

SMALLPOX

Report Immediately
by phone

Potential Bioterrorism Agent: Category A

Responsibilities:

Hospital: Report immediately by phone

Lab: Report immediately by phone, send specimens for testing to State Hygienic Laboratory

Physician: Report immediately by phone

Local Public Health Agency (LPHA):): **Immediate follow-up required. Iowa Department of Public Health will lead the follow-up investigation.**

Iowa Department of Public Health

Disease Reporting Hotline: (800) 362-2736

Secure Fax: (515) 281-5698

After Hours: Iowa State Patrol Office at (515) 323-4360

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Smallpox is caused by the variola virus that emerged in human populations thousands of years ago. Except for laboratory stockpiles, the variola virus has been eradicated in the world.

B. Clinical Description

Symptoms: There is a clinical spectrum of disease with smallpox. Smallpox occurs in two clinical forms: variola major and variola minor. Variola major causes a more severe form of smallpox, with a more extensive rash and higher fever. Variola major has four distinct syndromes: ordinary (the most frequent type, accounting for 90% or more of cases); modified (mild and occurring in previously vaccinated persons); flat; and hemorrhagic (rare and very severe). Historically, variola major has an overall fatality rate of about 30%; however, flat and hemorrhagic smallpox usually are fatal. Variola minor is a less common presentation of smallpox, and a much less severe disease, with death rates historically of 1% or less.

Onset: The **first symptoms** of smallpox include fever, malaise, head and body aches, and sometimes vomiting. The fever is usually high, in the range of 101^o to 104^o Fahrenheit. At this time, people are usually too sick to carry on their normal activities. This is called the *prodrome* phase and may last for 2 - 4 days.

A **rash emerges** first as small red spots on the tongue and in the mouth. These spots develop into sores that break open and spread large amounts of the virus into the mouth and throat. This is when the person is most contagious. Around the time the sores in the mouth break down, a rash appears on the skin, starting on the face and spreading to the arms and legs and then to the hands and feet. Usually the rash spreads to all parts of the body within 24 hours. As the rash appears, the fever usually falls and the person may start to feel better. By the third day of the rash, the lesions become raised bumps. By the fourth day, the bumps fill with a thick, opaque fluid and often have a depression in the center that looks like a bellybutton. (This is a major distinguishing characteristic of smallpox.) Fever often will rise again at this time and remain high until scabs form. The bumps become **pustules**—sharply raised, usually round and firm to the touch as if there's a small round object under the skin. People often say the bumps feel like BB pellets embedded in the skin. The pustules begin to form a crust and then **scab**. By the end of the second week after the rash appears most of the sores have scabbed over. The scabs begin to fall off, leaving marks on the skin that eventually becomes pitted **scars**. Most scabs will have fallen off three weeks after the rash appears. The person is contagious to others until all of the scabs have fallen off.

Complications: arthritis was a common complication, all others are rare. They may include secondary bacterial infection of skin lesions, sepsis, corneal ulceration and keratitis, pulmonary edema, bronchopneumonia due to secondary bacterial infection, diarrhea, extensive viral infection of the intestinal mucous membrane, orchitis, hematuria, and encephalitis.

C. Reservoirs

Common reservoirs: Humans are the only natural reservoir for smallpox. However, in the aftermath of the events of September and October, 2001, there is heightened concern that the variola virus might be used as an agent of bioterrorism.

D. Modes of Transmission

Spread: Generally, direct and fairly prolonged face-to-face contact is required to spread smallpox from person to person.

Airborne: On rare occasions, smallpox has been spread by virus carried in the air in enclosed settings such as buildings, buses, and trains.

Person-to-person: Smallpox also can be spread through direct contact with infected bodily fluids, scabs of lesions, or contaminated objects such as bedding or clothing.

E. Incubation period

This incubation period averages about 12 - 14 days, but can range from 7 - 17 days.

F. Period of Communicability or Infectious Period

At about four days into illness a rash emerges first on the tongue and mouth and spreads to the rest of the body. A person is contagious from the time the rash appears until all the scabs have fallen off. This is approximately 3 weeks.

G. Epidemiology

Smallpox outbreaks had occurred from time to time for thousands of years, but the disease is now eradicated 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. After the disease was eradicated from the world, routine vaccination against smallpox among the general public was stopped because it was no longer necessary for prevention. Vaccination of healthcare response teams and the military against smallpox has been reinstated due to the potential use of smallpox as a biological weapon.

Except for laboratory stockpiles, the variola virus has been eliminated.

H. Bioterrorism Potential

Category A: There are concerns that the smallpox virus could be used for bioterrorism.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify individual cases and outbreaks as soon as possible.
- To assess the magnitude of the disease.
- To work in conjunction with law enforcement and homeland security to identify the source of cases as soon as possible.
- To put in place effective control or prevention methods. Please refer to state smallpox information at www.idph.state.ia.us/CADE/DiseaseIndex.aspx?disease=Smallpox

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider immediately report any suspected or confirmed case. The reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736. If you are calling after business hours you may call the Iowa State Patrol Office at (515) 323-4360 and they will page a member of the on-call CADE staff.

Laboratory Testing Services Available

After communicating with IDPH, contact the University of Iowa State Hygienic Laboratory (SHL) at (319) 335-4500 for further instructions.

C. Local Public Health Agency Follow-up Responsibilities

Case Investigation

- a) Case investigation of suspected smallpox disease in Iowa residents will be directed by the IDPH Center for Acute Disease Epidemiology (CADE).
- b) Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report a suspected smallpox case immediately. Any suspected cases of smallpox should be reported immediately to IDPH, Center for Acute Disease Epidemiology (CADE) at (800) 362-2736. Instructions for reporting are given at this number after normal business hours.
- c) Institution of disease control measures is an integral part of case investigation. It is the LPHA's responsibility to understand, and, if necessary, institute the control guidelines listed below.

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

All suspect and known cases will be isolated at an appropriate site, which may include a healthcare facility or at home. When caring for a smallpox patient adhere to Standard, Contact and Airborne Precautions. This includes an N 95 or better mask, goggles, gloves and gown and if hospitalized, a negative pressure room. All persons caring for smallpox patients should be vaccinated for smallpox.

All susceptible contacts will be in quarantine until an incubation period has passed. Quarantine orders will be issued by IDPH or the local public health agency. Release from quarantine will be done by written notice.

B. Protection of Contacts of a Case

Contacts of cases should be given smallpox vaccine as soon as possible, ideally within five days of exposure. This may prevent or reduce the severity of disease.

C. Managing Special Situations

If a suspect or known case of smallpox infection is reported in your county or if you suspect an outbreak, immediately consult with the epidemiologist on-call for CADE at (800) 362-2736. CADE can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several county lines and therefore be difficult to identify at a local level.

D. Preventive Measures

Environmental Measures

The best way to prevent smallpox is to vaccinate all those potentially exposed and susceptible. Refer to smallpox section of your local public health agency's bioemergency plan.

Preventive Measures/Education

People involved in smallpox response should

- Annually update knowledge about smallpox and response to an event.
- Maintain adequate numbers of trained key responders.

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Smallpox can be found at: www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

CDC Website. Smallpox www.bt.cdc.gov/agent/smallpox/index.asp
Heymann, D., L., ed. *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC: American Public Health Association, 2015.

Additional Resources

CDC. Vaccines & Preventable Diseases: www.cdc.gov/vaccines/vpd-vac/default.htm
Iowa Dept. of Public Health. Smallpox website:
www.idph.state.ia.us/CADE/DiseaseIndex.aspx?disease=Smallpox