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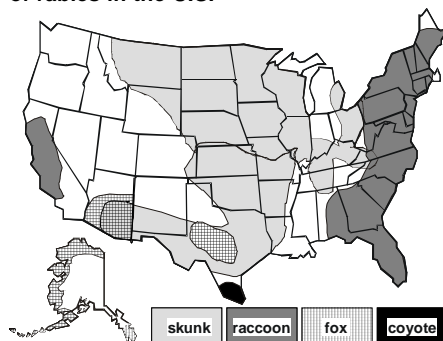
ANIMAL BITES AND THE RISK OF RABIES

ON MARCH 19, 2002, a 28-year-old Northern California man was admitted to his local hospital with headache, vomiting, and dehydration. On March 29, corneal impression smears were positive for rabies antigen. The patient died on March 31. Subsequent molecular testing at the Centers for Disease Control and Prevention (CDC) identified the rabies virus as the Mexican free-tailed bat strain. The patient had not reported having exposure to bats.

This untimely death serves as a reminder that rabies is an ever-present risk in most of the world, including the West Coast of the United States. There is, however, no need to panic—rabies is both extremely rare and preventable. The last case of human rabies in Oregon occurred in 1989 an 18-year old man who was bitten by either a rabid dog while in Mexico or a rabid skunk while in California. In 1978, a Baker County woman dies of rabies after receiving a corneal transplant from a donor who had died of an unexplained illness. And in 1967, a Multnomah County boy who had been bitten by a dog in Egypt became ill after his return to Oregon, and died of rabies shortly thereafter.

This issue of the *CD Summary* details nationwide data on human and animal rabies over the past several years and outlines recommendations for rabies prophylaxis following animal bites in Oregon.

Distribution of major terrestrial reservoirs of rabies in the U.S.



HUMAN RABIES IN THE U.S.

From 1990 to 1999, 20 U.S. citizens contracted rabies. All viral strains were bat-associated variants, although a history of bat contact had been reported by only 11 of the cases. In 2000, five cases of human rabies were diagnosed in California, Georgia, Minnesota and Wisconsin. Four were related to bat bites in the U.S. Two persons were bitten by Mexican free-tailed bats (*Tadarida brasiliensis*), one by a silver-haired bat (*Lasiorycteris noctivagans*) and one by an Eastern pipistrelle bat (*Pipistrellus subflavus*). In 2001, rabies occurred in a 72-year-old man who had traveled to the Philippines and contracted a rabies-virus variant associated with Filipino dogs. Neither the victim nor his family remembered a dog bite or other animal exposure—a tragic (though typical) circumstance, since reporting the exposure could have led to post-exposure prophylaxis (PEP).

ANIMAL RABIES IN THE U.S.

All warm-blooded animals are susceptible to rabies. Six to seven thousand cases of rabies have been reported in animals over each of the past several years in the U.S. (map). Wild animals accounted for 93% of the 7,369 reported cases of rabies in 2000. Overall, raccoons continued to be the most frequently reported rabid wildlife species (38% of all animal cases during 2000), followed by skunks (30%), bats (17%), and foxes (6%). Obviously, these are not random samples of animals in the wild; the data are subject to huge biases in-

volving the likelihood that a given animal in a given area will be captured, decapitated, tested, and reported. We do not even have “denominator” data for the test results—i.e., numbers of animals tested—so that we can calculate the probability that an animal of a given species is rabid.

But because bat-variant strains have predominated among human cases of rabies, they certainly deserve our attention. And unlike the geographically limited epizootics of rabies in raccoons, foxes, skunks, and coyotes (map), rabies in bats is widely distributed throughout the United States, with cases reported from all 48 contiguous states. (Hawaii is the only state that has never reported indigenously acquired human or animal rabies.*)

OREGON ANIMALS

Here, rabies has *not* been established in animals other than bats (table). Nine percent of Oregon bats tested for rabies over the past 5 years had the virus. Again, this is not representative of the bat population in Oregon, since tested bats are typically those that bit, scratched or salivated on humans and were sick, stupid, or dead enough to allow themselves to be captured.

The Pacific Northwest remains free of rabies in land-dwelling (terrestrial) animals, except for the occasional one unfortunate enough to get bitten by a bat. At highest risk are bat predators like cats and foxes, and (rarely) bat cohabitants like cows and horses. N.b.: we have *never* had a raccoon, rodent, or lagomorph (rabbits, hares) test positive for wild-type rabies in Oregon.

Animal rabies test results, Oregon 1997–2001

Year	Bat	Cat	Dog	Fox	Other animals
1997	14/116	1/83	0/52	0/6	0/45
1998	6/95	0/95	0/56	0/3	0/49
1999	11/115	1/95	0/45	0/1	1/47 [⊗]
2000	8/73	0/79	0/56	1/4	0/4
2001	4/59	0/67	0/46	0/1	0/41
Totals	43/458 (9%)	2/419 (1%)	0/583	1/52 (2%)	1/668[⊗] (0.15%)

[⊗] Yow! it was a cow!

* in case you needed a reason...



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ASSESSING RISK OF RABIES

All disquieting bites of human beings by mammals (excluding humans) must, by law, be reported within 24 hours to the local public-health authority. Public-health officials will help you to evaluate the risk of rabies, and, depending on the circumstances, make arrangements for quarantine, facilitate testing of the animal's brain for rabies, or recommend PEP. Important general principles are shown in the box.

Most human exposures to rabies are via bite, but potential exposures include scratches or other lacerations that result in contact between a warm-blooded animal's *saliva* and a person's non-intact skin or mucous membrane. Human exposure to animal blood, urine, or feces through non-intact skin or a mucous membrane should *not* raise a concern about rabies. Public-health investigators may be consulted when bats are found around persons who have recently been asleep or who are unable to tell you whether they've been bitten; these situations present very low risk, but we can help you through them.

All bats should be considered rabid until proved otherwise (i.e., by testing their brains for rabies virus). After a bite by any other animal, rabies risk assessment is based largely upon the provoked or unprovoked nature of the incident. Animal bites are considered "provoked" when they involve handling, petting, hand feeding, cornering, taking away food, disciplining, falling on, releasing from a trap, intervening in flight or predation, helping after injury, or otherwise intruding into an animal's "space." Rarely, an animal may bite after deliber-

ately crossing neutral space despite having one or more open avenues of escape—such a bite is called "unprovoked." In general, unprovoked bites are risky, whereas provoked bites are not. Other factors to be weighed include the animal species (see table, *verso*) and vaccination status of the animal. If your patient is bitten by a dog, cat, or ferret, observation of the animal during a 10-day quarantine is usually an excellent alternative to starting an expensive PEP regimen or killing the animal for the purpose of testing its brain.

RULES OF THE ROOST

- All bats must be considered rabid until proved otherwise.
- Bites from foxes are high-risk.
- "Provoked" bites are low-risk.
- Bites from rodents and lagomorphs (rabbits, hares) are low-risk.
- Bites from adequately-vaccinated animals are low-risk.
- Report animal bites within 24 hours to the local health department.

HUMAN RABIES PREVENTION

"Primary prevention" means preventing exposures. Handling bats is a bad idea. The same is true for handling other wild animals or unfamiliar domestic animals.

Following an exposure, PEP is highly effective but expensive (roughly \$1500/course). It consists of human rabies immunoglobulin (HRIG), given as soon as possible, and 5 doses of vaccine given IM (in the deltoid) over 28 days. HRIG and vaccine are available in many emer-

gency departments or by calling 1-800-VACCINE. There are no contraindications to PEP for persons who have been exposed. Once symptoms develop, human rabies is 100% fatal.

SUMMARY

Oregon remains free of terrestrial rabies. The rabies isolates obtained from cats and foxes are of bat origin. Bats remain the single most important threat for exposure to rabies in Oregon as well as in the rest of the United States. Bites of humans by mammals should be reported within 24 hours to local public-health officials.

REFERENCES

1. Krebs MS, Alison M, Mondul BS, et al. Rabies surveillance in the United States during 2000. *JAVMA* 2001;219:1687-1699. At <http://www.cdc.gov/ncidod/dvrd/rabies/Professional/Surveillance00/text00.htm>.

Shortage of Pneumococcal Conjugate Vaccine

AS THIS ISSUE of the *CD Summary* goes to press, the Oregon Immunization Program is completely out of pneumococcal conjugate vaccine (PCV; Prevnar®), with no concrete news from either the manufacturer or the CDC about when we can expect a new delivery. Fifteen other states have been without PCV for several weeks. If you are running low or are out of PCV, please call a Vaccines-for-Children Health Educator at the Immunization Program (503/731-4020) for assistance. We may be able to facilitate some trading and transferring of doses.

For vaccine supply updates go to www.healthoregon.org/imm/provider/welcome.htm