



## Smallpox Vaccination in Tennessee

The last case of smallpox in the United States occurred in 1949; on October 26, 1977, the last case of naturally acquired smallpox in the world occurred in the Merca District of Somalia. In May 1980, the World Health Assembly certified the world free of naturally occurring smallpox, an event of unprecedented accomplishment for public health. Routine smallpox vaccination was discontinued in the United States in 1972.

There has been ongoing concern that terrorists may possess covert stockpiles of the virus. Since the September 11, 2001 attacks on the World Trade Center and Pentagon, there has been an acceleration of public health preparedness at the local, state and federal levels with respect to the possible intentional introduction of smallpox as a biological weapon.

This article describes the disease and elements of Tennessee's smallpox preparedness response. It includes vaccination adverse events, the pre-event vaccination program and the post-event vaccination program.

### The Disease

**Clinical case definition for smallpox:** an illness with acute onset of fever  $\geq 101^{\circ}\text{F}$  followed by a rash characterized by firm, deep-seated vesicles or pustules in the same stage of development and without other apparent cause.

Smallpox is a serious, contagious infectious disease. There is no specific treatment for it and the best prevention is vaccination. Historically the case fatality rate for those with the disease was about 30%.

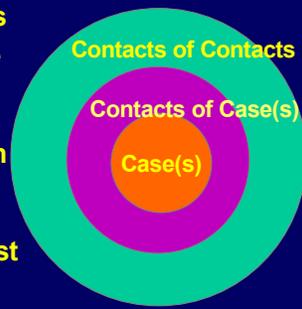
Smallpox is transmitted via direct and fairly prolonged face-to-face contact. It can also be spread through direct contact with infected bodily fluids or contaminated objects such as bedding or clothing. Airborne spread can occur but is less common.

The public health response to smallpox cases includes finding and isolating cases and identifying and vaccinating contacts of cases, even if they have been previously vaccinated. Vaccination prevents the disease if it is administered within three days of exposure. The goal is to provide a ring of immunity around each case, focusing vaccination on those who need it the most (**Figure 1**).

**Figure 1**

## Surveillance and Containment (Ring Vaccination)

- Find and isolate cases
- Identify and vaccinate contacts
- Provide a ring of immunity around each case
- Focus vaccination to those who need it most



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Moderate to Severe Side Effects. More severe side effects are due to the fact that the live virus in the vaccine can be shed from the vaccination site to other parts of the body (for example the eyes and mouth) and to other people. It is crucial that instructions for care of the vaccination site are followed. Generalized vaccinia, encephalitis and death can also result

### Smallpox Vaccine

Smallpox vaccine is made from a live virus called *vaccinia* which is a “pox”-type virus related to smallpox. It confers a high level of immunity for 3-5 years and provides some level of immunity for at least ten years. Protection develops 8-14 days after vaccination, faster if the person has been vaccinated before. However, since routine vaccination stopped approximately 30 years ago, no one today is considered immune.

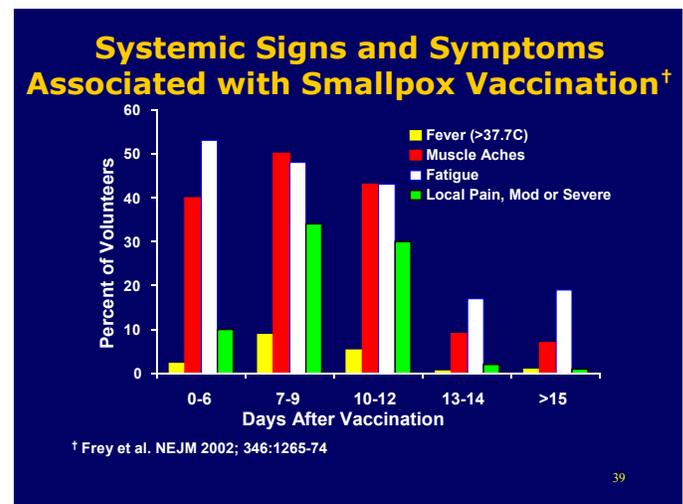
### Vaccination Adverse Events

People at greatest risk for complications from the vaccine include those with immunocompromising conditions such as HIV infection, cancer, intake of steroids, pregnancy, those with atopic dermatitis or eczema, and household members of those in the above categories. Screening out those who are at risk for developing complications can minimize the number of adverse reactions.

Mild Vaccine Side Effects. Mild side effects are more common in those receiving their first smallpox vaccination and include lymph node swelling and tenderness around the vaccination site, fever  $\geq 100^{\circ}\text{F}$ , rash 10 days after vaccination and head and body aches. About 33% of those being vaccinated for the first time will miss a day or two of work.

**Figure 2** depicts the signs and symptoms associated with smallpox vaccine.

Figure 2



from vaccination. **Figure 3** presents the frequency of severe reactions to vaccination.

### Pre-event Vaccination Program

The pre-event vaccination program refers to the current situation: there is no case of smallpox anywhere in the world, only the concern that a terrorist may use smallpox. The goal of the pre-event program is to make plans to deal with possible cases of smallpox and

Figure 3

## Serious Adverse Events Following Vaccinia Vaccination in Adults\*

Vaccination Status	Post-vaccinial encephalitis	Eczema vaccinatum	Vaccinia necrosum	Deaths
Primary vaccination	3.5	24.3–30.3	6.9	None reported
Re-vaccination	4.5	4.5	1.1–6.8	0.3

\*rates / million vaccinees  $\geq 20$  years of age; data from Lane et al., NEJM, 1969 & Lane et al. JID, 1970

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to decide who should be vaccinated now to make Tennessee and the United States better prepared for a possible attack using smallpox.

On December 13, 2002, President George Bush announced that he is requesting that volunteer health care workers and public health teams be vaccinated. He stated that vaccination is not recommended for the general public.

### Public Health Smallpox Response Teams

The first element of the pre-event program in Tennessee has been the identification of eight public health response teams. They are located across the state so that one team can be in any part of the state within 1 1/2 hours.

Each six-person team is headed by a health department physician and has at least two physicians, two nurses and two members who are experienced in outbreak investigation. All are health department employees and can be reached 24 hours a day, seven days a week.

### Pre-Event Clinic Sites

Seven cities have been selected for vaccine clinic sites. They were chosen for their proximity to the greatest number of the state's larger hospitals. The clinics will be located in Johnson City, Knoxville, Chattanooga, Nashville, Murfreesboro, Jackson, and Memphis

### Health Care Smallpox Response Teams

The Tennessee Department of Health has identified 131 acute care hospitals in the state that can provide smallpox response teams.

The teams in these hospitals would be vaccinated and trained to provide medical care for the first few smallpox patients requiring hospital admission and to evaluate and manage patients who present to the ER with suspected smallpox.

For the first 7-10 days after patients with smallpox have been identified, this team would be hospital-based and provide care 24 hours a day. Non-essential workers would be restricted from entering the rooms of patients with smallpox.

The hospitals have been provided detailed information regarding the management of the vaccination program. Each one has been asked to submit a list of staff members including ER physicians and nurses, ICU nurses, residents, medical ward physicians and nurses, x-ray and respiratory technicians, and security and housekeeping staff, who are willing to be vaccinated. Larger facilities may immunize more staff members. All vaccinations are to be voluntary. This pre-event vaccination program is expected to begin in February 2003.

### Post-Event Response

Should the United States experience a smallpox bioterrorist attack, there are plans in place for assuring that voluntary vaccinations take place safely and rapidly. The plans call for offering vaccinations to all Tennesseans without contraindications over a 10-day period. Figure 4 depicts the foundation of the vaccination clinic plan.

Figure 4

**Post-Event Mass Vaccination Plan**

- **Clinic demographics**
  - One clinic per 50,000 population, 117 clinics statewide
  - Each clinic serves 5000 pts per day
  - Each clinic staffed by over 200 people (combination of public health staff and volunteers), over 25,000 statewide

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### Conclusion

One case of smallpox anywhere in the world would constitute an international public health emergency. Both the United States and the state of Tennessee must prepare for such an event. A deliberate and careful approach to screening and vaccinating health care and public health workers will provide one safe and effective method for making us prepared.

### Learning Resources

Both the Centers for Disease Control and Prevention and the Public Health Foundation provide materials that can be used by health – care providers to familiarize themselves with the diagnosing and reporting of smallpox.

 Department of Health. Authorization No. 343227, 9,000 copies. This public document was promulgated at a cost of \$0.16 per copy. 06/02

CDC's website can be accessed at [www.cdc.gov/bt](http://www.cdc.gov/bt). The Public Health Foundation has produced the video, "Smallpox: What Every Clinician Should Know." Specialists discuss methods designed to improve recognition and diagnosis of the disease. It can be viewed on the internet or via videotape and continuing education credits are offered until the end of 2003. The videotape is available from the Foundation at 301-645-7773 or email at [info@phf.org](mailto:info@phf.org).

CDC has also produced a poster, "Evaluating Patients for Smallpox: Acute, Generalized Vesicular or Pustular Rash Protocol." It is useful for differentiating varicella from smallpox and presents common conditions that might be confused with smallpox. CEDS has distributed these posters to emergency departments across the state. More copies can be obtained by calling CDC at 404-639-3632.

If you have questions about the smallpox vaccination program, please call your local health department or the Tennessee Department of Health at 615-741-7247. CDC's hotline number for public information is 888-246-2675.

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