

Varicella (Chickenpox)

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Chickenpox is caused by varicella-zoster virus (VZV), a DNA virus belonging to the herpes virus group. Primary infection with VZV causes **varicella** (chickenpox). Like other herpes viruses, VZV has the capacity to persist in the body as a latent infection after the primary infection.

Shingles, also known as herpes zoster, results from reactivation of the latent VZV infection.

B. Clinical Description

Varicella (chickenpox) is a highly contagious febrile rash illness resulting from primary infection with the varicella-zoster virus. A mild prodrome may precede the onset of rash. Adults may have 1-2 days of fever and malaise prior to rash onset; however, in children, rash may be the first sign of chickenpox. The rash is generalized, pruritic (itchy) and rapidly progresses from macules to papules to vesicular lesions before crusting. Several crops of these vesicles will develop over a period of 2-4 days with lesions presenting in several stages of development. Lesions generally appear first on the head, then the trunk and the extremities. The lesions are usually concentrated on the trunk and may appear on the mucous membranes. Photographs of wild-type varicella rashes are posted on the CDPHE web site at www.cdphe.state.co.us/dc/epidemiology/Varicella. Chickenpox immunity is generally lifelong, however, symptomatic reinfection with chickenpox can occur, but is uncommon in immunocompetent persons.

The disease is usually mild among children, and can be more severe in adolescents and adults. Complications of varicella include secondary bacterial infection of skin lesions, encephalitis, pneumonia and death. Invasive group A streptococcal infection has been reported as a complication of varicella, which may result in cellulitis, necrotizing fasciitis, septicemia, and toxic shock syndrome.

The following individuals are more likely to experience serious complications with chickenpox: pregnant women, immunocompromised persons, children < 1 year of age, persons with chronic cutaneous or pulmonary disorders, persons receiving systemic corticosteroids or long-term salicylate therapy and some adolescents and adults. The risk of complications is especially high when corticosteroids are given during the incubation period for chickenpox. Infants born to women having varicella within 5 days before delivery to 2 days after delivery are at risk of severe varicella infection. The infected neonates lack sufficient maternal antibody to lessen the severity of disease, and the infection may be fatal.

Congenital varicella syndrome can occur among infants born to mothers having primary varicella infection during the first 20 weeks of their pregnancy (unborn child is infected while in the uterus). The risk of congenital abnormalities from primary maternal varicella infection during pregnancy is very low (less than 2%). The newborn may have a variety of abnormalities,

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including developmental abnormalities, encephalitis, mental retardation, atrophy, chorioretinitis, microcephaly, and low birth weight.

Vaccinated persons who develop varicella more than 42 days after vaccination have **breakthrough varicella disease**. Breakthrough infection is significantly milder, with fewer lesions (generally fewer than 50), many of which are maculopapular rather than vesicular. Most persons with breakthrough infection do not have a fever. Persons with breakthrough infection may be able to return to normal activities earlier, since they have fewer lesions.

Herpes zoster or shingles occurs when latent VZV reactivates and causes recurrent disease. Varicella virus remains inactive in clusters of nerve cells adjacent to the spinal cord after chickenpox resolves, and reactivation can occur later in life. Shingles symptoms include red, painful, itchy and blistering rash, typically, in one area on one side of the body, usually without fever or other systemic symptoms. Currently, there is no adequate therapy available to treat shingles. However, there is a zoster vaccine to prevent shingles, which is recommended for adults ≥ 60 years of age. Contact with shingles lesions (prior to crusting) can cause chickenpox in a susceptible individual. Complications of shingles include postherpetic neuralgia, which may last a year or longer after the episode of zoster. Severe sequelae often occur if the ocular nerve or other organs are involved with the zoster infection.

C. Reservoirs

Humans are the only host.

D. Modes of Transmission

VZV is transmitted person-to-person by the following means:

1. From chickenpox cases
 - respiratory contact with airborne droplets and/or
 - direct contact with nasopharyngeal secretions or vesicular fluid from lesions (prior to crusting)
2. From shingles cases
 - direct contact with vesicular fluid from lesions (prior to crusting)

Varicella is highly infectious with secondary infection rates in susceptible household contacts approaching 90%. Exposure to chickenpox does **not** cause shingles (exposure to shingles can result in chickenpox in a susceptible person, but **cannot** cause shingles).

E. Incubation Period

The incubation period for varicella is usually 14–16 days, with a range of 10–21 days. The incubation period may be prolonged for as long as 28 days after receipt of varicella zoster immune globulin (VZIG) and shortened in immunocompromised persons.

F. Period of Communicability or Infectious Period

The infectious period for **chickenpox** is usually 1–2 days (may be as long as 5 days) before the rash appears and until all of the vesicles have formed scabs, usually within 5 days of rash onset. Chickenpox cases, including breakthrough varicella cases, should be excluded from school, childcare or work. They should voluntarily isolate themselves at home until all lesions have formed scabs or crusts. If a person with breakthrough disease has a nonvesicular rash, they

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should stay at home until the rash is gone. The period of communicability may be prolonged in immunocompromised patients.

G. Epidemiology

Varicella occurs worldwide and some data suggest that in tropical areas, acquisition of infection occurs at later ages. Varicella cases are reported throughout the year in Colorado; however, incidence is highest in winter and early spring. As of January 30, 2004, varicella became a 7-day reportable disease in Colorado. Colorado varicella statistics are available at the CDPHE website: www.cdphe.state.co.us/dc/CODiseaseStatistics/index.html

2) CASE DEFINITION (Varicella)

Clinical Description

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 Criteria for Diagnosis

- Isolation of varicella virus (VZV), or
- Positive direct fluorescent antibody (DFA), or
- Positive polymerase chain reaction (PCR), or
- Significant rise in serum varicella immunoglobulin G (IgG) antibody level by any standard serologic assay.

Note: Commercial test kits for varicella immunoglobulin M (IgM) antibody are unreliable and not recommended for the diagnosis of acute varicella infection. False positive IgM results are common in the presence of high IgG levels on these tests. Thus, clinical varicella cases with positive IgM tests are classified as probable, unless they are linked to another probable or confirmed case.

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 is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a confirmed or probable case.

Note: Two probable cases who are epidemiologically linked would be considered confirmed, even in the absence of laboratory confirmation.

Outbreak Case Definition

Five or more varicella cases clustered in time (e.g., occurring within 21 days of each other) and sharing common space (e.g., school or childcare facility).

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3) REPORTING CRITERIA

What to Report to the Colorado Department of Public Health and Environment (CDPHE) or local health agency

- Varicella (chickenpox) cases based on clinical diagnosis should be reported to the state or local health agency within 7 days of suspicion/diagnosis.
- Report any laboratory specimen diagnostic of or highly correlated with varicella clinical illness within 7 days.
- If a varicella death occurs please call CDPHE Vaccine Preventable Disease staff at 303-692-2671 or 303-692-2672.
- **Shingles** (herpes zoster) is **not** a reportable disease.

Purpose of Surveillance and Reporting

- To monitor trends in disease incidence in the vaccine era
- Monitor changing age-specific epidemiology
- Facilitate more timely disease control of outbreaks
- May help guide future immunization policy

Important Phone Numbers and Web Resources

- CDPHE Communicable Disease Epidemiology Program
 - Phone: 303-692-2700 or 800-866-2759
 - Fax: 303-782-0338
 - After hours: 303-370-9395
- CDPHE, Communicable Disease Manual (CD Manual) website:
http://www.cdphe.state.co.us/dc/Epidemiology/dc_manual.html
- CDPHE, Disease Control and Environmental Epidemiology Division, Varicella website:
<http://www.cdphe.state.co.us/dc/Epidemiology/Varicella/index.html>

4) STATE LABORATORY SERVICES

Currently varicella testing is not routinely available at the CDPHE Laboratory.

Laboratory Testing Recommendations

- Laboratory testing for typical varicella disease is not routinely recommended.
- Laboratory testing is indicated to confirm the diagnosis in severe cases or atypical mild cases without a link to a typical case or a laboratory confirmed case.
- Laboratory testing (i.e., serologic testing) may be done to determine susceptibility.

5) CASE INVESTIGATION

Individual cases of varicella are not required to be investigated **except** when a death occurs. Outbreak investigations of varicella are dependent upon available resources. Prioritizing the investigation of varicella outbreaks is described in Section 5 (C) - Outbreaks. The following guidance is for local public health agencies, which elect to investigate reported cases of varicella.

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A. Case Investigation / Form

Determine reported case classification, probable versus confirmed, and complete all sections of the CDPHE **Chickenpox Report Form**, which is located on the CD Manual website. Reports can either be entered into CEDRS or faxed or mailed to the CDPHE Communicable Disease Program. The following guidance is for local public health agencies, which elect to investigate reported cases of varicella.

B. Identify and Evaluate Contacts

The main purpose of identifying contacts is to determine which contacts are susceptible to varicella and provide information regarding postexposure prophylaxis with varicella vaccine or for high-risk contacts the use of varicella zoster immune globulin (VZIG).

Evidence of immunity to varicella includes any of the following:

- 1) Documentation of age-appropriate vaccination:
 - Preschool-aged children 12 months of age or older: 1 dose, however, a second dose should be administered if there is an exposure to varicella and it has been at least 3 months since the first varicella vaccination.
 - School-age children, adolescents, and adults: 2 doses administered at least 28 days apart (for children < 13 years of age the second dose should be administered 3 months after the first dose; however, second doses inadvertently administered at least 28 days after the first dose do not need be repeated).
- 2) Laboratory evidence of immunity or laboratory confirmation of disease. Commercial assays can be used to assess disease induced immunity, but lack adequate sensitivity to reliably detect vaccine-induced immunity (i.e., they may yield false-negative results).
- 3) Born in the United States before 1980. For health care personnel, pregnant women, or immunocompromised persons, birth before 1980 should not be considered evidence of immunity. Persons born outside the United States should meet one of the other criteria for varicella immunity.
- 4) A healthcare provider diagnosis or verification of varicella disease. Verification of history or diagnosis of typical disease can be done by any health care provider (e.g., school or occupational clinic nurse, nurse practitioner, physician assistant, or physician). A physician should assess persons reporting a history of or presenting with atypical or mild varicella symptoms or their designee and one of the following should be sought:
 - a) an epidemiological link to a typical varicella case or a laboratory-confirmed case, or
 - b) evidence of laboratory confirmation if testing was performed at the time of acute disease.When such documentation is lacking, a person should not be considered to have a valid history of disease, because other diseases may mimic mild atypical varicella.
- 5) Diagnosis or verification of a history of herpes zoster (shingles) by a health-care provider.

1. Symptomatic Contacts

- Contacts of a varicella case having a vesicular rash should be excluded from school, childcare or work and should voluntarily isolate themselves at home until all lesions have formed scabs or crusts (usually 5 days after rash onset).
- Contacts having an atypical rash following exposure should be excluded from school, childcare or work and isolated until their rash is gone or a healthcare provider determines they are non-infectious.

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- Symptomatic contacts that meet the clinical case definition should be reported to CDPHE as confirmed cases, since cases linked to another case are considered confirmed.

2. Asymptomatic Contacts

- Recommend susceptible contacts receive varicella vaccine if it is not contraindicated.
- Administration of varicella vaccine to susceptible contacts may abort infection or modify the disease if given within 3-5 days of exposure.
- Varicella vaccine should be given even if more than 5 days have passed since exposure, to provide future immunity as not every exposure leads to infection.
- Contacts should be informed of the incubation period for varicella (10-21 days), the symptoms of disease, and asked to isolate themselves at home if they develop symptoms.

C. Outbreaks

Investigation of varicella outbreaks should be prioritized as follows:

- Outbreaks involving deaths.
- Outbreaks involving patients and staff in health-care settings or correctional facilities.
- Outbreaks associated with severe complications (e.g., pneumonia, encephalitis, hemorrhagic complications or serious infectious complications such as invasive Group A streptococcal infection) and/or hospitalizations.
- Outbreaks among persons who are immunocompromised due to HIV infection, cancer, or immunosuppressive therapy.
- Outbreaks involving adolescents and adults.
- Outbreaks occurring among vaccinated populations.
- Clusters of varicella reports, which may suggest improper storage and handling of vaccine.
- Outbreaks involving a large number of cases.

6) DISEASE CONTROL MEASURES

A. Treatment

- The only therapy for varicella is antiviral drugs (e.g., acyclovir); however, antiviral drugs are only recommended in certain circumstances. Antiviral drugs (e.g., acyclovir) are not recommended for routine use among otherwise healthy infants and children with varicella. Antiviral therapy is not recommended for post-exposure prophylaxis. Clinical studies indicate that antiviral drugs given within 24 hours of rash onset may reduce the number of days new lesions appear, fever duration, and the severity of cutaneous and systemic signs and symptoms. Antiviral drugs have not been shown to decrease transmission of varicella, reduce the number of days an infected person misses school/work, or reduce complications.

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Varicella antiviral drugs are only recommended in the following circumstances:

- Oral acyclovir should be considered for persons \geq 13 years of age.
- Consider oral acyclovir for persons with chronic cutaneous or pulmonary disorders, long-term salicylate therapy, or steroid therapy.
- Intravenous antiviral therapy is recommended for immunocompromised persons, including persons being treated with chronic corticosteroids.

B. Prophylaxis

1. Vaccination

- Varicella vaccine is recommended for post-exposure prophylaxis of persons without evidence of varicella immunity and who do not have contraindications to vaccination. Please refer to section 5 (B) – for evidence of varicella immunity.
- Administration of varicella vaccine to susceptible contacts may abort infection or modify the disease if given within 3-5 days of exposure.
- In June 2006, the Advisory Committee on Immunization Practices (ACIP) recommended all children routinely receive 2 doses of varicella vaccine. The first dose should be given at age 12-15 months and the second dose at age 4-6 years.
- For children ages 12 months through 12 years, the minimum interval between varicella vaccine doses is 3 months; for persons age 13 years and older, the minimum interval is 28 days. However, second varicella vaccinations inadvertently administered to children 12 months through 12 years age at least 28 days after the first dose do not need to be repeated.
- During a varicella outbreak, persons having only one dose of varicella vaccine should receive a second dose, provided the appropriate vaccination interval has elapsed since the first dose (3 months for persons 12 months to 12 years of age and at least 28 days for persons \geq 13 years of age).
- Varicella vaccination of non-immune contacts may be recommended even if the time since exposure is $>$ 5 days, to provide protection from future exposure, especially if there is ongoing transmission in a particular setting such as a childcare, school or work setting.
- A small portion of individuals receiving varicella vaccine may develop a rash from 7 – 42 days following vaccination. It is usually caused by the vaccine strain of the virus. Individuals who develop a vesicular rash within 7 days of varicella vaccination should be treated as having wild type varicella, unrelated to vaccination. A resource regarding rash following varicella vaccine, “Guidelines for Students Developing a Rash Following Varicella Vaccination,” is available at <http://www.cdphe.state.co.us/dc/Epidemiology/Varicella/index.html>.

2. Varicella Zoster Immune Globulin (VZIG)

- VZIG is recommended for susceptible individuals with significant exposure to varicella who are at increased risk of developing complications of varicella.
- The only Varicella Zoster Immune Globulin (VZIG) product currently available in the United States is VariZIG (manufactured in Canada). The patient groups recommended by ACIP to receive VariZIG include the following:
 - Immunocompromised patients

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- Neonates whose mothers have signs and symptoms of varicella around the time of delivery (i.e., 5 days before to 2 days after)
- Preterm infants born at 28 weeks gestation or later who are exposed during the neonatal period and whose mothers do not have evidence of immunity
- Preterm infants born earlier than 28 weeks' gestation or who weigh 1,000g or less at birth and were exposed during the neonatal period, regardless of maternal history of varicella disease or vaccination
- Pregnant women
- VariZIG is not licensed in the United States, but is available under an Investigational New Drug Application Expanded Access protocol.
- VariZIG can be obtained 24 hours a day from the sole authorized U.S. distributor (FFF Enterprises, Temecula, CA) at 1-800-843-7477 or online at www.fffenterprises.com.
- For further details regarding VZIG use see **Prevention of Varicella, Recommendations of the Advisory Committee on Immunization Practices (ACIP)**, at www.cdc.gov/mmwr/preview/mmwrhtml/rr5604a1.htm

C. Education

- Advise contacts of signs and symptoms of varicella.
- Recommend varicella vaccine for exposed susceptible contacts.
- Recommend VZIG for exposed susceptible individuals at increased risk of developing complications of varicella.
- A CDPHE sample letter, **Chickenpox Exposure Letter, Important Notice**, which includes varicella symptoms and vaccine information is located on the CD Manual website.

D. Managing Special Situations

1. Childcare / Preschool

Refer childcare providers to the CDPHE, "Infectious Disease in Child Care Settings: Guidelines for Child Care Providers", (<http://www.cdphe.state.co.us/dc/Epidemiology/ChildCareflipchart02a.pdf>) and to the CDPHE, Varicella website:

<http://www.cdphe.state.co.us/dc/Epidemiology/Varicella/index.html> for additional varicella information.

- Varicella cases should be excluded from childcare and voluntarily isolate themselves at home until all lesions have formed scabs or crusts (usually 5 days after onset). Children with breakthrough infection may have fewer lesions and may be able to return to childcare earlier than 5 days if all lesions have formed scabs or the rash is gone.
- Determine the dates the varicella case attended childcare or preschool while infectious.
- Recommend that the childcare center or preschool notify parents and staff of the possible exposure to chickenpox. A sample letter, **Chickenpox Exposure Letter, Important Notice**, is available on the CDPHE varicella website. If the center develops their own letter, the notice should recommend that parents contact their child's health-care provider as soon as possible to obtain varicella vaccine for their child if they have not had chickenpox or have not received 2 doses of varicella vaccine. Refer to section 5 (B) regarding evidence of varicella immunity.

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- See section 6 (B.1.) for information regarding the minimum interval between varicella vaccine doses.
- Childcare and preschool personnel should report all varicella cases to CDPHE or their local public health agency, including reports from parents saying their child has chickenpox.

2. School and College

Refer school personnel to the Communicable Disease Guidelines for Special Settings, “Infectious Disease In School Settings-Guidelines for School Nurses and Personnel” at: http://www.cdphe.state.co.us/dc/Epidemiology/manual/School_Guidelines.pdf

and to the CDPHE, Varicella website:

<http://www.cdphe.state.co.us/dc/Epidemiology/Varicella/index.html> for additional varicella information.

- Varicella cases should be excluded from school and voluntarily isolate themselves at home until all lesions have formed scabs or crusts (usually 5 days after onset). Children with breakthrough infection may have fewer lesions and may be able to return to school earlier than 5 days if all lesions have formed scabs or the rash is gone.
- Determine the dates the varicella case attended school while infectious.
- Recommend school personnel notify students, parents and staff about a possible varicella exposure. A **Chickenpox Exposure Letter, Important Notice** is available on the CDPHE varicella website. If school is developing their own letter, the notice should recommend that parents contact their child’s health-care provider as soon as possible to obtain varicella vaccine for their child if they have not had chickenpox disease or have not received 2 doses of varicella vaccine. Refer to section 5 (B) for evidence of varicella immunity.
- See section 6 (B.1.) for information regarding the minimum interval between varicella vaccine doses.
- School personnel should report all varicella cases to CDPHE or their local public health agency, including reports from parents saying their child has chickenpox .

School Requirement

- Beginning in the 2007-2008 school year, 2 doses of varicella vaccine or a history of varicella are required at kindergarten entry. Each following school year the next grade level will be required to have 2 doses of varicella vaccine (e.g., 2008-2009 school year - kindergarten and first grade).
- For the 2007-2008 school year, preschool aged children (12 months – 4 years of age) attending childcare and students in grades 1 – 7 were required to have 1 dose of varicella vaccine given at 12 months of age or older or a history of varicella. Each following school year the next grade level will be required to have 1 dose of varicella vaccine (e.g., 2008-2009 school year – grades 1 through 8).
- The criteria for documenting a history of varicella disease for the school immunization requirements changed at the beginning of the 2007-2008 school year. For further information about varicella school immunization requirements see the CDPHE Immunization Program website: <http://www.cdphe.state.co.us/dc/Immunization/index.html>

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3. Patients and Staff in Health-Care Facilities (Hospitals and Long Term Care Facilities)

Hospitals and long term care facilities generally have written infection control policies and procedures for handling cases of communicable disease among patients and staff members. If a facility does not have such policies in place, provide the following recommendations apply:

- Identify exposed personnel and patients and determine their immune status. Refer to section 5 (B) for evidence of immunity to varicella.
- VZIG should be administered to exposed susceptible patients and staff at increased risk of developing varicella complications. See **Prevention of Varicella, Recommendations of the Advisory Committee on Immunization Practices (ACIP)**, at www.cdc.gov/mmwr/preview/mmwrhtml/rr5604a1.htm for details regarding the use of VZIG.

a. Health-Care Personnel

- Health-care personnel with unknown varicella immune status should have blood collected and tested for immunity to varicella.
- Recommend varicella immunization for susceptible personnel if there are no contraindications to vaccination. If the susceptible person is being tested for immunity to varicella, blood should be collected prior to or at the time of vaccination.
- Efforts should be made to vaccinate susceptible employees within 3 to 5 days of exposure if vaccination is not contraindicated.
- All susceptible exposed personnel (including those receiving their first varicella vaccine dose within 3 to 5 days of exposure) should be furloughed or excused from patient contact from day 10 to day 21 after exposure or until day 28 after exposure for persons who receive VZIG.
- Health-care personnel with 1 dose of varicella vaccine should receive a second dose within 3 to 5 days after exposure (provided 28 days have elapsed since the first dose). Personnel receiving a second varicella vaccine dose do not need to be furloughed, but should be monitored daily for fever, skin lesions, and other systemic symptoms during days 10 – 21 following exposure.
- Health-care personnel who have previously received 2 varicella vaccinations should be monitored daily for fever, skin lesions, and systemic symptoms during days 10 – 21 following exposure.
- Serologic testing for immunity is not necessary for personnel who have been appropriately immunized.
- Instruct health-care personnel to report any symptoms immediately.
- Immunized health-care personnel who develop breakthrough infection should be considered infectious.

b. Patients

- Patients who are diagnosed with varicella while hospitalized should be isolated using standard airborne and contact precautions for a minimum of 5 days after onset of rash and until all lesions are crusted, which in immunocompromised patients may be a week or longer.
- Exposed susceptible patients should receive varicella vaccine within 3 to 5 days of exposure if possible and vaccination is not contraindicated.

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- All exposed susceptible patients should be discharged as soon as possible.
- All susceptible exposed patients (including those receiving with their first varicella vaccine dose within 3 to 5 days of exposure) unable to be discharged should be placed in airborne and contact precautions from day 10 to day 21 after exposure. Note: exposed patients who received VZIG or IGIV should continue precautions until 28 days after exposure.

4. Jails and Detention Centers

A resource document for prisons is available from the Federal Bureau of Prisons: **Clinical Practice Guidelines for the Management of Varicella Zoster Infections, October 2002** at <http://www.bop.gov/news/PDFs/varicella.pdf>.

- Varicella cases should be isolated from other prisoners and susceptible personnel until all lesions have formed scabs or crusts (usually 5 days after onset).
- Determine dates the varicella case was infectious and identify exposed prisoners and staff.
- Determine the varicella immunity status of exposed personnel and prisoners. Refer to section 5 (B) for evidence of immunity to varicella.
- Consider testing staff and prisoners with unknown varicella immune status for immunity to varicella.
- Provide varicella immunization to susceptible personnel and prisoners within 3 to 5 days of exposure if possible and vaccination is not contraindicated. If the susceptible person is being tested for immunity to varicella, blood should be collected prior to or at the time of vaccination.
- All susceptible exposed prisoners (including those receiving with their first varicella vaccine dose within 3 to 5 days of exposure) should be placed in airborne (if available) and contact precautions from day 10 to day 21 after exposure to the index patient. Note: exposed persons who received VZIG or IGIV should continue precautions until 28 days after exposure.
- All susceptible exposed personnel (including those receiving with their first varicella vaccine dose within 3 to 5 days of exposure) should be furloughed or excused from inmate contact from day 10 to day 21 after exposure or until day 28 after exposure for persons who received VZIG.
- Serologic testing for immunity is not necessary for personnel who have been appropriately immunized.
- Immunized personnel and prisoners who develop breakthrough infection should be considered infectious until their rash is gone.

5. Airline Passengers

- Varicella cases should not travel by airplane until all lesions have formed scabs or crusts (usually 5 days after onset).
- Currently, the Federal Quarantine Station does not investigate or follow up on varicella cases on domestic or international flights.

6. Environmental Measures

No specific environmental measures are recommended.

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