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Smallpox - What You Should Know

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Smallpox infection was eliminated from the world in 1977. The World Health Organization's worldwide vaccination campaign, begun in 1967, came to an end in 1980 when the disease was officially declared "eradicated." Here in the U.S., where smallpox was stamped out even earlier, childhood vaccination ceased in 1972. This was the first world-wide eradication of a deadly infectious disease and was a major triumph of public health efforts.

There are only two official repositories of smallpox virus in the world: the CDC in Atlanta and the Russian State Research Center of Virology and Biotechnology in Koltsovo, Novosibirsk. Those supplies are used for scientific research and vaccine development. These two sources, however, are not the only stashes of the deadly virus. The same year that worldwide vaccination ceased, the Soviet government began growing and stockpiling large quantities of smallpox virus, specially adapted for use in bombs and missiles.

Facts About Smallpox

Smallpox is a highly contagious virus that can be spread through the air and infects 30% of the people who are exposed to it. Once infected, there is no cure. None of our current antiviral medications is effective. Smallpox can spread from person to person and through infected blankets, linens, and clothing. Experts consider it a likely weapon of choice for use in a bioterrorist attack.

Smallpox is caused by variola virus. The incubation period is about 12 days (range: 7 to 17 days) following exposure. Initial symptoms include high fever, fatigue, and head and back aches. A characteristic rash, most prominent on the face, arms, and legs, follows in 2-3 days. The rash starts with flat red lesions that evolve at the same rate. Lesions become pus-filled and begin to crust early in the second week. Scabs develop and then separate and fall off after about 3-4 weeks. The majority of patients with smallpox recover, but death occurs in up to 30% of cases.

Smallpox is spread from one person to another by infected saliva droplets that expose a susceptible person having face-to-face contact with the ill person. Persons with smallpox are most infectious during the first week of illness, because that is when the largest amount of virus is present in saliva. However, some risk of transmission lasts until all scabs have fallen off.

Should I Get a Smallpox Vaccination?

Routine vaccination against smallpox ended in 1972. The level of immunity, if any, among persons who were vaccinated before 1972 is uncertain; therefore, these persons are

assumed to be susceptible.

Vaccination against smallpox is not recommended to prevent the disease in the general public and therefore is not available. In people exposed to smallpox, the vaccine can lessen the severity of or even prevent illness if given within 4 days after exposure.

Vaccine against smallpox contains another live virus called vaccinia. The vaccine does not contain smallpox virus. The United States currently has an emergency supply of smallpox vaccine.

Smallpox vaccination is not recommended, and the vaccine is not available to health providers or the public. In the absence of a confirmed case of smallpox anywhere in the world, there is no need to be vaccinated against smallpox. There also can be severe side effects to the smallpox vaccine, which is another reason we do not recommend vaccination.

In the event of an outbreak, the CDC has clear guidelines to swiftly provide vaccine to people exposed to this disease. The vaccine is securely stored for use in the case of an outbreak. In addition, plans to accelerate production of a new smallpox vaccine was announced.

Can Smallpox Be Treated?

There is no proven treatment for smallpox but research to evaluate new antiviral agents is ongoing. Patients with smallpox can benefit from supportive therapy (intravenous fluids, medicine to control fever or pain, etc.) and antibiotics for any secondary bacterial infections that occur.

What is the difference between "chicken pox" and "smallpox?"

Chickenpox is a relatively benign, self-limited disease caused by Herpes Varicella. It is common among children and also causes a condition called "shingles" in adults. The lesions of chickenpox develop as a series of "crops" over several days and are very superficial. Papules, vesicles, pustules, and scabs can be seen adjacent to each other. The trunk is usually more affected than the face or extremities.

Most cases of smallpox are clinically typical and readily able to be diagnosed. Lesions on each area of the body are at the same stage of development, are deeply embedded in the skin, and are more densely concentrated on the face and extremities.

What is the Onset of Smallpox?

Symptoms don't start until about 12 days after exposure to the virus. At first, it's like the flu - causing an under-the-weather feeling of fever, nausea, vomiting, headache, and backache. Then, severe abdominal pain and disorientation can set in, as small, round sores erupt all over the skin. About 30% of people who become infected will die, and survivors can be left with permanent scars.

Edward Jenner

Edward Jenner(1749-1823), British physician, discovered the vaccine that is used against smallpox and laid the groundwork for the science of immunology. Smallpox, a major cause of death in the 18th century, was treated in Jenner's time by the often-fatal procedure of inoculating healthy persons with pustule substances from those who had mild cases of the disease. In 1796 he inoculated an eight-year-old boy with cowpox virus; six weeks after the boy's reaction Jenner reinoculated him with smallpox virus, finding the result negative. By 1798, having added similarly successful cases, Jenner wrote *An Inquiry into the Causes and Effects of the Variolae Vaccinae, a Disease Known by the Name of Cow Pox*, a tract in which he also introduced the term virus.

Jenner encountered some public resistance and professional chicanery in publicizing his findings, and he experienced difficulties in obtaining and preserving cowpox vaccine. Nevertheless his procedure was soon accepted, and mortality due to smallpox plunged. The procedure quickly spread through Europe and to North America. Three-quarters of a century later, the French chemist Louis Pasteur, drawing on Jenner's work, set the course for the science of immunology and the discovery of modern preventive vaccines. Jenner died in Berkeley on January 26, 1823.

Anyone asked to define 'conscientious objector' would undoubtedly describe someone refusing military service on religious or moral grounds. However the term entered English Law in 1898 to describe those who risked fines and imprisonment for refusing vaccination for their children. We now refer to measles and polio vaccines and the prospect of AIDS vaccines as a matter of course, but a hundred years ago there was only one common human vaccine -- that for smallpox -- introduced in 1798 by Edward Jenner (1749-1823). In 1967 smallpox was targeted for eradication, an achievement officially certified in 1980.

The Word Vaccination

Jenner's claim to fame is that he first proved the idea that smallpox could be prevented by inoculation with cowpox, a safe related animal agent (or virus). Unfortunately he also claimed that protection was lifelong which proved to be untrue. There was a country tradition that those that recovered from cowpox, a mild disease with localized sores at the site of infection, did not catch smallpox. Jenner investigated the theory and collected circumstantial evidence that supported it. In 1796 he 'inoculated' James Phipps with cowpox material from the hand of Sarah Nelmes. Six weeks later Phipps was 'challenged' by smallpox inoculation which he resisted. Jenner did more successful cowpox inoculations and published his famous *Inquiry* in 1798. To avoid confusion, cowpox inoculation was soon called 'vaccination' (from vacca, meaning cow) and smallpox inoculation was termed 'variola' (from variola, the clinical term for smallpox).

How Was Smallpox Eliminated?

The elimination of smallpox from Europe and North America prompted the World Health

Organization (WHO) to mount a campaign in 1967, when there were 10-15 million cases annually, to eradicate smallpox globally. Smallpox was an ideal candidate for eradication; good immunity followed an attack and the virus was antigenically stable (unlike influenza); there were no carriers (unlike typhoid) or animal reservoirs (unlike malaria); there was a good vaccine. Also, epidemics developed slowly, allowing control measures to be implemented.

Contrary to popular belief smallpox was not eradicated by mass vaccination. Though tried initially it proved difficult to implement in many countries and was abandoned in favor of surveillance-containment. This involved trained workers searching for cases, with rewards for those who found them. Cases and their contacts were then isolated; contacts were vaccinated. Interestingly this strategy incorporated elements of a system devised in 1778 by John Haygarth in Chester. The last natural case occurred in Somalia in 1977 and after exhaustive enquiries the 1980 WHO Assembly concluded that smallpox had been eradicated.

Smallpox is a disease which killed millions, shaped dynasties, was the first to be controlled by immunization, the first to be eradicated; which introduced the concept of conscientious objection and health and safety legislation. In the 1880s Louis Pasteur suggested that the term 'vaccine' be extended to cover immunizing agents being developed by newly-introduced laboratory technology. This has happened, but vaccine's original meaning and purpose and the disease it helped to eradicate still deserve to be remembered.

Smallpox is a threat, but one which can be dealt with. We must be vigilant, but not fearful. Remember, it is your life and it is your health.