RABIES GUIDANCE FOR PENNSYLVANIA HEALTH PROFESSIONALS

Rabies is a nearly always fatal, neurological disease occurring in mammals. Rabies is transmitted most frequently through the bite of an infected animal. There are typically between 400-500 cases of animal rabies reported in Pennsylvania each year. Human cases are rare in the United States. The last human case in Pennsylvania occurred in 1984. If a human is bitten or has an exposure to the saliva of a rabid or potentially rabid animal, the person should be evaluated for rabies post-exposure prophylaxis (PEP). PEP is highly effective in preventing rabies in humans if administered prior to the onset of rabies symptoms.

In Pennsylvania, the animals considered the most significant risk for rabies transmission to humans include bats and wild terrestrial mammals. Of lesser risk are cats, dogs and ferrets. Livestock, rabbits and small rodents are considered very low risk for rabies transmission.

Assessing a patient’s rabies risk associated with various animals can be complicated. The following information and algorithms are provided to guide you in assessing this risk. Consultation with the Pennsylvania Department of Health is available seven days a week/24 hours a day. Contact the health department at 1-877-724-3258 for assistance. As a reminder, all animal bites are reportable to the health department within 24 hours using the Animal Bite Report form.

DEFINITIONS

Significant Human Exposure - Any bite, scratch, or other situation in which saliva or central nervous system (CNS) tissue of a potentially rabid animal may have entered a fresh open wound or come into contact with the mucous membrane by contacting the eye, mouth or nose. In most instances, touching or handling a potentially rabid animal or another animal or inanimate object that has had contact with a rabid animal does not constitute an exposure unless wet saliva or CNS tissue may have entered a fresh, open wound or had contact with a mucous membrane. Contact with bats requires special consideration, since a person may not know if an exposure has occurred. See Bat section (PAGE 3) for important information about bat exposures.

Open Wound – A wound that has bled within the last 24 hours.

Currently Immunized Against Rabies - An animal is currently immunized against rabies if a vaccination certificate is available that describes the animal adequately and documents that the animal received rabies vaccine approved by the United State Department of Agriculture (USDA) administered or supervised by a licensed veterinarian; the duration of immunity must be adequate for that animal's species and age as outlined in the Compendium of Animal Rabies Prevention and Control (http://www.cdc.gov/mmwr/pdf/rr/rr6006.pdf) or described on the USDA approved vaccine label. In lieu of a vaccination certificate, the records of the attending veterinarian may suffice as proof of immunization. Animals brought into this country from other countries must satisfy United States requirements for immunization against rabies. Often this will require re-vaccination once in the United States.

Signs of Rabies – Clinical signs of rabies in animals may initially be nonspecific and include lethargy, fever, vomiting and anorexia. The signs may become more severe as the disease progresses and may include cerebral dysfunction, cranial nerve dysfunction, ataxia, weakness, paralysis, seizures, difficulty breathing, difficulty swallowing, excessive salivation, abnormal behavior, aggression and/or self-mutilation.

Provoked/Unprovoked Attack - An attack is considered "provoked" and not a sign of rabies if a domestic animal is placed in a situation such that an expected reaction would be to bite or attack.

This would include, but not be limited to, invasion of an animal's territory, attempting to pet or handle an unfamiliar animal, startling an animal, running or bicycling past an animal, assisting an injured or sick animal, trying to capture an animal, or removing food, water, or other objects in the animal's possession. An "unprovoked" attack, which may be interpreted as potentially symptomatic of rabies, occurs when an animal bites for no apparent reason. Unusual biting behaviors may assist in determining the cause of the attack.
Untestable – An animal is considered “untestable” if the animal cannot be found or if the animal specimen is insufficient, too degraded or otherwise cannot be tested.

Confinement - The animal is housed in a building, pen or by some other suitable escape-proof method or enclosure. Tying the animal in an open yard is not adequate confinement. The animal cannot be removed from confinement unless on a leash and under the immediate control of a responsible adult. The animal may not be moved from the premises unless permission is obtained from the local health department. Under no circumstances should the animal be permitted to run at large during the confinement. At the first indication the animal is becoming ill, it is the responsibility of the owner or custodian to notify the local health department and take the animal to a veterinarian for an examination. If rabies is suspected, the animal should be immediately euthanized and the brain submitted for rabies testing. To avoid misunderstanding, such instructions should be provided to the owner or custodian in writing. Dogs, cats and ferrets should be confined for 10 days from the date of the bite. A 14-day confinement period is recommended for livestock following a bite.
ASSESSING RABIES RISK ASSOCIATED WITH BATS

Most of the human deaths and indigenously acquired rabies cases in the United States in recent years have been due to infection with bat variants of the virus. Most bats do not have rabies, and the number of human cases of rabies from bats is small, usually fewer than three each year in the United States. Thus, the risk of rabies from contact with bats is low. However, evidence indicates that many of the human cases of rabies resulted from exposures to bats that were not recognized or reported.

Once clinical signs of rabies appear, the disease is nearly always fatal; therefore, the goal is to reduce the rabies risk as much as possible. However, as with any health issue, achieving zero risk is not possible. The state department of health, local health departments and physicians should work cooperatively to consider the exposure potential before recommending the post-exposure rabies vaccination.

Pennsylvania Department of Health staff are available 24 hours a day, seven days a week to consult with medical, veterinary and public health professionals regarding problematic rabies exposures. Contact the health department at 1-877-724-3258 for assistance. As a reminder, all animal bites are reportable to the health department within 24 hours using the Animal Bite Report form.

I. Determining Rabies Status of the Bat

It is frequently much easier to determine the rabies status of a bat than to determine the likelihood of exposure to a human or companion animal. Based on recent data, on average, only 4 percent of bats tested in Pennsylvania are confirmed with rabies. Most bat-related post-exposure treatments can be avoided if the bat is captured and tested. Thus, in circumstances where there is any reasonable probability of exposure, attempts to capture the bat should be made and the local health department should be contacted to arrange rabies testing.

Instructions for submitting specimens to the Pennsylvania rabies testing laboratories can be found here: http://www.portal.state.pa.us/portal/server.pt/community/laboratories/14158/rabies/556798.

Pennsylvania Department of Health Laboratory: 610-450-2098
Pennsylvania Department of Agriculture Laboratory: 717-787-8808
Allegheny County Department of Laboratories: 412-578-8070
Philadelphia Department of Health Laboratory: 215-685-6740

II. Bat Exposure and Rabies Treatment Considerations

Post-exposure prophylaxis is recommended for the following exposures with a rabid or untestable bat:

- bites (the primary, well-documented route of exposure);
- scratches;
- saliva or nervous tissue in contact with a mucous membrane (e.g., inside the eyes, nose, mouth) or an open break in the skin (bled within 24 hours); and
- direct contact between a human and a bat occurred and the person cannot be reasonably certain a bite, scratch, or mucous membrane exposure did not occur.

Since contact with a bat when a bite could not be ruled out is a potential rabies risk, consideration should be given to those circumstances in which a bite may have occurred. The Recommendations of the Advisory Committee on Immunization Practices, Human Rabies Prevention – United States, 2008 states:

“The risk for rabies resulting from an encounter with a bat might be difficult to determine because of the limited injury inflicted by a bat bite (compared with more obvious wounds caused by the bite of terrestrial carnivores), an inaccurate recall of a bat encounter that might have occurred several weeks or months earlier, and evidence that some bat-related rabies viruses might be more likely to result in infection after inoculation into superficial epidermal layers. For these reasons, any direct contact between a human and
a bat should be evaluated for an exposure. If the person can be reasonably certain a bite, scratch, or mucous membrane exposure did not occur, or if the bat is available for testing and is negative for presence of rabies virus, postexposure prophylaxis is not necessary. Other situations that might qualify as exposures include finding a bat in the same room as a person who might be unaware that a bite or direct contact had occurred (e.g., a deeply sleeping person awakens to find a bat in the room or an adult witnesses a bat in the room with a previously unattended child, mentally disabled person, or intoxicated person). These situations should not be considered exposures if rabies is ruled out by diagnostic testing of the bat, or circumstances suggest it is unlikely that an exposure took place. Other household members who did not have direct contact with the bat or were awake and aware when in the same room as the bat should not be considered as having been exposed to rabies. Circumstances that make it less likely that an undetected exposure occurred include the observation of bats roosting or flying in a room open to the outdoors, the observation of bats outdoors or in a setting where bats might normally be present, or situations in which the use of protective covers (e.g., mosquito netting) would reasonably be expected to preclude unnoticed contact. Because of the complexity of some of these situations, consultation with state and local health departments should always be sought. If necessary, further guidance can be sought from CDC and experts in bat ecology.

During 1990–2007, a total of 34 naturally acquired bat-associated human cases of rabies was 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. 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).”

Table 1 describes a number of examples of exposure in which rabies PEP should be considered and non-exposure scenarios in which rabies PEP is not recommended.

**Note:** If the person is reasonably certain that a bite, scratch or contact with a mucous membrane did not occur, initiating post-exposure prophylaxis (PEP) is not necessary. If the animal is available for testing, awaiting test results before initiating PEP is acceptable.
### Table 1: What's the Rabies Exposure Risk? (bat tests positive or is untestable)

<table>
<thead>
<tr>
<th>Probable Rabies Exposure</th>
<th>Low Probability of Rabies Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-exposure prophylaxis should be considered</strong></td>
<td><strong>Post-exposure prophylaxis not generally recommended</strong></td>
</tr>
<tr>
<td>• physical contact of an unclear nature with a bat</td>
<td></td>
</tr>
<tr>
<td>• unattended young child is found handling a bat</td>
<td></td>
</tr>
<tr>
<td>• person touches bat without seeing the part of the bat they touched</td>
<td></td>
</tr>
<tr>
<td>• bat flies into someone of any age and touches bare skin</td>
<td></td>
</tr>
<tr>
<td>• adult sees bat fly near a child and child reports “it hit me”</td>
<td></td>
</tr>
<tr>
<td>• someone, with bare feet, steps on a live or dead bat</td>
<td></td>
</tr>
<tr>
<td>• deeply sleeping person awakens to find a bat in the room with them</td>
<td></td>
</tr>
<tr>
<td>• adult comes into room where a young child was left alone for a period of time, and live bat is found near child</td>
<td></td>
</tr>
<tr>
<td>• bat found near unattended infant, toddler, or a person with sensory or mental impairment</td>
<td></td>
</tr>
</tbody>
</table>

- • older child, teenager or adult touches the fur, wings, or legs of a live bat while looking at it
- • person has contact with a completely dried-up carcass of a bat
- • person has touched an inanimate object that a bat had contacted
- • bat swoops past awake older child, teenager or adult, but the person does not feel the bat touch them
- • bats are heard or seen in walls or attic of house
- • bats are heard or seen hanging from upper rafters of large, non-sleeping, A-frame cabin
- • bat guano or other signs of bats are found in sleeping quarters

**See also**
Advisory Committee on Immunization Practices (ACIP) Human Rabies Prevention:  
FIGURE 1
Decision tree for bats

Note: See “Definitions.”

*If the exposure is unknown or the need for rabies PEP is not clear, the Pennsylvania Department of Health is available 24 hours a day/seven days a week for consultation. Please call 1-877-PA HEALTH (1-877-724-3258).
ASSESSING RABIES RISK ASSOCIATED WITH WILD TERRESTRIAL ANIMALS

Most of the human deaths and indigenously acquired rabies cases in the United States in recent years have been due to infection with bat variants of the virus. However, wild terrestrial animals do still pose a rabies risk to humans. Most rabid animals reported in Pennsylvania are wild animals, specifically raccoons. On average, Pennsylvania reports 300-400 rabid wild terrestrial animals a year.

Examples of wild terrestrial animals that have been infected with rabies in Pennsylvania include, but are not limited to:
- Raccoons;
- Foxes;
- Skunks;
- Beavers;
- Woodchucks/groundhogs;
- Bobcat;
- Coyote; and
- Wolf hybrid.

Once clinical signs of rabies appear, the disease is nearly always fatal; therefore, the goal is to reduce the rabies risk as much as possible. However, as with any health issue, achieving zero risk is not possible. The state department of health, local health departments and physicians should work cooperatively to consider the exposure potential before recommending the post-exposure rabies vaccination.

Pennsylvania Department of Health staff are available 24 hours a day, seven days a week to consult with medical, veterinary and public health professionals regarding problematic rabies exposures. Contact the health department at 1-877-724-3258 for assistance. As a reminder, all animal bites are reportable to the health department within 24 hours using the Animal Bite Report form.

I. Determining Rabies Status of the Wild Terrestrial Animal

It is frequently much easier to determine the rabies status of an animal than to determine the likelihood of exposure to a human. Generally, around 10 percent of wild terrestrial animals tested in Pennsylvania are confirmed with rabies. Most wild animal-related post-exposure treatments can be avoided if the animal is captured and tested. Wild terrestrial animals should NOT be confined and observed for 10 days. Thus, in circumstances where there is any reasonable probability of exposure, the animal should be submitted for rabies testing. Instructions for submitting specimens to the Pennsylvania rabies testing laboratories can be found here: http://www.portal.state.pa.us/portal/server.pt/community/laboratories/14158/rabies/556798

Pennsylvania Department of Health Laboratory: 610-450-2098
Pennsylvania Department of Agriculture Laboratory: 717-787-8808
Allegheny County Department of Laboratories: 412-578-8070
Philadelphia Department of Health Laboratory: 215-685-6740

II. Wild Animal Exposure and Rabies Treatment Considerations

Post-exposure prophylaxis is recommended for the following exposures with a rabid animal or an untestable animal that was exhibiting signs of rabies:
- bites (the primary, well-documented route of exposure);
- scratches; and
- saliva or nervous tissue in contact with a mucous membrane (e.g., inside the eyes, nose, mouth) or an open break in the skin (bled within 24 hours).
See Table 1 for examples of non-exposure scenarios.

**Note:** If the person is reasonably certain that a bite, scratch or contact with a mucous membrane did not occur, initiating post-exposure prophylaxis (PEP) is not necessary. If the animal is available for testing, awaiting test results before initiating PEP is acceptable. Beginning PEP immediately may be considered for severe head or neck wounds or contact with mucous membranes (eyes, mouth, nose).

<table>
<thead>
<tr>
<th>Low Probability of Rabies Exposure</th>
<th>Post-exposure prophylaxis not generally recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• indirect contact through a companion animal</td>
</tr>
<tr>
<td></td>
<td>• petting an animal where there was no contact with saliva</td>
</tr>
<tr>
<td></td>
<td>• person has contact with a completely dried-up carcass of an animal</td>
</tr>
<tr>
<td></td>
<td>• person has touched an inanimate object that an animal had contacted</td>
</tr>
</tbody>
</table>

**See also**

Advisory Committee on Immunization Practices (ACIP) Human Rabies Prevention:
FIGURE 2
Decision tree for high-risk group animal exposure
(Bobcat, coyote, fox, groundhog/woodchuck, raccoon, skunk, wolf hybrid, and other carnivores)

Note: See “Definitions.”

*If the exposure is unknown or the need for rabies PEP is not clear, the Pennsylvania Department of Health is available 24 hours a day/seven days a week for consultation. Please call 1-877-PA HEALTH (1-877-724-3258).
ASSESSING RABIES RISK ASSOCIATED WITH DOGS, CATS AND FERRETS

Most of the human deaths and indigenously acquired rabies cases in the United States in recent years have been due to infection with bat variants of the virus. However, companion animals such as dogs, cats and ferrets do still pose a potential rabies risk to humans. Pennsylvania law requires all dogs and house cats to be vaccinated against rabies. Rabies vaccine is available for dogs, cats and ferrets. **Vaccination of household pets reduces the risk of rabies transmission to humans.**

In recent years, Pennsylvania has had about 40-60 rabid cats a year and about 0-3 rabid dogs.

Once clinical signs of rabies appear, the disease is nearly always fatal; therefore, the goal is to reduce the rabies risk as much as possible. However, as with any health issue, achieving zero risk is not possible. The state department of health, local health departments and physicians should work cooperatively to consider the exposure potential before recommending the post-exposure rabies vaccination.

Pennsylvania Department of Health staff are available 24 hours a day, seven days a week to consult with medical, veterinary and public health professionals regarding problematic rabies exposures. **Contact the health department at 1-877-724-3258 for assistance.** As a reminder, all animal bites are reportable to the health department within 24 hours using the Animal Bite Report form.

I. Determining Rabies Status of the Companion Animal

It is frequently much easier to determine the rabies status of an animal than to determine the likelihood of exposure to a human. In recent years, only 2.5 percent of cats tested and less than one percent of dogs tested in Pennsylvania are confirmed with rabies.

If the animal is not exhibiting any signs of rabies, then the animal should be observed for 10 days. If the animal remains well, then the animal was not shedding rabies virus in its saliva at the time of the bite.

If the animal is exhibiting signs of rabies or if the animal becomes ill or dies during the 10-day confinement period, the local health department should be contacted to arrange rabies testing.

Instructions for submitting specimens to the Pennsylvania rabies testing laboratories can be found here: [http://www.portal.state.pa.us/portal/server.pt/community/laboratories/14158/rabies/556798](http://www.portal.state.pa.us/portal/server.pt/community/laboratories/14158/rabies/556798).

Pennsylvania Department of Health Laboratory: 610-450-2098
Pennsylvania Department of Agriculture Laboratory: 717-787-8808
Allegheny County Department of Laboratories: 412-578-8070
Philadelphia Department of Health Laboratory: 215-685-6740

II. Companion Animal Exposure and Rabies Treatment Considerations

Post-exposure prophylaxis is **recommended** for the following exposures with a rabid companion animal or an untestable companion animal that was exhibiting signs of rabies:

- bites (the primary, well-documented route of exposure);
- scratches; and
- saliva or nervous tissue in contact with a mucous membrane (e.g., inside the eyes, nose, mouth) or an open break in the skin (bled within 24 hours).

Table 1 describes a number of examples of exposure in which rabies PEP should be considered and non-exposure scenarios in which rabies PEP is not recommended.
Note: If the person is reasonably certain that a bite, scratch or contact with a mucous membrane did not occur, initiating post-exposure prophylaxis (PEP) is not necessary. If the animal is available for testing, awaiting test results before initiating PEP is acceptable.

Table 1: What’s the Rabies Exposure Risk?

<table>
<thead>
<tr>
<th>Probable Rabies Exposure</th>
<th>Low Probability of Rabies Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-exposure prophylaxis should be considered</td>
<td>Post-exposure prophylaxis not generally recommended</td>
</tr>
</tbody>
</table>
| • animal cannot be found after 72 hours  
• person was bitten by a dog in a country in which canine rabies is enzootic | • person was bitten by a dog, cat, ferret with more than one vaccination, even if vaccinations are not up to date  
• contact with an animal that had contact with a wild animal  
• bite was provoked  
• petting an animal where there was no contact with saliva  
• person has contact with a completely dried-up carcass of an animal  
• person has touched an inanimate object that an animal had contacted |

See also
Advisory Committee on Immunization Practices (ACIP) Human Rabies Prevention:
FIGURE 3
Decision tree for dogs, cats, and ferrets.

Note: See “Definitions.”

*If the exposure is unknown or the need for rabies PEP is not clear, the Pennsylvania Department of Health is available 24 hours a day/seven days a week for consultation. Please call 1-877-PA HEALTH (1-877-724-3258).
ASSESSING RABIES RISK ASSOCIATED WITH LIVESTOCK

Most of the human deaths and indigenously acquired rabies cases in the United States in recent years have been due to infection with bat variants of the virus. Although livestock are considered low risk for rabies transmission to humans, the potential for rabies transmission still exists and exposures should be evaluated on a case-by-case basis.

Livestock may include, but is not limited to:
- Cattle;
- Horses;
- Captive deer;
- Swine;
- Goats.

Livestock exhibiting unusual behavior should be suspected of rabies. The actual viral shedding period for livestock has never been determined, which precludes the ability to provide evidence-based guidance on confinement periods for livestock that have bitten or otherwise exposed a human. However, given that the viral shedding period in terrestrial animals has been determined to be fewer than 10 days, a 14-day confinement period for livestock is recommended. If the animal remains healthy, rabies PEP is not necessary. If the animal becomes ill or dies, it should be tested for rabies, and PEP should be administered appropriately.

Pennsylvania Department of Health staff are available 24 hours a day, seven days a week to consult with medical, veterinary and public health professionals regarding problematic rabies exposures. Contact the health department at 1-877-724-3258 for assistance. As a reminder, all animal bites are reportable to the health department within 24 hours using the Animal Bite Report form.
FIGURE 4
Decision tree for livestock

Note: See “Definitions.”

Did an exposure occur?*

NO

Rabies prophylaxis is not necessary.

YES

Rabies PEP may be considered after consultation with health department.

Is the animal available for confinement?

NO

Rabies prophylaxis is not necessary if animal does not develop signs or symptoms of rabies within 14 day confinement period.

YES

Did the animal exhibit signs of rabies at the time of exposure?

NO

Rabies prophylaxis is not necessary.

YES

Test for rabies

If laboratory results are pending, PEP may be delayed. PEP may be started immediately for head and neck wounds. If test results are later found to be negative then prophylaxis may be stopped.

Positive

Begin rabies prophylaxis.

Negative

Rabies prophylaxis is not necessary.

*If the exposure is unknown or the need for rabies PEP is not clear, the Pennsylvania Department of Health is available 24 hours a day/seven days a week for consultation. Please call 1-877-PA HEALTH (1-877-724-3258).
ASSESSING RABIES RISK ASSOCIATED WITH SMALL RODENTS AND LAGOMORPHS (HARES AND RABBITS)

Most of the human deaths and indigenously acquired rabies cases in the United States in recent years have been due to infection with bat variants of the virus. Small rodents and rabbits are not considered a significant rabies risk to humans.

Small rodents and rabbits may include, but are not limited to:

- Rabbits;
- Mice;
- Rats;
- Squirrels;
- Chipmunks;
- Gerbils;
- Hamster;
- Guinea pigs;
- Moles; and
- Voles.

Due to this very small risk, rabies post-exposure prophylaxis is rarely recommended when exposure occurs. Exposure to rabbits or small rodents exhibiting unusual behavior should be discussed with the Pennsylvania Department of Health.

Pennsylvania Department of Health staff are available 24 hours a day, seven days a week to consult with medical, veterinary and public health professionals regarding problematic rabies exposures. **Contact the health department at 1-877-724-3258 for assistance.** As a reminder, all animal bites are reportable to the health department within 24 hours using the Animal Bite Report form.

**See also**
Advisory Committee on Immunization Practices (ACIP) Human Rabies Prevention:
FIGURE 5
Decision tree for very low risk group animals.
(Lagomorphs [hares and rabbits] and small rodents.)

Note: See “Definitions.”

*If the exposure is unknown or the need for rabies PEP is not clear, the Pennsylvania Department of Health is available 24 hours a day/seven days a week for consultation. Please call 1-877-PA HEALTH (1-877-724-3258).
ASSESSING RABIES RISK ASSOCIATED WITH PRIMATES (MONKEYS/APES) AND OTHER EXOTIC MAMMALS

Primates (monkeys/apes) and other exotic mammals may be a potential rabies risk to humans if exposure occurs. However, these instances should be evaluated on a case-by-case basis; therefore, consultation with the Pennsylvania Department of Health is recommended.

**Herpes B virus** may be a more immediate concern when a bite or scratch has occurred involving old world primates; therefore, evaluation for Herpes B virus should be considered as soon as possible.

Nonmammalian exotic animals (reptiles, amphibians, fish and birds) are not a rabies risk, therefore, rabies vaccination is not necessary.

Pennsylvania Department of Health staff are available 24 hours a day, seven days a week to consult with medical, veterinary and public health professionals regarding problematic rabies exposures. **Contact the health department at 1-877-724-3258 for assistance.** As a reminder, all animal bites are reportable to the Pennsylvania Department of Health.

**See also**