SMALLPOX

REPORTING INFORMATION
- Class A(1)
- Report a suspected case immediately by telephone

Smallpox was declared eradicated by the World Health Organization in 1980. If a suspected case is identified, it is an international public health emergency as it calls into question the eradication of the disease and indicates its escape from a research laboratory and/or a potential act of bioterrorism. Notify the Ohio Department of Health immediately at (614) 466-0265.

AGENT
Variola virus, a species of Orthopoxvirus.

Infectious Dose
The infectious dose is thought to be low, 10-100 organisms. The virus is highly stable and retains infectivity for long periods outside the host (e.g. clothing, bed linens, dust).

CASE DEFINITION
No definition is given in "Case Definitions for Infectious Conditions Under Public Health Surveillance" (MMWR 1997;46[RR-10]).

SIGNS AND SYMPTOMS
Systemic symptoms occur as the virus is disseminated to the lungs, spleen, liver and other organs. Onset is sudden with fever, malaise, headache, severe backache, prostration and occasionally severe abdominal pain. After two to four days the temperature drops and a rash appears first in the mouth and throat, followed by a rash on the face, hands and forearms, which then spreads to the trunk and lower limbs. The rash passes through macular, papular, vesicular, and pustular stages, and finally forms scabs. Scabs separate about two to three weeks after onset of the eruption and leave depressed depigmented scars primarily on the face. Fever usually intensifies as the rash progresses to the pustular stage. The lesions develop synchronously and are more abundant on the face and extremities (centrifugal distribution), with relatively fewer lesions on the trunk. Symptoms can progress quickly with internal bleeding in the lungs and intestines, and severe tissue damage in the liver, spleen and other organs, which may ultimately lead to death. Smallpox has a case fatality rate of ~30%.

DIAGNOSIS
Specimen collection, packaging and transport must be coordinated with the ODH Lab. A chain of custody form should accompany the specimen from the moment of collection. Contact ODH Lab at (614) 644-4659 for specific instructions.
Specimens will be tested at the CDC’s Biosafety Level 4 reference laboratory using the following tests: electron microscopy, viral cultures, polymerase chain reaction and restriction fragment length polymorphism.

EPIDEMIOLOGY
Source
Humans used to be the only reservoir. Now, only laboratory specimens remain.

Occurrence
Formerly worldwide; declared eradicated since 1980. The last reported case of smallpox in Ohio was reported in 1950. The last naturally acquired case in the world was in Somalia in 1977.
**Mode of Transmission**
Person-to-person through close contact with respiratory discharges and skin lesions of patients or items that have recently been contaminated (e.g. bed linens, clothing).

**Period of Communicability**
Smallpox is communicable at the onset of the rash and remains infectious until disappearance of all scabs, about three to four weeks. Permanent immunity usually follows recovery.

**Incubation Period**
From 7 to 17 days; usually 12 to 14 days to onset of the illness and 2 to 4 days more to onset of the rash.

**PUBLIC HEALTH MANAGEMENT**

**Case**
Any suspected case constitutes a public health emergency. The patient should be kept in strict isolation. Oral and nasal discharges should be deposited in a paper container and burned. Bedclothes and other fabrics should be boiled or autoclaved. Floors, walls, and other hard surfaces should be disinfected.

**Isolation Control for Patient Management**
For patients with suspected or confirmed smallpox, both Airborne and Contact Precautions should be used in addition to Standard Precautions (See the APIC/CDC guidelines: *Bioterrorism Readiness Plan: A Template for Healthcare Facilities*, which can be downloaded at: [http://www.apic.org/bioterror/](http://www.apic.org/bioterror/))

**Treatment**
Supportive treatment to relieve symptoms, plus antibiotics as indicated for treatment of occasional secondary bacterial infections. No antiviral substances have been effective against the disease.

**Public Health Significance**
A single case is considered a public health emergency. Smallpox is highly contagious. It is considered a good candidate for an act of bioterrorism due to its potential to cause severe morbidity in a non-immune population and its ease of transmission via the airborne route. Smallpox has a case fatality rate of ~30%.

**Contacts**
Face-to-face contacts should be vaccinated immediately if vaccine is available. Vaccination administered within 3 days of first exposure has been shown to offer some protection against acquiring infection and significant protection against a fatal outcome. All face-to-face contacts should be placed under quarantine for 17 days after last contact with a smallpox case. When dealing with a large outbreak due to bioterrorism, exposed persons could be placed under surveillance in their home. They should take their temperature daily during this period and any fever above 38°C (101°F) would suggest the development of smallpox. They should then be isolated until the diagnosis has been confirmed or ruled out.
Prevention and Control
Comply with airborne and contact precautions in addition to standard precautions. Control of smallpox is based on immunization with vaccinia virus. Vaccination is most effective at protecting against smallpox if given within 3 days of exposure. All exposed persons, including face-to-face and household contacts of patients, should be vaccinated immediately, if vaccine is available. Health care workers that might care for smallpox patients, emergency personnel who might transport patients and mortuary staff should be vaccinated, if vaccine is available. Prompt investigation to determine the source of infection, rapid identification of cases, and vaccination of contacts are of great importance. When smallpox used to be endemic, about 30% of susceptible contacts became infected.

Special Information
Vaccination against smallpox does not confer lifelong immunity. Routine vaccination for smallpox was ceased in the United States in 1980 and immunity acquired before that time has waned. Therefore, previously vaccinated persons are considered susceptible to smallpox. The Centers for Disease Control and Prevention (CDC) oversees the limited smallpox vaccine supply. The vaccine is no longer commercially available.

DIFFERENCES BETWEEN SMALLPOX AND CHICKENPOX

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<thead>
<tr>
<th></th>
<th>Smallpox (Variola)</th>
<th>Chickenpox (Varicella)</th>
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<tbody>
<tr>
<td><strong>Incubation</strong></td>
<td>7-17 days</td>
<td>14-21 days</td>
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<tr>
<td><strong>Prodrome</strong></td>
<td>2-4 days</td>
<td>Minimal/none</td>
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<tr>
<td><strong>Skin Lesions</strong></td>
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<td></td>
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<tr>
<td>Simultaneous appearance</td>
<td>Deep-seated</td>
<td>Superficial</td>
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<tr>
<td>Similar appearance</td>
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<tr>
<td><strong>Distribution of Rash</strong></td>
<td>Centrifugal</td>
<td>Centripetal</td>
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<td>(lesions most dense on the face and extremities, e.g. palms and soles)</td>
<td>(lesions concentrated on covered parts of body, e.g. trunk)</td>
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<tr>
<td><strong>Period of Communicability</strong></td>
<td>At onset of rash until scabs separate (~3 weeks)</td>
<td>- A few days before rash appears through a maximum of 6 days after the first appearance of vesicles; - Scabs are not infectious</td>
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