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The Dangers of Ferrets as Pets

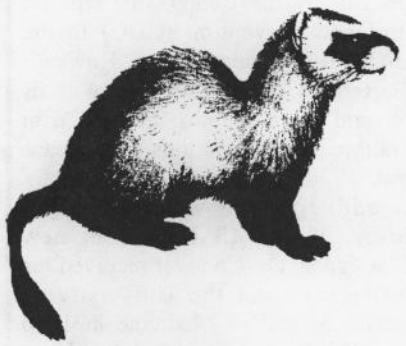
The following article includes excerpts from a "Statement on Ferrets" issued jointly by the Council of State and Territorial Epidemiologists and The National Association of State Public Health Veterinarians. For a complete copy of this statement and its references, please contact the Office of Epidemiology at (804) 786-6261.*

During the past ten years, the European ferret (*Mustela putorius*) has become increasingly popular as a pet. Public health officials, however, have not endorsed the ferret as a household companion based on two issues: reports of serious injuries inflicted by ferrets on infants and young children and a lack of data on the pathogenesis of rabies in ferrets.

More than 400 ferret attacks on humans have been documented since 1978, including 63 unprovoked attacks on infants and small children, and one fatality. Although attacks by dogs account for more reported injuries and deaths than do ferret attacks, the risk posed by ferrets cannot be adequately compared to dogs until reliable animal population data are available and animal bites are more accurately reported. The fact that more dog than ferret bites are reported is likely a reflection of the larger dog population and the tendency for bigger animals to inflict wounds that require medical care.

There are several characteristics of attacks by ferrets that are of particular public health concern. Many ferret attacks involve infants and small children who are sleeping or lying down. Ferrets have climbed into cribs and inflicted hundreds of disfiguring bites on defenseless infants. In contrast, dogs usually bite when their territory has been invaded, they perceive competition for food or attention, or they view a running or screaming child as prey. There is anecdotal information that the propensity to be aggressive and bite varies with the family line of the ferret. Public health officials believe that more objective data are needed on the risk factors that lead to injuries from ferrets so that specific preventive strategies can be recommended. Until such data are available the safest approach is to restrict ferrets from households that have infants or small children.

The length of time that ferrets are infectious (i.e., shed virus in the saliva) before showing signs of rabies is not known and definitive signs of rabies are not well documented *in their species*. There is substantial scientific and historical evidence indicating that if a dog or cat maintains normal



behavior and has no change in observable health status during a 10-day observation period, no rabies virus was present in its saliva at the time of the bite and the person who was bitten is not at risk for developing rabies. If the dog or cat does show clinical signs of rabies, postexposure treatment can be administered to the bitten person in time to prevent rabies from occurring. For most other species, however, the period of time that rabies virus is shed in the animal's saliva prior to the onset of recognizable signs is unknown. Therefore, most animals other than cats and dogs that bite a person are euthanized and tested so that the bitten person can receive timely treatment if the test result indicates that the animal has rabies.

The closest relative to the ferret on which we have rabies natural history data is the skunk. Both ferrets and skunks are members of the family *Mustelidae*. In laboratory experiments (which may not mimic natural infection), skunks have shed rabies virus in their saliva for as long as 18 days before death and at least eight days before showing clinical signs.

In the United States, 14 ferrets with laboratory confirmed rabies have been reported to the Centers for Disease Control and Prevention since 1958. One was infected with the mid-Atlantic raccoon rabies virus strain and one with the north central skunk strain; the strains infecting the others were not identified. Before it is possible for public health officials in the United States to recommend a period of observation following a ferret bite, more definitive data are needed on the period of viral shedding prior to recognizable signs of rabies infection with the North American rabies virus strains.

Prior to 1990, when a licensed rabies vaccine became available for ferrets, public health officials pointed to the lack of an approved vaccine as one of the reasons to discourage the ownership of ferrets as pets. In 1990, the United States Department of Agriculture gave approval for the use of an inactivated rabies vaccine (Imrab, Rhone Merieux, Inc†) for vaccinating ferrets. The product label for the vaccine includes the following statement, "Public health authorities may require rabies vaccinated

ferrets that bite humans to be sacrificed and tested for rabies infection." This statement was included because a history of vaccination does not eliminate the possibility of rabies in an animal, and the period of viral shedding prior to onset of recognizable signs of rabies is unknown for ferrets.

Based on the above information, the Council of State and Territorial Epidemiologists and the National Association of State Public Health Veterinarians recommend the following:

1) Develop public information for people who own or are contemplating owning ferrets that includes the risks and benefits of ferret ownership, and how to select, train and confine ferrets to reduce bites to humans,
2) Publicize widely the risk that ferrets pose for inflicting injurious bites to infants and small children,
3) Conduct suitable epidemiologic studies to identify the risk factors for ferret bites relative to bites of other animals, and
4) Conduct appropriate, scientifically designed studies on ferrets to establish the period of rabies virus shedding prior to onset of definitive signs.

** Issued Jointly by The Council of State and Territorial Epidemiologists and The National Association of State Public Health Veterinarians, April 22, 1994.*

† Inclusion of the trade and company name does not imply endorsement by either CSTE or NASPHV.

Bats and the Risk of Rabies*

Since 1980, there have been 19 human deaths from rabies in this country. Eight (42%) of the infections were aquired outside of the United States from exposure to domestic animals. Of the 11 (58%) cases with exposure in this country, 8 were infected with a strain of rabies virus associated with bats. The silver-haired bat rabies virus variant was identified in 6 of the 8 human cases. A definite exposure through a bat's bite was identified in only one of the 8 cases; contact with a bat was associated

with 2 additional cases in which animal bites were not detected; in five no history of exposure to bats could be elicited. Bat-associated strains of rabies can be transmitted to humans either directly through a bat's bite or indirectly through the bite of an animal previously infected by a bat.

Bat rabies is enzootic in the contiguous United States; 647 rabies-positive bats were reported from 46 states during 1992. The silver-haired bat is widely distributed from Alaska to the southern United States during fall and spring, but is uncommon throughout its range. These bats usually roost in rock crevices and under loose tree bark; however, during fall and spring migration, they use a variety of temporary shelters (e.g., wood piles and open outbuildings), but only rarely use closed structures (e.g., attics). Although this species is infrequently submitted for rabies testing, it is an important source of domestically acquired rabies. Of approximately 25,000 bats submitted for rabies diagnosis and identified to species in 15 states during 1956-1992, 796 (3%) were silver-haired bats; of these 41 (5%) were rabid.

In Virginia, an average of 11 bats (range, 6 to 17) are reported rabid each year. At least 15 different species of bats have been identified in Virginia. From January 1984 through December 1986, 421 of 642 bats examined for rabies in Virginia were available for speciation. The big brown bat (60%), red bat (32%), and the silver-haired bat (2%) were the most commonly identified species. The evening bat, little brown bat, eastern pipistrelle, Keen's bat and hoary each represented less than 2% of those identified. Sixteen of the 421 bats were fluorescent antibody positive for rabies; 7 big brown bats, 7 red bats and 2 pipistrelles.

The emergence of the bat as an important source for human rabies in this country and the lack of a specific bite history in most cases have resulted in the following recommendation from the Centers for Disease Control and Prevention: **because some bat bites may be less severe and therefore more difficult to recognize than bites inflicted by larger mammalian carnivores, rabies postexposure treatment should be considered for any physical contact with bats when bite or mucous membrane contact cannot be excluded.**

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2. CDC. Human rabies - New York, 1993. MMWR 1993; 42:799-806.
3. Evans, C.S. Demographic features of rabid and rabies suspect bats in Virginia. 1987. M.S. Thesis, Virginia Commonwealth University, Richmond, Va.

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Things Have Changed in Epidemiology

Carl Armstrong, M.D., F.A.C.P., the Director of the Division of Health Hazards Control and an integral part of the Office of Epidemiology for 12 years has left the Central Office of the Department of Health to become the Health Director in the Piedmont Health District. Dr. Armstrong will be greatly missed in the Office, whether for his advice that was invaluable, his knowledge that was so broad or his hard work as editor for the Virginia Epidemiology Bulletin. We wish him well in his new role and know that the citizens of the Piedmont District will benefit from his presence.

Elizabeth Barrett, D.M.D., M.S.P.H., has completed her two-year assignment by the Centers for Disease Control and Prevention (CDC) to the VDH Office of Epidemiology. However Dr. Barrett has agreed to remain with us for several more months, helping with new outbreak investigations and disease control.

In addition, we welcome **Craig Conover, M.D., M.P.H.**, as our new CDC assignee. Dr. Conover received his M.D. degree from the University of Rochester School of Medicine in 1986 and his M.P.H. degree from Johns Hopkins University in 1994. Prior to moving to Baltimore, he did his residency and practiced emergency medicine in Vermont. Dr. Conover has completed the Epidemic Intelligence Service course in Epidemiology at CDC and now joins the Office of Epidemiology where he will work on investigations and surveillance projects during his two year assignment. He can be reached at (804)786-6261.

E. COLI 0157:H7 IN VIRGINIA

Since the first of July, there have been eight confirmed cases of hemorrhagic colitis caused by *E. coli O157:H7* reported to the Virginia Department of Health. Five of these cases are related to outbreaks that are currently under investigation and the additional three cases are sporadic reports from across the state. Three of the cases are children who have been hospitalized with hemolytic-uremic syndrome (HUS), a serious complication of *E. coli O157:H7* infection. The ages of the cases have ranged from one year to 67 years but 50% of them have been under the age of five. Both males and females have been affected.

To identify *E. coli 0157:H7* in a stool, the specimen must be plated on special media which is not often included in a routine stool culture. Some laboratories will add the appropriate media if the specimen is grossly bloody or the culture request mentions a history of bloody diarrhea. In other situations, culture for this organism must be specifically requested by the physician. It is probable, therefore, that there are many more cases of *E. coli 0157:H7* infection in Virginia than have been identified.

E. coli 0157:H7 is recognized as an important emerging pathogen, causing an estimated 10,000-20,000 infections in the United States each year. People at the extremes of age are especially susceptible to *E. coli 0157:H7* associated illness, but individuals of all ages have been affected. Symptoms include diarrhea, which usually becomes bloody several days after onset, associated with severe abdominal cramping. Vomiting is seen in approximately 50% of cases with only minimal, if any, fever. The illness usually resolves within a week and antimicrobial agents have not been found to modify the course.

Most cases of *E. coli 0157:H7* have been associated with eating poorly cooked, contaminated ground beef. Other meats, raw milk, apple cider, and water have also been found to be vehicles for infection. In addition to food- or waterborne transmission, *E. coli 0157:H7* is spread from person to person through the fecal-oral route. These secondary infections can be seen in day care settings, nursing homes, and within families.

REMEMBER:

- The most common cause of *E. coli O157:H7* infection, eating contaminated meat, can be prevented with thorough cooking.
- Stool specimens from all patients with bloody diarrhea or a history of bloody diarrhea should be cultured for *E. coli O157:H7* and a specific request may be required.
- Children who are ill with *E. coli O157:H7* should not re-enter day care until diarrhea has stopped. Adults involved with day-care, patient care or foodhandling should avoid these activities until diarrhea ceases and two stool cultures are negative.
- Always WASH HANDS after using the toilet, diapering, and before and after preparing food.
- HUS is a possible sequelae for persons with bloody diarrhea.
- Please report cases of *E. coli O157:H7* and HUS to local health officials for further investigation.

The most important complication of *E. coli 0157:H7* infection is HUS. HUS is the leading cause of renal failure in children in the United States and most cases of HUS are preceded by infection with *E. coli 0157:H7*. HUS is usually diagnosed about one week after diarrhea begins, possibly too late for the *E. coli* organism to be detected in the stool.

In cases with bloody diarrhea or a history of bloody diarrhea, and particularly in persons with HUS, it is important to look for *E. coli 0157:H7* in the stool. In order to isolate the organism, a sample, obtained within 1 to 5 days of onset of illness, should be plated on sorbitol-MacConkey agar (regular MacConkey agar is not differential for this organism). *E. coli O157:H7* ferments sorbitol slowly so colonies appear sorbitol-negative at 24 hours. Suspected sorbitol-negative colonies must be confirmed using commercial antiserum.

If your local laboratory isolates a sorbitol-negative *E. coli* but does not have the antiserum necessary to identify it further, 5 to 6 colony isolates should be sent to the Division of Consolidated Laboratory Services (DCLS) for confirmatory group typing. If the laboratory that you use is unable to screen for *E. coli O157:H7*, a stool sample, in Cary-Blair transport media, from a patient with suspected infection can be sent to DCLS for culturing for this agent only. Call the DCLS Enteric Bacteriology laboratory at (804) 786-5147 for further information and assistance.

Even though sporadic cases of *E. coli O157:H7* are not required to be reported in Virginia, we are interested in learning more about this disease. Therefore, we ask that confirmed cases of *E. coli O157:H7* diarrheal illness and /or HUS be reported to your local health department for further investigation. If you have any questions about these infections, please call Dr. Craig Conover, Office of Epidemiology, (804) 786-6261.

"*E. coli O157:H7*: What the Clinical Microbiologist Should Know"

A video, with accompanying printed material, produced by the Centers for Disease Control, is available for loan from the DCLS Enteric Laboratory. This video, entitled "*E. coli O157:H7*: What the Clinical Microbiologist Should Know" is described as an "overview of the epidemiological and clinical aspects of *E. coli O157:H7*, with a step by step guide to its isolation and identification."

Part I. Epidemiologic and Clinical aspects (16 minutes)

Part II. Laboratory isolation and identification procedures (22 minutes)

Call the Enteric Bacteriology laboratory at (804) 786-5147 for further information.

Cases of Selected Notifiable Diseases, Virginia, May 1 through May 31, 1994.*

Disease	Total Cases Reported This Month						Total Cases Reported to Date in Virginia		
	State	Regions NW	N	SW	C	E	This Yr	Last Yr	5 Yr Avg
AIDS	92	7	12	8	33	32	526	823	357
Campylobacteriosis	47	13	10	10	10	4	215	151	173
Gonorrhea†	957	-	-	-	-	-	5318	4813	6635
Hepatitis A	15	0	11	1	2	1	54	60	86
Hepatitis B	14	1	3	4	4	2	47	65	90
Hepatitis NANB	2	0	0	1	1	0	17	19	17
Influenza	4	4	0	0	0	0	812	1016	872
Kawasaki Syndrome	4	0	3	0	0	1	11	13	11
Legionellosis	1	0	0	1	0	0	3	2	5
Lyme Disease	9	0	5	1	0	3	22	16	15
Measles	1	0	0	0	0	1	2	1	18
Meningitis, Aseptic	10	2	1	1	1	5	59	73	74
Meningitis, Bacterial‡	4	1	1	0	0	2	31	43	66
Meningococcal Infections	11	2	1	0	0	8	35	19	25
Mumps	6	0	3	0	0	3	24	14	34
Pertussis	2	1	0	0	1	0	15	9	7
Rabies in Animals	33	12	2	7	7	5	166	155	116
Reye Syndrome	0	0	0	0	0	0	1	0	1
Rocky Mountain Spotted Fever	2	0	1	1	0	0	2	1	1
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	71	7	24	9	20	11	326	297	339
Shigellosis	58	5	11	9	26	7	254	157	128
Syphilis (1° & 2°)†	63	0	0	2	2	59	305	258	331
Tuberculosis	22	0	10	6	3	3	141	176	137

Localities Reporting Animal Rabies: Accomack 1 fox, 1 raccoon; Albemarle 1 raccoon, 1 skunk; Amelia 1 raccoon; Amherst 1 raccoon; Appomattox 1 raccoon; Augusta 1 cat, 1 fox, 2 skunks; Bedford 1 raccoon; Chesapeake 1 cat, 1 raccoon; Chesterfield 2 raccoons; Fairfax 1 fox; Fauquier 1 raccoon; Floyd 1 raccoon; Franklin County 1 raccoon; Hanover 2 raccoons; King & Queen 1 fox; Loudoun 1 fox; Mecklenburg 1 raccoon; Montgomery 1 raccoon; Page 1 skunk; Prince George 1 raccoon; Rockbridge 1 cat, 1 cow; Rockingham 1 raccoon; Stafford 1 cat; Wythe 1 raccoon.

Occupational Illnesses: Asbestosis 5; Carpal Tunnel Syndrome 59; Coal Workers' Pneumoconiosis 26; Loss of Hearing 29; Repetitive Motion Disorder 2; Silicosis 1.

*Data for 1994 are provisional. †Total now includes military cases to make the data consistent with reports of the other diseases. ‡Other than meningococcal.

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