

Historically, smallpox epidemic has been devastating to the Americas and the world in general. And its history, though the virus had been 'eradicated', still makes one fear the unknown. In the 1500s, smallpox virus introduced into Central and South America caused horrendous loss of lives and may have contributed to the downfall of the Inca and Aztec nations. An epidemic swept the Massachusetts coast in the 1600s and killed so many Native Americans that in some communities, there were not enough survivors to bury the dead.

Even in the latter 1700s, during the Revolutionary War, a smallpox epidemic raged through the American colonies. George Washington suspected that the virus had been deliberately introduced by the British. So many of his men were ill after his defeat at Quebec in 1777, that he ordered the mass variolation of remaining troops.

Why does the ghost of smallpox concern us now, when the last case, acquired through a laboratory accident, occurred in 1978? The answer is that the smallpox virus still exists, locked up in high security laboratories in the United State and the Russian Federation, and perhaps in the secret locations by countries or individuals that could use it to harm others.

The recent discovery of vials of the virus in a FDA storage facility is also a big cause for concern. As reported by a science media house on July 9, 2014, "Six vials of freeze-dried smallpox virus have been found tucked away in a Food and Drug Administration (FDA) cold storage room. The vials appear to have been stored there since the 1950s..." This makes one wonders whether other places exist where it could have been stored and accesses easily to cause intentional or accidental outbreak and epidemic.

This has necessitated the need to inform the public about the number of factors that could be considered in using smallpox virus as an agent of bioterrorism.

Factors that might encourage its use include:

It spread easily from person to person, being one of the most contagious diseases ever known, mainly through close contact with the respiratory secretions, but also airborne spread from the respiratory tract, skin lesions, and contaminated beddings or other objects.

It can be highly lethal, with mortality rates generally above 25%. After the virus establishes infection of the respiratory system, it enters the lymphatics and bloodstream, finally causing lesions of the skin and throughout the body.

The virus is relatively stable, probably remaining infective for hours in the air of a building; viable smallpox virus has been demonstrated in dried crusts from skin lesions after storage for 10 years at room temperature in ordinary envelopes.

Large numbers of people are highly susceptible to the virus. Routine vaccination against smallpox was discontinued in the United States decades ago.

The relatively large genome of the smallpox virus probably permits genetic modifications that could enhance its virulence.

Factors that discourage its use include:

Propagating the smallpox virus is dangerous and requires advanced knowledge and laboratory facilities with high bio-safety measures.

A proven highly effective vaccine (vaccinia virus) is available. A protective antibody response occurs rapidly and prevents fatalities for 10 years or more. The disease is prevented even when the vaccine is administered up to four days after exposure to the virus.

Infected persons do not spread the disease during the long incubation period, generally 12 to 14 days; they only become infectious with the onset of fever

The disease can usually be diagnosed rapidly by the characteristic appearance of skin lesions that predominate on the face and hands, and by laboratory examination of materials from the skin lesions,

There is already widespread experience of how to watch for and contain the disease as witnessed in recent outbreaks of SARS, and Ebola haemorrhagic virus fever.

In a simulated attack on an American city in the summer of 2001, only 24 primary cases of smallpox grew in 2 months to 3 million, with 1 million deaths. This study probably exaggerated the risk. Nevertheless, even though unlikely, the potential danger from a smallpox introduction has caused the United States to begin preparation for this possibility,

including a markedly expansion of its stockpile of smallpox vaccine. Despite this, the world would be a better place if there are no outbreaks of smallpox, as we are currently battling even more serious emerging viruses such as Ebola, Lassa, Marburg, SARSV, and Arboviruses.

The article was largely extracted from Nester et al., Microbiology: A Human Perspective, 2004 (4th Ed). Editing and additional information is provided by the Tayo Fasuan, the Magazine's Editor.

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