

Section 20: Varicella

BASIC EPIDEMIOLOGY

Infectious Agent

Human (alpha) herpesvirus 3 (varicella-zoster virus, VZV) a member of the *Herpesvirus* group.

Transmission

Direct contact with patient with varicella (chickenpox) or zoster (shingles); droplet or airborne spread of vesicle fluid (chickenpox and zoster) or secretions of the respiratory tract (chickenpox); indirectly by contaminated fomites. Scabs are not infectious.

Incubation Period

Usually 14-16 days but can be as short as 10 or as long as 21 days. May be prolonged after receipt of varicella zoster immune globulin (VZIG) and in the immunodeficient.

Communicability

Communicable 5 days before rash onset (especially 1-2 days before rash onset) and for up to 5 days after onset of lesions. Communicability may be prolonged in persons with altered immunity.

Clinical Illness

Varicella, the primary infection with VZV is an acute, generalized disease that occurs most commonly in children and is characterized by a maculopapular rash (few hours), then vesicular rash (3-4 days), often accompanied by fever. Lesions are typically more abundant on trunk; but sometimes present on scalp, mucous membranes of mouth and upper respiratory tract. Lesions commonly occur in successive crops, with several stages of maturity present at the same time. Lesions are discrete, scattered and pruritic. Mild, atypical and inapparent infections also occur.

Vaccinated persons with varicella may not have fever and may only have a few lesions that may resemble bug bites. Successive crops of lesions are unusual in vaccinated individuals. "Breakthrough" vesicles which can be seen in previously vaccinated persons, is usually a mild illness characterized by few lesions, most of which are papular or papulovesicular.

DEFINITIONS

Clinical Case Definition

An illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause. In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), 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 (maculopapular with few or no vesicles).

Laboratory Confirmation

- None required, but several testing methods are available.

Case Classifications

- **Confirmed:** A case that meets the clinical case definition AND is either laboratory confirmed OR epidemiologically linked to another probable or confirmed case.
- **Probable:** A case that meets the clinical case definition without epidemiologic linkage or laboratory confirmation.

Note: Two or more patients that meet clinical case definition and are epidemiologically linked to one another meet the confirmed case definition.

Outbreak Investigation

In general, the threshold for a community outbreak investigation should be 5 or more cases related in location within a 3-week period. In the presence of nosocomial varicella of known or suspected concurrent streptococcal infections, or among populations at high risk for complications (e.g., immunocompromised or susceptible adolescents or adults), the threshold for response should be 2 cases.

CASE INVESTIGATION & TREATMENT

Control Measures

- **Healthy Persons**
Varicella vaccine is recommended for post-exposure administration for unvaccinated persons without other evidence of exposure. The varicella vaccine should be administered within 3 to 5 days after exposure in order to be effective. Persons who have not received two doses should be brought up to date.
- **Pregnant women**
Evidence of varicella immunity should be obtained as soon as possible. If no varicella antibody is detectable, Varicella-Zoster Immune Globulin (VZIG) given within 96 hours of exposure may prevent or modify disease in susceptible close contacts of cases. VZIG is indicated for newborns of mothers who develop chickenpox within 5 days prior to delivery or within 48 hours after delivery. There is no evidence that administration of VZIG to a pregnant woman will prevent fetal infections. Susceptible pregnant women are at risk for associated complications when they contract varicella. Varicella causes severe maternal morbidity, and 10%-20% of infected women develop varicella pneumonia, with mortality reported as high as 40%. Their babies may also develop Congenital Varicella Syndrome, which may lead to severe complications, even death of the newborn.
- **Health-Care Personnel (HCP):**
Nosocomial transmission of varicella is well recognized. To prevent disease and nosocomial spread, vaccination is recommended routinely for all health care personnel without evidence of immunity and is the preferred method for preventing varicella in health-care settings. Preferably, HCP should be vaccinated when they begin employment. Routine testing for varicella immunity after 2 doses of vaccine is not recommended for the management of those fully vaccinated. HCP who have received 2 doses of vaccine and who are exposed should be monitored daily during days 10-21 after exposure through the employee health program or by an infection control nurse to determine clinical status. HCP who have received 1 dose of vaccine and who are exposed should receive the second dose with single-antigen varicella vaccine within 3-5 days after exposure. Unvaccinated HCP who have no other evidence of immunity who are exposed to VZV are potentially infective from days 10-21 after exposure and should

be furloughed during this period. They should receive post-exposure vaccination as soon as possible.

Recommendations for the Use of VZIG:

Immunocompromised patients

This category is comprised of persons who have primary and acquired immune-deficiency disorders, neoplastic diseases and those who are receiving immunosuppressive treatment. Patients receiving monthly high-dose Immune Globulin Intravenous (IGIV) (≥ 400 mg/kg) are likely to be protected and probably do not require VZIG if the last dose of IGIV was administered ≤ 3 weeks before exposure.

Neonates whose mothers have signs and symptoms of varicella around the time of delivery

VZIG should be administered to neonates whose mothers have signs and symptoms of varicella from 5 days before to 2 days after delivery.

Premature neonates exposed post-natally

Infants born at greater or equal to 28 weeks of gestation who are exposed during the neonatal period and whose mothers do not have evidence of immunity should receive VZIG because the immune system of premature infants is not fully developed. Premature infants born less than 28 weeks of gestation who weigh $\leq 1,000$ g at birth and were exposed during the neonatal period should receive VZIG regardless of maternal immunity because these infants might not have acquired maternal antibodies.

Pregnant women

Evidence of varicella immunity should be obtained as soon as possible. If no varicella antibody is detectable, VZIG should be strongly considered for pregnant women who have been exposed. Administration of VZIG to these women has not been found to prevent viremia, fetal infection, congenital varicella syndrome, or neonatal varicella. Thus, the primary indication for VZIG in pregnant women is to prevent complications of VZIG in the pregnant mother rather than to protect the fetus. VZIG is not recommended for healthy, full-term infants who are exposed post-natally, even if their mothers have no history of varicella.

- **Child-care facility setting:**

VZIG (or history of prior disease) is required for all children (≥ 12 months of age) to enroll in any licensed child-care facility in Texas, and vaccine is recommended for all susceptible children (≥ 12 months of age).

- **Persons who have contraindications to vaccination:**

Persons with a severe allergic reaction to a vaccine component or following a prior dose of vaccine should not receive varicella vaccine. Most immunocompromised persons should also not receive varicella vaccine. Women known to be pregnant or attempting to become pregnant should not receive a varicella-containing vaccine. Vaccinations of persons with moderate or severe acute illness should be postponed until the condition has improved.

Exclusion

- Exclude from work, school and health care facilities until vesicles become dry.
- In the hospital, strict isolation is appropriate because of the risk of serious varicella complications in immunocompromised susceptible patients.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School & Child-Care Facilities, and General Public Reporting Requirements

Varicella (chickenpox) cases are required to be reported within 1 week to the local or regional health department or the Texas Department of State Health Services (DSHS), Infectious Disease Control Unit (IDCU) at **(800) 252-8239** or **(512) 776-7676**. Cases of varicella (chickenpox) are reportable weekly by name, date of birth, sex, race and ethnicity, address, date of onset, and varicella vaccination history.

Local and Regional Reporting and Follow-up Responsibilities

No case investigation is required for varicella, however local and regional health authorities should provide education to prevent further spread of disease. Discuss exclusion criteria with reporters. Encourage timely vaccinations. In the event of a death, copies of the hospital discharge summary, death certificate, and autopsy report should be sent to DSHS IDCU. Records must be faxed within 30 days of initial report to **(512) 776-7616** or mailed to the following address:

Infectious Disease Control Unit,
Texas Department of State Health Services
Mail Code: 1960
PO Box 149347
Austin, TX 78714-9347

Data Entry

Local and regional health authorities are required to enter all varicella investigations with complete information into the NEDSS Base System and submit notifications within 30 days of initial report. Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

LABORATORY PROCEDURES

To obtain testing kits, contact the DSHS Laboratory at **(512) 776-7661**. Before shipping specimens, be sure to notify DSHS IDCU VPD staff at **(512) 776-7676**.

SPECIFIC LABORATORY PROCEDURES

IgG Serology: Acute AND convalescent samples. Collect acute early in the course of illness and convalescent 10-14 days later. Do not send serology solely to confirm immunity. If an acute specimen is obtained, every effort should be made to collect a convalescent sample.

Specimen Collection

Option 1:

- Collect at least 5 mL blood in red top tube.
- Label blood tubes with patient's first and last name, and we recommend a second identifier such as date of birth or medical record number or social security number. If the first and last name is not provided, the specimen will be rejected.
 - Centrifuge the **red top blood** collection tube within 2 hours from the time of collection to separate the serum from the red blood cells (clot).

- Transfer the serum from the red top tube into a serum transport tube properly labeled with the patient's name and date of birth or social security number and ship cold with cool packs and must be received within 48 hours.
- If the serum samples will not be delivered to the laboratory within 48 hours of collection, then the samples must be frozen at -20°C (frozen) or lower and shipped frozen with dry ice.
- Do not freeze whole blood in red top tube for shipping.

Option 2:

- Collect at least 5 mL blood in **gold top** or **tiger top** blood collection tube containing a gel serum separator (Gold top or tiger top tubes are types of Serum Separator Tubes with the gel that keeps the serum separated from the clot after the centrifugation).
- Label blood tubes with patient's first and last name, and we recommend a second identifier such as date of birth or medical record number or social security number. If the first and last name is not provided, the specimen will be rejected.
 - Centrifuge the gold top blood collection tube within 2 hours from the time of collection to separate the serum from the red blood cells (clot) and ship cold with cool packs and must be received within 48 hours.
 - If more than 48 hours, transfer the serum into a serum transport tube properly labeled with the patient's name and date of birth or social security number and ship frozen with dry ice.
 - Do not freeze serum in SST for shipping. Freezing will cause hemolysis and hemolyzed specimens will be unsatisfactory for testing.

Submission Form

- Use the DSHS Laboratory current version of G-2A form (Dec 2011, Rev 4) for specimen submission.
- Make sure the patient's first and last name and date of birth / social security number match exactly what is written on the tube.
- Mark the laboratory test requested, date of onset, and date of collection. Be certain that the names on acute and convalescent sera match exactly.
- Call DSHS Laboratory at 512-776-7138 if needing information for specimen submission.

Specimen Shipping

- To avoid specimen rejection, ship separated serum or centrifuged SST Mon-Thur to the DSHS laboratory via overnight delivery following the above guidelines.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
 - If the serum samples will not be delivered to the DSHS laboratory within 48 hours of collection, transfer into a serum transport tube and freeze on Fridays. Ship frozen specimens with dry ice on Monday. Lone Star service will not deliver specimen to the DSHS lab on Saturday.
- Ship specimens to:

Laboratory Services Section, MC-1947
 Texas Department of State Health Services
 Attn. Walter Douglass (512) 776-7569
 1100 West 49th Street
 Austin, TX 78756-3199

Causes for Rejection:

- Discrepancy between name on tube and name on form,

- Insufficient quantity of serum for testing specimens received with extended transit time, or
- Specimens received with extended transit time or received at incorrect temperature or no date of collection.

Varicella Culture

Specimen Collection

- The preferred specimens are vesicle fluids or skin scrapings.
- Specimens should be collected as close to onset date as possible and no later than one week from onset date.
- Place swab in 1-2 mL of viral transport media. Synthetic swabs should be used. Do not use cotton swabs for specimen collection.

Submission Form

- Use Specimen Submission Form G-2A.
- Make sure the patient's name and date of birth / social security number match exactly what is written on the container.
- Mark the laboratory test requested (viral isolation), date of onset, and date of collection. List the suspected virus or disease in the Virology section.

Specimen Shipping

- Maintain specimens at 2-8°C immediately after collection. Specimens not received at the lab within 12 hours of collection should be frozen at -70°C. Specimens should be shipped on dry ice.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
 Texas Department of State Health Services
 Attn. Walter Douglass (512) 776-7569
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Causes for Rejection:

- Specimen submitted on a preservative such as formalin.