

# Vaccine controversy

**With smallpox eradicated vaccination may not be necessary in the U.S.**

by Jeanne Bockel

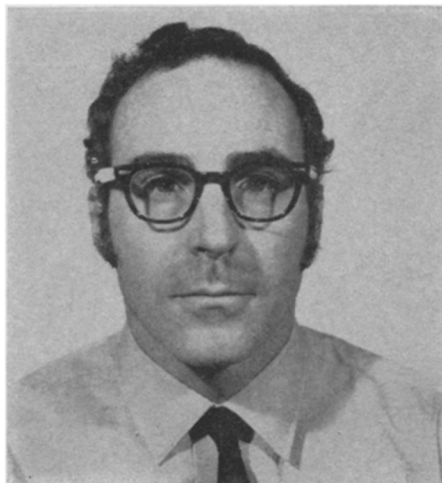
Smallpox vaccine, derived from cowpox virus grown on the underbellies of calves, has not changed much since Edward Jenner developed it in 1798. Its potency sets the stage for innumerable complications, although they appear in a limited number of cases. Among these are a progressive gangrenous reaction, skin rash or eczema, and even encephalitis, which can often be fatal.

**At present**, 90 percent of the nation's children receive routine vaccination, a practice that started in the 1920's after a series of outbreaks that spread the disease to a half-million persons and caused almost 5,000 deaths. In 1968, of an estimated 14,168,000 persons vaccinated, some 572 had confirmed complications from the vaccine. Nine deaths—four of which were the result of encephalitis—occurred during the year.

Smallpox, caused by an acute, contagious virus, kills about 1 in 10 of its victims. The current vaccine, produced from vaccinia virus, stimulates production of antibodies that kill the smallpox virus itself.

Persons who might develop a progressive or eczematous reaction can be singled out. The progressive deterioration results when the body fails to build defense mechanisms, and usually occurs in persons with immunologic disorders due to an underlying disease or from drugs that suppress the immune system. With the eczematous reaction, the virus thrives in the skin of those prone to skin diseases or an existing condition of eczema. But as yet there is no way of predicting who might acquire encephalitis because of the vaccination.

Smallpox has been virtually nonexistent in the United States for almost 30 years. Cases cropped up sporadically during World War II, carried home by servicemen returning from the Pacific. But since 1949, when one case im-

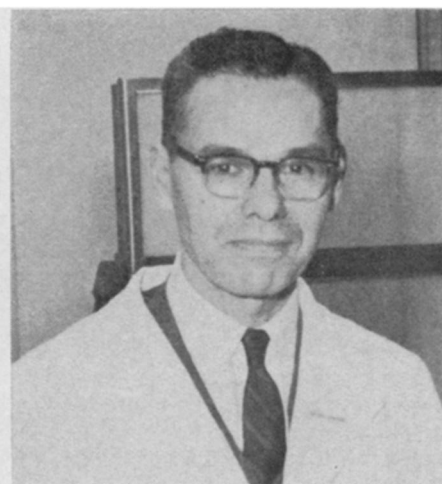


Univ. of California, Berkeley



Smallpox Eradication Program

*Lane and Millar: Smallpox vaccinations are no longer necessary.*



*Katz and Krugman: Smallpox could crop up again in unimmunized population.*

ported from Mexico was reported in the Rio Grande Valley, not a single case of the disease has been officially identified.

This can be attributed in part to good luck, particularly in light of the growth of international travel. But it would be more accurately ascribed to the routine and extensive use of the smallpox vaccine.

In the early 1950's when smallpox was declared officially to have been wiped out in the United States, specialists in infectious diseases began to argue whether the risks of vaccination finally outweighed the benefits. The questioning voices have grown louder over the years, until today many specialists hold that vaccination against smallpox is no longer justified in this country.

But habit dies hard.

**A team of immunologists**, Dr. J. Michael Lane and Dr. J. Donald Millar, both associated with the domestic branch of the smallpox education program of the National Communicable Disease Center in Atlanta, reopened the quarrel when they declared: "We vaccinate against smallpox more be-

cause of the dramatic successes of the past than the needs of the present." The two research scientists contend that routine infant and childhood vaccination for smallpox should be eliminated in the United States (SN: 11/15, p. 451).

Writing in the Nov. 27 *NEW ENGLAND JOURNAL OF MEDICINE*, Drs. Lane and Millar present a neat statistical argument, with a line of reasoning beginning with annual deaths. In a projection over a 30-year period from 1970 to 2000, the doctors estimate, with a single death expected for every million primary vaccinations, 210 deaths could be expected to occur.

On the other hand, if routine vaccination were abandoned, and only military recruits, hospital and health workers and visitors to and from areas where smallpox occurs were vaccinated, there would only be 20 million adult primary vaccinations, causing only 60 deaths. The international situation has changed sharply in the last two decades, and even if deaths from imported cases were included, the total would still increase only a few dozen.

More than 50 nations have eradicated

## . . . smallpox

the disease since World War II and, except for Brazil, the entire Western Hemisphere is free of smallpox. Only 30 nations, mostly in Africa and Asia, still are reporting cases of the dread disease.

In Europe less than 50 percent of the population is vaccinated against smallpox today. The International Sanitary Regulations adhered to by all European countries do not require smallpox vaccination for entry into any European country.

The NCDC scientists argue that despite last year's 14 million vaccinations and all the millions earlier, 13 percent of the population of the United States still remains unvaccinated, and there still is no smallpox. They recommend that possible smallpox cases be hunted down and outbreaks be controlled by vaccinating those who might come in contact with it.

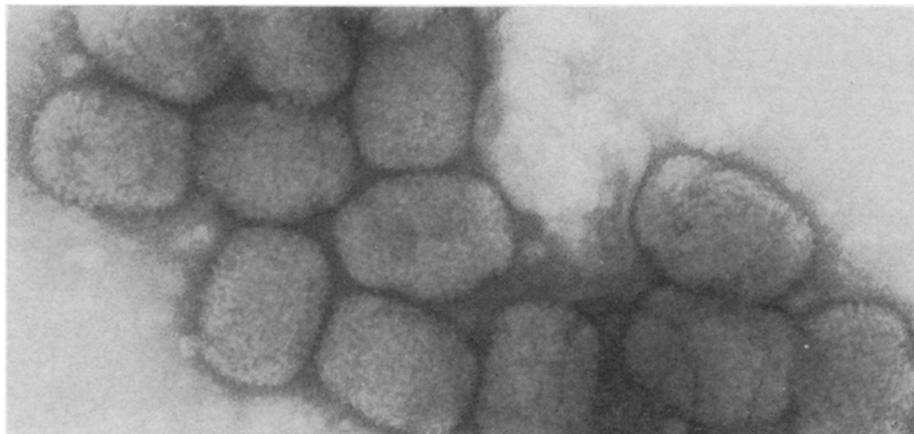
**Their view**, though popular, is not uncontested, particularly among clinicians.

Drs. Saul J. Krugman of New York University and Samuel L. Katz of Duke University, both pediatricians, argued in an editorial in the following issue of the journal, and vociferously at a recent meeting of the American Academy of Pediatrics in Chicago, that smallpox could crop up again in an unimmunized population. Dr. Katz feels the small number of yearly deaths attributable to the vaccine does not justify an end to mass vaccination. Drs. Katz and Krugman strongly oppose the NCDC team's argument. It is simply a numbers game, they declare.

Physicians today have never seen smallpox and don't know how to diagnose the disease, says Dr. Katz. With this kind of situation, he contends, an incident could occur like the classic one in 1924, when three men and a boy from Winnipeg, Canada, entered the United States on a train. Between the border and their destination in Connecticut, they left a trail of 74,000 cases of smallpox and 1,270 deaths. "This was due to an unimmunized population," Dr. Katz declares.

Drs. Katz and Krugman ascribe a smallpox-free United States strictly to the present vaccination practices, including the required vaccination of international travelers, and the fact that the United States has relatively few travelers from smallpox areas such as Africa, Pakistan, India and Indonesia.

But, they warn, jumbo jets will be used in the 1970's, which will make it easier for travelers from infected areas to enter the United States. Good luck is capricious, and continued vaccination is the one factor that can exert control, they contend.



NCDC

*Magnified cluster of vaccinia viruses grown on underbellies of calves.*

Another argument presented by the pediatricians is that reactions after primary smallpox vaccinations are more severe in adolescents and adults than in children. The threat of encephalitis, especially, increases with advancing age, they say.

Abandoning routine vaccination of children would only expose them to greater risks if they are vaccinated in later years. On the other hand, Dr. Katz stresses, revaccination of those already protected usually causes only a minimum of reactions.

As alternatives, Drs. Katz and Krugman believe improved vaccines should be developed, and that contraindications to the present vaccine be adhered to. Theoretically, they say, all cases of smallpox-related eczema are preventable simply by not vaccinating patients who either have the disease or any history of it. Progressive reactions can be avoided if doctors would not inoculate persons with an underlying disease or those who are taking drugs that might suppress immunologic responses to the vaccine.

They also suggest that a modified vaccine that provides the same protection but with less severe effects be developed.

**One such vaccine** on the way is the CVI-70 vaccine undergoing tests by Dr. Henry Kempe at the University of Colorado.

The vaccine has been approved for use in humans on an investigational basis by the Division of Biologics Standards. Although the vaccine is being tested in Europe, thus far only Dr. Kempe is investigating the vaccine in the United States.

A variation of a vaccinia strain developed by Dutch researchers, it is grown in tissue culture or eggs and is considered less virulent than the current vaccine and therefore less likely to cause reactions. Perhaps high-risk persons should receive the CVI-70 first, then

the fully potent strain, suggests Dr. Katz.

But the crux of the problem here, says Dr. Gordon Meiklejohn, chairman of the Department of Medicine at the University of Colorado, and former consultant to the Smallpox Eradication Program in Geneva, is that if double vaccination is prescribed most persons won't bother with the second. Yet he suggests, it doesn't make sense to waste time and money on a better vaccine when the disease will probably be eradicated throughout the world within five years.

If the argument is that complications are greater in the late teens, then perhaps the double vaccination method could be used on those patients. The irony is that if we stopped vaccinating children today, 15 years from now smallpox eradication will have been achieved in the world and no primary vaccinations will be needed for anything, according to Dr. Meiklejohn's view.

But the United States appears to have a fetish about vaccinations, and, despite the views of Drs. Lane and Millar, NCDC's official viewpoint is conservative. The center holds that even though smallpox areas have decreased, the possibility of smallpox being introduced into the United States has increased because of international travel. World eradication is the most direct attack on the problem, they say, but until that is achieved, or at least approached, vaccination now represents the only suitable approach for community protection throughout the United States.

The center does not set national policies, but makes recommendations followed by most state and local health departments.

The only concession NCDC policy will make at this time is that routine smallpox vaccination should be re-evaluated periodically as new information and data become available. □