December 2000 volume 16 number 12

Georgia Epidemiology Report

Human Rabies Case in Georgia Highlights Recent Prevention Recommendations

On October 10, 2000, a Georgia man died from rabies encephalitis caused by a rabies virus variant associated with insectivorous bats. This is consistent with an emerging pattern in the epidemiology of human rabies in the United States: bat-related virus variants were identified from 22 (59.5%) of the 37 cases of human rabies diagnosed in the United States from 1981-1999 (Table 1). Rabies is transmitted only when the virus is introduced into bite wounds or open cuts in skin or onto mucous membranes. However, epidemiologic data suggest that transmission of rabies virus can occur from minor, seemingly unimportant, or unrecognized bites from bats (2). On the basis of the available information from the 22 bat-associated cases of human rabies reported since 1981: one case had a history of a bat bite; 10-12 cases had apparent contact with a bat but no bite was detected; and 7-10 cases reported no exposure to bats, but an undetected or unreported bat bite remains the most plausible hypothesis (1,2). This report summarizes the clinical features of the Georgia human rabies case and the epidemiologic investigation conducted by the Georgia Division of Public Health and the Centers for Disease Control and Prevention (CDC). Investigation findings underscore: 1) the need for adherence to recent Advisory Committee for Immunization Practices (ACIP) guidelines (1) regarding post-exposure prophylaxis (PEP) administration for bat exposures; 2) the continuing need for public education regarding the risk of rabies acquisition from bat bites; and 3) the need for early consideration of rabies as a differential diagnosis in any progressive neurologic disease of unknown etiology to minimize the number of healthcare workers requiring PEP.

Case Report:

On the afternoon of October 3, a 26-year-old man from Taylor County developed nausea and vomiting; self-administration of an over-the-counter anti-emetic provided no amelioration of symptoms. During the next several hours, the frequency of vomiting increased and he developed hematemesis. The patient was transported to his primary care provider where he was treated with anti-emetic suppositories and advised to seek treatment at a local Emergency Department (ED) if symptoms persisted. That evening, he presented to a local hospital and was admitted. Over the next several hours he became confused, disoriented, combative, and complained of difficulty breathing. A lumbar puncture was performed; analysis of cerebrospinal fluid (CSF) was within normal limits. On October 5, he became hypotensive and hypoxic and was transferred to a regional referral hospital for ventilatory support.

Upon arrival at the referral hospital, he was intubated and placed on a mechanical ventilator. Findings on physical examination included an oral temperature of 104°F, anisocoric pupils, and production of copious amounts of oral secretions; pulmonary auscultation revealed scattered bilateral crackles. Additionally, a chest X-ray revealed bilateral diffuse alveolar densities suggestive of noncardiogenic edema.

Therapies of doxycycline, ceftriaxone, vancomycin, and acyclovir were initiated. Over the next two days the patient's clinical course temporarily improved—his fever resolved, his oxygen requirements improved, and the pulmonary edema evident on chest X-ray decreased. The patient remained mechanically ventilated, although sedative and paralytic agent therapies were withdrawn.

Georgia Department of Human Resources
Division of Public Health
Epidemiology Branch
Two Peachtree St., N.W.
Atlanta, GA 30303-3186
Phone: (404) 657-2588
Fax: (404) 657-2608

Please send comments to:
Gaepinfo@dhr.state.ga.us

The ***Georgia Epidemiology Report*** is a publication of the Epidemiology Branch, Division of Public Health, Georgia Department of Human Resources

The attending physician considered a diagnosis of rabies on October 7 but diagnostic testing was not immediately pursued due to the patient's apparent clinical improvement. However, on October 9 the patient developed cardiac arrhythmias and episodes of uncontrollable hypotension; he also became agitated and combative. On October 10, the patient developed respiratory and renal failure and expired. An autopsy was performed, and gross pathologic findings included diffusely consolidated lungs, and large, bilateral, serous pleural effusions. No gross evidence of encephalitis was seen upon examination of the patient's brain tissue. On October 12 rabies was diagnosed by direct fluorescent antibody (DFA) test from postmortem brain samples examined by the CDC Rabies Laboratory. Monoclonal antibody studies and nucleotide sequence analysis of viral RNA implicated a variant associated with Mexican free-tailed bats *(Tadarida brasiliensis*). A total of 71 health-care workers received PEP because of possible percutaneous or mucous membrane exposure to the patient's saliva.

Investigation:

Since July 2000, the patient had been renting a room on the upper floor of an old house. On several occasions, he reported to coworkers that bats from the attic had entered his living quarters and landed on him while he slept. Once he had been awakened by a bat that had settled on his foot under the bedcovers. Coworkers could not recall the exact date of this incident. The patient did not seek medical attention for PEP administration; he presumably did not appreciate the risk of rabies from such bat encounters. Investigation by state and local health officials revealed a colony of approximately two hundred Mexican free-tailed bats in the attic of the house occupied by the patient, as well as several direct openings between the attic and the patient's bedroom, bathroom, closet, and kitchen. The attic had numerous openings to the outside near the chimney, under the eaves, and between the roofing slates. Rabies PEP was recommended for 2 persons residing in the household who may have been exposed to the bats.

Prevention Recommendations:

The limited injury inflicted by a bat bite and an often-inaccurate recall of the exact exposure history might limit the ability of healthcare providers to determine the risk of rabies resulting from an encounter with a bat. As such, the document "*Human Rabies Prevention — United States, 1999: Recommendations of the Advisory Committee on Immunization Practices"* states that in all instances of potential human exposures involving bats, the bat in question should be safely collected, if possible, and submitted through local or state health departments for rabies testing. Rabies PEP is recommended for all persons with bite, scratch, or mucous membrane exposure to a bat, unless the bat is available for testing and is negative for evidence of rabies. In addition, rabies PEP should also be considered in all situations in which there is reasonable probability that a bat bite or direct contact with a bat may have occurred. For example, PEP should be considered if a 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 (and rabies cannot be ruled out by testing the bat). Detailed descriptions of the PEP regimen including local wound treatment, administration of passive antibody, and schedule of vaccine administration are also included in this document.

The Georgia Poison Center (1-800-282-5846 or 404-616-9000, 24 hours/day, 7-days-a week) can assist healthcare providers and the general public in making routine PEP risk assessments or other management decisions for animal bites and other potential human rabies exposures. In addition, the Epidemiology Branch of the Georgia Division of Public Health (404-657-2588) can provide rabies consultation for unusual human rabies exposures or situations involving animal management. For example, the Epidemiology Branch can provide management recommendations for domestic animals bitten by a rabid or potentially rabid wild mammal or a bat, as well as recommendations about confining domestic animals that bite humans.

Medical personnel should consider rabies as a diagnosis in any person presenting with 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 minimize the number of potential exposures and the need for PEP in healthcare workers because of prompt initiation of patient isolation and standard barrier techniques against infectious diseases in the hospital.

Reduction of bat populations is not a feasible, practical, or desirable strategy for rabies control in bats. Human and domestic animal contact with bats should be minimized. Bats should be physically excluded from houses and surrounding structures by sealing potential entrances. Bats should never be handled by untrained and unvaccinated persons without safety precautions and should never be kept as pets. In addition, rabies vaccination should be kept current for all dogs and cats to provide a barrier to indirect human exposures to wildlife rabies through domestic animals.

References:

1. Noah DL, Drenzek CL, Smith JS, et al. Epidemiology of human rabies in the United States, 1980 to 1996. *Ann Intern Med* 1998;128:922-30.
2. CDC. Human rabies prevention — United States, 1999: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 1999; 48 (no. RR-1).

This report contributed by Cherie L. Drenzek, D.V.M., M.S., State Public Health Veterinarian, Georgia Division of Public Health, Harold L. Katner, M.D., Mercer University School of Medicine, Zsolt Koppanyi, M.D., MPH, Ed Saidla, and Dee Cantrell, Ph.D., West Central Health District, Georgia Division of Public Health.

Table 1. Cases of rabies in human beings in the United States, by circumstances of exposure and rabies virus variant, 1981-1999*
(Adapted from: JW Krebs, JS Smith, CE Rupprecht, et al. Rabies surveillance in the United States during 1998. *J Am Vet Med Assoc* 1999; 215:1786-1798.)

Date of death	State of residence	Exposure history#	Rabies virus variant+
4 Jul 81	OK	Unknown	Skunk, South Central
11 Sep81	AZ	Dog bite - Mexico	Dog, Mexico
28 Jan 83	MA	Dog bite - Nigeria	Dog, Nigeria
9 Mar 83	MI	Unknown	Bat, Ln/Ps
8 Aug 84	TX	Unknown- Laos	Dog, Laos
29 Sep 84	PA	Unknown	Bat, Msp
1 Oct 84	CA	Dog bite – Guatemala	Dog, Guatemala
20 May 85	TX	Unknown – Mexico	Dog, Mexico
15 Dec 87	CA	Unknown – Philippines	Dog, Philippines
3 Feb 89	OR	Unknown - Mexico	Dog, Mexico
5 Jun 90	TX	Bat bite - TX	Bat, Tb
20 Aug 91	TX	Unknown	Dog/coyote
25 Aug 91	AR	Unknown	Bat, Ln/Ps
10 Oct 91	GA	Unknown	Bat, Ln/Ps
8 May 92	CA	Dog bite - India	Dog, India
11 Jul 93	NY	Unknown	Bat, LnPs
9 Nov 93	TX	Unknown	Bat, Ln/Ps
21 Nov 93	CA	Dog bite - Mexico	Dog, Mexico
18 Jan 94	CA	Unknown	Bat, Ln/Ps
21 Jun 94	FL	Unknown - Haiti	Dog, Haiti
11 Oct 94	AL	Unknown	Bat,Tb
15 Oct 94	WV	Unknown	Bat, Ln/Ps
23 Nov 94	TN	Unknown	Bat, Ln/Ps
27 Nov 94	TX	Unknown	Dog/coyote
15 Mar 95	WA	Unknown	Bat,Msp
2 Sep 95	CA	Unknown	Bat, Tb
3 Oct 95	CT	Unknown	Bat Ln/Ps
9 Nov 95	CA	Unknown	Bat, Ln/Ps
8 Feb 96	FL	Dog bite - Mexico	Dog, Mexico
20 Aug 96	NH	Dog bite - Nepal	Dog, Asia
15 Nov 96	KY	Unknown	Bat, Ln/Ps
19 Dec 96	MT	Unknown	Bat, Ln/Ps
5 Jan 97	MT	Unknown	Bat, Ln/Ps
18 Jan 97	WA	Unknown	Bat, Ef
17 Oct 97	TX	Unknown	Bat, Ln/Ps
23 Oct 97	NJ	Unknown	Bat, Ln/Ps
31 Dec 98	VA	Unknown	Bat, Ln/Ps

*All laboratory-confirmed cases of rabies in human beings who developed the disease in the United States through November 1998. Excluded are three persons who were exposed to the disease and died of their infections while outside the United States. # Data for exposure history are reported only when the biting animal was available and tested positive for rabies, when plausible information was reported directly by the patient (if lucid or credible), or when a reliable account of an incident consistent with rabies exposure (e.g., dog bite) was reported by an independent witness (usually a family member).
+Variants of the rabies virus associated with terrestrial animals in the United States are identified with the name of the animal reservoir, whereas variants of the rabies virus acquired
outside the United States are identified with the names of the reservoir animal (dog, in all cases shown), followed by the name of the most definitive geographic entity (usually the country) from which the variant has been identified. Variants of the rabies virus associated with bats are identified with the names of the species of bat(s) in which they have been found to be circulating. In some instances the known or presumed geographic location of human beings when they were infected may rule out one of the species indicated in for the variant known as the silver-haired/pipistrelle variant (Ln/Ps). Because information regarding the location of the exposure and the identity of the exposing animal is almost always gathered retrospectively and much information is frequently unavailable,the location of the exposure and the identity of the animal responsible for the infection are often limited to deduction.

Ln/Ps=*Lasionycteris noctivagans* or *Pipistrellus subflavus*, the silver-haired bat or the eastern pipistrelle; Msp=*Myotis*, species unknown; Tb=*Tadarida brasiliensis*, the Brazilian (Mexican)free-tailed bat; Ef=*Eptesicus fuscus*, the big brown bat.

The Georgia Epidemiology Report
Epidemiology Branch
Two Peachtree St., NW
Atlanta, GA 30303-3186

Bulk Rate
U.S. Postage
Paid
Atlanta, Ga
Permit No. 4528

December 2000 **Volume 16 Number 12**

Reported Cases of Selected Notifiable Diseases in Georgia Profile* for August 2000

Selected Notifiable Diseases	Total Reported for September 2000	Previous 3 Months Total Ending in September			Previous 12 Months Total Ending in September		
	2000	1998	1999	2000	1998	1999	2000
Campylobacteriosis	28	246	182	176	812	765	627
Chlamydia trachomatis	2410	5639	7439	8706	17698	30631	31317
Cryptosporidiosis	12	54	36	79	129	175	191
E. coli O157:H7	1	35	20	24	74	45	52
Giardiasis	111	427	474	376	1191	1335	1280
Gonorrhea	1585	5608	5395	5695	15439	20960	20610
Haemophilus influenzae (invasive)	2	12	8	7	57	83	79
Hepatitis A (acute)	43	242	127	123	870	638	338
Hepatitis B (acute)	34	43	77	85	227	204	273
Legionellosis	1	5	2	1	12	2	10
Lyme Disease	0	1	0	0	8	0	0
Meningococcal Disease (invasive)	4	16	11	6	98	75	60
Mumps	0	0	3	0	2	5	2
Pertussis	1	12	23	10	32	48	50
Rubella	0	0	0	0	0	0	0
Salmonellosis	170	828	795	673	1701	1990	1783
Shigellosis	30	327	90	84	1425	435	282
Syphilis - Primary	20	56	84	56	210	274	270
Syphilis - Secondary	58	100	166	164	410	552	626
Syphilis - Early Latent	110	374	304	266	1484	1516	1234
Syphilis - Other**	156	452	436	408	1503	1524	1450
Syphilis - Congenital	0	6	16	2	24	44	28
Tuberculosis	68	162	161	181	628	629	691

* The cumulative numbers in the above table reflect the date the disease was first diagnosed rather than the date the report was received at the state office, and therefore are subject to change over time due to late reporting. The 3 month delay in the disease profile for a given month is designed to minimize any changes that may occur. This method of summarizing data is expected to provide a better overall measure of disease trends and patterns in Georgia.

** Other syphilis includes latent (unknown duration), late latent, late with symptomatic manifestations, and neurosyphilis.

AIDS Profile Update

Report Period	Total Cases Reported*	Percent Female	Risk Group Distribution (%)						Race Distribution (%)		
			MSM	IDU	MSM&IDU	HS	Blood	Unknown	White	Black	Other
Latest 12 Months: 10/99-9/00	1259	27.3	28.2	10.8	2.5	13	2.1	43.4	20	76.9	3.1
Five Years Ago: 10/94-9/95	2335	18.5	47.3	21.1	5.7	14.6	1.9	9.3	35.5	62.1	2.4
Cumulative: 7/81-9/00	22377	16.5	49	18.5	5.7	12.9	1.9	12	36.1	61.7	2.1

MSM - Men having sex with men **IDU - Injection drug users** **HS - Heterosexual**

* Case totals are accumulated by date of report to the Epidemiology Section