



Questions and Answers About Monkeypox

Overview: About Monkeypox

What is monkeypox?

Monkeypox is a rare viral disease that occurs mainly in the rain forest countries of central and west Africa. The disease was first discovered in laboratory monkeys in 1958. Blood tests of animals in Africa later found evidence of monkeypox infection in a number of African rodents. The virus that causes monkeypox was recovered from an African squirrel. Laboratory studies showed that the virus also could infect mice, rats, and rabbits. In 1970, monkeypox was reported in humans for the first time. In June 2003, monkeypox was reported in prairie dogs and humans in the United States.

What is the cause of monkeypox?

Monkeypox is caused by *Monkeypox virus*, which belongs to the orthopoxvirus group of viruses. Other orthopoxviruses that cause infections in humans include variola (smallpox), vaccinia (used for smallpox vaccine), and cowpox viruses.

What are the clinical features of monkeypox?

In humans, monkeypox is similar to smallpox, although it is often milder. Unlike smallpox, monkeypox causes lymph nodes to swell (lymphadenopathy). The incubation period for monkeypox is about 12 days (range 7 to 17 days). 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 the appearance 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.

How long does monkeypox last?

The illness typically lasts for 2 to 4 weeks.

Is monkeypox fatal?

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% to 10%.

How do people get monkeypox?

Monkeypox can spread to humans from an infected animal through an animal bite or direct contact with the animal's lesions or body fluids. The disease also can be spread from person to person, although it is much less infectious than smallpox. The virus is thought to be transmitted by respiratory droplets during direct and prolonged face-to-face contact. In addition, it is possible monkeypox can be spread by direct contact with body fluids of an infected person or with virus-contaminated objects, such as bedding or clothing.

Is there a treatment or vaccine for monkeypox?

Currently, there is no proven, safe treatment for monkeypox. Smallpox vaccine has been reported to reduce the risk of monkeypox among previously vaccinated persons in Africa. 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.

November 4, 2003

Page 1 of 7

Questions and Answers About Monkeypox

(continued from previous page)

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 more information about CDC recommendations for the use of smallpox vaccine to protect against monkeypox, see www.cdc.gov/od/oc/media/monkeypx.htm.

Monkeypox in the United States

Where has human monkeypox been reported in the United States?

For current information about the number of human monkeypox cases under investigation in the United States, see the CDC case count page www.cdc.gov/od/oc/media/monkeypx.htm. Check the CDC Web site (www.cdc.gov/ncidod/monkeypox) for the monkeypox case definition (www.cdc.gov/ncidod/monkeypox/casedefinition.htm) and other current information about the outbreak.

How did these people become infected with monkeypox virus?

On the basis of preliminary investigations, it appears that most of the patients became ill after having close contact with infected prairie dogs that had been purchased as pets. Some patients also had contact with other persons with monkeypox in a household setting. No cases of monkeypox that could be attributed exclusively to person-to-person contact have been confirmed.

What evidence is there that monkeypox virus causes these illnesses?

The clinical features of the illness in U.S. patients – fever, headache, muscle aches, and rash – are consistent with those of monkeypox. There is also strong laboratory evidence of monkeypox. Scientists at the Marshfield Clinic in Marshfield, Wisconsin, recovered viral isolates from one of the first patients and a prairie dog. Using an electron microscope, they found that the virus had the size and appearance of a poxvirus (see this page <http://research.marshfieldclinic.org/crc/prairiedog.asp> for electron microscopy images). Laboratory tests at CDC – including several PCR-based assays, serologic tests, electron microscopy, immunohistochemistry, and gene sequencing – confirmed these results and showed that the virus is *Monkeypox virus*. Many of the reported cases have had laboratory evidence of monkeypox virus. For current information about the number of human monkeypox cases under investigation in the United States, see the CDC case count page (www.cdc.gov/od/oc/media/monkeypx.htm).

Has monkeypox previously been reported in the United States?

No. Prior to the recent report of the disease in the United States, community-acquired monkeypox had never been reported outside of Africa.

How was monkeypox introduced in the United States?

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. These rodents included rope squirrels (*Funisciurus* sp.), tree squirrels (*Heliosciurus* sp.), Gambian giant rats (*Cricetomys* sp.), brush-tailed 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 United States, 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.

November 4, 2003

Page 2 of 7

Questions and Answers About Monkeypox

(continued from previous page)

What should people do if they think they have been exposed to an animal or person with monkeypox?

Persons who think they may have been exposed to a person or an animal (e.g., pet prairie dog) with monkeypox should contact their health care provider and their state or local health department.

Could I have monkeypox?

It appears that most people who are ill with monkeypox in the United States 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. If you have not had close contact with a wild or exotic animal, then the risk that you might have monkeypox is very low.

What measures have been taken to control the outbreak?

CDC and the public health departments in the affected states, together with the US Department of Agriculture, the Food and Drug Administration, and other agencies, are participating in a variety of activities to prevent further spread of monkeypox and identify the source of the outbreak. To assist with the investigation and outbreak response, CDC has taken the following steps:

- Activated its Emergency Operations Center.
- Deployed teams of medical officers, epidemiologists, and other experts to several states to assist with the investigation.
- Conducted extensive laboratory testing on specimens from humans and animals thought to have been exposed to monkeypox.
- Issued interim U.S. case definitions for human monkeypox and for animal monkeypox.
- Issued interim guidelines on infection control and exposure management for patients in the health care and community settings.
- Issued an immediate embargo and prohibition on the importation, interstate transportation, sale, and release into the environment of certain rodents and prairie dogs.
- Provided ongoing assistance to state and local health departments in investigating possible cases of monkeypox in both humans and animals in the United States.
- Worked with state and federal agencies to trace the origin and distribution of potentially infected animals.
- Issued interim guidance on the use of smallpox vaccine, cidofovir, and vaccinia immune globulin in the setting of an outbreak of monkeypox.
- Issued interim guidelines for veterinarians.
- Issued interim guidance for persons who have frequent contact with animals, including pet owners, pet shop employees, animal handlers, and animal control officers.

Additional information will be posted on CDC's Web site (www.cdc.gov/ncidod/monkeypox) as it becomes available.

Pets and Monkeypox

How is monkeypox spread from animals to humans?

People can get monkeypox from an infected animal if they are bitten or touch the animal's blood, body fluids, or its rash. It is possible that the virus also might be spread through contact with respiratory droplets from an infected animal during close contact or with objects (for example, the animal's bedding) contaminated with the virus.

What kinds of animals can get monkeypox?

There is not enough information to determine all the types of animals that may become ill with monkeypox. Until more is known about this disease, it should be assumed that any mammal – including

November 4, 2003

Page 3 of 7

Questions and Answers About Monkeypox

(continued from previous page)

common household pets (e.g., dogs, cats) and “pocket pets” (e.g., hamsters or gerbils) – could get monkeypox if exposed to another animal that is infected.

What are the signs of monkeypox in animals?

In the current U.S. outbreak, illness in animals has been reported to include fever, cough, discharge from the eyes, and enlarged lymph nodes, followed by a bumpy or blister-like rash. Pets that have monkeypox also may appear to be very tired and may not be eating or drinking. It is possible that some animals may have only minimal signs of illness. Some animals have died and others have recovered.

Can my pet get the smallpox vaccine to protect it from monkeypox?

No, smallpox vaccination is not recommended for pets.

What should I do if I think my pet might have 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 with soap and hot water after contact with the animal and any object that may be contaminated with virus.
- Clothing should be changed after feeding or caring for the animal. 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 moved around a lot. Infectious particles could be spread and breathed in.
- 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.
- 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.

If my pet has monkeypox, what will happen to it?

If your vet determines that your pet has monkeypox, he or she will probably recommend that the animal be humanely euthanized to prevent further spread of this disease. This decision may be difficult for you, but it is the best step for the safety of family, friends and community. If monkeypox were to establish itself in the United States, many animals and people could become ill.

Embargo and Prohibition of Certain Rodents and Prairie Dogs

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 genera of African rodents implicated in the current monkeypox outbreak. On November 4, 2003, the joint order was replaced by an interim final rule which maintains the bans on importation of African rodents and the sale, distribution, transport, and release into the environment as previously described.

November 4, 2003

Page 4 of 7

Questions and Answers About Monkeypox

(continued from previous page)

What animals are subject to the interim final rule?

The interim final rule prohibits the importation of all rodents from Africa. In addition, prairie dogs and the following types of 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.), and striped mice (*Hybomys* sp.). The interim final rule applies to animals that are living or dead.

Does the rule apply to African rodents that do not come directly from Africa?

Yes, the rule covers any rodents that were caught in Africa and then shipped directly to the United States or shipped to other countries before being imported to the United States. The prohibition also applies to rodents whose native habitat is in Africa, even if those rodents were born elsewhere. A broad import ban on African rodents is necessary because there is no quick, practical method for determining whether a specific animal was born in a particular geographic region.

Does the rule apply to dead animals and animal products?

Yes, the monkeypox virus can remain infectious in bushmeat (a term used to describe meat obtained from animals taken in the wild or the "bush") and CDC is unaware of data demonstrating the safety of raw or even prepared bushmeat. Preparation methods such as smoking, salting, or brining bushmeat may slow down bushmeat's decay, but may not render bushmeat free of infectious agents. Therefore, CDC's rule applies to live and dead African rodents and also to products derived from such animals.

Are there any exceptions to the rule?

Yes, the rule recognizes that there are limited circumstances warranting exemptions from some prohibitions, such as the need to transport an animal for scientific, exhibition, or educational purposes. Consequently, under the CDC rule, an individual may seek written permission from CDC to import any rodents that were obtained, directly or indirectly, from Africa, or whose native habitat is Africa, or any other kind of animal whose importation the Director has prohibited by order. The interim final rule describes the procedures for seeking written permission from CDC and the information that should be submitted with any request and also states that the request must be limited to scientific, exhibition (such as exhibition of an animal at a zoo), or educational purposes. CDC will respond, in writing, to all requests.

Are there any exceptions for processed products, such as taxidermied animals or animal trophies?

Yes, some individuals have asked whether they could import taxidermied animals or animal trophies, while other questions have involved products derived from animals, such as brushes that use animal hair and animal skins. If these products are properly processed to render them non-infectious, they pose no disease risk. Such processes would include: (1) inactivation by Heat (heated to an internal temperature of 70°C or placed in boiling water for a minimum of 30 minutes); (2) preservation in 2% formaldehyde; chemically treating in acidic or alkaline solutions (soaking in a solution below pH 3.0 or above pH 11.5 for 24 hours); or (3) the use of hypertonic salt. Products derived from African rodents, if treated using one of these methods, are not subject to the import prohibition at § 71.56(a)(1) and may be imported without written permission from CDC. Similarly, fully taxidermied African rodents and completely finished trophies present no disease risk and therefore may be imported without written permission from CDC.

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 genera of 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

Questions and Answers About Monkeypox

(continued from previous page)

dogs and the six specified genera of rodents from Africa are prohibited, unless written permission is obtained from the FDA.

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 genera of 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 genera of 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 types of 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?

Section 361 of the Public Health Service Act (PHS Act) (42 U.S.C. 264) serves as the principal legal authority for both the CDC and FDA Rules. Section 361 of the PHS Act gives the Secretary of Health and Human Services the authority to make and enforce regulations to prevent the introduction, transmission, and spread of communicable diseases from foreign countries into the United States or from one State to another State. CDC's portion of the rule focuses on imported animals while FDA's portion focuses on animals moving between and within States.

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 interim final rule 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 interim final rule. 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

November 4, 2003

Page 6 of 7

Questions and Answers About Monkeypox

(continued from previous page)

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

- Restrictions on African Rodents and Prairie Dogs, Interim Final Rule, see edocket.access.gpo.gov/2003/03-27557.htm

For more information, visit www.cdc.gov/ncidod/monkeypox or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)