



# California Department of Public Health – February 2016

## Varicella Investigation Quicksheet



### Varicella-Zoster Virus (VZV) infections

In susceptible persons VZV infection causes varicella (chickenpox). After initial infection, VZV remains latent and can reactivate at a later time causing herpes zoster (shingles).\*

### Infectious period

From 1–2 days before rash onset and continuing until all lesions are crusted (usually about 5 days).

### VZV exposure

- VZV exposure can occur from direct contact with or aerosolization of lesion material, or through respiratory aerosols from an infectious person.
- Persons with shingles can also transmit VZV; in a susceptible person, exposure to a person with shingles can result in chickenpox.
- The CDC definition of exposure includes close contact with an infectious person, such as close indoor contact (e.g., in the same room) or face-to-face contact. Experts differ in their opinion about the duration of contact; some suggest 5 minutes and others up to 1 hour, but do agree that it does not include transitory contact.

### Incubation period

10–21 days from exposure to rash onset, most commonly 14–16 days. Incubation period may be up to 28 days in varicella-zoster immune globulin (VariZIG) recipients and may be shortened in immunocompromised patients. Among neonates born to mothers with active infection, incubation period can be as short as 2 days after birth.

### Clinical case definition

An illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause. Note: In vaccinated persons who develop “breakthrough” varicella more than 42 days after vaccination, the disease is almost always mild with fewer than 50 skin lesions and shorter duration of illness. The rash may also be atypical in appearance (maculo-papular with few or no vesicles).

### Laboratory criteria for diagnosis

- VZV antigen detected by direct fluorescent antibody test; or
- VZV-specific nucleic acid detected by polymerase chain reaction (PCR); or

- Isolation of VZV† from a clinical specimen; or
- Significant rise in serum anti-VZV immunoglobulin G (IgG) antibody level by any standard serologic assay.

### Specimen collection for PCR and virus isolation

- A PCR assay can detect VZV nucleic acid in vesicle swabs, scabs or lesions.
- When lesion is scabbed, remove several scabs, and place in a dry sterile container.
- Then collect cells from the base of the lesion by swabbing it vigorously with a **Dacron** swab with plastic handle.
- Use this swab to make a smear on a microscope slide (for direct detection) and then place the swab into 1–2 ml of viral transport media (VTM) for virus isolation or PCR. It may be necessary to collect basal cells from several lesions to obtain the required minimum number of cells.

Contact CDPH for more detailed instructions and to request testing.

### Case classification

- **Probable:** A case that meets the clinical case definition, is not laboratory-confirmed, and is not epidemiologically linked to another probable or confirmed case.
- **Confirmed:** A case that meets the clinical case definition and is laboratory-confirmed OR is epidemiologically linked to a confirmed or probable case. Note: Two probable cases that are epidemiologically linked are considered confirmed cases.

### Presumptive evidence of immunity

The following provide evidence of immunity to varicella for the purposes of a contact investigation:

- Documentation of age appropriate varicella vaccination (preschool aged children: 1 dose; school-aged children, adolescents and adults: 2 doses); or
- Laboratory evidence of immunity; or
- Prior laboratory confirmation of disease; or
- U.S. birth before 1980 (should not be considered evidence of immunity for healthcare personnel, immunocompromised persons, pregnant women and persons born outside the U.S.); or
- Prior healthcare provider diagnosis or verification of a history of varicella or shingles.

### **Post exposure prophylaxis**

- Varicella vaccine is effective in preventing illness or modifying the severity of illness if given within 3 days, and possibly up to 5 days, after exposure.
- Varicella zoster immune globulin (VariZIG) should be administered as soon as possible and within 10 days of exposure to:
  - Immunocompromised persons without evidence of immunity;
  - Pregnant women without evidence of immunity; or
  - Newborn infant whose mother had onset of chickenpox within 5 days before delivery or within 48 hours after delivery.
- Prophylaxis for healthy exposed, susceptible persons is not routinely recommended, however, acyclovir as PEP may be considered in some settings.

### **Recommendations for varicella outbreak<sup>¶</sup> control**

- Isolate infectious cases until all lesions are crusted (usually about 5 days). Vaccinated persons with breakthrough varicella may develop lesions that do not crust (macules and papules only). Isolation guidance for these persons is to exclude until no new lesions appear within a 24-hour period.
- Unvaccinated healthcare personnel without evidence of immunity to varicella should be furloughed from day 8 through day 21 after exposure.
- Healthcare personnel who have received two doses of varicella vaccine should be monitored daily from days 8 through 21 after exposure for symptoms.
- Persons without evidence of immunity who have contraindications to vaccination (e.g., immunocompromised persons, pregnant women) should be excluded from an outbreak setting through 21 days after rash onset of the last identified case because of the risk of severe disease in these groups.
- CDC recommends that students who do not have evidence of immunity and whose parents refuse vaccination be excluded from school from the start of the outbreak through 21 days after rash onset of the last identified case. However, CDPH does not feel that the benefits of this approach have been proven.

### **Course of infection**

In children, the rash is often the first sign of disease. Adults may have 1–2 days of fever and malaise prior to rash onset. Varicella rashes are pruritic, generalized and progress from macules to papules to vesicular lesions before crusting. Two to four successive crops of lesions will appear over several days and will be in several stages of development. Lesions usually first appear on the head, then the trunk, and then the extremities; the highest concentration of lesions is on the trunk (centripetal distribution).

Typical varicella cases have about 250–500 lesions. Breakthrough varicella (infection in a vaccinated person) tends to be milder with fewer lesions (usually <50) and mild or no fever.

### **Complications**

- Bacterial superinfection of skin lesions
- Pneumonia (viral or bacterial)
- Central nervous system manifestations
- Reye syndrome\*\*
- Hospitalization: 2–3/1,000 cases among healthy children and 8/1,000 cases among adults
- Death: 1/60,000 cases

### **Persons at higher risk for complications**

- Persons older than 15 years
- Infants younger than 1 year
- Immunocompromised persons
- Newborns of women with varicella onset from 5 days before to 2 days after delivery

### **State reporting requirements**

- Persons who were hospitalized or died due to varicella infection.
- Varicella outbreaks<sup>¶</sup>
- Varicella cluster (n=2-4) reporting is optional
- Shingles\* cases are NOT reportable.

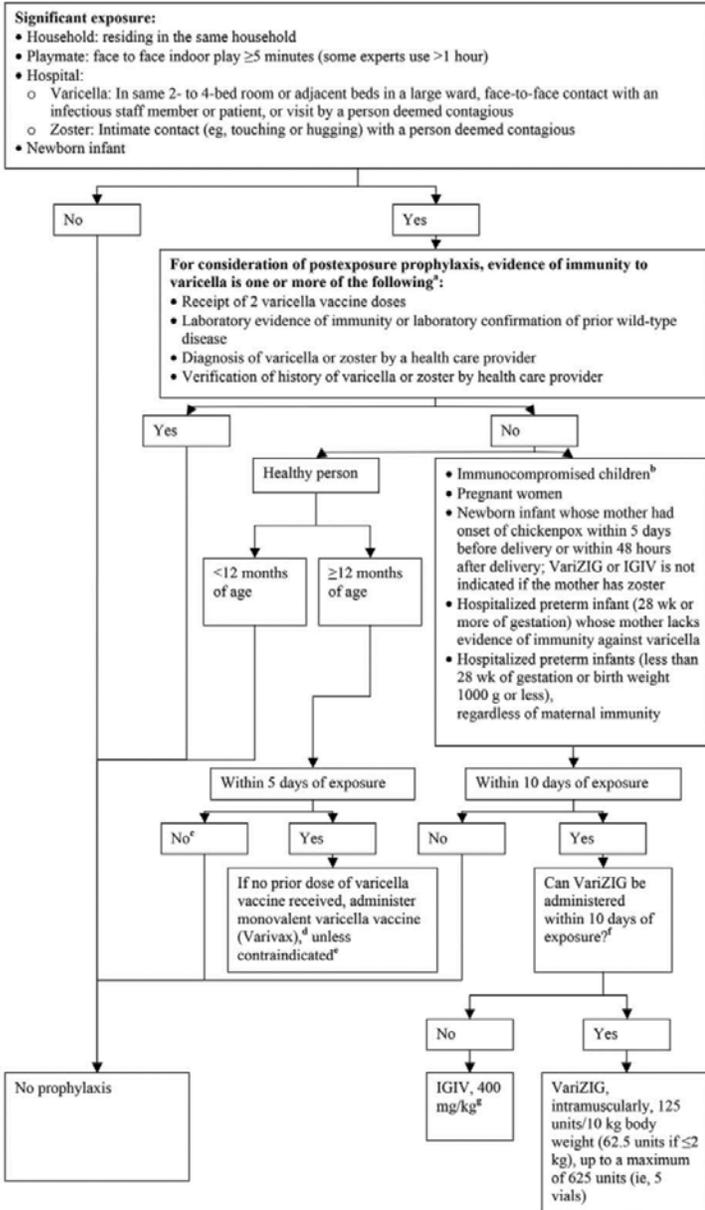
\* Shingles (herpes zoster): An infection that follows primary infection with varicella and is caused by the reactivation of latent varicella zoster virus. Shingles is characterized by grouped vesicular lesions in the distribution of 1–3 sensory dermatomes, sometimes accompanied by pain and/or itching.  
† Laboratory testing cannot differentiate between varicella and herpes zoster because they are both caused by VZV.

§ VariZIG is not indicated for neonates whose mothers have shingles.

¶ A chickenpox outbreak is defined as  $\geq 5$  cases related in time and place. However, single cases in a high risk setting, e.g., healthcare facility, prison or jail, or homeless shelter, should be investigated.

\*\* Children with varicella should not receive salicylates or salicylate containing products due to risk of Reye syndrome

**Management of Exposures to Varicella-Zoster**  
**(2015 Red Book)**



**Figure Legend**

<sup>a</sup> People who receive hematopoietic stem cell transplants should be considered nonimmune regardless of previous history of varicella disease or varicella vaccination in themselves or in their donors.

<sup>b</sup> Immunocompromised children include those with congenital or acquired T-lymphocyte immunodeficiency, including leukemia, lymphoma, and other malignant neoplasms affecting the bone marrow or lymphatic system; children receiving immunosuppressive therapy, including  $\geq 2$  mg/kg/day of systemic prednisone (or its equivalent) for  $\geq 14$  days; all children with human immunodeficiency virus (HIV) infection regardless of CD4+ T-lymphocyte percentage; and all hematopoietic stem cell transplant patients regardless of pretransplant immunity status.

<sup>c</sup> No postexposure prophylaxis, but age-appropriate vaccination still recommended for protection against subsequent exposures. If the exposure occurred during an outbreak, 2-dose vaccination is recommended for preschool-aged children younger than 4 years for outbreak control.

<sup>d</sup> If 1 prior dose of varicella vaccine has been received; a second dose should be administered at  $\geq 4$  years of age. If the exposure occurred during an outbreak, a second dose is recommended for preschool-aged children younger than 4 years for outbreak control.

<sup>e</sup> Contraindications include patients who are allergic to a vaccine component, or who are immunocompromised (see above footnote), or pregnant. Caution should be used in patients receiving salicylates. Vaccine may not be as effective if patient has recently received Immune Globulin Intravenous, whole blood, or plasma transfusions, and for this reason, it is recommended that varicella vaccine be withheld for 3 to 11 months, depending on the dose, after administration of these products.

<sup>f</sup> Varicella Zoster Immune Globulin (VariZIG) was approved by the US Food and Drug Administration in December 2012. The product is manufactured by Cangene Corporation (Winnipeg, Canada) and distributed in the United States by FFF Enterprises (Temecula, California; 800-843-7477; www.fffenterprises.com) and ASD Healthcare (Frisco, TX) (telephone, 800-746-6273; online at www.asdhealthcare.com).

<sup>g</sup> If VariZIG and IGIV are not available, some experts recommend prophylaxis with oral acyclovir (20 mg/kg per dose administered 4 times per day, with a maximum daily dose of 3200 mg) or oral valacyclovir (if  $>3$  months of age; 20 mg/kg per dose administered 3 times per day, with a maximum daily dose of 3000 mg) beginning 7 to 10 days after exposure and continuing for 7 days.