



Smallpox: Biological Weapon BACKGROUND

January 2001

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Biological Weapon

Smallpox was eradicated from the world in 1977. In 1980, the World Health Assembly recommended that all countries cease vaccination and that all laboratories destroy their stocks of variola (smallpox) virus or transfer them to one of two World Health Organization reference labs. All countries reported compliance.

The United States cannot, with complete certainty, verify that the virus is not being held in places other than the two WHO reference laboratories; therefore, the deliberate reintroduction of smallpox is regarded as a possibility.

Because this virus is relatively stable (not easily destroyed in the environment) and the infectious dose is small, an aerosol release of variola virus would disseminate widely.

A single suspected case of smallpox would be treated as a health emergency and should be brought to the attention of national officials through local and state health authorities. However, varicella, or chickenpox, which infects millions of children each year in the United States, is the disease most frequently confused with smallpox. (Chickenpox lesions are much more superficial and are almost never found on the palms and soles.)

The Disease

Variola virus belongs to a genus of virus known as *Orthopoxvirus*, four of which can infect humans: they include smallpox, chickenpox, monkeypox, and cowpox.

Smallpox outbreaks involve either variola minor or the more deadly variola major. Case fatality rates range from 1 to 20 percent.

Lesions in the mouth and throat that ulcerate quickly release large amounts of virus in the saliva. The most visible system is a rash with lesions most dense on the face, arms and legs. The lesions are round, tense and deeply embedded in the skin, appear during a 1- to 2-day period and evolve at the same rate on the body. Lesions begin to form crusts about the eighth or ninth day.

Deaths usually occur late in the first week or the second week of illness.

The incubation period is about 12 days (range: 7 to 17 days). Symptoms include high fever, fatigue and head and back aches followed by the rash.

Two less well known types of smallpox disease are hemorrhagic and malignant and health care providers seldom recognized them as smallpox unless an outbreak was in progress.

The Risk

Smallpox is spread, most often, by an ill person releasing droplets from their mouth into the air that are inhaled by a susceptible person in close contact with the ill person. Virus titers in saliva are highest during the first week of illness.

Disease is most often transmitted from the time the ill person appears with a rash and throughout the first week of illness. Virus is also present in the scabs that separate from the skin.

In the U.S., routine vaccination against smallpox stopped in 1972; therefore, few persons younger than 27 years of age have been vaccinated. Also, the level of immunity among persons who were vaccinated in the United States is uncertain. The duration of immunity has not been well measured. It must be assumed that the population at large is highly susceptible to infection.

The United States has a supply of approximately 15 million doses of smallpox vaccine available for emergency use, if needed. No preventive vaccination program to protect populations such as health care workers is planned at this time.

Treatment

Current vaccine against smallpox is made with vaccinia, or cowpox, virus. New methods of producing smallpox vaccine in large quantities are being explored, including tissue cell culture vaccine.

Patients infected with smallpox would be offered supportive therapy plus antibiotics as indicated for secondary bacterial infections.

No antivirals have yet proved effective for treating smallpox; however, research continues.

A smallpox outbreak would spread unless checked by vaccination and/or isolation of patients and their close contacts.

All individuals in whom smallpox is suspected should be vaccinated and placed under health monitoring.

Vaccination administered within 4 days of first exposure has been shown to offer some protection against acquiring infection and good protection against a fatal case.

Additional information about biological agents is available online at <http://www.bt.cdc.gov/bioagents.asp>