

# Unprotected People #14

## Rabies

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### Man without history of a bat bite dies of rabies

*An article entitled "Human Rabies—Virginia, 1998" was published in the February 12, 1999, issue of the Morbidity and Mortality Weekly Report (MMWR). The article is a case report of a 29-year-old incarcerated man who did not have a definitive history of an animal bite was eventually diagnosed with rabies and subsequently died.*

*The "Editorial Note" states: "Since 1990, 27 human rabies cases have occurred in the United States (an average of three cases per year). Although 20 (74%) have been attributed to bat-associated variants of the rabies virus, a definitive history of a bat bite was established for only one of these cases."*

*The "Editorial Note" further states that "medical personnel should consider rabies as a diagnosis in any case presenting with the acute onset and rapid progression of compatible neurologic signs, regardless of whether the patient reports a history of an animal bite. Although early diagnosis cannot save the patient, it may help minimize the number of potential exposures and the need for postexposure prophylaxis.*

*The full article is reprinted below:*

#### **Human Rabies—Virginia, 1998**

On December 31, 1998, a 29-year-old man in Richmond, Virginia, died from rabies encephalitis caused by a rabies virus variant associated with insectivorous bats. This report summarizes the clinical and epidemiologic investigations by the Virginia Department of Health and CDC.

On December 14, 1998, an inmate at the Nottoway Correctional Center in Nottoway County, Virginia, developed malaise and back pain while working on a roadside clean-up crew. He sought medical care at the prison on December 15, complaining of muscle pains, vomiting, and abdominal cramps, and was treated with acetaminophen. His clinical signs progressed to include persistent right wrist pain, muscle tremors in his right arm, and difficulty walking. On December 18, the patient was sent to a Richmond emergency department, where he had a temperature of 103°F (39.4°C). He initially was alert and oriented but had visual hallucina-

tions. During the next 12 hours, he became increasingly agitated and less oriented. Physical examination revealed anisocoria, increased tone in the right forearm, and hyperesthesia over the entire right side of the body. Intoxication with anticholinergic agents such as pesticides or Jimson weed was considered; however, toxicology studies were negative.

The patient's condition worsened, with hypersalivation, priapism, and wide fluctuations in body temperature and blood pressure. He was intubated and heavily sedated on December 20. Laboratory findings included a white blood cell count of 20,800/uL (normal: 3700–9400/uL), myoglobinuria, and a compensated metabolic anion gap acidosis with renal insufficiency. Peak creatine phosphokinase levels were 130,900 U/L (normal: 50–450 U/L), indicating rhabdomyolysis. Analysis of cerebrospinal fluid (CSF) showed a white blood cell count of 57/uL (normal: 0–5/uL), protein levels of 128 mg/dL (normal: 12–60 mg/dL), and glucose levels of 46 mg/dL (normal: at least two thirds of a concurrent serum glucose value, which was approximately 136 mg/dL). A computed tomography scan of the patient's head revealed no abnormal findings.

A diagnosis of rabies was first considered by the patient's physician on December 20. Samples sent to CDC for testing on December 21 included a nuchal skin biopsy, which tested positive for rabies virus by direct fluorescent antibody test on December 22, and saliva and skin, which were positive by reverse-transcriptase polymerase chain reaction (RT-PCR) assay on December 23. The sequence of the amplified RT-PCR product showed greater than 99.7% DNA homology to a rabies virus variant associated with eastern pipistrelle bats (*Pipistrellus subflavus*) and silver-haired bats (*Lasionycteris noctivagans*). Serum and CSF samples obtained December 21 contained rabies virus neutralizing antibody titers of 1:50 and 1:36, respectively, by rapid fluorescent focus inhibition test (RFFIT). A serum sample obtained December 28 showed a rabies virus neutralizing antibody titer of 1:1200 by RFFIT. After the removal of all sedatives, the patient

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showed no purposeful movement and loss of brain-stem reflexes. He died December 31.

Postexposure prophylaxis (PEP) was administered to 48 persons who possibly had contact with the patient's saliva between December 4 (10 days preceding the first clinical signs of illness) and death. Of the 48, 29 were prison inmates who reported possible contact with the patient's saliva, either while caring for him during his illness or through shared cigarettes or drinking and eating utensils. Three family members who visited the patient at the prison on December 6, 15 health-care providers, and the pathologist who conducted the autopsy also received PEP.

Family members, friends, and prison staff reported the patient had not indicated any contact with or bite from an animal in recent months, and prison medical records did not document evidence of a bite or scratch. The patient lived at a work center that housed up to 160 inmates in two separate dormitories. He had worked around the prison on a farm repairing fence lines and feeding cattle, in a paper recycling facility, and along roadsides cleaning up trash and debris. No evidence of bats was found within the prison or on prison grounds, although inmates reported occasionally seeing bats flying near the outdoor lights in the summer. Several stray cats were reported to occasionally approach inmates at the facility; however, the patient was not known to have handled them.

The patient had been incarcerated at Nottoway for approximately 6 weeks after transfer from another correctional unit. At the other correctional facility, the patient worked inside the prison and on a road crew cutting brush and picking up trash along highways. No evidence of bats was found in the prison, and inmates reported that they had never seen bats inside the facility. Prison staff and inmates reported that they did not recall the patient ever being bitten by an animal while working, and that he usually did not handle small animals found by the road crews.

**Editorial Note:** This report describes the only case of human rabies diagnosed in the United States during 1998 and the first case in Virginia since 1953. A definitive history of an animal bite could not be established for this patient, and the most likely explanation is an unrecognized bat bite occurring either at the farm or recycling facility or while the patient was working on a road crew. Because the incubation period for rabies varies from several weeks to several

months, he may have contracted rabies before his transfer to Nottoway.

Since 1990, 27 human rabies cases have occurred in the United States (an average of three cases per year). Although 20 (74%) have been attributed to bat-associated variants of the rabies virus, a definitive history of a bat bite was established for only one of these cases. Of the 20 attributed to bat-associated variants, 15 (75%) have been caused by the same eastern pipistrelle/silver-haired bat variant responsible for the death described in this report. Although bat-associated rabies virus variants theoretically can be secondarily transmitted from terrestrial mammals, an unrecognized bat bite is the most likely explanation for these cases.

The reasons for the preponderance of human rabies cases associated with the eastern pipistrelle/silver-haired bat virus variant remain speculative. Epidemiologic findings suggest that it can be transmitted following minor, undetected exposures. Insectivorous bats, such as those implicated in the human rabies deaths in the United States, have small teeth that may not cause an obvious wound in human skin. Accordingly, it is important to treat persons for rabies exposure when the possibility of a bat bite cannot be reasonably excluded. In all cases where bat-human contact has occurred, the bat should be collected and tested for rabies if possible. If the bat is not available for rabies testing, the need for PEP should be assessed by public health officials familiar with recent recommendations.

The total of 48 persons who received PEP after contact with the patient described in this report is similar to the mean of 49.8 persons who received PEP after exposures to human rabies cases during 1990–1997. Consideration of rabies before the patient's death may have minimized the number of hospital staff that received PEP in this case.

Although this patient did not exhibit classic hydrophobia, other typical clinical signs, such as hypersalivation, hallucinations, priapism, paresthesias, muscle spasms, and autonomic instability occurred. The use of sedatives may have masked hydrophobia in this patient. Medical personnel should consider rabies as a diagnosis in any case presenting with the acute onset and rapid progression of compatible neurologic signs, regardless of whether the patient reports a history of an animal bite. Although early diagnosis cannot save the patient, it may help minimize the number of potential exposures and the need for PEP.