Study Looks at Targeted Vaccinations

By THE ASSOCIATED PRESS

WASHINGTON (AP) -- Vaccinating just the people in close contact with infected smallpox patients after a bioterrorist attack would be almost as effective as vaccinating the entire population, a study found.

Emory University researchers constructed a math model to test which would be the most effective vaccination response of public health officials to a smallpox attack on a community of 2,000 people.

They found that targeted vaccinations -- giving shots to those who had close contacts with infected patients -- was about as effective in saved lives and reduced disease as inoculating the entire community, provided that some in the population had ``pre-existing immunity'' to smallpox.

Dr. M. Elizabeth Halloran, first author of the study appearing this week in Science, said pre-existing immunity in a community could be increased by vaccinating volunteers and hospital and medical workers before an attack.

``Increasing the level of immunity in the population by vaccinating first responders would make a post-attack effort more effective,'' she said. ``If you ignore residual immunity, then mass vaccination does best after an attack.''

The report comes as President Bush is believed close to deciding how many Americans will be offered smallpox vaccinations.

Halloran and her co-author, Ira M. Longini Jr., said mass inoculations before an attack would disarm smallpox bioterrorists because most of the public would be immune to their weapon. But smallpox vaccinations were abandoned in the United States in 1972 because the chances of becoming ill from the shot was greater than the chances of getting the disease.

It is estimated that the vaccines can cause serious illness in about one patient per 10,000 vaccinations, and one to two deaths per million shots.

Halloran said public health officials now must find the best balance between hurting too many people from the vaccine and halting the spread of smallpox after a bioterrorist attack.
The new study evaluated the effects if a few individuals infected with smallpox intentionally spread the disease by wandering among others in the community. It then mathematically calculated the effects of two responses -- targeted inoculations or mass inoculations.

It found that if 80 percent of the people in close contact with a smallpox case were inoculated in a community that had no pre-existing immunity then there would be a death rate of about 19.6 per 1,000. With some pre-existing immunity, however, the death rate per 1,000 would drop to about 1.8 per 1,000.

If a community used mass inoculations, however, it would take longer and 80 percent of the total population would not be inoculated until after the 15th smallpox case had occurred. The authors calculated that in a community with some pre-existing immunity under these conditions, the death rate would be about 2.4 per 1,000. With no pre-existing immunity, however, the mass inoculation method would have a death toll of about 9.4 per 1,000, or about 10 per 1,000 better than targeted inoculations under the same circumstances.

Dr. Edward H. Kaplan, an epidemiologist at the Yale School of Medicine, said the Emory research was "a competently executed study," but that it did not consider the logistics involved in a large and rapid vaccination effort. He said targeted vaccinations take time because the contacts must be found and then summoned for shots, and quarantine and isolation facilities must be organized. Also, he said, the Emory study based its estimate on a small community, 2,000 people, while an attack on a city could involve millions.

"Without explicitly considering the logistics of vaccination, this aspect of a bioterror response is completely missed," he said of the Emory study.

Kaplan said his studies suggests that a mass inoculation is the most effective public health response following a bioterrorist smallpox attack, particularly in a big city.
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