



CDC Home

Search

Health Topics A-Z

**MMWR**

Weekly

May 29, 2009 / 58(20);557-561

## Human Exposures to a Rabid Bat --- Montana, 2008

On September 29, 2008, the Ravalli County Public Health Department (RCPHD) notified the Montana Department of Public Health and Human Services (MDPHHS) of a large-scale human exposure to a dead bat at an elementary school. On October 1, the bat was confirmed to be rabid, and on October 4, MDPHHS requested assistance from CDC in evaluating persons for rabies exposure. Of 107 persons assessed, only one person (1%) was recommended for rabies postexposure prophylaxis (PEP) in accordance with guidance from the Advisory Committee on Immunization Practices (ACIP); however, 74 persons (68%) ultimately pursued rabies PEP. This report describes the incident and public health response, and highlights the importance of unified risk communication. After a potential large-scale exposure to rabies virus, guidance from clinicians should be consistent with ACIP recommendations to ensure appropriate use of rabies PEP ([1](#)).

### Incident Description

On September 28, a parent of two students at a Ravalli County elementary school found a dead bat carried into the house by the family cat. The bat carcass was placed in a jar and stored overnight. On September 29, one parent accompanied the children to school with the bat, and before leaving school premises, removed the carcass from the jar and presented it to eight different classrooms (one kindergarten, four 5th-grade, and three 4th-grade classrooms). Students and teachers in at least five classrooms touched the bat, along with a few other staff members of the school.

Later that morning, the school nurse notified RCPHD after learning of the presentation. RCPHD subsequently advised the parent to submit the bat for rabies diagnosis. That afternoon, the parent took the bat carcass to an off-campus soccer practice attended by students from the school. Some of these children touched the bat. On September 30, the bat was shipped to the Montana Veterinary Diagnostic Laboratory (MVDL). On October 1, MVDL detected the presence of rabies viral antigen in the animal's brain via direct fluorescent antibody testing. On October 16, CDC identified the implicated virus variant as one associated with the silver-haired bat (*Lasiurus noctivagans*).

On September 30, while awaiting the results of the laboratory testing, school officials sent letters home with students enrolled in the five classrooms (kindergarten and 5th grade) where the teacher observed students touching the bat. The letter described concern for potential exposure to the rabies virus. School officials did not send letters home to students enrolled in the three 4th-grade classrooms because teachers did not observe any of these students touching the bat. On the evening of October 1, school officials telephoned households of students in the kindergarten and 5th-grade classes with news of the positive laboratory findings; voice-mail messages were left if no one answered. The cat that had discovered the bat received a rabies booster shot after a veterinarian confirmed its current rabies vaccination status. The cat was observed in the owner's home for 45 days and was reported to be healthy at the time of this report.

### Public Health Response

On October 3, RCPHD held a public meeting in the school. A panel composed of representatives from RCPHD and MDPHHS and two local clinicians (a physician and a veterinarian) provided information and answered questions about rabies, PEP, and vaccine safety. They announced that public health recommendations for PEP would be based on individual risk assessments and that the school would host a vaccination clinic the following week where PEP would be administered. At the meeting, parents raised concerns that students in the three 4th-grade classrooms might also have touched the bat. School officials strongly encouraged that all students, staff, and soccer players suspected of touching the bat be evaluated for PEP. Announcements regarding the starting date and location of the vaccination clinic were made in the local press and on signs posted at the school.

On October 4, MDPHHS requested that CDC assist MDPHHS and RCPHD in evaluating and providing prevaccination counseling to potentially exposed persons. The vaccination clinic was scheduled to start on October 7 and continue on subsequent days for all doses of vaccine in the 5-dose rabies PEP series.

### Exposure Risk and Recommendation for PEP

On October 7, a total of 107 students (accompanied by parents or guardians) and faculty were individually interviewed at the school by representatives of RCPHD, MDPHHS, and CDC. All were identified as requiring evaluation for rabies exposure, either because they reported touching the bat at the school or soccer practice or had been recorded as present in a classroom where touching had been observed by a teacher. Of the 107 interviews, 91 were conducted in person and 16 by telephone. For these 107 interviews, 97 (91%) of respondents were students of the school, and the remaining 10 (9%) were faculty or staff members. Median age was 10 years (range: 5--61 years), and 58 (54%) of respondents were male. Most minors evaluated reported touching the bat while at school.

Based on ACIP guidance, respondents were considered to have been possibly exposed to the rabies virus if they reported a bite or nonbite exposure. A bite exposure was defined as skin penetration from the bat's teeth. A nonbite exposure was defined as skin contact with the bat's mouth (i.e., where infectious saliva might have been present) where 1) open wounds were present or 2) the presence of skin breaks could not be excluded, or 3) the respondent reported subsequent hand contact with conjunctiva or other mucous membranes. Touching the bat in the absence of these conditions was not considered an exposure. History of handwashing or hand sanitizer use immediately after touching the bat also was elicited.

PEP was recommended for one student, who reported possibly being pricked by the bat's teeth after probing its oral cavity with her fingers. The remaining 106 persons either reported touching nonmouth areas (89 [84%]), reported no contact at all (15 [14%]), or declined to be interviewed (two [2%]) and were not recommended for PEP. Of 11 respondents who reported possibly rubbing their eyes after touching the bat, none reported touching the bat's mouth, and 10 reported immediate hand sanitizer use or handwashing. Because this indirect contact does not meet ACIP criteria for rabies virus exposure, none of these respondents were recommended for PEP.

Risk assessment was communicated orally to the respondents and/or their parent or guardian, together with an explanation for why PEP was or was not recommended. Persons were counseled on possible adverse events associated with rabies vaccine, including mild local reactions and pain at the injection site and very rare but serious reports of Guillain-Barré syndrome or acute disseminated encephalomyelitis ([1](#)).

### Administration of PEP

After counseling, respondents pursued or declined PEP, a regimen normally composed of 1 dose of human rabies immune globulin (HRIG) infiltrated in the wound (when applicable) or administered intramuscularly on day 0 (day of initiation) and five injections of rabies vaccine administered intramuscularly on days 0, 3, 7, 14, and 28 (in previously unvaccinated persons). Seventy-four (69%) of the 107 respondents, including the one person with the possible bite exposure, pursued rabies PEP, at a total HRIG and vaccine cost exceeding \$75,000. The school's insurance policy covered this expense, and RCPHD assumed the cost of unused PEP (\$29,000) procured in advance of the vaccination clinic. At the time of this report, no serious adverse events had been reported to RCPHD in connection to the administered PEP, and no cases of human rabies had been reported in association with the incident.

### Decision to Pursue PEP

A written survey was administered to vaccinees to elucidate sources of information used in their decision to pursue PEP. Adult vaccinees and parents/guardians of minor vaccinees returning to the clinic for their second dose of vaccine (on day 3) were asked to indicate the information sources considered.\* Of the 73 persons who attended the day-3 vaccination clinic (one person made arrangements to receive vaccine at an alternate clinic location), 59 (81%) returned the questionnaire. These respondents most frequently rated a physician as the most important source of information used to guide decision-making (18 [31%] of 59), followed by family or friends (13 [22%]), the Internet (12 [20%]), and the health department or CDC (nine [15%]) ([Figure](#)). Anecdotal reports indicated that many of the vaccinees had consulted their primary-care physician for risk assessment and reported to the vaccination clinic with the expectation of receiving PEP.

**Reported by:** J Griffin, C Calderwood, MD, Ravalli County Health Dept; S Helgerson, MD, K Johnson, DVM, PhD, B Barnard, MPH, Montana Dept of Public Health and Human Svcs. C Rupprecht, VMD, PhD, Div of Viral and

*Rickettsial Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases; E Kennedy, DVM, K Robertson, DVM, EIS officers, CDC.*

## Editorial Note:

The rarity of human rabies in the United States is attributed to effective animal control and canine vaccination programs ([1](#)), in addition to widely accessible biologics used for rabies PEP in humans. However, the persistence of disease in wildlife reflects its public health relevance. During 2003--2007, an average of 6,927 animal cases were identified annually in the United States and Puerto Rico, with wildlife bearing approximately 90% of the disease burden ([2--6](#)). Although rabid bats constitute less than 25% of these cases, nearly all indigenous human rabies cases reported in the United States have been linked to bats in recent decades ([1](#)). Prevention of human rabies in the United States largely hinges on an educated public and professional sector that is aware of bat-associated rabies risks.

Large-scale human contact with rabid animals requires mobilization of substantial resources and involvement of public health officials, as demonstrated by this incident, a similar occurrence in New Hampshire during 1994 ([7](#)), and a multistate incident in 2007 ([8](#)). These incidents typically generate high public anxiety, which can lead to unnecessary rabies PEP. This report differs from accounts of previous large-scale human rabies exposures because it describes the compliance with ACIP recommendations by persons who were evaluated and counseled by public health officials.

During 2007--2009, the human rabies vaccine supply was limited because of temporary suspension of production by one manufacturer. To acquire rabies vaccine during that time, clinicians were required to first consult with state or local public health officials. MDPHHS requested CDC assistance because of the anticipated challenges posed by assessing and counseling so many persons in this incident, especially during a time of limited vaccine supply.

Approximately one third of rabies large-scale exposures occur in school settings ([9](#)), which also are ideal sites for educational outreach to promote safe animal practices. Such outreach should include messages that warn against contact with wildlife (both dead and alive) and instructions on what to do if an animal is found on school or home premises. School policies that prohibit bats and other common rabies reservoirs in classrooms are recommended to lessen exposure risks.† All animals suspected of being infected with the rabies virus should be handled carefully and brought promptly to public health officials for testing.

Risk communication is an integral component of a public health response after potential large-scale exposures ([10](#)), including those involving potential exposure to the rabies virus. Many of the persons who pursued PEP in this incident appear to have acted upon advice from community physicians in preference to information provided by public health officials. Clinicians can play an important role in ensuring that only persons with exposure that meet ACIP criteria receive PEP. Coordination among the medical and public health officials involved in a response to a potential large-scale rabies exposure is critical to ensuring the delivery of a unified message to the public regarding the appropriateness of PEP. Timely dissemination of ACIP exposure criteria to local clinicians via the Health Alert Network (HAN) or other communication tools might help ensure that exposed persons receive advice consistent with recommended public health practice.

## Acknowledgments

This report is based, in part, on contributions by Stevensville School District, S Dickerson, N Park, S Hamilton, D Parmenter, K Squires, K McKillip, Ravalli County Public Health Dept; M Emmett, S McClintick, Aspen Hospice; E Mosher, Montana Dept of Public Health and Human Svcs; K Prokop, B Layton, DVM, Montana Veterinary Diagnostic Laboratory; and A Tumpey, MS, P Yager, L Orciari, MS, J Blanton, MPH, Div of Viral and Rickettsial Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases, CDC.

## References

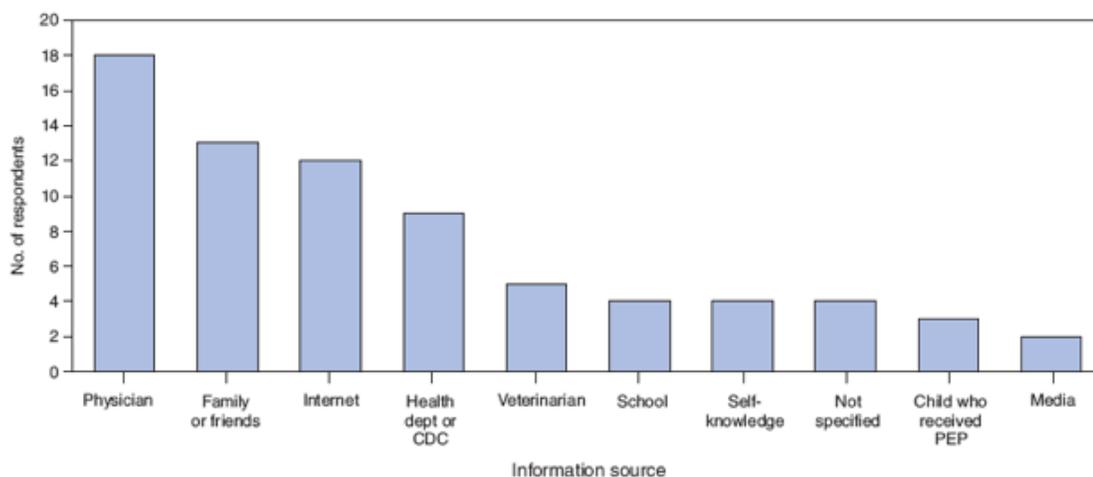
1. [CDC. Human rabies prevention---United States, 2008. Recommendations of the Advisory Committee on Immunization Practices \(ACIP\). MMWR 2008;57:1--26, 28.](#)
2. Blanton JD, Palmer D, Christian KA, Rupprecht CE. Rabies surveillance in the United States during 2007. *J Am Vet Med Assoc* 2008;233:884--97.
3. Blanton JD, Hanlon CA, Rupprecht CE. Rabies surveillance in the United States during 2006. *J Am Vet Med Assoc* 2007;231:540--56.

4. Blanton JD, Krebs JW, Hanlon CA, Rupprecht CE. Rabies surveillance in the United States during 2005. *J Am Vet Med Assoc* 2006;229:1897--911.
5. Krebs JW, Mandel EJ, Swerdlow DL, Rupprecht CE. Rabies surveillance in the United States during 2004. *J Am Vet Med Assoc* 2005;227:1912--25.
6. Krebs JW, Mandel EJ, Swerdlow DL, Rupprecht CE. Rabies surveillance in the United States during 2003. *J Am Vet Med Assoc* 2004;225:1837--49.
7. [CDC. Mass treatment of humans exposed to rabies---New Hampshire, 1994. \*MMWR\* 1995;44:484--6.](#)
8. [CDC. Public health response to a rabid kitten---four states, 2007. \*MMWR\* 2008;56:1337--40.](#)
9. Rotz LD, Hensley JA, Rupprecht CE, Childs JE. Large-scale human exposures to rabid or presumed rabid animals in the United States: 22 cases (1990--1996). *J Am Vet Med Assoc* 1998;212:1198--200.
10. Tinker TL, Zook E, Chapel TJ. Key challenges and concepts in health risk communication: perspectives of agency practitioners. *J Public Health Manag Pract* 2001;7:67--75.

\* Respondents were asked, "What sources of information helped you decide whether or not your child (or yourself) should be vaccinated?" and "What source of information influenced your decision the most?"

† Based on National Association of State Public Health Veterinarians, Inc. recommendations endorsed by CDC, the Council of State and Territorial Epidemiologists, and the American Veterinary Medical Association. Additional information available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5605a1.htm>.

**FIGURE. Information sources rated most important by survey respondents (N = 59)\* who pursued rabies postexposure prophylaxis (PEP) for themselves or their children despite lack of exposure to rabies virus as defined by Advisory Committee on Immunization Practices (ACIP)† --- Montana, 2008**



\* Respondents were asked, "What sources of information helped you decide whether or not your child (or yourself) should be vaccinated?" and "What source of information influenced your decision the most?" Twelve respondents indicated more than one source as being most important. The survey was administered to 73 vaccinees who reported to the vaccination clinic to receive the second dose of the series; 59 respondents returned the survey.

† According to ACIP, PEP is indicated for persons who report a bite from a rabid animal or report a nonbite exposure (e.g., introduction of rabies virus from saliva or other potentially infectious material, such as neural tissue, into fresh, open cuts in skin or onto mucous membranes). Of 107 persons evaluated, only one person reported a nonbite exposure and was recommended for PEP. All other persons reported indirect contact or activities (e.g., petting or handling an animal, which does not constitute exposure; therefore, PEP was not recommended. A total of 74 persons pursued PEP (one person received the second dose of vaccine at an alternate clinic location).

**Alternative Text:** The figure above shows information sources rated most important by respondents (N = 59) who decided to pursue rabies postexposure prophylaxis (PEP) for themselves or their children despite public health recommendations that PEP was not indicated because of rabies nonexposure in Ravalli County, Montana, in 2008. The information was derived from a survey administered to vaccinees. Adult vaccinees and parents/guardians of minor vaccinees returning to the clinic for their second dose of vaccine, following exposure to a rabid bat (on day 3), were asked to indicate the information sources considered. Of the 73 persons who attended the day-3 vaccination clinic (one

person made arrangements to receive vaccine at an alternate clinic location), 59 (81%) returned the questionnaire. Respondents rated a physician as the most important source of information used to guide decision-making (18 [31%] of 59).

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of pages found at these sites. URL addresses listed in *MMWR* were current as of the date of publication.

All *MMWR* HTML versions of articles are electronic conversions from typeset documents. This conversion might result in character translation or format errors in the HTML version. Users are referred to the electronic PDF version (<http://www.cdc.gov/mmwr>) and/or the original *MMWR* paper copy for printable versions of official text, figures, and tables. An original paper copy of this issue can be obtained from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402-9371; telephone: (202) 512-1800. Contact GPO for current prices.

\*\*Questions or messages regarding errors in formatting should be addressed to [mmwrq@cdc.gov](mailto:mmwrq@cdc.gov).

Date last reviewed: 5/27/2009

[HOME](#) | [ABOUT MMWR](#) | [MMWR SEARCH](#) | [DOWNLOADS](#) | [RSS](#) | [CONTACT](#)  
[POLICY](#) | [DISCLAIMER](#) | [ACCESSIBILITY](#)

**SAFER • HEALTHIER • PEOPLE™**

**Morbidity and Mortality Weekly Report**  
Centers for Disease Control and Prevention  
1600 Clifton Rd, MailStop E-90, Atlanta, GA 30333,  
U.S.A



Department of Health  
and Human Services