


TREATMENT

- There is currently no cure for smallpox, nor any antiviral drugs effective in treating smallpox infection.
- There is some evidence that cidofovir, an antiviral medication, may prevent infection with smallpox if administered within a day or two of exposure. 
- The smallpox vaccine can also be administered within four days of exposure to prevent infection.
- Neither of these efforts will be effective, however, if symptoms of infection have already developed.
- The only treatments available to physicians for symptomatic smallpox patients are supportive therapy and antibiotics to treat any resulting bacterial infections.



BIOTERRORISM

Since the events of September 11, 2001, the United States government has taken actions to improve its level of preparedness against bioterrorism. One of these measures has been designed specifically to prepare for the possibility of an intentional release of smallpox virus as an act of bioterrorism. Included in these measures have been updating and releasing a smallpox response plan, and ordering the production of enough smallpox vaccine to vaccinate the American public.

The United States currently has enough smallpox vaccine to vaccinate the U.S. population, and in September 2002, the CDC released a contingency plan to health officials of all states to quickly inoculate all Americans if the need arises. In the event of a smallpox outbreak, the U.S. government has prepared emergency guidelines to quickly vaccinate and contain a smallpox epidemic. A decision is being made regarding the government policy for vaccination in the absence of a smallpox outbreak.

RESOURCES

The Centers for Disease Control and Prevention
1600 Clifton Road
Atlanta, GA 30333
800.311.3435 (Public Inquiries)
404.639.3311 (Telephone)

<http://www.bt.cdc.gov/agent/smallpox/index.asp>

The Mayo Clinic
200 First Street S.W.
Rochester, MN 55905
507.284.2511 (Telephone)
507.284.0161 (Facsimile)

<http://www.mayoclinic.com/invoke.cfm?id=DS00424>

The World Health Organization
525, 23rd Street, N.W.
Washington D.C. 20037
202.974.3000 (Telephone)
202.974.3663 (Facsimile)

<http://www.who.int/emc/diseases/smallpox/factsheet.html>

eMedicine
Kenner, J. "Smallpox." *eMedicine Consumer Journal*.
2002

<http://www.emedicine.com/derm/topic901.htm>

***University of New Hampshire
Office of Environmental Health and Safety***
11 Leavitt Lane, Perpetuity Hall
Durham, NH 03824
603.862.4041 (Telephone)
603.862.0047 (Facsimile)

<http://www.unh.edu/ehs>



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Smallpox Safety Pamphlet

The University of New Hampshire's Office of Environmental Health and Safety has produced this pamphlet on smallpox for educational purposes only. This document is a guide and should not replace the expertise of your health care provider.


BACKGROUND

- Smallpox is a highly contagious disease caused by the variola virus, a member of the *orthopoxvirus* genus in the *poxviridae* family.
- Smallpox is believed to have originated over 3,000 years ago in northeastern Africa or south-central Asia, and is considered one of the most devastating diseases known to man.
- Repeated epidemics of smallpox swept across continents for centuries, destroying populations.
- In 1798, Edward Jenner demonstrated that inoculation with cowpox virus (a virus similar to smallpox) could protect against smallpox infection.
- In the early 1950s there was an estimated 50 million cases of smallpox occurring worldwide each year. This figure dropped to 10-15 million by 1967 due to the global implementation of the vaccinia vaccine.
- The last reported case of smallpox in the United States was in 1949. The last naturally occurring case of smallpox worldwide was in Somalia in 1977.
- In 1978 there was a reported case of smallpox infection in England due to a laboratory accident.
- In 1980, smallpox was officially declared eradicated and there have been no known reported cases since.


TRANSMISSION

- Humans are the only natural hosts of smallpox virus; it is not carried or spread by animals or insects.
- Smallpox is primarily spread by direct contact through infected aerosols and respiratory droplets, commonly produced by coughing, sneezing, and talking. The inhalation of a single smallpox virus particle may be enough to cause infection.
- Although rare, the virus has been spread through air and ventilation systems in enclosed settings such as in buildings, buses, and trains. It is also possible to become infected from contact with contaminated bedding and clothing.
- Once infected, the virus immediately begins replicating; first in the lymph nodes, and then in the spleen and bone marrow.
- The virus eventually resides in the skin and mucous membranes of the nose and throat. When lesions break open in the mucous membranes, large amounts of the virus are released into the saliva. It is then that the patient becomes the most contagious.
- The incubation period ranges from seven to 17 days, with an average of 12 to 14 days. This is why smallpox outbreaks typically occur in two-week intervals.
- There are two clinical forms of smallpox: **variola major** and **variola minor**. Variola major is the more severe and most common form, producing a more extensive rash and higher fever.
- There are four types of variola major smallpox: **ordinary**, which accounts for at least 90% of cases; **modified**, which is mild and occurs in previously vaccinated individuals; **flat or malignant** and **hemorrhagic**, which are both rare and very severe.
- Variola major has an overall fatality rate of 30%. Flat and hemorrhagic forms are almost always fatal.
- Variola minor is the less common form of smallpox and is much less severe than variola major. It has a fatality rate of approximately 1%.

SYMPTOMS

- Patients usually have no symptoms during the incubation period and are not considered to be contagious during this time.
- The initial symptoms of smallpox, known as the **prodrome phase**, usually include: high fever, malaise, fatigue, headache, body aches, and sometimes vomiting. This phase may last two to four days; the patient is still not considered to be contagious.
- After the initial symptoms, a rash will appear; small red spots on the tongue and in the mouth develop.
- These spots will develop into sores that break open, spreading large amounts of the virus into the mouth and throat. This is when patients are considered highly contagious. 
- Following the breaking of the lesions, a rash appears on the skin, beginning on the face and spreading to the arms and legs and then to the hands and feet.
- Within 24 hours the rash usually spreads to all parts of the body. As the rash appears, the fever usually drops and the patient may feel some relief. By the third day the rash becomes raised bumps.
- By the fourth day the bumps fill with a thick opaque fluid, and often have a depression in the center. At this time the fever often rises again and remains high until scabs form over the vesicles.
- Over the next 5 to 10 days the scabs become pustules, which are sharply raised, usually round, and firm to the touch. The pustules form a crust and then scab, and by day 14 most of the sores have scabbed over.
- The scabs begin to fall off, leaving marks on the skin, which eventually become pitted scars. The patient is still contagious until all scabs have fallen off. Most scabs will fall off after 3 weeks.
- Blindness often occurs in those patients who recover from smallpox infection.

PREVENTION

- Centuries ago people were aware that infection with smallpox resulted in immunity. Therefore, efforts were made to induce immunity by inoculating oneself with smallpox virus taken from lesions. These efforts became known as **variolation**, and although some individuals became immune to the virus, others contracted the disease. Also, inoculated individuals were still capable of transmitting the disease.
- In the United States, a smallpox vaccine was developed containing live **vaccinia virus**, another virus closely related to variola. Vaccination became widespread and was discontinued in 1972 when the need for vaccination had greatly decreased.
- Vaccination is the single best way to prevent smallpox infection. The vaccine provides full immunity for three to five years, with decreasing immunity thereafter. If individuals are re-vaccinated, immunity will last longer. Vaccination prevents smallpox infection in 95% of those vaccinated.
- The vaccine was also given to individuals who had been exposed to the virus and proved to prevent, or at least greatly reduce severity of infection if given within a few days of exposure.
- Isolation of patients with smallpox infection is the only way to control the spread of the disease.
- Medical care workers should wear proper personal protective equipment when working with smallpox-infected patients. This includes gloves, caps, gowns, and surgical masks. 
- All contaminated instruments, equipment, bodily excretions and fluids, and other contaminated materials should be decontaminated chemically, by heat, or by incineration.
- Contaminated bedding and clothing should be incinerated, autoclaved, or washed in hot water and bleach. Fumigation of contaminated premises may be done with formaldehyde.