

OREGON PUBLIC HEALTH DIVISION • DEPARTMENT OF HUMAN SERVICES

ANIMAL BITES IN OREGON

Each year, nearly 4.5 million Americans are bitten by dogs, and nearly 25% of those bitten require medical attention for dog bite-related injuries.¹ In addition, animal bites may need prophylaxis against tetanus, bacterial infection, and rabies. This issue of the *CD Summary* discusses infections related to animal bites in Oregon.

WHAT BITES, WHO'S BITTEN

In the US, animal bites account for more than 300,000 emergency department visits. Of these, bites from dogs account for 85%–90%, cats for 5%–10% and rodents for 2%–3%. Risk factors included being young or male. *Children are more likely to have head and face injuries and suffer a disproportionate number of fatal bite injuries.*^{2,3} Between 1996–1998, an emergency room study reviewed medical information of 2,030 patients with animal contact. The median age of the patients was 27 years, and 59% were male.²

Closer to home, we conducted a study of dog bites reported to Animal Control Services in Multnomah County, Oregon. From June 30, 2002, to July 1, 2003, 636 bites were reported. Male children aged 5–9 years were most likely to be bitten. Factors associated with dogs that bit included breed (terrier, working, herding, and non-sporting breeds), being a sexually intact male, and purebred status. There appeared to be a socioeconomic correlate: biting dogs were more likely than non-biting dogs to live in neighborhoods where the residents' median incomes were less than the county median.⁴

BITE BACTERIA

An emergency room survey assessed the types of bacteria responsible for dog- and cat-bite wounds that became infected. *Pasteurella* species were the most frequent isolates from both dog bites (50%) and cat bites (75%).

Pasteurella canis was the most common isolate from dog bites, and *Pasteurella multocida* subspecies *multocida* and *septica* were the most common from cat bites. Other common aerobes included streptococci, staphylococci, *Moraxella* spp. and *Neisseria* spp. Common anaerobes included *Fusobacterium*, *Bacteroides*, *Porphyromonas*, and *Prevotella*.⁵

RABIES

The most feared complication of an animal bite is rabies; fortunately, it is quite rare in the United States. Oregon's last human case of rabies occurred in 1989. From 2000–2006, 19 human rabies cases were reported in the United States and Puerto Rico — an average of fewer than three cases (<1 per 100 million persons) per year. Seventeen were attributed to bat-associated variants of the rabies virus, one to a raccoon (Virginia) and one to a mongoose (Puerto Rico). Of the 19 cases, four persons contracted rabies via organs transplanted from a single decedent.⁶ All cases were fatal except that of a teenaged Wisconsin girl who was bitten by a bat in 2004. She survived rabies after induction of coma with ketamine and midazolam and treatment with the antivirals ribavirin and amantadine.⁷

WOUND MANAGEMENT

Since elimination of rabies virus at the site of the bite by chemical or physical means is the most effective mechanism of protection, immediate vigorous washing and flushing with soap and water, detergent, or even water alone are imperative. This procedure is recommended for all bite wounds, including those unre-lated to possible exposure to rabies. After washing, apply either ethanol or tincture or aqueous solution of iodine or povidone iodine. Vaccine status should be checked and tetanus vaccine and immune globulin administered if indicated.⁸

RABIES POST-EXPOSURE PROPHYLAXIS (RPEP)

In previously unvaccinated patients, human rabies immune globulin (HRIG) should be administered to previously unvaccinated persons to provide immediate, passive, rabies virus neutralizing antibody coverage until the patient responds to the rabies vaccine by actively producing antibodies. The recommended dose is 20 IU/kg (0.133 mL/kg) body weight. As much of the product as is anatomically feasible should be infiltrated into and around the wound. Any remaining product should be administered intramuscularly in the deltoid or quadriceps. In addition, human diploid cell vaccine (HDCV; *Imovax*®) or purified chick embryo cell vaccine (PCECV; *RabAvert*®), should be administered into the deltoid muscle as soon as possible after exposure (day 0) and on days 3, 7, 14, and 28 after the first vaccination.⁸ Vaccine preparations for intradermal administration are no longer available in the United States.

There are no contraindications to rabies post exposure prophylaxis (RPEP) for exposed persons, since rabies is almost invariably fatal once contracted. However, prophylaxis should not be undertaken lightly as the biologics are expensive and necessitate at least five visits to a healthcare provider. According to a study in southern California, between 1998–2002, the mean total cost of a suspected human rabies exposure was \$3,688; the direct costs per case were \$2,564, and the indirect costs were \$1,124 of that total. Indirect costs included lost wages, transportation, and day-care fees and were not reimbursable to the patient.⁹

PROPHYLACTIC ABUSE

In 1994, a single rabid cat in New Hampshire precipitated an estimated \$1.5 million in RPEP spending, of which \$1.1 million was attributed to RPEP prescribed, astoundingly, to 655



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persons.¹⁰ In 2000, a survey of practice in 11 university-associated urban emergency departments revealed that rabies prophylaxis was administered inappropriately in 40% of the cases.²

Numbers of RPEP courses vary from state to state depending on the predominant animal reservoirs and can change dramatically with the emergence of a new reservoir.¹⁰ Overuse of RPEP is a public health problem because of the expense, especially since the supply of rabies vaccine has recently been tenuous in the US.

Many factors may lead to overly liberal prescription of RPEP. In pediatric cases, the reliability of the individual's description of the incident may be questionable or not available. In some instances, the patient may insist that RPEP be administered even when the risk of rabies is negligible. Overtreatment may be reduced by capturing biting animals for quarantine or testing; and by consulting with public health officials knowledgeable about local rabies reservoirs and trained in assessing exposure histories.¹¹

RABIES IN OREGON

Bats are the only reservoir for rabies in Oregon. Foxes are a significant concern because they may acquire rabies from bats, and rabid foxes may bite humans. Rarely, cats are infected by bats. *There has never been a documented case of rabies in a raccoon, skunk, or rodent acquired in Oregon* (Table).

Because rabies can theoretically be carried by any mammal, all bites of humans by other mammals are reportable to local public health officials in Oregon. Physical contact with a bat or

Animals tested and animals positive for rabies, Oregon, 2000–2008



YEAR	Bat	Cat	Dog	Fox	Other
2000	8/73	0/79	0/56	1/4	0/4
2001	4/59	0/67	0/46	0/1	0/41
2002	12/134	0/102	0/27	2/4	0/29
2003	6/61	0/75	0/36	1/5	0/39
2004	7/88	0/105	0/42	0/2	0/27
2005	8/83	0/100	0/48	0/1	0/23
2006	23/126	0/72	0/26	2/4	0/41
2007	12/153	0/80	0/33	0/1	0/26
2008	13/128	0/58	0/23	0/3	0/53
TOTALS	93/905	0/738	0/337	6/25	0/258
2000–2008	10%	0%	0%	24%	0%

a bite by a fox should always trigger a recommendation for RPEP, unless the animal* is available for rabies testing at the Oregon State Public Health Laboratory. If the animal is captured immediately, RPEP can generally be delayed until rabies testing results are available.

REFERENCES

- Centers for Disease Control and Prevention. www.cdc.gov/HomeandRecreationalSafety/Dog-Bites/prevention.html (Accessed June 5, 2009)
- Moran GJ, Talan DA, Mower W, et al. Appropriateness of rabies postexposure prophylaxis treatment for animal exposures. Emergency ID Net Study Group. *JAMA* 2000;284:1001–7.
- Griego RD, Rosen T, Orengo IF and Wolf JE. Dog, cat, and human bites: a review. *J Am Acad Dermatol* 1995;33:1019–29.
- Shuler CM, DeBess EE, Lapidus JA, and Hedberg K. Canine and human factors related to dog bite injuries. *J Am Vet Med Assoc* 2008;232:542–6.
- Talan DA, Citron DM, Abrahamian FM, Moran GJ, and Goldstein EJ. Bacteriologic analysis of infected dog and cat bites. Emergency Medicine Animal Bite Infection Study Group. *N Engl J Med* 1999;340:85–92.
- Investigation of rabies infections in organ donor and transplant recipients--Alabama, Arkansas, Oklahoma, and Texas, 2004. *MMWR Morb Mortal Wkly Rep* 2004;53:586–9.
- Willoughby RE, Jr., Tieves KS, Hoffman GM, et al. Survival after treatment of rabies with induction of coma. *N Engl J Med* 2005;352:2508–14.
- Manning SE, Rupprecht CE, Fishbein D, et al. Human rabies prevention--United States, 2008: recommendations of the Advisory Committee on Immunization Practices. *MMWR Recomm Rep* 2008;57:1–28.
- Shwiff SA, Sterner RT, Jay MT, et al. Direct and indirect costs of rabies exposure: a retrospective study in southern California (1998–2002). *J Wildl Dis* 2007;43:251–7.
- Mass treatment of humans exposed to rabies--New Hampshire, 1994. *MMWR Morb Mortal Wkly Rep* 1995;44:484–6.
- Krebs JW, Long-Marin SC and Childs JE. Causes, costs, and estimates of rabies postexposure prophylaxis treatments in the United States. *J Public Health Manag Pract* 1998;4:56–62.

*or at least its brain

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