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Scientists Say Mass Vaccination Is Best Response to a Smallpox Attack

Smallpox was eradicated from humans in 1979. But in light of last fall's terrorist attacks, it has returned to the forefront of public consciousness as a potential bioweapon. Because of the uncertainty surrounding both the chances of an assault involving the virus and the availability of vaccine stockpiles, the response policy to such an attack is continually evolving. Now a report published today in the *Proceedings of the National Academy of Sciences* suggests that mass vaccination after a smallpox attack would save thousands more lives than the government's current plan of action.

Edward H. Kaplan and David L. Craft of the Yale School of Medicine and Lawrence M. Wein of the Massachusetts Institute of Technology designed a computer model to track smallpox cases and deaths that would result from an attack on a large urban center. They tested a number of scenarios and compared two main treatment options. In the first, so-called traced or ring vaccination, people who have had contact with a person showing symptoms of the disease are vaccinated and those sick with the disease are quarantined. In mass vaccination, in contrast, the entire population is vaccinated once victims start exhibiting symptoms. Last month the Centers for Disease Control and Prevention (CDC) unveiled a response plan that calls for ring vaccination followed by mass vaccination only if the outbreak cannot be contained by the primary measures or if the initial number of cases is sufficiently large.

The modeling results indicate, however, that mass vaccinations would result in fewer deaths and quicker elimination of the disease regardless of the number of initial victims. The scientists tested different scenarios with varying values for parameters such as the number of infections, transmission rates, the fraction of contacted people correctly identified by victims and the resources available to administer vaccines. For a hypothetical city of 10 million inhabitants, the team found that more than 4,000 additional deaths would occur under the current CDC plan than if a mass vaccination was implemented. The authors conclude that "the cost in both deaths and time of delaying the switch to [mass vaccination]--as suggested by interim CDC policy--is very high, particularly in light of the public clamoring for vaccination and the mass panic that would likely ensue in the event of an attack." Considering recent news reports that the federal government plans to vaccinate as many as 500, 000 health care and emergency workers, there is some positive news to be found in the new findings. The researchers also found that vaccinations of a portion of the population prior

to an attack reduced the gap between the various strategies and led to fewer overall deaths. -- *Sarah Graham*

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