

Draft Guide C, Part 1

Infection Control Measures for Healthcare and Community Settings

Guide C – Infection Control Measures for Healthcare and Community Settings

The State Epidemiologist, state health officer, or other authorized state official should designate a person or persons to coordinate with federal authorities all activities related to isolation or quarantine and care of the specific groups listed below.

Local or state legal statutes regarding public health authorities for isolation of infectious persons and quarantine of potentially infected and incubating persons should be followed in implementing the control measures described below. If existing local or state public health statutes do not allow for implementation and enforcement of appropriate isolation and quarantine measures, federal public health statutes for the control of infectious diseases may be applied to assist local and state authorities in implementing the necessary outbreak control measures.

Rationale for these Guidelines: Prevention of the spread of smallpox virus from patients to others is a critical part of the control strategy. Smallpox patients usually transmit infection by expelled droplets to close contacts (those within 6 to 7 feet). Although smallpox patients generally are infectious from the time of first development of rash, the earliest stages of the rash may be difficult to recognize. However, preceding the development of rash, the patient will run a high fever for 2 to 3 days. Isolation of a possible case from the time of onset of fever will provide a sufficient time to assure appropriate infection control measures are in place at the onset of their infectious period (rash). Timely implementation of appropriate infection control precautions in combination with vaccination of all of the close contacts to the case should sharply limit the spread of smallpox.

In addition to the infection control measures recommended in this section, public health authorities should evaluate the potential need to implement additional early transmission control measures such as suspension of large public gatherings until other outbreak activities and control measures (surveillance, vaccination, isolation of cases, etc.) have been established. *See also Guide C, Part 2: Quarantine Guidelines.*

Note: Health care workers must be vigilant that standard, droplet, and airborne precautions are maintained when caring for all suspect smallpox patients. In addition, patients with severe disease, flat-type smallpox, and hemorrhagic-type smallpox are especially efficient at transmitting virus, as they are more likely to have extensive mucous membrane lesions, leading to increased viral shedding in saliva, and subsequent increased release of virus into the air. **It is critical that there be no violation of infection control measures when caring for these patients.**

Suggested Pre-Event Infection Control Activities

1. Assure local and/or state legal statutes are in place to allow public health intervention and implementation of the isolation and quarantine measures outlined in this section.
2. Identify personnel responsible for local/state coordination of isolation and quarantine activities.
3. Identify appropriate facilities to be utilized for isolation and care of smallpox patients and febrile contacts as outlined and establish procedures for activating them.
4. Identify appropriate law enforcement entities to enforce isolation and quarantine orders.
5. Identify appropriate personnel (medical, maintenance, etc.) to maintain/staff facilities.
6. Establish procedures for monitoring and controlling access to facilities.
7. Establish procedures for appropriate disposal of medical waste when using a non-medical facility.
8. Establish laundry service arrangements (on-site if possible) and appropriate disposal of medical waste.
9. Arrange for food service support for facility occupants.
10. Establish procedures for monitoring health status of facility staff and plans for referral to appropriate care.
11. Assure that all staff that will care for smallpox patients has been appropriately vaccinated.

SECTION 1: ISOLATION MEASURES AS PART OF THE RESPONSE TO A SMALLPOX EMERGENCY

Isolation is defined as the separation of a person or group of persons from other people to prevent the spread of infection.

Each of the following groups has specific isolation considerations:

I. Known or Presumed Infectious Individuals (Type C = Contagious Facility)

- a) Persons with a compatible illness and laboratory confirmation of smallpox (confirmed case)
- b) Persons with a compatible illness following suspected/known exposure with pending laboratory confirmation (probable case)
- c) Persons referred by a consultant as suspected cases of smallpox but who do not have a typical clinical presentation

II. Febrile Contacts without Rash (Type C or Type X Facility)

- a) Vaccinated contacts under surveillance who become febrile with oral temperatures $\geq 101^{\circ}$ F (38° C) on two successive readings (but do not have a rash)

III. Asymptomatic Contacts (Type R = Residential Facility)

- a) Afebrile vaccinated contacts
- b) Afebrile vaccinated individuals who were with a smallpox patient 10 to 18 days before the onset of the patient's rash (possible common exposure)
- c) Contacts who refuse vaccination

TYPES OF FACILITIES FOR USE IN A SMALLPOX EMERGENCY

The following sections describe the types of facilities that may be utilized for housing selected groups of individuals during a smallpox emergency. **Although isolation of a limited number of smallpox cases may be initially accomplished in a hospital setting, local and state health authorities should be prepared to activate and utilize alternative facilities for larger community outbreaks of smallpox. Until that time, should a suspect case of smallpox be identified in a hospital, strict standard, airborne, and isolation precautions will be followed. These procedures are similar to those used in dealing with varicella cases.**

I. TYPE C FACILITY - Isolation - Infectious Individuals (confirmed, probable, and suspected smallpox cases)

A. Isolation in Dedicated Type C (C= Contagious) Facility

The purpose of a Type C Facility is to house cases of smallpox and thus minimize the exposure of susceptible individuals to contagious individuals. Contacts who develop a fever and rash during their surveillance period should also be housed in this type of facility (if vaccinated prior to facility admission) while the diagnosis of smallpox is being confirmed or ruled-out in order to minimize the chance of exposure to susceptible persons. **All persons entering or admitted to a Type C facility must be vaccinated, including those who are considered to be smallpox cases, because errors in diagnosis are possible.**

Note on Varicella (Chicken Pox) Testing: Prior to admitting a patient to a Type C group facility it is reasonable to **consider laboratory testing to rule-out varicella disease in patients without a previous history of varicella or varicella vaccination.** This is best done using direct fluorescent antigen testing. Varicella is the febrile rash illness most likely to be confused with smallpox and accidental isolation of a varicella patient in a smallpox facility may cause an outbreak of varicella among already ill patients.

Examples of potential Type C facilities include any empty facility or facility that is not used for other purposes (e.g., motel, dedicated hospital, separate building of hospital, college dormitory) that meets the requirements listed below. Once designated for the care of smallpox patients, this facility should not be used for any other purpose. The facility should not have ventilation systems shared with any other facility and must have controllable access (e.g., fence around building or monitored entries) to prevent entrance by nonvaccinated individuals.

A Type C facility is an isolation facility that meets the following requirements:

1. A structure with nonshared air conditioning, heating, and ventilating systems that exhausts 100% of air to the outside through a HEPA filter **OR** is located at least 100 yards from any other occupied building or area.

Although smallpox virus is most commonly transmitted by large droplets that generally do not remain airborne for more than 6 to 7 feet, there have been several reports of more widespread aerosol disseminations in hospital settings via shared ventilation systems. In an outbreak in Meschede, Germany, in 1970, 17 people were apparently infected by virus particles that were transmitted by droplet nuclei aerosol to various parts of a hospital.

2. Adequate water, electricity, heating, cooling, and closed-window ventilation to maintain activities of daily living and tertiary medical care of residents.
3. A communication system that allows for dependable communication within and outside of the facility (e.g., telephone or intercom system).
4. Ability to provide the following level of medical care within the facilities:
 - a) Supportive care with IV fluids, antibiotics, etc.
 - b) Skin care
 - c) Oxygen monitoring (pulse ox) and oxygen (in-line or portable)

- d) Medical vital signs monitoring
- e) Cardiac and respiratory resuscitation
- f) Ventilatory support
- g) Suctioning equipment
- h) Basic laboratory evaluations (blood chemistries, CBC)
- i) Radiology (portable chest x-ray)
- j) Staffing resources (to be determined by severity of illness)

B. Isolation of Infectious Individuals in a Hospital Facility Initially Used for Non-smallpox Medical Purposes

It is expected that once a large outbreak of smallpox is confirmed, all confirmed or suspected smallpox patients will be isolated in a Type C facility that has been designated solely for the isolation of such patients. Until vaccine take is confirmed in facility staff at day 7, airborne and contact isolation precautions will be followed in the care of patients. These are similar to those used in dealing with varicella cases (see: Garner JS, Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. Infect Control Hosp Epidemiol 1996;17:53-80, and Am J Infect Control 1996;24:24-52).

However, prior to the confirmation of a smallpox outbreak or activation of the designated Type C facility, admission of confirmed or otherwise suspected smallpox patients into a hospital facility that is not designated for the sole purpose of isolating smallpox patients may be unavoidable.

A confirmed or suspected case of smallpox should only be admitted to a hospital where non-smallpox patients are present, under the following conditions:

1. The facility has negative pressure isolation room(s) for housing confirmed or suspected case(s) that meet the following criteria:
 - a. Negative air pressure in relation to the corridor and surrounding areas with all exhaust externally vented away from air intakes or where people may pass. If possible the air should be externally vented after passing through a filter with an efficiency of at least 95% based on the DOP (dioctyo-phthalate) test method. The filters should be disposed of in an appropriate manner (discarded in biohazard bags and autoclaved or incinerated). Air exhaust should also be separated by >25 feet from the air intake.
 - b. A toilet, sink, and bath or shower for the patient
2. Unless the number of smallpox patients is sufficiently low (i.e., 1 or 2) to allow for appropriate strict isolation precautions in the hospital facility or the facility is designated only for the care of smallpox patients, transfer to a designated Type C facility should be arranged as soon as possible.

II. **TYPE X FACILITY – Isolation of persons with uncertain diagnoses - Vaccinated febrile contacts without rash – (two successive temperatures >101°F (38C))**

If the number of vaccinated febrile contacts is small, they may be housed in a Type C Facility with smallpox cases. If the number is large, additional facilities must be utilized (Type X Facility) to house these individuals.

The purpose of a Type X Facility (X= Uncertain diagnosis) is to house a febrile contact during the observation period for further development of symptoms of smallpox (rash). It is expected that there will be a number of individuals who will experience fever during this interval. Some will be experiencing the prodrome of smallpox while most will probably be experiencing fever associated with vaccination or from some other cause. All such individuals should be treated as potentially contagious.

If rash develops during the observation period, the individual should be moved to a Type C Facility for further evaluation and isolation to minimize the risk of exposing others in the event the individual has developed smallpox. If rash does not develop within 5 days and the fever is diagnosed as being a result of vaccination or some other non-smallpox related cause, the contact may be released to complete their fever surveillance at home.

A Type X Facility should meet the same isolation and general supply requirements as a Type C Facility. However, Type X Facilities need to supply only basic medical care functions such as monitoring vital signs.

III. **Type R Facility** – **Asymptomatic contacts (not infectious)**

A Type R Facility (R = residential) may be the person's own home.

Asymptomatic contacts must be placed under fever surveillance for 18 days after their last exposure or until 14 days following successful vaccination (whichever comes first).

Asymptomatic contacts may continue routine daily activities but must remain within 20 miles of their city of residence and must monitor their temperatures twice daily. In addition, they must maintain daily telephone contact with designated health department personnel. If resources permit, closer monitoring is desirable, such as daily visits by public health personnel.

If an asymptomatic contact under fever surveillance develops two successive fevers $\geq 101^{\circ}$ F (38C) they should notify health department personnel and remain in their home until transportation to a Type X (or Type C) Facility for further evaluation can be arranged.

If asymptomatic contacts cannot be housed in their own residences due to logistical difficulties or potential societal unacceptance, alternative Type R facilities to house the contacts during their period of surveillance must be established. Potentially acceptable facilities include designated motels, hotels, or other facilities that have sleeping accommodations, heating and air conditioning systems, running water, and toilet facilities.

PROCEDURES FOR ISOLATION OF INDIVIDUALS

The following sections describe the procedures to follow when establishing isolation of the groups described above during a smallpox emergency.

I. Procedures for Isolating Known or Presumed Infectious Individuals (confirmed, probable, and suspected smallpox cases)

A. Prepare dedicated Type C Facility for occupation by smallpox patients.

The facility should be clean; bedding, linens, food service, medical supplies and equipment should be provided; and the utilities (water, electrical, and telephone services) should be turned on.

B. Vaccinate and confirm vaccine take in the following individuals associated with dedicated Type C Facilities:

1. Personnel who will transport smallpox cases to Type C Facilities
2. ALL personnel who are authorized to enter the facility (medical staff, support personnel, selected visitors, etc.)
3. Personnel who will handle laundry and waste associated with the facility
4. ALL patients (confirmed, probable, and suspected smallpox cases) who are admitted to facility. Vaccinating all patients entering facility is the most practical method to protect patients who may have been misclassified as a smallpox case.

Only individuals who have no contraindications to vaccination should be selected to staff and/or enter a Type C Facility as they will require vaccination prior to entry.

C. If transportation of a case(s) to a designated Type C facility via ambulance is required, the following guidelines should be followed:

1. Remove unnecessary items from the ambulance(s) to avoid contamination and facilitate decontamination. The ambulance should be equipped with a working 2-way communication device (e.g., two-way radio or cellular telephone).
2. Vaccinate ambulance personnel prior to transportation or within 24 hours following transportation.
3. Equip ambulance with all necessary equipment to permit adherence to appropriate isolation precautions. (N95 masks, disposable latex and/or vinyl gloves, gowns, shoe covers, and a supply of impervious biohazard plastic bags).
4. The ambulance driver and attendant should wear protective clothing to include a gown, shoe covers, and disposable latex or vinyl gloves.

The ambulance(s) should not be used to transport non-smallpox cases after transportation of a smallpox case until a full decontamination has been completed (see Guide F –Environmental Control Guidelines).

D. Transporting confirmed cases to a Type C facility

The patient should be covered in a linen sheet (to prevent contact with and potential contamination of objects in the area) and his nose and mouth should be covered with a disposable surgical mask (to decrease potential for droplet exposure of other individuals).

The ambulance driver and attendant(s) should remove their gloves and place them in impervious biohazard plastic bags as soon as the patient is placed in the ambulance and the doors are closed.

E. Admit the patient to the dedicated Type C facility

The driver and attendant should remove and place all protective clothing (gowns, gloves, masks, etc.) in biohazard bags while in the ambulance and replace them with clean protective clothing (gowns, gloves, masks, etc.). The bagged materials should be autoclaved or incinerated with other medical waste collected from the facility.

F. Establish a list of those who may enter the Type C facility

This list should include the smallest possible number of people required for patient care, investigation, and facility maintenance (physicians, nurses or aides, laboratory personnel, housekeeping and laundry personnel, maintenance personnel, etc.). This list should be kept by the nurse on duty or other personnel responsible for monitoring access to the facility.

G. Implement a monitoring system for the facility to:

1. Ensure that all personnel who enter the facility have been recently vaccinated.
2. Monitor above personnel for symptoms (fever).

This monitoring system should include a log/register of all persons who enter and leave the facility (including staff members) and should also include a notation of each person's vaccination status (see Annex 7 – Forms for form to be used for facility access monitoring).

Until successful vaccination has been confirmed, all personnel working in the Type C facility should check their temperature every 12 hours. At the beginning of each shift, they are to present to the person responsible for coordinating employee illness surveillance or their designee to report any temperatures or any illness. On days they are not at the facility, they are required to be in telephone contact each morning to report their temperatures. Once successful vaccination has been confirmed, personnel are not required to routinely check their temperatures; however, they are still required to report any illness to the person(s) assigned to coordinate employee illness surveillance.

- H. Use Standard Precautions for all patient care. In addition, use Contact and Airborne Precautions (i.e., disposable gowns and gloves to enter the contaminated area, disposal of used gowns and gloves before leaving the area, and fit-tested N95 masks) for patient care until a vaccine take has been confirmed in the care provider. Following the vaccine take, the care provider is no longer required to wear an N95 mask. Standard Precautions and Contact Precautions should be maintained.
- I. Instruct all personnel who are involved in patient care activities in the necessary precautions they must take:
 - 1. Instruct personnel in the meaning of Standard Precautions, Contact Precautions, and Airborne Precautions, and how to use each one.
 - 2. Report immediately any symptoms they develop to the person(s) assigned to coordinate employee illness surveillance.
 - 3. Dispose of all nonsharps waste in biohazard bags and have it autoclaved before it is disposed of or incinerate it on the premises.
 - 4. Place all laundry and linens (towels, protective clothing, etc.) in biohazard bags and launder on the premises using vaccinated personnel. If the laundry is to be done by nonvaccinated personnel, it should be autoclaved first. Laundry will need to be taken out of biohazard bags to be autoclaved. Bags are used to permit safe transportation to the autoclave site.
 - 5. Use disposable items whenever possible.
- J. Arrange to have food prepared on the premises or brought into the facility in disposable containers, if possible. Otherwise, all serving ware, plates, cups, and utensils should be sterilized in a standard dishwasher.
- K. Confirm laboratory diagnosis for probable and suspected smallpox cases admitted to facility:
 - 1. If smallpox diagnosis is confirmed, release from facility when all scabs have separated and they are no longer considered infectious (3 to 4 weeks).
 - 2. If another diagnosis is confirmed, the patient may be released from the Type C Facility once a vaccine take is confirmed
- L. Release confirmed smallpox patients when all scabs have separated and they are no longer considered infectious (3 to 4 weeks).
- M. If febrile contacts are also isolated at a Type C facility, they may be released to home if no rash develops after 5 days and the fever is diagnosed as being caused by recent vaccination or some other nonsmallpox etiology. They should maintain fever surveillance for 18 days following their last contact with a case or 14 days following successful vaccination.

The final approval to release a patient from a Type C Facility will be made by the State Epidemiologist, health officer, or their designee.

- N. Once the facility is no longer in use for smallpox patient isolation, all areas of the facility must be decontaminated before reuse. (*See Guide F – Decontamination Guidelines*).

II. Infection Control Precautions for Suspected or Confirmed Infectious Smallpox Patients in Facilities Used for the Care of Non-smallpox patients

- A. Select a route to transport the patient through the hospital to isolation room.

All people should be cleared from route. Criteria for selecting route include: directness to room, ease of decontamination if required, and isolation from other people. If an elevator is required, use a nonpublic elevator.

B. Transport the patient to the isolation room.

Cover the patient with a linen sheet and place a surgical mask (or N95 respirator) on the patient during transport through the hospital to the isolation room. A surgical mask will decrease the chance for droplet transmission of smallpox to other individuals.

C. Isolation Precautions

Place the patient in an airborne infection isolation room to prevent airborne transmission of variola to other parts of the facility.

All healthcare personnel entering the room should be vaccinated and wear an N95 respirator.

Disposable gowns and gloves should be donned before entering the room and should be worn for all patient contacts.

D. All protective clothing (including sheet covering patient) should be disposed of in plastic biohazard bags prior to leaving the isolation room where the patient is admitted.

E. Follow Airborne and Contact Precautions while patient is isolated in hospital facility to prevent nosocomial transmission to other patients

F. Follow steps G-N above.

III. Procedure for Isolating Febrile Contacts

a. Prepare Type X Facility for occupation of febrile contacts.

b. Arrange for transportation of febrile contacts to facility.

Assure that all persons admitted to or entering the facility have been recently vaccinated (see Annex 7 – Forms, for form to be utilized for facility access monitoring).

c. Follow steps F and G above under “Procedures for Isolating Known or Presumed Infectious Individuals (confirmed, probable, and suspected smallpox cases).”

d. Establish close monitoring for rash development.

e. If rash develops, transfer patient to Type C facility utilizing precautions for the transportation of suspected smallpox patients outlined above.

f. If no rash develops after 5 days and the fever is diagnosed as being caused by recent vaccination or some other non-smallpox etiology, the contact may be released to home to continue fever surveillance for 18 days following their last contact with a case or 14 days following successful vaccination.

The final approval to release a patient from a Type X Facility will be made by the state officer or a designee.

g. Once the facility is no longer in use for patient isolation, the facility must be cleaned before reuse. (See Guide F – Decontamination Guidelines).

IV. Infection Control Precautions for Non-Infectious Contacts (exposed individuals without rash) of Smallpox Cases

- a. Vaccinate contacts and household members of smallpox cases who do not have contraindications to vaccination.

Arrangements should be made for household members with contraindications to vaccination, to stay outside of the home, without direct contact with the people being monitored, during the period of surveillance for the contact.

- b. Place contact under fever surveillance for 18 days from the last contact or 14 days from successful vaccination (whichever comes first). The contact is required to monitor and record his/her temperature twice daily (morning and evening) during the period of surveillance and report via telephone once daily to designated health department personnel. If resources are available, more active, closer supervision is desirable. This could include visiting asymptomatic close contacts one or more times a day.
- c. Asymptomatic contacts may continue routine daily activities but must remain within 20 miles of their city of residence.
- d. Contacts that do not develop fever during the surveillance period may be released from surveillance 18 days following the last contact with a smallpox patient or 14 days following successful vaccination, whichever comes first.
- e. If a contact **has an oral temperature** $\geq 101^{\circ}$ F (38° C) on two successive readings, they should immediately notify health department personnel and remain in their home until transported to a Type X or C Facility.
- f. No unvaccinated individual should enter the home where a febrile contact is isolated (prior to transportation to a Type X or C Facility) until the contact is transported out of the home:

V. Procedures for Cohort Isolation of Noninfectious Individuals in a Type R Facility

If an alternative Type R Facility is selected to cohort and monitor asymptomatic contacts during their surveillance period because of logistical problems or societal unacceptance of home monitoring for contacts, the following procedures should be followed:

- A. Prepare an Type R Facility for use by asymptomatic contacts to smallpox patients

A hotel or motel equivalent would be suitable options for housing asymptomatic contacts. The facility should be clean; bedding, linens, food service, and laundry service should be provided; and the utilities (water, electrical, and telephone services) should be turned on.

- B. Vaccinate ALL personnel entering the facility.
- C. Contacts should remain in the facility during the surveillance period.
- D. Contacts should monitor their temperatures as outlined above. Temperatures should be recorded in an individual record for each asymptomatic contact.

E. If 2 successive fevers $\geq 101^{\circ}$ F (38C) occur, the contact should be transported to a Type X (or C) Facility for further evaluation.

VI. Respiratory Protection for Healthcare Workers Exposed to Patients with Suspected or Confirmed Smallpox

Patients with suspected or confirmed smallpox should be placed on Airborne Infection Isolation Precautions.

Once an outbreak has been confirmed, only HCWs with confirmed vaccination status should provide direct care to patients with suspected or confirmed smallpox. HCWs with confirmed vaccination status would include those vaccinated prior to (or who could be vaccinated within three days of) contact with a smallpox patient.

Prior to a smallpox outbreak, there may situations where a vaccinated healthcare worker is not available to care for a patient with a febrile rash illness which may be smallpox. In this case, unvaccinated HCWs should wear N95 masks and only a limited number of HCWs should have access to the patient's room.

In order to assure that all persons entering a smallpox patient's room adhere to infection control precautions, an N95 respirator should continue to be worn by all HCWs with confirmed vaccination status that perform either routine patient care or other procedures on smallpox patients.

This measure should be maintained to:

- 1) Provide visual assurance that all persons entering a room are maintaining airborne precautions;
- 2) Assure that HCWs are protected regardless of the date of their last smallpox vaccination;
- 3) Provide additional protection should there be any modification in the infectivity of the smallpox virus.