Suspect Varicella Cases

- Consider varicella in patients of any age or vaccination status who have symptoms compatible with varicella.

Varicella Case Definition

- An illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause. In vaccinated persons, varicella that develops more than 42 days after vaccination (breakthrough disease) due to infection with wild-type VZV, is usually mild, with fewer than 50 skin lesions and of shorter duration of illness. The rash may also be atypical in appearance (maculopapular with few or no vesicles).

Varicella Infectious Period

From 1 to 2 days before rash until all the lesions are crusted (usually about 5 days).

Prevent Healthcare Exposures

- Ensure that your facility has protocols in place to:
  - Train telephone triage staff to identify patients with symptoms of varicella, and schedule suspect cases who need care at the end of the day when other patients aren’t present, if possible; and
  - Promptly identify suspect varicella cases arriving at the facility who have not called ahead.
- Ensure that all staff have documentation of immunity to varicella.

Infection Control Measures for Suspected Varicella Patients

1. Do not allow patient to stay in the waiting area.
2. Immediately place a surgical mask on patient suspected to have varicella; and place patient in airborne infection isolation room (AIIR), if one is available.
3. The patient may remove their mask only when in an AIIR with the door closed.
4. If an AIIR is not available, place patient in a single person exam room with a closed door OR evaluate patient in an outside location away from other patients.
5. Only essential visitors and staff should be in the patient room. All staff should use an N95 or PAPR along with standard and contact precautions (gowns, gloves, and use of hand hygiene at all times).
6. Staff known to be susceptible to varicella should not enter the room.
7. If patient’s symptoms are clinically compatible with varicella, diagnosis can be made on clinical grounds, but if there is a question about diagnosis, laboratory testing can be done (see below).
8. If possible, keep exam room vacant for 1 hour before using it for another patient; room can be cleaned using routine cleaning procedures.
9. If the patient is discharged home, advise patient to remain home until all lesions have crusted, which usually takes about 5 days.

Laboratory Testing

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

†Laboratory testing cannot differentiate between varicella and herpes zoster because they are both caused by VZV. However, laboratory testing can differentiate wild vs. vaccine-type VZV.

Specimen collection for PCR

- A PCR assay can detect VZV nucleic acid in vesicle swabs, scabs or lesions.
- For PCR, the ideal specimens include scabs and dry lesion swabs. In cases with neurological symptoms, cerebrospinal fluid can also be tested.
  - Remove several scabs (a glass slide is useful for this purpose) and place in a clean, dry container.
  - Swab basal cells from the unroofed lesion.
  - Place swab in clean, dry container.
  - Swabs submitted for PCR should be sent dry rather than diluted in viral transport media (VTM).

Contact CDPH for more detailed instructions and to request testing. See Lab Specimens in “Resources”.

Varicella Exposure

- Varicella exposure can occur from direct contact with or aerosolization of lesion material, or through respiratory aerosols from an infectious person.
- Persons with zoster (shingles) can also transmit VZV, i.e., exposure to a person with shingles can result in varicella in a susceptible person.
- The CDC definition of exposure includes close contact with an infectious person, such as sharing the same 2-4 bed room or adjacent beds in a large ward, face-to-face contact with an infectious staff member or patient, or visit by a person deemed contagious.
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, e.g., walking by someone in a waiting room.

**VARICELLA CONTACT INVESTIGATION**
1. Contact staff responsible for infection control immediately.
2. Determine if the patient was masked before or immediately upon entry to facility and immediately placed in an AIIR. If not, an exposure investigation should be conducted (Steps 3-12).
3. Identify all exposed patients, visitors, and staff.
4. Check the varicella immunity status of exposed staff.
5. Identify exposed patients and staff who are likely to be unvaccinated or who are at high-risk for severe infection (see definition in “Resources”)
   - Consider identifying all children 12-18 months of age as the first dose of varicella vaccine is recommended between 12-15 months of age.
6. Ascertain whether immunization data are available for exposed patients. If no immunization data is in patient medical records, the California Immunization Registry (CAIR) may be queried. The local health department and CDPH can help check CAIR if the facility does not have access.
7. Plan for the possibility of a need for rapid serologic testing for varicella immunity (varicella IgG) for high risk contacts whose varicella immune status is not known.
8. Plan for the possibility of a need to obtain VariZIG or intravenous (IV) immune globulin (IG) for high risk susceptible contacts, or varicella vaccine as post-exposure prophylaxis (PEP) for low risk susceptible contacts according to recommendations (see: CDPH Varicella Investigation Quicksheet in “Resources”).
   - Healthcare facilities typically do not stock VariZIG so it may need to be rapidly ordered (see “Resources” section).
   - Hospital pharmacies typically have IGIV in stock if it is needed.
9. Contact persons at known high-risk of severe disease (see “Resources”) by phone as soon as possible.
10. Contact the parents of infants 12-18 months of age who are potentially unvaccinated.
11. Determine if the exposed person:
   - Has age appropriate receipt of vaccination, laboratory evidence of immunity, or laboratory confirmation of prior wild-type disease; or
   - A plausible history of varicella or zoster as determined by the healthcare provider interviewing the contact; or has
   - Received one dose of varicella vaccine if infant is 12-18 months of age; or
   - Is immunocompromised (see “Resources”); or
   - Had anyone else with them at the time of the exposure, and whether they are high-risk (see “Resources”), unvaccinated, or a healthcare worker.

12. Contact all other potentially exposed patients.
   - If the number of patients is manageable, these patients can also be contacted by phone.
   - If the number of patients is too large for phone calls to be practical, a certified letter may be sent, or in some healthcare systems, an email.
   - CDPH template letter is available upon request.

**POSTEXPOSURE PROPHYLAXIS**
If PEP is indicated, and it is within the time window for the indicated PEP, it is the healthcare facility’s responsibility to arrange for PEP administration.

Antiviral PEP for healthy, exposed, susceptible persons is not routinely recommended, however, acyclovir as PEP may be considered for some persons.

**Varicella vaccine**
- Varicella vaccine may be effective in preventing illness or modifying illness severity if given within 3-5 days, after first exposure.
- A second dose of varicella vaccine can be given to patients who have received only one dose:
  - Children <13 years of age can receive second dose ≥3 months after their first dose.
  - People ≥13 can receive second dose ≥28 days after their first dose.

**Varicella zoster immune globulin (VariZIG)**
- VariZIG should be administered as soon as possible and within 10 days of first exposure to those groups at high risk for severe infection (see “Resources”).
- If VariZIG is not available within the PEP window, IGIV can be given as an alternative.
- One source of VariZIG is FFF Enterprises in Temecula, California, which can be reached 24/7 at 1-800-843-7477 for rapid ordering.
- VariZIG is not indicated for neonates whose mothers have shingles.
HOSPITAL INPATIENT UNIT EXPOSURES
If exposure occurs in a hospital inpatient unit:
• All exposed patients without evidence of immunity should be discharged as soon as possible.
• All exposed patients without evidence of immunity who cannot be discharged should be placed in isolation from day 8 to day 21 after exposure to the index patient.
• Patients who received VariZIG or IGIV should be isolated until through day 28.

EXPOSED HEALTHCARE WORKERS (HCWs)
• HCWs who have received 2 doses of vaccine and who are exposed to VZV should be monitored daily during days 8 through 21 after exposure and should be placed on sick leave immediately if symptoms such as fever, headache, other constitutional symptoms, or any suspicious skin lesions occur.
• HCWs who have received only 1 dose of vaccine and who are exposed to VZV should receive the second dose of single-antigen varicella vaccine, preferably within 3 to 5 days of exposure.
• Immunized HCWs who develop breakthrough infection should be considered infectious until vesicular lesions have crusted or, if they had maculopapular lesions, until no new lesions appear within a 24-hour period.

PRESUMPTIVE EVIDENCE OF IMMUNITY
The criteria below provide evidence of immunity to varicella for the purposes of a healthcare exposure:
• 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
• Healthcare provider diagnosis or verification of a history of varicella or shingles.

CONTACTS AT HIGH RISK OF SEVERE VARICELLA INFECTION
• Hematopoietic stem cell transplant recipients;
• Immunosuppressed persons without evidence of varicella immunity (see definition in below);
• Pregnant women without evidence of varicella immunity;
• Newborn infants whose mothers had onset of chickenpox within 5 days before delivery or within 48 hours after delivery;
• Hospitalized preterm infants (28 wk or more of gestation) whose mother lacks evidence of immunity against varicella;
• Hospitalized preterm infants less than 28 wk gestation or birth weight 1000 g or less, regardless of maternal immunity.

DEFINITION OF IMMUNOCOMPROMISE
Per CDC and IDSA guidance: Patients with high-level immunosuppression include those:
• with combined primary immunodeficiency disorder (e.g., severe combined immunodeficiency);
• who are receiving cancer chemotherapy;
• on treatment for ALL within 6 months after completion of immunosuppressive therapy;
• within 2 months after solid organ transplantation;
• who have received a bone marrow transplant, until at least 12 months after finishing all immunosuppressive treatment, or longer in patients who have developed graft-versus-host disease;
• with HIV infection with a CD4 T-lymphocyte count <200 cells/mm³ (age >5 years) and percentage <15 (all ages) (some experts include HIV-infected persons who lack recent confirmation of immunologic status or measles immunity);
• receiving daily corticosteroid therapy with a dose ≥20 mg (or ≥2 mg/kg/day for patients who weigh <10 kg) of prednisone or equivalent for ≥14 days; and
• receiving certain biologic immune modulators, such as a tumor necrosis factor-alpha (TNF-α) blocker or rituximab.

After hematopoietic stem cell transplantation, duration of high-level immunosuppression is highly variable and depends on type of transplant, type of donor and stem cell source, and post-transplant complications such as graft vs. host disease and their treatments.

CALIFORNIA REPORTING REQUIREMENTS
• Persons who were hospitalized or died due to varicella infection.
• Varicella clusters and outbreaks.
• Shingles cases are not reportable.
Varicella Healthcare Exposure Investigation Quicksheet

**Significant exposure:**
- Household: residing in the same household
- Playmate: face-to-face indoor play ≥5 minutes (some experts use ≥1 hour)
- Hospital:
  - Varicella: in same 2- to 4-bed room or adjacent beds in a large ward, face-to-face contact with an infectious staff member or patient, or visit by a person deemed contagious
  - Zoster: Intimate contact (e.g., touching or hugging) with a person deemed contagious
- Newborn infant

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**Does the patient have evidence of immunity to varicella based on one or more of the following**:  
- Receipt of 2 varicella vaccine doses
- Laboratory evidence of immunity or laboratory confirmation of prior wild-type disease
- Diagnosis of varicella or zoster by a health care provider
- Verification of history of varicella or zoster by health care provider

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**Healthy person**

- <12 months of age
  - Within 5 days of exposure
    - If no prior dose of varicella vaccine received, administer monovalent varicella vaccine (Varivax),
    - unless contraindicated
  - No prophylaxis
- ≥12 months of age
  - Within 10 days of exposure
    - Can VarizIG be administered within 10 days of exposure?
      - Yes
      - VarizIG, intramuscularly, 125 units/10 kg body weight (62.5 units if ≤2 kg), up to a maximum of 625 units (i.e., 5 vials)\n      - No
    - No prophylaxis
      - IGIV, 400 mg/kg
      - No prophylaxis

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*From 2018-2021 AAP Red Book (footnotes on next page)*
If the exposed person is an adolescent or adult, has chronic illness, or is allergic to a vaccine, 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.

Preemptive oral acyclovir has only been studied in the normal host but sometimes is used in addition to VariZIG or IGIV in the immunocompromised host.

RESOURCES

- Local health department contacts: https://www.cdph.ca.gov/Programs/CCLHO/CDPH%20Document%20Library/LHD_CD_Conact_Info_DA.pdf
- Lab specimen collection https://www.cdc.gov/chickenpox/lab-testing/collecting-specimens.html
- Information on VariZIG and IGIV administration is available at:
  - AAP Redbook varicella chapter (above)
  - Updated recommendations for the use of VariZIG – United States, 2013 https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6228a4.htm
- CDC Prevention of Varicella Recommendations of the Advisory Committee on Immunization Practices https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5604a1.htm