

# Micro Morphs



**Space Shuttle Columbia Flight 1998**  
PHOTO CREDIT: NASA or National Aeronautics and Space Administration

### Prayer for Columbia

"Nunc Dimittis" ( tr. "Now Scattered"),  
in Peace, said I  
for these, Thy servants of the sky  
Their lives, a revelation made....  
that Peace, not war, is our true gain  
to paths for worlds yet to be known  
came not, from those with hearts of  
stone

Then "Nunc Dimittis", Peace, I say  
Dear Lord in Thee, do such souls lay.

-Patricia D. Mahon 2/1/03

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## Smallpox Vaccine Factsheet

From the Center for Disease Control and Prevention website  
Public Health Preparedness and Response

### The Smallpox Vaccine

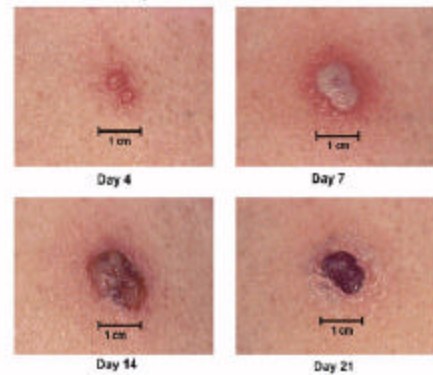
The smallpox vaccine helps the body develop immunity to smallpox. The vaccine is made from a virus called *vaccinia* which is a "pox"-type virus related to smallpox. The smallpox vaccine contains the "live" vaccinia virus—not dead virus like many other vaccines. For that reason, the vaccination site must be cared for carefully to prevent the virus from spreading. Also, the vaccine can have side effects (see the section "Smallpox Vaccine Safety" in this fact sheet). The vaccine does not contain the smallpox virus and cannot give you smallpox.

Currently, the United States has a big enough stockpile of smallpox vaccine to vaccinate everyone in the country who might need it in the event of an emergency. Production of new vaccine is underway.

### Length of Protection

Smallpox vaccination provides high level immunity for 3 to 5 years and decreasing immunity thereafter. If a person is vaccinated again later, immunity lasts even longer. Historically, the vaccine has been effective in preventing smallpox infection in 95% of those vaccinated. In addition, the vaccine was proven to prevent or substantially lessen infection when given within a few days of exposure. It is important to note, however, that at the time when the smallpox vaccine was used to eradicate the disease, testing was not as advanced or precise as it is today, so there may still be things to learn about the vaccine and its effectiveness and length of protection.

Primary Vaccination Site Reaction



Major (primary) reaction – Expected vaccine site reaction and progression following primary smallpox vaccination or revaccination after a prolonged period between vaccinations. Multiple pressure vaccination technique used. Source: CDC.

### Receiving the Vaccine

The smallpox vaccine is not given with a hypodermic needle. It is not a shot as most people have experienced. The vaccine is given using a bifurcated (two-pronged) needle that is dipped into the vaccine solution. When removed, the needle retains a droplet of the vaccine. The needle is used to prick the skin a number of times in a few seconds. The pricking is not deep, but it will cause a sore spot and one or two droplets of blood to form. The vaccine usually is given in the upper arm.

If the vaccination is successful, a red and itchy bump develops at the vaccine site in three or four days. In the first week, the bump becomes a large blister, fills with pus, and begins to drain. During the second week, the blister begins to

## Smallpox Vaccine factsheet cont'd.....

People who are being vaccinated for the first time have a stronger reaction than those who are being revaccinated

### Post-Vaccination Care

After vaccination, it is important to follow care instructions for the site of the vaccine. Because the virus is live, it can spread to other parts of the body, or to other people. The vaccinia virus (the live virus in the smallpox vaccine) may cause rash, fever, and head and body aches. In certain groups of people (see the section "Smallpox Vaccine Safety" in this fact sheet), complications from the vaccinia virus can be severe.

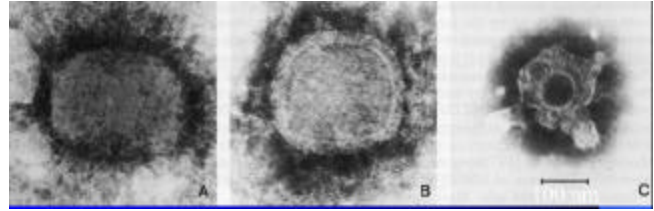
### Benefit of Vaccine Following Exposure

Vaccination within 3 days of exposure will prevent or significantly lessen the severity of smallpox symptoms in the vast majority of people. Vaccination 4 to 7 days after exposure likely offers some protection from disease or may modify the severity of disease.

### Smallpox Vaccine Safety

The smallpox vaccine is the best protection you can get if you are exposed to the smallpox virus. Anyone directly exposed to smallpox, regardless of health status, would be offered the smallpox vaccine because the risks associated with smallpox disease are far greater than those posed by the vaccine.

There are side effects and risks associated with the smallpox vaccine. Most people experience normal, usually mild reactions that include a sore arm, fever, and body aches. However, other people experience reactions ranging from serious to life-threatening. People most likely to have serious side effects are: people who have had, even once, skin conditions (especially eczema or atopic dermatitis) and people with weakened immune systems, such as those who have received a transplant, are HIV positive, are receiving treatment for cancer, or are currently taking medications (like steroids) that suppress the immune system. In addition, pregnant women should not get the vaccine because of the risk it poses to the fetus. Women who are breastfeeding should not get the vaccine. Children younger than 12 months of age should not get the vaccine. Also, the Advisory Committee on Immunization Practices (ACIP) advises against non-emergency use of smallpox vaccine in children younger than 18 years of age. In addition, those allergic to the vaccine or any of its components should not receive the vaccine.



Variola

Variola

Varicella

Courtesy of CDC site

In the past, about 1,000 people for every 1 million people vaccinated for the first time experienced reactions that, while not life-threatening, were serious. These reactions included a toxic or allergic reaction at the site of the vaccination (erythema multiforme), spread of the vaccinia virus to other parts of the body and to other individuals (inadvertent inoculation), and spread of the vaccinia virus to other parts of the body through the blood (generalized vaccinia). These types of reactions may require medical attention. In the past, between 14 and 52 people out of every 1 million people vaccinated for the first time experienced potentially life-threatening reactions to the vaccine. Based on past experience, it is estimated that 1 or 2 people in 1 million who receive the vaccine may die as a result. Careful screening of potential vaccine recipients is essential to ensure that those at increased risk do not receive the vaccine.

### Smallpox Vaccine Availability

Routine smallpox vaccination among the American public stopped in 1972 after the disease was eradicated in the United States. Until recently, the U.S. government provided the vaccine only to a few hundred scientists and medical professionals working with smallpox and similar viruses in a research setting.

After the events of September and October, 2001, however, the U.S. government took further actions to improve its level of preparedness against terrorism. One of many such measures—designed specifically to prepare for an intentional release of the smallpox virus—included updating and releasing a smallpox response plan. In addition, the U.S. government ordered production of enough smallpox vaccine to immunize the American public in the event of a smallpox outbreak. Right now, the U.S. government has access to enough smallpox vaccine to effectively respond to a smallpox outbreak in the United States.

“ Grief and pain are part of human existence. Not letting ourselves feel them is part of human deprivation”.

- author unknown



## **SMALLPOX FACT SHEET – *Information for Lab Workers*** **Specimen Collection of Smallpox (Vaccinia) Vaccine Virus**

*Laboratorians should follow the steps below for vaccinia virus specimen labeling and handling, infection control procedures, and specimen collection.*

### **Specimen Labeling and Handling**

Label all tubes, vials, and microscope slide holders with patient's name, unique identifier, date of collection, source of specimen (vesicle, pustule, scab, or fluid), and name of person collecting the specimen.

### **Infection Control Procedures**

Wear appropriate personal protective equipment. (Contact appropriate infection control personnel.)

### **Specimen Collection**

#### ***Vesicular Material***

1. Sanitize the patient's skin with an alcohol wipe and allow skin to dry.
2. Open the top of a vesicle or pustule with a scalpel, sterile 26-gauge needle, or slide. Collect the skin of the vesicle top in a dry, sterile 1.5- to 2-mL screw-capped tube. Label the tube.
3. Scrape the base of the vesicle or pustule with the wooden end of an applicator stick or swab and smear the scrapings onto a glass or plastic light microscope slide. Allow slide to dry for 10 minutes.
4. Label the slide and place it in a slide holder. To prevent cross-contamination, do not place slides from more than one patient in the same slide holder.
5. Take another slide, and touch it repetitively to the opened lesion using progressive movements of the slide in order to make a touch prep. Allow slide to dry for 10 minutes.
6. Label the slides as touch preps and place in the same slide holder. To prevent cross-contamination, do not place slides from more than one patient in the same slide holder.
7. If plastic-coated electron microscopic (EM) grids are available, lightly touch the shiny side of 3 EM grids to the base of the open lesion, allow EM grids to air-dry for 10 minutes, and place grids in an appropriately labeled grid box. Use varying degree of pressure (minimal, light, and moderately firm) in application of the 3 grids to the unroofed lesion. EM grids and collection materials will soon be available at Laboratory Response Network (LRN) sites.
8. If a slide or EM grid is not available, swab the base of the lesion with a polyester or cotton swab, place in screw-capped plastic vial, break off applicator handle, and seal.

Repeat this procedure for 2 or more lesions.

4. Wrap parafilm around the juncture of the cap and vial.
5. Label the tube.

*Continued on page 4*



## **Specimen Collection of Smallpox (Vaccinia) Vaccine Virus cont'd.....**

*Laboratorians should follow the steps below for vaccinia virus specimen labeling and handling, infection control procedures, and specimen collection.*

### **Scab Specimens**

1. Sanitize the patient's skin with an alcohol wipe and allow skin to dry.
2. Use a 26-gauge needle to remove 2 to 4 scabs.
3. Place 1 or 2 scabs in each of 2 dry, sterile screw-capped plastic tubes.
4. Wrap parafilm around the juncture of the cap and vial.
5. Label the tube.

### **Biopsy Lesions**

(At least 2 specimens obtained by using a 3.5- or 4- mm punch biopsy kit.)

1. Use sterile technique and appropriate anesthetic.
2. Place 1 sample in formalin for immunohistochemical or histopathologic evaluation and store at room temperature.
3. The second specimen should be placed dry (do not add transport medium) in a sterile 1.5- to 2- mL screw-capped container (do not add transport medium).
4. Refrigerate if shipment occurs within 24 hours; otherwise, the specimen should be frozen.

### **Serum Specimens**

1. Draw 10 mL of blood for serum separation and collection.
2. Send serum, stored refrigerated.

Additional information on specimen collection for suspect smallpox cases is available at <http://www.bt.cdc.gov/agent/smallpox/response-plan/files/guide-d.pdf>.

Additional information on packaging is available at <http://www.bt.cdc.gov/labissues/packaginginfo.pdf>.