

# Rabies (Human and Animal)

(Also Known as Hydrophobia)

## IMMEDIATELY REPORTABLE DISEASE

Per N.J.A.C. 8:57, healthcare providers and administrators shall immediately report **by telephone** confirmed and suspected cases of rabies to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. The health officer (or designee) **must immediately institute the control measures listed below in section 6, "Controlling Further Spread,"** regardless of weekend, holiday, or evening schedules. A directory of local health departments in New Jersey is available at <http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



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# 1 THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

The virus that causes rabies is a rhabdovirus of the genus *Lyssavirus*.

### B. Clinical Description and Laboratory Diagnosis

#### 1. Animal Rabies

Rabies is an acute viral encephalomyelitis that principally affects bats and carnivores, although all mammals are susceptible. Classically, clinical signs may appear in two phases: excitative or “furious” and/or paralytic or “dumb.” In the furious stage, the animal displays uncharacteristically aggressive behavior and may bite at inanimate objects. The paralytic stage is characterized by depression, unresponsiveness, and ascending paralysis. In either form, prodromal signs may include unusual vocalization, wobbly gait, tremors, and abnormal behavior (i.e., a wild animal may approach humans without fear). The end stages of disease are paralysis, coma, and death. The time period between onset and death is typically less than ten days. The behavior of an animal, however, is NOT always a reliable indicator of whether or not the animal has rabies, particularly in the wild animal species that serve as reservoirs in nature for the virus. The only way to definitively diagnose an animal with rabies is by laboratory testing of the animal’s brain tissue after euthanasia.

#### 2. Human Rabies

Rabies is almost always a fatal infection. A progressive illness of approximately two to 21 days follows an incubation period of usually three to eight weeks. A prodromal phase, lasting about two to ten days, is characterized by pain and numbness/tingling at the site of the bite (present in 50% to 80% of cases) and nonspecific complaints such as fatigue, headache, and fever. Behavioral changes, including apprehension, anxiety, agitation, irritability, insomnia, and depression, may also be apparent.

The prodromal phase is followed by the neurologic phase, which is characterized by disorientation and hallucinations, paralysis, episodes of terror and excitement, hydrophobia, hyperventilation, hypersalivation, and seizures. These symptoms are followed by coma and

death. Once symptoms have begun, the disease is nearly always fatal, despite intensive treatment. In 2004, one person did recover from a documented infection with rabies, after an intensive protocol that included a drug-induced coma and the administration of antiviral drugs (Willoughby et al.). This recovery is considered highly unusual, however, and no single specific course of therapy for rabies in humans has been demonstrated to be effective after clinical signs manifest.

Several tests are necessary to diagnose rabies antemortem (before death) in humans; no single test is sufficient. Specimens for rabies testing should be collected only after more common etiologies of encephalitis or myelitis have been ruled out, in consultation with the New Jersey Department of Health and Senior Services (NJDHSS) (see section 3 B, below, for more information). Tests are performed on samples of saliva, serum, spinal fluid, and skin biopsies of hair follicles at the nape of the neck. Saliva can be tested by virus isolation or reverse transcription followed by polymerase chain reaction (RT-PCR). Serum and spinal fluid are tested for antibodies to rabies virus. Skin biopsy specimens are examined for rabies antigen in the cutaneous nerves at the base of hair follicles.

### **C. Reservoirs**

Although all species of mammals are susceptible to rabies virus infection, only a few species are important in maintaining the disease cycle in nature. In the United States, raccoons, skunks, foxes, and coyotes are the major reservoirs in terrestrial animals, with bats being the other animal reservoir. Two variants of rabies virus are present in New Jersey, the bat and raccoon variants. In contrast to the United States and Europe where wildlife rabies predominates, dogs remain the principal reservoir of rabies in developing countries. Any of the rabies variants can be passed to other animals and humans through exposure to contaminated saliva. Small rodents and lagomorphs (e.g., squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice, wild rabbits, and hares) have not been known to transmit rabies to humans and are almost never found to be infected with rabies. The exceptions are rodents and lagomorphs (specifically domestic rabbits) caged outdoors, because cages often allow exposure to rabid animals while still providing enough protection for the rabbit to survive and go on to develop the disease. Also, a significant number of groundhogs (considered a large rodent) have been found to be rabid in areas where raccoon rabies is present. For this reason, they are considered a high-risk animal despite the fact that they are rodents.

### **D. Modes of Transmission**

Rabies is transmitted when the virus-laden saliva or other potentially infectious material (brain, spinal cord) of an infected animal is introduced into bite wounds or open cuts in the skin, or onto mucous membranes. Bites by some animals, such as bats, can inflict injury so minor that it may go undetected. Also, indirect exposure to saliva of a rabid animal can occasionally occur through contact with a pet or other object. Direct person-to-person transmission is theoretically possible, but cases occurring under such conditions have not been documented. However, cases have been documented after corneal transplants from infected individuals. Airborne spread in specific situations (i.e., in a cave with a multitude of bats or in a laboratory with rabies virus or specimens) has occurred on rare occasions. Rabies

is not transmitted through contact with blood, urine, skunk spray, or feces of an infected animal. Because rabies virus is rapidly inactivated by desiccation and ultraviolet irradiation, if the material potentially containing virus is dry to the touch, it can be considered noninfectious.

## **E. Incubation Period**

### **1. Animal Rabies**

Depending on the species of animal, dose of virus, and site of inoculation, the incubation period may vary from 12 days to one year or more, but is typically one to three months. The progression of rabies infection in dogs and cats has been studied extensively, and it is known that the incubation period of these animals rarely exceeds six months.

### **2. Human Rabies**

The incubation period is usually three to eight weeks, but can be as short as nine days (although nine-day incubation periods have not been documented in the United States with native strains), and in some very rare cases appears to have been a year or more. It is estimated that less than 1% of human cases have an incubation period longer than six months, however. The incubation period is typically related to the site of exposure, e.g., the incubation period is usually shorter if the virus is inoculated closer to the central nervous system or in an area that is highly innervated (such as the hand). The incubation period also depends on the severity of exposure (a large amount of virus embedded into a severe wound would result in a shorter incubation period). The incubation period of pneumococcal infections can vary but is generally from one to three days.

## **F. Period of Communicability or Infectious Period**

### **1. Animal Rabies**

Animals are not infectious until virus appears in their saliva, which occurs at or very near the end of the incubation period in most domestic animals. Testing has shown that most cats, dogs, and ferrets will begin to shed virus either right at the time of the onset of clinical signs or shortly thereafter, with a very small number starting to shed three to four days before onset. Therefore, if the animal is healthy (i.e., not showing signs of rabies) at the time of a bite to a human, it is probably not rabid, but to cover those cases where the animal might be shedding before the onset of signs, a ten-day confinement and observation period of the animal should be performed. When exposures to a domestic animal after it has been diagnosed with rabies are evaluated, the date of onset should be ascertained (or estimated as closely as possible), and the animal should be considered to have been infectious for a period of ten days prior to its onset, as well as throughout the course of the illness.

The shedding/communicability period for wild animals has not been determined, although it has been demonstrated that skunks may shed virus up to 18 days before death. Therefore, there is no safe confinement and observation period for these animals as there is with dogs, cats, and ferrets, and they are more likely to potentially be shedding rabies virus and still appear healthy. Carcasses of animals with rabies may contain infectious virus, depending on

temperature and environmental conditions. Rabies virus may persist in a frozen carcass for many weeks. Because drying and sunlight exposure rapidly deactivate rabies virus, a desiccated or decomposed carcass would not contain live rabies virus.

## 2. Human Rabies

The period during which a patient is considered infectious begins up to ten days before symptom onset and lasts until death. Saliva, brain and spinal cord tissue, and spinal cord fluid are considered to be potentially infectious. It should be noted, however, that with the exception of corneal transplants with corneas unknowingly received from infected persons, there have been no documented cases of person-to-person transmission of rabies.

## G. Epidemiology

### 1. Animal Rabies

Animal rabies exists in most parts of the world. Dogs are a primary reservoir for rabies in Mexico and much of Central and South America, Asia, and Africa. Children are exposed to rabid and potentially rabid animals more often than are adults. In the United States, Hawaii is the only state that has never reported an indigenously acquired rabies case in humans or animals. Most of the continental United States and Alaska has enzootic rabies in terrestrial mammals, as well as bat rabies. In 2005, 5923 wild animals accounted for approximately 93% of the reported 6417 animal rabies cases in the United States. Raccoons continued to be the most frequently reported rabid wildlife species (39% of all animal cases in 2005), followed by skunks (23%), bats (22%), foxes (6%), and other wild animals (2%).

In New Jersey, the raccoon rabies epizootic entered the state in 1989, with peak years in 1991 and 1992, and has now spread into all areas of the state. In the raccoon rabies epizootic, raccoons are the primary species cycling the disease (i.e., the reservoir species), but can infect other terrestrial wildlife and domestic animals. From 1989 through 2006, over 5100 terrestrial animals were confirmed positive for rabies by laboratory testing in New Jersey, including 3781 raccoons (74%), 768 skunks (15%), 111 groundhogs (2%), and 107 foxes (2%). Although rabies has been confirmed in a variety of pets, livestock, and other domestic animals, rabid cats (n = 285) account for over 90% of the total domestic animal cases. Summer months are peak months for exposures to animals, as people and animals are both outside and more likely to interact with each other and wild animals. Raccoon rabies is no longer considered to be epizootic in New Jersey, as there is now some immunity in the raccoon population and a lower number of yearly cases. This lower level of disease in an animal population is called an enzootic level.

**NOTE: If referring to a disease in the human population, the corresponding terms would be epidemic and endemic.**

### 2. Human Rabies

In the United States over the past century, the number of human deaths attributed to rabies has declined from hundreds each year to an average of three per year. The decline is due to pet vaccination and animal control programs begun in the 1940s that have practically

eliminated the domestic dog as a reservoir of rabies, and to the development of effective human rabies vaccines and immune globulin. From 1990 through 2006, 56 human rabies deaths in the United States have been reported to the Centers for Disease Control and Prevention (CDC), with 44 (79%) of those associated with bat variants. Nine of the remaining 12 cases are associated with dog bites occurring in areas outside the United States where dog rabies is enzootic. Worldwide, an estimated 40,000 to 60,000 human rabies deaths occur each year. The vast majority of these deaths occur in developing countries from exposure to rabid dogs.

The last indigenous case of human rabies in New Jersey was in 1997 in a man who had direct contact with bats, and was caused by the silver-haired/pipistrelle bat rabies variant strain. The last case prior to that was in 1971 and was due to incomplete postexposure treatment following a bat bite.

## 2 CASE DEFINITION

### A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

#### 1. Animal Rabies

##### *Clinical Description*

Sudden onset of neurologic illness consisting of a prodromal syndrome with variable behavior changes (howling or unusual vocalization, hiding, aggression, shyness) followed shortly by the onset of either a paralytic syndrome or one of extreme aggression, always succeeded by coma and death due to respiratory paralysis. The entire course of illness is very short (less than ten days), unless extraordinary life-maintaining measures (such as use of a ventilator) are taken.

##### *Laboratory Criteria*

A positive direct fluorescent antibody test (preferably on central nervous system [CNS] tissue) OR

A positive PCR test (preferably on CNS tissue) OR

Isolation of the virus in either cell culture or a laboratory animal.

**NOTE: Because of the specialized tests involved, laboratory tests for animal rabies are primarily conducted by state health or agricultural laboratories, veterinary school laboratories, or federal laboratories at CDC or the U.S. Department of Agriculture.**

***Case Classification***

**CONFIRMED**

A laboratory-confirmed case.

**PROBABLE**

Not used.

**POSSIBLE**

Not used.

**2. Human Rabies**

***Clinical Description***

Rabies is almost always a fatal infection. A progressive illness of approximately two to 21 days follows an incubation period of usually three to eight weeks. A prodromal phase, lasting about two to ten days, is characterized by pain and numbness/tingling at the site of the bite (present in 50% to 80% of cases) and nonspecific complaints such as fatigue, headache, and fever. Behavioral changes may also be apparent, including apprehension, anxiety, agitation, irritability, insomnia, and depression.

The prodromal phase is followed by the neurologic phase, which is characterized by disorientation and hallucinations, paralysis, episodes of terror and excitement, hydrophobia, hyperventilation, hypersalivation, and seizures. These symptoms are followed by coma and death. Once symptoms have begun, the disease is nearly always fatal, despite intensive treatment.

***Laboratory Criteria for Diagnosis***

Detection by direct fluorescent antibody of viral antigens in a clinical specimen (preferably the brain or the nerves surrounding hair follicles in the nape of the neck) OR

Isolation (in cell culture or in a laboratory animal) of rabies virus from saliva, cerebrospinal fluid (CSF), or CNS tissue OR

Identification of a rabies neutralizing antibody titer greater than or equal to 5 (complete neutralization) in the serum or CSF of a person who has not been vaccinated against rabies.

**NOTE: Human rabies testing is performed only at certain state health departments and the CDC.**

***Case Classification***

**CONFIRMED**

A clinically compatible case that is laboratory confirmed.

**PROBABLE**

Not used.

**POSSIBLE**

Not used.

**B. Differences from CDC Case Definition**

The New Jersey Department of Health and Senior Services (NJDHSS) case definition is identical to the CDC case definition.

## **3 LABORATORY TESTING SERVICES AVAILABLE**

### **1. Animal Rabies**

Animals are tested at the New Jersey Public Health and Environmental Laboratories (PHEL) using the direct fluorescent antibody test. Local health departments (LHDs) must make arrangements for transport of specimens to PHEL. Animal control officers and veterinarians need to be familiar with the proper way to euthanize, prepare, and properly submit animals to the laboratory. Except for whole bats and other animals weighing less than two pounds, only animal heads will be accepted for rabies testing. For more information on submitting specimens, contact the NJDHSS Infectious and Zoonotic Diseases Program (IZDP) at 609.588.3121. All animal test results performed at PHEL are reported to the LHDs via fax; all positive reports are telephoned to the LHD immediately.

### **2. Human Rabies**

PHEL does not test human specimens for rabies; all testing for suspect human cases in New Jersey is performed by the CDC rabies laboratory. CDC will not accept specimens from suspect human cases unless reviewed by IZDP staff and approved by CDC rabies personnel. Contact IZDP at 609.588.3121 for human specimen testing screening/approval and specific instructions regarding the types of specimens to submit and the proper methods for submission. See section 3B for more information.

## **4 DISEASE REPORTING AND CASE INVESTIGATION**

### **A. Purpose of Surveillance and Reporting**

- To develop knowledge of the reservoir species in the state and the relative incidence of rabies in this and other species; to forward this information to CDC to add to national surveillance data

- From the above, develop educational information for the public, so they may avoid contact with the vector species, ensure rabies vaccination of pets and livestock, and report all animal bites for the evaluation of rabies exposure risk
- To educate the healthcare community about the risk of rabies in various species and ensure appropriate postexposure treatment of exposed individuals

## **B. Laboratory and Healthcare Provider Reporting Requirements**

### **1. Animal Rabies**

Suspect cases of animal rabies are to be reported to the LHD by any person having knowledge thereof, as mandated by state statute (NJSA Title 26, Chapter 4-78). It is then the responsibility of the local health agency to evaluate the reported situation as to the likelihood of rabies and act accordingly, which may include submission of the appropriate specimen from the animal to PHEL for testing.

The LHD will be informed of the results of all animal rabies testing performed by PHEL in animal specimens submitted from their jurisdiction. Positive results will be telephoned to the LHD by IZDP staff immediately after IZDP is notified by PHEL; the laboratory form will be faxed to the LHD within 24 hours of diagnosis. Notification of negative results is by fax report from PHEL to the LHD within 24 hours of test completion.

### **2. Animal Bites**

As per state statutes (NJSA Title 26, Chapter 4-79 to 81) all animal bites shall be reported to the LHD by the attending physician, bite victims themselves or their caretaker, or parent or guardian in the case of a child. As per state statutes (NJSA Title 26, Chapter 4-82 and 86) the LHD may then confine the biting animal for observation for at least ten days and may order the brain tested for rabies if the animal dies or is euthanized during the observation period.

### **3. Human Rabies**

Because of the rarity and potential severity of human rabies, NJDHSS requests that information about any known or suspect case of human rabies be immediately reported to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. Alternatively, healthcare providers may call NJDHSS IZDP at 609.588.3121 or 588.7500 (nonholiday weekdays between 8 AM and 5 PM), or 609.392.2020 (emergency number for nights/weekends and holidays). Detailed information on the clinical signs, laboratory test results, and patient history will likely be requested at follow-up. It should be stressed that human rabies is an extremely rapidly progressing disease (i.e., ventilator support needed within one week of onset or less), and that patients who have had a more extended course of illness not requiring respiratory support would not be considered suspect rabies cases.

The protocol for suspect human rabies cases is for IZDP staff to review the reported case with the attending physician and contact CDC for further review if an evaluation is made that rabies is a possibility. If CDC determines that the case warrants testing, IZDP staff will work

with the physician/hospital to facilitate submission of specimens from the patient to CDC for testing. PHEL does not test human specimens for rabies, nor do other laboratories in New Jersey. Specimens should be forwarded (hand delivered if possible) to PHEL for shipment to CDC, as PHEL is highly experienced with the interstate shipping protocols for different classes of medical specimens. In the past, testing has been delayed when hospitals have attempted to ship human rabies specimens to CDC on their own, with specimens returned by the shipping company because of improper labeling.

See Laboratory Criteria for Diagnosis in section 2 above for the types of specimens needed for testing. More detailed information on specimen collection and packaging are provided on CDC laboratory forms and information sheets.

### ***Reporting of Administration of Rabies Postexposure Prophylaxis***

The administration of rabies postexposure prophylaxis (PEP), which consists of rabies immune globulin and vaccine, is reportable to the local health officer by the healthcare provider using NJDHSS Report of Rabies Post-Exposure Treatment Form on the NJDHSS Web site. Please remind healthcare providers of this requirement.

## **C. Local Health Departments Reporting and Follow-Up Responsibilities**

### **1. Reporting Requirements**

The New Jersey Administrative Code (NJAC 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of human rabies, as defined by the case definition in section 2A above. Current requirements are that cases be immediately reported to NJDHSS IZDP.

### **2. Case Investigation**

- The most important step a local health officer can take if he or she learns of a suspect or confirmed case of human rabies is to immediately call IZDP at 609.588.3121 or 588.7500 (nonholiday weekdays between 8 AM and 5 PM), or 609.392.2020 (emergency number for nights/weekends and holidays).
- NJDHSS IZDP will direct case investigation of human rabies in New Jersey as described in section 3B above.
- Following immediate notification of NJDHSS, the health officer may be asked to assist in investigating any suspect case within their community, including gathering the following:
  - The patient's name, age, address, telephone number, status, and parent/guardian information, if applicable
  - The name and telephone number of the hospital where the patient is, or was, hospitalized
  - The name and telephone number of the patient's attending physician
  - The name and telephone number of the infection control official at the hospital

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- If the patient was seen by a healthcare provider before hospitalization, or was seen at more than one hospital, including all contact names and telephone numbers
  - History of travel outside the United States within one year
  - History of bites, scratches, or other exposure to animals within the past year
  - Exposure to attics, barns, caves and other areas where bats might roost
  - People who have been exposed to the suspect case and may need postexposure rabies treatment
  - See Section 3 below for specific instructions on utilizing the Communicable Disease Reporting and Surveillance System (CDRSS) for human rabies case reporting
- Institution of disease control measures is an integral part of case investigation. It is the local health officer’s responsibility to understand, and, if necessary, institute the control guidelines listed below in section 4, Controlling Further Spread.

**3. Entry into CDRSS**

The mandatory fields in CDRSS include disease, last name, county, municipality, gender, race, ethnicity, case status and report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of human rabies cases. The “CDRSS Screen” column includes the fields which appear in the system and the “Required Information” column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
<b>Patient Info</b>	Enter the disease name (“RABIES”), patient demographic information, illness onset date, and the date the case was reported to the local health department (LHD). There are no subgroups for this disease. <b>NOTE:</b> CDRSS is only for cases of human rabies and not human postexposure rabies prophylactic treatment reports or animal rabies cases.
<b>Addresses</b>	Enter any alternate address (e.g., a second residence outside of the US). Use the <span style="border: 1px solid black; padding: 2px;">Comments</span> section in this screen to record any pertinent information about the alternate address. Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.

CDRSS Screen	Required Information
<b>Clinical Status</b>	<p><b>Enter Onset of Illness</b>—very important to ascertain. Enter any treatment that the patient received and record the names of the medical facilities and physician(s) involved in the patient’s care. If the patient received care from two or more hospitals, be sure that all are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. If rabies preimmunization status is known, it should also be entered here. If the patient died, date of death should be recorded under the <b>Mortality</b> section.</p>
<b>Signs/Symptoms</b>	<p>Check appropriate boxes for signs and symptoms and indicate their onset. Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient’s illness. Also, information regarding the resolution of signs and symptoms should be entered.</p>
<b>Risk Factors</b>	<p>Enter complete information about risk factors for rabies infection, using the approximate incubation period range (two weeks to one year) for rabies. Ask the case-patient/family about bites, scratches or other contact with animals, particularly raccoons, bats, skunks, foxes, groundhogs or stray cats; outdoor activity; exposure to attics, barns or caves where bats might roost; and travel to rabies endemic countries (India, Africa, Central or South America, etc.).</p>
<b>Laboratory Eval</b>	<p>Enter appropriate lab and diagnostic tests performed at the hospital – a human rabies case will always be hospitalized. All rabies testing for suspect human cases must be performed at the CDC, with pre-approval by Zoonotic IZDP staff. DHSS staff will enter results of CDC rabies tests into CDRSS and will change the case status to confirmed if tests are positive.</p>
<b>Contact Tracing</b>	<p>If the case is highly suspicious or confirmed as rabies, family members and others, including hospital/medical office staff, who had close contact with saliva and other body secretions of the case may need postexposure rabies prophylactic treatment. <b>The infectious period of the case patient is considered to be up to ten days prior to their onset of illness and throughout the course of illness.</b> The hospital ICP will be responsible for the follow up of hospital staff as to their need for prophylaxis; the local health department will be responsible for all other contact tracing and follow up. <b>Zoonotic IZDP staff will be available for consultation in this area.</b></p>

CDRSS Screen	Required Information
<p><b>Case Comments</b></p>	<p>Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the <b>Comments</b> section. <b>NOTE:</b> Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.</p>
<p><b>Epidemiology</b></p>	<p>Under the <b>Other Control Measures</b> section, indicate if the patient falls into any of the categories listed under <b>Patient Role(s)/Function(s)</b>. Record name of and contact information for case investigators from other agencies (e.g., CDC, out-of-state health departments). Document communication between investigators in the <b>Comments</b> section.</p>
<p><b>Case Classification Report Status</b></p>	<p>Case status options are: “REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> <li>• Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”</li> <li>• Upon completion of the investigation, the LHD should wait for Zoonotic IZDP staff to receive results of CDC rabies testing and to determine whether the case is “CONFIRMED” or “NOT A CASE”.</li> <li>• Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</li> <li>• Cases reported by laboratories should be assigned a report status of “PENDING.” Cases of human rabies reported by laboratories are usually errors (reporting titer results), but still need to be investigated.</li> <li>• Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.”</li> <li>• The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing).</li> <li>• Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status</li> </ul>

CDRSS Screen	Required Information
	<p>to “LHD CLOSED.”</p> <ul style="list-style-type: none"> <li>• “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff (see section C below).</li> </ul> <p>If a case is inappropriately entered the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of human rabies simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

## 5 CONTROLLING FURTHER SPREAD

### A. Isolation and Quarantine Requirements

#### 1. Minimum Period of Isolation of Patient

Known or suspect human rabies cases should be isolated for the duration of illness. Contact isolation for respiratory secretions should be put in place.

#### 2. Minimum Period of Quarantine of Human and Animal Contacts

##### *Human*

None.

##### *Animal*

Animals exposed to a known or suspect rabid animal should be given a rabies booster vaccination if they are currently vaccinated and observed for a 45-day period. Exposed animals that are not vaccinated should be either euthanized or appropriately quarantined by the LHD as per IZDP guidelines. These guidelines have been supplied to LHDs; contact IZDP at 609.588.3121 if you do not have them or wish to consult with staff concerning the situation. If animals show signs of rabies while under observation or confinement, the animal should be taken to a veterinarian for examination and the LHD should be notified immediately.

## B. Managing Rabies Situations

### 1. Protection of Humans Exposed to a Rabid or Potentially Rabid Human

Minimize the number of attendants and educate them regarding the disease and its mode of transmission. Attending personnel should be protected (gloves, gowns, face protection) against any exposure to saliva. Articles soiled with saliva should be disinfected. If a patient who has rabies exposes another person via his or her saliva (through a bite, an open wound, or a mucous membrane), rabies PEP of the contact should be considered. Once a patient is diagnosed with rabies, other human contacts from the patient's home/family and work environment should be interviewed by the LHD to determine their exposure risk. **The patient should be considered to be infectious for a period of ten days previous to their onset of illness date, and all throughout the duration of illness.**

### 2. Protection of Humans Exposed to a Rabid or Potentially Rabid Animal

If a biting animal is found to be positive for rabies, humans who were exposed to the infected animal's saliva through a bite, scratch, or mucous membrane should receive PEP as soon as possible.

New Jersey Statutes Annotated (NJSA) 26:4-79, 80, and 81 establish that all animal bites or attacks are reportable to the LHD. Domestic animals (i.e., dogs, cats, ferrets and domestic livestock) that have bitten, scratched, or otherwise exposed a human and appear healthy may be quarantined for ten days in lieu of euthanasia and testing. Dogs, cats, and ferrets that are incubating rabies will begin to exhibit signs of the disease very soon after they begin shedding virus in their saliva and die within seven days. Therefore, a ten-day quarantine is an acceptable and appropriate way to rule out rabies in these animals; if the animal begins to show signs of rabies during the quarantine period, there is still time to safely administer rabies PEP to the bite victim.

Wild animals may be classified as high or low risk. **High-risk wild animals** are those that commonly carry rabies. In New Jersey, this includes raccoons, skunks, foxes, groundhogs (woodchucks), and bats. Because viral-shedding periods are not known for these animals, quarantining the animal following a bite to a human is not appropriate—the animal should be immediately euthanized and submitted for rabies testing. If the animal is unavailable for testing, it must be assumed to be rabid and rabies PEP should be administered to the bite victim. **Low-risk wild animals** almost never carry rabies. These include small animals such as voles, mice, rats, squirrels, and chipmunks. Rabies postexposure treatment is not specifically recommended following provoked bites from healthy rodents of this type; it may be recommended if the animal is showing neurologic signs or is unusually aggressive, however. Bites by trapped mice and rats, by squirrels being fed, or by chipmunks and other animals captured by cats or dogs are considered provoked, and prophylaxis is rarely recommended after such a bite. **Other animals:** Postexposure treatment decisions regarding exposure to other animals (e.g., beaver, opossum, coyotes) are made on a case-by-case basis. Refer to the New Jersey Guide for Postexposure Treatment for Healthcare Professionals at [http://nj.gov/health/cd/documents/postexp\\_rabies\\_Guide.pdf](http://nj.gov/health/cd/documents/postexp_rabies_Guide.pdf) for more information.

**Bats** pose a unique problem. The bite or scratch of a bat can be so small that it may be undetected. Persons who awaken to find a bat in their room or small children who have been

alone with a bat in a room may require PEP. If an exposure cannot be ruled out and the bat is unavailable for testing, PEP should be given. For more information, refer to the Guide to Proper Handling of Bat Exposures (<http://nj.gov/health/cd/documents/batexposure.pdf>).

### **3. Treatment of Domestic Animals Exposed to a Rabid or Potentially Rabid Animal**

#### ***(NJSA 26:4-78 through 86)***

NJSA 26:4-78 requires a veterinarian, animal control officer, or any person with knowledge of the case to notify the local health officer of an animal known or suspected to be affected with rabies or an animal known or suspected of being bitten or exposed to a known or suspect rabid animal. Dogs, cats, and other domestic animals exposed to rabies shall be confined and observed for either 45 days (currently vaccinated) or six months (currently unvaccinated). Euthanasia may be recommended for unvaccinated animals exposed to rabies. The latest recommendations and requirements concerning the quarantine of animals exposed to a rabid or potentially rabid animal can be obtained from NJDHSS IZDP at 609.588.3121 or 609.588.7500.

## **C. Preventive Measures**

Control of human rabies relies on controlling rabies in the animal population and preventing human exposure to rabid or potentially rabid animals. Therefore, it is important to enforce animal quarantine regulations and licensing requirements, and encourage rabies vaccination of dogs, cats, and other domestic animals.

#### ***Personal Preventive Measures/Education***

The following will help prevent rabies:

- Vaccinate pets; dogs are required by law to be vaccinated and licensed. Although not required by law, vaccination of cats, ferrets, other pets, and livestock is strongly encouraged. Vaccination of domestic animals will create a protective barrier between humans and rabid wildlife.
- Do not feed or handle wild or stray animals. Avoid sick or strangely acting animals.
- Do not keep wild animals as pets. This is illegal as well as dangerous.
- Cover your garbage cans securely and keep pet food indoors so that wild animals are not attracted to it.
- Do not touch or handle dead animals. Wear gloves if there is a need to handle an animal carcass.
- Contact the local animal control officer concerning all stray domestic animals, and ill or strangely acting wild animals. The public should be discouraged from capturing these animals.
- Never handle bats. A bat bite or scratch may be so small as to go unnoticed. People who awaken to find a bat in their room, or children, awake or asleep, who have been alone with a bat in a room may require PEP. Shut the door to an (empty) room a bat is in to keep it contained, or if it is on the floor, place a solid-walled garbage can on top of it.

Bats found in homes should be captured by an animal control officer and submitted for rabies testing. Bats found in houses with people should **NOT** be let go until a health department consult is obtained as to whether the bat needs to be submitted for testing or not.

- When handling a pet that was very recently fighting with or bitten by a wild or potentially rabid animal, avoid handling the animal until its fur is dry. If the animal must be handled, the handler should wear waterproof gloves and use soap and water to clean the wound.
- Travelers to developing countries with enzootic rabies should receive preexposure prophylaxis if it is anticipated that they will be in situations where exposure is likely (e.g., camping, hiking, backpacking, or away from areas where they would be able to receive prompt treatment for a bite wound). Travelers should be warned to avoid petting or having other contact with all animals when in these areas; dog rabies is common in many international areas and pet dogs may not always be vaccinated against rabies.

**NOTE: For more information regarding international travel and rabies, contact the CDC's Traveler's Health Office at 877.394.8747 or through the Internet at <http://www.cdc.gov/travel/>.**

The LHD should:

- Receive and investigate animal bite reports
- Receive reports of human PEP and assist healthcare provider in ensuring completion of the treatment according to the prescribed schedule
- Receive and investigate reports of suspect cases of animal rabies and domestic animal exposures to rabies
- Issue and enforce animal confinement orders
- Train local police to as to the proper handling of “bat in the house” calls, because the public will often call the police at night about these situations—make sure police do **NOT** tell them to let the bats go outside!
- Assist veterinarians, animal control officers, and private citizens with preparing and submitting specimens to the PHEL Rabies Laboratory
- Help enforce pet licensing vaccination laws and encourage livestock vaccination
- Conduct rabies education and awareness efforts within its jurisdiction

**NOTE: Rabies educational materials for the public (e.g., brochures and pamphlets) are available from NJDHSS IZDP at 609.588.3121 or 609.588.7500.**

## Additional Information

NJDHSS Web sites: <http://nj.gov/health/cd/izdphome.htm> or [http://nj.gov/health/cd/f\\_rabies.htm](http://nj.gov/health/cd/f_rabies.htm).

CDC Web site: <http://www.cdc.gov/rabies>.

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