

## **A Summary of Rabies in Massachusetts, 1992-2002**

### **Massachusetts Department of Public Health**

The following report summarizes data collected on animal specimens sent to the State Laboratory Institute for rabies testing between 1992-2002.

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#### **A. Background**

Rabies is a viral disease of mammals most often transmitted through the bite or scratch of a rabid animal. Rabies virus infects the central nervous system, causing encephalitis and ultimately death.

The number of cases of rabies in domestic animals decreased dramatically through the introduction of animal control, licensing, and vaccination campaigns; however, because rabies is common among wild animals (raccoons, skunks, bats, woodchucks), the public health impact of rabies in Massachusetts remains significant. Considerable time and resources are expended in testing suspect animals, in evaluating human and pet exposures, and in the quarantine of pets that have bitten or scratched other humans or pets or have been bitten or scratched themselves by another potentially rabid animal.

The raccoon rabies epizootic reached Massachusetts in September 1992. Bat rabies, first detected in Massachusetts in 1961, continues to be a problem throughout the state. The vast majority of rabies cases identified in Massachusetts are in wild animals.

#### **B. Number of Submissions and Positive Results by Species**

Between 1992 and 2002 there were 36,154 specimens submitted to the State Laboratory Institute (SLI) for rabies testing. Of these specimens, 3893 tested positive for rabies. As **Table 1** indicates, the positive animals include approximately 2100 raccoons, 1200 skunks, 250 bats, 100 cats, 90 foxes and 75 woodchucks. Other species that have had at least one animal test positive in Massachusetts include: cattle, coyote, dog, horse, pig, fisher, otter, rabbit, goat, deer, shrew, and chinchilla. While no squirrels or opossums tested positive in Massachusetts during this time period, large numbers of these low-risk animals were submitted for testing.

Table 1. Number of Submissions and Positive Results by Species (sorted from highest to lowest by # of positive results), 1992-2002

<b>Animal</b>	<b>Submitted</b>	<b>Positive</b>	<b>Percent Positive</b>
RACCOON	5107	2136	42%
SKUNK	3223	1195	37%
BAT	4658	253	5%
CAT	13094	106	1%
FOX	511	89	17%

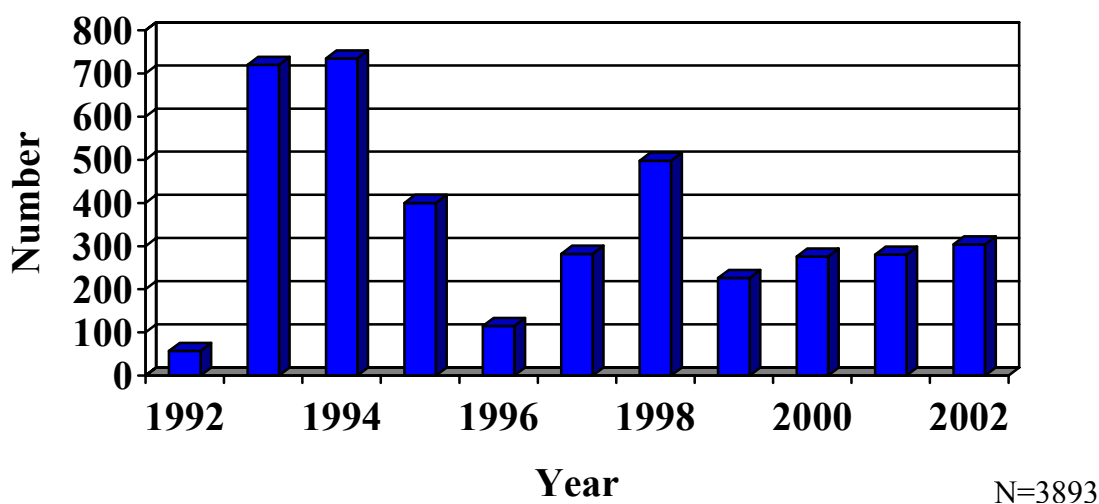
WOODCHUCK	1248	76	6%
COW	83	13	16%
COYOTE	65	6	9%
DOG	4349	4	<1%
HORSE	99	3	3%
PIG	23	3	13%
FISHER	21	2	10%
OTTER	4	2	50%
CHINCHILLA	1	1	100%
DEER	81	1	1%
GOAT	85	1	1%
RABBIT	427	1	<1%
SHREW	43	1	2%
ALPACA	5	0	0%
ANTELOPE	1	0	0%
BEAR	4	0	0%
BEAVER	13	0	0%
BINTURANG	1	0	0%
BIRD	2	0	0%
BISON	1	0	0%
BOAR	1	0	0%
BOBCAT	2	0	0%
CARACAL	1	0	0%
CHICKEN	1	0	0%
CHIPMUNK	140	0	0%
DEGU	1	0	0%
DONKEY	2	0	0%
DUCK	1	0	0%
ERMINE	1	0	0%
FERRET	227	0	0%
GERBIL	9	0	0%
GUINEA PIG	17	0	0%
HAMSTER	71	0	0%
HEDGEHOG	1	0	0%
LLAMA	21	0	0%
MINK	16	0	0%
MOLE	25	0	0%
MOUSE	138	0	0%
MUSKRAT	131	0	0%
OPOSSUM	683	0	0%
PONY	1	0	0%
PORCUPINE	41	0	0%
PRIMATE	2	0	0%
RAT	175	0	0%
SEAL	2	0	0%
SHEEP	62	0	0%
SQUIRREL	1167	0	0%

UNKNOWN	1	0	0%
VOLE	37	0	0%
WALLABY	1	0	0%
WEASEL	27	0	0%
<b>Total</b>	<b>36154</b>	<b>3893</b>	<b>11%</b>

**C. Number of Submissions and Positive Results by Year**

**Chart 1 and Table 2** indicate an initial peak in animals submitted and tested positive for rabies in 1993 and 1994. In 1993, 3972 animals were submitted with 720 (18%) testing positive. In 1994, 4535 animals were submitted with 735 (16%) testing positive. A second peak in submissions occurred in 1998 with almost 500 cases of rabies identified, representing 12.6% of submitted animals. Between 1998 and 2002, an average of 3400 animals per year were submitted to SLI for rabies testing.

**Chart 1. Number of Animals Testing Positive for Rabies by Year, 1992-2002**



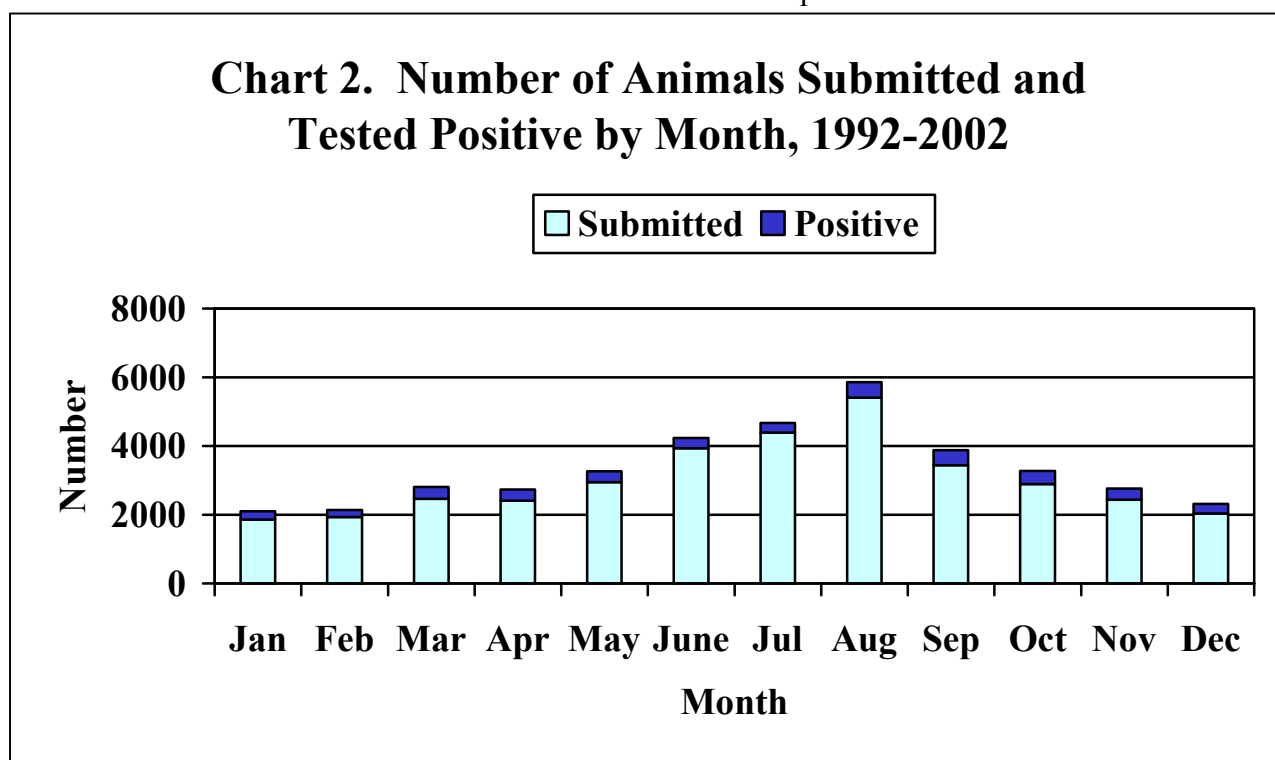
**Table 2. Number of Submissions and Positive Results by Year, 1992-2002**

Year	Submitted	Positive	% Positive
1992	1079	57	5%
1993	3971	720	18%
1994	4532	735	16%
1995	3438	400	12%
1996	3005	115	4%
1997	3128	282	9%
1998	3938	498	13%
1999	3270	226	7%
2000	3310	276	8%
2001	3346	280	8%

2002	3137	304	10%
<b>Total</b>	<b>36154</b>	<b>3893</b>	<b>11%</b>

**D. Number of Submissions and Positive Results by Month**

As **Chart 2** and **Table 3** show, there are seasonal variations in the number of animals submitted for testing, with the highest numbers of submissions occurring during the summer months of June, July, and August. The lowest numbers of submissions occur in the winter months of December, January, and February. Decreased animal and outdoor human activity during the winter months decreases the likelihood of animal-human exposures.



**Table 3. Number of Submissions and Positive Results by Month, 1992-2002**

Month	Submitted	Positive	% Positive
Jan	1863	237	13%
Feb	1934	205	11%
Mar	2464	349	14%
Apr	2410	322	13%
May	2953	315	11%
Jun	3934	296	8%
Jul	4388	285	6%
Aug	5407	456	8%
Sep	3441	436	13%
Oct	2889	384	13%
Nov	2434	330	14%
Dec	2037	278	14%
<b>Total</b>	<b>36154</b>	<b>3893</b>	<b>11%</b>

### **E. Number of Submissions and Positive Results by County**

Between 1992-2002 each of the 14 counties in Massachusetts submitted at least one animal for rabies testing and all counties except Nantucket and Dukes have had at least one positive animal (See Table 4 below). Middlesex County submitted the highest number of animals (n=7077).

**Table 4. Number of Submissions and Positive Results by County 1992-2002**

<b>County</b>	<b>Submitted</b>	<b>Positive</b>
Barnstable	1045	3
Berkshire	1193	211
Bristol	3432	513
Dukes	40	0
Essex	5020	511
Franklin	679	102
Hampden	1993	195
Hampshire	831	115
Middlesex	7077	751
Nantucket	19	0
Norfolk	4114	496
OUT OF STATE	263	4
Plymouth	3044	368
Suffolk	3142	101
UNKNOWN	30	0
Worcester	4232	523
Grand Total	36154	3893

### **F. Domestic Animal Summary**

Domestic animals have the greatest potential to bridge wildlife rabies to humans. Massachusetts state law requires that all dogs, cats, and ferrets be vaccinated against rabies. However domestic animals, particularly dogs and cats, still place the greatest burden on the rabies laboratory. Dogs and cats accounted for nearly 50% of all submissions between 1992-2002, but accounted for less than 3% of all positive animals.

Of the 4349 dogs submitted for testing in the ten-year period, 50% were vaccinated against rabies, 20% were not vaccinated, and vaccination status was unknown for 30% (**See Table 5**). Almost 90% of the dogs submitted were pets. Only four dogs tested positive for rabies in Massachusetts between 1992 and 2002. Of these four, three were unvaccinated and one had an unknown vaccination status. Three of the animals were pets and one was considered a stray.

Of the 13,094 cats that were submitted for testing in the ten-year period, only 16% were reported as vaccinated against rabies, 35% were reported as unvaccinated, and almost 50% had an unknown vaccination status (**See Table 5**). Almost half of the cats submitted were considered pets while half were either stray or wild or status unknown. Between 1992-2002, 106 cats have tested positive for rabies. Of these, 4% were reported as vaccinated, 51% were reported as

unvaccinated, and 45% had an unknown vaccination history. Thirty-four percent of the positive cats were considered to be pets while 59% were considered stray or wild and 7% were unknown.

**Table 5. Rabies Surveillance Statistics on Domestic Pets, 1992-2002**

<b>DOGS</b>		<b>CATS</b>	
<b>Number Submitted</b>	<b>4349</b>	<b>Number Submitted</b>	<b>13094</b>
<b>Vaccination Status</b>		<b>Vaccination Status</b>	
<i>Number Vaccinated (%)</i>	<i>2193 (50)</i>	<i>Number Vaccinated (%)</i>	<i>2098 (16)</i>
<i>Number Unvaccinated (%)</i>	<i>848 (20)</i>	<i>Number Unvaccinated (%)</i>	<i>4622 (35)</i>
<i>Number Unknown (%)</i>	<i>1307 (30)</i>	<i>Number Unknown (%)</i>	<i>6364 (49)</i>
<b>Pet Status</b>		<b>Pet Status</b>	
<i>Number Pets (%)</i>	<i>3835 (88)</i>	<i>Number Pets (%)</i>	<i>6383 (49)</i>
<i>Number Stray or Wild (%)</i>	<i>390 (9)</i>	<i>Number Stray or Wild (%)</i>	<i>6059 (46)</i>
<i>Number Unknown (%)</i>	<i>124 (3)</i>	<i>Number Unknown (%)</i>	<i>652 (5)</i>
<b>Number Positive</b>	<b>4</b>	<b>Number Positive</b>	<b>106</b>
<b>Vaccination Status</b>		<b>Vaccination Status</b>	
<i>Number Vaccinated (%)</i>	<i>0 (0)</i>	<i>Number Vaccinated (%)</i>	<i>4 (4)</i>
<i>Number Unvaccinated (%)</i>	<i>3 (75)</i>	<i>Number Unvaccinated (%)</i>	<i>54 (51)</i>
<i>Number Unknown (%)</i>	<i>1 (25)</i>	<i>Number Unknown (%)</i>	<i>48 (45)</i>
<b>Pet Status</b>		<b>Pet Status</b>	
<i>Number Pets (%)</i>	<i>3 (75)</i>	<i>Number Pets (%)</i>	<i>36 (34)</i>
<i>Number Stray or Wild (%)</i>	<i>1 (25)</i>	<i>Number Stray or Wild (%)</i>	<i>63 (59)</i>
<i>Number Unknown (%)</i>	<i>0</i>	<i>Number Unknown (%)</i>	<i>7 (7)</i>

**G. Human Rabies Summary**

Nationally, between 1992 and 2002, 32 cases of rabies in humans were reported to the Centers for Disease Control and Prevention (CDC) from 18 states. Of these cases, 1 had a known bat exposure, 5 had known dog exposures, and 26 had unknown exposure histories. Twenty-four of the cases had bat-strain rabies and eight had dog-strain rabies. Seven of the eight dog-strain cases had known travel history outside of the United States. (Mexico (2), India, Ghana, Nepal, Haiti, and Philippines).

In Massachusetts, between 1894 and 1935 there were 70 human deaths attributed to rabies. Since that time there has been only a single case of human rabies in a Massachusetts resident, reported in 1983, a case that was acquired through the bite of a dog in Africa.

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