

Vaccinia Disease !

PROTOCOL CHECKLIST

- Notify Division of Disease Control and Health Protection, Bureau of Epidemiology (DCBE) immediately upon initial report.
- Enter available information into Merlin within 24 hours.
- Review background on disease, case definition, and laboratory testing.
- Contact provider and/or reporting facility. Ensure communication between medical providers and DCBE.
- Bureau of Epidemiology (DCBE) will facilitate contact with CDC.
- Ensure appropriate measures are in place to prevent contact transmission.
- Ensure health care providers have access to guidance for evaluation and treatment of patients with complications from smallpox vaccination.
- Interview patient and complete the Vaccine Adverse Event Reporting System (VAERS) form at: <http://vaers.hhs.gov>.
 - Review disease facts, risk factors, and pertinent history during the interview.
 - Recent medical history including smallpox vaccination history
 - Recent exposure (5-14 days) to a person with smallpox vaccination
 - Possible recent exposure to a person with a known rash illness, such as chickenpox or shingles in past 21 days, or other alternative diagnosis accounting for presentation
 - Development of rash, lesions, or ulcerations; note characteristics and distribution
 - Description of other adverse events as a result of the vaccination or exposure, including outcome (hospitalization, recovery, disability, death)
 - Current medications including immunosuppressive drugs
 - Medical evaluation, diagnosis and treatment to date including administration of VIG or cidofovir
 - Review available laboratory test results.
 - Identify any (other) possible exposed or symptomatic contacts.
- Provide education on transmission and prevention including frequent hand-washing, keeping the vaccination site covered with a bandage, and not sharing linens or clothing with unvaccinated persons.
- Address patient's questions or concerns
- Follow-up on patient and other contacts
- Enter additional data obtained from interview into Merlin and attach VAERS form.
- Submit VAERS form to VAERS via website, fax or encrypted e-mail (addresses on top of form)
- Provide a copy of the completed VAERS form to the Immunization Program, Bureau of Communicable Diseases.

Vaccinia Disease

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. To identify vaccinia disease developing in a person or close contact following a smallpox vaccination, ensure prompt evaluation and treatment as appropriate, and prevent secondary transmission.
2. To ensure reporting of such events to the Vaccine Adverse Events Reporting Systems (VAERS) to track the frequency and epidemiology of such events.

B. Legal reporting requirements

Practitioners and laboratories are required to immediately report by phone 24/7 to the county health department (CHD) upon initial suspicion or laboratory test order.

C. County health department investigation responsibilities

1. Begin investigation upon receiving report from a provider.
2. Certain localized and low-grade systemic reactions can be managed by observation and supportive care only. In conjunction with the provider, evaluate the need for treatment with vaccinia immune globulin (VIG), a first-line therapy or cidofovir, a second-line therapy
3. Report all confirmed and probable cases in Merlin as Vaccinia (code = 9990).
4. Development of vaccinia disease or any unexpected or serious event occurring after smallpox vaccination should be reported to VAERS. Electronic submission of the initial report can be completed online at <http://vaers.hhs.gov/index>. (Note: there is a 20-minute time limit on completing the secure online form.) A printable version of the case report form is available at: http://www.baltimorehealth.org/info/Vaccine_adverse_report.pdf.
 - a. Attach a scanned version of the VAERS form to the Merlin record.
 - b. Provide a copy of the completed VAERS form to the Immunization Section, Bureau of Communicable Diseases.
5. Vaccinia disease contracted via contact transmission is not nationally notifiable; however, Florida Department of Health (FDOH) will notify CDC about these infections.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent in Smallpox Vaccine (Vaccinia Virus)

The smallpox vaccine helps the body develop immunity to smallpox. The vaccine is made from a virus called vaccinia, which is a “pox”-type (orthopox) virus related to smallpox. The smallpox vaccine contains the live vaccinia virus—not a dead virus like many other vaccines. While the vaccinia virus has been genetically engineered and biologically derived into vaccines with low potential for spread to non-immune contacts, it is a live virus and as such, the vaccination site must be cared for carefully to prevent the virus from spreading.

B. Recommendations for who should get the Smallpox Vaccine

Vaccination is generally recommended for all laboratory workers at high risk of contracting infection such as those who directly handle cultures or animals contaminated or infected with vaccinia or other orthopoxviruses that infect humans. It may be considered for health care personnel such as doctors and nurses, but they are at lower risk due to limited contact with the virus through exposure to contaminated dressings. Many military personnel also receive the vaccine. The Department of Defense’s Smallpox Vaccination Program is part of the national strategy to safeguard against a possible smallpox attack. The World Health Organization (WHO) does not recommend vaccination in the general public because the risk of death (1 per 1,000,000 doses) or serious side effects is greater than the known risk of infection with smallpox.

Vaccination should be repeated unless a major reaction (one that is indurated and erythematous seven days after vaccination) or a “robust take” (RT) has developed. A RT is a vaccinia cellulitis and defined as more than three inches (7.5 cm) of redness with swelling, pain, and warmth at the vaccination site.

Booster vaccinations are recommended every ten years.

Routine smallpox vaccination among the American public stopped in 1972 after the disease was eradicated in the United States. Since the events of September and October 2001, however, the U.S. government has taken actions to be prepared in the event of intentional release of smallpox virus. There is currently enough vaccine to vaccinate every person in the U.S. in the event of a smallpox emergency.

C. Contraindications to the Smallpox Vaccine

Vaccination is contraindicated in persons with deficient immune systems, persons with eczema or certain other dermatitis disorders and pregnant women. For additional details refer to:

<http://emergency.cdc.gov/agent/smallpox/faq/screening.asp>.

D. Range of vaccine reactions

1. Normal, Typically Mild Reactions

These reactions usually go away without treatment:

- The arm receiving the vaccination may be sore and red where the vaccine was given.

- The glands in the armpits may become large and sore.
- The vaccinated person may run a low fever.
- One out of three people may feel bad enough to miss work, school or recreational activity, or have trouble sleeping.

2. Serious Reactions

In the past, about one in every thousand people vaccinated for the first time experienced reactions that, while not life threatening, were serious. These reactions may require medical attention:

- A vaccinia rash or outbreak of sores limited to one area. This is an accidental spreading of the vaccinia virus caused by touching the vaccination site and then touching another part of the body or another person. It usually occurs on the genitals or face, including the eyes, where it can damage sight or lead to blindness. Washing hands with soap and water after touching the vaccine site will help prevent this (inadvertent inoculation).
- A widespread vaccinia rash is when the virus spreads from the vaccination site through the blood. Sores break out on parts of the body away from the vaccination site (generalized vaccinia).
- A toxic or allergic rash, in response to the vaccine, can take various forms (e.g., erythema multiforme).

3. Life-Threatening Reactions

Rarely, people have had very bad reactions to the vaccine. In the past, between 14 and 52 people per million vaccinated for the first time experienced potentially life-threatening reactions. These reactions require immediate medical attention:

- Eczema vaccinatum are serious skin rashes caused by widespread infection of the skin in people with skin conditions such as eczema or atopic dermatitis.
- Progressive vaccinia (or vaccinia necrosum) is an ongoing infection of skin with tissue destruction frequently leading to death.
- Postvaccinal encephalitis is inflammation of the brain.

People with certain medical conditions—including people with weakened immune systems or certain skin conditions—are more likely to have these reactions and should not get the smallpox vaccine unless they have been exposed to smallpox. Based on experience, it is estimated that between one and two people out of every one million people vaccinated may die as a result of life-threatening reactions to the vaccine.

E. Modes of transmission for Vaccinia Disease

Infection typically occurs following a smallpox vaccination or may be self-inoculated to a secondary site, or transferred to another individual through contact with the unhealed vaccination site. The most frequently reported sites of vaccinia infections caused by unintentional transfer are the eye, face, nose, mouth, lips, genitalia, and anus. Fetal vaccinia can also occur. Cases arising from contact transmission have

resulted in either eczema vaccinatum (EV) or inadvertent inoculation, with cases occurring approximately five to 19 days after suspected exposure to the index case. See: *Vaccinia Virus Infection after Sexual Contact with a Military Smallpox Vaccinee, Washington, 2010*. Available at:

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5925a2.htm?s_cid=mm5925a2_w

See: *Secondary and Tertiary Transmission of Vaccinia Virus from US Military Service Member*. Available at: <http://www.cdc.gov/eid/content/17/4/718.htm>

As detailed below under **Clinical description**, vaccinia disease can present in a variety of manifestations along a spectrum ranging from mild, localized disease to serious, life-threatening disease.

F. Treatment for vaccine reactions or Vaccinia Disease

Treatment for vaccinia disease should be determined after clinical evaluation. It may range from supportive care in an outpatient setting to administration of VIG, cidofovir, and ophthalmic antivirals. In rare cases, hospitalization and appropriate life-support intervention may be necessary.

Clinicians considering treating a patient should consult with the Florida State Epidemiologist. The Florida State Epidemiologist may consult with CDC experts.

Further clinical guidance is available at:

Smallpox Vaccinations and Adverse Reactions – Guidance for Clinicians

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5204a1.htm>

3. CASE DEFINITION

A. Clinical description

Vaccinia disease can present as any number of clinical manifestations ranging from self-limited responses to life-threatening events due to receiving or being inadvertently inoculated with vaccinia as a result of smallpox vaccination. Clinical complications can include any of the following:

- **Eczema vaccinatum** - Characterized by localized or generalized papular, vesicular, or pustular rash, which can occur anywhere on the body, with a predilection for areas of previous atopic dermatitis (e.g., face, forearms, antecubital fossa, popliteal fossa). Rash onset may occur concurrently or shortly after development of the smallpox vaccine lesion and is often accompanied by fever, malaise, lymphadenopathy and prostration or severe systemic illness.
- **Erythema multiforme major (Stevens-Johnsons Syndrome)** - Characterized by systemic symptoms (fever, malaise, prostration) and involvement of two or more mucosal surfaces or 10% of the body surface area.
- **Fetal vaccinia (Congenital vaccinia)** - Characterized by skin lesions (e.g., vesicular, pustular or ulcerative) and/or organ involvement in a newborn. The

- skin lesions are similar to those of Generalized Vaccinia or Progressive Vaccinia and can be confluent and extensive.
- **Post-vaccinial encephalitis (Post-vaccinial encephalomyelitis)** - Post-Vaccinial Encephalopathy or Post-Vaccinial Encephalitis has symptom onset of 6-15 days post-vaccination and is characterized by any change in mental status (confusion, delirium, drowsiness, restlessness, disorientation, amnesia, seizures, loss of consciousness, or coma) or in sensorimotor function (altered sensation, weakness, paresis, aphasia, incontinence or urinary retention, obstinate constipation) or any combination thereof.
 - **Progressive vaccinia (PV)** - Characterized by a painless progressive and ulcerating lesion at the vaccination site that does not heal, often with central necrosis, and with little or no inflammation.
 - **Generalized vaccinia** - Characterized by disseminated maculopapular or vesicular rash, frequently on an erythematous base, usually occurring 6-9 days after first-time vaccination. Lesions may occur on any part of the body, most often on the trunk and abdomen, less commonly on the face and limbs. Though usually benign and self-limiting, it can develop into severe systemic illness.
 - **Inadvertent inoculation** - Characterized by extensive vesicular and pustular lesion(s) at a distant different location on the vaccinee, or anywhere on a close contact, which is not generalized but may involve a large contiguous area.
 - **Ocular vaccinia** - Characterized by inflammation of peri-ocular soft tissue or the eye itself (blepharitis, conjunctivitis, keratitis, or iritis) or any combination thereof.
 - **Pyogenic infection** - Characterized by:
 - **Staphylococcal infections** - Can result in a vesiculo-pustular lesion at the site of vaccination, often spreading peripherally in circumferential fashion, with clearing behind the advancing border. Bacterial lymphangitis and regional lymphadenitis may occur, but most often the lesions are solely superficial infections;
OR
 - **Streptococcal infections** – Can result in a piled up eschar, heaping at the vaccination site. Lymphangitis occurs commonly, as does edematous painful regional lymphadenitis;
OR
 - **Enteric and anaerobic infections** – May present with purulence or with extensive necrosis at the vaccination site. Necrotic fasciitis has also been encountered in some cases.
 - **Other serious adverse events** - Serious to life-threatening events can result in hospitalization, permanent disability, life-threatening illness, or death in a smallpox vaccinee, or a close contact of a vaccinee.

B. Laboratory criteria for diagnosis

None unless laboratory confirmation is indicated to distinguish from other infections or other pox.

C. Case classification

Probable: clinical features compatible with the diagnosis, other causes are excluded and supportive information is available

Suspect: clinical features compatible with the diagnosis but either further investigation is required **OR** additional investigation of the case did not provide supporting evidence for the diagnosis **AND** did not identify an alternative diagnosis.

D. Comment

Specimens from all suspected or probable cases must be submitted to the Bureau of Public Health Laboratories (BPHL) for confirmation.

Questions regarding case definition follow up should be directed to the Florida Department of Health, Bureau of Communicable Disease, Immunizations Section at (850) 245-4342.

4. LABORATORY TESTING

A. Criteria for diagnosis

Surveillance case definitions are available for adverse events resulting from vaccinia vaccinations are noted above. Further information on *Surveillance Guidelines for Smallpox Vaccine (Vaccinia) Adverse Reactions* is available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5501a1.htm>

B. Appropriate specimens

Health care providers should contact their state or county health department for information on testing specimens for the presence of vaccinia; testing is available at laboratories participating in the Laboratory Response Network of which the BPHL is a participant. Appropriate specimens to be tested for vaccinia virus infection include vesicle fluid, skin, crust, "roof" of lesion; dry or wet swab of lesion (dry swab is preferred); touch prep (slide) of lesion; and/or fresh biopsy of pustule or vesicle (no formalin). The laboratory will conduct a polymerase chain reaction (PCR) test for orthopoxvirus and for nonvariola orthopoxvirus. More detailed information on specimen collection guidelines are available at: <http://www.bt.cdc.gov/agent/smallpox/vaccination/vaccinia-specimen-collection.asp>.

C. Testing requests

The BPHL will assist in confirming a specimen. A Clinical Lab Submission Form should accompany all submissions. Available at:



Adobe Acrobat
Document

5. CASE INVESTIGATION

A. Contact the physician or hospital

Confirm that a **probable** or **suspected** case of vaccinia disease has presented.

B. Interview the case

1. Interview the patient, provider and others who may be able to provide pertinent information. The interview should include possible exposure history. If the patient is not a vaccinee, contact with a recent vaccinee should be assessed. Incubation period consistent with disease development should also be ascertained.

2. Vaccinia Disease interview form:
Use the VAERS reporting form to gather data for Merlin as well as to submit to VAERS and provide a copy to the Immunization Program.

http://vaers.hhs.gov/resources/vaers_form.pdf

Electronic submission of the initial report can be completed online at <http://vaers.hhs.gov/index>. (Note: there is a 20-minute time limit on completing the secure online form). The document should be printed prior to submission and faxed to the Immunization Program.

3. Items to cover during interview - VAERS Adverse Reaction worksheet:

- physician/provider administering vaccine
- adverse events (symptoms, signs, time course, treatment and outcome)
- relevant diagnostic tests
- specific vaccine information (manufacturer, lot, site, number of previous doses)
- pre-existing conditions
- any adverse events following prior vaccinations
- other medications

C. Isolation

Contact isolation precautions should be followed until the vaccination site or any lesions are healed. Bandages should be treated as contaminated and disposed of properly.

D. Merlin data entry

Create a case in Merlin under **VACCINIA DISEASE - code 9990**. Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen, complete the Case Symptoms screen, and attach all relevant laboratory results. The case report form in VAERS is available at:

http://vaers.hhs.gov/resources/vaers_form.pdf.

6. CONTROLLING FURTHER SPREAD

A. All contacts who may have been exposed and are at risk of developing vaccinia disease should be contacted for interview and referred for clinical evaluation if indicated.

- B. Vaccinees should be educated by health care professionals on ways to prevent potential transmission to others or auto-inoculation. These methods include frequent hand washing, keeping the vaccination site covered with a bandage, and not sharing linens or clothing with unvaccinated persons.

7. ADDITIONAL RESOURCES

- A. Vaccine Adverse Events Reporting System can be found at:
<http://vaers.hhs.gov/index>.
(This website is for reporting adverse events to vaccines, such as the development of vaccinia following exposure to smallpox vaccine or contact exposure from recent vaccine).
- B. Smallpox Vaccinations and Adverse Reactions – Guidance for Clinicians
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5204a1.htm>

8. REFERENCES

- A. Heymann, D.L. (Ed.). (2008). *Control of Communicable Diseases Manual* (19th ed.). Washington: American Public Health Association.
- B. Centers for Disease Control and Prevention website on smallpox vaccination
<http://emergency.cdc.gov/agent/smallpox/vaccination/>
Accessed November 26, 2012.
- C. Department of Defense Smallpox Vaccination Program:
<http://www.smallpox.mil/event/default.asp>
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- D. Surveillance Guidelines for Smallpox Vaccine (Vaccinia) Adverse Reactions
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5501a1.htm>
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