

# **Varicella and Varicella Vaccines**

**Epidemiology and Prevention of Vaccine-  
Preventable Diseases**

**National Immunization Program  
Centers for Disease Control and Prevention**

**Revised January 2007**

# **NOTICE**

**Content and order of the slides in  
this file may differ from those  
presented on the broadcast and  
webcast**

# **Varicella Zoster Virus**

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

# **Varicella Clinical Features**

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

# **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**
- **Central nervous system manifestations**
- **Pneumonia (viral or bacterial)**
- **Hospitalization: 3-4 per 1,000 cases**
- **Death: 1 per 60,000 cases**

# **Groups at Increased Risk of Complications of Varicella**

- **Healthy adults**
- **Immunocompromised persons**
- **Newborns of women with rash onset within 5 days before to 2 days after delivery**

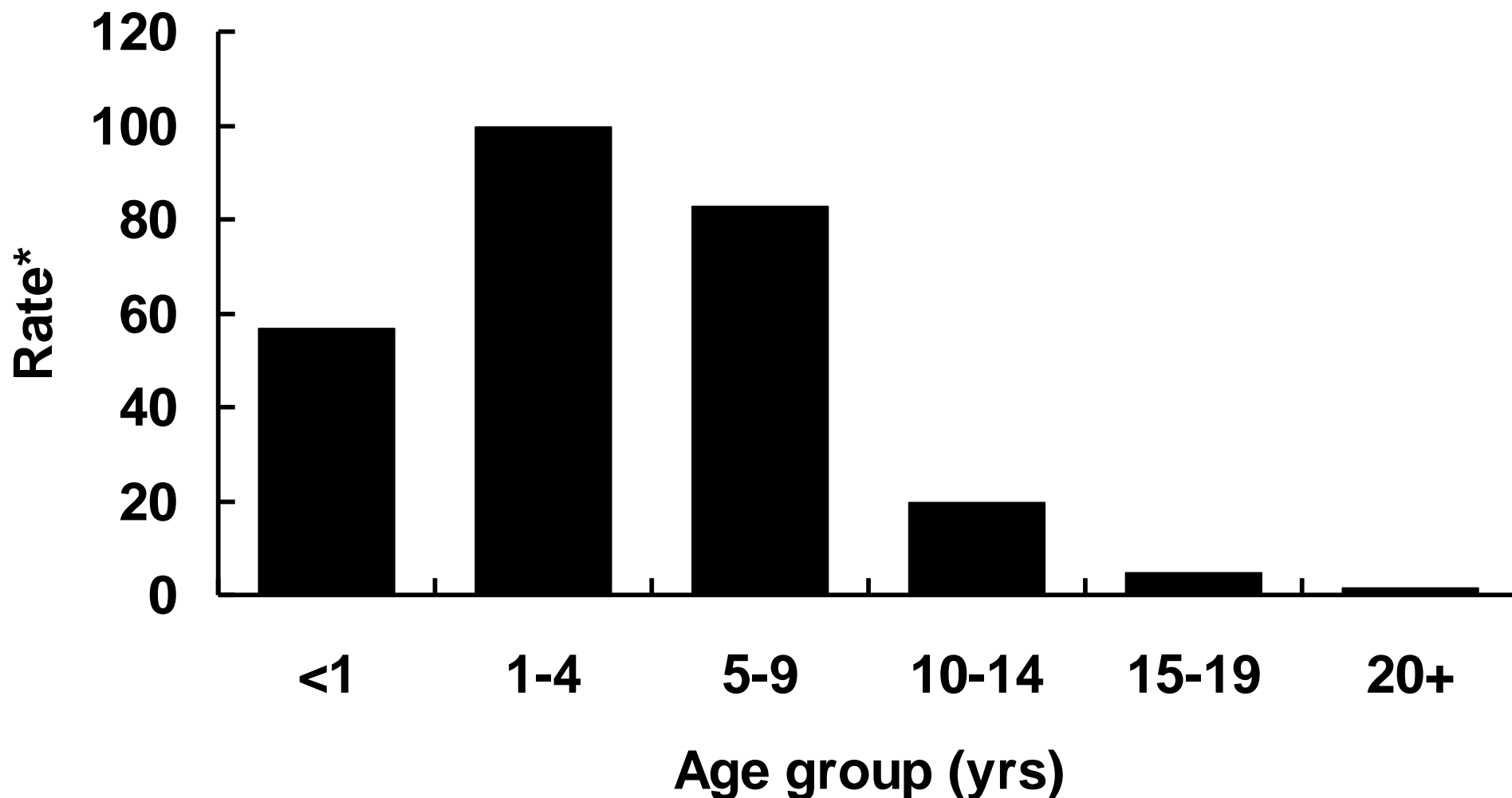
# **Complications of Herpes Zoster**

- **Postherpetic neuralgia (PHN)**
- **Ophthalmic zoster (involvement of the ophthalmic division of the trigeminal nerve and the eye)**
- **Dissemination with generalized skin eruptions and involvement of the central nervous system, lung, liver, and pancreas**

# Varicella Epidemiology

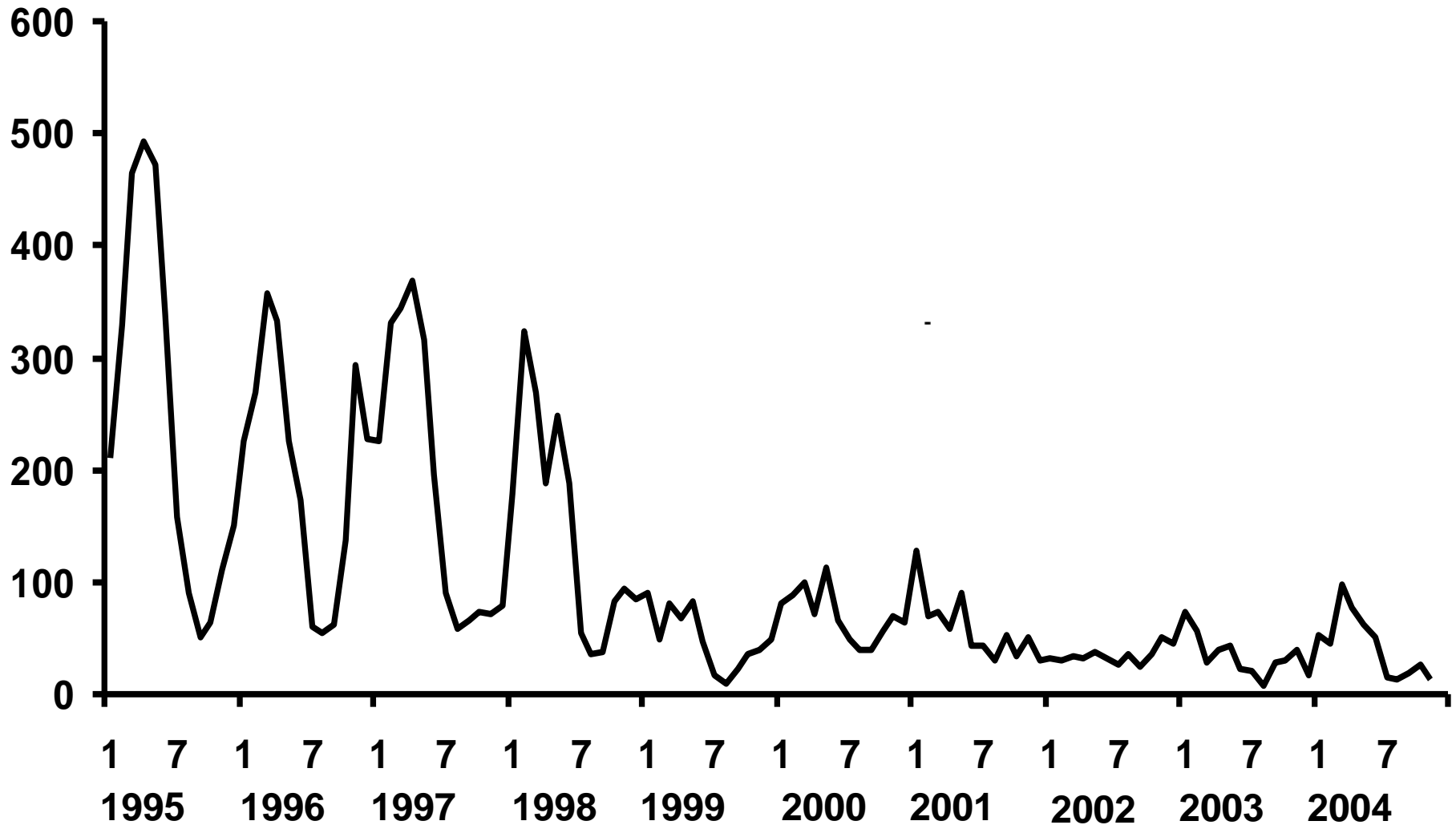
- **Reservoir**                      **Human**
- **Transmission**                **Airborne droplet**  
**Direct contact with lesions**
- **Communicability**            **1-2 days before to 4-5**  
**days after onset of rash**  
**Secondary attach rate of 90%**

# Varicella Age-Specific Incidence United States, 1990-1994



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

# Varicella Cases by Month -- Antelope Valley, CA, 1995–2004



# **Varicella Outbreaks, 2001-2005**

- **Occurred in elementary schools**
- **Vaccine effectiveness 72%-85%**
- **Highest attack rates occurred among the younger students.**
- **Outbreaks lasted about two months**
- **Vaccinated children played a role in transmission although their disease was mild**
- **Overall attack rates among vaccinated children 11%-17%**

# Varicella Vaccines

- **All three vaccines contain the same live Oka-Merck varicella vaccine virus but in different concentrations**
  - **Varivax - 1,400 pfu**
  - **ProQuad - 9,800 pfu (7x Varivax)**
  - **Zostavax - 19,000 pfu (14x Varivax)**

# **Varicella Vaccine (Varivax)**

- **Live virus (Oka-Merck strain)**
- **Efficacy**
  - **Infection** **70%-90%**
  - **Severe disease** **95%**
- **Duration of immunity** **At least 10 yrs**
- **Schedule** **2 doses**

# **MMRV (ProQuad)**

- **Combination measles-mumps-rubella-varicella vaccine**
- **Approved for children 12 months through 12 years of age (to age 13 years)**
- **Do not use for persons 13 years and older**
- **May be used for both first and second doses of MMR and varicella vaccines**

# **Varicella Breakthrough Disease**

- **Varicella in a previously vaccinated person**
- **Breakthrough disease much milder than in unvaccinated persons**
- **Can occur in up to 30% of recipients of one dose of varicella vaccine**

# **Nonsimultaneous Administration of Live Virus Vaccines**

- If varicella vaccine is not administered on the same day as MMR or live attenuated influenza vaccine, the vaccines should be separated by at least 4 weeks**
- If separated by less than 4 weeks the vaccine given second should be repeated**

# **Varicella Vaccine Recommendations\***

- Routine vaccination at 12-15 months of age**
- Routine second dose at 4-6 years of age**
- Two doses recommended for all persons older than 4-6 years who do not have evidence of varicella immunity**
- Second dose recommended for persons of any age who have only received one dose**

**\*provisional recommendation as of January 2007**



# **Varicella Immunity\***

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

**\*provisional recommendations as of January 2007**

# **Varicella Vaccination of Healthcare Workers**

- **Recommended for all healthcare personnel without evidence of immunity**
- **Prevaccination serologic screening probably cost-effective**
- **Postvaccination testing not necessary or recommended**

# **Varicella Immunity Among Healthcare Personnel**

- **Laboratory evidence of immunity**
- **History of clinician diagnosed or verified varicella or zoster**
- **Documentation of age-appropriate vaccination**

# **Varicella Vaccine**

## **Postexposure Prophylaxis**

- **Varicella vaccine is recommended for use in persons without evidence of varicella immunity after exposure to varicella**
  - **70%-100% effective if given within 72 hours of exposure**
  - **not effective if administered more than 5 days after exposure but will produce immunity if not infected**

# **Varicella Vaccine Adverse Reactions**

- **Local reactions – 20%**  
**(pain, erythema)**
- **Rash – 3%-4%**
  - **may be maculopapular rather than vesicular**
  - **average 5 lesions**
- **Temp  $\geq$ 102 F - 10%-15%**

# **Zoster Following Vaccination**

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

# **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 (except herpes zoster vaccine)**

# **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**
  - **2 doses of vaccine separated by 3 months**
  - **MMRV not approved for HIV-infected children**

# **Transmission of Varicella Vaccine Virus**

- **Asymptomatic transmission of vaccine virus may occur**
- **Risk of transmission is increased if the recipient develops a rash**

# **Varicella Vaccine Storage and Handling**

- Store frozen at 5 F (-15 C ) or lower at all times**
- May be stored up to 72 hours at 35°-46° F**
- Unused vaccine must be discarded after 72 hours at this temperature**
- Discard if not used within 30 minutes of reconstitution**

# **MMRV Storage and Handling**

- **Store frozen at 5 F (-15 C ) or lower at all times**
- **May NOT be stored at refrigerator temperature AT ANY TIME**
- **Discard if not used within 30 minutes of reconstitution**

# **Herpes Zoster Vaccine (Zostavax)**

- **Contains the same live attenuated varicella virus as Varivax but at a much higher titer of vaccine virus**
- **Approved by FDA for persons 60 years of age and older**
- **Administered by the subcutaneous route**

# **Herpes Zoster Vaccine Efficacy**

- **Compared to the placebo group the vaccine group had:**
  - 51% fewer episodes of zoster**
  - Less severe disease**
  - 66% less postherpetic neuralgia**
- **No significant safety issues were identified**

# **Herpes Zoster Vaccine\***

- **Approved for a single dose among persons 60 years and older whether or not they report a prior episode of 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**

# **Herpes Zoster Vaccine Storage and Handling**

- **Store frozen at 5 F (-15 C ) or lower at all times**
- **Protect from light**
- **Discard if not used within 30 minutes of reconstitution**

# **National Immunization Program**

## **Contact Information**

- **Telephone**                      **800.CDC.INFO**
- **Email**                              **nipinfo@cdc.gov**
- **Website**                            **www.cdc.gov/nip**