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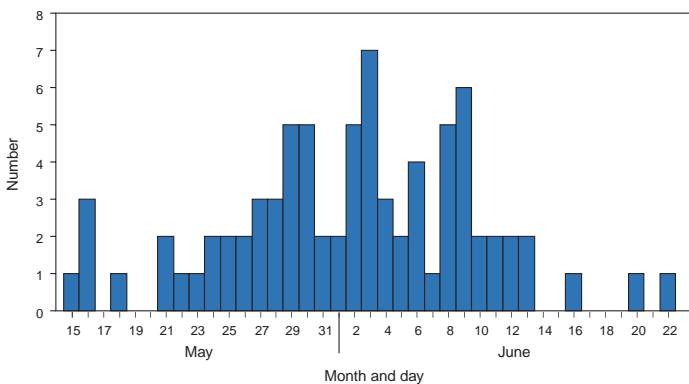
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Update: Multistate Outbreak of Monkeypox — Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, 2003

CDC and state and local health departments continue to investigate cases of monkeypox among persons who had contact with wild or exotic mammalian pets or persons with monkeypox (1–3). This report updates epidemiologic, laboratory, and smallpox vaccine use data for U.S. cases, and summarizes the laboratory-based evidence implicating imported African rodents as the probable source of the outbreak.

As of July 2, a total of 81 cases of monkeypox have been reported to CDC from Wisconsin (39), Indiana (22), Illinois (16), Missouri (two), Kansas (one), and Ohio (one) (Figure); these include 32 (40%) cases laboratory-confirmed at CDC and 49 (60%) suspect and probable cases under investigation (Table). One case was excluded from those reported in the previous update because it met the exclusion criteria outlined in the updated case definition, and three were added (3). Of the 81 cases, 43 (53%) were among females; the median age was 27 years (range: 1–51 years). Age data were unavailable for one patient. Among 78 patients for whom data were available, 19 (24%) were hospitalized. The previously reported child with painful adenopathy associated with diffuse pox lesions improved clinically and was discharged from the hospital

FIGURE. Number* of persons with monkeypox, by date of first symptom onset — Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, May 15–July 1, 2003



* N = 79. Includes laboratory-confirmed cases and cases meeting suspect or probable case definition. Dates of illness onset were not available for two of 81 patients.

TABLE. Number* and percentage of laboratory-confirmed monkeypox cases, by selected characteristics — United States, 2003

Characteristic	No.	(%)
State		
Illinois	8	(25)
Indiana	7	(22)
Kansas	1	(3)
Missouri	2	(6)
Wisconsin	14	(44)
Possible sources of monkeypox exposure		
Prairie dog(s)	13	(41)
Prairie dog(s) and human case(s)	14	(44)
Premises with prairie dogs	5	(16)
Age group (yrs)		
6–18	11	(34)
19–51	21	(66)
Sex		
Female	15	(47)
Male	17	(53)
Clinical features		
Rash	32	(100)
Fever	27	(87)
Respiratory symptoms†	25	(78)
Lymphadenopathy	22	(69)
Hospitalized§		
16	(50)	
Previous smallpox vaccination¶		
8	(25)	

* N = 32.

† Includes one or more of the following symptoms: cough, sore throat, shortness of breath, and nasal congestion.

§ Some persons were hospitalized for isolation precautions and not because of severe illness.

¶ Information was available for 22 (69%) of the laboratory-confirmed cases.

after 6 days (3). Confirmatory testing of skin rash lesions at CDC was positive for monkeypox virus.

Of the 81 reported cases, 31 have been laboratory confirmed at CDC for monkeypox by detection of virus in skin rash lesions by using culture, polymerase chain reaction (PCR), immunohistochemical testing, and/or electron microscopy; one case was confirmed by virus isolation and PCR testing of an oropharyngeal specimen. The number of confirmed cases by state includes Wisconsin (14), Indiana (seven), Illinois (eight), Missouri (two), and Kansas (one). For these laboratory-confirmed cases, the onset of illness ranged from May 16 to June 20. All confirmed patients reported a rash, and all but one reported at least one other clinical sign or symptom,

including fever, respiratory symptoms, and/or lymphadenopathy. The median incubation period* was 12 days (range: 1–31 days). The majority of patients with confirmed monkeypox reported exposure to wild or exotic mammals, including prairie dogs; some patients also had contact with other persons with monkeypox virus infection in a household setting. No cases of monkeypox that could be attributed exclusively to person-to-person contact have been confirmed.

Use of Smallpox Vaccine

To prevent further transmission of monkeypox, 28 residents of six states have received smallpox vaccine since June 13; recipients included 26 adults and two children. Vaccine was administered to two laboratory workers and two health-care workers pre-exposure and to 24 persons post-exposure (10 health-care workers, seven household contacts, three laboratory workers, two public health veterinarians, one public health worker, and one work contact). One child vaccinated post-exposure had a rash 6 days after vaccination; PCR testing of skin lesions from the child was positive for monkeypox virus. The child lived in a household with two ill prairie dogs and an adult with laboratory-confirmed monkeypox virus infection. One prairie dog had been present in the household for approximately 1 year and became ill after the introduction of a second ill prairie dog into the home. The child's period of exposure began 25 days before vaccination, when the ill prairie dog was brought into the home; the child's rash began 12 days after the onset of rash illness in the adult household member.

Animal Laboratory Testing

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 (1,2). 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,

* Defined as first possible exposure date to illness onset date; however, some persons reported intermittent or continuous exposure.

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.

CDC had recommended previously that state health officials place quarantines on commercial facilities or households that had infected animals or received African rodents from the April 9 shipment (1). CDC has issued guidance on the quarantine and euthanasia of all rodents from the April 9 shipment, as well as prairie dogs that were exposed to the imported rodents or other animals with illnesses consistent with the case definition for monkeypox (<http://www.cdc.gov/ncidod/monkeypox/quarantineremoval.htm>). Animals that are euthanized according to the guidance should be incinerated and not buried in a landfill or backyard setting.

CDC and the Food and Drug Administration issued a joint order on June 11 prohibiting the importation of any African rodent. In addition, the order prohibits the sale and transport within the United States of prairie dogs and six genera of African rodents (<http://www.cdc.gov/ncidod/monkeypox/pdf/embargo.pdf>). To prevent the spread of monkeypox virus into domestic or wild animal populations, the order also prohibits releasing any of these animals into the wild. State and local health departments or departments of agriculture should be consulted for guidance on the safe disposal of animals. The joint order remains in effect regardless of the actions related to the guidance for quarantine and euthanasia of animals of concern.

Health-care providers, veterinarians, and public-health officials who suspect monkeypox in animals or humans should report such cases to their state and local health departments. State health departments should report suspect cases to CDC, telephone 770-488-7100. An updated case definition with revised case exclusion criteria is available at <http://www.cdc.gov/ncidod/monkeypox/index.htm>. Clinical specimens should be submitted for testing after consultation with the state and local health department. Interpretation of laboratory results requires completion of specimen submission forms, which are available at <http://www.cdc.gov/ncidod/monkeypox/diagspecimens.htm>.

Reported by: State and local health departments. Monkeypox investigation team, CDC.

References

1. CDC. Multistate outbreak of monkeypox—Illinois, Indiana, and Wisconsin, 2003. *MMWR* 2003;52:537–40.
2. CDC. Update: multistate outbreak of monkeypox—Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, 2003. *MMWR* 2003;52:561–4.
3. CDC. Update: multistate outbreak of monkeypox—Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin, 2003. *MMWR* 2003;52:589–90.

All *MMWR* references are available on the Internet at <http://www.cdc.gov/mmwr>. Use the search function to find specific articles.

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