

Overview

Smallpox is a contagious, disfiguring and often deadly disease that has affected humans for thousands of years. Naturally occurring smallpox was wiped out worldwide by 1980 — the result of an unprecedented global immunization campaign.

Samples of smallpox virus have been kept for research purposes. And advances in synthetic biology have made it possible to create smallpox from published amino acid sequences. This has led to concerns that smallpox could someday be used as a biological warfare agent.

No cure or treatment for smallpox exists. A vaccine can prevent smallpox, but the risk of the vaccine's side effects is too high to justify routine vaccination for people at low risk of exposure to the smallpox virus.

Symptoms

The first symptoms of smallpox usually appear 10 to 14 days after you're infected. During the incubation period of seven to 17 days, you look and feel healthy and can't infect others.

Following the incubation period, a sudden onset of flu-like signs and symptoms occurs. These include:

- Fever
- Overall discomfort
- Headache
- Severe fatigue
- Severe back pain
- Vomiting, possibly

A few days later, flat, red spots appear first on your face, hands and forearms, and later on your trunk. Within a day or two, many of these lesions turn into small blisters filled

1

with clear fluid, which then turns into pus. Scabs begin to form eight to nine days later and eventually fall off, leaving deep, pitted scars.

Lesions also develop in the mucous membranes of your nose and mouth and quickly turn into sores that break open.

Causes

Smallpox is caused by infection with the variola virus. The virus can be transmitted:

- **Directly from person to person.** Direct transmission of the virus requires fairly prolonged face-to-face contact. The virus can be transmitted through the air by droplets that escape when an infected person coughs, sneezes or talks.
- **Indirectly from an infected person.** In rare instances, airborne virus can spread farther, possibly through the ventilation system in a building, infecting people in other rooms or on other floors.
- **Via contaminated items.** Smallpox can also spread through contact with contaminated clothing and bedding, although the risk of infection from these sources is less common.
- **As a terrorist weapon, potentially.** A deliberate release of smallpox is a remote threat. However, because any release of the virus could spread the disease quickly, government officials have taken numerous precautions to protect against this possibility, such as stockpiling smallpox vaccine.

Complications

Most people who get smallpox survive. However, a few rare varieties of smallpox are almost always fatal. These more-severe forms most commonly affect pregnant women and people with impaired immune systems.

People who recover from smallpox usually have severe scars, especially on the face, arms and legs. In some cases, smallpox may cause blindness.

2

Prevention

In the event of an outbreak, people who had smallpox would be kept in isolation in an effort to control the spread of the virus. Anyone who had contact with someone who developed an infection would need a smallpox vaccine, which can prevent or lessen the severity of the disease if given within four days of exposure to the smallpox virus.

Two vaccines are available. One vaccine (ACAM2000) uses a live virus that's related to smallpox, and it can occasionally cause serious complications, such as infections affecting the heart or brain. That's why it's not recommended that everyone be vaccinated at this time. The potential risks of the vaccine outweigh the benefits, in the absence of an actual smallpox outbreak.

A second vaccine, a modified vaccinia Ankara vaccine (Jynneos), has been found to be safe, and it can be used in people who aren't able to take ACAM2000, who have weakened immune systems or who have skin disorders.

If you were vaccinated as a child

Immunity or partial immunity after a smallpox vaccine may last up to 10 years, and 20 years with revaccination. If an outbreak ever occurred, people who were vaccinated as children would still likely receive a new vaccination after direct exposure to someone with the virus.

Diagnosis

If an outbreak of smallpox were to occur today, it's likely that most doctors wouldn't realize what it was in its early stages, which would allow the disease to spread.

Even one confirmed case of smallpox would be considered an international health emergency. The Centers for Disease Control and Prevention can do definitive testing using a tissue sample taken from one of the lesions on the skin of the infected person.

Treatment

No cure for smallpox exists. In the event of an infection, treatment would focus on relieving symptoms and keeping the person from becoming dehydrated. Antibiotics might be prescribed if the person also develops a bacterial infection in the lungs or on the skin.

Tecovirimat (Tpoxx), an antiviral drug, was approved for use in the U.S. in 2018. However, it wasn't tested in people who are sick with smallpox, so it's not known if it is an effective drug option. A trial tested its safety in humans and found it to be as safe as the placebo. Other antiviral drugs continue to be studied.