

Varicella (Chickenpox) Surveillance Protocol

Healthcare Provider Responsibilities:

1. Manage patients with varicella and their close contacts in accordance with physician's guidance available at:
<http://www.wvdep.org/Portals/31/PDFs/IDEP/varicella/ChickenpoxProviderInfoSheetApril%202010.pdf>
2. Reporting varicella:
 - a. Weekly report the total number of cases of varicella to your local health department by phone or fax throughout the year. You may report the number of varicella cases along with your weekly influenza-like illness report.
 - b. Immediately report all outbreaks of varicella in any setting to your local health department by phone. You may also report to West Virginia Division of Infectious Disease Epidemiology (DIDE) at 800-423-1271 in WV or 304-558-5358.
 - c. Within one week, report death associated with varicella to your local health department or DIDE, by using West Virginia Electronic Disease Surveillance System (WVEDSS) form for Chickenpox (Varicella) death:
<http://www.wvdhhr.org/idep/pdfs/wvedss/chickenpoxDeath.pdf>.

Laboratory Responsibilities:

1. Varicella is reportable as an aggregate total in West Virginia. You may report a positive laboratory test result of varicella, including patient demographic information, to West Virginia Division of Infectious Disease Epidemiology (DIDE) by faxing a report to 304-558-8736.
2. The infection control practitioner or the healthcare provider who ordered the test should be notified of a positive result immediately.

Public Health Actions (Responsibilities):

1. Employees who will conduct interview or face-to-face contact with infectious persons should be immune to varicella. If there is no contraindication, immunize with varicella vaccine to those who are non-immune following Advisory Committee of Immunization Practices (ACIP) recommendations.

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2. Educate your healthcare providers to report outbreak(s) of varicella immediately and report aggregate total chickenpox cases weekly to their respective local health department.
3. Reporting:
 - a. Report weekly to DIDE aggregate total of chickenpox and influenza-like-illness (ILI) by using “Influenza like Illness and Chickenpox Weekly Reporting Form” at http://www.wvidep.org/Portals/31/PDFs/flupox_reporting_form.pdf. Send the report to DIDE every Monday by faxing it to 304-558-8736.
 - b. Report death due to chicken pox (varicella) by using West Virginia Electronic Disease Surveillance System (WVEDSS) form for Chickenpox (Varicella) death: <http://www.wvdhhr.org/idep/pdfs/wvedss/chickenpoxDeath.pdf>
 - c. Immediately report varicella outbreaks in any setting to your regional epidemiologist and the Division of Infectious Disease Epidemiology (DIDE) via phone: 800-423-1271 in WV or 304-558-5358.
4. Educate the public, such as parents and guardians of infants, children, adolescents, adults, and pregnant women about the disease and the importance of varicella vaccine. Adults aged 60 and older should be offered the shingle vaccine according to the ACIP recommendations.
5. Educate healthcare providers to track immune status of staff in healthcare settings. Offer vaccine to non-immune staff that has no contraindications.
6. Varicella in vaccinated persons is usually mild or atypical and can pose challenges for clinical diagnosis. Laboratory confirmation is important as fewer cases are seen among highly vaccinated populations. This link shows how to collect rash specimens. Serology and blood/specimens are not being collected for the purposes of this protocol. For specimen collection and demonstration visit: <http://www.cdc.gov/vaccines/vpd-vac/varicella/surv-collect-virus-spec.htm#form>

Specimen collection procedure

This video outlines procedures for collecting varicella skin lesions. Skin lesions are the preferable method for laboratory confirmation of varicella. There are 3 types of lesions you will see most often resulting from varicella zoster virus: a

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scabbed or crusted lesion; a maculopapular lesion, which is a lesion with a raised red bump; or a vesicular lesion, which is a blister-like or fluid-filled lesion.

To collect a scab for varicella zoster virus testing, begin by gently lifting the scab from the lesion. Once the scab is collected, place it in a container such as a swab specimen tube or a plastic baggie. If there is more than one scab, place each scab individually in different containers.

The most effective technique for collecting cells from a maculopapular lesion or fluid from a vesicular lesion is the same, though for maculopapular lesions it is a greater challenge to ensure that enough skin cells are collected. Lesions in vaccinated individuals are likely to be atypical, macular only or papular only, but obtaining specimens from papular lesions are possible using the following technique. Use the edge of a clean slide to loosen and collect skin cells or fluid from the lesion as shown here. Then, using a sterile swab, rub the lesion vigorously enough to ensure that skin cells or fluid are collected. To ensure an adequate amount of skin cells is collected, particularly with maculopapular lesions, we recommend also using the swab to wipe the skin cells off the edge of the slide used to scrape the lesion. You may also press the slide directly to the lesion to collect skin cells or fluid as shown here. This technique is especially effective for vesicles where a “smudge” should be visible. To ensure that skin cells or fluid are on the slide, compare it to a clear slide under light.

For specimen collection kit, contact DIDE at 304-558-5358. Complete the specimen collection form;

<http://www.wvdep.org/Portals/31/PDFs/IDEP/varicella/CDC%20Specimen%20Collection%20Form.pdf> and submit with the specimen to Division of Infectious Disease Epidemiology at 350 Capitol Street, Room 125, Charleston, WV 25301.

7. **Steps for Outbreak management:**

- a. Check to confirm that the reported cases meet the clinical criteria of Varicella and outbreak case definition.
- b. Immediately notify DIDE to assist you with outbreak investigation by Varicella Team.

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- c. Rapidly triage (interview) all cases of chickenpox by completing the chickenpox outbreak line listing form:
<http://www.wvidep.org/Portals/31/PDFs/IDEP/varicella/Varicella%20Outbreak%20Line%20List%20Form%20August%202009.pdf>

Complete individual Varicella case report forms for each student and forward the line list and case report forms to DIDE via fax at 304-558-8736.

<http://www.wvidep.org/Portals/31/PDFs/IDEP/varicella/Varicella%20Outbreak%20Case%20Report%20Form%20Dec2009.pdf>

Determine vaccination status by first contacting the parent for vaccination records. If the parent does not have this information, request that they obtain the information through their health care provider. WVSIIIS will be checked if the parent and provider are unable to provide this information.

- d. Initiate rapid case and contact identification to prevent the spread of disease, especially among susceptible persons at high risk for serious complications of varicella, such as immunocompromised persons and pregnant women. For identification of close contacts, see table 1 below:

Table 1- Types of Exposure to Varicella or Zoster

<u>Type of Facility</u>	<u>Description</u>
Household	Residing in the same household
Playmate	Face-to-face*indoor play (*the contact should be Nontransient, some experts suggest a contact of 5 Or more minutes as constituting significant exposure; Others define close contact as more than 1 hour)
<u>Hospital:</u> Varicella	In same 2 to 4 bedroom or adjacent beds in a large ward, face-to-face*(see above)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	Onset of Varicella in the mother 5 days or less before delivery or within 48 hours after delivery; VariZig or IGIV is not indicated if the mother has zoster.

- e. Issue a healthcare provider alert and parent/guardian notification letter in settings where exposed persons may seek post exposure prophylaxis with vaccine or immune globulin or antiviral from their providers in the community. Sample healthcare provider and parent/guardian letters are available at

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<http://www.wvdep.org/AZIndexofInfectiousDiseases/VaricellaSurveillanceProject/tabid/1903/Default.aspx>

- f. Isolate (exclude) or cohort individuals with varicella until all of their lesions have formed scabs or crusts (usually 5 days after rash onset).
- g. Post exposure Immunization: Administration of varicella vaccine to individuals without evidence of immunity (see table below) exposed to varicella (12 months of age or older, including adults) may prevent or modify the disease, if administered as soon as possible, within 72 hours 93 days) and possibly up to 120 hours (5 days) after exposure, if there is no contraindication to vaccine use. During a varicella outbreak, give a second dose of varicella vaccine to those who have received one dose, provided the appropriate vaccination interval has elapsed since the first dose (3 months for people 12 months to 12 years of age and at least 4 weeks for people 13 years of age). West Virginia Division of Immunization Services may provide varicella containing vaccines for outbreak control when resources are available. Please contact DIDE immediately after verifying the Varicella outbreak to initiate control measures.

The Advisory Committee on Immunization Practices (ACIP) Criteria for Evidence of Immunity to Varicella includes any of the following:

1. Documentation of two doses of varicella vaccine(See current recommendations)
 - a. Preschool-aged children 12 months of age: one dose
 - b. School-aged children, adolescents, and adults: two doses
2. Laboratory evidence of immunity or laboratory confirmation of prior disease.
3. Born in the US before 1980, excluding health-care workers, pregnant women, and immunocompromised individuals. These individuals need to meet one of the other criteria for evidence of immunity.
4. Receipt from a healthcare provider of a diagnosis of chickenpox or history of chickenpox.
5. Receipt from a healthcare provider of a diagnosis of herpes zoster or verification of a history of herpes zoster (shingles).

For people reporting a history of or presenting with a typical and/or mild case, assessment by a physician or their designee is recommended and one of the following should be sought:

- a. An epidemiologic link to a typical varicella case or
- b. Evidence of laboratory confirmation.

When such documentation is lacking, people should not be considered as having a valid history of disease because other diseases may mimic mild atypical varicella.

- h. Recommend varicella vaccination to non-immune childcare or school contacts even if the time since exposure is greater than 5 days, to protect from future

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- exposure, especially if there is ongoing transmission in that setting, Note: Varicella vaccine should not be administered to people who are immunocompromised or had an anaphylactic-type reaction to any component of the vaccine, including gelatin and neomycin.
- i. For individuals for whom varicella vaccine is contraindicated and no history of Varicella is unknown or negative serologic test, offer Varicella-Zoster Immune Globulin (VariZIG) as soon as possible within 96 hours of varicella exposure. For detailed information about VariZIG refer to WVDHHR “Information for Healthcare Providers on Varicella Exposure Management”:
<http://www.wvdep.org/Portals/31/PDFs/IDEP/varicella/ChickenpoxProviderInfoSheetApril%202010.pdf>
(Note: VariZIG is available under an investigational new drug (IND) protocol and can be requested by contacting Fortuna Favet Fortibus (FFF) globulin (IGIV) containing anti-varicella antibodies is recommended. WVDHHR does not provide VariZIG or IGIV.
 - j. Chemoprophylaxis: If VariZIG is not available or more than 96 hours have passed since exposure, some experts recommend prophylaxis with acyclovir for a susceptible immunocompromised patient who has been exposed to varicella. For detailed information, see
<http://www.wvdep.org/Portals/31/PDFs/IDEP/varicella/ChickenpoxProviderInfoSheetApril%202010.pdf>.
 - k. WVDHHR does not provide acyclovir.
 - k. Exclude exposed susceptible individuals who may be in contact with persons at high risk of serious complications (e.g., health-care workers, family members of immunocompromised persons) for the duration of the period of communicability (i.e., 8 to 21 days after exposure).
 - l. Assess the status of the outbreak control within the outbreak setting. Document the outbreak line listing form and fax the completed line listing form to DIDE at 304-558-8736.
 - m. Healthcare personnel have increased potential for close contact with persons at high risk for developing severe disease and serious complications. In institutional outbreaks or outbreaks involving adolescents and adults, consider vaccinating susceptible persons (staff and residents) to limit or control the outbreak by interrupting transmission.

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- n. Only persons with a history of chickenpox or varicella vaccination should come in contact with the varicella case until lesions have formed scabs or crusts.
- o. For hospital exposure, refer to
<http://www.wvdep.org/Portals/31/PDFs/IDEP/varicella/ChickenpoxProviderInfoSheetApril%202010.pdf>
- p. In outbreaks where there are childcare or school requirements, unvaccinated children with no history of varicella should be vaccinated immediately or excluded from school for the duration of communicability (from 10-21 days post exposure or for the duration of the outbreak).
- q. It is unknown whether Reye syndrome results from administration of salicylates after immunization for varicella in children. Because of the association between Reye syndrome, natural varicella infection, and salicylates, the vaccine manufacturer recommends that salicylates be avoided for 6 weeks after administration of varicella vaccine.

Disease Prevention Objective

Prevent cases of disease by:

1. Full immunization of all children (12 months and older) and adults without evidence of immunity following the ACIP approved schedule.
2. Provide immunization for susceptible health care workers and high risk individuals.

Disease Control Objectives

After a case of chickenpox is identified in a setting, reduce further transmission by educating providers to:

- a. Isolate (exclude) or cohort individuals with varicella until all of their lesions have crusted.
- b. Offer chickenpox vaccine within 72 hours (3 days) and possibly up to 120 hours (5 days) following varicella exposure. Encourage vaccination even if exposure is greater than 5 days.
- c. Offer VariZIG or IGIV or Acyclovir (if applicable) as soon as possible, but within 96 hours to susceptible persons who are at high risk for developing severe disease and when varicella vaccine is contraindicated.

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- d. Exclude exposed susceptible individuals who may be in contact with persons at high risk of serious complications (e.g. health care workers, family members of immunocompromised persons) for the duration of the period of communicability (i.e. from the 8th until the 21st day post exposure. (MMWR Recomm Rep. 2007; PR04:1-54

Disease Surveillance Objectives

1. To develop or improve outbreak detection and investigation.
2. To monitor effectiveness of two-dose varicella vaccination in the context of an outbreak.

Public Health Significance

Varicella (chickenpox) is a febrile rash illness resulting from primary infection with the varicella-zoster virus (VZV). Varicella is highly infectious with secondary infection rates between 65% and 85% among susceptible household contacts. While mostly mild disorder in childhood, varicella tends to be more severe in adults. It may be fatal, especially in neonates and in immunocompromised persons. VZV causes a systemic infection that usually results in lifetime immunity. According to CDC, approximately 11,000 hospitalizations and 100 deaths occurred before the introduction of live attenuated varicella vaccine in 1995. Varicella affected mainly children with approximately 90% of cases occurring before the age of 15 years. In the 1970s and 1980s, the highest rates of disease were among children 5-9 years of age followed closely by children 1-4 years of age. In the 1990s, the highest rate of disease has been reported in the preschool age group. This may be due to increasing attendance at childcare and preschool. Children with varicella expose adults in households, schools, and daycare centers to the risk of severe, even fatal disease. Maximum transmission occurs during late winter and spring.

In 2007, 90% of 19-35 month-old children in United States had received one dose of varicella vaccine. As vaccine coverage increases and the incidence of wild-type varicella decreases, a greater number of varicella cases are occurring in immunized people as breakthrough disease. In the surveillance areas with high vaccine coverage, the rate of Varicella disease decreased by approximately 85% from 1995 to 2004, the rate of varicella disease decreased by approximately 85% with the use of varicella vaccine. Immunocompromised people with primary (varicella) or recurrent (zoster) infection are at increased risk of severe disease.

Clinical Description

Varicella (Chickenpox) is a febrile rash illness resulting from primary infection with the varicella-zoster virus (VZV). Varicella in children is usually a self-limited disease

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that lasts 4-5 days and is characterized by fever, malaise, and a generalized vesicular rash typically consisting of 250-500 blister-like lesions, usually on the face, scalp or trunk. Adolescents, adults, and immunocompromised persons usually have more severe disease and are at higher risk for complications. Serious complications include secondary bacterial infections (most notably those caused by group A beta-hemolytic streptococcus, including cellulites, necrotizing fasciitis, septicemia, and toxic shock syndrome), pneumonia, encephalitis, cerebellar ataxia, Reye syndrome, and death. The consequences of primary VZV infection in pregnancy for the mother and for the fetus vary with the gestational period. Although primary infection (Varicella) in pregnant women is rare since most women of childbearing age are

immune to VZV, varicella in pregnancy is also associated with a risk for VZV transmission to the fetus or weight, cutaneous scarring, limb hypoplasia, microcephaly, cortical atrophy, chorioretinitis, cataracts, and other anomalies.

Etiologic Agent

Varicella-zoster virus (VZV) is a member of the herpes virus family.

Reservoir

Humans are the only source of infection for this virus.

Mode of Transmission

Transmission occurs from person to person by direct contact with patients with either varicella or herpes zoster lesions, by airborne droplets, infected respiratory secretions, or from contact with vesicular zoster lesions.

Incubation Period

The incubation period for varicella is 10-21 days, most commonly 14-16 days.

Infectious Period

The infectious period for varicella is usually 1-2 days before onset of rash, and continuing until all lesions are crusted which is usually 4-5 days after onset of rash. Contagiousness may be prolonged in patients with altered immunity.

Outbreak Recognition (Definition)

To facilitate disease prevention and control, health departments should encourage varicella outbreak reporting in the following situations: three cases or more from any given school, day care facility, or long term care facility within one incubation period.

Case Definitions

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Clinical case definition

An illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause.

Laboratory criteria for diagnosis

- Isolation of varicella virus from a clinical specimen, or
- Varicella antigen detected by direct fluorescent antibody test, or

- Varicella-specific nucleic acid detected by polymerase chain reaction (PCR), or
- Significant rise in serum anti-varicella immunoglobulin G (IgG) antibody level by any standard serologic assay.

Case Classification

Probable:

An acute illness with

- Diffuse (generalized) maculopapulovesicular rash, AND
- Lack of laboratory confirmation, AND
- Lack of epidemiologic linkage to another probable or confirmed case.

Confirmed:

An acute illness with diffuse (generalized) maculopapulovesicular rash, AND

- Epidemiologic linkage to another probable or confirmed case, OR
- Laboratory confirmation by any of the following:
 - ❖ Isolation of varicella virus from a clinical specimen, OR
 - ❖ Varicella antigen detected by direct fluorescent antibody test, OR
 - ❖ Varicella-specific nucleic acid detected by polymerase chain reaction (PCR)OR
- ❖ Significant rise in serum anti-varicella immunoglobulin (IgG) antibody level by any standard serologic assay.

Notes

Two probable cases that are epidemiologically linked are considered confirmed, even in the absence of laboratory confirmation.

In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), the disease is almost always mild with fewer than 50

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skin lesions and shorter duration of illness. The rash may also be atypical in appearance (maculopapular with few or no vesicles).

Laboratory confirmation of cases of varicella is not routinely recommended; laboratory confirmation is recommended for fatal cases and in other special circumstances.

Varicella deaths case definition and case classification

Case classification

Probable: A probable case of varicella that contributes directly or indirectly to acute medical complications that result in death.

Confirmed: A confirmed case of varicella that contributes directly or indirectly to acute medical complications that result in death.

Laboratory Diagnosis of Varicella

With the Varicella project, we are obtaining laboratory confirmation in outbreaks. Laboratory testing for varicella is not routinely required but is indicated to confirm the diagnosis in severe or unusual cases or to determine varicella susceptibility. As disease continues to decline, laboratory confirmation will become standard practice. Local health departments and DIDE will assist with laboratory confirmation at CDC National VZV Laboratory. Please contact DIDE at 304-558-5358 for laboratory confirmation. For more information about laboratory diagnosis, please refer to the Public Health Actions.

Preventive Interventions

- The advisory Committee on Immunization Practices recommends varicella vaccination for persons not previously immunized, persons without previous history of infection, or persons at high risk for exposure.
- Administration of varicella VZIG for high risk groups for whom varicella vaccine is contraindicated.
- The American Academy of Pediatrics (AAP) recommends excluding affected children from school until the lesions have crusted. This may not prevent spread of varicella because the child is infective before rash appears.

Surveillance Indicators

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- Proportion of MMWR weeks for which reporting of chickenpox is available (county level).

References:

Strategies for the Control and investigation of Varicella Outbreaks 2008, National Center for Immunization and Respiratory Diseases, CDC

Varicella-Zoster Infections, page 714-727, Red Book (28th edition)-2009 Reports of the Committee on Infectious Diseases, American Academy of Pediatrics.

CDC Varicella-Zoster Infection - http://www.cdc.gov/ncidod/diseases/list_varicl.htm