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## Rabies, animal

### **Overview**

Rabies is a viral disease of mammals and is transmitted primarily through bites. Annually, 6,000 to 8,000 rabid animals are detected in the United States, with approximately 92 percent of the cases in wild animals. Rabies is found naturally in Missouri, occurring primarily in bats and skunks, although it is also found sporadically in other animals, including domestic species such as dogs, cats, horses, and cattle. The annual number of rabid animals reported in Missouri during the ten-year period 2002 through 2011 ranged from 29 to 73 (average of 55 cases per year). It should be noted that the only specimens tested are those involved in situations for which there is a public health concern (e.g., animal bite to a person), and the annual number of cases does not reflect the true prevalence of animal rabies in the state (i.e., these data reflect merely “the tip of the iceberg.”)

The incubation period (time from exposure to signs of illness) of rabies in domestic animals such as dogs and cats can be quite variable, but averages three to six weeks. The first sign of rabies in animals is often a change in temperament or behavior. For example, a friendly dog may become reclusive (or vice versa) and nocturnal wild animals such as skunks may become active during the daytime. In the next stage, classically referred to as “furious” rabies, the animal will attack and bite other animals, objects, or people. The final stage is referred to as “dumb” rabies, and at this point the animal is partially or completely paralyzed and close to death. Often, there is paralysis of the throat muscles, resulting in an inability to swallow and profuse salivation. The animal may want to drink water, but painful throat muscle spasms prevent this. Excess salivation may result in “frothing at the mouth,” but this characteristic is often observed in animals dying from other causes as well. An animal may go through all of these stages or only some of them. Death is virtually certain within ten days of onset of signs. A dog, cat, or ferret may be infectious (have rabies virus in its saliva) for several days before it develops any outward signs of disease. Whether this is true, and for what time period, is unknown for other animal species.

For a more complete description of animal rabies, refer to the following texts:<sup>1,2,3,4,5</sup>

- [Control of Communicable Diseases Manual \(CCDM\)](#).
- [Red Book, Report of the Committee on Infectious Diseases](#).
- [Compendium of Animal Rabies Prevention and Control, 2011](#). National Association of State Public Health Veterinarians, Inc.
- [Human Rabies Prevention - United States, 2008. Recommendations of the Advisory Committee on Immunization Practices \(ACIP\)](#).
- [Use of a Reduced \(4-Dose\) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies. Recommendations of the Advisory Committee on Immunization Practices](#).

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## **1997 Case Definition – Rabies, animal<sup>7</sup> - (1/14)**

### **Laboratory criteria for diagnosis**

- A positive direct fluorescent antibody test (preferably performed on central nervous system tissue).
- Isolation of rabies virus (in cell culture or in a laboratory animal).

### **Case classification**

*Confirmed:* A case that is laboratory confirmed.

### **Information Needed for Investigation**

- **Rabies (animal) is reportable within one day in accordance with [19 CSR 20-20.020, Reporting Communicable, Environmental and Occupational Diseases](#).** It shall be reported to the [local health authority](#) or to the Missouri Department of Health and Senior Services (MDHSS) immediately upon first knowledge or suspicion by telephone, facsimile or other rapid communication.
- **Verify the diagnosis.** Determine laboratory tests conducted and the results.

### **Notification**

- Contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist](#) for the District, or MDHSS – Office of Veterinary Public Health (OVPH), phone (573) 526-4780, Fax (573) 751-6185, or Bureau of Communicable Disease Control and Prevention (BCDCP) phone (573) 751-6113, Fax (573) 526-0235, **or** for after hours notification contact the MDHSS’ ERC at (800) 392-0272 (24/7) if an animal originating from Missouri tests positive for rabies at an out-of-state laboratory, or if a Missouri resident is exposed to a rabid animal out-of-state. **COMMENT:** Local Public Health Agencies (LPHAs) are normally informed by MDHSS of animals that test positive for rabies at the Missouri State Public Health Laboratory (MSPHL).
- If a case(s) is associated with a childcare center, OVPH / BCDCP or the LPHA will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a long-term care facility, OVPH / BCDCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center, OVPH / BCDCP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.

### **Control Measures**

- **Public education remains an important part of rabies prevention.** Although rabies is a fatal disease that has no known cure, it is preventable with timely and proper administration of rabies postexposure prophylaxis. Public education should emphasize avoiding exposure to bats and other potentially rabies-infected wildlife and the importance of proper wound care and seeking prompt medical attention after potential exposures from such animals. (e.g. Any person who has been bitten, scratched, or somehow exposed to the saliva of a potentially rabid animal should see a physician as soon as possible for postexposure treatment).

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- Vaccinate your pets (dogs, cats, ferrets) and livestock (sheep, cattle, horses) against rabies.
- Don't let your pets wander unsupervised.
- Spay or neuter your pets; pets that are fixed are less likely to leave home and become strays.

An excellent informational sheet, [Rabies: Questions and Answers - Information about the disease and vaccines](#) is available from the Immunization Action Coalition. Additional resources are also available on CDC's website at: <http://www.cdc.gov/rabies/> and <http://www.cdc.gov/vaccines/vpd-vac/rabies/default.htm>.

- **The District Communicable Disease Coordinator and/or OVPH staff** will work with LPHAs to investigate the case and to ensure proper animal disposition/patient care.
- Follow-up measures will be dependent on the potential risk to the public from exposure to a rabid or suspected rabid animal. In the case of known or possible human exposure to a rabid (or potentially) rabid animal, rabies postexposure prophylaxis (RPEP) should be considered.
- **Domestic Animals:**
  - If the exposure was to a healthy dog, cat, or ferret and was provoked, the animal may be confined for ten days from the date of exposure and observed for symptoms of rabies. An unvaccinated dog, cat, or ferret may be quarantined as long as the incident was provoked and the animal is in good health. If the animal exhibits clinical signs of rabies during the quarantine period, the patient should immediately begin RPEP and the animal should be euthanized and tested for rabies. RPEP may be discontinued if the laboratory test is negative. RPEP is not required if no symptoms appear during the ten-day confinement period. The Centers for Disease Control and Prevention (CDC) has stated that there are no known treatment (RPEP) failures in the United States using the present treatment regimen, as long as it is initiated in a timely fashion and accomplished according to recommended guidelines.
  - Exposure to domestic rodents (mice, rats, gerbils, hamsters, guinea pigs, etc.) and lagomorphs (rabbits, hares) rarely requires RPEP or laboratory testing of the animal, but each exposure should be evaluated on a case-by-case basis.
  - Exposure to other domestic animals (horses, cattle, sheep, swine, etc.) should be evaluated on a case-by-case basis in consultation with MDHSS staff.
- **Wild Animals:**
  - Exposure to wild terrestrial carnivores (skunks, raccoons, foxes, coyotes, etc.) and bats: consideration should be given to immediate initiation of RPEP with concomitant laboratory testing of the animal. Prophylaxis may be terminated if the laboratory test is negative.
  - Exposure to small, wild rodents (mice, rats, squirrels, chipmunks, etc.) and lagomorphs (rabbits, hares) rarely requires RPEP or laboratory testing of the animal, but each exposure should be evaluated on a case-by-case basis.
  - Exposure to large, wild rodents (woodchucks [groundhogs], beavers, etc.) should be evaluated on a case-by-case basis in consultation with MDHSS staff.
  - Exposure to exotic animals maintained in zoological parks, petting zoos, privately owned, etc. should be evaluated on a case-by-case basis in consultation with MDHSS staff.

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Unvaccinated dogs, cats, and ferrets exposed to a known rabid animal should be euthanized immediately. Less preferably, the animal should be placed in strict isolation (i.e., at an animal control or veterinary facility) for six months and vaccinated one month before being released. Animals with expired vaccinations should be evaluated on a case-by-case basis. Dogs, cats, and ferrets that are currently vaccinated should be revaccinated immediately, kept under the owner’s control, and observed for 45 days. Vaccination of animals for rabies in Missouri may only be legally performed by a licensed veterinarian.<sup>8</sup>

All species of livestock are susceptible to rabies; cattle and horses are among the most frequently infected. Livestock exposed to a rabid animal and currently vaccinated with a vaccine approved by the USDA for that species should be revaccinated immediately and observed for 45 days. Unvaccinated livestock should be slaughtered immediately. Less preferably, the animal should be kept under close observation for six months. Additional recommendations regarding disposition of livestock and utilization of meat, milk, etc. from exposed animals may be found in the [Compendium of Animal Rabies Prevention and Control, 2011](#).<sup>3</sup>

Bats are of special concern for the transmission of rabies virus to humans or domestic animals since seemingly insignificant physical contact with bats may result in viral transmission even without a clear history of a bite. During 1990–2007, a total of 34 naturally acquired bat-associated human cases of rabies were reported in the United States. In six cases, a bite was reported; in two cases, contact with a bat and a probable bite were reported; in 15 cases, physical contact was reported (e.g., the removal of a bat from the home or workplace or the presence of a bat in the room where the person had been sleeping), but no bite was documented; and in 11 cases, no bat encounter was reported. In these cases, an unreported or undetected bat bite remains the most plausible hypothesis because the genetic sequences of the human rabies viruses closely matched those of specific species of bats.<sup>4</sup> Therefore, special consideration should be given to those situations where a person was possibly exposed to a bat but who might be unaware that a bite or direct contact had occurred (e.g., child, mentally disabled person, intoxicated person, a sleeping person awakens to find a bat in the same room). Clustering of human cases associated with bat exposures has never been reported in the United States (e.g., within the same household or among a group of campers where bats were observed during their activities).

**Rabies Alerts**

A county is placed under a rabies alert when a single rabid domestic animal or an unusually high number of rabid wild animals are detected in the county. A rabies alert does not place limitations on the movement of animals into, within, or out of the county. Instead, a rabies alert is merely a statement that animal rabies is apparently increasing and thus could pose a human health threat. The respective LPHA is notified of a rabies alert declaration for its county by means of a letter and electronic message from MDHSS. The letter and message describe the circumstances that resulted in the alert and which request that the LPHA take appropriate actions such as education of citizens and notification of medical providers regarding the increased rabies risk. Notification letters are also sent to county veterinarians, county commissioners, and the respective state senator/representative(s), notifying them of the situation and requesting that they take actions appropriate to their position.



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### Programs for Uninsured and Underinsured Patients<sup>9</sup>

Patient assistance programs that provide medications to uninsured or underinsured patients are available for rabies vaccine and immune globulin.

Sanofi Pasteur’s Patient Assistance Program (providing Imogam<sup>®</sup> Rabies-HT and Imovax<sup>®</sup> Rabies as well as other vaccines) is now administered through the Franklin Group. A healthcare professional or patient can either contact the Franklin Group directly, or call the customer service team (1-800-VACCINE) who will transfer them to the Franklin Group. The Franklin Group will review the application against the eligibility criteria. For more information about the program or to request an application, please contact the Sanofi Pasteur, Inc. Patient Assistance Program (Franklin Group) at 1 (866) 801-5655. Instructions and request forms are available at the [Sanofi Patient Connection](#) website.

Novartis’ Patient Assistance Program for RabAvert<sup>®</sup> is managed through RX for Hope and can be accessed at 1-800-589-0837. Instructions and request forms are available at the Rx for Hope website [RabAvert Patient Assistance Program](#).

### Control Measures

- See the [Control of Communicable Diseases Manual](#), Rabies (Hydrophobia), “Methods of control.”<sup>1</sup>
- See the [Red Book](#), Rabies, “Control Measures.”<sup>2</sup>
- See the [Compendium of Animal Rabies Prevention and Control, 2011](#).<sup>3</sup>
- See [Human Rabies Prevention - United States, 2008 Recommendations of the Advisory Committee on Immunization Practices \(ACIP\)](#).<sup>4</sup>

### Laboratory Procedures for Animal Specimens

Generally, specimens for rabies testing will only be accepted for testing at the MSPHL when there is known or significant potential exposure of any of the following to a possibly infected animal: (1) humans, (2) pets, (3) domesticated animals such as livestock and horses, (4) exotic or non-native animal species maintained for husbandry purposes or in zoos.

Specimens for rabies testing will not be accepted in the following instances: (1) animals (including bats) when there has been no exposure history as described above, (2) decomposed or destroyed brains (when testing material is unavailable), (3) juvenile bats submitted with the mother bat.

Rodents: The laboratory rarely accepts domesticated rodents such as mice, rats, gerbils, hamsters, or guinea pigs for rabies testing because of their extremely low rabies risk. Wild rodents may be accepted and tested when a human bite has occurred (this is normally limited to unprovoked bite situations, which are uncommon).

Exceptions to this policy will be evaluated on a case-by-case basis in consultation with the State Public Health Veterinarian or the District Communicable Disease Coordinator. Exceptions must be authorized by the MSPHL.

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Animal specimen submission requirements, testing policy, and information pertaining to the courier service and discontinuation of weekend rabies testing are provided on the MSPHL web site at <http://health.mo.gov/lab/rabies.php>. Rabies specimen submission kits can be obtained free of charge from the MSPHL by calling (573) 751-3334. Each kit includes an absorbent packet, inner protective cover, screw-top pail with threaded cover, foam cooler with lid, gel pack/refrigerant, and instruction sheet.

### **Reporting Requirements**

**Rabies (animal) is reportable within one day in accordance with 19 CSR 20-20.020, Reporting Communicable, Environmental and Occupational Diseases.** It shall be reported to the local health authority or to MDHSS immediately upon first knowledge or suspicion by telephone, facsimile or other rapid communication. The MDHSS may be contacted afterhours through the MDHSS/ERC by calling (800) 392-0272 (24/7). The MSPHL is the only laboratory that conducts animal rabies testing in Missouri. The MSPHL: telephones positive test results to the submitter; telephones positive and unsatisfactory results to OVPH and/or the BCDCP; faxes all test results to LPHAs of counties in which submitters are located via its electronic laboratory information system (OpenELIS). OVPH and/or BCDCP report these results and perform follow-up as described above under Control Measures. Refer to RSMo 322.140 and RSMo 322.145 regarding responsibilities of the owner of an animal that may have transmitted rabies or other zoonotic disease.<sup>10</sup>

As a Nationally Notifiable Condition, **confirmed** animal rabies cases (*Imported from outside continental US within past 60 days*) are an **IMMEDIATE, URGENT** report to the Centers for Disease Control and Prevention (CDC). **IMMEDIATE, URGENT** reporting requires MDHSS to call the CDC EOC at 770-488-7100 within 24 hours of a case meeting the notification criteria; followed by submission of an electronic case notification via (WebSurv) in the next regularly scheduled electronic transmission.

As a Nationally Notifiable Condition, , **confirmed** animal rabies cases (*Animal not imported within past 60 days*) are a **STANDARD** report to the Centers of Disease Control and Prevention (CDC). **STANDARD** reporting requires the Missouri Department of Health and Senior Services (MDHSS) to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.

➤ MDHSS will report to CDC following the above reporting criteria (see boxes).

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