Given the fact that smallpox is not, after all, eradicated, should the U.S. bring back the smallpox vaccination program?

Reportedly employed as a biological weapon during the French & Indian War in the 18th century, smallpox remains a potential threat to the general health, welfare, and security of the United States. It is believed to be one of the most dangerous weaponized diseases in existence. Smallpox is highly contagious and easily spread from person to person. With a population that is largely unvaccinated, highly mobile, and living in densely populated urban areas, an aerosol release of the smallpox virus could conceivably lead to a national epidemic or even a global pandemic.

The variola virus (smallpox) is an infectious virus spread from person to person through aerosol distribution, inhalation of droplets, infected linens, and direct physical contact. Symptoms of infection include fever, malaise, backache, headache, rashes, and abdominal pain. The rashes appear within one to two days. The infected individual is most contagious during the first seven to ten days after the appearance of rashes. After this ten-day period, scabs begin to form over the lesions and the patient either dies, makes limited improvements, or recovers fully. The only treatments are vaccination during the first few days after infection and supportive therapies to alleviate pain and discomfort. The devastating impacts of smallpox outbreaks throughout history and its continued presence across the globe led to a 1967 vaccination campaign to eradicate the virus.

The program succeeded in eradicating natural outbreaks of the disease by 1977. In 1980, the World Health Organization convinced the global community to either destroy their remaining stocks or send them to one of two labs in the United States and Soviet Union respectively. In 1996 the World Health Assembly recommended that the remaining two stocks of the smallpox virus be destroyed. The World Health Organization followed suit in 1999. These recommendations helped spur an international debate over whether the virus stocks should be destroyed or preserved for research purposes. The deadline for destruction has currently been delayed to 2002.

Ken Alibek (Dr. Kanatjan Alibekov), the former first deputy director of Biopreparat, the Soviet Union's civilian bioweapons program, alleges that the Soviet Union began producing large quantities of the smallpox virus and proceeded to modify that supply for use as biological weapons, including the use of genetic engineering to produce more contagious and virulent strains of the virus. (1) Concern over Alibek's allegations is heightened by the fact that Russia's poor economy and limited resources increase the risk that the virus has leaked to outside parties. Russia's poorly supported research scientists may have turned elsewhere for research funding, and the fact that no single body effectively controls the materials developed by the Soviet's germ warfare

program leaves their existing research stocks vulnerable. According to the Center for Nonproliferation Studies, four countries have weaponized smallpox. Iraq has weaponized a similar virus, cowpox. (2)

Public officials and scientists have become increasingly concerned over the devastating impact a small aerosolized release could have on the general population. Under the proper conditions, a first generation outbreak of as few as fifty people could lead to paranoia, loss of civic order, and a full-blown epidemic. Smallpox has a 12 to 14 day incubation period. As a result, an aerosolized release in a major U.S. city could rapidly spread before public health officials have identified and isolated infected persons. If the public health infrastructure could not contain an initial outbreak and officials lost control of an emergency situation, the virus could become an epidemic, and in today's increasingly mobile population, a global pandemic. The United States stopped vaccinations in 1972, so anyone under the age of 27 in 2000 is highly vulnerable to the disease. In addition, the longevity of smallpox vaccinations is uncertain. Officials estimate that a majority of the population is vulnerable to smallpox infection. Under these conditions, an epidemic could have a mortality rate as high as 30%.

The key question then becomes, should the United States make preparations to defend against a biological attack involving smallpox? If the answer is yes, what should be the extent of such preparations? There are two proposed vaccination scenarios made in favor of a vaccination program and one opposed to it. The first, and most extreme scenario, is to begin the substantial and costly efforts to vaccinate a majority of the population – civilian and military. The second is to vaccinate military personnel; begin generating adequate stockpiles of the vaccine for first responder emergency personnel, health officials, laboratory workers, and civilians suspected of having come into contact with the virus; and develop emergency procedures to control, isolate, and eventually quell an outbreak.

Skeptics assert that an outbreak is highly unlikely and that existing emergency procedures could reasonably contain the virus by isolating infected persons and their contacts. They continue by arguing that a vaccination program would only increase the risk of an unintended release of the viral stocks used to develop and test vaccines or the accidental infection of those individuals engaged in vaccine development and testing. An additional argument against vaccination centers on the fact that portions of the population can have severe adverse reactions, including death, in response to the vaccine. Further complications and risks stem from the fact that supplies of vaccinia immune globulin (VIG) – the primary treatment for persons with adverse reactions to the vaccine – are quite limited.

Growing concerns and increasing calls for action among public health officials, defense experts, research scientists, and government authorities make it increasingly likely that the federal government will initiate an emergency smallpox preparedness program. By integrating smallpox prevention measures into an overarching bioterror preparedness program, the federal government could

develop emergency response procedures while beginning the production of the smallpox vaccine and vaccinia immune globulin.

Proponents of a vaccination program argue that the government could expand its military vaccinations to include health care workers, emergency personnel, and key public health officials. A limited vaccination program along with emergency containment procedures would protect those most at risk to infection while helping to shield the general population. Proponents of bioterror preparedness assert that the significant costs of a preparedness program are well worth it when considering the massive ramifications of a smallpox epidemic.

Questions for Discussion

1. The last mass vaccination program of the federal government was the swine flu vaccination in 1976. The vaccination caused a neurological disease—Guillian-Barre syndrome, in some takers and resulted in three deaths. The federal government was held accountable for the adverse reactions and ultimately paid more than $85 million dollars in wrongful death and injury claims. One reason the smallpox vaccination program was halted was because a small percentage of deaths and injuries did result each year from its taking. If the smallpox vaccine is re-instituted, who should be liable for any deaths or injuries? —the federal government? --the vaccine manufacturers? Should the vaccine be voluntary, with the taker responsible for the consequences?

2. It has been suggested that the easiest way to provide smallpox vaccinations to the general public is to include it in the pre-school vaccination requirements for children. However, since there has been no incident of smallpox disease since the late 1970s, can the risk to children, even though it is small, be justified? Should the vaccination be an adults-only program if it is reinstated?

3. Ken Alibek states that Russia developed considerable genetic engineering capabilities for viruses, particularly to make them vaccination-resistant. (3) Should the government put tax dollars to R&D for other options, such as antiviral drugs to be given after an attack, instead of vaccinations? Do you feel technical advances in weapons preparation have rendered vaccines obsolete?

4. Should the U.S. begin an accelerated vaccine development program, to expand the capability of vaccines to inhibit multiple virus strains, to develop vaccines for other weaponized illnesses, etc.? If so, the government may need to reproduce virus samples and share them with other laboratories. A massive R&D effort might require the assistance of labs in allied countries. Is the risk that this involves justified by the potential threat of biological weapons?

5. In the absence of an aggressive vaccination program, a smallpox outbreak would probably be contained by isolating those within the attack radius and vaccinating those outside the radius to contain the disease spread. Of course, those that had already left the area would spread the disease, thus minimizing the effectiveness of this plan. Many of those isolated in quarantine would probably die. Martial law would probably have to be invoked. How do you feel about the loss of civil liberties for the greater societal good? Is this an acceptable strategy for containing a biological weapon-induced illness outbreak? Would your feelings be different if you or your family were in the quarantine zone?