

Study examines the potential risks of smallpox vaccination

ANN ARBOR, MI - An immunization campaign to vaccinate Americans against smallpox would be protective against a smallpox bioterror attack, but the smallpox vaccination itself poses a risk of death or serious illness.

"So, a new study recommends, any decision to resume smallpox vaccination should be based on the likelihood of a smallpox attack, the effectiveness of other smallpox control measures, and the potential harm of the smallpox vaccine."

These conclusions are based on historical evidence from prior smallpox vaccination campaigns, adjusted to the current American population. Pediatric researchers at the University of Michigan Health System published these findings in the April issue of *Effective Clinical Practice*, published by the American College of Physicians and the American Society of Internal Medicine.

Smallpox is deadly, killing as many as 30 percent of those infected. Immunization against smallpox using vaccinia, the

live cowpox virus, was successful in eradicating smallpox globally by 1980. But routine vaccination in the United States was stopped in 1972 when the risk posed by the vaccine outweighed the risk of contracting smallpox.

It is not known how much immunity against smallpox remains in those people vaccinated prior to 1972. The recent anthrax attacks have raised concern about the nation's vulnerability to smallpox attack, and recent polls found that many Americans would be interested in smallpox vaccination, if it were available.

The UMHS researchers — led by pediatrician Alex Kemper, M.D., MPH, MS — hope their results may help guide public officials as they develop plans to prepare for a possible bioterror attack with smallpox. Their research group, the Child Health Evaluation and Research (CHEAR) Unit, focuses on issues of vaccine delivery and preventive health.

Historical evidence indicates that children less than one year

Kemper and his colleagues estimate that an immunization campaign targeting young people age 1-29 could lead to the vaccination of 82.5 million individuals, of which 190 people would be expected to die from vaccine complications. A more comprehensive campaign, for those age 1-65 could lead to vaccination of 178.5 million individuals, of which 285 people would be expected to die.

old, and people with compromised immune systems or eczema, are most at risk for side effects from smallpox vaccination and should not receive the vaccine. And, because the smallpox vaccine is a live virus, a recently vaccinated person could pass the smallpox vaccine virus to a vulnerable unvaccinated person, potentially leading to death or serious illness. To prevent this, the researchers recommend that people in close contact with high-risk individuals should not be vaccinated.

As a result of these precautions, the U-M researchers estimate that 25 percent of the

vaccine complications. A more comprehensive campaign, for those age 1-65 could lead to vaccination of 178.5 million individuals, of which 285 people would be expected to die.

The number of people suffering serious, but survivable, side effects would be 1,600 in the campaign targeted towards children and young adults, and 4,600 in the more comprehensive campaign. Approximately 15 million people in the campaign for children and young adults and 32 million people in the more comprehensive campaign would have less serious side effects, including fever and rash.

According to Kemper, "These numbers need to be interpreted cautiously, because they are based on historical data. Improvements in healthcare over the past three decades may decrease the number of fatal or serious side effects."

But, he continued, "In contrast, the number of serious side effects may be greater due to the increased number of individuals who are immunocompromised. In any case, the risk posed by smallpox vaccination is greater than the risk from other recommended vaccines, such as the MMR vaccine or the varicella vaccine against chickenpox. The public should be aware of these risks. Any decision to resume routine smallpox vaccination before a bioterror attack must carefully weigh these risks against the benefit of protection."

In addition to Kemper, the authors of the study are pediatric researcher Matthew Davis, MD, MAPP, and Gary Freed, M.D., MPH, chief of the Division of General Pediatrics and director of the CHEAR Unit.

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