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Human Exposure to Rabies from Pet Wild Raccoons in South Carolina and West Virginia, 1987 through 1988

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ABSTRACT

During 1987 and 1988, exposures to eight pet wild raccoons in South Carolina and West Virginia resulted in administration of rabies postexposure prophylaxis to 19 children and 26 adults. All eight raccoons appeared normal at the time of capture, and three had no signs of illness when sacrificed. The direct medical cost resulting from these exposures was $23 714 ($527 per person). Regulations and public education may help decrease this type of rabies exposure. (*Am J Public Health.* 1991;81:1328–1330)

Introduction

Although human rabies deaths in the United States are extremely rare, approximately 18 000 persons per year receive rabies postexposure prophylaxis (CDC, unpublished data). In most southeastern and mid-Atlantic states, including South Carolina and West Virginia, raccoons account for the largest proportion of laboratory-confirmed rabid animals.[1] Most human exposures from rabid raccoons and other wild animals involve animals encountered in the wild, but exposures to rabid wild animals kept as pets have been documented.[2–4] As a result, several health organizations and government agencies recommend that wild animals not be kept as pets, and most states have laws requiring special permits to keep such animals[5]; however these measures may be ineffective. In this report, we describe eight incidents where wild raccoons were captured and kept as pets resulting in potential human exposure to rabies in South Carolina and West Virginia in 1987 and 1988.

Methods

State public health personnel in West Virginia and South Carolina were interviewed regarding incidents of possible human rabies exposure resulting from pet wild raccoons during 1987 and 1988. All reports were further investigated by interviewing exposed persons, physicians, and public health personnel and by reviewing records in state laboratories, physicians' offices, and emergency rooms. Data were available only for persons who received prophylaxis.

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Human exposure to rabies was defined as a bite, a scratch, or direct contact with saliva from a laboratory-proven rabid animal. Potential exposure was defined as similar contact with an animal that was not tested.

Direct medical care costs included the cost of rabies immune globulin (RIG) and human diploid cell vaccine (HDCV) and the costs for services provided by hospitals and physicians. Medical costs were calculated from billed amounts. Direct social costs, such as the costs of contact investigations and laboratory testing, and indirect personal costs, such as lost wages and transportation costs, were not included in cost estimates because data were unavailable.

Results

During 1987 and 1988, 8 incidents occurred in South Carolina and West Virginia involving potential or actual human rabies exposure from pet wild raccoons (Table 1). None of the eight raccoons had signs of rabies or behaved abnormally at the time of capture. The median interval between capture and the discovery of rabies was 1 month (range = 7 days to 1 year). The precise incubation period was unknown for these animals; however, minimum incubation periods could be derived from the date of last possible contact with other potentially rabid animals.

Six raccoons were tested for rabies; five were positive and one was reported as "inconclusive." Of the five positive animals, two appeared normal at the time of sacrifice, two died after developing signs of illness, and one died suddenly without signs of illness. Two animals were not tested for rabies: one was shot in the head, making testing impossible, and the other escaped after biting the owner. Of the three animals sacrificed without signs of illness, two were killed only after persons who had been bitten demanded that the animals be tested.

Of the 45 persons receiving prophylaxis, 19 (42%) were children ≤ 15 years of age. Eighteen (40%) persons were bitten, 25 (56%) were scratched or exposed to saliva, and 2 (4%) had no apparent exposure but demanded prophylaxis. All were residents of rural areas.

Five raccoons exposed only members or close friends of a single household. Three raccoons exposed others in the community. In the first such incident, a baby raccoon was passed between two families and handled by many neighborhood children, exposing 16 persons. In the second incident, a rabid raccoon displayed in a store exposed 13 customers and staff. In the third incident, a science teacher encouraged a student to bring his pet raccoon to school; two students in the class required prophylaxis after the raccoon was found to be rabid.

TABLE 1—Summary Data for Eight Incidents of Actual and Potential Human Rabies Exposures from Pet Wild Raccoons, South Carolina (SC) and West Virginia (WV), 1987–1988

State	Number of Persons Exposed: Child[a]	Number of Persons Exposed: Adult	Type of Exposure: Bite	Type of Exposure: Scratch or Contact with Saliva	Duration of Captivity (months)	Minimum Incubation Period[b] (months)
SC	5	8	7	6	1	1
SC	0	2	1	1	.25	.25
SC	1	0	1	0	?[c]	?[c]
SC	2	2	4	0	1	1
SC	1	1	2	0	12	1.25
WV	7	9	1	14	1	1
WV	0	1	1	0	8	3
WV	3	3	1	4	0.5	0.5
Total	19	26	18	25	3.4 (mean)	1.1 (mean)

[a] ≤15 years of age.
[b] Time between last possible contact with a potentially rabid animal and time of the raccoon's diagnosis of rabies (either onset of signs or date of laboratory testing).
[c] Unknown.

The 45 persons in the 8 incidents received 420 cc of RIG and 225 doses of HDCV at a cost of $21 092. Physician, emergency department, and clinic fees were $2622, for total direct health care costs of $23 714 or $527 per treated person.

Discussion

Keeping wild animals as pets poses a substantial risk of human rabies exposure. No vaccine can prevent rabies infection in such animals, because current rabies vaccines are not licensed for use in wild animals. As in all the incidents described in this report, owners of pet rabid animals are often not aware of their animal's infection because, at the time of capture, the animal may appear completely healthy. In addition, rabies infection in raccoons and other wild animals may have a longer subclinical course than in domestic animals.[6–8] In our series, five of eight animals had incubation periods lasting 1 month or longer. If an animal is infectious for a long period of time, both the number of persons contacting the animal and the likelihood of rabies exposure increase.

On average, a rabid pet wild animal exposes more persons to rabies than a rabid domestic animal or free-living wild animal.[9] This is probably due to longer human contact with pet wild animals than with wild animals in nature, and/or the greater attraction posed by an unusual pet such as a raccoon than is posed by more common domestic animals. In addition, pet wild animals may bite or scratch more than domestic animals, and such behavior may be more readily considered normal, resulting in delayed testing for rabies. As an extreme example of the large numbers of persons who can be exposed to a single animal, one pet rabid raccoon in Florida accounted for the prophylaxis of 172 persons at a cost of more than $64 000.[4] Moreover, many rabies exposures from wild animals may go unrecognized and untreated in children. Most dog bite injuries in this age group are not reported to health professionals[10]; the same may be true of bite injuries from wild animals.

Current legislation or regulation may be insufficient. For example, South Carolina regulations do not forbid keeping wild animals as pets. While West Virginia law allows wild animal adoption only during the hunting season for that particular species and requires a special permit, the owners of the three raccoons in West Virginia reported ignorance of these regulations. Public education is needed regarding the dangers of keeping wild animals as pets and the existence of applicable laws and regulations. Programs should target

groups at highest risk, including children and residents of rural areas. □

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Routine Nutrition Screening Could Prevent Serious Health Problems in the Nation's Elderly, Report Says

A significant percentage of older Americans are at risk of malnutrition which could be detected and prevented through routine, inexpensive nutrition screening and greater attention to nutritional needs, according to a research report released recently.

"This excellent report lends new weight to the proposition that routine nutrition screening and care can help prevent serious illness and keep older Americans healthy and independent," said Representative Edward Roybal (D-Ca), Chair of the House Select Committee on Aging, who joined in releasing the report. "That's not only good for individuals, it's good news for a nation struggling to hold down health care costs."

The report, *Screening Older American's Nutritional Health: Current Practices and Future Possibilities,* was written by Johanna T. Dwyer, DSc, RD, Director of the USDA Frances Stern Nutrition Center at Tufts University in Boston. It is one of the most comprehensive reviews ever undertaken to examine the prevalence of malnutrition and nutrition-related problems among this nation's elderly.

"Using widely accepted criteria, a substantial proportion of older Americans have dietary intakes or diseases which place them at high risk of malnutrition," Dwyer said. "Routine nutrition screening, not only to detect the presence of malnutrition but to identify those at risk of poor nutrition, is the essential first step to improving people's nutritional status and keeping older Americans free living and in good health."

In a Foreword to the Report, Joyce T. Berry, PhD, US Commissioner on Aging, says, "Nutrition is one of many important factors affecting the health and longevity of older persons. For many low-income and minority older Americans it might be the most important."

Representative Ralph Regula (R-OH), a senior minority member of the House Select Committee on Aging, applauded Dwyer's recommendation that "screening for risk factors of malnutrition in older Americans does not need to be—nor should it be—limited to health professionals.

"Dr. Dwyer makes the case convincingly that attention to nutritional status needs to become as routine as taking our temperature or pulse," Regula said.

"The fact that nonmedical professionals and individuals themselves can employ screening techniques represents tremendous potential to keep people healthy without resorting to costly medical treatments," Regula said. "And the cost for a few minutes spent screening in a physician's office as part of a routine check-up could save many times that much in acute or chronic care treatment later."

Research has shown that people suffering from poor nutritional status have longer and more expensive hospital stays, and suffer more major complications when they are ill or injured.

Dwyer's research was commissioned by the Nutrition Screening Initiative, a five-year project focused on nutrition screening and better nutritional care among the nation's older adults.