2010 Rabies Summary
Massachusetts Department of Public Health

The following summarizes data collected on animal specimens from Massachusetts sent to the William A. Hinton State Laboratory Institute (HSLI) for rabies testing from January to December 2010. Cumulative reports summarizing rabies testing from 1992-2002 and annual reports from 2003 to 2009 are available on the MDPH website and can be found through www.mass.gov/dph/rabies.

Prior to 2010, data for annual reports included specimens received from other states. Originally, this was done to help document the emergence of the raccoon rabies virus in the Northeast. Table 1 has been adjusted to exclude those animals.

Number of Submissions and Positive Results by Year

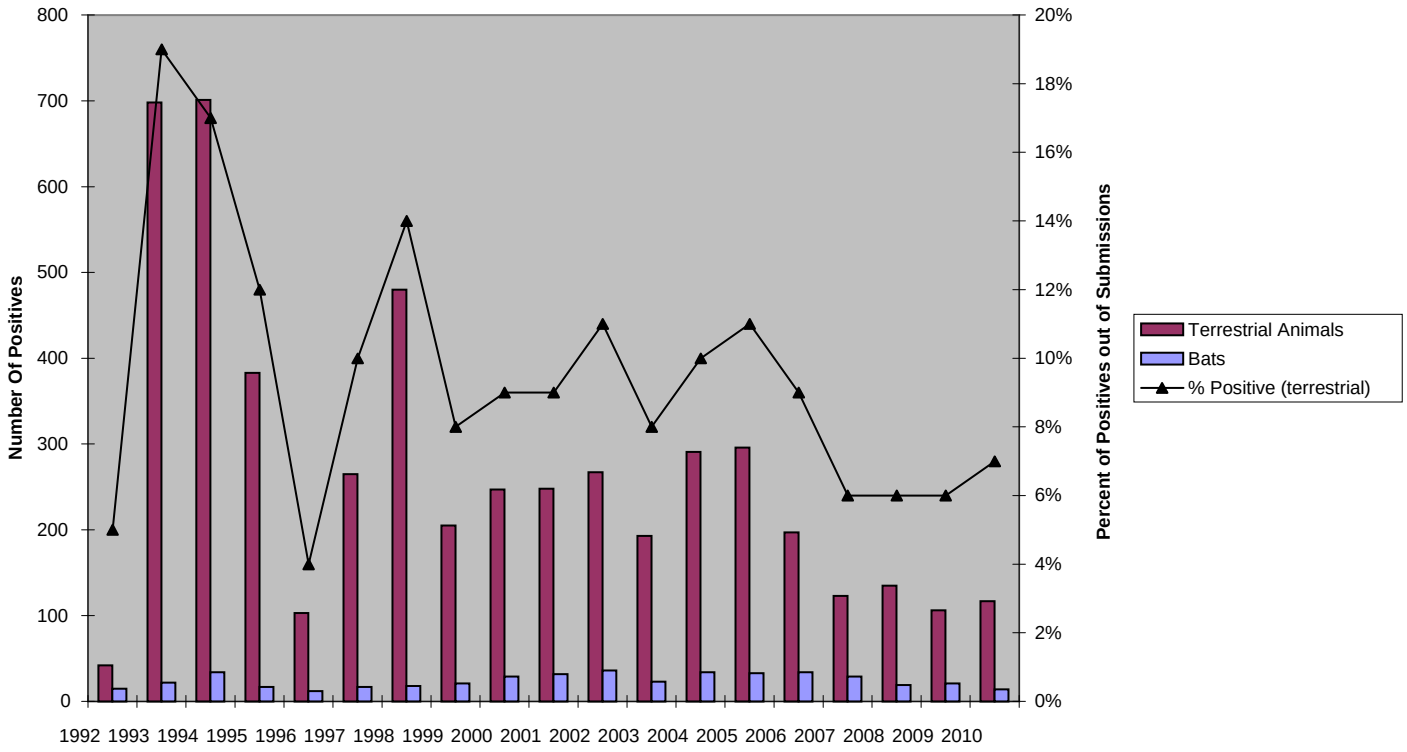
The number of terrestrial animals that tested positive in 2010 was only slightly higher than in 2009 which recorded the lowest number of positive animals since 1996 (see **Table 1**). Terrestrial rabies incidence has generally demonstrated a 4-5 year cycle in Massachusetts (see **Figure 1**). The 2004 introduction of raccoon rabies into the last part of the mainland, Cape Cod, interrupted the endemic cycle that had been established in the rest of the Commonwealth.

TABLE 1. Number of Submissions, Positive Results and Percent Positive by Year and Type of Animal

	TERRESTRIAL ANIMALS			BATS		
Year	**Number Submitted**	**Number Positive**	**% Positive**	**Number Submitted**	**Number Positive**	**% Positive**
1992	926	42	5%	143	15	10%
1993	3660	698	19%	289	22	8%
1994	4119	700	17%	391	34	9%
1995	3175	383	12%	241	17	7%
1996	2701	103	4%	277	12	4%
1997	2771	264	10%	334	17	5%
1998	3483	480	14%	439	18	4%
1999	2643	205	8%	595	21	4%
2000	2666	247	9%	611	29	5%
2001	2615	248	9%	710	32	4%
2002	2505	267	11%	613	36	6%
2003	2358	193	8%	602	23	4%
2004	2842	291	10%	600	34	6%
2005	2653	296	11%	708	33	5%
2006	2122	197	9%	756	34	5%
2007	1988	123	6%	787	29	4%
2008	2298	135	6%	748	19	3%
2009	1747	106	6%	696	21	3%
2010	**1740**	**117**	**7%**	**678**	**14**	**2%**
Total	**49,408**	**5,101**	**10%**	**10,242**	**460**	**4%**

The number of bats submitted for rabies testing remains relatively stable despite documented population losses, primarily in little brown bats, due to white-nose syndrome. The percentage of bats that test positive for rabies continues to decline and is at the lowest level since 1996, despite the stable level of specimen submission.

Figure 1. Positive Animals by Year and Type and Percentage of Terrestrial Animals Testing Positive Out of all Terrestrial Animals Submitted



Notable Rabies Situations

In 2010, 2,418 specimens were submitted to the HSLI for rabies testing. Of these specimens, 131 tested positive for rabies. **Table 2** shows positive animals in 2010. During the first quarter of 2010, a bobcat from Hampden County tested positive for rabies. This was the fifth bobcat to test positive in Massachusetts. A bobcat attacked a vaccinated dog, severely injuring it and then ran away. The next day, what was presumed to be the same bobcat, attempted to climb through a window of a residence near where the dog attack occurred. Local residents and an animal control officer responded and observed the bobcat chewing on a tire and growling. The bobcat lunged at them, was beaten off with a wooden bat and was eventually euthanized and submitted. There were no human exposures reported, and the dog received a booster dose of rabies vaccine and was quarantined for 45 days.

During the second quarter of 2010, a horse from Bristol County tested positive for rabies. The unvaccinated horse was exposed by proximity to a confirmed rabid skunk approximately three weeks prior to illness onset. No human exposures were reported. This was the fifth horse to test positive for rabies in Massachusetts.

During the fourth quarter of 2009, a second horse tested positive for rabies, this one from Hampden County. This two-year old miniature horse with an unknown vaccination history developed colic followed by progressive neurologic symptoms requiring euthanasia. The horse's owners as well as several veterinary staff that syringe-fed the animal and inspected its mouth all received post exposure prophylaxis. The horse had no known exposure to wildlife prior to its illness.

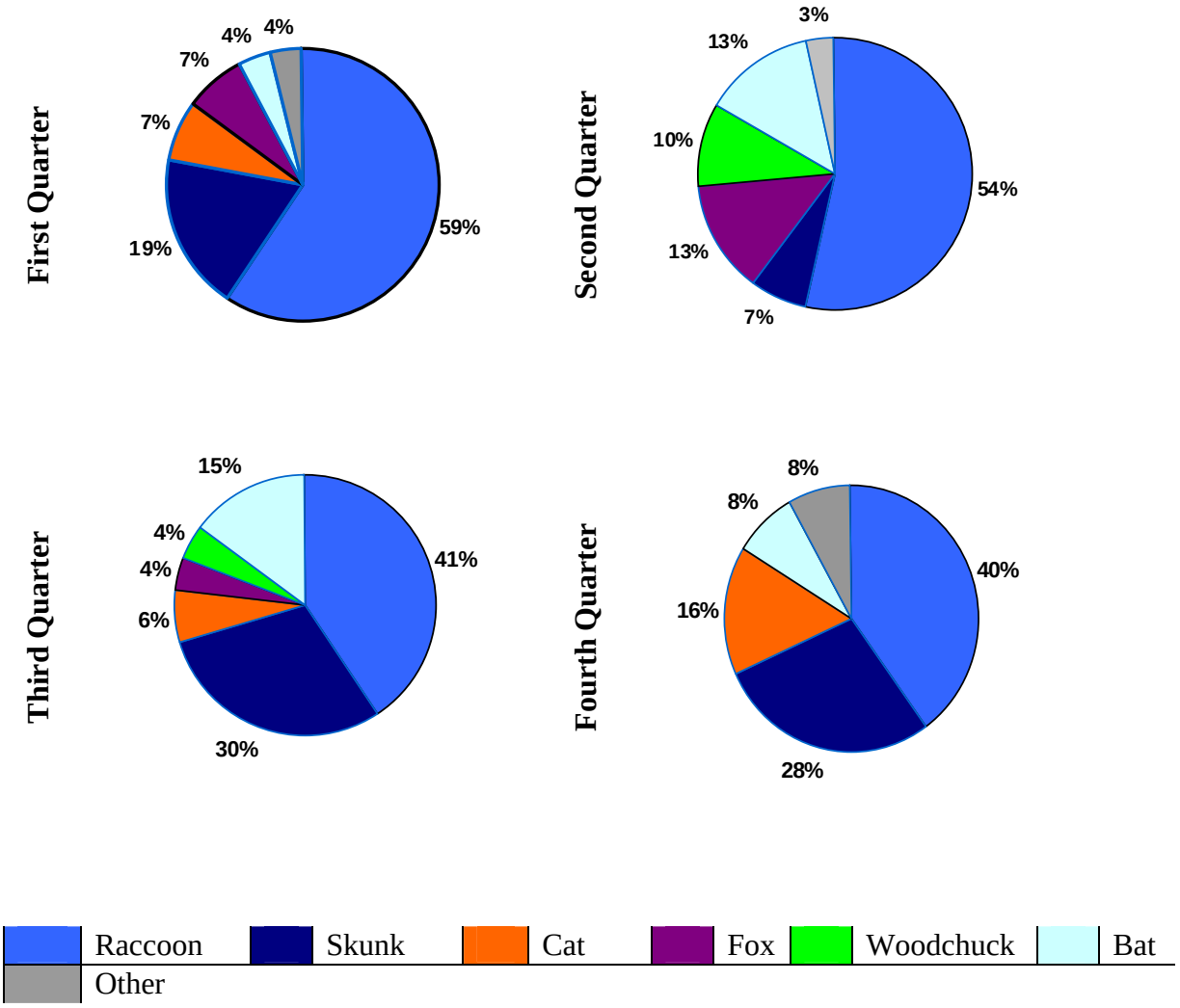
Number of Submissions and Positive Results by Species

Raccoons and skunks continued to account for the large majority of rabies positive animals in Massachusetts, although the proportion of rabies positive animals that they represent varies by quarter (see **Figure 2**).

Table 1. Number of Animals Positive for Rabies/Animals Submitted (%), 2010										
Animal	**1st Quarter**		**2nd Quarter**		**3rd Quarter**		**4th Quarter**		**Total 2010**	
Raccoon	16/29	(55.2%)	16/50	(32.0%)	19/40	(47.5%)	10/18	(55.5%)	**61/137**	(44.5%)
Skunk	5/13	(38.5%)	2/11	(18.2%)	14/47	(29.8%)	7/22	(31.8%)	**28/93**	(30.0%)
Cat	2/160	(1.3%)	0/192	(--)	3/270	(1.0%)	4/211	(1.9%)	**9/833**	(1.1%)
Fox	2/6	(33.3%)	4/8	(50.0%)	2/6	(33.3%)	2/7	(2.9%)	**10/27**	(37%)
Woodchuck	0/6	(--)	3/27	(11.1%)	2/28	(16.8%)	0/0	(--)	**5/61**	(10.8%)
Bat	1/61	(1.6%)	4/136	(3.0%)	7/443	(1.6%)	2/38	(5.2%)	**14/678**	(2.1%)
Cow	0/1	(--)	0/0	(--)	0/0	(--)	0/0	(--)	**0/1**	(--)
Coyote	0/1	(--)	0/1	(--)	0/1	(--)	0/2	(--)	**0/5**	(--)
Dog	0/90	(--)	0/136	(--)	0/117	(--)	0/100	(--)	**0/443**	(--)
Other*	1/23	(4.3%)	1/43	(2.3%)	0/51	(--)	2/23	(8.7%)	**4/140**	(2.9%)
TOTAL	**27/390**	**(6.9%)**	**30/604**	**(5.0%)**	**47/1003**	**(4.7%)**	**27/421**	**(6.4%)**	**131/2418**	**(5.4%)**

**QI: Bobcat; QII: Horse; QIV: Horse, Fisher*

Figure 2. Proportion of All Positive Results Represented by Each Animal Species and Type, by Quarter



Cumulative Submissions and Positive Results by Month

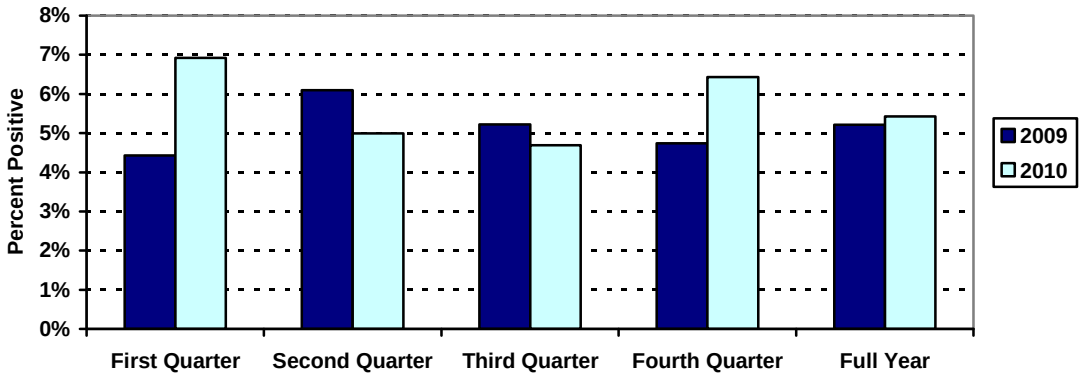
Animal specimen submissions fluctuate throughout the year. The highest number of submissions occurs during June, July and August (see **Table 3**). The lowest number of submissions occurs during the winter. This is seen annually and is due to the greater activity of wildlife species during the spring and summer months coinciding with the time that humans increase their outdoor activity level. These simultaneous events result in more frequent contact between humans and wildlife and lead to more rabies testing.

Table 3. Submissions, Number Positive for Rabies, and Percent Positive by Month and Animal Type, 2009 and 2010

	TERRESTRIAL ANIMALS						BATS					
Month	**Submitted 2009**	**Positive 2009**		**Submitted 2010**	**Positive 2010**		**Submitted 2009**	**Positive 2009**		**Submitted 2010**	**Positive 2010**	
January	118	5	4%	121	9	7%	30	1	3%	24	1	4%
February	114	6	5%	99	6	6%	23	2	9%	21	0	0%
March	117	5	4%	109	11	10%	28	0	0%	16	0	0%
April	137	12	9%	110	6	5%	18	1	6%	13	0	0%
May	137	10	7%	159	7	4%	45	1	2%	54	1	2%
June	194	12	6%	199	13	7%	57	0	0%	69	3	4%
July	193	15	8%	217	11	5%	142	2	1%	165	4	2%
August	174	10	6%	187	11	6%	296	7	2%	247	2	1%
September	177	15	8%	156	18	12%	20	3	14%	31	1	3%
October	128	7	5%	132	12	9%	9	2	22%	4	1	25%
November	144	5	3%	140	9	6%	9	1	11%	9	0	0%
December	114	4	4%	111	4	4%	19	1	5%	25	1	4%
TOTAL	**1747**	**107 (6%)**		**1740**	**117 (7%)**		**696**	**21 (3%)**		**678**	**14 (2%)**	

The proportion of animals testing positive for rabies also varies throughout the year, generally showing a consistent pattern from year-to-year (see **Figure 3**). The change in the percent positive is normally small between quarters.

Figure 3. Percent Positive of All Submissions by Quarter, by Year



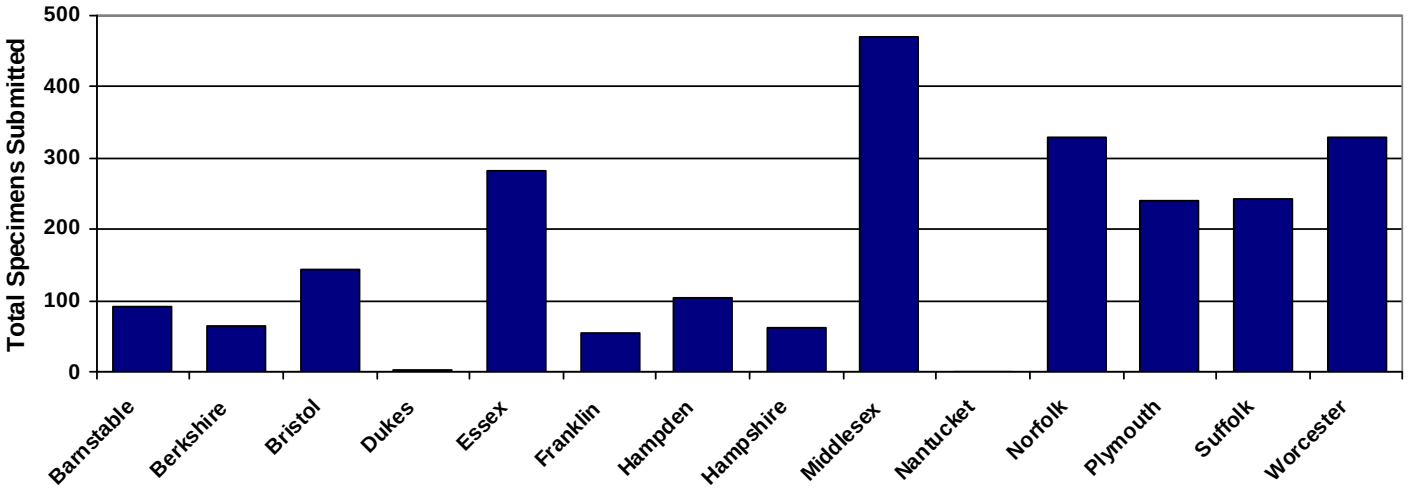
Submissions and Positive Results by County

In 2010, each of the 14 counties in Massachusetts submitted at least one animal for rabies testing, and all counties, except Nantucket and Dukes, had at least one animal that tested positive (See **Table 4 and Figure 4**). Middlesex, Norfolk and Worcester counties submitted the highest number of animals (n = 470, n = 330, n = 330, respectively). Worcester County had the highest number of animals that tested positive (n = 29) and Hampden County had the highest proportion of submitted animals that tested positive (15.2%).

Table 4. Rabies Testing Data by County- Number of Animals Positive for Rabies/Number of Animals Submitted (%)

County	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Cumulative	
Barnstable	0/12	(--)	0/19	(--)	1/51	(2.0%)	0/10	(--)	1/92	(1.1%)
Berkshire	2/8	(25.0%)	1/8	(12.5%)	4/36	(11.1%)	2/13	(15.4%)	9/65	(13.9%)
Bristol	1/25	(4.0%)	3/32	(9.4%)	3/62	(4.8%)	3/24	(12.5%)	10/143	(7.0%)
Dukes	0/1	(--)	0/0	(--)	0/1	(--)	0/1	(--)	0/3	(--)
Essex	1/62	(1.6%)	2/79	(2.5%)	1/94	(1.1%)	1/46	(2.2%)	5/281	(1.8%)
Franklin	1/11	(9.1%)	2/19	(10.5%)	0/19	(--)	0/5	(--)	3/54	(5.6%)
Hampden	2/20	(10.0%)	5/26	(19.2%)	7/40	(17.5%)	2/19	(10.5%)	16/105	(15.2%)
Hampshire	0/10	(--)	1/17	(5.9%)	4/26	(15.4%)	0/9	(--)	5/62	(8.1%)
Middlesex	5/70	(7.1%)	6/127	(4.7%)	1/200	(0.5%)	3/73	(4.1%)	15/470	(3.2%)
Nantucket	0/0	(--)	0/0	(--)	0/0	(--)	0/1	(--)	0/1	(--)
Norfolk	3/42	(7.1%)	5/92	(5.4%)	6/146	(4.1%)	6/50	(12.0%)	20/330	(6.1%)
Plymouth	4/40	(10.0%)	1/55	(1.8%)	7/98	(7.1%)	2/47	(4.3%)	14/240	(5.8%)
Suffolk	0/43	(--)	0/51	(--)	3/95	(3.2%)	1/53	(1.9%)	4/242	(1.7%)
Worcester	8/46	(17.4%)	4/79	(5.1%)	10/135	(7.4%)	7/70	(10.0%)	29/330	(8.8%)

Figure 4. Number of Animals Submitted for Rabies Testing by County, 2010



Mapping

MDPH has begun mapping animal rabies activity on a monthly and annual basis (see **Figure 5**). Over time, this may reveal hotspots which could benefit from outreach and prevention activities.

Figure 5.