

Public Health Update

A Bi-monthly Newsletter on Current
Public Health Topics



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Public Health Update

January 2003

Smallpox and other Potential Biologic Terrorism Agents

by Jenna Patnaik, MHS

The Centers for Disease Control and Prevention (CDC) has classifications for potential biologic terrorism (BT) agents. Category A agents are believed to: 1) pose the greatest potential threat for adverse public health impact, and 2) have a moderate to high potential for large-scale dissemination. Category A agents include anthrax, smallpox, plague, botulism, tularemia, and viral hemorrhagic fevers. Due to the recently announced national vaccination plan, this update will focus on smallpox, however other key BT agents will be overviewed briefly.

Distinguishing between smallpox and chickenpox

Chickenpox (varicella) is the condition most likely to be confused with smallpox. The following differences exist between the two illnesses:

Smallpox

- Patient becomes ill between 7 and 17 days after close contact with someone who has the disease (average incubation time is 12 to 14 days). During this time, the infected person feels fine and is not contagious. Usually, 2-4 days before a rash appears the patient has a high fever and does not feel well enough to carry on with normal activities.
- The lesions are all in a similar stage; they are most numerous on the face, arm and legs and are usually present on the palms and soles.
- Scabs begin to form 10-14 days after the rash appears and fall off 14-28 days after the rash begins.

Chickenpox (Varicella)

- Patient becomes ill between 14-21 days after close contact with someone who has the disease and has no symptoms until the rash appears.
- Lesions appear in crops (or in different stages); they are most numerous on the body and are seldom present on the palms and soles.
- Scabs begin to form 4-7 days after the rash appears and fall off within 14 days after the rash begins.

If smallpox is suspected, it is important to track the patient history of both varicella and varicella vaccine. Also, patients with chickenpox can often (50-80%) recall an exposure to chickenpox or shingles prior to becoming ill.



Smallpox: Frequently Asked Questions

Why is smallpox a current health topic?

Smallpox is an acute, contagious, and sometimes fatal disease caused by the variola virus and marked by fever and a distinctive progressive skin rash. In 1979, the disease was declared eradicated following worldwide vaccination programs. However, it is still considered a potential bioterrorism agent. The U.S. government is currently taking actions to improve its level of preparedness against terrorism.

What are the symptoms of smallpox?

The symptoms of smallpox begin with fever, head and body aches, and sometimes vomiting. A rash (that usually starts on the tongue and mouth) 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.

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, and some patients are left blind.

How is smallpox spread?

Generally, direct and fairly prolonged face-to-face contact with an infected person is required to spread smallpox. Smallpox can also be spread through direct contact with infected bodily fluids, infected lesions (until scabs disappear) or contaminated objects such as bedding or clothing. This last transmission route is less common. Rarely, smallpox has been spread by virus carried in the air in enclosed settings such as buildings, buses, and trains.

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 and remains 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; however, early results from research studies suggest that the drug cidofovir may fight the virus. 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.

What is the smallpox vaccine, and is it still required?

The current smallpox vaccine is made from a virus called VACCINIA (another "pox"-type virus related to smallpox but does not cause smallpox) that helps the body develop immunity to smallpox. It was successfully used to eradicate smallpox from the human population. The last case of smallpox in the United States was in 1949 and the last naturally occurring case in the world was in Somalia in 1977. After the disease was eradicated, routine vaccination stopped in 1972 in the U.S. because prevention was no longer considered necessary and at the time the potential reactions to the vaccine exceeded the risk of problems associated with development of disease.

How is the vaccine given?

The smallpox vaccine is not given with a hypodermic needle; it is usually given in the upper arm with a sterile bifurcated (two-pronged) needle that is dipped into the vaccine solution. The needle is then used to prick the skin a number of times in a few seconds. The pricking is not deep, but it will cause a sore spot and one or two drops of blood to form.

If the vaccination is successful, a red and itchy bump develops at the vaccination site in 3-4 days. In the first week, the bump becomes a large blister, fills with pus, and begins to drain. During week two, the blister begins to dry up and a scab forms. The scab falls off in the third week, leaving a small scar.

If someone is exposed to smallpox, is it too late to get a vaccination?

Vaccination within 3 days of exposure will completely prevent or significantly modify smallpox in the vast majority of persons. Vaccination 4 to 7 days after exposure likely offers some protection from disease and may modify the severity of disease.

How long does a smallpox vaccination last?

Past experience indicates that the first dose of the vaccine offers protection from smallpox for 3 to 5 years, with decreasing immunity thereafter. If a person is vaccinated again later, immunity lasts longer.

Is it possible for people to get smallpox from the vaccination?

No. The smallpox vaccine does not contain smallpox virus and cannot spread or cause smallpox. However the vaccine does contain another virus called vaccinia, which is "live" in the vaccine.

Is it possible to get vaccinia, the virus in the vaccine, from someone who has recently been vaccinated?

Yes. Because the virus is live, vaccinia can spread to other parts of the body or to other people by touching the unhealed vaccination site and/or contaminated bandages or clothing. This can be prevented through proper care of the vaccination site, which includes hand washing and careful disposal of used bandages. Vaccinia is not spread through airborne pathways. The vaccinia virus may cause localized swelling, rash, fever, and head and body aches.

How safe is the smallpox vaccine?

Most people experience mild reactions that include a sore arm, fever, and body aches. In recent tests, one in three people felt bad enough to miss work, school, or recreational activity or had trouble sleeping after receiving the vaccine.

In the past, about 1,000 people for every 1 million people vaccinated for the first time experienced moderate reactions. These reactions include a vigorous (toxic or allergic) reaction at the site of the vaccination and spread of the vaccinia virus (the live virus in the smallpox vaccine) to other parts of the body and to other people. These reactions typically do not require medical attention but are important to report and monitor.

Between 14 and 52 people per 1 million vaccinated experienced potentially life-threatening reactions, including eczema vaccinatum, progressive vaccinia (or vaccinia necrosum), or postvaccinal encephalitis. Based on past experience, it is estimated that between 1 and 2 people out of every 1 million people vaccinated will die as a result of reactions to the vaccine.

Careful screening of potential vaccine recipients is essential to ensure that those at increased risk do not receive the vaccine. People most likely to have side effects should NOT get the vaccine unless smallpox exposure is documented.

Who should NOT get the vaccine?

People who should not get the vaccine include anyone who is allergic to the vaccine or any of its components; pregnant women because of the risk it poses to the fetus; women who are breastfeeding; anyone under 12 months of age; people who have, or have had, skin conditions (especially eczema and atopic dermatitis); and people with weakened immune systems, such as those who have received a transplant, are HIV positive, are receiving treatment for cancer, or are taking medications (like steroids) that suppress the immune system. Also, the Advisory Committee on Immunization Practices (ACIP) advises against non-emergency use of smallpox vaccine in persons under 8 years of age.

Anyone who falls within these categories, or lives with someone who falls into one of these categories, should NOT get the smallpox vaccine in non-emergency situations. These persons should only get smallpox vaccine if they are directly exposed to smallpox.

Is there any way to treat bad reactions to the vaccine?

There are two treatments that may help people who have certain serious reactions to the smallpox vaccine: Vaccinia Immune Globulin (VIG) and cidofovir.

Two Other Key Category A Biological Agents

BT Agent	<u>Pneumonic Plague</u>	<u>Anthrax</u>
What is it?	Disease caused by <i>Yersinia pestis</i> , a bacterium found in rodents and their fleas.	Acute infectious disease caused by the spore-forming bacterium <i>Bacillus anthracis</i> .
How is it transmitted?	Breathing in <i>Yersinia pestis</i> particles or respiratory droplets of a person (or animal) with pneumonic plague. Direct and close contact is usually required.	There are three types of transmission: cutaneous (95% of infections), inhalation, and gastro-intestinal (consumption of contaminated meat). Direct person-to-person spread is extremely unlikely, if at all.
What are the signs and symptoms?	Illness occurs 1 to 6 days after exposure. Symptoms include fever, weakness, and rapidly developing pneumonia with shortness of breath, chest pain, cough, and sometimes bloody or watery sputum. Without treatment respiratory failure, shock, and rapid death may occur.	Symptoms usually occur within 7 days of exposure and depend on how disease was contracted. <u>Cutaneous</u> : Raised itchy bump that resembles an insect bite but develops into a vesicle and then a painless ulcer within 1-2 days. <u>Inhalation</u> : Initially resembles a common cold and after several days may progress to severe breathing problems and shock. It can present as mediastinal widening on chest X-ray. <u>Intestinal</u> : Acute inflammation of the intestinal track. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea.
Treatment options?	Available oral medications should be given within 24 hours of symptoms and include either a tetracycline or a fluoroquinolone.	Antibiotic treatment: penicillin, doxycycline, and fluoroquinolones.
Available Vaccine?	No vaccine available in the United States as of yet.	Yes, but not recommended or available for the general public.

Information for this issue of the Public Health Update was taken from:

Centers for Disease Control and Prevention, Available at <http://www.bt.cdc.gov/agent/agentlist>

Colorado Department of Public Health and Environment, Available at <http://www.cdphe.state.co.us/bt>

Comments or questions, please call Tri-County Health Department at (303) 220-9200.

**Tri-County Health Department
Selected Diseases by Date of Report
Adams, Arapahoe, and Douglas Counties
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