

## SMALLPOX

### REPORTING INFORMATION

- **Class A:** Report immediately via telephone the case or suspected case and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report immediately via telephone to the local public health department in which the reporting health care provider or laboratory is located. Local health departments should report immediately via telephone the case or suspected case and/or a positive laboratory result to the Ohio Department of Health (ODH).
- Reporting Form(s) and/or Mechanism:
  - Immediately via telephone.
  - The local health department should enter the case into the Ohio Disease Reporting System (ODRS) within 24 hours after the telephone report.
- Smallpox outbreaks have occurred from time to time for thousands of years, but the disease was officially declared eradicated in 1979 after a successful worldwide vaccination program. The last case of smallpox in the United States was in 1949. The last naturally occurring case in the world was in Somalia in 1977. Thus, if a suspected smallpox case is identified, it is an international epidemiologic emergency.
- The Centers for Disease Control and Prevention (CDC) has several resources (e.g. algorithms for evaluating patients for smallpox, worksheet to collect clinical information to classify the risk of smallpox using CDC criteria) to assist public health and clinicians in the evaluation of a febrile, rash-illness patient for the likelihood of smallpox. These can be located at the following web site:  
<https://www.cdc.gov/smallpox/>
- Key fields for ODRS reporting include: import status (whether the infection was travel-associated or Ohio-acquired), date of illness onset, and all the fields in the Epidemiology module.

### AGENT

Variola virus, a species of *Orthopoxvirus*.

### CASE DEFINITION

This case definition is from the

CDC: <http://www.cdc.gov/NNDSS/script/conditionssummary.aspx?CondID=133>

### Clinical Case Definition

An illness with acute onset of fever  $\geq 101^{\circ}\text{F}$  ( $\geq 38.3^{\circ}\text{C}$ ) followed by a rash characterized by firm, deep seated vesicles or pustules in the same stage of development without other apparent cause. Clinically consistent cases are those presentations of smallpox that do not meet this classical clinical case definition: a) hemorrhagic type, b) flat type, and c) *variola sine eruptione*. (Detailed clinical description is available on the CDC web site:

<https://www.cdc.gov/smallpox/clinicians/clinical-disease.html>)

### Laboratory criteria for diagnosis

- Polymerase chain reaction (PCR) identification of variola DNA in a clinical specimen, or
- Isolation of smallpox (variola) virus from a clinical specimen (Level D laboratory only; confirmed by variola PCR).

Note: Laboratory diagnostic testing for variola virus should be conducted in Level C or D laboratories only. Specimen collection, packaging and transport to CDC must be coordinated with the ODH Laboratory. A chain of custody form should accompany the

specimen(s). Contact the ODH Laboratory at 614-728-0544 (Monday – Friday; 8 AM – 5 PM) for CDC specimen submission criteria.

### **Case Classification**

Suspected: A case with a generalized, acute vesicular or pustular rash illness with fever preceding development of rash by 1-4 days.

Probable: A case that meets the clinical case definition, or a clinically consistent case that does not meet the clinical case definition and has an epidemiological link to a confirmed case of smallpox.

Confirmed: A case of smallpox that is laboratory confirmed, or a case that meets the clinical case definition that is epidemiologically linked to a laboratory confirmed case.

Exclusion Criteria: A case may be excluded as a suspect or probable smallpox case if an alternative diagnosis fully explains the illness or appropriate clinical specimens are negative for laboratory criteria for smallpox.

### **SIGNS AND SYMPTOMS**

Onset is sudden, with fever, malaise, headache, severe backache, prostration and occasionally abdominal pain. After two to four days the temperature falls and a rash appears, passing through several stages (e.g. macular, papular, pustular, crusting), and finally forming scabs which fall off at the end of the third or fourth week; fever usually intensifies as the rash progresses to the pustular stage. The lesions form initially on the face and are most profuse there, followed closely by the arms and legs, with relatively fewer lesions on the trunk (centrifugal distribution).

### **DIAGNOSIS**

The CDC has several resources to assist public health and clinicians in the evaluation of a febrile, rash-illness patient for the likelihood of smallpox. These can be located at the following web site: <https://www.cdc.gov/smallpox/clinicians/diagnosis-evaluation.html> The tools include algorithms for evaluating patients to classify the risk of smallpox using CDC criteria.

### **EPIDEMIOLOGY**

#### **Source**

Humans were the only reservoir. Now, only laboratory specimens remain.

#### **Occurrence**

Formerly worldwide; currently eradicated. The last naturally acquired case in the world was in Somalia in 1977.

#### **Mode of Transmission**

Smallpox is transmitted person-to-person through contact with the respiratory discharges and the skin lesions of patients. Although droplet spread is the major mode of person-to-person smallpox transmission, airborne transmission through fine particle aerosol can occur. Smallpox may also be transmitted by contact with items (e.g. bed linens, clothing) that have been recently contaminated by respiratory secretions or smallpox skin lesions.

**Period of Communicability**

Communicable from a few days before the lesions appear until disappearance of all scabs, which usually occurs about three weeks after the onset of the rash. Permanent immunity usually follows recovery.

**Incubation Period**

After exposure, it takes between 7 and 19 days for symptoms of smallpox to appear (average incubation time is 10 to 14 days).

**PUBLIC HEALTH MANAGEMENT****Case**Investigation

Any suspected case constitutes a public health emergency. The patient should be kept in strict isolation in a private, negative airflow room with airborne and contact precautions.

Isolation

The Ohio Administrative Code (OAC 3701-3-13, (Y)) states that "a person with confirmed or suspected smallpox shall be placed in airborne isolation in a facility designated by the director. The patient's release from the facility can occur when all scabs have fallen off."

**Contacts**

All face-to-face contacts should be vaccinated and placed in quarantine for 19 days after their last contact with a smallpox case. In a large outbreak due to bioterrorism, exposed persons could be placed under surveillance in their home. These persons would take their temperature daily during this period and a fever greater than 101 °F would suggest smallpox. These persons would then be isolated until a smallpox diagnosis has been confirmed or ruled-out.

**Prevention and Control**

Prompt investigation to determine the source of infection is of great importance. A ring of vaccination should be formed around the case.

**Special Information**

The vaccine has no other medical indication or use and is no longer commercially available.

For further information, see: <http://emergency.cdc.gov/agent/smallpox/index.asp>.

**What are the symptoms of smallpox?**

The symptoms of smallpox begin with high fever, head and body aches, and sometimes vomiting. A rash follows that spreads and progresses to raised bumps and pus-filled blisters that crust, scab, and fall off after about three weeks, leaving a pitted scar.

**If someone comes in contact with smallpox, how long does it take to show symptoms?** After exposure, it takes between 7 and 19 days for symptoms of smallpox to appear (average incubation time is 12 to 14 days). During this time, the infected person feels fine and is not contagious.

**Is smallpox fatal?**

The majority of patients with smallpox recover, but death may occur in up to 30% of cases. Many smallpox survivors have permanent scars over large areas of their body, especially their face. Some are left blind.

**How is smallpox spread?**

Smallpox normally spreads from contact with infected persons. Generally, direct and prolonged face-to-face contact is required to spread smallpox from one person to another. Smallpox also can be spread through direct contact with infected bodily fluids or contaminated objects such as bedding or clothing. Indirect spread is less common. Rarely, smallpox has been spread by virus carried in the air in enclosed settings such as buildings, buses, and trains. Smallpox is not known to be transmitted by insects or animals.

**If smallpox is released in aerosol form, how long does the virus survive?**

The smallpox virus is fragile. In laboratory experiments, 90% of aerosolized smallpox virus dies within 24 hours; in the presence of ultraviolet (UV) light, this percentage would be even greater. If an aerosol release of smallpox occurs, 90% of virus matter will be inactivated or dissipated in about 24 hours.

**How many people would have to get smallpox before it is considered an outbreak?**

One confirmed case of smallpox is considered a public health emergency, as the disease was eradicated in 1979. The virus only exists in a few labs worldwide.

**Is smallpox contagious before the smallpox symptoms show?**

A person with smallpox is sometimes contagious with onset of fever (prodrome phase), but the person becomes most contagious with the onset of rash. The infected person is contagious until the last smallpox scab falls off.

**Is there any treatment for smallpox?**

Smallpox can be prevented through use of the smallpox vaccine. There is no proven treatment for smallpox, but research to evaluate new antiviral agents is ongoing. Early results from laboratory studies suggest that the drug cidofovir may fight against the smallpox virus; currently, studies with animals are being done to better understand the drug's ability to treat smallpox disease (the use of cidofovir to treat smallpox or smallpox reactions should be evaluated and monitored by experts at the National Institutes of Health [NIH] and CDC). Patients with smallpox can benefit from supportive therapy (e.g. intravenous fluids, medicine to control fever or pain) and antibiotics for any secondary bacterial infections that may occur.

For further information, see: <http://emergency.cdc.gov/agent/smallpox/index.asp>.