Vaccinia Transmission

Signs and Symptoms	• Close contact with someone who was recently vaccinated (within 2 weeks of vaccination); self-inoculation (vaccinia transmission from the point of vaccination to other parts of the body) is also possible • Cases often present with vesicular lesion(s) and/or rash at the area of contact; some also experience fever, malaise, nausea, and vomiting • There may also be signs of lymphadenopathy, myalgia, and/or cellulitis • Those without prior receipt of vaccinia vaccine are at higher risk; individuals who have past or current skin conditions (e.g., atopic dermatitis), are immunocompromised, and/or taking steroids are at high risk of complications when exposed to vaccinia		
Incubation	2 to 6 days. Most cases occur within 3 days of contact with the virus (e.g., contact with the recently vaccinated individual).		
Case classification	**Clinical criteria:** Unexpected vesicular lesions in a person meeting the epidemiologic criteria. Area of the body affected by lesion or rash is dependent on the location of contact with the virus. Pain, malaise, and fever are common symptoms. Lymphadenopathy may also be present. **Epidemiologic criteria:** Recent receipt of vaccinia inoculation or contact with a person who recently received vaccinia inoculation.		
	Confirmed case: Person who meets epidemiologic and clinical criteria AND both orthopoxvirus and nonvariola orthopoxvirus targets are positive upon preliminary testing at WA PHL AND vaccinia specific DNA detected by PCR at CDC lab.	**Probable case:** Person who meets epidemiologic and clinical criteria AND both orthopoxvirus and nonvariola orthopoxvirus targets are positive upon preliminary testing at WA PHL AND vaccinia specific PCR testing at CDC lab is pending.	**Suspect case:** Person who meets the epidemiologic and clinical criteria.
Differential diagnosis	Herpes simplex, varicella, shingles, pustular staph or strep lesions, other orthopoxviruses (e.g., monkeypox, camelpox)		
Treatment	• Supportive treatment such as pain relief • Vaccinia immune globulin intravenous (VIGIV)* can be given and most effective when administered early in the course of illness. • When VIGIV is inadequate or not readily available, Tecovirimat*, Cidofovir*, and Brincidofovir may be considered as secondary or alternative treatment, though none of these are currently FDA approved. Clinicians can also consider antiviral treatment in consultation with their LHJ, WA DOH CD Epi and CDC. *Supply access granted by CDC through the Strategic National Stockpile (SNS)		
Laboratory	Contact DOH CDE to arrange for testing at WA PHL, and at CDC as needed • Preferred specimen: Swab of vesicular or pustular fluid collected within 72 hours of symptom onset • If specimen is received within 24-hours of collection, keep specimen refrigerated; if longer than 24-hours, store frozen. Ship according to PHL requirements: https://doh.wa.gov/public-health-provider-resources/public-health-laboratories/lab-test-menu Specimen collection and submission instructions can be found here: https://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-Non-variola-Orthopox-V1.pdf		
Public Health investigation	• Assess the likelihood of vaccinia transmission: confirm compatible clinical symptoms, verify recent contact with a smallpox vaccinee, and assess risk of further transmission • If vaccinia is suspected, collect specimens immediately and contact CD Epi to arrange testing at PHL • Identify close contacts (e.g. health care professional, family, etc.) to assess the risk of transmission *Infection Control:* Standard precautions with added contact precautions		

Vaccinia Transmission

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To confirm vaccinia transmission incidents and facilitate prompt administration of vaccinia immune globulin intravenous (VIGIV).
2. To identify other individuals who may be at risk of vaccinia transmission due to contact with the recent vaccinee or with the recently identified case.
3. To notify facility where the vaccine was administered to promote increased education and prevention efforts.

B. Legal Reporting Requirements

1. Health care providers and Health care facilities: *immediately* notifiable to **local health jurisdiction**.
2. Laboratories: no reporting requirement.
3. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Office of Communicable Disease Epidemiology (CDE) within seven days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin the investigation immediately.
2. Report all *suspected* cases (see definition below) to DOH CDE. Complete the vaccinia transmission report form available at https://www.doh.wa.gov/Portals/1/Documents/5100/420-211-ReportForm-Vaccinia.pdf and enter the data into the Washington Disease Reporting System (WDRS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Vaccinia is a non-variola orthopoxvirus which is used for the live-virus smallpox vaccine. The smallpox vaccine is administered with approximately 15 small needle pricks. When administered appropriately, a small lesion should form at the site of the vaccination. The lesion is where vaccinia transmission can initiate. The virus remains live until the lesion heals. During this healing process, the virus can transfer to other parts of the body (self-inoculation) or to other individuals (transmission or contact transfer).

B. Description of Illness

Vaccinia transmission illness is characterized by vesicular lesion(s) and/or rash at the area of contact with the live virus. Fever, malaise, nausea, vomiting, and lymphadenopathy are also common symptoms of vaccinia transmission illness.

For example, a case in New York presented with painful face, neck and chest lesions and reported close contact with a recent smallpox vaccinee through a wrestling match. It was also later reported that the vaccinee's injection site dressing had come off during the wrestling match. This led to three documented secondary transmissions and one tertiary transmission. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3377411/

C. Vaccinia Transmission in Washington

Vaccinia transmission is rare in Washington State and in the United States. Over the past ten years there have only been sporadic cases across the U.S. Most cases have been connected to military personnel who have recently been vaccinated for smallpox. Individuals who have or have had previous symptoms of eczema dermatitis are at higher risk of having a reaction to the vaccinia vaccine and vaccinia transmission.

D. Reservoir

The live vaccinia virus is primarily only seen in the vaccine and in laboratory settings. It is very rare for vaccinia virus to be captured outside of those controlled locations. Once given the live vaccine, humans become a reservoir for the virus and can transmit the virus while the virus is still live and incubating on the individual's skin.

E. Modes of Transmission

Vaccinia virus from the live vaccine can be transmitted through self-inoculation, contact transfer, and fomites (e.g., bandages, towels, razors, bedding, etc.). Self-inoculation occurs when the virus is transmitted from one part of the body to another, e.g., from the site of vaccination to the mouth. Contact transfer occurs when the virus is transmitted from one individual to another, which is more commonly seen. Typically, in cases of contact transfer, the individual who was vaccinated has not kept the site properly covered. There have been cases in which the vaccinee transmits the virus to an unvaccinated individual who unknowingly goes on to infect a third individual (a tertiary case) through close contact.

Evidence of transmission is often apparent, as vesicular lesions will typically occur at the site of contact with the virus.

F. Incubation Period

Two to six days. Most cases occur within three days of contact with the virus (e.g., contact with the recently vaccinated individual).

G. Period of Communicability

Vaccinia transmission occurs from person-to-person. Vaccinia is transmissible from the time of vaccination until the vaccine lesion has healed. The vaccine lesion typically heals within two to three weeks; during this time, it is suggested that individuals cover their vaccination site properly and ensure that any items that touch the site of inoculation are not shared and are cleaned appropriately. After vaccination, the vaccinee should cover the site of administration with gauze or a semi permeable bandage, changing the gauze or bandage every three days. For added precautions, it is recommended to wear a long sleeve shirt that covers the bandage.

H. Treatment

The only indicated treatment for vaccinia disease is Vaccinia Immune Globulin Intravenous (VIGIV), which is recommended as first-line therapy. VIGIV does not treat smallpox, only adverse reactions to the vaccine. VIGIV is most effective when given in early stages of symptom progression.

Washington State hospitals do not have VIGIV on hand. When needed, clinicians should contact their local health jurisdiction and contact DOH CDE in order to obtain VIGIV from CDC's Strategic National Stockpile (SNS).

If VIGIV is not available or not working effectively, antiviral therapy may be used off-label as treatment. CDC should be consulted to recommend use of antivirals as secondary treatment. Tecovirimat, Cidofovir, and Brincidofovir have shown to be effective in animal studies; however, use of these drugs are not FDA-approved. Tecovirimat and Cidofovir are stockpiled by SNS. DOH CDE can help facilitate this process.

Supportive treatment such as pain medication may be prescribed to alleviate symptoms of disease.

https://www.cdc.gov/smallpox/clinicians/vaccine-medical-management6.html

I. Immunity

Vaccinia vaccination is the only way to become immune to vaccinia transmission. Confirmed cases of vaccinia transmission may become immune to smallpox. Immunity can be confirmed by the presence of vaccinia-specific immunoglobulin G.

3. CASE DEFINITIONS

A. Clinical Criteria for Diagnosis

Unexpected vesicular lesions in a person meeting the epidemiologic criteria. Area of the body affected by lesion or rash is dependent on the location of contact with the virus. Pain, malaise, and fever are common symptoms. Lymphadenopathy may also be present.

B. Epidemiologic Criteria

Recent receipt of vaccinia inoculation or contact with a person who recently received vaccinia inoculation.

C. Laboratory Criteria for Diagnosis

Vaccinia DNA detected through PCR.

D. Case Definition

Suspect: Person who meets the epidemiologic and clinical criteria.

Probable: Person who meets epidemiologic and clinical criteria AND both orthopoxvirus and nonvariola orthopoxvirus targets are positive upon preliminary testing at Washington State Public Health Laboratories (PHL) AND vaccinia specific PCR testing at CDC lab is pending.

Confirmed: Person who meets epidemiologic and clinical criteria AND both orthopoxvirus and nonvariola orthopoxvirus targets are positive upon preliminary testing at PHL AND vaccinia specific DNA detected by PCR at CDC lab.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

Diagnosis of vaccinia transmission is based vaccinia DNA detected through PCR.

B. Services Available at the Washington State Public Health Laboratories (PHL)

PHL can run PCR with orthopoxvirus and nonvariola orthopoxvirus targets. If both targets come back positive, PHL will proceed to submit the specimen to CDC for vaccinia PCR testing.

The preferred specimen type is a dry swab of vesicular or pustular fluid collected within 72 hours of symptom onset. If transportation is within 24-hours of specimen collection, keep specimens refrigerated; if longer than 24-hours, store frozen and ship on dry ice. Collect only using synthetic tipped swabs with a non-wooden shaft. Do not transport medium to the vial. Other accepted specimen types include vesicle/pustule skin or crust, punch biopsy, and serum.

If specimen is received within 24-hours of collection, keep specimen refrigerated; if longer than 24-hours, store frozen. Collect specimens and ship according to PHL requirements: https://doh.wa.gov/public-health-provider-resources/public-health-laboratories/lab-test-menu Specimen collection and submission instructions can be found here: https://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-Non-variola-Orthopox-V1.pdf

5. ROUTINE CASE INVESTIGATION

Interview the case and others who may be able to provide pertinent information.

A. Evaluate the Diagnosis and Assist with Securing VIGIV (Vaccinia Immune Globulin Intravenous)

Assess the clinical presentation (e.g., lesion(s), rash, malaise, fever), risk factors (e.g., recent close contact with smallpox vaccinee), and immunization history for the patient.

B. Identify Source of Infection

Vaccinia transmission primarily occurs through contact with a recent vaccinee (e.g., a military member).

C. Identify Potentially Exposed Persons

Outbreaks are extremely rare. Collect exposure information, demographics, and onset date of any person reported to have a similar illness.

D. Environmental Evaluation

Not required. The vaccinia virus does not persist long enough in the environment to be detected upon investigation.

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations/Case Management

Hospitalized patients should be cared for using standard with contact precautions.

B. Contact Management

Close contacts should be monitored for symptoms that may be compatible with vaccinia transmission. If symptoms are present, VIGIV can be offered as treatment. When needed, clinicians should contact their local health jurisdiction and contact DOH CDE in order to obtain VIGIV from CDC's Strategic National Stockpile (SNS).

C. Environmental Measures

Typically no environmental measures are required.

7. MANAGING SPECIAL SITUATIONS

Special situations will be handled on a case by case basis. Please consult with the Office of Communicable Disease Epidemiology (CDE).

8. ROUTINE PREVENTION

A. Immunization Recommendations

The smallpox vaccine is no longer recommended for the general public. Currently, smallpox vaccine is routinely used only by the military. It is also recommended for individuals who conduct research on smallpox in an authorized laboratory setting.

B. Preventing Vaccinia Transmission

The primary way to prevent vaccinia transmission is to properly care for the smallpox vaccine injection site. This is especially crucial until a scab forms at the injection site, which is usually within two to three weeks. It is recommended that bandages be changed every three days with proper hand hygiene. Bandages should be sealed in a plastic bag before being disposed of. Clothing or other items (i.e., bedding, towels) should be washed with hot water and detergent/bleach. Once the scab detaches from the skin, it should also be sealed in plastic and thrown away.

Proper hygiene and injection site care are key in preventing the transmission of vaccinia.

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UPDATES

December 2020: Guideline created.

December 2022: For 2023 WAC revision combined provider and facility reporting requirement, updated laboratory submission (Section 1B).

December 2023: For 2024 WAC revision updated laboratory submission.

June 2024: CDC links updated

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