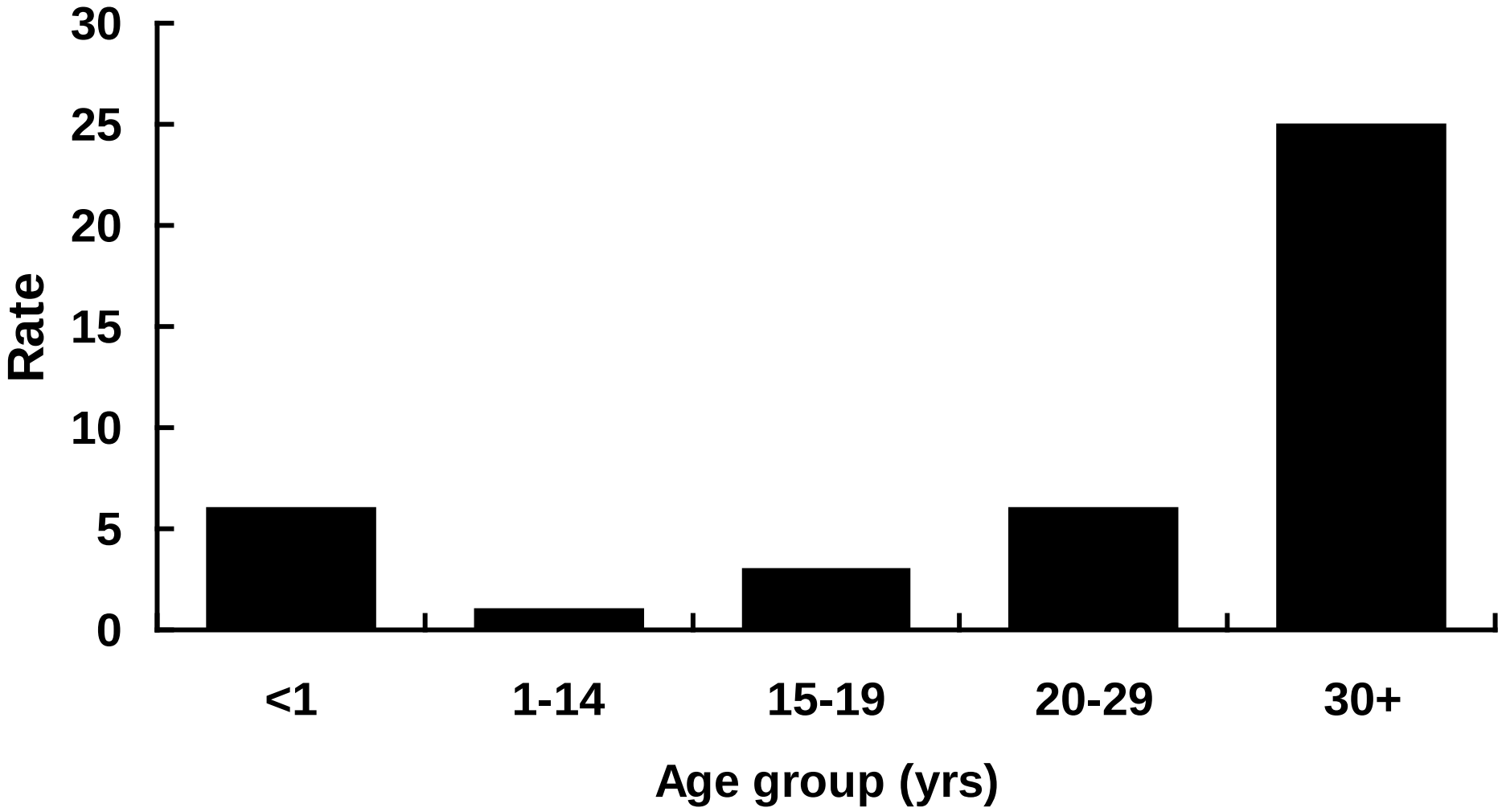
Varicella Complications

- **Bacterial infection of lesions**
- **CNS manifestations**
- **Pneumonia (rare in children)**
- **Hospitalization ~3 per 1,000 cases**
- **Death ~1 per 60,000 cases**

Groups at Increased Risk of Complications of Varicella

- **Healthy adults**
- **Immunocompromised persons**
- **Newborns of mothers with rash onset within 5 days before to 48 hours after delivery**

Varicella Fatality Rate in Healthy Persons



Congenital Varicella Syndrome

- **Results from maternal infection during pregnancy**
- **Period of risk may extend through first 20 weeks of pregnancy**
- **Atrophy of extremity with skin scarring, low birth weight, eye and neurologic abnormalities**
- **Risk appears to be small (< 2%)**

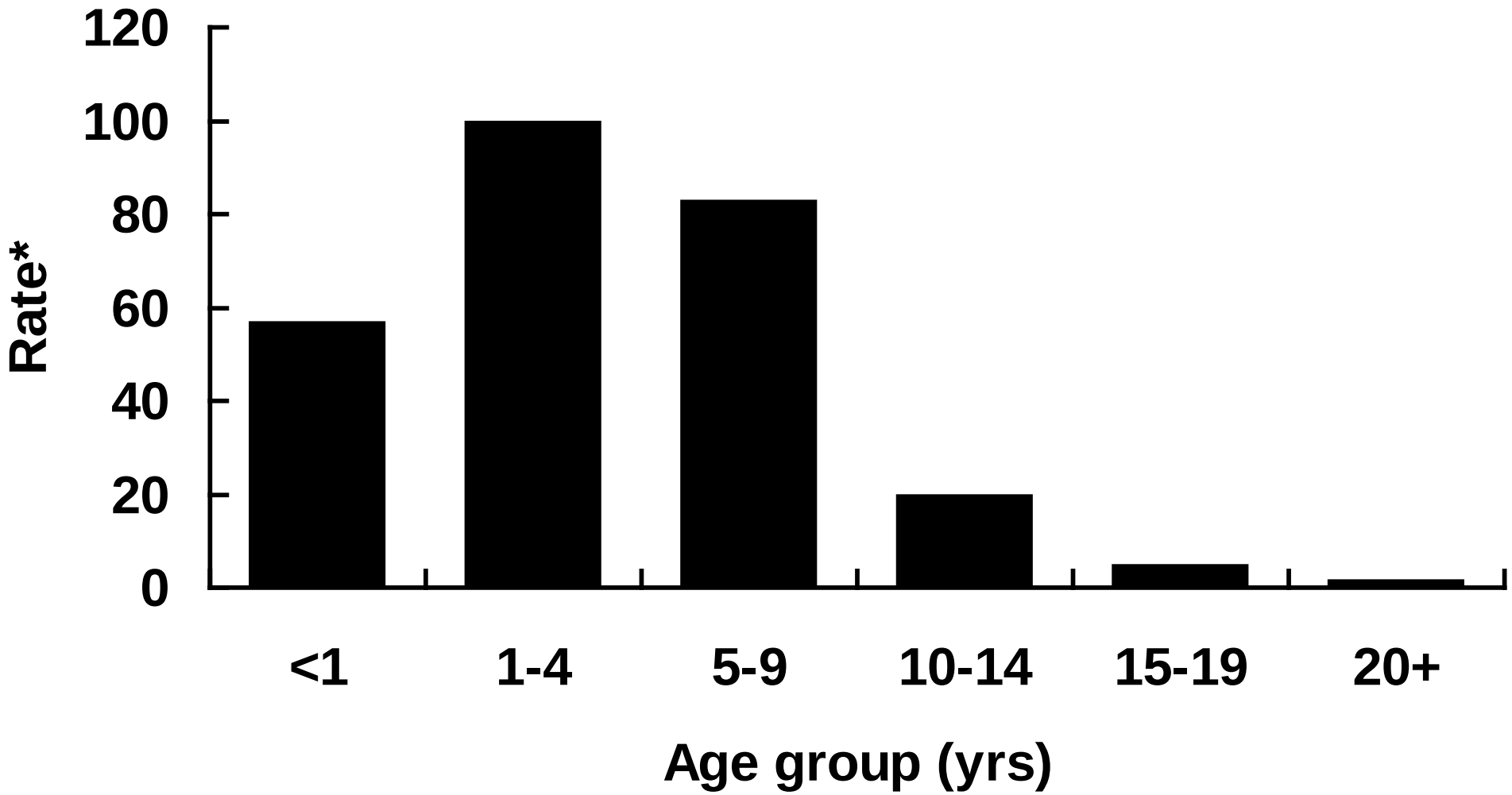
Varicella Laboratory Diagnosis

- **Isolation of varicella virus from clinical specimen**
- **Rapid varicella virus identification using direct fluorescent antibody (DFA) testing**
- **Significant rise in varicella IgG by any standard serologic assay (e.g., enzyme immunoassay)**

Varicella Epidemiology

- **Reservoir** — **Human**
- **Transmission** — **Airborne droplet**
  Direct contact with lesions
- **Temporal pattern** — **Peak in winter–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



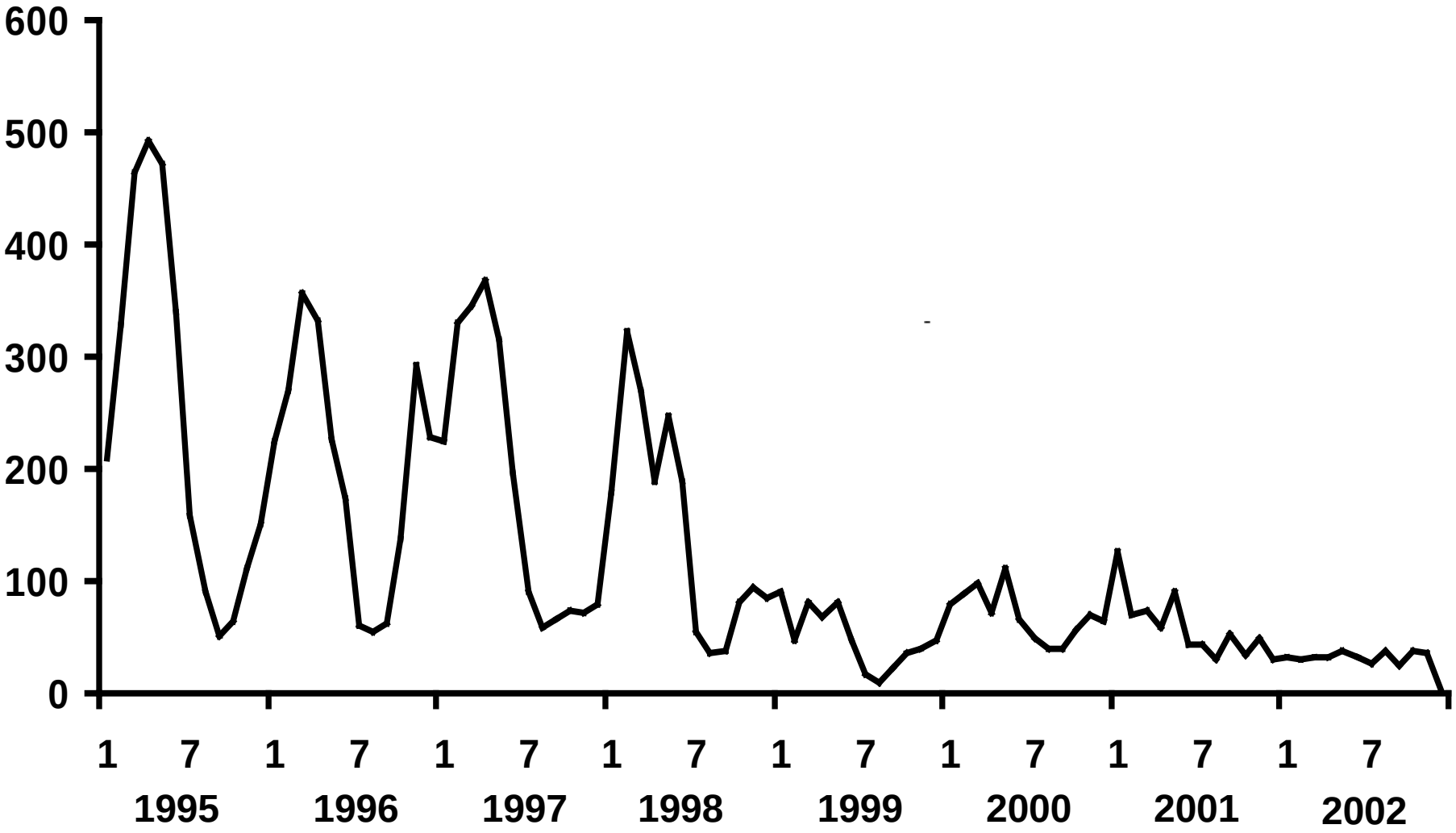
*Rate per 100,000 population. National Health Interview Survey data

Active Varicella Surveillance

- **3 sites conducting active surveillance for varicella since 1995**
- **Combined population 1.2 million**
- **Combined birth cohort 21,000**
- **2000 varicella vaccine coverage 74%-84%**

Seward JF, et al. JAMA 2002;287:606-11

Varicella Cases by Month -- Antelope Valley, CA, 1995–2002



Reduction of Reported Varicella by Age, Active Surveillance Sites, 1995 to 2001

	----------Surveillance Area----------		
Age	Antelope Valley, CA	West Phila., PA	Travis County, TX*
< 1 year	**73%**	**87%**	**87%**
1–4 years	**88%**	**91%**	**87%**
5–9 years	**71%**	**80%**	**87%**
10–14 years	**51%**	**78%**	**89%**
15–19 years	**60%**	**85%**	**78%**
≥20 years	**77%**	**74%**	**54%**
Overall	**76%**	**86%**	**86%**

***Travis County: 1995 vs. 2000**

Varicella Vaccine

- **Composition** — **Live virus (Oka/Merck strain)**
- **Efficacy** — **95% (Range, 65%-100%)**
- **Duration of Immunity** — **>7 years**
- **Schedule** — **1 Dose (<13 years of age)**

  May be administered simultaneously with measles-mumps-rubella (MMR) vaccine

Breakthrough Infection

- **Immunity appears to be longlasting for most recipients**
- **Breakthrough disease much milder than in unvaccinated persons**
- **No consistent evidence that risk of breakthrough infection increases with time since vaccination**

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**

Varicella Vaccine Recommendations Children

- **Routine vaccination at 12-18 months of age**
- **Recommended for all susceptible children by the 13th birthday**

Varicella Vaccine Recommendations Adolescents and Adults

- **Persons ≥13 years of age without history of varicella**
- **Two doses separated by 4-8 weeks**
- **Up to 90% of adults immune**
- **Serologic testing may be cost-effective**

Varicella Vaccine Recommendations Adolescents and Adults

- **Susceptible persons at high risk of exposure or severe illness**
  - **Teachers of young children**
  - **Institutional settings**
  - **Military**
  - **Women of childbearing age**
  - **International travelers**

Varicella Vaccine Recommendations Adolescents and Adults

- **Susceptible persons likely to expose persons at high risk for severe illness**
  - **Healthcare workers**
  - **Family members of immuno-compromised persons**

Vaccination of Healthcare Workers

- **Recommended for all susceptible healthcare workers**
- **Prevaccination serologic screening probably cost-effective**
- **Postvaccination testing not necessary or recommended**

Varicella Vaccine Postexposure Prophylaxis

- **Varicella vaccine is recommended for use in susceptible persons after exposure to varicella**
  - **70%-100% effective if given within 72 hours of exposure**
  - **not effective if >5 days but will produce immunity if not infected**

Varicella Vaccine Adverse Reactions

- **Injection site complaints – 20%**
- **Rash – 3%-4%**
  - **May be maculopapular rather than vesicular**
  - **Average 5 lesions**
- **Systemic reactions not common**

Zoster Following Vaccination

- **Most cases in children**
- **Risk from vaccine virus less than from wild virus**
- **Usually a mild illness without complications**

Varicella Vaccine Contraindications and Precautions

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

Varicella Vaccine
Use in Immunocompromised Persons

- **Most immunocompromised persons should not be vaccinated**
- **Vaccinate persons with isolated humoral immunodeficiency**
- **Consider varicella vaccination for asymptomatic HIV-infected children with CD4% >25% (CDC class A1 and N1)**

Transmission of Varicella Vaccine Virus

- **Transmission of vaccine virus not common**
- **Asymptomatic seroconversion may occur in susceptible contacts**
- **Risk of transmission increased if vaccinee develops rash**

Vaccine Storage and Handling

- **Store frozen at +5˚F (-15˚C) or lower**
- **Generally should not be refrozen**
- **Store diluent at room temperature or refrigerate**
- **Discard if not used within 30 minutes of reconstitution**

Varicella Zoster Immune Globulin (VZIG)

- **May modify or prevent disease if given <96 hours after exposure**
- **Indications**
  - **immunocompromised persons**
  - **newborn of mothers with onset 5 days before to 48 hours after birth**
  - **premature infants with postnatal exposure**
  - **susceptible adults and pregnant women**

Varicella Antiviral Therapy

- **Not recommended for routine use among otherwise healthy infants and children with varicella**
- **Consider for persons age >13 years**
- **Consider for persons with chronic cutaneous or pulmonary disorders, long-term salicylate therapy, or steroid therapy**
- **IV in immunocompromised children and adults with viral-mediated complications**
- **Not recommended for post-exposure prophylaxis**

2003 AAP Red Book