

Health Alert

July 29, 2003

Since this information can change frequently and to confirm that you have the most recent Health Alert,

go to the DHSS web site at:
www.dhss.state.mo.us/BT_Response/BT_Response.html

How to contact us:

Office of the Director
912 Wildwood
P.O. Box 570

Jefferson City, MO 65102
Telephone: (800) 392-0272
Fax: (573) 751-6041

Web site: www.dhss.state.mo.us



Health Alert #45 Monkeypox (7/29/03)

New/updated information is indicated by **New** or **Updated**.
[Dates noted in this document are date of release by CDC].
This health alert updates information in Health Alert #45
(previously updated 7/3/03).

**FROM: RICHARD C. DUNN
DIRECTOR**

SUBJECT: Monkeypox

As of July 24, 2003, a total of 72 cases of monkeypox have been reported to the Centers for Disease Control and Prevention (CDC) from Wisconsin (39), Indiana (16), Illinois (13), Missouri (2), Kansas (1), and Ohio (1); these include 37 (51%) cases laboratory-confirmed at CDC (including both Missouri cases) and 35 (49%) suspect and probable cases under investigation by state and local health departments

Among 69 patients for whom data were available, 18 (26%) were hospitalized; there have been no deaths related to the outbreak. It appears that most of the cases became infected after close contact with infected prairie dogs that had been purchased as pets. Some patients may have been infected through contact with other infected animals, and the possibility of human-to-human transmission in some cases cannot be excluded at this time.

The 2 cases of monkeypox in Missouri are believed to have resulted from contact with infected pet prairie dogs.

Traceback investigations have implicated a shipment of animals from Ghana that was imported to Texas on April 9 as the probable source of introduction of monkeypox virus into the United States. The shipment contained approximately 800 small mammals of nine different species, including six genera of African rodents. Gambian rats from this shipment were kept in close proximity to prairie dogs at an Illinois animal vendor implicated in the sale of infected prairie dogs.

The purpose of this Health Alert is to inform medical and public health professionals, and veterinarians, of the occurrence of this outbreak, including the fact that cases of monkeypox have now occurred in Missouri, and to provide information on monkeypox, including its clinical presentation, diagnosis, management, and prevention.

Health care providers and veterinarians should immediately report any suspected cases of monkeypox in humans or animals to their local public health agency, or to the Missouri Department of Health and Senior Services (DHSS) at 1-800-392-0272 (24 hours a day/7 days a week).

This Health Alert will be updated as new information and recommendations become available. The most recent update can be accessed by going to the DHSS web site (<http://www.dhss.state.mo.us/>) and clicking on "Monkeypox."

Contents

Description of Monkeypox and the Current Outbreak ...Page 3	Updated
Diagnostic Considerations and Human Case Definition ...Page 5	
Specimen Collection/Submission & Lab Testing in Patients With Suspected Monkeypox ...Page 8	
Clinical Management ...Page 9	
Use of Smallpox Vaccine & Treatment Considerations in a Monkeypox Outbreak ...Page 9	Updated
Smallpox Vaccine and Monkeypox (Q&As) ...Page 9	New
CDC Guidance for Use of Smallpox Vaccine, Cidofovir, & Vaccinia Immune Globulin (VIG) for Prevention and Treatment in the Setting of a Monkeypox Outbreak ...Page 10	
Infection Control & Exposure Management ...Page 17	Updated
Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection ...Page 17	Updated
Biosafety Guidelines for Laboratory Personnel Handling Human and Animal Specimens for Monkeypox Testing ...Page 21	
Guidance for Autopsy & Safe Handling of Human Remains of Monkeypox Patients ...Page 23	
Prevention ...Page 24	
Monkeypox Virus Infections and Blood and Plasma Donors ...Page 25	
Animal Case Definition ...Page 26	
Monkeypox Infections In Animals: Information for Veterinarians ...Page 28	Updated
Guidance for Veterinarians ...Page 28	Updated
Guidance for Necropsy & Animal Specimen Collection for Lab Testing (Animal Specimens) ...Page 31	
Monkeypox Infections in Animals: Guidance for Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers ...Page 32	Updated
What Pet Owners Should Know About Monkeypox ...Page 32	
What Owners of Pet Shops Should Know About Monkeypox ...Page 35	
Guidance for Persons Who Have Frequent Contact with Animals (Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers) ...Page 38	Updated
Quarantine & Euthanasia of Animals Affected by the Monkeypox Outbreak (Q&As) ...Page 41	New
Guidance to State/Local Governments for Removal of State- and Locally Imposed Quarantine Orders and the Euthanasia of Animals Affected by Monkeypox ...Page 43	
Information on Embargo & Prohibition of Certain Rodents & Prairie Dogs ...Page 45	

Description of Monkeypox and the Current Outbreak [July 24, 2003] **Updated**

Monkeypox is a rare viral disease that is found mostly in the rainforest countries of central and west Africa. The disease is called “monkeypox” because it was first discovered in laboratory monkeys in 1958. In Africa, serologic evidence of monkeypox infection has been found in a wide variety of nonhuman primates, rodents, and squirrels; monkeypox virus has been isolated from a species of squirrel in Zaire, but the role of any particular species as a reservoir has not been established.

In 1970, monkeypox was identified as the cause of a rash illness in humans in remote African locations. In early June 2003, monkeypox was reported in prairie dogs and humans in the United States. This is the first evidence of community-acquired monkeypox in the U.S.

Certain species of primates, rodents and lagomorphs are known to be susceptible to monkeypox infection. However, minimal data are available about the natural history of monkeypox in animals, and certain aspects of infection, such as the types of susceptible animal species, incubation period, and duration of infectiousness, are not known. Although no infections have been previously reported in dogs or cats, these species may also be susceptible to monkeypox. Because the types of animals that may become ill with monkeypox are currently unknown, it is prudent to assume that any mammal, including common household pets (e.g., dogs, cats) and “pocket pets” (e.g., hamsters or gerbils), can get monkeypox if exposed to another animal that is infected. (Additional information on monkeypox infection in animals is available in the sections below entitled “[Guidance for Veterinarians](#)” and “[Monkeypox Infections in Animals: Guidance for Pet Owners, Pet Shop Employees, Animal Handlers, and Animal Control Officers.](#)”)

As of July 24, 2003, a total of 72 cases of monkeypox have been reported to the Centers for Disease Control and Prevention (CDC) from Wisconsin (39), Indiana (16), Illinois (13), Missouri (2), Kansas (1), and Ohio (1); these include 37 (51%) cases laboratory-confirmed at CDC (including both Missouri cases) and 35 (49%) suspect and probable cases under investigation by state and local health departments.

Among 69 patients for whom data were available, 18 (26%) were hospitalized. The majority of patients were not seriously ill; some were hospitalized to facilitate proper isolation. There have been no deaths related to the outbreak; however, 2 patients have had a serious clinical illness. The first patient was a child with severe monkeypox-associated encephalitis who subsequently improved and was discharged after requiring hospitalization for 14 days. A second child was hospitalized with profound painful cervical and tonsillar adenopathy and diffuse pox lesions, including lesions in the oropharynx. Although the child had difficulty breathing and swallowing, mechanical ventilation was not required. The adenopathy peaked 5 days after rash onset and 7 days after onset of initial prodromal symptoms of general malaise, myalgia, and fever. The child was discharged from the hospital 6 days after admission. These cases indicate the potentially serious consequences of the disease.

It appears that most people who are ill with monkeypox in the U.S. got sick after close contact with infected prairie dogs that had been purchased as pets. Some patients may have been infected through contact with other infected animals, including a Gambian giant rat (purchased as an exotic pet) and a rabbit. (In addition, the possibility of human-to-human transmission in some cases cannot be excluded at this time. However, no cases of monkeypox that could be attributed exclusively to person-to-person contact have, at present, been confirmed.) If a person has not had close contact with an exotic animal then the risk that he/she might have monkeypox is very low.

Traceback investigations have implicated a shipment of animals from Ghana that was imported to Texas on April 9 as the probable source of introduction of monkeypox virus into the U.S. The shipment contained approximately 800 small mammals of nine different species, including six genera of African

rodents. These rodent genera included rope squirrels (*Funisciurus* sp.), tree squirrels (*Heliosciurus* sp.), Gambian giant rats (*Cricetomys* sp.), brushtail porcupines (*Atherurus* sp.), dormice (*Graphiurus* sp.), and striped mice (*Hybomys* sp.). Gambian rats from this shipment were kept in close proximity to prairie dogs at an Illinois animal vendor implicated in the sale of infected prairie dogs.

CDC laboratory testing of some animals by using PCR and virus isolation demonstrated that one Gambian giant rat, three dormice, and two rope squirrels from the April 9 importation were infected with monkeypox virus. Evaluation of other animals associated with the shipment is ongoing. Evidence of infection was found in some animals that had been separated from the rest of the shipment on the day of their arrival into the U.S., indicating early and possibly widespread infection among the remaining animals in the shipment. The laboratory investigation confirmed that multiple animal species are susceptible to infection with monkeypox virus. (For more information, see CDC. Update: multistate outbreak of monkeypox --- Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, 2003. *MMWR* 2003; 52(Dispatch):1-3 at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm52d702a1.htm>.)

There is additional concern that monkeypox might have spread more broadly to other animals housed together with the initially infected animals in pet stores, other animal facilities, and “pet swap” meets.

Etiologic agent: Monkeypox is caused by infection with monkeypox virus, which belongs to the orthopoxvirus group of viruses. Other orthopoxviruses that can cause infection in humans include variola (smallpox), vaccinia (used in smallpox vaccine), and cowpox viruses.

Transmission: People can get monkeypox from an infected animal through a bite or through direct contact with the infected animal’s blood, body fluids, or lesions. Although the current outbreak investigation in the U.S. has identified transmission of monkeypox from ill prairie dogs to persons by direct (intimate) contact, airborne transmission from ill animals with respiratory symptoms (e.g., cough) to persons cannot be excluded as a possibility. It is potentially possible, but unknown, if transmission can occur from ill animals to persons by contact with the ill animal’s bedding or cages; monkeypox virus may be transmitted through fomites on contaminated surfaces.

Monkeypox can be transmitted from person to person, but it is much less infectious than smallpox. The virus is thought to be spread by large respiratory droplets during direct and prolonged face-to-face contact. Monkeypox can also be transmitted by direct contact with the body fluids or lesions of an infected person, or with virus-contaminated objects, such as bedding or clothing. In addition, airborne transmission of monkeypox virus cannot be excluded, especially in patients presenting with cough.

In the recent monkeypox outbreak in the U.S., there has been, to date, no evidence of person-to-person transmission of the virus. However, recovery of monkeypox virus from skin lesions and tonsillar tissue demonstrates the potential for contact and droplet transmission, and at least a theoretical risk for airborne transmission. CDC has stated that accumulating experience in the U.S. suggests a relatively low risk of person-to-person transmission.

(The route of transmission from animal to animal is less clear. The virus might be transmitted to animals through droplets entering the nose, mouth, skin cuts, or scrapes or through consumption of infected animal tissue. It is unknown whether persons with monkeypox can spread the disease to their animals; however, persons with monkeypox should limit their contact with mammalian pets, including cats, dogs, and pocket pets, during their period of infectiousness.)

Period of Communicability: CDC now estimates that the period of communicability (i.e., exposure period for contacts) for humans may be from 1 day before onset of rash up to 21 days after rash or illness onset or when all rash lesions have scabbed over.

(The exact duration of infectiousness for animals with monkeypox is not known. CDC has estimated that the period of communicability [i.e., exposure period for contacts] for animals may be from 1 day before onset of illness up to 21 days after rash or illness onset or when the ill animal is removed from possible exposure with the contact, or when the animal's clinical illness ends and all rash lesions have scabbed over. Currently, capacity for laboratory testing of animals is limited, and available assays are not able to prove that animals are not infectious.)

Signs and Symptoms: In humans, the signs and symptoms of monkeypox are similar to those of smallpox, but usually milder. Unlike smallpox, monkeypox causes lymphadenopathy. CDC has stated that the incubation period is about 12 days (range 7-17 days). A more recent report has indicated that during the current outbreak, the median incubation period has been 12 days (range: 1-31 days).

Illness begins with nonspecific signs/symptoms which can include fever, headache, muscle aches, backache, lymphadenopathy, malaise, and exhaustion. Within 1-3 days (sometimes longer) after onset of fever, the patient develops a papular rash, often first on the face but sometimes initially on other parts of the body. The lesions usually develop through several stages before crusting and falling off. (Pictures of monkeypox lesions can be seen at <http://www.mcw.edu/derm/> and <http://research.marshfieldclinic.org/crc/monkeypox.asp>.) It should be noted that in the current outbreak, each of the laboratory-confirmed patients has reported a rash, and all but one reported at least one other clinical sign or symptom, including fever, respiratory symptoms, and/or lymphadenopathy.

The illness typically lasts 2-4 weeks. Studies of human monkeypox in rural central and west Africa – where people live in remote areas and are medically underserved – have reported case-fatality ratios of 1 - 10%.*

(The incubation period for monkeypox in animals is not known. Symptoms in animals that have been observed in the present outbreak include fever, cough, conjunctivitis with discharge from the eyes [eyes may appear cloudy or crusty], swelling in the limbs from enlarged lymph nodes, and a nodular or blister-like rash. Animals that have monkeypox also may just appear to be very tired and may not be eating or drinking. Some prairie dogs died, whereas others apparently recovered. Preliminary information suggests the Gambian giant rat under investigation experienced a much milder illness than that observed in prairie dogs, with no respiratory signs and possibly limited dermatologic involvement.)

*See also CDC. Update: multistate outbreak of monkeypox -- Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, 2003. *MMWR* 2003; 52(Dispatch):1-3 (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm52d702a1.htm>.) and Hutin YJF, Williams RJ, et al. Outbreak of human monkeypox, Democratic Republic of Congo, 1996 to 1997. *Emerging Infectious Diseases* 2001; 7(3):434-38. (<http://www.cdc.gov/ncidod/eid/vol7no3/hutin.htm>) In addition, information on monkeypox is available from CDC's monkeypox web site at www.cdc.gov/ncidod/monkeypox.

Diagnostic Considerations and Human Case Definition [July 2, 2003]

Persons seeking medical care with fever or rash should be asked about possible exposure to small mammals, especially pet prairie dogs and Gambian giant rats. If a patient with suspect monkeypox infection is seen as an outpatient or admitted to the hospital, infection control personnel (and the local public health agency or DHSS) should be notified immediately. A combination of Standard, Contact, and Airborne Precautions (www.cdc.gov/ncidod/hip/isolat/isolat.htm) should be applied in all health-care settings (more information on recommended infection control practices is available in the section below entitled "[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection](#)").

The current (July 2, 2003) **CDC Interim Case Definition** for human cases of monkeypox is the following:

The previous case definition (published June 17, 2003) has been updated as follows:

- Exclusion criteria have been revised
- Suspect, probable, and confirmed case classifications have been edited

Clinical Criteria

Rash (macular, papular, vesicular, or pustular; generalized or localized; discrete or confluent)

Fever (subjective or measured temperature of $\geq 99.3^{\circ}\text{F}$ [$\geq 37.4^{\circ}\text{C}$])

Other signs and symptoms

- Chills and/or sweats
- Headache
- Backache
- Lymphadenopathy
- Sore throat
- Cough
- Shortness of breath

Epidemiologic Criteria

- Exposure¹ to an exotic or wild mammalian pet² obtained on or after April 15, 2003, with clinical signs of illness (e.g., conjunctivitis, respiratory symptoms, and/or rash)
- Exposure¹ to an exotic or wild mammalian pet² with or without clinical signs of illness that has been in contact with either a mammalian pet³ or a human with monkeypox
- Exposure⁴ to a suspect, probable, or confirmed human case of monkeypox

Laboratory Criteria

- Isolation of monkeypox virus in culture
- Demonstration of monkeypox virus DNA by polymerase chain reaction testing of a clinical specimen
- Demonstration of virus morphologically consistent with an orthopoxvirus by electron microscopy in the absence of exposure to another orthopoxvirus
- Demonstration of presence of orthopoxvirus in tissue using immunohistochemical testing methods in the absence of exposure to another orthopoxvirus.

Case Classification

Suspect Case

- Meets one of the epidemiologic criteria

AND

- Fever or unexplained rash AND two or more other signs or symptoms with onset of first sign or symptom ≤ 21 days after last exposure meeting epidemiologic criteria

Probable Case

- Meets one of the epidemiologic criteria

AND

- Fever AND vesicular-pustular rash with onset of first sign or symptom ≤ 21 days after last exposure meeting epidemiologic criteria

Confirmed Case

- Meets one of the laboratory criteria

Exclusion Criteria

A case may be excluded as a suspect or probable monkeypox case if:

- An alternative diagnosis can fully explain the illness⁵ OR
- The case was reported on the basis of primary or secondary exposure to an exotic or wild mammalian pet or a human (see above under Epidemiologic Criteria) subsequently determined not to have monkeypox, provided other possible epidemiologic exposure criteria are not present OR
- A case without a rash does not develop a rash within 10 days of onset of clinical symptoms consistent with monkeypox⁶.
- The case is determined to be negative for non-variola generic orthopoxvirus by polymerase chain reaction testing of a well sampled rash lesion by the approved Laboratory Response Network (LRN) protocol.

1. Includes living in a household, petting or handling, or visiting a pet holding facility (e.g., pet store, veterinary clinic, pet distributor)

2. Includes prairie dogs, Gambian giant rats, and rope squirrels. Exposure to other exotic or non-exotic mammalian pets will be considered on a case-by-case basis; assessment should include the likelihood of contact with a mammal with monkeypox and the compatibility of clinical illness with monkeypox

3. Includes living in a household, or originating from the same pet holding facility as another animal with monkeypox

4. Includes skin-to-skin or face-to-face contact

5. Factors that might be considered in assigning alternate diagnoses include the strength of the epidemiologic exposure criteria for monkeypox, the specificity of the diagnostic test, and the compatibility of the clinical presentation and course of illness for the alternative diagnosis.

6. If possible, obtain convalescent-phase serum specimen from these patients. See specimen collection guidelines for details on collecting serum for convalescence evaluation.

For information on collection and submission of clinical specimens from suspected monkeypox cases, and on laboratory testing available through DHSS, see the next section entitled “[Specimen Collection/Submission & Laboratory Testing in Patients With Suspected Monkeypox.](#)”

Because suspected cases of monkeypox might actually represent varicella infections, patients should be assessed for history of varicella or having received varicella vaccine. Rash illness suspected to be monkeypox should be confirmed by laboratory evaluation, particularly if use of smallpox vaccine is being considered for purposes of monkeypox outbreak control.

(Veterinarians examining sick exotic animal species, especially prairie dogs and Gambian giant rats, should consider monkeypox. Veterinarians should also be alert to the development of illness in other animal species that may have been housed with ill prairie dogs or Gambian giant rats. For more information, see the section below entitled “[Guidance for Veterinarians.](#)”)

Specimen Collection/Submission & Laboratory Testing in Patients With Suspected Monkeypox [June 23, 2003]

If a patient is suspected to have monkeypox, immediately notify the local public health agency, or DHSS at 1-800-392-0272 (24 hours a day/7 days a week). DHSS’s Section of Disease Investigation will provide consultation to determine if specimens should be collected.

Suitable specimens are the following (all of these specimens should be collected from a suspected case):

- Vesicular or pustular tissue and fluid
- Roof of lesion or scabs
- Serum for serological tests (if indicated, a convalescent-phase serum sample should be obtained 4-6 weeks after collection of the acute-phase serum)

The Missouri State Public Health Laboratory (SPHL) will perform polymerase chain reaction (PCR) testing for non-variola orthopox virus on lesion material. A positive PCR test indicates the presence of non-variola orthopox virus DNA. Specimens will then be sent to CDC for confirmation and species identification. A negative PCR test indicates non-variola orthopox virus DNA was not detected.

Serum will not be tested by SPHL but will be sent to CDC if lesion material tests positive by PCR for orthopox virus DNA.

Procedures recommended for collection of samples for diagnosis of potential monkeypox disease are essentially the same as those for diagnosis of the related orthopoxvirus diseases, vaccinia and smallpox. Instructions for submitting specimens to SPHL (including the specimen submission form) are available at http://www.dhss.state.mo.us/Lab/bt/MO_monkeypoxinstructions.pdf. See also the following CDC document: “Interim Guidance for Collection of Diagnostic Specimens from Persons with Suspect Monkeypox” at <http://www.cdc.gov/ncidod/monkeypox/diagspecimens.htm>.

(For information on collection of specimens from animals suspected of being infected with monkeypox virus, see the section below entitled “[Monkeypox Infections In Animals: Information for Veterinarians.](#)”)

Clinical Management [June 25, 2003]

No data are available on the effectiveness of VIG in treatment of monkeypox complications. VIG has no proven benefit in the treatment of smallpox complications.⁹ It is unknown whether a person with severe monkeypox infection will benefit from treatment with VIG, however, its use may be considered in such instances. VIG can be considered for prophylactic use in an exposed person with severe immunodeficiency in T-cell function for whom smallpox vaccination following exposure to monkeypox is contraindicated.

No data are available on the effectiveness of cidofovir in treatment of human monkeypox cases. However, cidofovir has proven anti-monkeypox viral activity in *in vitro* and in animal studies.^{12,13} It is unknown whether a person with severe monkeypox infection will benefit from treatment with cidofovir, however, its use may be considered in such instances. Cidofovir has significant toxicity and should only be considered for treatment of severe monkeypox infections, not for prophylactic use.

Clinical consultation on the use of VIG and cidofovir is available from staff at each state health department in the affected states. In addition, clinical consultation is available from staff at CDC at 877-554-4625.

Use of Smallpox Vaccine & Treatment Considerations in a Monkeypox Outbreak [July 9, 2003]

Updated

Smallpox Vaccine and Monkeypox (Q&As) [July 9, 2003] **New**

How effective is the smallpox vaccine in preventing monkeypox?

Past data from Africa suggests that the smallpox vaccine is at least 85% effective in preventing monkeypox.

Why have smallpox vaccination recommendations changed?

When there is no "pox" outbreak, the smallpox vaccine is only available to certain people, including health-care workers and members of first response teams. It is not available to the general public.

However, when there is an outbreak, decisions about who should get the vaccine change because the disease poses an immediate risk to people. Given the outbreak of monkeypox now, the risk from the disease for people who are exposed (or could be exposed) to the monkeypox virus is believed to be greater than the risk posed by the smallpox vaccine. For that reason, CDC is advising that certain people get the smallpox vaccine to prevent monkeypox.

Who should get the smallpox vaccine to prevent monkeypox?

CDC is advising that people investigating monkeypox outbreaks and involved in caring for infected people or animals should get a smallpox vaccine to protect against monkeypox. People who have had close or intimate contact with individuals or animals that have monkeypox also should get the vaccine. These people can get the vaccine up to 14 days after they have been exposed to monkeypox.

Are there some people who should not get smallpox vaccine even if they have been exposed to monkeypox?

Yes. People with weakened immune systems due to treatments or certain health conditions (e.g. cancer treatment, organ transplant, HIV, and primary immune deficiency disorders) should **NOT** get the smallpox

vaccine, even if they have been exposed to monkeypox. People who have had life-threatening allergies to latex or to smallpox vaccine or any of its components (polymyxin B, streptomycin, chlortetracycline, neomycin) should also NOT get the smallpox vaccine, even if they have been exposed to monkeypox. For these people, the risk from the smallpox vaccine may be more than the risk posed by monkeypox disease. People who aren't sure about their immune status or if they are allergic to the vaccine should ask a health-care provider whether it is OK to get the vaccine.

The other health conditions that normally mean people should not get the smallpox vaccine (age, pregnancy, skin conditions, etc.) no longer apply in the context of monkeypox exposure. Visit the CDC monkeypox website (<http://www.cdc.gov/ncidod/monkeypox/index.htm>) for more information on the smallpox vaccine.

Is it too late to get the vaccine after you've been exposed to the monkeypox virus?

No, it is not too late. However, the quicker an exposed person gets the vaccine, the better. CDC recommends that the vaccine be given within 4 days from the date of exposure in order to prevent onset of the disease. If given between 4 to 14 days after the date of exposure, vaccination may reduce the symptoms of the disease, but may not prevent the disease.

Who decided to offer smallpox vaccination to people exposed to monkeypox?

CDC recommendations on smallpox vaccination for people exposed to monkeypox were developed in consultation with members of the Advisory Committee on Immunization Practices (ACIP) and other experts. They will continue to be reviewed and updated by both of these groups.

What are the risks of smallpox vaccine compared to the risks of monkeypox disease?

For most persons who have been exposed to monkeypox, the risks from monkeypox disease are greater than the risks from the smallpox vaccine. Monkeypox is a serious disease. It causes fever, headache, muscle aches, backache, swollen lymph nodes, a general feeling of discomfort, exhaustion, and severe rash. Studies of monkeypox in West Africa—where people live in remote areas and are medically underserved—showed that the disease killed 1% to 10% of people infected. In contrast, most people who get the smallpox vaccine have only expected minor reactions, like mild fever, tiredness, swollen glands, and redness and itching at the place where the vaccine is given. However the smallpox vaccine does have more serious risks too. Based on past experience, it is estimated that between 1 and 2 people out of every 1 million people vaccinated will die as a result of life-threatening reactions to the vaccine.

I have had the smallpox vaccine, should I get it again?

If you have been exposed to the monkeypox virus and have not received the smallpox vaccine within the last 3 years, you should get the smallpox vaccine. The sooner you get the vaccine, the more effective it will be in protecting you against the monkeypox virus.

For more about recommendations for the prevention of monkeypox see the next section entitled “CDC Guidance for Use of Smallpox Vaccine, Cidofovir, & Vaccinia Immune Globulin (VIG) for Prevention and Treatment in the Setting of a Monkeypox Outbreak.”

CDC Guidance for Use of Smallpox Vaccine, Cidofovir, & Vaccinia Immune Globulin (VIG) for Prevention and Treatment in the Setting of a Monkeypox Outbreak [June 25, 2003]

This interim guidance updates the June 12, 2003, interim guidance on the use of smallpox vaccine, cidofovir, and vaccinia immune globulin (VIG) for purposes of monkeypox outbreak control in affected states. The principal changes include a revision of the definition of close contact with an ill animal, vaccination of clinical laboratory workers handling specimens from ill animals and persons infected with

monkeypox virus, and instructions for reporting smallpox vaccine-related serious adverse events to the Vaccine Adverse Event Reporting System (VAERS).

In most instances, only limited data are available on which to directly base recommendations and thus the guidance is primarily based on expert opinion. This interim CDC guidance was developed using the best available information about the benefits and risks of smallpox vaccination, VIG, and cidofovir for prevention and management of smallpox, monkeypox and complications of vaccinia infection. Smallpox vaccine for controlling outbreaks of monkeypox would be available under an investigational new drug (IND) protocol sponsored by CDC.

Limited information is available on efficacy of smallpox vaccination for prevention of monkeypox. The data suggest that pre-exposure smallpox vaccination is highly effective ($\geq 85\%$) in protecting persons exposed to monkeypox from disease.¹⁻⁵ No information is available on the efficacy of post-exposure vaccination. Data that suggest smallpox vaccination following exposure to smallpox is effective in preventing or ameliorating disease, suggest that post-exposure smallpox vaccination should have similar impact against monkeypox. Data from investigations in Africa in the 1980s suggested that in household setting, secondary transmission occurred to about 8 – 15% of contacts. Among infected human cases, reported mortality rates have ranged most frequently from 1-10%¹⁻⁸; the risk of death from smallpox vaccine is estimated to be 1-2 per million vaccinees.⁹

Available data on transmission from monkeypox cases are based on studies in Africa. Person-to-person transmission is thought to occur primarily by direct contact and may occur by respiratory droplet spread. Transmission of monkeypox within hospitals has been described, albeit rarely. In the absence of data, extrapolating from smallpox outbreaks where person-to-person airborne transmission has been clearly described, person-to-person airborne transmission from (human) monkeypox cases cannot be excluded as a possibility, especially in patients presenting with cough. Similarly, although the current outbreak investigation in the United States has identified transmission of monkeypox from ill prairie dogs to persons by direct (intimate) contact, airborne transmission from ill prairie dogs with respiratory symptoms (e.g., cough) to persons cannot be excluded as a possibility. It is potentially possible, but unknown, if transmission can occur from ill prairie dogs to persons by contact with the ill animal's bedding or cages; monkeypox virus may be transmitted through fomites on contaminated surfaces.

Because of the potential seriousness of this disease, CDC has developed interim guidance, which attempts to balance the risks of smallpox vaccination against the risks posed by exposure to monkeypox infection. This interim guidance will be re-evaluated as more information becomes available.

It is important that vaccinators, as currently occurs in the pre-event smallpox vaccination program, screen potential vaccinees for precautions and contraindications to smallpox vaccination and evaluate vaccination sites for a successful vaccination (i.e., a major reaction at the site 6-8 days after vaccination). Persons without a successful vaccine take should be revaccinated within 2 weeks of the most recent exposure to monkeypox. State and local health departments should provide information on how vaccinees should seek consultation on evaluation of vaccination sites for major reactions or for potential complications of vaccination.

Rash illnesses suspected to be monkeypox should be confirmed by laboratory evaluation, which, in addition to determining the presence of monkeypox, should have the capability to detect varicella, vaccinia and other relevant viruses. Laboratory confirmation of monkeypox cases is particularly important before recommending vaccination to persons with close or intimate contact with a monkeypox case and considered to have contraindications to smallpox vaccination in the pre-event smallpox vaccination (e.g., pregnant women, persons with eczema, and children aged <1 year). Intimate contact refers to contact resulting in exposure to body fluids or lesions of ill persons or ill animals. The period of communicability

(i.e., exposure period for contacts) for humans may be from 1 day before onset of rash up to 21 days after rash or illness onset or when all rash lesions have scabbed over. The period of communicability (i.e., exposure period for contacts) for animals may be from 1 day before onset of illness up to 21 days after rash or illness onset or when the ill animal is removed from possible exposure with the contact, or when the animal's clinical illness ends and all rash lesions have scabbed over. As general guidance, for purposes of smallpox exposure (for human-to-human transmission), close contact has been defined as ≥ 3 hours of direct (face-to-face) exposure within 6 feet; this is reasonable guidance for exposure to monkeypox from humans as well. In animal care settings, close contact has been defined as direct exposure within 6 feet of an animal suspected to have monkeypox with respiratory symptoms such as nasal discharge, cough, or conjunctivitis in a setting where the animal has been manipulated (e.g., an exam room). However, judgment must be applied to determine the significance of contact in individual exposure situations.

1 - Should persons investigating suspected human and animal monkeypox cases receive smallpox vaccination? If so, should a prior recent history of smallpox vaccination with a confirmed take be required or is it acceptable to vaccinate these individuals as they depart for the investigation?

Ideally investigators of suspected monkeypox cases should have received smallpox vaccination within the past 1-3 years. When possible, priority should be given to using investigators, veterinarians, and animal control personnel who previously were vaccinated and who had a confirmed take. Ideally the vaccination site should have crusted over before deployment. However, if this is not feasible these individuals may be vaccinated immediately before deploying for the field investigation. Unvaccinated investigators currently involved in field investigations or who have been recently involved in such work should be vaccinated as soon as possible, preferably within 4 days from initial direct exposure. Any investigator with an active vaccination site that is not healed should follow the precautions advised for health care workers (HCWs) with regard to vaccination site care to avoid potential contamination of field samples or transmission of vaccinia to others.⁹

Field investigators of suspected cases of monkeypox should observe recommended standard, contact, and air-borne infection control precautions even if vaccinated. These include the use of recommended personal protection equipment (currently N95 or comparable respirator) when appropriate. See the section below entitled "[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection.](#)"

2 - Should HCWs who care for suspected cases of monkeypox be vaccinated?

A. Previously or currently exposed HCWs

HCWs currently caring for confirmed monkeypox cases or who have been recently involved in such care should be vaccinated. Vaccination should occur as soon as possible after confirmed exposure. Vaccination is recommended for persons who are within 4 days of initial direct (intimate or close) exposure and should be considered only for persons who are within 2 weeks of most recent exposure. Vaccination sites should be managed as recommended for HCWs in the pre-event smallpox vaccination program.⁹ Persons without a vaccine take by day 7 should only be revaccinated if within 2 weeks of most recent exposure.

B. HCWs who may be asked to care for monkeypox patients in the future

Ideally, HCWs selected to care for suspected monkeypox cases should not have any of the contraindications to smallpox vaccination in the pre-event smallpox vaccination setting.^{10, 11}

When possible, priority should be given to having HCWs who were previously vaccinated, with confirmed takes, care for patients with suspected monkeypox. When such workers are unavailable, HCWs may be vaccinated immediately prior to beginning their clinical care duties. Vaccination sites should be managed as recommended for HCWs in the pre-event vaccination program.⁹

HCWs who care for suspected cases of monkeypox should continue to observe recommended standard, contact, and air-borne infection control precautions including use of personal protective equipment (currently N95 or comparable respirator)¹⁰ when appropriate, even if vaccinated.

C. Clinical laboratory workers

See the guidance from CDC at <http://www.cdc.gov/ncidod/monkeypox/lab.htm>.

3 – Should smallpox vaccination of contacts of human monkeypox cases be recommended? If so, how is contact defined (e.g., family, classroom etc.) and what is the recommended interval for vaccination following exposure?

Close contacts, defined as household contacts as well as others who have had close or intimate contact with confirmed human cases, and who are within 4 days of initial direct exposure to a monkeypox case should be vaccinated. Vaccination should be considered for persons who are within 2 weeks of most recent exposure. As general guidance, for purposes of smallpox exposure, close contact has been defined as ≥ 3 hours of direct exposure within 6 feet and this is reasonable guidance for monkeypox exposure as well. Intimate contact refers to contact resulting in exposure to body fluids or lesions of affected persons. However, judgment must be applied to determine the significance of contact in individual exposure situations. State and local health departments should be consulted regarding decisions about vaccination of contacts, and in particular be consulted for contacts who may not meet the strict definitions of close or intimate contact above, especially in child care, school, or health care settings.

Vaccination sites should be managed as recommended for HCWs in the pre-event smallpox vaccination program.⁹ Persons who care for recently vaccinated children should be particularly vigilant to observe recommended standard and contact infection control precautions with the vaccination site. Persons without a vaccine take by day 7 should only be revaccinated if within 2 weeks of most recent exposure.

4 – Should smallpox vaccination be recommended for persons who have been exposed to a recently acquired prairie dog or other small mammals from implicated distributors?

Smallpox vaccination should be recommended for persons who have, within the past 4 days, had direct physical (intimate) contact with ill prairie dogs or other ill small mammals meeting the probable or confirmed case definitions for monkeypox from implicated distributors acquired since April 15 within the affected areas (see the section below entitled “[Animal Case Definition](#)”). Vaccination should be considered for persons who are within 2 weeks of most recent exposure. In addition, vaccination can be considered for persons who have close contact with an ill animal that meets the probable or confirmed animal case definition. Close contact is defined as direct exposure within 6 feet of a probable or confirmed monkeypox case in an animal with respiratory symptoms such as nasal discharge, cough, or conjunctivitis in a setting where the animal has been manipulated (e.g., an exam room). Smallpox vaccination is not recommended for persons exposed to a healthy animal.

These recommendations may change should evidence show that other symptomatically ill small mammals pose significant risk for human monkeypox.

Vaccination sites should be managed as recommended for HCWs in the pre-event smallpox vaccination program.⁹ Persons who care for recently vaccinated children should be particularly vigilant to observe recommended standard and contact infection control precautions with the vaccination site. Persons without a vaccine take by day 7 should only be revaccinated if within 2 weeks of most recent exposure.

Veterinary health care workers should observe recommended infection control practices (see the section below entitled “[Guidance for Veterinarians](#)”) including use of personal protective equipment when appropriate, even if vaccinated. It is anticipated that fit-tested N95 respirators will not be available in most veterinary facilities; when currently N95 or comparable respirators are unavailable, surgical masks should be worn to protect against transmission through contact or large droplets. Exposed veterinarians and staff without N95 (or comparable) respirator protection who have direct or close contact to animals with monkeypox should be vaccinated according to the guidelines. See the section below entitled “[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection](#).” See also the section below entitled “[Biosafety Guidelines for Laboratory Personnel Handling Human and Animal Specimens for Monkeypox Testing](#).”

5 – What contraindications to smallpox vaccination should be observed for persons exposed to monkeypox infections?

The nature of exposure should be assessed carefully for HCWs, household, close or intimate contacts who have been exposed within the past 2 weeks to a probable or confirmed animal case or confirmed human case of monkeypox, but who have contraindications to smallpox vaccine receipt in the pre-event smallpox setting.^{10, 11} If there are difficulties in obtaining rapid laboratory confirmation, the state health department should be urgently consulted. The risk of monkeypox disease for persons with a close or intimate exposure to confirmed monkeypox cases is believed to be greater than the risk of adverse events resulting from vaccinia exposure for most persons for whom smallpox vaccination would be otherwise contraindicated in the pre-event smallpox vaccination setting. In the post-exposure setting, the benefit of vaccination outweighs the risk of vaccination. In this setting, most contraindications are considered precautions to vaccination. In persons with close or intimate exposure within the past 2 weeks to a confirmed human case or probable or confirmed animal case of monkeypox, neither age, pregnancy, nor a history of eczema are contraindications to receipt of smallpox vaccination. These conditions are precautions and not contraindications. Active eczematous disease is more concerning, but in instances when the potential vaccinee has had true close or intimate exposure, the risk of contracting monkeypox would likely still be greater than the risk of complications of smallpox vaccination. Appropriate site care should be used to prevent transmission of smallpox vaccine (vaccinia virus) from vaccinated persons to other non-vaccinated household members.⁹

Smallpox vaccination is still contraindicated for:

1. Persons who have severe immunodeficiency in T-cell function, defined as:
 - HIV-infected adults with CD4 lymphocyte count less than 200 (or age appropriate equivalent counts for HIV infected children);

- Solid organ, bone marrow transplant recipients or others currently receiving high dose immunosuppressive therapy (i.e. 2 mg/kg body weight or a total of 20 mg/day of prednisone or equivalent for persons whose weight is >10 kg, when administered for >2 weeks); and
- Persons with lymphosarcoma, hematological malignancies, or primary T-cell congenital immunodeficiencies.

2. Persons with life-threatening allergies to latex or to smallpox vaccine or any of its components (polymyxin B, streptomycin, chlortetracycline, neomycin).

These persons have a risk of severe complications from smallpox vaccination that may approach or exceed the risk of disease from monkeypox exposure. Consultation with state and local health departments and CDC should be sought regarding judgments about vaccination of such persons in the post-exposure setting.

6 - What is the role of cidofovir and vaccinia immune globulin (VIG) in treatment and prophylaxis of these cases?

No data are available on the effectiveness of VIG in treatment of monkeypox complications. VIG has no proven benefit in the treatment of smallpox complications.⁹ It is unknown whether a person with severe monkeypox infection will benefit from treatment with VIG, however, its use may be considered in such instances. VIG can be considered for prophylactic use in an exposed person with severe immunodeficiency in T-cell function for whom smallpox vaccination following exposure to monkeypox is contraindicated.

No data are available on the effectiveness of cidofovir in treatment of human monkeypox cases. However, cidofovir has proven anti-monkeypox viral activity in *in vitro* and in animal studies.^{12,13} It is unknown whether a person with severe monkeypox infection will benefit from treatment with cidofovir, however, its use may be considered in such instances. Cidofovir has significant toxicity and should only be considered for treatment of severe monkeypox infections, not for prophylactic use.

Clinical consultation on the use of VIG and cidofovir is available from staff at each state health department in the affected states. In addition, clinical consultation is available from staff at CDC at 877-554-4625.

7 - Should pre-exposure smallpox vaccination be offered to veterinarians, veterinary staff, and animal control officers in the affected states?

Similar to health care workers, at this time pre-exposure smallpox vaccination is not recommended for unexposed veterinarians, veterinary staff, and animal control officers in the affected areas, but routine use of appropriate standard, contact and air-borne infection control measures should be stressed.

Persons who may be involved in field investigations involving potentially infected animals should be vaccinated in advance ([see question 1](#)). This recommendation will be re-evaluated as more information becomes available.

Laboratory workers (e.g., veterinary pathologists) at designated reference laboratories who handle specimens from ill prairie dogs or other ill small mammals meeting the probable or confirmed case definitions for monkeypox from implicated distributors acquired since April

15 within the affected states should be vaccinated as recommended for field investigators or health care workers anticipated to have future contact with suspected monkeypox cases.

8 –Reporting of adverse events associated with smallpox vaccination:

Serious adverse events after smallpox vaccination¹⁴ should be reported to the Vaccine Adverse Event Reporting System (VAERS). Reports can be submitted through a secure Internet-based system (see <https://secure.vaers.org/VaersDataEntryintro.htm>), printable VAERS forms (see http://www.vaers.org/pdf/vaers_form.pdf), or postage-paid forms can be obtained by calling 800-822-7967 (toll-free). Submission of VAERS reports by Internet is encouraged to expedite processing and data entry.

Completed forms can be faxed to 877-721-0366 (toll-free) or mailed to P.O. Box 1100, Rockville, MD 20894-1100. Additional information related to VAERS reporting can be obtained by calling 800-822-7967 or by e-mail at info@vaers.org.

References:

1. Arita I, Jezek Z, Khodakevich L, Ruti K. Human monkeypox: a newly emerged orthopoxvirus zoonosis in the tropical rain forests of Africa. *Am J Trop Med Hyg.* 1985 Jul;34(4):781-9.
2. Fine PE, Jezek Z, Grab B, Dixon H. The transmission potential of monkeypox virus in human populations. *Int J Epidemiol.* 1988 Sep;17(3):643-50.
3. Jezek Z, Grab B, Paluku KM, Szczeniowski MV. Human monkeypox: disease pattern, incidence and attack rates in a rural area of northern Zaire. *Trop Geogr Med.* 1988 Apr;40(2):73-83.
4. Jezek Z, Marennikova SS, Mutumbo M, Nakano JH, Paluku KM, Szczeniowski M. Human monkeypox: a study of 2,510 contacts of 214 patients. *J Infect Dis.* 1986 Oct;154(4):551-5.
5. Jezek Z and Fenner F. Human Monkeypox. *Mongraphs in Virology.* Vol. 17. 1988. Karger press, New York. Melnick J, Ed.
6. Breman JG. Monkeypox: an emerging infection in humans? Chapter in *Emerging Infections 4*, edited by Scheld WM, Craig WA and Hughes JM, 2000 ASM press, Washington, DC.
7. Fenner F, Henderson DA, Arita I, Jezek Z and Ladnyi LD. Smallpox and its eradication. Chapter 29, *Human monkeypox and other poxvirus infections of man.* WHO, 1988. (<http://www.who.int/emc/diseases/smallpox/Smallpoxeradication.html>)
8. Hutin YJ, Williams RJ, Malfait P, Pebody R, Loparev VN, Ropp SL, Rodriguez M, Knight JC, Tshioko FK, Khan AS, Szczeniowski MV, Esposito JJ. Outbreak of human monkeypox, Democratic Republic of Congo, 1996 to 1997. *Emerg Infect Dis* 2001;7(3):434-8. (<http://www.cdc.gov/ncidod/eid/vol7no3/hutin.htm>)
9. CDC. Recommendations for using smallpox vaccine in the pre-event vaccination program: Supplemental recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Healthcare Infection Control Practices Advisory Committee (HICPAC). *MMWR* 2003; 52 (RR07); 1-16. (<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5207a1.htm>)

10. CDC. Smallpox Vaccination and adverse reactions: Guide for clinicians. MMWR 2003; 52 (RR-4); 1-28. (<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5204a1.htm>)
11. CDC. Notice to Readers: Supplemental Recommendations on adverse events following smallpox vaccine in the pre-event vaccination program: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2003; 52:282-284. (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5213a5.htm>)
12. Huggins J. Abstract presented at the Sixth Symposium on Antiviral Chemotherapy: New Directions for Clinical Applications and Research. University of California-San Francisco, San Francisco, California, April 18-20, 2002.
13. De Clercq E. Cidofovir in the treatment of poxvirus infections. Antiviral Res 2002;55(1):1-13.
14. CDC. Smallpox vaccination and adverse reactions: a guide for clinicians. MMWR 2003;52(RR-4):1-28. (<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5204a1.htm>)

Infection Control & Exposure Management [July 18, 2003] **Updated**

Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection [July 18, 2003] **Updated**

CDC is updating previous interim guidance concerning infection control precautions and exposure management in the health-care and community settings. The guidance will be further updated as additional information about the epidemiology of disease transmission is better understood.

Limited data on transmission of monkeypox virus are available from studies conducted in Africa. Person-to-person transmission is believed to occur primarily through direct contact and also by respiratory droplet spread. Transmission of monkeypox within hospitals has been described, albeit rarely. Extrapolating from smallpox for which airborne transmission has been clearly described, airborne transmission of monkeypox virus cannot be excluded, especially in patients presenting with cough.

To date in the United States there has been no evidence of person-to-person transmission of monkeypox. However, recovery of monkeypox virus from skin lesions and tonsillar tissue demonstrates the potential for contact and droplet transmission, and at least a theoretical risk for airborne transmission.

The following modification of CDC's infection control guidance is based on the accumulating experience in the United States that suggests a relatively low risk of person-to-person transmission. All health-care settings, i.e., hospitals, emergency departments, physician offices, have the capacity to care for monkeypox patients and protect health-care workers and other patients from exposure.

Infection Control: General Precautions

Persons seeking medical care with fever and vesiculopustular rash should be asked about possible exposure to wild or exotic mammalian pets (e.g., prairie dogs and rodents imported from Africa) or persons with monkeypox. If a patient with suspect monkeypox infection is seen as an outpatient or admitted to the hospital, infection control personnel should be notified immediately. A combination of Standard, Contact, and Droplet Precautions (see <http://www.cdc.gov/ncidod/hip/isolat/isolat.htm>) should be applied in all health-care settings. In addition, because of the theoretical risk of airborne transmission, Airborne Precautions should be applied whenever possible.

These include:

1. Hand hygiene after all contact with an infected patient and/or the environment of care.
2. Use of gown and gloves for patient contact
3. Protection from virus spread through droplets or aerosols. Use of a NIOSH-certified N95 (or comparable) filtering disposable respirator that has been fit-tested for the health-care worker is preferred, especially for extended contact in the inpatient setting.¹ If N95 or comparable respirators are not available for health-care workers, then surgical masks should be worn to protect against transmission through contact or large droplets. The respirator or mask should be applied before entering the patient room.
4. Eye protection (e.g. face shield or goggles) if splash or spray of body fluids is likely, as recommended for Standard Precautions
5. Contain and dispose of contaminated waste (e.g., dressings) in accordance with facility-specific guidelines for infectious waste or local regulations pertaining to household waste.
6. Use care when handling soiled laundry (e.g., bedding, towels, personal clothing) to avoid contact with lesion exudates. Soiled laundry should not be shaken or otherwise handled in a manner that may aerosolize infectious particles.
7. Handle used patient-care equipment in a manner that prevents contamination of skin and clothing. Ensure that used equipment has been cleaned and reprocessed appropriately.
8. Ensure that procedures are in place for cleaning and disinfecting environmental surfaces in the patient care environment. Any EPA-registered hospital detergent-disinfectant currently used by health-care facilities for environmental sanitation may be used. Manufacturer's recommendations for use-dilution (i.e., concentration), contact time and care in handling should be followed.

Patient Placement

Outpatient settings. Patients who present to an emergency room or outpatient clinical setting with fever and vesiculopustular rash should be placed in a private examination room as soon as possible. (Particularly in the absence of a known association with other monkeypox cases, in addition to monkeypox, the differential diagnosis should include chickenpox, vaccinia in a person recently vaccinated against smallpox, and even the unlikely possibility of smallpox.) If a negative pressure room is available, it should be used. Before these precautions can be implemented, or in areas in which personal protective equipment or separation from others is not feasible (e.g., residential settings in which health-care may be provided), place a surgical mask over the patient's nose and mouth (if tolerated) and cover exposed skin lesions with a sheet or gown.

Inpatient settings. In this outbreak, the majority of patients with monkeypox have not required hospitalization for medical management. Patients who do require hospitalization should be placed in a negative pressure isolation room on Contact, Droplet, and Airborne Precautions. If a negative pressure room is not available, a private room should be used.

Vaccination of Health-Care Workers and Household Contacts of Suspected Cases of Monkeypox

Vaccination with smallpox vaccine is recommended for health care workers and household contacts of confirmed monkeypox cases. Whenever possible, preference for providing care to suspected or confirmed monkeypox patients should be given to vaccinated health-care workers and health-care workers without contraindications to vaccination in the pre-event smallpox vaccination setting. Pre-exposure vaccination is preferred, however, vaccination can be administered after laboratory confirmation of an infection is obtained and when vaccine is available (see the above section entitled "[CDC Guidance for Use of](#)

[Smallpox Vaccine, Cidofovir, & Vaccinia Immune Globulin \(VIG\) for Prevention and Treatment in the Setting of a Monkeypox Outbreak](#)⁹).

Irrespective of vaccination status, health-care workers and household contacts who care for suspected or confirmed cases of monkeypox should observe recommended infection control precautions.

Monitoring of Exposed Health-Care Personnel

Health-care workers who have unprotected exposures (i.e. were not wearing PPE) to patients with monkeypox need not be excluded from duty, but should undergo active surveillance for symptoms, including measurement of body temperature at least twice daily for 21 days following the exposure. Prior to reporting for duty each day, the health-care worker should be interviewed regarding evidence of fever or rash. Health-care workers who have cared for or otherwise been in contact with exposed to monkeypox patients while adhering to recommended infection control precautions do not need to undergo active monitoring. Any health-care worker who has cared for a monkeypox patient should be alert to the development of symptoms that could suggest monkeypox, especially within the 21-day period after the last date of care, and should notify infection control and/or occupational health, or their designees, to be guided about a medical evaluation.

Home Management

Patients who do not require hospitalization for medical indications may be isolated at home. The ability to implement isolation and infection control measures in the home is likely to vary, based on whether the patient is a child or adult with monkeypox, whether multiple persons in the home are infected, the number of persons residing in the home, and the nature and extent of lesions in each case. The following principles should be considered and adopted to the extent possible in the home setting.

1. Home isolation. Persons with monkeypox should not leave the home except as required for follow-up medical care. They also should avoid going outdoors if contact with wild or domestic mammals is possible. Unexposed persons who do not have an essential need to be in the home should not visit. Household members who are not ill should limit contact with the person with monkeypox. Persons with extensive lesions that cannot be easily covered (excluding facial lesions) or draining/weeping lesions or respiratory symptoms (e.g., cough, sore throat, or rhinorrhea) should be isolated in a room or area separate from other family members when possible.
2. Persons with monkeypox should wear a surgical mask, especially those who have respiratory symptoms (e.g., cough, shortness of breath, sore throat). If this is not feasible (e.g., a child with monkeypox), other household members should consider wearing a surgical mask when in the presence of the person with monkeypox.
3. Skin lesions should be covered to the extent possible (e.g., long sleeves, long pants) to minimize risk of contact with others.
4. Disposable gloves should be worn for direct contact with weeping lesions and disposed after use.
5. Hand hygiene (i.e., hand washing with soap and water or use of an alcohol-based hand rub) should be performed by infected persons and household contacts after touching body sites, clothing, linens, or environmental surfaces that may have had contact with infectious lesions.
6. Laundry (e.g., bedding, towels, clothing) may be washed in a standard washing machine with warm water and detergent; bleach may be added but is not necessary. Care should be used when handling soiled laundry to avoid direct contact with contaminated material. Soiled laundry should not be shaken or otherwise handled in a manner that may aerosolize infectious particles.

7. Dishes and other eating utensils should not be shared but segregation of specific utensils for use by the infected person is not necessary. Soiled dishes and eating utensils should be washed in a dishwasher or by hand with warm water and soap
8. Contaminated surfaces should be cleaned and disinfected. Standard household cleaning/disinfectants may be used in accordance with manufacturer's instructions.
9. Dressing, bandages, and other materials contaminated with lesion drainage should be bagged and placed in another container for disposal with other household waste.

Duration of Isolation Precautions

Decisions regarding discontinuation of isolation precautions should be made only after consultation with the local or state health department.

For individuals with vesiculopustular rash, isolation precautions, either in health-care facilities or home settings, should be continued until all lesions are crusted. Following the discontinuation of isolation precautions, affected individuals should avoid close contact with immunocompromised persons until all crusts have separated. Immunocompromised persons include those whose immune mechanisms are deficient because of immunologic disorders (e.g., human immunodeficiency virus [HIV] infection or congenital immune deficiency syndrome); chronic diseases (e.g., diabetes, cancer, emphysema, or cardiac failure); or immunosuppressive therapy (e.g., radiation, cytotoxic chemotherapy, anti-rejection medication, or steroids).

For individuals who develop symptoms (i.e., fever, sore throat, cough) without rash, isolation precautions should be continued for 7 days after fever onset. If rash does not develop during this time, isolation precautions may be discontinued. Affected individuals should continue symptom surveillance for an additional 14 days. If symptoms return or if rash develops the local or state health department should be notified immediately. Affected individuals should not donate blood, cells, tissue, organs, breast milk or semen while ill or are under symptom surveillance.

Asymptomatic Contacts

Asymptomatic contacts to animals or humans suspected to have monkeypox should be placed under symptom surveillance for 21 days after their last exposure. Symptoms of concern include fever (temperature $\geq 99.3^{\circ}\text{F}$), sore throat, cough, or skin rash. Contacts should monitor their temperature twice daily. In addition, they should maintain daily telephone contact with designated health department personnel. If resources permit, closer monitoring is desirable.

Asymptomatic contacts should not donate blood, cells, tissue, organs, breast milk or semen while they are under symptom surveillance.

Asymptomatic contacts should continue routine daily activities (e.g., go to work, school) but should remain close to home for the duration of surveillance. However, it may be prudent to exclude pre-school children from daycare or other group settings.

1. Respirators should be used in the context of a complete respiratory protection program in accordance with OSHA regulations. This includes training and fit testing to ensure a proper seal between the respirator's sealing surface and the wearer's face. Detailed information on respirator programs, including fit test procedures, is available at <http://www.osha.gov/SLTC/etools/respiratory/>. Where possible, a qualitative fit test should be conducted for N95 respirators; detailed information on fit testing is available at <http://www.osha.gov/SLTC/etools/respiratory/oshfiles/fittesting1.html>.

Biosafety Guidelines for Laboratory Personnel Handling Human and Animal Specimens for Monkeypox Testing [June 23, 2003]

This document provides interim biosafety guidance for laboratory personnel working with specimens from humans or animals with suspected or confirmed monkeypox infection. These guidelines should be used by laboratory directors and/or safety officers to perform risk assessments and develop safety protocols that take into consideration the unique facility and personnel characteristics of their particular institutions.

General Considerations

Effective communication between specimen collection teams and laboratory staff is essential in maximizing safety in the manipulation of these specimens. This is especially relevant in hospital settings, where laboratories routinely process specimens from patients with a variety of infectious and/or noninfectious conditions. A labeling system should be in place to clearly indicate specimens, such as those from monkeypox patients, that require special handling. Specific protocols for specimen collection are available from DHSS and CDC (See the above section entitled "[Specimen Collection/Submission & Laboratory Testing in Patients With Suspected Monkeypox](#)." See also the CDC documents entitled "Interim Guidance for Collection of Diagnostic Specimens from Persons with Suspect Monkeypox" at <http://www.cdc.gov/ncidod/monkeypox/diagspecimens.htm>, and "Interim Guidance for Necropsy and Animal-Specimen Collection for Laboratory Testing" at <http://www.cdc.gov/ncidod/monkeypox/necropsy.htm>.)

When possible, successfully vaccinated (i.e., smallpox vaccination within the past 3 years) persons should perform laboratory work that involves handling specimens that may contain monkeypox virus. However, vaccination is not an absolute requirement for handling specimens. When only non-immunized persons are available, additional personal protection equipment and practices should be used to further reduce the risk for exposures. Smallpox vaccine is not recommended for personnel handling and processing routine clinical specimens from monkeypox patients (e.g., urine for urinalysis, blood for CBC, chemistries, microbiology).

Laboratory exposures to poxviruses occur primarily through needle-stick injuries, other direct contact with the specimen, or aerosols that may be generated by laboratory procedures. Sharps should not be included with any specimens, and should be disposed of in appropriate puncture-resistant containers for autoclave of infectious waste. Guidelines for monitoring health-care workers who have unprotected exposures to patients with monkeypox or laboratory specimens from these patients can be found in the preceding section entitled "[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection](#)." Post-exposure vaccination may be appropriate in cases of direct exposure to monkeypox specimens. Guidelines for the use of smallpox vaccine can be found in the above section entitled "[CDC Guidance for Use of Smallpox Vaccine, Cidofovir, & Vaccinia Immune Globulin \(VIG\) for Prevention and Treatment in the Setting of a Monkeypox Outbreak](#)."

Use of a certified Class II Biological Safety Cabinet (BSC) is recommended for manipulations of monkeypox specimens. If a BSC cannot be used, the risk of exposure to an inadvertent sample release should be reduced by the appropriate combinations of personal protective equipment (e.g., respirators, face shields) and physical containment devices (e.g., centrifuge safety cups or sealed rotors). Use sealed centrifuge rotors or sample cups for centrifugation. Ideally, these rotors or cups should be unloaded in a BSC.

If procedures that generate fine-particle aerosols cannot be contained within a BSC, acceptable methods of respiratory protection include disposable particulate respirators (e.g. N-95, N-99, or N-100); these

respirators provide the minimum level of respiratory protection. Facilities may consider the use of higher levels of respiratory protection, particularly if vaccination status of staff is not confirmed or if personnel cannot be correctly fitted to disposable models. These higher levels may include:

- Powered air purifying respirator (PAPRs) designed with loose-fitting facepieces that form a partial seal with the face;
- PAPRs with hoods that completely cover the head and neck and may also cover portions of the shoulder and torso;
- PAPRs with tight-fitting facepieces (both half and full facepiece);
- Full facepiece elastomeric negative pressure (i.e. non-powered) respirators with N, R, or P100 filters.

Respirators should be used in the context of a complete respiratory protection program in accordance with Occupational Safety and Health Administration (OSHA) regulations. This includes training and fit testing to ensure a proper seal between the respirator's sealing surface and the wearer's face. For detailed information on respirator programs, including fit test procedures, see <http://www.osha.gov/SLTC/etools/respiratory/>.

Careful hand hygiene is essential. Hands should always be washed after removal of gloves and especially before touching the eyes or mucosal surfaces.

Decontamination of work surfaces after the completion of work or at the end of the day is essential. Any Environmental Protection Agency (EPA)-registered hospital detergent-disinfectant currently used by health-care facilities for environmental sanitation may be used. Manufacturer's recommendations for use-dilution (i.e., concentration), contact time, and care in handling should be followed.

All cultures, stocks, and other regulated wastes should be decontaminated before disposal by using an approved method, such as autoclaving. Materials to be decontaminated outside of the immediate laboratory should be placed in a durable, leakproof container and closed for transport from the laboratory. Materials to be decontaminated off-site from the facility should be packaged in accordance with applicable local, state, and federal regulations, before removal from the facility.

If the appropriate safety equipment and/or protocols are not available, consideration should be made to refer specimens to a suitably equipped reference laboratory.

It should be noted that monkeypox virus is regulated as a Select Agent under Federal Code 42 part 73. Further guidance regarding the possession, transfer, and handling of confirmed monkeypox virus cultures can be found at the CDC Select Agent Program web site at <http://www.cdc.gov/od/sap/> (lrsat@cdc.gov, phone: 404-498-2255, FAX: 404-498-2265).

Routine Clinical Laboratory Procedures

A. Microbiology

For laboratories with personnel vaccinated within the past 3 years, specimens may be handled in Biosafety Level 2 (BSL-2) facilities, using BSL-2 practices as indicated in the CDC/NIH publication entitled *Biosafety in Microbiological and Biomedical Laboratories, 4th edition*, available at <http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm>. Specimen manipulations should be carried out in a certified Class II BSC, especially if there is a potential to generate fine-particulate aerosols (e.g., vortexing or sonication of specimens in an open tube). Directional air flow (negative air

pressure with respect to the surrounding area) is recommended, but not required for BSL-2 laboratory facilities.

For laboratories without vaccinated personnel, routine specimen processing may be handled in BSL-2 facilities, but with more stringent BSL-3 work practices (see *Biosafety in Microbiological and Biomedical Laboratories, 4th edition*, at <http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm>).

Laboratory workers must wear protective equipment, including disposable gloves, solid front gowns with cuffed sleeves, and face protection (snugly fitting goggles are preferred; if a face shield is used, it should have crown and chin protection plus wrap around the face to the point of the ear) to provide a barrier to mucosal surface exposure. Centrifugation must be performed using safety cups or sealed rotors. Rotors or safety cups should be opened in a BSC after centrifugation involving monkeypox specimens.

B. Routine Chemistry, Hematology, and Urinalysis

These procedures may be performed using rigorously applied Standard (previously Universal) Precautions. Special care should be taken to avoid the production of infectious aerosols. The use of sealed rotors and safety cups is encouraged for centrifugation of monkeypox specimens.

C. Clinical Pathology, Molecular Testing, and Analysis of Bacterial or Mycotic Cultures

BSL-2 facilities with standard BSL-2 work practices may be used for the following activities:

1. Pathologic examination and processing of formalin-fixed or otherwise inactivated tissues
2. Molecular analysis of extracted nucleic acid preparations
3. Electron microscopic studies with glutaraldehyde-fixed grids
4. Routine examination of bacterial and mycotic cultures
5. Routine staining and microscopic analysis of fixed smears

Handling of Monkeypox Cultures

Culture-based testing should be limited to laboratories with appropriately trained and vaccinated staff.

Biosafety in Microbiological and Biomedical Laboratories, 4th edition (BMBL) provides the following guidance for research and reference laboratories handling large volumes or numbers of monkeypox cultures:

All persons working in or entering laboratory or animal care areas where activities with vaccinia, monkeypox, or cowpox viruses are being conducted should have documented evidence of satisfactory vaccination within the preceding 10 years. BSL-2 practices and facilities are recommended for all activities involving the use or manipulation of poxviruses, other than variola, that pose an infection hazard to humans. Activities with vaccinia, cowpox, or monkeypox viruses, in quantities or concentrations greater than those present in diagnostic cultures, may also be conducted at BSL-2 by immunized personnel, provided that all manipulations of viable materials are conducted in Class I or II BSCs. Immunosuppressed individuals are at greater risk of severe disease if infected with a poxvirus (see <http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm>).

CDC has published interim recommendations to provide guidance to autopsy personnel and morticians on the safe handling of human remains that may contain monkeypox virus. These recommendations are available at <http://www.cdc.gov/ncidod/monkeypox/autopsy.htm>.

Prevention [June 14, 2003]

DHSS has issued the following general recommendations for anyone who has gotten prairie dogs since April 15:

- Anyone who has a prairie dog or other small rodents in their household as pets should be watching their animals for signs of illness.
- If your animal has symptoms of monkeypox, contact your veterinarian or your local health department to ensure your animal is properly evaluated. Symptoms of monkeypox in animals include cold-like symptoms, running or oozing eyes, respiratory disease and rash.
- Persons bringing their ill animals to their veterinarian should contact the veterinarian beforehand so the appropriate measures can be taken in the veterinary office to avoid exposing a potentially sick animal to other animals that may be in the veterinarian's office.
- Any individual who has had contact with a sick animal should be on the lookout within their family for symptoms of fevers, chills, muscle aches and rash. If they do develop those symptoms, they should contact their health care provider. Since human-to-human transmission of this disease is possible, it is advisable first to phone the health care provider or facility for special instructions that will help minimize the spread of infection.
- As always, people with pets, particularly those with exotic pets, should always wash their hands after handling their pets.

It is crucial that sick animals not be released into the environment to ensure this disease does not spread into the wild animal population.

Avoid contact with any prairie dogs or Gambian giant rats that appear to be ill (e.g., are missing patches of fur, have a visible rash on the skin, or have a discharge from eyes or nose).

Wash hands thoroughly after any contact with prairie dogs, Gambian giant rats, or any ill animal.

CDC is recommending that persons investigating monkeypox outbreaks and involved in caring for infected individuals or animals should receive a smallpox vaccination to protect against monkeypox. Persons who have had close or intimate contact with individuals or animals confirmed to have monkeypox should also be vaccinated. These persons can be vaccinated up to 14 days after exposure. CDC is not recommending preexposure vaccination for unexposed veterinarians, veterinary staff, or animal control officers, unless such persons are involved in field investigations. For detailed recommendations, see the above section entitled "[CDC Guidance for Use of Smallpox Vaccine, Cidofovir, and Vaccinia Immune Globulin \(VIG\) for Prevention and Treatment in the Setting of a Monkeypox Outbreak.](#)"

As an additional prevention measure, CDC, pursuant to 42 CFR 71.32(b), is implementing an immediate embargo on the importation of all rodents from Africa (Order *Rodentia*). In addition, CDC and the Food and Drug Administration (FDA), pursuant to 42 CFR 70.2 and 21 CFR 1240.30, are prohibiting the transportation or offering for transportation in interstate commerce, or the sale, offering for sale, or offering for any other type of commercial or public distribution, **including release into the environment**

of prairie dogs and the following rodents from Africa: tree squirrels (*Heliosciurus* sp.), rope squirrels (*Funisciurus* sp.), dormice (*Graphiurus* sp.), Gambian giant pouched rats (*Cricetomys* sp.), brush-tailed porcupines (*Atherurus* sp.), and striped mice (*Hybomys* sp.). For more information, see the section below entitled "[Information on Embargo & Prohibition of Certain Rodents & Prairie Dogs](#)." The CDC/FDA joint order is available at <http://www.cdc.gov/ncidod/monkeypox/pdf/embargo.pdf>.

Monkeypox Virus Infections and Blood and Plasma Donors [June 13, 2003]

(This section was taken from the Food and Drug Administration (FDA) monkeypox web site [<http://www.fda.gov/oc/opacom/hottopics/monkeypox.html>].)

Background

In early June 2003, CDC reported monkeypox virus as the cause of illness among some residents in the U.S. after coming in contact with sick prairie dogs. Monkeypox virus is an orthopoxvirus related to smallpox, and also related to the virus used in the smallpox vaccine (vaccinia). Monkeypox causes a human disease that resembles smallpox but has a lower person-to-person transmission rate. Monkeypox infections occur naturally in Africa, and the current U.S. infections appear to have originated from imported animals. However, domestic prairie dogs and rabbits can transmit this disease to people. Additional current information about monkeypox is available from the CDC at <http://www.cdc.gov/ncidod/monkeypox/index.htm>.

On June 11, 2003, CDC recommended smallpox vaccination under a CDC-sponsored Investigational New Drug Application (IND) for people exposed to monkeypox (<http://www.cdc.gov/od/oc/media/pressrel/r030611.htm> and <http://www.cdc.gov/ncidod/monkeypox/index.htm>). FDA has recommended temporary blood and plasma donor deferrals after smallpox vaccination (<http://www.fda.gov/cber/gdlns/smpoxdefquar.htm>). .

Signs and Symptoms of Monkeypox Infection

In humans, the symptoms of monkeypox are similar to those of smallpox, except that more swelling of lymph nodes is associated with monkeypox. About 12 days after exposure, the illness begins with fever, headache, muscle aches, backache, swollen lymph nodes, a general feeling of discomfort, and exhaustion. Within 1 to 3 days (sometimes longer) after onset of fever, the patient develops a papular rash (i.e., raised bumps), often first on the face but sometimes initially on other parts of the body. The lesions usually develop through several stages before crusting and falling off. The illness typically lasts for 2-4 weeks. In Africa, monkeypox has been reported to be fatal in as many as 10% of people who get the disease. However, although over 50 suspected or confirmed cases have occurred in the U.S. to date, there have been no deaths, and the disease appears to be following a mild to moderate course of severity. In contrast, the case fatality ratio for smallpox was about 30% before the disease was eradicated.

Case definition of Monkeypox Infection

An interim case definition for human cases of monkeypox has been published by CDC (see the above section entitled "[Diagnostic Considerations and Human Case Definition](#)").

Mode of transmission of monkeypox in humans

People can get monkeypox from an infected animal through a bite or direct contact with the infected animal's blood, body fluids, or rash. The disease also can be spread from person to person, but it is much less infectious than smallpox. The virus is thought to be transmitted by large respiratory droplets during

direct and prolonged face-to-face contact. In addition, monkeypox can be spread by direct contact with body fluids of an infected person or with virus-contaminated objects, such as bedding or clothing.

Risk for Transmission by Blood or Plasma

There have been no reports of transmissions of any poxvirus, including monkeypox, through transfusion. However, the risk of monkeypox transmission by blood or plasma is not known, and a viremic phase and resultant risk of transmission by transfusion could potentially exist. Since people with monkeypox infection usually have fevers, rash, and other signs of illness, they would ordinarily be deferred from donation based on answers to donor questions about current health.

CDC is working to identify all people with monkeypox infection, and their close contacts. CDC has recommended that pet owners, health care workers, and others who may have been exposed to monkeypox be vaccinated with the smallpox vaccine under a CDC-sponsored IND which is in effect (<http://www.cdc.gov/ncidod/monkeypox/index.htm>).

CDC has recommended that asymptomatic close contacts of infected people or animals be placed under fever surveillance for 21 days (<http://www.cdc.gov/ncidod/monkeypox/infectioncontrol.htm>).

- **Donors who have been exposed to monkeypox, and have fever and/or rash, may have monkeypox, and be at risk of viremia.**
- **Donors undergoing fever surveillance may be incubating monkeypox virus, and may be at risk of viremia.**
- **CDC is offering smallpox vaccination under IND to people who may have been exposed to monkeypox, or who are likely to become exposed. This may result in increased use of the smallpox vaccine. In our existing guidance on smallpox vaccination, we recommend blood and plasma donor deferrals for people who have recently received the smallpox vaccine (<http://www.fda.gov/cber/gdlns/smpoxdefquar.htm>).**
- **If you suspect a case of unreported monkeypox, CDC recommends that you contact your state or local health department (http://www.cste.org/members/state_and_territorial_epi.asp).**
- **If you have questions about blood or plasma donors, please contact the Division of Blood Applications, Office of Blood Research and Review FDA at (301- 827-3543).**

Animal Case Definition [June 19, 2003]

Clinically Compatible Illness

Rash (macular, papular, vesicular, or pustular; generalized or localized; discrete or confluent)

Other possible signs and symptoms:

- Conjunctivitis
- Coryza
- Cough
- Anorexia

- Lethargy

Epidemiological Criteria

- Originating from the shipment of rodents from Ghana to Texas on April 9, 2003 (i.e., Gambian giant rats, rope squirrels, tree squirrels, striped mice, brush-tailed porcupines, and dormice)
- Originating from a pet holding facility where wild or exotic mammalian pets¹ with suspect, probable, or confirmed monkeypox have been reported.
- Exposure² to a wild or exotic mammalian pet that has been diagnosed with suspect, probable, or confirmed monkeypox.
- Exposure² to a suspect, probable, or confirmed human case of monkeypox.

Laboratory Criteria

- Isolation of monkeypox virus in culture
- Demonstration of monkeypox virus DNA by polymerase chain reaction testing in a clinical specimen
- Demonstration of virus morphologically consistent with an orthopoxvirus by electron microscopy in the absence of exposure to another orthopoxvirus
- Demonstration of presence of orthopox virus in tissue using immunohistochemical testing methods in the absence of exposure to another orthopoxvirus.

Case Classification

Suspect Case

- Meets one of the epidemiologic criteria, AND
- Rash OR two or more other signs or symptoms

Probable Case

- Meets one of the epidemiologic criteria, AND
- Rash AND two or more other signs or symptoms

Confirmed Case

- Meets one of the epidemiologic criteria, AND
- Rash AND two or more other signs and symptoms, AND
- Meets one of the laboratory criteria

1. Wild or exotic mammalian pets include prairie dogs, Gambian giant rats, rope squirrels, tree squirrels, striped mice, and dormice. Exposure to other exotic or non-exotic mammalian pets will be considered on a case-by-case basis; assessment should include the likelihood of contact with a mammal with monkeypox and the compatibility of clinical illness with monkeypox.

2. Exposure includes living in a household as a human or a wild or exotic mammalian pet with monkeypox, or originating from the same pet holding facility as a wild or exotic mammalian pet with monkeypox.

Monkeypox Infections In Animals: Information for Veterinarians [July 22, 2003] Updated

Guidance for Veterinarians [July 22, 2003] Updated

These interim guidelines will be updated as new information becomes available and after consultation with additional public health partners.

CDC has been working closely with other federal agencies and several state and local health departments to investigate cases of monkeypox virus infections among humans (including veterinarians and staff at veterinary hospitals) who had direct or close contact with ill prairie dogs. The first exposure to ill animals was reported to have occurred after April 15, 2003.

Human monkeypox is a rare zoonotic viral disease that occurs primarily in the rain forest countries of central and west Africa. In humans, the illness produces a vesicular and pustular rash similar to that of smallpox. The incubation period from exposure to fever onset is about 12 days. Case-fatality ratios for human monkeypox in Africa have ranged from 1% to 10% (for additional information about monkeypox, see the monkeypox article in the May–June 2001 issue of *Emerging Infectious Diseases* at <http://www.cdc.gov/ncidod/eid/vol7no3/hutin.htm>).

These guidelines have been developed to assist veterinarians in considering infection control guidelines to protect the health of their staff, clients, and patients.

Transmission of Monkeypox in Humans and Animals

Infection in humans may be acquired through contact or respiratory droplets, the nasopharyngeal, oropharyngeal, or cutaneous route. Most of the human cases in this outbreak appear to have been transmitted through the cutaneous route. The route of transmission in animals is less clear. The virus might be transmitted to animals through the nasopharynx or oropharynx route, through skin abrasions, or through the ingestion of infected animal tissue.¹

Animal Species Affected by Monkeypox

In this outbreak, most human cases of monkeypox have been associated with close contact with prairie dogs (including bites, handling, household contact, or handling of cages/bedding). CDC is currently investigating how the prairie dogs may have become infected. The current working hypothesis is that prairie dogs may have been infected by an imported species of exotic mammals kept in close proximity.

In Africa, serologic evidence of monkeypox infection has been found in a wide variety of nonhuman primates, rodents, and squirrels; monkeypox virus has been isolated from a species of squirrel in Zaire, but the role of any particular species as a reservoir has not been established. Some species of primates, rodents, and lagomorphs are known to be susceptible. Although no infections have been previously reported in dogs or cats, these species may also be susceptible to monkeypox. Because the types of animals that may become ill with monkeypox are currently unknown, all mammals should be considered susceptible as a precaution.

Manifestations of Monkeypox in Animals

In the current outbreak, illness in prairie dogs was reported to include fever, cough, conjunctivitis, and lymphadenopathy, followed by a nodular rash. Some prairie dogs died, whereas others apparently recovered. Preliminary information suggests the Gambian giant rat under investigation reportedly experienced a much milder illness than that observed in prairie dogs, with no respiratory signs and possibly limited dermatologic involvement.

Recommendations for Veterinarians Examining Animals with Suspected Monkeypox

Veterinarians should be suspicious of monkeypox in ill prairie dogs or Gambian rats, or any animal presenting with a history of fever, conjunctivitis, respiratory signs, and nodular rash. In some states, health departments are recommending that animals with suspected monkeypox not be transported to veterinary clinics due to public health risks. Veterinarians should check with state and local health officials for recommendations in their state.

Veterinarians who decide to examine or treat animals with suspected monkeypox should use infection control precautions to protect the health of themselves, staff, and clients, as well as other animal patients in the clinic. Clients who have alerted the clinic in advance that they are bringing an animal with suspected monkeypox should not be allowed to enter through the waiting area of the clinic. Veterinarians should isolate the animal and wear personal protective equipment (PPE) during the examination. The animal should not be taken to a common treatment room, and all treatments and diagnostics should be performed in the examination room.

The number of staff allowed in the exam room and that come in contact with the animal should be limited to as few persons as possible. Veterinarians who do not wish to examine an animal with suspected monkeypox should advise the animal's owner to contact the local or state health department for further guidance.

Infection Control Precautions

The most common route for transmission of monkeypox from animals to humans appears to be direct contact with infected animals; however, the possibility of airborne transmission cannot be excluded. When examining animals with suspected monkeypox, veterinarians and staff should use the following precautions:

1. Hand hygiene after all contact with a sick animal and contaminated surfaces.
2. Use of gown and gloves for any contact with the sick animal and contaminated surfaces.
3. Eye protection (e.g., tight-fitting goggles or face shield) if splash or spray of body fluids is likely.
4. Respiratory protection, including a NIOSH-certified N95 filtering disposable respirator (or other respirator offering comparable levels of respiratory protection), for entering the exam room or patient care area.² For additional information about respirators, see the CDC document "Information About Respirators for Use by Veterinary Staff in the Setting of Suspected Monkeypox" at <http://www.cdc.gov/ncidod/monkeypox/respirators.htm>. Most veterinary clinics will not have N95 respirators. If N95 or comparable respirators are not available for veterinary personnel, then surgical masks should be worn to protect against transmission through contact or large droplets.
5. Contain and dispose of contaminated waste after consultation with state or local health officials. Do not dispose of waste in landfills or dumps.

6. Handle used patient-care equipment in a manner that prevents contamination of skin and clothing. Ensure that used equipment has been cleaned and reprocessed appropriately.
7. Ensure that procedures are in place for cleaning and disinfecting contaminated environmental surfaces. Any EPA-registered hospital detergent-disinfectant currently used by health-care facilities for environmental sanitation may be used. Manufacturer's recommendations for dilution (i.e., concentration), contact time, and care in handling should be followed.
8. Laundry (e.g., towels, clothing) may be washed in a standard washing machine with hot water and detergent. The use of chlorine bleach during hot-water washing can provide an added measure of safety. Care should be used when handling soiled laundry to avoid direct contact with contaminated material. Soiled laundry should not be shaken or otherwise handled in a manner that may aerosolize infectious particles.
9. Contaminated surfaces should be cleaned and disinfected. Standard household cleaners or disinfectants may be used in accordance with the manufacturer's instructions. The animal's bedding, cage, toys, or food and water bowls should not be disposed of with the clinic trash or at a dump or landfill because this material may be potentially infectious; contact the state or local health department for further instructions. Items that cannot be disposed of should be disinfected as contaminated surfaces.

Specimens for Diagnosis of Monkeypox

Veterinarians that suspect monkeypox in an animal (i.e., an animal with a clinically compatible illness or is asymptomatic but is associated with human illness) should contact the state health department for information on specimen submission (in Missouri, call 800/392-0272, 24 hours a day/7 days a week). CDC will not accept any specimens that are not sent through state health department laboratories. CDC recommends that practicing veterinarians *not* perform necropsies or biopsies to collect samples for diagnosis because of the risk for infection to the veterinarian. Samples that may be obtained by minimally invasive procedures, such as serum or conjunctival swabs, should be collected only by personnel wearing PPE. If the animal is deceased, double bag the carcass and place it in a freezer pending a decision for shipment.

Recommendations for Pet Owners

Veterinarians should advise pet owners to consult the CDC document "Monkeypox Infections in Animals: Interim Guidance for Persons Who Have Frequent Contact with Animals (Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers)," which is available at <http://www.cdc.gov/ncidod/monkeypox/animalhandlers.htm>. The contents of this document are reproduced below in the section entitled "[Guidance for Persons Who Have Frequent Contact with Animals \(Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers\)](#)."

Disposition of Animals with Suspected Monkeypox

All animals with suspected monkeypox infection should be humanely euthanized to prevent further spread of the disease. Disposal of the carcass should *not* include burial in a landfill or backyard setting. CDC recommends incineration of the carcass. If the animal is associated with a human case, it should be tested for monkeypox. Do not perform necropsies on animals with suspected monkeypox. Rather, whole carcasses should be double bagged and frozen. Consultation with the state epidemiologist and state public health laboratory (in Missouri, call 800/392-0272, 24 hours a day/7 days a week) is necessary to obtain submission instructions before sending specimens to CDC.

Exposed asymptomatic animals should be quarantined in the home and not allowed to come into contact with other animals or people. They should be observed for development of symptoms compatible with monkeypox for at least 6 weeks following the last date of exposure. Should such symptoms develop, the animal should then be evaluated and euthanized if indicated, in consultation with state or local health officials. For more information on home quarantine, see the section below entitled "[Guidance for Persons Who Have Frequent Contact with Animals \(Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers\)](#)."

Recommendations for Veterinarians Who Have Been Exposed to Monkeypox

Veterinarians and staff who have come in contact with animals with monkeypox should be alert for signs of illness for 21 days following the date of last exposure. Although restriction of day-to-day activities is not recommended for healthy, asymptomatic persons, individuals who develop a fever, respiratory symptoms, or unusual skin lesions within 21 days of contact with the animal should immediately limit activities outside the home and contact their physician. Guidance regarding monitoring of exposed healthcare workers can be found in the section above entitled "[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection](#)."

Veterinarians who are diagnosed with monkeypox should not examine animals during their illness because they may pose a risk of disease transmission to animals, and should isolate themselves at home to minimize contact with other persons and animals. These individuals should remain in home isolation as outlined in the section above entitled "[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection](#)." Veterinarians may resume job duties when their physician and state and local health officials have determined that they are no longer infectious.

At the present time, CDC is recommending smallpox vaccination for persons who are within 4 days of initial direct physical contact with sick prairie dogs acquired since April 15 within the affected areas. Vaccination should also be considered for persons with such contact within the past 2 weeks. In addition, vaccination can be considered for persons who have, within the past 2 weeks, had close contact likely to have resulted in exposure to this environmentally hardy virus in respiratory secretions or through fomites on contaminated surfaces. For more information about smallpox vaccination practices in the monkeypox setting, see the above section entitled "[CDC Guidance for Use of Smallpox Vaccine, Cidofovir, & Vaccinia Immune Globulin \(VIG\) for Prevention and Treatment in the Setting of a Monkeypox Outbreak](#)."

Additional Information

For further information, contact your state or local health department or the CDC Emergency Operations Center at 770-488-7100. Additional information and recommendations will be released as they become available. Updated information can be accessed at the CDC monkeypox web site at <http://www.cdc.gov/ncidod/monkeypox/index.htm>.

1. Jezek Z, Fenner F. Human Monkeypox. *Monographs in Virology* vol 17. 1988.
2. Respirators should be used in the context of a complete respiratory protection program in accordance with OSHA regulations. This includes training and fit testing to ensure a proper seal between the respirator's sealing surface and the wearer's face. Detailed information on respirator programs, including fit test procedures. Where possible, a qualitative fit test should be conducted for N95 respirators; detailed information on fit testing.

CDC is working with local and state health departments and public health laboratories to test specimens from humans and some animals with suspect monkeypox infection. More specifically, CDC will consider testing specimens from animals with suspect monkeypox on a case-by-case basis. More information on what types of specimens may be considered, as well as laboratory submission guidelines for animal specimens, is available at <http://www.cdc.gov/ncidod/monkeypox/labsubmissionguid.htm>.

Revised interim CDC recommendations have been published to provide guidance to necropsy personnel on the safe performance of necropsies and collection of animal specimens for monkeypox testing. These recommendations are available at <http://www.cdc.gov/ncidod/monkeypox/necropsy.htm>.

Monkeypox Infections in Animals: Guidance for Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers [July 22, 2003]

Updated

What Pet Owners Should Know About Monkeypox [June 27, 2003]

The Disease

Monkeypox is a rare viral disease caused by monkeypox virus. The virus can spread from animals to humans (and sometimes from human to human). In humans, monkeypox causes fever, headache, backache, and swollen lymph nodes, followed by a blister-like rash. In some cases, monkeypox can be fatal.

Origins

Monkeypox is found mostly in central and western Africa. The illness was first noted in monkeys in 1958, which is why it was named monkeypox. However, other animals can get monkeypox too. The first cases of monkeypox in humans were seen in 1970.

Monkeypox in the United States

In early June 2003, monkeypox was reported among several people in the United States. This is the first outbreak of human monkeypox in the United States. Most of these people became ill after having contact with pet prairie dogs that were sick. It appears that these prairie dogs might have gotten the virus from animals brought in from Africa to be sold as pets. The imported animals include Gambian giant pouched rats, rope squirrels, dormice, and other small mammals. Public health experts believe the earliest exposure to any of the infected animals most likely happened on or after April 15, 2003.

There is concern that monkeypox might have spread more broadly to other animals housed together in pet stores, other animal facilities, and “pet swap” meets. CDC has issued guidelines for pet owners so that they can be on the lookout for monkeypox symptoms (see [Could Your Pet Have Monkeypox](#), below).

Legal Restrictions on Animals Associated with Monkeypox Outbreak

CDC and FDA have issued a joint order banning the importation into the United States of all African rodents and the transport, sale, distribution, or release into the environment within the United States of prairie dogs and six specified African rodents (tree squirrels, rope squirrels, dormice, Gambian giant pouched rats, brush-tailed porcupines, and striped mice).

The ban on prairie dogs and the six specified African rodents includes any transport, sale, offering for sale or distribution, including release into the environment on public or private property, even if the animal is healthy or acquired before April 15, 2003. There is only one exception to this ban. If you have one of the

animals listed above, you can take it to a veterinarian or to animal control if instructed to do so by your state or local health department.

The joint order also bans the importation of all rodents from Africa. This includes rodents in shipments originating in Africa and rodents in transshipments from Africa through other countries.

People who violate the joint order may be subject to criminal and/or civil penalties.

Could Your Pet Have Monkeypox?

Public health experts are looking for signs of monkeypox in “wild and exotic mammalian pets,” including prairie dogs, Gambian giant rats, and rope squirrels. However, other animals that have been in contact with infected members of these species could be of concern also. If you acquired an wild or exotic mammalian pet (or if your pet was exposed to an ill wild or exotic mammalian pet) on or after April 15 and is now sick, it is possible they might have monkeypox.

Symptoms to Look For

Symptoms of monkeypox in animals that have been observed in this outbreak include:

- fever
- cough
- discharge from the eyes (eyes may appear cloudy or crusty)
- swelling in the limbs from enlarged lymph nodes
- a bumpy or blister-like rash.

Pets that have monkeypox also may appear to be very tired and may not be eating or drinking.

If You Think Your Pet Has Monkeypox

If your pet could have been exposed to a sick animal and is showing the symptoms of monkeypox, follow these instructions:

- Separate the animal from people and other animals immediately. (Lock it in a room or put it in a cage or cardboard box well apart from others, such as in the garage.)
- Wash your hands well after contact with the animal and any object that may be contaminated with virus.
- Inform your state or local health department that you think you have a pet with monkeypox. The health department may pick up the animal, or they may tell you to take the animal to a vet.
- Do **not** release your pet into the wild. If it is infected, this could spread the disease to other animals and people. It is very important that this disease be contained.
- Do **not** leave your pet at a shelter. Again, this could spread the disease.
- Do **not** take your pet to a vet without calling first. The vet must take precautions to receive your pet.

When taking your pet to the vet you should:

- Call your vet before you go and tell them you think your pet may have monkeypox (this way they can follow procedures to keep themselves and others from getting sick.)

- Only one person should travel with the pet, to keep exposure to the pet to a minimum.
- If possible, put the pet in a cage and place the cage in a cardboard box with a few air holes.
- Separate the pet from the driver as much as possible.
- Later, clean any surfaces in the car that the animal, its secretions, or its cage, may have come in contact with and wash your hands thoroughly.

After taking your sick pet to the vet, you'll need to clean the household areas where it lived. Follow these instructions:

- Contaminated surfaces, such as floors and furniture, should be cleaned and disinfected using standard household cleaners according to manufacturer's instructions.
- Wash any clothing or other fabric that may have come in contact with the sick pet in warm water with detergent, followed by hot air drying. You can use bleach in the wash cycle as an extra precaution. Be careful when handling the laundry and do not shake it.
- Food dishes, cages, and other items that may have had contact with the pet should be washed in hot water with dishwashing detergent.
- If the animal's bedding is not washable, call your local or state health department to find out how to do this. Follow their instructions for disposal of potentially contaminated materials.
- When you are done, wash your hands thoroughly.
- Do **not** throw any potentially contaminated materials away in the trash or at a dump or landfill. This could spread the disease.

Pet Quarantine

If your pet has potentially been exposed to monkeypox, but is not showing symptoms of the disease, it still needs to be watched for signs of illness. Exposure is defined as living in the same house with, or coming from the same pet store or other pet facility as, an animal known to have monkeypox. Your pet must be quarantined for at least 30 days. This can be done in the home. Follow these instructions:

- Put your pet in a room with a closed door and keep it away from all other animals and people while under quarantine.
- Limit time spent with the pet. Do not handle the pet. Ask your vet for advice about protecting yourself when caring for your pet.
- After feeding or otherwise caring for the animal, wash your hands thoroughly with soap and hot water.
- If the animal gets sick while under quarantine, contact your local or state health department for instructions.
- During this 30-day period, watch your own health and the health of family members carefully for signs of monkeypox. If you or someone you have been in close contact with develops a fever, headache, backache, swollen lymph nodes, or a rash, contact your health-care provider immediately.

- If you have a weakened immune system for any reason, do not care for or come into contact with the potentially infected pet. (Cancer treatment, an organ transplant, HIV infection, primary immune deficiency disorders, some severe autoimmune disorders, and medications to treat autoimmune disorders and other illnesses can weaken the immune system.)

If it is too difficult to meet the requirements of home quarantine, contact your local or state health department for advice on other options.

Additional guidance will be forthcoming regarding the appropriate next steps for animals under quarantine.

What Owners of Pet Shops Should Know About Monkeypox [June 27, 2003]

The Disease

Monkeypox is a rare viral disease caused by monkeypox virus. The virus can spread from animals to humans (and sometimes from human to human). In humans, monkeypox causes fever, headache, backache, and swollen lymph nodes, followed by a blister-like rash. In some cases, monkeypox can be fatal.

Origins

Monkeypox is found mostly in central and western Africa. The illness was first noted in monkeys in 1958, which is why it was named monkeypox. However, other animals can get monkeypox too. The first cases of monkeypox in humans were seen in 1970.

Monkeypox in the United States

In early June 2003, monkeypox was reported among several people in the United States. This is the first outbreak of human monkeypox in the United States. Most of these people became ill after having contact with pet prairie dogs that were sick. It appears that these prairie dogs might have gotten the virus from animals brought in from Africa to be sold as pets. The imported animals include Gambian giant pouched rats, rope squirrels, dormice, and other small mammals. Public health experts believe the earliest exposure to any of the infected animals most likely happened on or after April 15, 2003.

There is concern that monkeypox might have spread more broadly to other animals housed together in pet stores, other animal facilities, and “pet swap” meets. CDC has issued guidelines for pet owners to help guide their response to this situation.

Legal Restrictions on Animals Associated with Monkeypox Outbreak

CDC and FDA have issued a joint order banning the importation into the United States of all African rodents and the transport, sale, distribution, or release into the environment, within the United States of Prairie dogs and six specified African rodents (tree squirrels, rope squirrels, dormice, Gambian giant pouched rats, brush-tailed porcupines, and striped mice).

The ban on Prairie dogs and the six specified African rodents includes any transport, sale, offering for sale or distribution, including release into the environment on public or private property, even if the animal is healthy or acquired before April 15, 2003. There is only one exception to this ban. If you have one of the animals listed above, you can take it to a veterinarian or to animal control if instructed to do so by your state or local health department.

The joint order also bans the importation of all rodents from Africa. This includes rodents in shipments originating in Africa and rodents in transshipments from Africa through other countries.

People who violate the joint order may be subject to criminal and/or civil penalties.

Pet Quarantine

If any of the animals in your shop might have been exposed to monkeypox, they need to be watched for signs of illness, even if they do not appear to be ill. “Exposure” is defined as living in the same house with, or coming from the same pet store or other pet facility as, an animal known to have monkeypox. The animal must be quarantined and observed for at least 30 days. This can be done in the shop. Follow these instructions:

- Put the animal(s) in a room with a closed door and keep it (them) away from all other animals and people for at least 30 days from the date of exposure or the date you acquired the potentially infected animal.
- Limit time spent with the animal(s). Do not handle the animal(s). Ask your vet for advice about protecting yourself when caring for the animal(s).
- After feeding or otherwise caring for the animal, change your clothes and wash your hands thoroughly with soap and hot water.
- If the animal gets sick while under quarantine, contact your local or state health department for instructions.
- During this 30-day period, watch your own health and the health of employees and family members carefully for signs of monkeypox. If you or someone you have been in close contact with develops a fever, headache, backache, swollen lymph nodes, or a rash, contact your health-care provider immediately.
- If you have a weakened immune system for any reason, do not care for or come into contact with the potentially infected animal. (Cancer treatment, an organ transplant, HIV infection, primary immune deficiency disorders, some severe autoimmune disorders, and medications to treat autoimmune disorders and other illnesses can weaken the immune system.)

If it is too difficult to meet the requirements of home quarantine, contact your local or state health department for advice on other options.

Additional guidance will be forthcoming regarding the appropriate next steps for animals under quarantine.

Could Your Pet Have Monkeypox?

Public health experts are looking for signs of monkeypox in “wild or exotic mammalian pets,” including prairie dogs, Gambian giant rats, and rope squirrels. However, other animals that have been in contact with infected members of these species could be of concern also. If you acquired a wild or exotic animal (or if the animals in your shop were exposed to an ill wild or exotic animal) on or after April 15 and is now sick, it is possible they might have monkeypox.

Symptoms to Look For

Symptoms of monkeypox in animals that have been observed in this outbreak include:

- fever
- cough

- discharge from the eyes (eyes may appear cloudy or crusty)
- swelling in the limbs from enlarged lymph nodes
- a bumpy or blister-like rash.

Animals that have monkeypox also may appear to be very tired and may not be eating or drinking.

If You Think Any of the Animals in Your Store Have Monkeypox

If any of the animals in your pet shop could have been exposed to a sick animal and are showing the symptoms of monkeypox, follow these instructions:

- Separate the animal from people and other animals immediately. Lock it in a room or put it in a cage or cardboard box well apart from other animals.
- Wash your hands well after contact with the animal and any object that may be contaminated with virus.
- Inform your state or local health department that you think you have an animal with monkeypox. The health department may pick up the animal, or they may tell you to take the animal to a vet.
- Do not release the animal into the wild. If it is infected, this could spread the disease to other animals and people. It is very important that this disease be contained.
- Do not leave the animal at a shelter. Again, this could spread the disease.
- Do not take the animal to a vet without calling first. The vet must take precautions to receive the animal.

When taking the animal to the vet you should:

- Call your vet before you go and tell them you think you have an animal with monkeypox (this way they can follow procedures to keep themselves and others from getting sick.)
- Only one person should travel with the animal to keep exposure to the animal to a minimum.
- If possible, put the animal in a cage and place the cage in a cardboard box with a few air holes.
- Separate the animal from the driver as much as possible.
- Later, clean any surfaces in the car that the animal, its secretions, or its cage may have come in contact with and wash your hands thoroughly.

After taking the sick animal to the vet, you'll need to clean the areas that it occupied. Follow these instructions:

- Contaminated surfaces, such as floors and furniture, should be cleaned and disinfected using standard household cleaners according to manufacturer's instructions.
- Wash any clothing or other fabric that may have come in contact with the sick animal in warm water with detergent, followed by hot air drying. You can use bleach in the wash cycle as an extra precaution. Be careful when handling the laundry and do not shake it.

- Food dishes, cages, and other items that may have had contact with the animal should be washed in hot water with dishwashing detergent.
- If the animal's bedding is not washable, call your local or state health department to find out how to do this. Follow their instructions for disposal of potentially contaminated materials.
- When you are done, wash your hands thoroughly.
- Do not throw any potentially contaminated materials away in the trash or at a dump or landfill. This could spread the disease.

Guidance for Persons Who Have Frequent Contact with Animals (Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers) [July 22, 2003]

Updated

This document provides updated interim guidance for persons who have frequent contact with animals (including pet owners, pet shop owners and employees, animal control officers, animal rescuers, and others). It will be updated as new information becomes available and after consultation with additional public health partners. Veterinarians should refer to the above section entitled "[Guidance for Veterinarians](#)."

Spread of Monkeypox

Monkeypox is found mostly in central and western Africa. The illness was first noted in monkeys in 1958, which is why it was named monkeypox. Other animals can get monkeypox too. Humans appear to get monkeypox mainly from direct contact with infected animals. Limited human-to-human spread of monkeypox has been reported among people in rural Africa, most likely as a result of direct contact (i.e., skin-to-skin) or contact with respiratory droplets. How animals become infected is less clear. The virus might be transmitted to animals through droplets entering the nose, mouth, skin cuts, or scrapes or through eating infected animal tissue.

Monkeypox in the United States

In early June 2003, monkeypox was reported among several people in the United States – the first outbreak of its kind in this country. The U.S. residents who developed monkeypox became ill after having contact with pet prairie dogs that were sick. It now appears that these prairie dogs became infected from a shipment of animals from Africa that were imported into the United States on April 9 to be sold as pets. The imported animals include Gambian giant pouched rats, rope squirrels, dormice, and other small mammals (to view images of these types of mammals, see <http://www.cdc.gov/ncidod/monkeypox/animals.htm>).

Legal Restrictions on Importation and Distribution of Animals Associated with Monkeypox Outbreak

On June 11, 2003, CDC and the Food and Drug Administration issued a joint order banning the importation into the United States of all rodents from Africa and the transport, sale, distribution, or release into the environment within the United States of prairie dogs and six types of African rodents (tree squirrels, rope squirrels, dormice, Gambian giant pouched rats, brush-tailed porcupines, and striped mice). This includes rodents in shipments originating in Africa and rodents in transshipments from Africa through other countries.

The ban on prairie dogs and the six types of African rodents includes any transport, sale, offering for sale or distribution, including release into the environment on public or private property, even if the animal is healthy. If you have one of the animals listed above, you can take it to a veterinarian, animal control, or other official if instructed to do so by your state or local health department. People who violate the joint order may be subject to criminal and/or civil penalties.

Symptoms of Monkeypox in Animals

The types of animals that may become ill with monkeypox are currently unknown. Until more information is available, it is best to assume that any mammal, including common household pets (e.g., dogs, cats) and “pocket pets” (e.g., hamsters or gerbils), can get monkeypox if exposed to another animal that is infected. Some animals infected with monkeypox have died and others have recovered. Symptoms of monkeypox in animals that have been observed in this outbreak include the following:

- cough
- discharge from the eyes (appear cloudy or crusty) or the nostrils
- swelling in the limbs from enlarged lymph nodes
- a bumpy or blister-like rash

Animals that have monkeypox also may just appear to be very tired and may not be eating or drinking.

Contact with Sick Animals

Contact with sick animals could lead to monkeypox infection in humans. Animals that are sick should be cared for by trained individuals using the proper precautions. If an animal develops symptoms of monkeypox, the state or local health department should be contacted. The health department may decide to collect the animal.

If the health department recommends that the animal be taken to a veterinarian, follow the steps below:

- Call the veterinary clinic and let staff there know that you have an animal that may have monkeypox so they can then take the proper precautions.
- If the clinic can take the animal, the staff there should make arrangements for the animal to be brought into the clinic safely and minimize time spent in the waiting room.
- Prepare to handle the animal for transport.
 - Wear gloves and protective clothing (e.g., heavy rubber gloves, long sleeve shirt) to help prevent abrasions from biting or scratching and to minimize contact with lesions and the animal’s body fluids. If the animal is likely to bite during handling, use the heaviest gloves available (e.g., leather garden gloves, household utility gloves) for protection.
 - Contain the animal in a cage or box (be sure there is enough air) for transport.
 - Limit the number of persons who transport the animal. Avoid involving children whenever possible.
- If the veterinarian suspects monkeypox in the animal, clean and disinfect the area of the vehicle where the animal was kept (see below for cleaning agents.) Also, wash and dry clothing and other washable materials used to handle the animal and use good hand hygiene (e.g., hand washing). If you use heavy protective gloves that you do not want to throw away, you can wash them as clothing or soak them with a disinfectant after use.
- Persons with a sick animal need to be watchful for signs of human illness that could be monkeypox. If a fever or other signs of illness develop (see [human monkeypox case definition](#)), a health care provider and the local or state health department should be contacted immediately.

Cleaning of Household or Facility after Removal of an Animal with Monkeypox

Contact the state or local health department for information regarding local recommendations for cleaning after removal of an animal with monkeypox. In the absence of local recommendations, follow the steps below:

- Standard household detergents should be used first to clean surfaces.
- Follow this cleaning with a disinfectant solution, such as a bleach and water solution of ¼ cup bleach to 1 gallon of water.
- Washable toys, cages, food containers, and other objects used by the infected animal can be cleaned and disinfected by hand or in a dishwasher.
- Animal bedding, pillows, or other washable materials that have been in contact with the infected animal should either be laundered in a household washing machine or discarded after disinfection.
- Materials (such as wood chips) and objects that must be discarded should be thoroughly soaked with a disinfectant (e.g., bleach solution), placed in a plastic bag, and then contained in a covered trash can for disposal with other household waste.

Quarantine of Exposed Animals

Most animals that have come in contact with another animal known to have monkeypox must be placed under quarantine for 6 weeks from the date of last exposure. (Please refer to the July 11 MMWR article at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5227a5.htm>) about the multistate outbreak for more information about animals known to have monkeypox.) You may be notified by the health department of this exposure or you may yourself be aware of such contact. Contact includes living in the same house, coming from the same pet store or other pet facility, or being purchased or traded at a “swap meet” where animals were sold. If you believe you have or know of such an animal, contact your local or state health department immediately and use the following instructions for dealing with a quarantined animal:

- Put the exposed animal (caged if appropriate) in a room with a closed door and keep it away from all other animals for 6 weeks from the date of exposure or purchase. Be sure that the environment is comfortable for the animal, adequate lighting and air are available, and that basic needs for food, water, cleaning, and removal of waste will be met. Consider having only one person provide care for the animal. Limit the time spent with the animal. After any contact with the animal, wash hands thoroughly with soap and water.
- Protective clothing is not routinely necessary when handling quarantined animals that have no symptoms.
- Watch for signs of illness in the quarantined animal (see [animal monkeypox case definition](#)). If the animal appears ill, contact your local or state health department immediately and follow the instructions listed above regarding contact with sick animals.
- During the quarantine period, persons with an exposed animal need to be watchful for signs of human illness that could be monkeypox. If a fever or other signs of illness develop (see [human monkeypox case definition](#)), a health care provider and the local or state health department should be contacted immediately.
- If quarantined animals remain in the home or facility, they should be kept away from persons who are immunocompromised (e.g., persons with HIV, cancer, or other diseases that affect the immune system; pregnant women; people who have had transplants or who are undergoing treatments such

as chemotherapy). General information about diseases and pets is available at CDC's Healthy Pets, Healthy People web site at <http://www.cdc.gov/ncidod/diseases/pets/index.htm>.

What to Do with Exposed Animals That Cannot Be Quarantined

If you are unable to care for or keep an animal that has been exposed to monkeypox, you should contact your state or local health department for advice. The health department may recommend the animal be taken to a veterinarian to be cared for during the 6-week quarantine, or they may recommend humane euthanasia of the animal. In some cases, the health department may collect the animal.

Do **not** take the animal to a veterinarian without calling first and explaining that the animal has been exposed to monkeypox (see above under "Contact with Sick Animals").

Do **not** abandon animals at shelters or release them back into the wild. The animals cannot survive and, if infected, could spread monkeypox to animals in the wild.

If the animal dies, the state or local health department should be contacted for advice on what to do with the body. Do **not** throw the animal's body away in household trash or at a dump or landfill. Do not bury the animal's body on your property. Doing this could spread the disease if the animal was infected.

Care of Animals by Humans Infected with Monkeypox

Animals that have had contact with infected humans are considered exposed to monkeypox and must be quarantined. It is unknown whether persons with monkeypox can spread the disease to their animals. Persons with monkeypox should limit their contact with mammalian pets, including cats, dogs, and pocket pets. Pets should not be allowed to share an ill owner's bed and should not be allowed to have contact with clothing and other materials that have come into contact with an infected person's skin lesions. Dressings and bandages should be put in a secure container and kept away from animals. Persons with monkeypox should practice good general hygiene (including hand washing) and may choose to limit contact with animals until the health care provider says it is safe to resume normal activities. For further information about infection control practices in this setting, see the above section entitled "[Infection Control & Exposure Management Guidance in the Health-Care & Community Setting for Patients with Possible Monkeypox Virus Infection.](#)"

Additional Information

For more information, contact the state or local health department or the CDC Emergency Operations Center 770-488-7100. Additional information and recommendations will be released as they become available. Updated information will be available at CDC's monkeypox web site at <http://www.cdc.gov/ncidod/monkeypox/index.htm>.

Quarantine & Euthanasia of Animals Affected by the Monkeypox Outbreak (Q&As) [July 10, 2003] **New**

What animals should be euthanized according to CDC recommendations?

To protect people, pets and domestic and wild animals in the United States from the spread of monkeypox, on July 1, 2003, CDC issued recommendations to state and local government about the euthanasia (humanely putting to sleep) of certain animals. This included all African rodents from a shipment of animals imported from Ghana to Texas on April 9, 2003 that has been traced as the original source of monkeypox in the United States. The animals in the African shipment include tree squirrels, rope squirrels, Gambian giant pouched rats, brush-tailed porcupines, striped mice, and dormice.

In addition, it is recommended that any prairie dogs that may have come in contact with any of these animals be euthanized. Prairie dogs that have been housed at an infected premise (defined as a location that

housed animals meeting the suspect, probable, or confirmed [animal case definition for monkeypox](#)), either residential or commercial, should also be euthanized. These measures are considered essential in order to address the threat of monkeypox effectively.

What about recommendations for quarantine?

CDC is recommending that other animals that may have come into contact with any of the African rodents or prairie dogs that may be carrying monkeypox should be quarantined for six weeks. The 6-week quarantine period should begin with the last exposure to one of the implicated animals. The quarantine recommendation includes dogs, cats, other pets, and domestic animals. [See the information contained in the above section entitled “[Monkeypox Infections in Animals: Guidance for Pet Owners, Pet Shop Employees, Animal Handlers, and Animal Control Officers](#)” for more information on quarantine.]

What effect does this interim guidance have upon the joint order issued by CDC and FDA?

The interim guidance does not change the joint order against importing, selling, trading, or transporting African rodents or prairie dogs. Importing any rodent from Africa still is banned. In addition, the sale and transport within the United States of any prairie dog or any of the following rodents from Africa is forbidden: tree squirrels, rope squirrels, dormice, Gambian giant pouched rats, brush-tailed porcupines or striped mice. The joint order and associated documents are available on the CDC website at <http://www.cdc.gov/ncidod/monkeypox/law.htm>.

What should veterinarians, pet sellers, and other people affected by the quarantine do to have the quarantine lifted from their property?

The CDC recommends that people euthanize any African rodents from the implicated tainted April 9, 2003 shipment (see the complete list in the first question above: “What animals should be euthanized according to CDC recommendations?”) and any prairie dogs that may have come into contact with the African rodents from this shipment or with other exposed/infected prairie dogs. Other mammals on the premises, including pets and domestic animals, will need to be quarantined for 6 weeks in accordance with the guidelines spelled out in the interim guidances and recommendations for infection control. These guidelines may be found online at <http://www.cdc.gov/ncidod/monkeypox/>.

Euthanasia of animals that fit the definitions of suspect, probable, or confirmed cases, and quarantine of exposed animals, is necessary to prevent the spread of monkeypox and to help ensure that the disease does not become established in North America.

CDC guidance alternately states that quarantines may be lifted immediately if all mammals on a quarantined premise are euthanized and the premise is thoroughly cleaned and disinfected before it is restocked.

Why were new guidelines that call for euthanizing certain animals issued?

As more is learned about the monkeypox outbreak in the United States, recommendations to protect the nation's public health are revised accordingly. The new interim guidance to state and local government to lift quarantine and euthanize animals affected by the monkeypox outbreak attempts to balance the prudent use of quarantine and euthanasia of exposed animals in order to prevent additional infections of humans and other animals.

Can I be forced to turn over my pet (prairie dog, Gambian giant rat, etc.) to be euthanized?

These guidelines do not impose federal legal requirements for euthanasia, and are intended for guidance purposes only. State or local authorities, however, may have separate legal authority to require euthanasia of exposed or infected animals. CDC recommends that you contact your state and local health department for more information.

Can my pet be tested to see if it has monkeypox?

No. Tests to determine if a **live** animal is infected with monkeypox are still under development and not yet available for this purpose.

How can I clean out a contaminated area?

Contaminated surfaces should be cleaned and disinfected using standard household cleaners or disinfectants in accordance with the manufacturer's instructions. The animal's bedding, cage, toys, or food and water bowls should not be disposed with household trash or at a dump or landfill because it may be infectious. Contact the state or local health department for instructions. Follow the laundry steps provided in the above section entitled "[Guidance for Persons Who Have Frequent Contact with Animals \(Pet Owners, Pet Shop Owners and Employees, Animal Rescuers, Animal Handlers, and Animal Control Officers\)](#)."

Guidance to State/Local Governments for Removal of State- and Locally Imposed Quarantine Orders and the Euthanasia of Animals Affected by Monkeypox [July 1, 2003]

This document provides interim guidance for state and federal officials who have issued quarantine orders restricting the movement of animals that may have been exposed to monkeypox virus.

Background and Rationale for Recommendations

During the emergency response to monkeypox, CDC and the Food and Drug Administration issued a joint order banning the importation of African rodents and the sale and movement of involved animals. (See the next section entitled "[Information on Embargo & Prohibition of Certain Rodents & Prairie Dogs](#)." The full text of the joint order is available at <http://www.cdc.gov/ncidod/monkeypox/pdf/embargo.pdf>.) The joint order remains in effect regardless of the actions taken pursuant to this guidance. In addition, CDC recommended that states place quarantines or hold orders on 1) premises with infected animals (Infected Premises); 2) premises that received African rodents from a particular shipment (from Ghana to Texas on April 9, 2003) of imported animals that was identified during the traceback investigation (Premises Receiving Imported African Rodents); and 3) premises that received prairie dogs from a holding facility where wild or exotic mammalian pets with suspect, probable, or confirmed monkeypox have been reported.

Minimal data are available about the natural history of monkeypox in animals, and certain aspects of infection, such as the types of susceptible animal species, incubation period, and duration of infectiousness, are not known. Various rodent species are known to be susceptible, but all mammals are considered potentially susceptible. Currently, capacity for laboratory testing of animals is limited, and available assays are not able to prove that animals are not infectious.

These guidelines attempt to balance the prudent use of quarantine and euthanasia of exposed animals with the goal of preventing additional infections among humans and other animals, as well as preventing monkeypox from being maintained in a new wild animal reservoir.

Definitions

Infected premises are defined as commercial or residential premises that housed animals meeting the suspect, probable, or confirmed animal case definition for monkeypox (see the above section entitled "[Animal Case Definition](#)").

Premises receiving imported African rodents are defined as commercial or residential premises that housed a rodent originating from the shipment of animals imported from Ghana to Texas on 4/9/03, and includes Tree squirrels (*Heliosciurus* sp.), Rope squirrels (*Funisciurus* sp.), Dormice (*Graphiurus* sp.), Gambian Giant Pouched Rats (*Cricetomys* sp.), Brush-tailed porcupines (*Atherurus* sp.), and Striped mice (*Hybomys* sp.).

Recommendations For Premises That Received Prairie Dogs Acquired From Infected Premises

Commercial and residential premises that have prairie dogs acquired from infected premises should be placed under quarantine until the following conditions are met:

- All prairie dogs on the premises have been euthanized.
- All other mammals remaining on the premises have completed a six-week quarantine following the last date of occupation by the aforementioned prairie dogs.

Recommendations For Premises That Received Rodents From The African Shipment

Premises Receiving Imported African Rodents should be placed under quarantine until the following conditions are met:

- All African rodents from the 4/9/03 shipment from Ghana on the premises have been euthanized.
- All prairie dogs on the premises that may have been exposed to African rodents have been euthanized.
- All other mammals remaining on the premises have completed a 6-week quarantine following the last date of occupation by the aforementioned African rodents and prairie dogs.

Recommendations for Other Infected Premises

Infected premises should be placed under quarantine until the following conditions are met:

- All animals meeting the suspect, probable, or confirmed case definition for monkeypox have been euthanized.
- All prairie dogs have been euthanized.
- Other mammals remaining on the premises have completed a 6-week quarantine following the last date of occupation by the aforementioned infected animals and prairie dogs.

Owners of commercial establishments may choose the following alternative to the 6-week quarantine period: quarantines may be lifted immediately if all mammals on an infected premise are euthanized and the premise is thoroughly cleaned and disinfected prior to restocking. Trade in animals not covered by the CDC/FDA joint order of June 11, 2003, may resume immediately following cleaning and disinfection.

Euthanasia and Disposal of Animals

Animals should be humanely euthanized. (See the AVMA guidelines on humane euthanasia at <http://www.avma.org/resources/euthanasia.pdf> for more information.) Carcasses should **not** be disposed of by burial in a landfill or backyard setting. CDC recommends incineration of carcasses. Animals associated with a human case should be tested for monkeypox. Necropsies should not be performed on animals with suspected monkeypox. Rather, whole carcasses should be double bagged and frozen. To obtain submission

instructions before sending specimens to CDC, consult with DHSS's Section of Disease Investigation at 800/392-0272.

Cleaning of Premises after Removal of an Animal with Monkeypox

Contaminated surfaces should be cleaned and disinfected. Standard household cleaners or disinfectants may be used in accordance with the manufacturer's instructions. Do not dispose of the animal's bedding, cage, toys, or food and water bowls with the household trash or at a dump or landfill because this material may be potentially infectious; contact the state or local health department for instructions. Follow the laundry steps contained in the above section entitled "[Guidance for Persons Who Have Frequent Contact with Animals, Including Pet Owners, Pet Shop Employees, Animal Handlers, and Animal Control Officers](#)" when caring for a quarantined animal.

Recommendations for Follow-Up of Previously Quarantined Facilities

Close public health surveillance of morbidity and mortality of animals on the premises is required during the 6-week quarantine. Evidence of monkeypox based on clinical or laboratory findings results in automatic extension of quarantine. Following the end of the 6-week quarantine or depopulation, cleaning, and disinfection of the premises, trade in animals not covered by the CDC/FDA joint order of June 11, 2003, may resume at commercial facilities; the owners should keep records on all sales and transactions. Close state and federal surveillance of morbidity and mortality of animals on the premise is encouraged for at least 6-weeks after the quarantine is lifted and trade has resumed.

Additional Information

For more information, contact the state or local health department or the CDC Emergency Operations Center at 770-488-7100. Additional information and recommendations will be released as they become available. Updated information will be available at CDC's monkeypox web site at <http://www.cdc.gov/ncidod/monkeypox/>.

Information on Embargo & Prohibition of Certain Rodents & Prairie Dogs [June 19, 2003]

What action have CDC and FDA taken?

On June 11, 2003, CDC and FDA issued a joint order announcing an immediate embargo on the importation of all rodents from Africa due to the potential that these rodents can spread monkeypox virus infection to other animal species and to humans. The joint order also banned within the United States any sale, offering for distribution, transport, or release into the environment, of prairie dogs and six specific African rodent species implicated in the current monkeypox outbreak.

What animals are subject to the order?

The joint order prohibits the importation of all rodents from Africa. In addition, Prairie dogs and the following rodents from Africa may not be distributed, sold, transported, or released into the environment within the United States: Tree squirrels (*Heliosciurus sp.*); Rope squirrels (*Funisciurus sp.*); Dormice (*Graphiurus sp.*); Gambian Giant Pouched Rats (*Cricetomys sp.*); Brush-tailed porcupines (*Atherurus sp.*), Striped mice (*Hybomys sp.*). The joint order applies to animals that are living or dead.

To what extent does this order apply to the import of these animals?

Until further notice, importation of all rodents from Africa is prohibited. This includes rodents in shipments originating in Africa and rodents in transshipments from Africa through other countries.

To what extent does this order apply to distribution of these animals in the United States?

The joint order bans within the United States any transportation, sale, offering for sale or distribution, including release into the environment, of prairie dogs and six specified rodents from Africa. This ban includes any sale or offering for sale or distribution that occurs completely within one state.

May I take my animal to the veterinarian or animal control as directed by my state or local health department?

Individuals may transport prairie dogs and the six specified rodents from Africa to veterinarians or animal control officials or other entities pursuant to guidance or instructions issued by Federal, state, or local government authorities. All other transports, distributions, or sales within the United States of prairie dogs and the six specified rodents from Africa are prohibited.

May I release my prairie dog or one of the specified rodents from Africa into the wild?

No, under no circumstances may individuals release prairie dogs or one of the specified rodents from Africa into the wild or any other public or private environment. This prohibition includes the wilderness, as well as any public or private lands, parks, prairies, or sanctuaries. Individuals who are apprehensive about retaining these animals should contact their state animal control office for information regarding appropriate disposition.

May I take my prairie dog or one of the specified rodents from Africa to a pet "swap meet" (pets for sale or exchange)?

No, individuals may not transport, sell, distribute, or offer for sale or distribution, prairie dogs and the six specified rodents from Africa at pet "swap meets."

May I take my prairie dog or one of the specified rodents from Africa to a school "show and tell" or to a friend's house?

No, CDC and FDA have issued a joint order banning the transport of prairie dogs and six other animals, including tree squirrels; rope squirrels; dormice; Gambian giant pouched rats; brush-tailed porcupines and striped mice. This ban includes all transport of any of these animals, even if the animal is healthy or acquired before April 15, 2003.

If you have a prairie dog, or one of the animals listed above, you can take it to the veterinarian or to animal control as instructed by your state or local health department. No other transport is allowed. Nor is the distribution, or sale of these animals allowed within the United States.

People who violate the joint order may be subject to criminal and/or civil penalties.

What is HHS' authority for taking this action?

These actions are based upon provisions in Title 42 United States Code Section 264 (Section 361 of the Public Health Service Act) which authorize HHS to make and enforce regulations necessary to prevent the introduction, transmission, or spread of communicable diseases from foreign countries into the United States, or from one State or possession into any other State or possession. CDC and FDA have implemented this statute through regulations, and those that specifically authorize the joint order can be found at 21 CFR 1240.30, 42 CFR 70.2, and 42 CFR 71.32(b).

How does this action affect the role of state and local health departments?

In order to implement and enforce the joint order, CDC, FDA, and other involved federal agencies will work collaboratively with state and local veterinary, agriculture, and public health authorities. HHS has authority to assist state and local authorities in the prevention and suppression of communicable diseases and to accept state and local assistance in the enforcement of federal communicable disease control regulations. In addition, the joint order does not supercede any action that may be lawfully undertaken by state or local authorities except to the extent that any such state or local action conflicts with the joint order. Some states involved in the outbreak, such as Wisconsin and Illinois, have already taken regulatory action. We expect that other states and local jurisdictions may do likewise.

Who will enforce the provisions of the order?

A number of federal agencies have authorities related to the animals involved. FDA will work with the Department of Agriculture, State and local health authorities, and CDC to make sure that people who trade in prairie dogs and the listed rodent species as well as other people who may own these animals are aware of the ban and follow it. CDC and FDA will work with other appropriate federal agencies, such as the Bureau of Customs and Border Protection of the Department of Homeland Security, and the United States Fish and Wildlife Service of the Department of Interior, who have statutory responsibility for enforcing the importation embargos.

What are the consequences of violating the joint order?

CDC and FDA are most concerned with bringing individuals into compliance with the joint order as a means of preventing the spread of monkeypox virus infection to humans and other animals. However, individuals who violate the joint order may be subject to criminal and/or civil penalties.

Related Links

The embargo order is available at <http://www.cdc.gov/ncidod/monkeypox/pdf/embargo.pdf>.

A CDC fact sheet entitled “Embargoed Animals and Monkeypox Virus,” which includes pictures of some of the embargoed animals, is available at <http://www.cdc.gov/ncidod/monkeypox/animals.htm>.

DHSS Distribution: DHSS web page and providers managing suspect cases.