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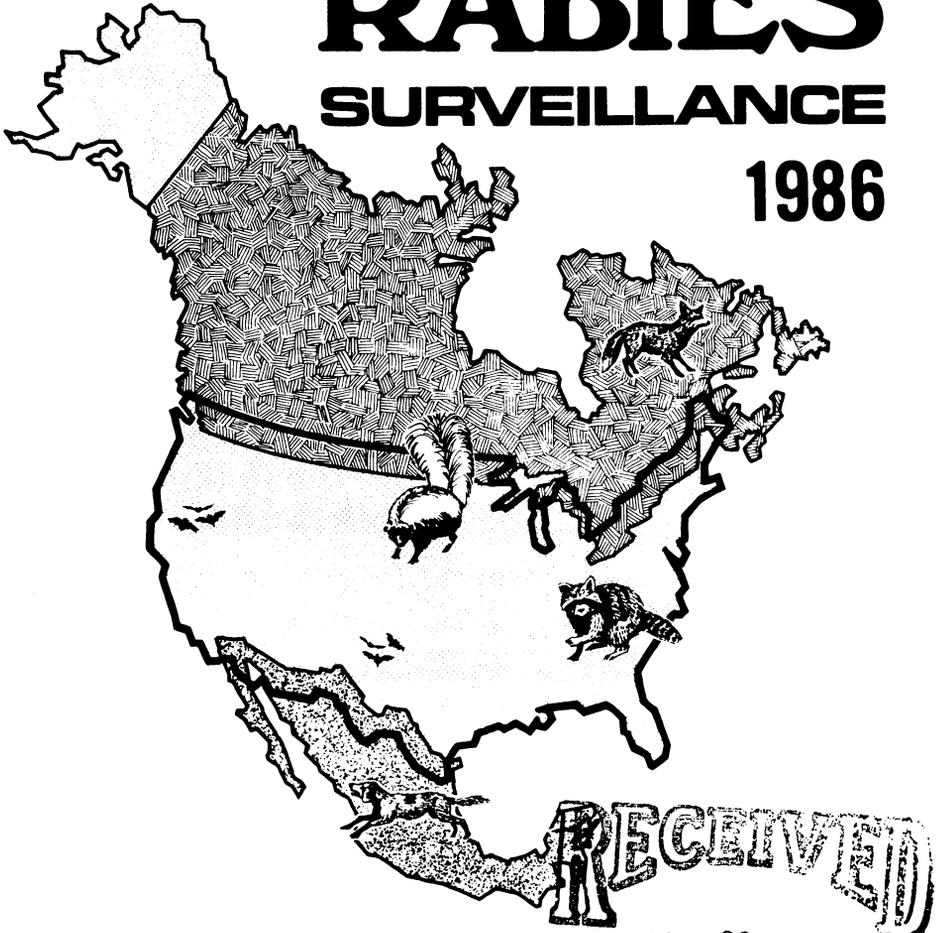
Supplement

MORBIDITY AND MORTALITY WEEKLY REPORT

RABIES

SURVEILLANCE

1986



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Preface

Although a summary of animal rabies cases in the United States has been published by CDC since 1960, with cases prior to that year reported by the U.S. Department of Agriculture, a somewhat different format was adopted a few years ago. Canada and Mexico share the northern and southern borders of the United States, and rabies outbreaks on one or the other side of those borders occasionally involve two countries. This occurred, for instance, in 1961, when rabid foxes from the Canadian province of Ontario apparently crossed the frozen St. Lawrence River into the United States, extending a rabies outbreak that had begun in northern Ontario in the 1950s. Similarly, in recent years rabid skunks have often been reported from contiguous areas of northern Montana and southern Saskatchewan and Alberta, with movement of disease both northward and southward.

For these reasons CDC has, since 1973, included in its annual rabies report summaries of animal and human rabies in both Canada and Mexico, provided through the courtesy of epidemiologists and other public health officials in those two countries. For the following report we would like to especially acknowledge the contributions of the following persons: Dr. David Gregory, Animal Health Division, Agriculture Canada, Ottawa, and Dr. Jaime Sepulveda, Dirección General de Epidemiología, Secretaría de Salud, México, D.F. The information submitted on the annual numbers of rabies cases by state or province and the species in the three countries has been helpful in reviewing the patterns and movement of disease, especially in contiguous areas. It is apparent that the United States and Canada bear the burden of enzootic wildlife rabies, although in dissimilar species, with mostly canine rabies found in Mexico. The continuing surveillance of rabies cases in the three countries, along with additional mapping activities, should help to show additional similarities and differences in the disease in those areas.

This report summarizes information received from state and local health departments and other pertinent sources. It is intended primarily for use by those responsible for disease control activities. Anyone desiring to quote this report should contact the appropriate state or international health agency for updated information and analyses.

Contributions to the *Rabies Surveillance* are most welcome. Please address them to:

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I. ANIMAL RABIES IN NORTH AMERICA — SUMMARY

United States

The United States and its territories reported 5,551 cases of animal rabies to the Centers for Disease Control (CDC) in 1986, almost the same number as the 5,606 reported the previous year. This includes rabies in wild and domestic animals. Just as in 1985, wild animals accounted for 91% of all cases (Figure 1).*

I. LA RAGE ANIMALE EN AMÉRIQUÉ DU NORD - RÉSUMÉ

Les Etats-Unis

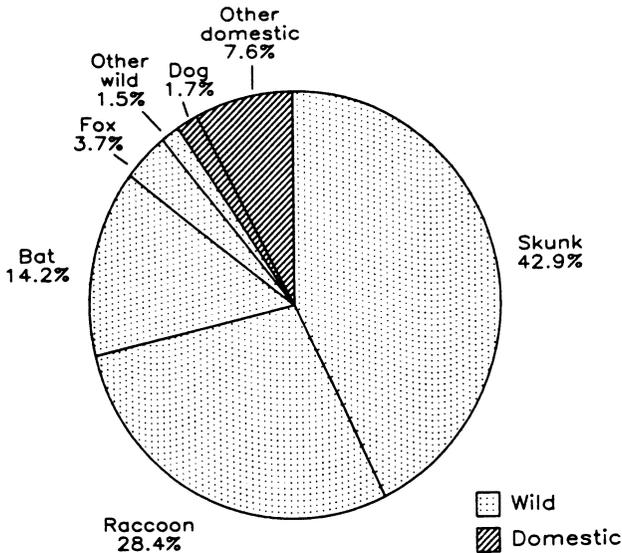
Les Etats-Unis et leurs Territoires ont déclarés aux Centers for Disease Control (CDC) 5.551 cas de rage animale en 1986, un nombre proche des 5.606 cas déclarés l'année précédente. Ce nombre concerne les cas de rage diagnostiques chez les animaux sauvages et domestiqués. Tout comme en 1985, les animaux sauvages représentent 91% des cas déclarés (Figure 1).†

I. LA RABIA ANIMAL EN NORTEAMERICA - RESUMEN

Los Estados Unidos

Se reportaron 5,551 casos de rabia animal a los Centros de Control de Enfermedades (CDC) de los Estados Unidos y sus territorios, casi el mismo numero que el año pasado (5,606). Esta cifra incluye animales domesticos y animales silvestres. La gran mayoría de casos, el 91%, se reportaron en varias especies de animales silvestres, tal como el año anterior (Figure 1).‡

FIGURE 1. Animal rabies, United States, 1986



* U.S. comparisons with previous years by animal type and state are shown in Appendices 1, 2, and 3.

† Pour les données concernant les Etats-Unis, les comparaisons pour les différentes espèces animales et par état pour les années précédentes figurent en Annexes 1, 2, et 3.

‡ Los datos por especie en años pasados y por estado se encuentran en Anexos 1, 2, y 3.

Canada

Canada reported 3,819 cases of animal rabies in 1986, up 39% from the number reported in 1985 and 125% more than in 1984. Wild animals, especially foxes and skunks, accounted for the majority of cases (Figure 2).§

Canada

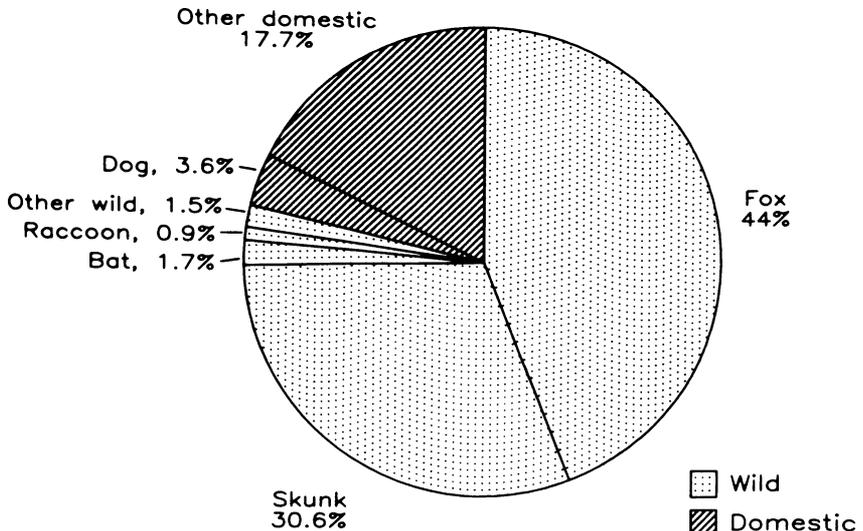
Le Canada a déclaré 3.819 cas de rage animale en 1986, soit 39% de plus que les cas déclarés en 1985. Les animaux sauvages tout particulièrement les renards et les moufettes représentent la majorité des cas (Figure 2)¶.

Canada

Canada reportó 3,819 casos de rabia animal en 1986, 39% mas de los 2,340 casos del año pasado y 125% mas que en 1984. Tal como en los Estados Unidos, la mayoría se diagnosticaron en animales silvestres, sobre todo zorros y zorillos (Figure 2)¶.

Source: Canadian data provided by Agriculture Canada, Food Production and Inspection Branch, Animal Health Division, Ottawa.

FIGURE 2. Animal rabies, Canada, 1986



§Canadian cases by province and animal type and totals by province are shown in Appendix 4.

¶ Les cas enregistrés au Canada par espèce et par province et les totaux par province figurent en Annexe 4.

¶ Los casos de rabia en Canada por especie y los totales por provincia se encuentran en Anexo 4.

Mexico

Mexico reported 9,069 cases of animal rabies in 1986, a decrease of 18% from the 10,736 cases reported in 1985. Unlike cases in the United States and Canada, where wild animals are the principal hosts of the disease, most Mexican cases were in domestic and farm animals (97%) (Figure 3).**

Mexique

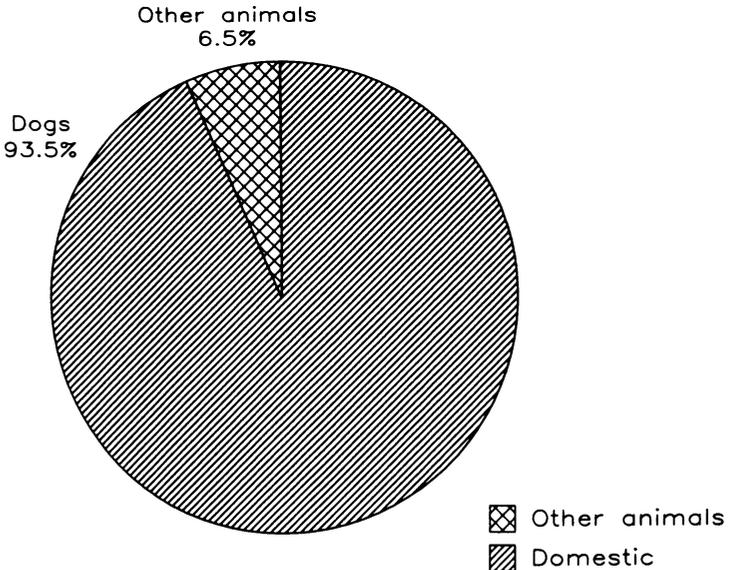
Le Mexique a déclaré 9.069 cas de rage animale en 1986, soit une diminution de 18% par rapport aux 10.736 cas déclarés en 1985. Contrairement aux Etats-Unis et au Canada, où les animaux sauvages constituent les principales victimes de la maladie, les animaux domestiques représentent la majorité des cas (97%) (Figure 3).††

México

Mexico reportó 9,069 casos de rabia animal en 1986, 18% menos que los 10,756 casos en 1985. La gran mayoría de estos casos, 97%, se diagnosticaron en animales domésticos (incluyendo animales de granja), a diferencia de los Estados Unidos y Canada donde animales silvestres predominaron (Figure 3).††

Source: Mexican data provided by Dirección General de Epidemiología, Secretaría de Salud, Mexico, D.F.

FIGURE 3. Animal rabies, Mexico, 1986



** Mexican cases by state and animal type are shown in Appendix 5.

†† Les cas enregistrés au Mexique par espèce et par Etat figurent en Annexe 5.

** Casos de rabia en México por estado y por especie se encuentran en Anexo 5.

II. RABIES IN NORTH AMERICA — WILD ANIMALS

United States

Skunks, raccoons, and bats remained the major wild animal hosts of rabies in the United States in 1986.* The reported cases of rabies in these three species all stayed at about the same level as in 1985: 2,379 rabid skunks in 1986 vs. 2,507 in 1985; 1,576 rabid raccoons vs. 1,487; and 788 rabid insectivorous bats vs. 830.

In the last decade, the epidemiologic features of rabies have changed very little, with most cases occurring in the same wildlife species (skunks, raccoons, foxes, bats) and in the same areas, except for the introduction of raccoon rabies to the mid-Atlantic states.

Virus analysis by monoclonal antibodies has permitted study of the distribution of different rabies virus strains in these areas. A study of skunk rabies in enzootic areas of the central United States showed that two viruses were actually circulating. One strain was found in the upper midwest (Montana, Minnesota, Iowa, Wisconsin), and the other in Texas and other south central states. Both types are found in Missouri and Arkansas.

A study of wildlife rabies cases in New York showed that a cluster of four cases in gray foxes in a two-county area was apparently the result of contact with infected bats, either big browns (*Eptesicus fuscus*) or reds (*Lasiurus borealis*). This raises the distinct possibility that epizootics in foxes and other wild animals may be started by bats and that future control efforts, such as oral vaccination of foxes, skunks, and raccoons must be accompanied by a careful surveillance system to assure that rabies-free areas remain so and are not reinfected by rabid bats.

Canada

Foxes and skunks continued to be the predominant rabid wild animals in Canada in 1986. Reported wild animal cases again rose markedly in 1986 to 2,994, a 64% increase from the 1,826 in 1985. Ontario continued to report the greatest number of cases, accounting for 84% of all reported wild animal rabies in Canada.†

Mexico

Mexico reported 50 cases of rabies in bats, 122 in coyotes, and 12 in rats in 1986.‡

* U.S. wild animal cases by county and animal type are shown in Appendices 7-10.

† Canadian cases by province and animal type are shown in Appendix 4.

‡ Mexican cases by state and animal type are shown in Appendix 5.

III. RABIES IN NORTH AMERICA — DOMESTIC ANIMALS

United States

Virtually no change occurred in the number of rabies cases in domestic animals in the United States: 515 in 1986 and 503 in 1985. Cattle continued to be the animal most commonly infected, followed by cats, which in turn outnumbered dogs for the sixth consecutive year.*

Canada

Canada reported 825 cases of rabies in domestic animals in 1986 compared with 514 in 1985, a 60% increase, and 333 in 1984, a 148% increase. As in the United States, cattle accounted for the majority of cases, with cats second. Cases reported by Ontario accounted for 93% of all reported rabid domestic animals in Canada in 1986.†

Mexico

Mexico reported 8,483 rabid dogs in 1986, a decrease of 8% compared with the 10,036 reported in 1985. These 8,483 cases of canine rabies made up 96% of all reported animal rabies in Mexico for 1986. Cats, pigs, and horses accounted for an additional 319 cases of domestic animal rabies.‡

* U.S. domestic and farm animal cases by county and animal type are shown in Appendices 11-13.

† Canadian cases by province and animal type are shown in Appendix 4.

‡ Mexican cases by state and animal type are shown in Appendix 5.

IV. REPORTS — ANIMALS, UNITED STATES

Mid-Atlantic States Raccoon Rabies

The 1,195 rabid raccoons reported by the mid-Atlantic states of Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia represented a moderate increase (11%) from the 1,078 in 1985 (Figures 4 and 5). The increase was most notable in Pennsylvania (44%) and Virginia (36%); the number reported for the District of Columbia increased from four to 29. In Maryland, however, rabies cases in raccoons continued to decline from 964 in 1984 to 672 in 1985 and to 588 in 1986, a 39% decrease in the last 2 years (Table 1). Raccoons represented 77% of the total number of rabid animals reported by the mid-Atlantic area in 1986.

Ferret Rabies

Three ferrets were reported rabid in 1986. Reports of rabid ferrets are rare (11 since 1980). Because no one has tested rabies vaccine in ferrets, vaccination cannot be relied on to protect them from infection. The ferret belongs to the Mustelidae family, along with the skunk, otter, mink, and weasel. The species used for pets, *Mustela putorius furo*, should be distinguished from the black-footed ferret, *M. nigripes* (1). Ferrets, originally imported into the United States from Europe and also known as European ferrets, are descendants of the European polecat.

There has been considerable publicity regarding the aggressive tendencies of ferrets; this aggression is frequently directed at young children (2). According to Dr. George G. Harmon, executive director of the International Ferret Association, ferrets are not suitable pets for children. Harmon says he "won't sell a ferret to anyone who has a child under 6 years old" (3). This has been the policy of the International Ferret Association since it was founded in 1980.

At its meeting in March 1986, the Council on Public Health and Regulatory Veterinary Medicine of the American Veterinary Medical Association reaffirmed its opinion that keeping ferrets as pets poses certain risks and hazards, especially to infants and other young children. The Council concluded that the ferret, although domesticated as a working animal to hunt rodents and snakes, is wild in nature and is not a suitable household pet (4).

TABLE 1. Cases of raccoon rabies in mid-Atlantic states, 1983-1986

State	1983	1984	1985	1986
Maryland	732	964	672	588
Pennsylvania	81	281	285	409
Virginia	545	158	102	139
West Virginia	88	27	15	30
District of Columbia	158	12	4	29
Total	1,604	1,442	1,078	1,195

FIGURE 4. Raccoon rabies cases, mid-Atlantic states, 1978-1986

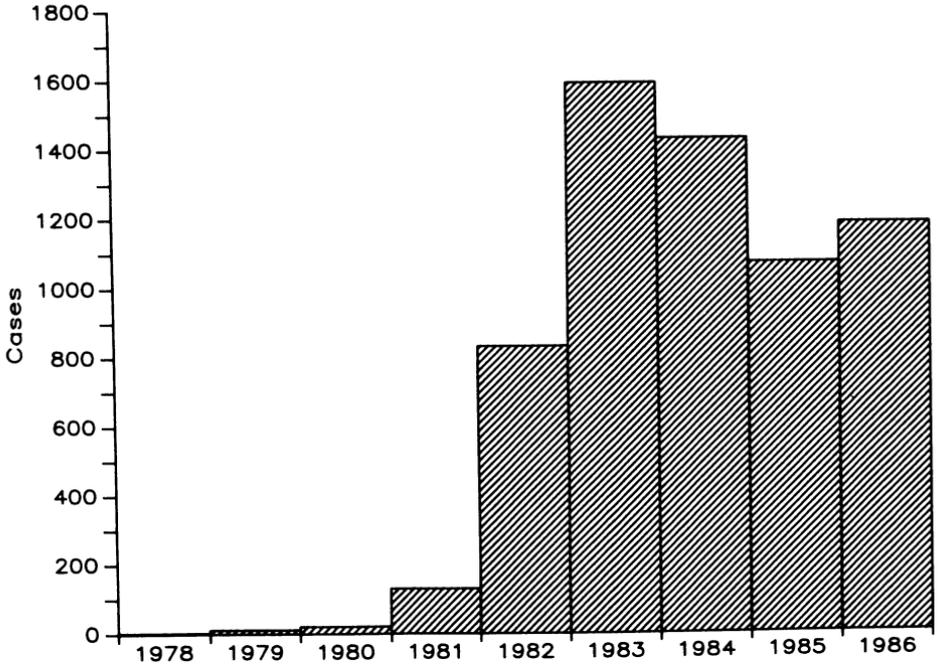
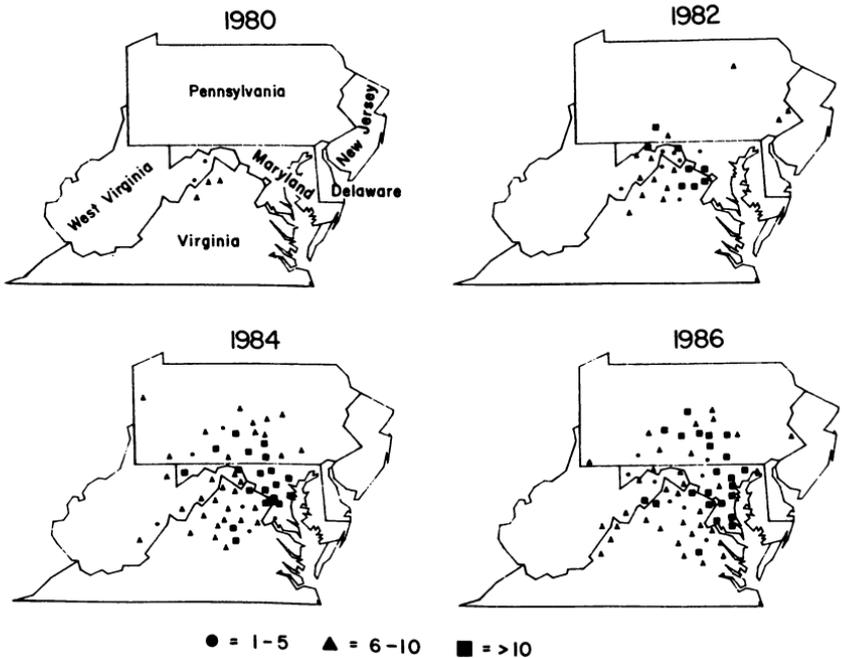


FIGURE 5. Raccoon rabies cases by county, mid-Atlantic states, 1980-1986

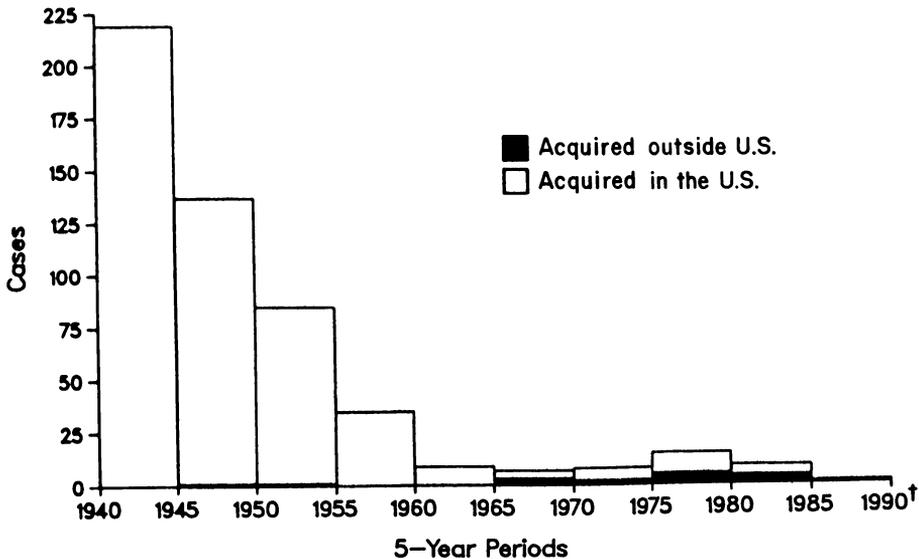


V. REPORTS — HUMAN RABIES

United States

No cases of human rabies were reported to CDC in 1986 (Figure 6).

FIGURE 6. Human rabies cases, United States,* by 5-year periods, 1940-1986



* Includes all cases diagnosed in the United States and cases diagnosed outside the United States in United States citizens.

† 2-year period only.

Canada

No cases of human rabies were reported in Canada in 1986.

Mexico

Mexico reported 81 human rabies cases in 1986. Seventy were caused by dog bites, two by cat bites, five by exposure to rabid bats, and four by exposure to other species.

Human Postexposure Prophylaxis — U.S. Update

Montana

Since 1980, the Montana State Department of Health and Environmental Sciences has collected data on requests for human diploid cell vaccine (HDCV). During 1985 and 1986, 199 and 135 postexposure consultations were done, respectively. Sixteen consultations in 1985 and 19 in 1986 resulted in no treatment. No treatment was given in these instances for one or more of the following reasons: because 1) the animal was available for observation or testing, 2) no exposure occurred, and 3) the animal species was not thought to be involved in the endemic rabies cycle and the animal was acting normally.

In both 1985 and 1986, three persons began treatment but did not finish the series. The most common reason for this was that the animal was found for observation or

testing after the treatment was initiated. In 1986, 113 persons completed postexposure rabies prophylaxis. Thirty-five percent of those were exposed to a rabid animal (Table 2). In 1985, 180 persons received postexposure rabies prophylaxis, and 54% of those treatments were due to exposure to an animal proven to be rabid.

It is interesting to note that between 1985 and 1986 the number of persons treated for exposure to dogs decreased markedly (69 persons in 1985 vs. 30 in 1986), as did the number treated for exposure to rabid cows (40 vs. 13), but the number treated for exposure to cats remained about the same (33 vs. 37) (Table 3).

Source: Judith Gedrose, State Epidemiologist, Montana Department of Health and Environmental Sciences, Helena.

TABLE 2. Treatment and exposure status of persons seeking consultations for potential exposure to rabies — Montana, 1985 and 1986

Treatment and exposure status	1985	1986
Total postexposure consultations	199*	135†
No treatment after consult	16	19
Didn't finish treatment	3	3
Total treated after exposure	180	113
Exposed to a rabid animal	98 (54%)	39 (35%)
Exposed to untested or unknown animal	81 (45%)	74 (65%)
Treated even though animal available	1 (1%)	0
Total	180	113

*Eleven had had preexposure vaccine.

†Six had had preexposure vaccine.

TABLE 3. Human postexposure rabies prophylaxis, by species involved — Montana, 1985 and 1986

Species	Number of Persons Treated	
	1985	1986
Dog	69 (38%)	30 (27%)
Cow	40 (22%)	13 (12%)
Cat	33 (18%)	37 (33%)
Horse	9 (5%)	6 (5%)
Skunk	9 (5%)	10 (9%)
Bat	9 (5%)	7 (6%)
Pig	4 (2%)	0
Dog/Coyote	1 (<1%)	0
Gopher	1 (<1%)	0
Squirrel	1 (<1%)	1 (<1%)
Raccoon	1 (<1%)	1 (<1%)
Fox	1 (<1%)	0
Bear	0	2 (2%)
Bobcat	1 (<1%)	1 (<1%)
Unknown	1 (<1%)	4 (4%)
Other	0	1 (<1%)
Total	180	113

New Jersey

In New Jersey 62 persons received postexposure rabies prophylaxis in 1986, a decrease of six (9%) from the number in 1985. The average cost of the prophylaxis was \$393, an increase of 27% over the \$310 average for 1985.

New Jersey surveillance data (15) indicate that of the 62 persons treated, three had been exposed to animals that were rabid. The other 59 were exposed to animals that escaped after biting. The animals identified as sources of exposure for humans were: bat, raccoon, dog, cat, opossum, hyrax, monkey, and ferret (Table 4).

Source: Paul Marzinsky, Public Health Epidemiologist, New Jersey Department of Health, Trenton.

TABLE 4. Human postexposure rabies prophylaxis, by species involved — New Jersey, 1985

Species	No. Persons Treated
Bat	39
Raccoon	9
Dog*	8
Cat	1
Opossum	1
Hyrax	1
Monkey	1
Ferret	2
Total	62

*Six of the exposures occurred outside the United States: four were to dogs (one in Israel, two in Belize, and one in Mexico), one was to a hyrax in Kenya, and one was to a monkey in Mexico.

VI. CANADIAN REPORTS

Rabies and Postexposure Treatment in Canada — 1985

Rabies in Humans

Human rabies is rare in Canada. Since 1924, only 21 cases have been reported; the two most recent ones occurred in 1984 and 1985. The former was an imported case resulting from a bite of a rabid dog in the Dominican Republic (5). The second case involved a young man from Calgary, Alberta, who was a student at the University of British Columbia in Vancouver (6). In late July 1985, while working in Northern Alberta, he was scratched or bitten on the face by a bat. He received no immediate rabies postexposure treatment. Approximately 3 months after the incident, when he had returned to the university, he experienced neck pain, swollen cervical lymph nodes, and sweating. He was admitted to the hospital in Vancouver where a brain biopsy confirmed rabies by the fluorescent antibody test. Human rabies immune globulin and human diploid cell vaccine were administered at this time, but his condition did not improve and he died approximately 4 months after the incident. A bat strain of rabies virus was identified by monoclonal antibody testing. Because the infection occurred in Alberta and in a resident of that province, the Provincial Epidemiologists for Alberta and British Columbia have agreed to report this as an Alberta case.

Human Rabies Postexposure Prophylaxis

In 1985, a total of 2,495 persons (10 per 100,000 population) were treated (an increase of 11% over 1984). Quebec, Ontario, Saskatchewan, and British Columbia reported increases in the number of postexposure prophylaxis, while Manitoba and Alberta reported a decline. The remaining four provinces and the two territories did not report any postexposure prophylaxis. In 1985, Ontario accounted for 86% of all treatments, followed by Quebec (4%) and Saskatchewan (4%). Nationally, one in every 10,000 Canadians received rabies treatment; for Ontario residents this was two to three times higher.

At least 17 species of animals were involved in incidents requiring postexposure treatment in 1985. Table 5 shows the provincial distribution of human postexposure prophylaxis, by species of animal involved. Dogs continue to be most frequently involved (27% of postexposure prophylaxis treatments in 1985), followed by cats (22%) and cattle (13%). The percentages for the various species involved were similar to those for 1984. In addition, it should be noted that 28 persons received postexposure treatment following contact with the Alberta rabies patient.

Rabies in pet animals is important because of the human contact involved. During the years 1980-1985, 77%-100% of confirmed rabies cases in dogs (mean = 91%) and 76%-95% of confirmed disease in cats (mean = 87%) resulted in postexposure prophylaxis. The number of persons treated following exposure to rabid dogs has declined steadily since 1981, while the number exposed to "rabies suspect" dogs has increased significantly (Figure 7). Figure 7 also shows that postexposure prophylaxis involving rabid cats increased steadily from 1980 to 1983, but declined in 1984 and 1985.

Animal Rabies

In 1985, a total of 2,340 laboratory-confirmed cases of rabies in animals were reported. As in previous years, the highest proportion of cases (85%) occurred in Ontario, followed by Saskatchewan (10%). Compared with 1984 totals, the number of reported cases in 1985 increased 44% in Ontario and 25% in Saskatchewan. No cases were reported from the Atlantic provinces and the Yukon Territory. Of the 2,340 reported animal cases, 1,730 (74%) involved wild animals and 610 (26%) domestic animals. A total of 16 species were identified; foxes accounted for 44%, followed by skunks (30%), cattle (11%), and other species (15%). Other species included dogs, cats, horses, sheep, goats, swine, coyotes, wolves, raccoons, bats, rabbits, groundhogs, and beavers.

Source: PV Varughese, DVM, MSc, Bureau of Communicable Disease Epidemiology, Ottawa, Ontario, adapted from Rabies and Post-Exposure Treatment in Canada — 1985. Canadian Diseases Weekly Report 1987;13-5:17-22.

Rabies Exposures in a Nursing Home — Ontario, Canada

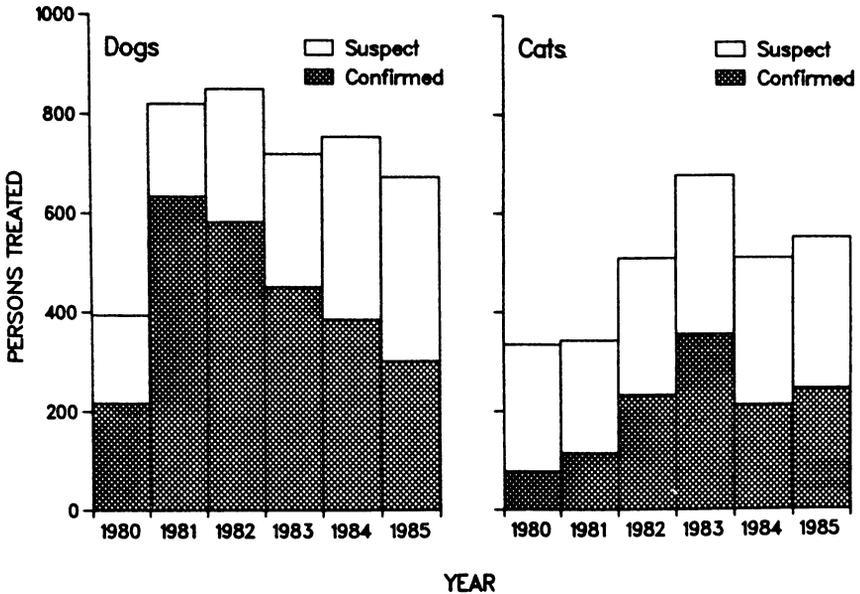
On August 15, 1986, a woman reported to a private veterinary practitioner that a fox had had direct contact with her female dog and its four puppies on the front porch of her farmhouse. The veterinarian advised her either to destroy the dogs or to have them quarantined on her premises, but failed to report the contact with a potentially rabid animal to the federal veterinarian as legally required. Subsequently, on August 20, the owner delivered the four puppies to a local animal shelter. She neglected to mention

TABLE 5. Number of persons receiving human postexposure rabies prophylaxis and species involved — Canada, 1985

Species	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total (%)
Dogs	58	557	19	16	17	7	674 (27.0)
Cats	16	482	7	34	11	3	553 (22.2)
Cattle	6	268	12	26			312 (12.5)
Foxes	7	283	1			1	292 (11.7)
Skunks		124	6	3	1		134 (5.4)
Horses		113		5			118 (4.7)
Not known	2	106	3		1		112 (4.5)
Bats	1	71	1	3	4	24	104 (4.2)
Raccoons	4	68	1			1	74 (3.0)
Sheep/Goats	1	69					70 (2.8)
Human			1		2	25	28 (1.1)
Swine		9					9 (0.3)
Squirrels			5				5 (0.2)
Muskrat			1	1	1		3 (0.1)
Coyotes			1		1		2 (0.1)
Wolves			2				2 (0.1)
Beavers						1	1 (0.1)
Rodents				1			1 (0.1)
Monkeys			1				1 (0.1)
Total (%)	95 (3.8)	2,150 (86.2)	61 (2.4)	89 (3.6)	38 (1.5)	62 (2.5)	2,495 (100%)

Source: Adapted from Rabies and Post-Exposure Treatment in Canada — 1985. Canada Diseases Weekly Report 1987;13-5:21.

FIGURE 7. Number of persons treated for rabies by confirmation status of animals involved, Canada, 1980-1985



Source: Adapted from Rabies and Post-Exposure Treatment in Canada — 1985. Canada Diseases Weekly Report 1987;13-5:21.

the fox contact to the staff. That afternoon, two of the puppies were taken to a nursing home and introduced to most of the residents and staff and a limited number of visitors.

Within 24 hours, all four puppies had been adopted by four different families. On August 24, one of the pups had diarrhea and vomiting and was seen at a veterinary clinic. It died on August 29. A second pup became ill on August 28 and died on August 31. The brain in each case was submitted for rabies testing. On September 4 and 5, the Health Unit was notified that both puppies were positive for rabies. Furthermore, there was strong evidence that one of the rabid puppies was one of the two taken to the nursing home. The remaining two puppies were traced and destroyed. They were subsequently found to be negative for rabies. The owner's dog was placed under a federal quarantine for a six-month period and is currently asymptomatic.

With the assistance of Health Unit staff, the nursing home immediately prepared lists of those individuals who had definitely been in contact with the pup (26), those who were definitely not in contact (approximately 25), and those for whom the contact was uncertain. In addition, two press releases were issued by the Health Unit because of the large number of people who had had contact with the rabid puppies. Individuals were encouraged to question their children to determine whether they had had contact with the pups and, if so, to consult their family physician. The press releases were followed by an audit of all households in the vicinity of the homes that had adopted the two rabid animals. It was learned that one of the rabid pups had been placed in a carriage with two babies.

In total, 134 Canadians received postexposure treatment with rabies vaccine and rabies immune globulin: 60 nursing home contacts, 62 neighborhood contacts (mostly children), six veterinary clinic staff, and six animal shelter staff. Also, one boy visiting from England and four vacationers from Massachusetts had been exposed; all were vaccinated.

The average cost of a course of rabies immune globulin and vaccine ranges from \$400 to \$700 per person, depending on body weight. Total cost of prophylaxis provided by the Ontario Ministry of Health is estimated at \$65,000.

This incident emphasizes the problems that may result from failure to report the rabies risk of animals and the need to immunize pets against rabies before they have contact with large numbers of people. If the fox contact had been reported promptly, the large number of treatments and the consequent expense and anxiety may have been avoided.

Source: CG Clark, Director of Environmental Health, Peel Regional Health Unit, and C LeBer, DVM, DVPM, Senior Veterinary Consultant, Disease Control and Epidemiology Service, Public Health Branch, Ontario Ministry of Health.

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2. Anonymous. Need for data on ferrets that bite, eat human flesh, or develop rabies. *Calif Morbid* 1986;21[Feb]:7.
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APPENDICES

APPENDIX 1. Reported rabies in the U.S.,* by animal type, 1953-1986†

Year	Dogs	Cats	Farm Animals	Foxes	Skunks	Bats	Raccoons	Other Animals	Humans	Totals
1953	5,688	538	1,118	1,033	319	8	40	79	14	8,837
1955	2,657	343	924	1,223	580	14	37	61	5	5,844
1957	1,758	382	714	1,021	775	31	36	79	6	4,802
1959	1,119	292	751	920	789	80	43	83	6	4,083
1961	594	217	482	614	1,254	186	58	62	3	3,470
1963	573	217	531	622	1,462	303	162	62	1	3,933
1965	412	289	625	1,038	1,582	484	99	54	1	4,584
1967	412	293	691	979	1,568	414	143	107	2	4,609
1969	256	165	428	888	1,156	321	255	52	1	3,522
1971	235	222	484	677	2,018	465	190	99	2	4,392
1973	180	139	448	477	1,851	432	114	56	1	3,698
1975	129	104	200	276	1,226	514	192	31	3	2,675
1977	120	108	217	122	1,631	637	281	65	1	3,182
1979	196	156	284	145	3,031	756	543	34	5	5,150
1981	216	285	581	196	4,480	858	481	111	2	7,210
1983	132	168	284	111	2,285	910	1,906	82	2	5,880
1986	95	166	255	207	2,379	788	1,576	85	0	5,551

*Includes Guam, Puerto Rico, Virgin Islands

†Data prior to 1960 from USDA, ARS. Subsequent data from PHS, CDC.

APPENDIX 2. Reported rabies in the U.S., by state, 1970-1986

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
	3,274	4,392	4,427	3,698	3,156	2,675	3,146	3,182	3,282	5,150	6,482	7,210	6,278	5,880	5,630	5,607	5,551
Alabama	49	61	82	52	48	34	18	13	53	73	55	123	146	83	130	124	115
Alaska	21	43	11	7	14	6	46	40	10	19	53	44	89	20	18	43	20
Arizona	48	40	61	39	50	26	31	49	23	27	77	30	60	33	50	123	102
Arkansas	53	108	112	108	61	83	155	118	160	332	191	152	157	160	101	151	168
California	322	322	275	401	358	290	357	434	355	358	544	579	517	358	547	586	520
Colorado	66	33	23	19	50	32	52	56	37	51	51	39	47	36	44	26	32
Connecticut	4	17	7	5	7	8	5	8	8	2	10	6	5	6	8	7	2
Delaware	0	4	7	6	1	6	22	2	3	2	4	3	2	7	6	1	1
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	5	162	12	8	42
Florida	97	76	87	43	50	37	100	93	47	79	101	116	80	131	149	146	183
Georgia	116	146	109	94	138	170	225	210	288	338	250	225	213	214	200	200	202
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	4	4	1	1	4	0	8	4	7	0	2	7	11	17	11	10	9
Illinois	158	318	277	202	120	65	50	51	76	226	520	552	294	236	73	49	46
Indiana	31	82	84	57	15	10	24	12	13	68	75	91	76	30	23	24	19
Iowa	136	240	350	214	130	102	125	134	150	206	545	881	377	200	152	149	193
Kansas	107	112	129	101	75	60	68	42	34	128	159	211	147	83	53	61	61
Kentucky	141	187	271	238	157	96	63	29	78	139	153	131	134	83	53	42	106
Louisiana	69	62	49	52	25	8	8	22	17	41	20	31	32	34	67	24	23
Maine	49	198	100	69	5	52	41	34	79	31	31	20	21	17	20	1	1
Maryland	3	3	19	16	27	15	40	16	22	39	37	50	153	828	1,100	760	684
Massachusetts	2	6	6	7	4	12	26	10	7	9	15	11	9	16	14	14	8
Michigan	28	48	9	12	7	10	8	6	11	16	15	15	7	20	22	26	23
Minnesota	126	265	295	373	254	184	193	342	204	172	278	491	224	171	104	219	177
Mississippi	3	5	4	1	3	1	2	1	6	7	4	4	13	9	15	10	9
Missouri	125	148	110	92	41	42	72	59	95	307	379	232	123	97	70	59	73
Montana	3	6	7	41	36	172	92	56	26	21	56	123	97	119	122	250	205
Nebraska	17	12	18	7	5	4	20	2	8	4	92	199	126	64	48	36	37
Nevada	11	5	2	4	4	7	17	7	7	6	1	6	6	38	23	15	13
New Hampshire	2	4	4	38	3	2	1	2	3	5	7	6	1	5	17	1	1
New Jersey	11	20	21	18	28	22	27	28	14	12	18	24	16	24	35	38	17
New Mexico	16	9	16	7	78	42	22	21	27	49	21	28	22	15	12	12	7
New York	260	136	45	30	43	76	27	65	62	48	40	85	113	84	137	153	93
North Carolina	3	5	4	14	26	12	16	14	16	26	18	18	66	24	27	12	10
North Dakota	57	193	147	159	114	103	137	122	105	99	255	359	97	92	138	149	162
Ohio	60	123	101	38	32	18	35	18	23	41	57	61	81	60	27	30	16
Oklahoma	103	283	299	174	164	105	181	243	177	293	247	219	189	107	104	111	60
Oregon	4	9	4	8	6	6	11	16	14	17	4	12	5	3	7	6	5
Pennsylvania	4	23	63	29	18	20	24	19	22	17	19	14	75	168	385	449	583
Rhode Island	3	1	2	1	4	4	5	0	0	2	1	2	0	2	0	0	3
South Carolina	0	20	13	6	6	11	5	35	119	173	62	49	66	35	67	62	78
South Dakota	119	167	132	151	164	85	114	139	97	143	471	322	115	149	218	347	192
Tennessee	65	108	316	149	53	21	48	37	35	109	145	251	356	190	82	74	152
Texas	227	323	344	264	396	326	347	389	556	1,194	945	697	784	703	720	589	470
Utah	2	9	9	3	1	3	21	11	7	11	10	12	18	11	6	4	7
Vermont	57	16	10	3	1	0	0	0	2	1	0	0	2	2	1	1	2
Virginia	216	79	109	99	113	114	56	5	14	19	37	166	745	625	208	179	200
Washington	8	5	9	10	2	10	14	7	5	21	3	15	8	10	3	5	8
West Virginia	153	121	60	25	32	5	17	11	15	12	27	35	62	120	41	29	64
Wisconsin	60	93	156	154	109	72	97	90	94	119	294	336	193	119	71	66	46
Wyoming	6	14	2	0	25	36	19	9	11	12	15	34	27	10	30	85	254
Guam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Puerto Rico	49	80	56	57	49	50	54	51	40	26	68	93	66	50	60	41	47
Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX 3. Reported rabies in the U.S., by state and animal type, 1986

	Dogs	Cats	Cattle	Horses & mules	Sheep & goats	Swine	Domestic animal total	Skunks	Bobcats	Coyotes	Ferrets	Raccoons	Bats	Rodents & lagomorphs	Other wild animals	Wild animal total	Total
Totals	95	166	197	43	13	2	516	2,379	8	6	207	1,578	788	15	56	5,035	5,551
State																	
Alabama	2	3					5	5			8	53	45		1 Opossum	110	115
Alaska											20					20	20
Arizona	1						1	57	2	1	12		28		1 Javelina	101	102
Arkansas	2	3	2	2			9	143		1	1		14			159	168
California	3	1	2	1	2		9	368			7		135		1 Opossum	511	520
Colorado													30			32	32
Connecticut													2			2	2
Delaware													1			1	1
District of Columbia		8					8								5*	34	42
Florida	4	7		1			12	3			5	29	128	34	1 Otter	171	183
Georgia	2	4	3				9	5	1		15	154	17		1 Otter	193	202
Hawaii																	0
Idaho																9	9
Illinois	1	2	4		1		8	29								9	46
Indiana			1				1	13								18	19
Iowa	8	21	46	5	2	2	84	103				1	6			109	193
Kansas	1	5	2	1			9	45			1		6			52	61
Kentucky	10		2	3			15	70			12	1	8			91	106
Louisiana	1						1	18					4			22	23
Maine																1	1
Maryland		18	3	1	1		23	12			25	588	27	8†	1 Deer	661	684
Massachusetts													8			8	8
Michigan								3			1	1	18			23	23
Minnesota	8	11	26	3			48	121			1	1	5	1 Woodchuck		129	177
Mississippi													9			9	9
Missouri	5		2				7	54			1		10		1 Opossum	66	73
Montana	1	2	16	1			20	168			1	2	14			185	205
Nebraska	2	1	2				5	29					3			32	37
Nevada				1									12			12	13
New Hampshire							1						1			1	1
New Jersey																17	17
New Mexico								4					3			7	7
New York	1	1	2	1			5	9		1	32		46			88	93
North Carolina													10			10	10
North Dakota	3	13	23	4	1		44	116			1				1 Ferret	118	162
Ohio			1				1	2			1		12			15	16
Oklahoma			7	5			12	43					5			48	60
Oregon													5			5	5
Pennsylvania	2	19	3	3			27	101			24	409	17	5 Woodchucks		556	583
Rhode Island											1		2			3	3
South Carolina	3	14					17	3			5	37	15		1 Ferret	61	78
South Dakota	9	12	25	1	2		49	140			1	2				143	192
Tennessee	4						4	127			7		14			148	152
Texas	14	13	14	3	2		46	275	3	2	11	1	132			424	470
Utah		1					1						6			6	7
Vermont																	2
Virginia		3	2	1	2		8	38	1		12	139	2			192	200
Washington													8			8	8
West Virginia	1						1	24	1		4	30	4			63	64
Wisconsin							7	29					10			39	46
Wyoming	3	2	5	4			14	221		1				17	1 Prairie Dog	240	254
Guam																	0
Puerto Rico	4																47
Virgin Islands				1			5									42	47
															42 Mongooses		0

* Two red pandas, two opossums, one ferret

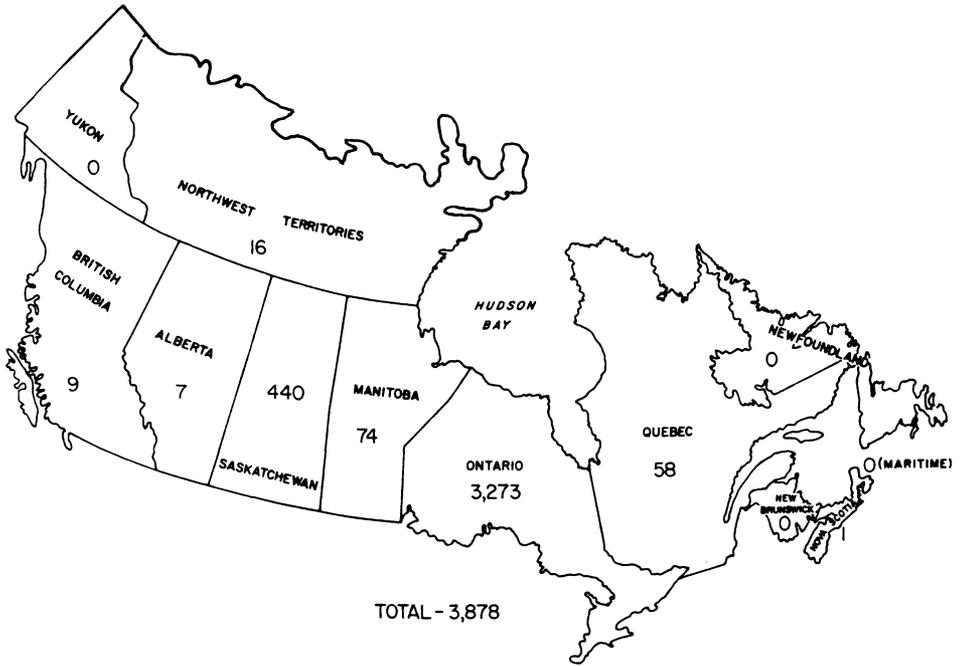
APPENDIX 4. Reported rabies in Canada, by province and animal type, 1986

Province	Dogs	Cats	Cattle	Horses	Sheep/ Goats	Swine	Foxes	Skunks	Bats	Racoons	Other Wild	Total
Alberta	—	—	—	—	—	—	—	1	6	—	—	7
British Columbia	—	—	—	—	—	—	—	—	9	—	—	9
Manitoba	3	1	6	1	—	—	5	57	—	—	1*	74
North West Territory	—	—	—	—	—	—	15	—	—	—	—	16
Nova Scotia	—	—	—	—	—	—	—	—	1	—	—	1
Ontario	130	150	357	36	82	12	1,650	722	45	32	57†	3,273
Quebec	3	—	5	—	—	—	38	10	1	1	—	58
Saskatchewan	3	10	24	1	1	—	—	396	5	—	—	440
Total	139	161	392	38	83	12	1,708	1,186	67	33	59	3,878

*Wolf

†Ten wolves, one bear, 35 coyotes, eight woodchucks, two rabbits, one bison

RABIES CASES IN CANADA, 1986



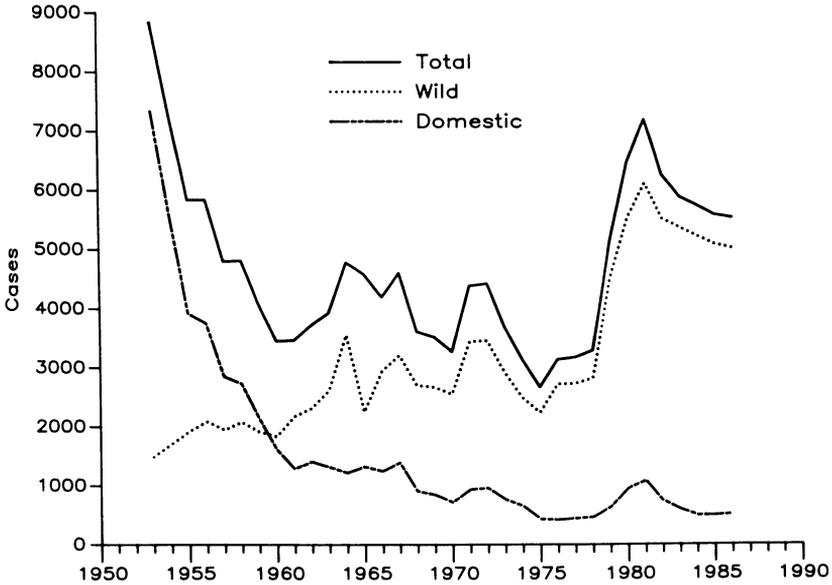
* Two red pandas, two opossums, one ferret

APPENDIX 5. Reported rabies in Mexico, by state and animal type, 1986

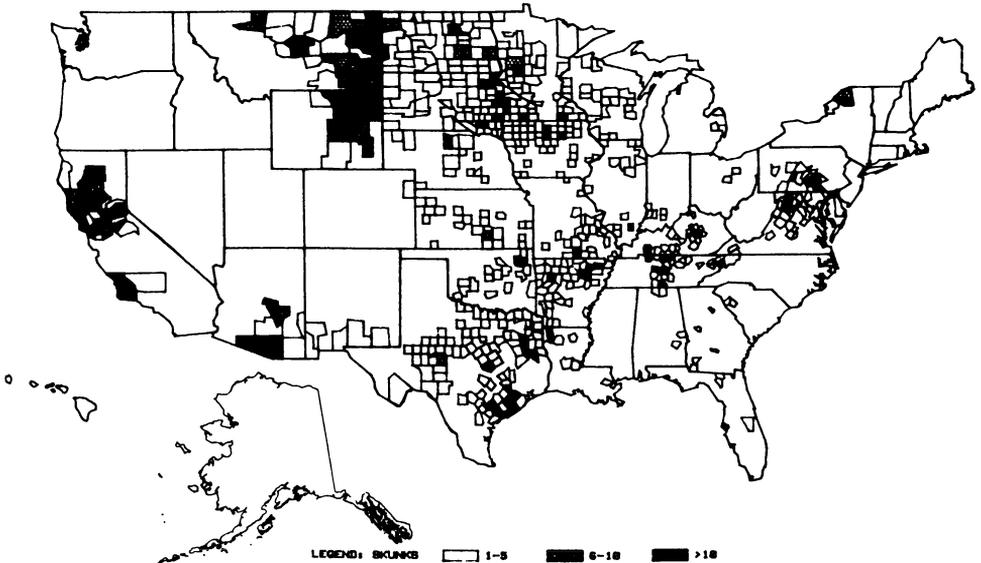
State	Dog	Cat	Bat	Mule	Coyote	Rat	Pig	Others	Total
Aguascalientes	682	14	7	2	3	2	2	8	720
Baja Calif Norte	0	0	0	0	0	0	0	0	0
Baja Calif Sur	0	0	0	0	0	0	0	0	0
Campeche	867	34	2	3	11	1	2	8	928
Coahuila	15	0	0	0	1	0	0	0	16
Colima	805	19	9	1	16	1	1	9	861
Chiapas	0	0	0	0	0	0	0	0	0
Chihuahua	916	26	1	2	18	0	1	9	973
Distrito Federal	33	1	0	0	1	0	0	0	35
Durango	723	23	1	1	7	1	1	10	767
Guanajuato	0	0	0	0	0	0	0	0	0
Guerrero	807	38	1	3	11	0	0	7	867
Hidalgo	5	1	0	1	2	0	0	0	9
Jalisco	616	12	14	9	10	1	0	2	664
México	0	0	0	0	0	0	0	0	0
Michoacán	879	29	8	3	17	1	0	7	944
Morelos	0	0	0	0	0	0	0	0	0
Nayarit	488	15	1	4	5	0	0	6	519
Nuevo León	0	0	0	0	0	0	0	0	0
Oaxaca	571	21	3	2	6	1	0	7	611
Puebla	134	1	0	0	0	0	0	0	135
Querétaro	597	23	2	1	2	3	1	5	654
Quintana Roo	0	0	0	0	0	0	0	0	0
San Luis Potosí	305	13	1	4	8	0	0	5	336
Sinaloa	21	1	0	0	4	0	0	0	26
Sonora	0	0	0	0	0	0	0	0	0
Tabasco	8	2	0	1	0	0	0	0	11
Tamaulipas	0	0	0	0	0	0	0	0	0
Tlaxcala	0	0	0	0	0	0	0	0	0
Veracruz	0	0	0	0	0	0	0	0	0
Yucatán	0	0	0	0	0	0	0	0	0
Zacatecas	11	0	0	1	0	0	0	0	12
Total	8,483	273	50	38	122	11	8	83	9,088



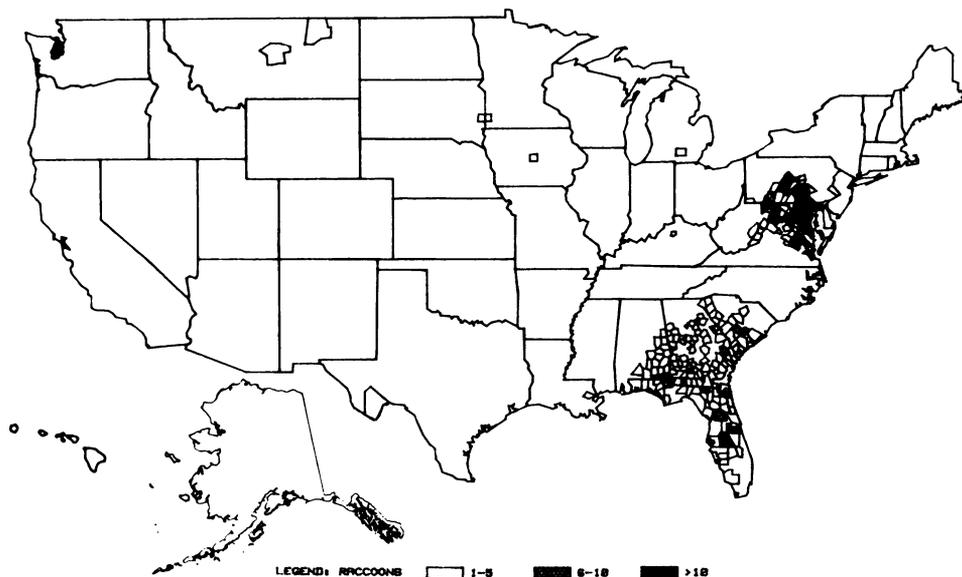
APPENDIX 6. Reported rabies in wild and domestic animals by year, U.S., 1953-1986



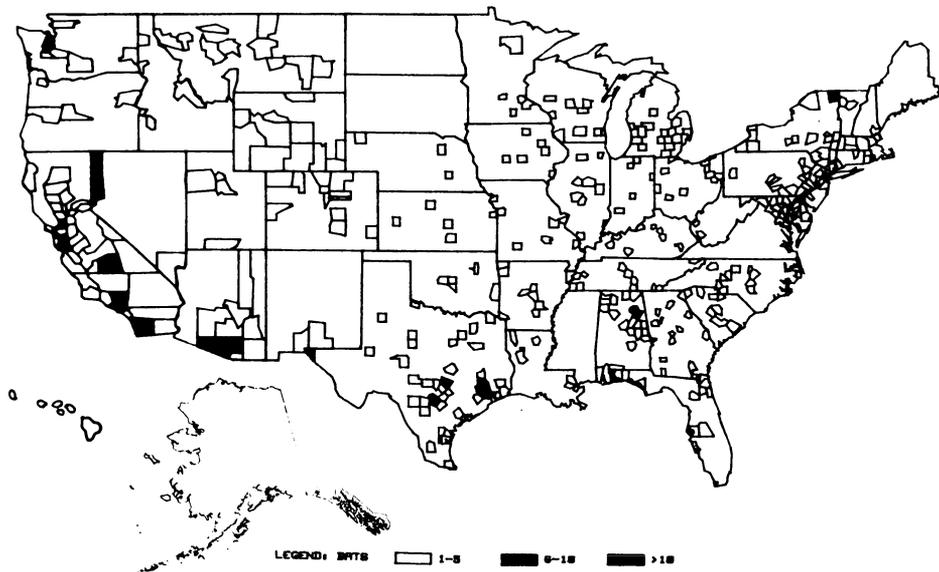
APPENDIX 7. U.S. counties reporting skunk rabies, 1986



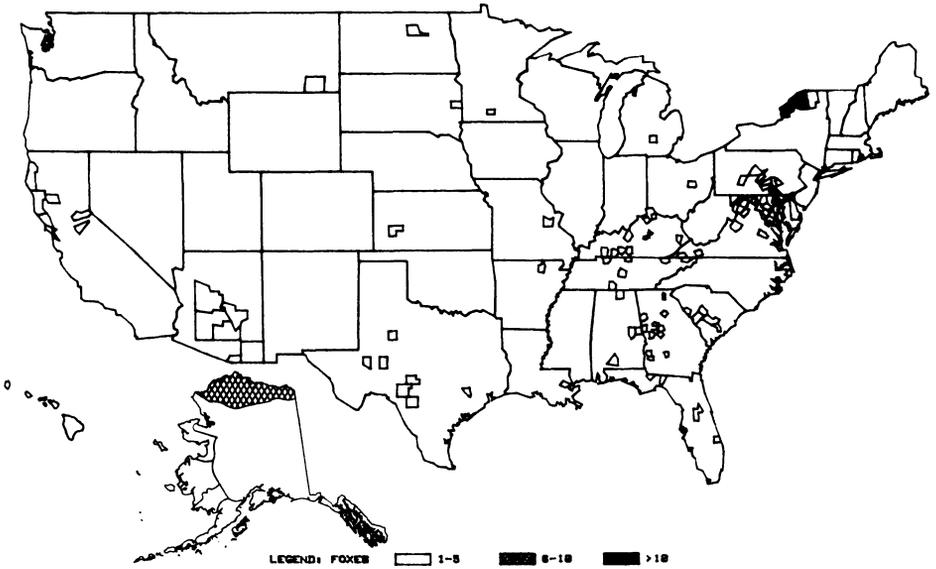
APPENDIX 8. U.S. counties reporting raccoon rabies, 1986



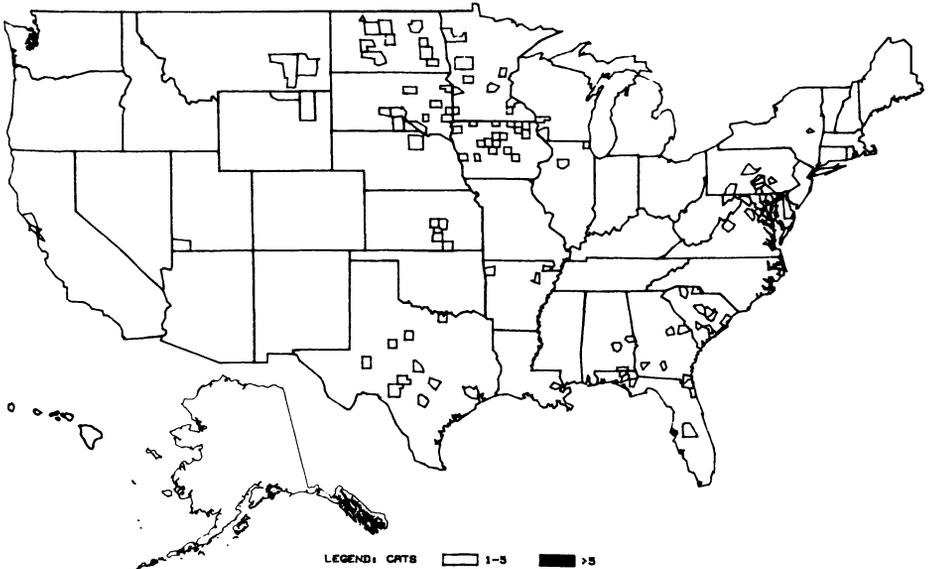
APPENDIX 9. U.S. counties reporting bat rabies, 1986



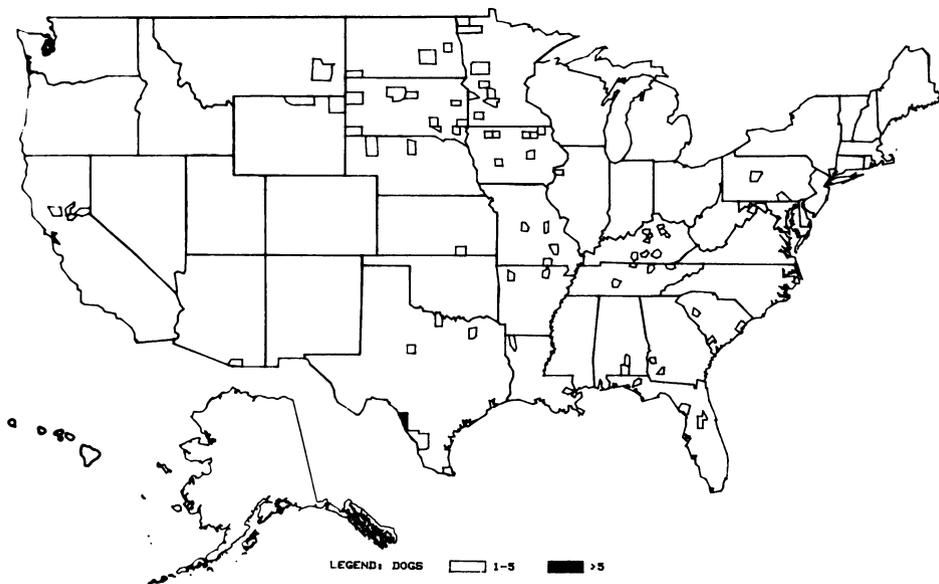
APPENDIX 10. U.S. counties reporting fox rabies, 1986



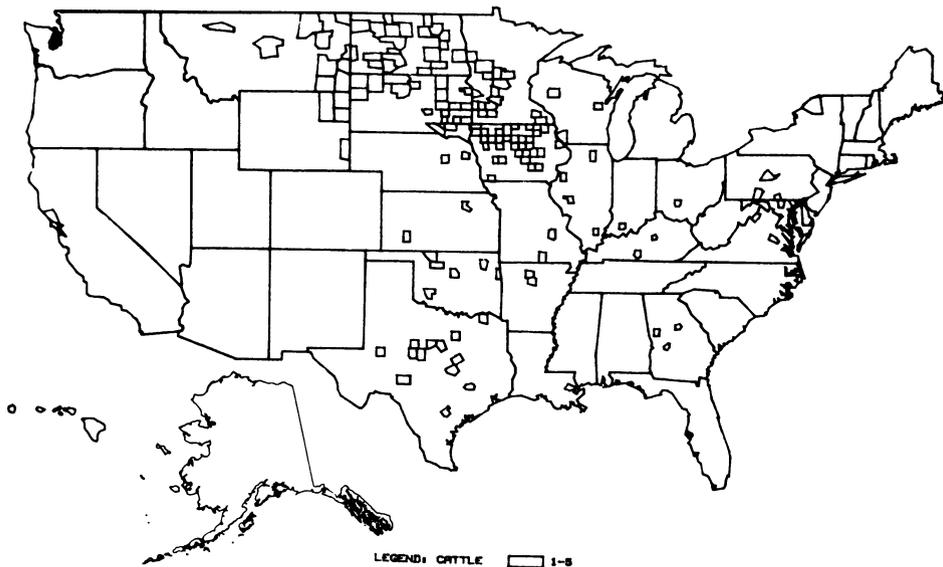
APPENDIX 11. U.S. counties reporting cat rabies, 1986



APPENDIX 12. U.S. counties reporting dog rabies, 1986



APPENDIX 13. U.S. counties reporting cattle rabies, 1986



APPENDIX 14. Countries reporting no rabies cases

The following areas reported that rabies was not present:

Africa	St. Martin	Oceania†
Mauritius*	St. Vincent	American Samoa
	Turks	Australia
North America	Caicos Islands	Belau (Palau)
Bermuda	Virgin Islands (U.K./U.S.)	Cook Islands
St. Pierre and Miquelon		Federated States of Micronesia:
	South America	Kosrae
Caribbean	Suriname*	Ponape
Anguilla	Uruguay	Truk Islands
Antigua and Barbuda		Yap
Bahamas	Asia	Fiji
Barbados	Bahrain	French Polynesia
Cayman Islands	Brunei	Guam
Dominica	Japan	Kiribati
Guadeloupe	Kuwait	New Caledonia
Jamaica	Malaysia (Malaysia-Sabah*)	New Zealand
Martinique	Maldives*	Niue
Montserrat	Oman	Northern Mariana Islands
Netherlands Antilles:	Singapore	Papua New Guinea
Aruba	Taiwan	Samoa
Bonaire		Solomon Islands
Curacao	Europe	Tonga
Saba	Bulgaria*	Vanuatu
St. Maarten	Faroe Islands	
St. Eustatius	Iceland	
St. Christopher (St. Kitts)	Ireland	
Nevis	Malta	
St. Lucia	Norway	
	Portugal	
	Spain	
	Sweden	
	United Kingdom	

*Countries that have only recently reported no cases of rabies; these classifications are considered provisional.

†Most of Pacific Oceania is rabies-free.

This list is based on information and data provided to CDC from the following publications:

World Health Organization World Survey of Rabies XXII (for 1984/85), Veterinary Public Health Unit, Division of Communicable Diseases, Geneva, WHO, 1987.

WHO Collaborating Centre for Rabies Surveillance and Research Rabies Bulletin Europe 36 (July-September, 1986). 1986;10(3).

Pan American Zoonoses Center (PAHO/WHO) Epidemiological Surveillance of Rabies for the Americas (1986). 1986;16(1-6).

**APPENDIX 15. State and Territorial Epidemiologists and
State Public Health Veterinarians***

State	State Epidemiologist/ State Public Health Veterinarian†	Rabies Phone Number
Alabama	Charles H. Woernle, MD Wallace E. Birch, DVM	205-261-5018
Alaska	John P. Middaugh, MD	907-561-4406
American Samoa	Julia L. Lyons, MD, MPH	011-684-633-4590
Arizona	Steven J. Englender, MD, MPH Harvel Alishouse, DMV, MPH	602-255-1203
Arkansas	Thomas C. McChesney, DVM*	501-661-2597
California	Vacant Denny G. Constantine, DVM, MPH (Acting)	415-540-2391
Colorado	Richard E. Hoffman, MD, MPH	303-331-8330
Connecticut	James L. Hadler, MD, MPH	203-556-2540
Delaware	Paul R. Silverman, DrPH	302-736-5617
District of Columbia	Martin E. Levy, MD, MPH	202-673-6741
Florida	Michael H. Wilder, MD (Acting)	904-488-2905
Georgia	R. Keith Sikes, DVM*	404-894-6527
Guam	Robert L. Haddock, DVM	011-671-734-2544
Hawaii	Arthur P. Liang, MD, MPH Elizabeth L. Lyons, DVM	808-548-5986
Idaho	Charles D. Brokopp, DrPH	208-334-5930
Illinois	Byron J. Francis, MD Russell J. Martin, DVM	217-782-2016
Indiana	Charles L. Barrett, MD James M. Shuler, DVM, MPH	317-633-0122
Iowa	Laverne A. Wintermeyer, MD Russell W. Currier, DVM	515-281-5643
Kansas	Robert French (Acting)	913-862-9360 x481
Kentucky	James Michael Moser, MD, MPH Joseph W. Skaggs, DVM	502-564-3418
Louisiana	Joyce B. Mathison, MD, MPH&TM William Fairchild, DVM	504-342-4984
Maine	Kathleen F. Gensheimer, MD	207-289-3591
Maryland	Ebenezer Israel, MD Joseph T. Horman, DVM	301-225-6711
Massachusetts	George F. Grady, MD	617-522-3700
Michigan	Kenneth R. Wilcox, Jr., MD George R. Anderson, DVM	517-335-8057
Micronesia	Eliuel K. Pretrick, MO	619
Minnesota	Michael T. Osterholm, PhD, MPH	612-623-5414
Mississippi	Fred Edgar Thompson, MD	601-354-6660
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New Mexico	Harry F. Hull, MD Millicent Eidson, DVM	505-827-0006

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Northern Mariana Islands	Frank T. Palacios, MD	011-670-6111
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Oklahoma	Gregory R. Istre, MD	
	Barton Rohrbach, DVM	405-271-4060
Oregon	Laurence R. Foster, MD	
	L. Paul Williams, Jr., DVM	503-229-5015
Palau	Anthony H. Polloi, MO (Acting)	680-813, 420, 555
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Wyoming	Harry C. Crawford, MD	
	Norman R. Swanson, DVM	307-777-7515

*As of May 1, 1987.

†State Public Health Veterinarian post vacant where none listed

*Dual Assignment

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