

# West Highland White Terrier Health Survey Final Report

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For the  
Westie Foundation of America, Inc.  
And the  
Health Committee  
Of the  
West Highland White Terrier Club of America

February 20, 2007

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## INTRODUCTION

The primary purpose of this study was to determine the owner-reported prevalence of 27 diseases in West Highland White Terriers by means of an anonymous survey distributed by mail to owners and breeders in 2005. This report compares the results of the most recent study with the findings of a similar survey conducted in 2000.

## METHODS

### Survey Design and Administration

The survey instrument was designed by the Westie Foundation of America, Inc. and the Health Committee of the West Highland White Terrier Club of America based on a similar survey administered in 2000. Section A contained the 14 diseases included in the 2000 administration. Section B added 13 new diseases, presumably based on high interest in the Westie owner community. For each dog, owners were asked to report sex, date of birth, date of death (if applicable), and for each disease listed, age of onset and source of diagnosis, whether self, breeder, vet, specialist, or lab test. A final section solicited information on numbers of litters bred since January 1, 1999 and the health status of dogs included in the 2000 survey. Unlike the previous survey, data on ownership category (general or member) was not collected.

Copies of the survey were mailed to approximately 6,000 homes, along with a stamped self addressed return envelope. Follow-up mailings to non-responders were not conducted, as no effort was made to track returns. This was the result of a decision to make the surveys completely anonymous in an effort to increase response rates and the validity of reported information.

### Data Collection

Completed surveys were forwarded to an independent collection center and results were entered into a Microsoft Excel™ spreadsheet.

### Data Cleaning

The data were forwarded to the analyst as Excel spreadsheets. Dog ages—at the time of survey or time of death—were calculated by subtracting the birth date from either December 1, 2005, the date the surveys were to be returned, or the date of death, as needed. A substantial number of surveys only contained partial birth or death dates. In these instances, a date missing a day defaulted to the 15<sup>th</sup> of the month. A date missing both day and month defaulted to June 15<sup>th</sup> of the particular year. Onset ages for each disease were calculated by combining the onset years, onset months, and onset weeks fields.

A new variable, “layvet,” was created by combining the Self, Breeder, Vet, and Specialist fields, where layvet equaled 0 for Self or Breeder and 1 for Vet or Specialist.

Layvet was coded 1 whenever the Vet or Specialist fields were checked, regardless of whether the Self or Breeder fields were also checked. Some owner responses were clearly inappropriate for deafness, where the onset ages exceeded those specified in the survey instructions. These were recoded.

## Data Analysis

Ultimately, a working dataset was created by exporting the data to STATA™, a standard statistical analysis program. Simple descriptive statistics were calculated for each variable in the dataset. Where appropriate, subgroups were determined and hypotheses tested using the applicable statistical tests.

A note on statistical tests: these are used to test a statistical hypothesis, for instance that there is no difference in the average age at death in the 2000 and 2005 surveys. In general, these tests arrive at a “p-value” which assesses whether a result as large or larger than that observed could have been obtained by chance alone. Generally, scientists have adopted  $p = 0.05$  as a cut point for interpreting the results of statistical tests. P-values smaller than this figure indicate a statistically significant difference, meaning chance probably had minimal impact. In addition, 95 percent confidence intervals were calculated for most percentages, due to the uncertainty associated with estimates obtained from only a sample of the entire population. These figures represent the range around each estimate in which the true value is expected to be found.

## RESPONSE RATE

Approximately 6,000 surveys were distributed, of which 1,177 were returned for an overall response rate of 19.6 percent. In survey research, 40 percent is considered the minimum return rate needed to draw valid conclusions about the population being sampled. However, according to the AKC Canine Health Foundation, seven to nine percent is the average national return rate for canine health surveys. So, even though the return rate was good, care should be taken when generalizing the findings from this survey to the Westie population at large. In 2000, the response rate was 27 percent, somewhat higher than that obtained with this administration, but still below a desirable return rate.

## DOG INFORMATION

Respondents were asked to complete surveys for all dogs that currently reside with them, and for any they had lost since January 1, 1999. Survey information was returned for 2,173 dogs. The vital status of these animals is shown in table 1. Roughly 16 percent of the dogs reported on had died since 1999. This figure is substantially higher than the eleven percent reported in the last survey. Among those reported dead at the time of this survey, the average age of both males and females was around eleven years as shown in table 2. The difference in age at death between males and females was not statistically significant ( $t = 1.188$ ,  $p = 0.236$ ). The oldest dog was eighteen when it died and the youngest died at birth. In the 2000 survey, the average

age at death was ten years, significantly less than that reported in the current administration ( $t = 2.813$ ,  $p = 0.005$ ), but of no practical importance.

Among living dogs, the majority (54.1 percent) were female. This figure matches closely (53.4 percent) the results from the 2000 survey. Table 6 lists the average ages of dogs reported alive. The average reported age was five years, and these results were similar to those (5.6 years) reported in the 2000 survey. There was no significant difference ( $t = 0.563$ ,  $p = 0.574$ ) between the ages of males and females reported to be alive at the time of the 2005 survey.

## TARGETED DISEASES

### Dogs Reported Dead

There were 337 dogs reported by owners to have died since January 1, 1999, which represented nearly 16 percent of the animals reported on by owners (table 1). Among deceased dogs, the average age at death was about 11.5 years, with a range of 0 to slightly over 18 years. Among dogs that had died, slightly over 80 percent had at least one disease reported. The most common disease was atopic dermatitis, which was reported for nearly one-third of dogs (table 3). Next in frequency was pulmonary fibrosis, followed by congestive heart failure and lymphoma, diabetes, dry eye, and luxated patella. Note that these are not causes of death, but diseases reported by owners for dogs that had died. Confidence intervals are included with each percentage because the results are based on a sample and there is uncertainty associated with each measure. The confidence interval reflects the range around each estimate in which the true answer can be expected to be found 95 percent of the time.

Table 4 shows the prevalence of targeted diseases among dogs reported to be deceased, by sex. Females had a slightly higher average prevalence of targeted diseases than males. Most notably, males had a much higher prevalence of atopic dermatitis than females, although the difference was not statistically significant. Males also had higher prevalences of Addison's disease, portosystemic shunts, and renal dysplasia. For many diseases, female prevalence rates exceeded those for males, including: diabetes, dry eye, congestive heart failure, pancreatic enzyme deficiency, and sick-sinus syndrome. The prevalence rate for female lymphoma was more than twice that of males, a statistically significant difference. Regardless, the ranking of disease prevalences was similar for males and females.

Among dogs reported deceased, females had a slightly older disease onset age on average than males, and this result was statistically significant, although the ranges were the same (table 5). Females had statistically significantly higher onset ages than males for luxated patella and pulmonary fibrosis.

## Dogs Reported Alive

Nearly two-thirds (64.5 percent) of the dogs reported alive had no diseases reported. For the remaining 35 percent, slightly more than three-quarters had a single disease reported, and slightly under one-quarter had two or more diseases checked. A few dogs had as many as five of the targeted diseases reported.

Table 7 contains responses for all 1836 dogs reported alive for the 27 targeted diseases, along with rankings by the frequency of positive responses. The overall average was 1.7 percent positive, from a high of 17.1 percent yes for atopic dermatitis to several conditions for which there were no reports. Confidence intervals are included with each percentage because the results are based on a sample and there is uncertainty associated with each measure. The confidence interval reflects the range around each estimate in which the true answer can be expected to be found 95 percent of the time. Thus, there is 95 percent certainty that the “true” answer for atopic dermatitis likely lies somewhere between 15.4 and 18.7 percent. Compared to the 2000 survey, fewer dogs were reported to have any of the conditions listed in Section A, but the difference was slight, 1.7 versus 2.7 percent. The disease rankings were also similar, with the exception of “inflammatory bowel disease,” a new targeted disease which was the fourth most commonly reported disease in the 2005 survey. Comparing other conditions, several had substantially lower reporting percentages in the 2005 survey, including: aggression, craniomandibular osteopathy, diabetes, dry eye, and pulmonary fibrosis. Of course, comparisons between the two surveys are not possible for the diseases in Section B of the survey, since they weren’t included in the 2000 administration.

Table 8 lists the onset ages for each of the targeted conditions calculated by combining the reported years, months, and weeks data for each dog record. In the 2005 survey, average onset ages ranged from 0.4 years (5 months) for pulmonic stenosis to 10.3 years for lymphoma. Compared to the 2000 survey, average onset ages were lower for deafness (under 6 months), and higher for Addison’s disease, dry eye, and pulmonary fibrosis. The difference in average onset age for juvenile cataracts between the two surveys is difficult to interpret, since the 2005 did not include any age limits.

Targeted disease reports are grouped by sex in table 9. The rankings by frequency were fairly consistent between the sexes. Statistically significant differences in the proportions of yes answers were seen for atopic dermatitis (males more than females) and dry eye (females more than males). Similar differences were reported for atopic dermatitis in the 2000 survey, but not for dry eye.

The prevalence of targeted diseases in females is compared between the 2000 and 2005 surveys in table 10. The rankings by frequency were consistent between the two surveys. Statistically significant differences in female prevalences were noted for craniomandibular osteopathy (lower in 2005), deafness (higher in 2005), diabetes (lower in 2005), and pulmonary fibrosis (lower in 2005). Most notably, the average prevalence for all reported conditions was significantly lower in 2005 compared to 2000. Table 11

shows the same survey comparisons for males. The rankings by frequency were similar between the two surveys. Statistically significant differences in prevalences were noted for aggression (lower in 2005) and for craniomandibular osteopathy (lower in 2005). Statistically, there was no difference between the average male disease prevalences reported in the two surveys.

Table 12 compares the average onset ages for females and males for each targeted disease in 2005. Of these, only Legg-Perthes disease was significantly different, with males having an onset age nearly three times that of females. Average disease onset ages for females in 2000 and 2005 are compared in table 13. There was a statistically significant difference for atopic dermatitis, but the practical difference is not meaningful. The onset age for juvenile cataracts reported in the 2005 survey was significantly higher than 2000, but cannot be interpreted because the reporting instructions were different. Table 14 shows survey comparisons for onset ages in male dogs. There were no significant differences in onset ages for any of the conditions in males.

Source of diagnosis information was grouped into two categories, “lay” and “vet.” The former included the categories self and breeder and the latter veterinarian and specialist. When both lay and vet boxes were checked on the survey, the default was vet. Overall, 87 percent of the reported diseases were diagnosed by a veterinarian in the 2005 survey, up from 81 percent in 2000. The notable exceptions were aggression and deafness, which were more commonly diagnosed by owners or breeders.

The last page of the survey solicited owner information on numbers of litters bred, and data on dogs listed in the 2000 survey that developed diseases since then. As seen in table 15, nearly 84 percent of owners had bred no litters since January 1, 1999. Slightly over 10 percent had bred one to four litters, and only about four percent had bred five or more litters. Relatively small numbers of dogs were listed as developing the diseases listed in Section A (31 dogs) and Section B (22 dogs) since the last survey. The proportions generally followed the patterns already described for dogs elsewhere in the survey. Of note, nearly 68 percent of dogs listed in Section A were responding to treatment, while only about 55 percent were responding to therapy in Section B.

## DISCUSSION

Determining disease prevalence is an important yet difficult part of any breed improvement program. Genetic conditions in particular need to receive attention. Various approaches towards screening for disease in dog populations have been tried with variable results. Screening individual animals prior to breeding has been used with some success to control hip dysplasia and retinal conditions.<sup>1</sup> This approach is likely to become more common as the genetic basis for more diseases is characterized and as the tools with which to study them are developed. In the mean time, health surveys have been commonly used to characterize the common diseases afflicting animal populations. These have taken several forms, including surveys of veterinarians and owners.<sup>1,2</sup> Previous health surveys presented in the veterinary literature have included either general health surveys,<sup>1,2</sup> or have been targeted towards specific conditions.<sup>3</sup>



Increasingly, the internet is being used to gather canine health survey information. The American Kennel Club Canine Health Foundation has established a website<sup>4</sup> to distribute canine health survey tips, and it acts as a clearinghouse for canine health survey information. Many breed groups have active and ongoing internet health survey programs, including: Rhodesian Ridgeback, Spimoni Italiani, Cocker Spaniel, Golden Retriever, and others.

Generally, response rates of at least 40 percent are considered necessary to obtain a representative sample of opinion, although it has been found that response rates to canine health surveys average seven to nine percent nationally. The response rate to this survey, approximately 20 percent, is considerably better than most, but still low enough that caution should be used when generalizing the findings to the entire Westie population.

Only a small percentage of dogs reported on in this survey had died. The overall figure, roughly 16 percent, was much less than that reported for Old English Sheepdogs (36 percent).<sup>2</sup> However, given the constraints placed on the respondents—that only dogs dying since 1999 be included—the difference between these figures cannot be interpreted. Regardless, the maximum lifespan reported in this study was 21 years, and from the records of deceased Westies it can be estimated that 95 percent of dogs would be expected to be alive between the ages of 1 and 20 years, based on an average age of 11 years and an approximate standard deviation of 4.5 years. These figures remain unchanged from the findings of the 2000 survey. Among those dogs reported to have died, females and males lived the same number of years, on average.

In surveys of other breeds, varying proportions of dogs have had one or more disease reports: for Old English Sheepdogs the figure was 72 percent, Newfoundlands 63 percent, Irish Wolf Hounds 34 percent, and Basenjis 28 percent.<sup>1</sup> Among the Westies surveyed in 2005, 65 percent were reported to have one or more of the targeted diseases, a figure which falls towards the upper end of those reported for other breeds. This figure is substantially higher than the 40 percent figure found in the 2000 survey, but likely reflects the addition of many more diseases to the targeted list. The differences from other breed surveys can be readily explained by differences in survey design and administration; from that used for Cocker Spaniels, which is 18 pages long, to that for Basenjis, which focused on a single disease. The upshot is that these prevalence rates are not directly comparable across breeds due to differences in questionnaire design and administration.

Atopic dermatitis remains the most common disease reported by respondents, being noted in approximately 31 percent of the Westies that were reported to have died, and 23 percent of those reported alive in this survey. The latter figure is considerably higher than the 2000 survey, when only about 16 percent of dogs were reported to have atopy. As before, reports of atopy were considerably higher among males than females. Among males that had died, over 41 percent were reported to have atopy, with a upper 95 percent confidence limit of over 50 percent. This estimate indicates that nearly half of male Westies had a history of atopic dermatitis by the time they died.

Note: the disease prevalence reports for dogs that had died should not be misconstrued as being associated with the cause of death. Rather, these dogs had longer life experiences within which to develop one of the targeted diseases. The correct interpretation should be that by the time they died, nearly half of male Westies had been diagnosed at some point in their lifetime with atopy, nearly one quarter of females had been diagnosed with atopy, etc.

Atopy is recognized as a heritable susceptibility, with dogs developing IgE mediated Type I hypersensitivity reactions to aeroallergens.<sup>5</sup> This typically appears at an early age, and the disease is reported to be either equally common in males and females, or perhaps slightly more common in females.<sup>6</sup> The results of the 2000 and 2005 surveys confirm the age at diagnosis, but are in disagreement with the sex distribution. Atopy onset ages have consistently been reported in the Westie surveys at around two to three years, and the prevalence among males is generally twice that of females. Westies are often mentioned as having a high prevalence of atopy in various published reports. In one investigation, conducted to determine if serum IgE concentrations can predict future atopy, the investigators found 66 percent of Westie puppies had developed some type of skin disease by three years of age. In 46 percent, the disease was severe enough for veterinary care to be required, and atopic dermatitis was diagnosed in 25 percent of the puppies.<sup>7</sup> This figure is consistent with that found in this study for deceased dogs. Regardless, the owner reported prevalence of atopic dermatitis in Westies appears to be increasing when results of the 2000 and 2005 surveys are compared. While the exact mode of inheritance of atopy susceptibility is unknown, breed and familial dispositions suggest that it is definitely a heritable condition. Research on the inheritance of atopic dermatitis is ongoing at North Carolina State University, and the same researcher has established an experimental model for atopic dermatitis in beagles.<sup>8</sup> A recent review of several clinical trials suggests that cyclosporin A is an effective treatment for atopic dermatitis.<sup>9</sup>

Analysis of records from the 2005 survey for deceased dogs underscores the importance of pulmonary fibrosis, which was second only to atopic dermatitis in frequency, effecting approximately 10 percent of Westies that had died. The disease is characterized by a middle to old-age onset, changes in chest x-rays, decreased exercise tolerance, difficulty breathing, and coughing.<sup>10</sup> In the 2005 survey, males and females were equally likely to be afflicted, although the average onset age for males was significantly less than that reported for females.

Not too surprisingly, Westies that had died had high rates of lymphoma, congestive heart failure, diabetes, and dry eye reported by their owners. Interestingly enough, females had much higher prevalences for each of these diseases, significantly so for lymphoma. The onset ages for each sex were generally similar for each disease. Information is lacking on the heritability of each of these conditions in Westies. However, analysis of breed differences for diabetes suggests a genetic component, perhaps associated with particular blood proteins.<sup>11</sup> Familial analysis of Keeshonds suggests diabetes susceptibility may be inherited as an autosomal recessive gene.

Dry eye, or keratoconjunctivitis sicca is a common eye disease of dogs. One study found increasing incidence of dry eye reports over a 25 year period. In 1988, the prevalence of dry eye in one database was 1.5 percent and slightly over 50 percent of all canine conjunctivitis cases were thought to be due to this disease.<sup>12</sup> In the same report, the prevalence of dry eye among Westies was reported to be four percent. Females have also been reportedly more likely to develop dry eye than males.<sup>13</sup> The prevalence of dry eye reported in this study was 2.1 percent overall, with a higher prevalence reported among females than males. However, much higher rates of dry eye, around seven to eight percent, were reported for dogs that had died, and were also much higher for females than males. The prevalences for deceased dogs were higher than those previously reported, and the Westie health surveys have consistently shown females to be more commonly afflicted than males, which may offer clues for further research.

Luxated patellas was reported at a higher frequency among dogs alive in 2005 than in 2000. Similar to the previous survey, males were more likely than females to be reported having the condition. Medial patellar luxation remains a common orthopedic problem of smaller dog breeds.<sup>14</sup> The origins of this condition are complex and poorly understood, but congenital or developmental malalignment of the quadriceps mechanism is thought to be a possible cause, although other defects in pelvic limb conformation are also considered likely. Regardless, a hereditary component is considered highly probable by most authors.<sup>15</sup> Females are believed to be more liable to develop the condition than males, but this is not necessarily borne out by the 2005 survey data. The remaining targeted diseases had low overall prevalences—and few published reports in the literature—so they are not considered at length here. Inflammatory bowel disease was a targeted disease in the 2005 survey that was frequently reported, but little literature exists on the topic. Legg-Perthes disease is a noninflammatory aseptic necrosis of the femoral head and neck, thought to be due to vascular occlusion. Abnormal blood clotting factors have been ruled out as a cause of this condition.<sup>13</sup> CMO is a noncancerous bony proliferation of the mandibular ramus and tympanic bulla.<sup>14</sup> One analysis of a kindred of Westies found the inheritance of this condition to be autosomal dominant.<sup>15</sup>

## CONCLUSIONS

The prevalences of targeted diseases remain essentially unchanged between the 2000 and 2005 surveys. For some common diseases, such as: atopic dermatitis, deafness, luxated patella, and Legg-Perthes disease; the prevalences have actually increased. For others, such as: aggression, deafness, diabetes, and pulmonary fibrosis; modest decreases were realized. Progress is being made at many veterinary schools on determining the mode of inheritance and new treatments for many of these conditions. Continued financial, data, and case material support for these programs will greatly benefit the breed in the future.

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**Table 1. Vital Status of Surveyed Dogs in 2005.**

	Number	Percent
Dead	337	15.5
Alive	1836	84.5
Overall	2173	100.0

**Table 2. Ages of Deceased Dogs in 2005.**

Sex	Number*	Average	SD	Min	Max
Unknown	4	12.6	3.1	9.2	15.9
Female	173	11.7	4.0	0.0	17.4
Male	145	11.1	5.0	0.2	18.2
Overall	322	11.4	4.5	0.0	18.2

\*Note: numbers differ from table 1 due to missing birth or death dates.

Table 3. Prevalence of Targeted Diseases Among Deceased Dogs in 2005.

Disease Name	(N = 337)		
	#	%Yes (95% CI)	Rank
Addison's Disease	7	2.1(0.9 – 4.3)	
Aggression	13	4.0(2.2 – 6.7)	9
Atopic Dermatitis	80	31.1(25.5 – 37.2)	1
Copper Toxicosis	13	4.0(2.2 – 6.7)	9
Craniomandibular Osteopathy	3	0.9(0.2 -2.6)	
Deafness	4	1.2(0.3 – 3.0)	
Diabetes	27	8.7(5.8 – 12.4)	5
Dry Eye	26	8.4(5.5 – 12.0)	6
Globoid Cell Leukodystrophy	2	0.6(0.1 -2.1)	
Juvenile Cataracts	6	1.8(0.7 – 3.9)	
Legg-Perthes Disease	4	1.2(0.3 – 3.0)	
Luxated Patella	21	6.6(4.2 – 10.0)	7
Pulmonary Fibrosis	32	10.5(7.3 – 14.5)	2
White Shaker Syndrome	6	1.8(0.7 – 3.9)	
Bladder Cancer	13	4.0(2.2 – 6.8)	9
Chronic Active Hepatitis	3	0.9(0.2 – 2.6)	
Congestive Heart Failure	28	9.1(6.1 – 12.8)	3
Cushings	12	3.7(1.9 – 6.4)	
Hemophilia A	2	0.6(0.1 – 2.1)	
Inflammatory Bowel Disease	21	6.6(4.2 – 10.0)	7
Lymphoma	28	9.1(6.1 – 12.8)	3
Mammary Adenocarcinoma*	2	1.2(0.2 – 3.4)	
Pancreatic Enzyme Deficiency	5	1.5(0.5 – 3.5)	
Portosystemic Shunts	5	1.5(0.5 – 3.5)	
Pulmonic Stenosis	3	0.9(0.2 – 2.6)	
Renal Dysplasia	8	2.4(1.1 – 4.7)	
Sick-Sinus Syndrome	6	1.8(0.7 – 3.9)	
Average	382	3.7(3.4 – 4.1)	

\*Females only.

Table 4. Prevalence of Targeted Diseases Among Deceased Dogs, by Sex 2005.

Disease Name	Females (N = 181)			Males (N = 147)		
	#	%Yes (95% CI)	Rank	#	%Yes (95% CI)	Rank
Addison's Disease	3	1.7(0.3 – 4.8)		4	2.8(0.8 – 7.0)	
Aggression	6	3.4(1.3 – 7.3)		7	5.0(2.0 – 10.0)	7
Atopic Dermatitis	37	25.7(18.8 – 33.6)	1	43	41.3(31.8 – 51.4)	1
Copper Toxicosis	8	4.6(2.0 – 8.9)	9	5	3.5(1.2 – 8.0)	10
Craniomandibular Osteopathy	1	0.6(0.0 – 3.1)		2	1.4(0.2 – 4.9)	
Deafness	3	1.7(0.3 – 4.8)		1	0.7(0.0 – 3.8)	
Diabetes	18	11.0(6.7 – 16.9)	5	9	6.5(3.0 – 12.0)	4
Dry Eye	17	10.4(6.2 – 16.1)	6	9	6.5(3.0 – 12.0)	4
Globoid Cell Leukodystrophy	0			1	0.7(0.0 – 0.3)	
Juvenile Cataracts	3	1.7(0.3 – 4.8)		3	2.1(0.4 – 6.0)	
Legg-Perthes Disease	3	1.7(0.3 – 4.8)		1	0.7(0.0 – 0.3)	
Luxated Patella	13	7.7(4.2 – 12.9)	7	6	4.3(1.9 – 9.0)	9
Pulmonary Fibrosis	19	11.7(7.2 – 17.7)	3	13	9.7(5.3 – 16.0)	2
White Shaker Syndrome	3	1.7(0.3 – 4.8)		3	2.1(0.4 – 6.0)	
Bladder Cancer	8	4.6(2.0 – 8.9)	9	5	3.5(1.2 – 8.0)	10
Chronic Active Hepatitis	1	0.6(0.0 – 0.3)		2	1.4(0.2 – 4.9)	
Congestive Heart Failure	19	11.7(7.2 – 17.7)	3	9	6.5(3.0 – 12.0)	4
Cushings	6	3.4(1.3 – 7.3)		5	3.5(1.2 – 8.0)	10
Hemophilia A	1	0.6(0.0 – 3.1)		1	0.7(0.0 – 0.3)	
Inflammatory Bowel Disease	10	5.8(2.8 -10.5)	8	11	8.0(4.1 – 14.0)	3
Lymphoma	20	12.4(7.8 -18.5)	2	7	5.0(2.0 – 10.0)*	7
Mammary Adenocarcinoma <sup>†</sup>	2	1.1(0.1 – 4.0)				
Pancreatic Enzyme Deficiency	4	2.3(0.6 – 5.7)		1	0.7(0.0 – 0.3)	
Portosystemic Shunts	1	0.6(0.0 – 3.1)		4	2.8(0.8 – 7.0)	
Pulmonic Stenosis	2	1.1(0.1 – 4.0)		1	0.7(0.0 – 0.3)	
Renal Dysplasia	3	1.7(0.3 – 4.8)		5	3.5(1.2 – 8.0)	10
Sick-Sinus Syndrome	5	2.8(0.9 – 6.5)		1	0.7(0.0 – 0.3)	
Average	217	4.6(4.1 – 5.3)		160	4.0(3.5 – 4.7)	

\*Statistically significant difference, p < 0.05.

<sup>†</sup>Females only.

Table 5. Average Onset Ages for Targeted Diseases among Deceased Dogs, by Sex, 2005.

Disease Name	Females (N = 137)*			Males (N = 99)*		
	#	Mean(SD)	Range	#	Mean(SD)	Range
Addison's Disease	3	2.7(2.9)	1.0 – 6.0	4	4.3(5.3)	0.5 – 12.0
Aggression	6	4.6(4.5)	1.0 – 12.0	7	2.6(4.6)	0.2 – 13.0
Atopic Dermatitis	33	3.2(2.6)	0.5 – 10.5	41	3.3(2.8)	0.1 – 10.0
Copper Toxicosis	8	6.6(3.9)	0.6 – 11.0	5	8.8(4.2)	3.0 – 13.0
Craniomandibular Osteopathy	1	0.3		2	5.7(7.5)	0.3 – 11.0
Deafness	3	14.3(1.2)	13.0 – 15.0	1	14.0	
Diabetes	17	10.2(3.6)	0.0 – 14.0	9	10.0(3.9)	0.7 – 13.0
Dry Eye	13	7.7(3.6)	1.0 – 12.0	9	8.1(4.9)	0.0 – 16.0
Globoid Cell Leukodystrophy				2	6.1(8.4)	0.2 – 12.0
Juvenile Cataracts	3	1.8(1.0)	1.0 – 3.0	3	5.3(2.3)	4.0 – 8.0
Legg-Perthes Disease	3	3.5(4.8)	0.5 – 9.0	1	0.8	
Luxated Patella	13	5.2(3.5)	1.0 – 13.0	6	2.1(1.4) <sup>†</sup>	0.0 – 4.0
Pulmonary Fibrosis	18	11.5(2.7)	5.0 – 15.0	13	8.5(3.8) <sup>†</sup>	0.8 – 15.0
White Shaker Syndrome	3	5.7(5.5)	2.0 – 12.0	3	7.3(5.0)	2.0 – 12.0
Bladder Cancer	7	10.1(2.9)	5.0 – 14.0	5	6.4(4.8)	0.7 – 11.0
Chronic Active Hepatitis	1	10.0		2	11.0(1.4)	10.0 – 12.0
Congestive Heart Failure	19	11.6(3.3)	1.0 – 15.5	8	13.1(2.3)	9.0 – 15.5
Cushings	6	9.8(2.8)	6.0 – 13.0	4	11.9(0.6)	11.0 – 12.5
Hemophilia A	1	0.3		1	2.0	
Inflammatory Bowel Disease	9	5.8(5.0)	0.5 – 14.0	11	7.5(5.0)	1.0 – 15.0
Lymphoma	20	10.9(3.5)	1.8 – 16.0	7	11.1(2.5)	8.0 – 15.0
Mammary Adenocarcinoma <sup>‡</sup>	2	11.0(1.4)	10.0 – 12.0			
Pancreatic Enzyme Deficiency	4	5.2(4.7)	0.9 – 11.0	1	13.0	
Portosystemic Shunts	1	0.0		4	2.3(1.7)	0.3 – 4.0
Pulmonic Stenosis	2	12.0(0.0)	12.0 – 12.0	0		
Renal Dysplasia	3	9.3(0.6)	9.0 – 10.0	5	11.0(4.3)	3.8 – 15.0
Sick-Sinus Syndrome	5	11.2(1.6)	10.0 – 14.0	1	15.0	
Overall	205	7.8(4.7)	0.0 – 16.0	155	6.7(4.9) <sup>†</sup>	0.0 – 16.0

\*Numbers differ from table 4 due to missing onset ages.

<sup>†</sup>Statistically significant difference, p < 0.05.

<sup>‡</sup>Females only.



**Table 6. Ages of Dogs Reported Alive at Survey Administration in 2005.**

Sex	Number*	Average	SD	Min	Max
Unknown	39	5.2	4.1	0.3	14.6
Female	993	5.0	3.7	0	19.6
Male	804	4.9	3.8	0	21.2
Overall	1836	5.0	3.8	0	21.2

\*Note: numbers differ from table 1 due to missing birth dates.

Table 7. Comparison of Prevalence of Targeted Diseases among Surveyed Dogs.

Disease Name	2000 Survey (N = 2773)			2005 Survey (N = 1836)		
	#	%Yes (95% CI)	Rank	#	%Yes (95% CI)	Rank
Addison's Disease	35	1.3 (0.8 – 1.7)	8	30	1.7(1.1 – 2.4)	7
Aggression	141	5.1 (4.2 – 5.9)	2	69	3.9(3.1 – 4.9)	3
Atopic Dermatitis	430	15.5 (14.2 – 16.8)	1	346	23.2(21.1 – 25.5)	1
Copper Toxicosis	19	0.7 (0.4 – 1.0)		10	0.5(0.3 – 1.0)	
Craniomandibular Osteopathy	43	1.6 (1.1 – 2.0)	6	13	0.7(0.4 – 1.2)	
Deafness	4	0.1 (0.0 – 0.3)		8	0.4(0.2 – 0.9)	
Diabetes	36	1.3 (0.9 – 1.7)	8	14	0.8(0.4 – 1.3)	
Dry Eye	76	2.7 (2.1 – 3.3)	4	38	2.1(1.5 – 2.9)	6
Globoid Cell Leukodystrophy	4	0.1 (0.0 – 0.3)		0		
Juvenile Cataracts	16	0.6 (0.3 – 0.9)		15	0.8(0.5 – 1.4)	
Legg-Perthes Disease	46	1.7 (1.2 – 2.1)	5	41	2.3(1.6 – 3.1)	5
Luxated Patella	111	4.0 (3.3 – 4.7)	3	96	5.5(4.5 – 6.7)	2
Pulmonary Fibrosis	40	1.4 (1.0 – 1.9)	7	17	0.9(0.5 – 1.5)	
White Shaker Syndrome	36	1.3 (0.9 – 1.7)	8	28	1.5(1.0 – 2.2)	9
Bladder Cancer				1	0.1(0.0 – 0.3)	
Chronic Active Hepatitis				3	0.2(0.0 – 0.4)	
Congestive Heart Failure				11	0.6(0.3 – 1.1)	
Cushings				8	0.4(0.2 – 0.9)	
Hemophilia A				1	0.1(0.0 – 0.3)	
Inflammatory Bowel Disease				44	2.5(1.8 – 3.3)	4
Lymphoma				3	1.6(0.0 – 0.5)	8
Mammary Adenocarcinoma*				7	0.7(0.3 – 1.5)	
Pancreatic Enzyme Deficiency				13	0.5(0.3 – 1.0)	
Portosystemic Shunts				3	0.2(0.0 – 0.4)	
Pulmonic Stenosis				2	0.1(0.0 – 0.4)	
Renal Dysplasia				1	0.1(0.0 – 0.3)	
Sick-Sinus Syndrome				6	0.3(0.1 – 0.7)	
Average	1037	2.7(2.6 – 2.9)		828	1.7(1.6 – 1.8)	

\*Females only.

Table 8. Comparison of Average Onset Ages for Targeted Diseases Among Surveyed Dogs.

Disease Name	2000 Survey (N = 2773)			2005 Survey (N = 1836)		
	#	Mean(SD)	Range	#	Mean(SD)	Range
Addison's Disease	35	3.6(3.6)	0 – 13.3	25	5.3(3.9)	1.0 – 15.0
Aggression	141	1.6(1.8)	0 – 13.0	62	1.5(1.9)	0.0 – 10.0
Atopic Dermatitis	430	2.5(2.6)	0 – 15.0	312	2.3(2.4)	0.0 – 13.0
Copper Toxicosis	19	6.3(3.8)	0 – 12.0	8	3.1(1.8)*	1.5 – 6.0
Craniomandibular Osteopathy	43	1.2(2.7)	0 – 12.0	13	1.2(3.0)	0.2 – 11.0
Deafness	4	0.5(1.0)	0 – 2.0	2	0.1(0.8)	0.0 – 0.3
Diabetes	36	8.2(3.7)	0 – 15.5	13	9.2(2.1)	7.0 – 13.0
Dry Eye	76	4.7(3.6)	0 – 14.0	33	5.9(3.7)	0.0 – 14.0
Globoid Cell Leukodystrophy	4	3.6(6.3)	0 – 13.0	0		
Juvenile Cataracts	16	2.3(1.7)	0 – 5.0	13	4.5(3.3)*	1.0 – 12.0
Legg-Perthes Disease	46	1.7(2.5)	0 – 12.0	40	1.4(2.0)	0.2 – 8.0
Luxated Patella	111	2.8(2.8)	0 – 12.0	89	2.7(2.7)	0.0 – 12.0
Pulmonary Fibrosis	40	8.0(4.7)	0 – 14.0	16	10.2(3.7)	1.3 – 14.0
White Shaker Syndrome	36	2.6(3.2)	0 – 14.0	24	3.6(4.1)	0.3 – 16.0
Bladder Cancer				1	14.0	
Chronic Active Hepatitis				3	6.2(5.7)	0.5 – 12.0
Congestive Heart Failure				8	8.4(6.6)	0.2 – 16.0
Cushings				6	8.4(5.3)	1.5 – 13.0
Hemophilia A				1	6.0	
Inflammatory Bowel Disease				39	2.9(3.1)	0.3 – 15.0
Lymphoma				3	10.3(3.8)	6.0 – 13.0
Mammary Adenocarcinoma†				7	7.9(2.8)	5.0 – 13.0
Pancreatic Enzyme Deficiency				13	4.0(5.0)	0.5 – 16.0
Portosystemic Shunts				2	3.3(3.9)	0.5 – 6.0
Pulmonic Stenosis				2	0.4(0.5)	0.0 – 0.8
Renal Dysplasia				1	3.0	
Sick-Sinus Syndrome				6	7.5(4.7)	1.0 – 11.0
Average	1037	3.0(3.3)	0 – 15.5	748	3.3(3.5)	0.0 – 16.0

\*Statistically significant difference, p < 0.05

†Females only.

Table 9. Prevalence of Targeted Disease Among Surveyed Dogs, by Sex, in 2005.

Disease Name	Females (N = 993)			Males (N = 804)		
	#	%Yes (95% CI)	Rank	#	%Yes (95% CI)	Rank
Addison's Disease	20	2.1(1.3 – 3.2)	7	8	1.0(0.4 – 2.0)	
Aggression	33	3.4(2.4 – 5.0)	3	34	4.4(3.1 – 6.1)	3
Atopic Dermatitis	163	19.6(17.0 – 22.5)	1	173	27.4(24.0 – 31.1)*	1
Copper Toxicosis	5	0.5(0.2 – 1.2)		4	0.5(0.1 – 1.3)	
Craniomandibular Osteopathy	8	0.8(0.4 – 1.6)		5	0.6(0.2 – 1.5)	
Deafness	6	0.6(0.2 – 1.3)		1	0.1(0.0 – 0.7)	
Diabetes	7	0.7(0.3 – 1.5)		7	0.9(0.4 – 1.8)	
Dry Eye	28	2.9(1.9 – 4.2)	4	10	1.3(0.6 – 2.3)*	6
Globoid Cell Leukodystrophy	0			0		
Juvenile Cataracts	7	0.7(0.3 – 1.5)		7	0.9(0.4 – 1.8)	
Legg-Perthes Disease	25	2.6(1.7 – 3.8)	6	13	1.6(0.9 – 2.8)	5
Luxated Patella	57	6.1(4.6 – 7.8)	2	39	5.1(3.6 – 6.9)	2
Pulmonary Fibrosis	10	1.0(0.5 – 1.9)	9	5	0.6(0.2 – 1.5)	
White Shaker Syndrome	19	2.0(1.2 – 3.0)	8	8	1.0(0.4 – 2.0)	
Bladder Cancer	0			0		
Chronic Active Hepatitis	1	0.1(0.0 – 0.6)		2	0.2(0.0 – 0.9)	
Congestive Heart Failure	3	0.3(0.0 – 0.9)		6	0.8(0.3 -1.6)	
Cushings	4	0.4(0.1 – 1.0)		4	0.5(0.1 – 1.3)	
Hemophilia A	1	0.1(0.0 – 0.6)		0		
Inflammatory Bowel Disease	23	2.4(1.5 – 3.5)	5	21	2.7(1.7 – 4.1)	4
Lymphoma	3	0.3(0.0 – 0.9)		0		
Mammary Adenocarcinoma	6	0.6(0.2 – 1.3)				
Pancreatic Enzyme Deficiency	6	0.6(0.2 – 1.3)		7	0.9(0.4 – 1.8)	
Portosystemic Shunts	0			3	0.4(0.1 – 1.1)	
Pulmonic Stenosis	2	0.2(0.0 – 0.7)		0		
Renal Dysplasia	1	0.1(0.0 – 0.6)		0		
Sick-Sinus Syndrome	2	0.2(0.0 – 0.7)		3	0.4(0.1 – 1.1)	
Average	440	1.8(1.6 – 2.0)		360	2.2(2.0 – 2.4)	

\*Statistically significant difference, p < 0.05

Table 10. Comparison of Prevalence of Targeted Disease Among Surveyed Females.

Disease Name	2000 Survey (N =1627)			2005 Survey (N = 993)		
	#	%Yes (95% CI)	Rank	#	%Yes (95% CI)	Rank
Addison's Disease	26	1.6 (1.0 – 2.2)	8	20	2.1(1.3 – 3.2)	7
Aggression	60	3.7 (2.8 – 4.6)	3	33	3.4(2.4 – 5.0)	3
Atopic Dermatitis	216	13.3(11.6 – 14.9)	1	163	19.6(17.0 – 22.5)*	1
Copper Toxicosis	13	0.8 (0.4 – 1.2)		5	0.5(0.2 – 1.2)	
Craniomandibular Osteopathy	23	1.4 (0.8 – 2.0)	9	8	0.8(0.4 – 1.6)	
Deafness	1	0.1 (0.0 – 0.2)		6	0.6(0.2 – 1.3)*	
Diabetes	27	1.7 (1.0 – 2.3)	6	7	0.7(0.3 – 1.5)*	
Dry Eye	51	3.1 (2.3 – 4.0)	4	28	2.9(1.9 – 4.2)	4
Globoid Cell Leukodystrophy	2	0.1 (0.0 – 0.3)		0		
Juvenile Cataracts	11	0.7 (0.3 – 1.1)		7	0.7(0.3 – 1.5)	
Legg-Perthes Disese	32	2.0 (1.3 – 2.6)	5	25	2.6(1.7 – 3.8)	5
Luxated Patella	63	3.9 (2.9 – 4.8)	2	57	6.1(4.6 – 7.8)*	2
Pulmonary Fibrosis	27	1.7 (1.0 – 2.3)	6	10	1.0(0.5 – 1.9)	
White Shaker Syndrome	21	1.3(0.7 – 1.8)	10	19	2.0(1.2 – 3.0)	8
Bladder Cancer				0		
Chronic Active Hepatitis				1	0.1(0.0 – 0.6)	
Congestive Heart Failure				3	0.3(0.0 – 0.9)	
Cushings				4	0.4(0.1 – 1.0)	
Hemophilia A				1	0.1(0.0 – 0.6)	
Inflammatory Bowel Disease				23	2.4(1.5 – 3.5)	6
Lymphoma				3	0.3(0.0 – 0.9)	
Mammary Adenocarcinoma				6	0.6(0.2 – 1.3)	
Pancreatic Enzyme Deficiency				6	0.6(0.2 – 1.3)	
Portosystemic Shunts				0		
Pulmonic Stenosis				2	0.2(0.0 – 0.7)	
Renal Dysplasia				1	0.1(0.0 – 0.6)	
Sick-Sinus Syndrome				2	0.2(0.0 – 0.7)	
Average	573	2.5(2.3 – 2.8)		440	1.8(1.6 – 2.0)*	

\*Statistically significant difference, p < 0.05

Table 11. Prevalence of Targeted Disease Among Surveyed Males.

Disease Name	2000 Survey (N = 1146)			2005 Survey (N = 804)		
	#	%Yes (95% CI)	Rank	#	%Yes (95% CI)	Rank
Addison's Disease	9	0.8 (0.3 – 1.3)		8	1.0(0.4 – 2.0)	7
Aggression	81	7.1 (5.6 – 8.6)	2	34	4.4(3.1 – 6.1)*	3
Atopic Dermatitis	214	18.7 (16.4 – 20.9)	1	173	27.4(24.0 – 31.1)	1
Copper Toxicosis	6	0.5 (0.1 – 0.9)		4	0.5(0.1 – 1.3)	
Craniomandibular Osteopathy	20	1.7 (1.0 – 2.5)	5	5	0.6(0.2 – 1.5)*	
Deafness	3	0.3 (0.0 – 0.6)		1	0.1(0.0 – 0.7)	
Diabetes	9	0.8 (0.3 – 1.3)		7	0.9(0.4 – 1.8)	
Dry Eye	25	2.2 (1.3 – 3.0)	4	10	1.3(0.6 – 2.3)	6
Globoid Cell Leukodystrophy	2	0.2 (0.0 – 0.4)		0		
Juvenile Cataracts	5	0.4 (0.0 – 0.8)		7	0.9(0.4 – 1.8)	
Legg-Perthes Disease	14	1.2 (0.6 – 1.9)	7	13	1.6(0.9 – 2.8)	5
Luxated Patella	48	4.2 (3.0 – 5.4)	3	39	5.1(3.6 – 6.9)	2
Pulmonary Fibrosis	13	1.1 (0.5 – 1.7)	8	5	0.6(0.2 – 1.5)	
White Shaker Syndrome	15	1.3 (0.6 – 2.0)	6	8	1.0(0.4 – 2.0)	7
Bladder Cancer				0		
Chronic Active Hepatitis				2	0.2(0.0 – 0.9)	
Congestive Heart Failure				6	0.8(0.3 -1.6)	
Cushings				4	0.5(0.1 – 1.3)	
Hemophilia A				0		
Inflammatory Bowel Disease				21	2.7(1.7 – 4.1)	4
Lymphoma				0		
Pancreatic Enzyme Deficiency				7	0.9(0.4 – 1.8)	
Portosystemic Shunts				3	0.4(0.1 – 1.1)	
Pulmonic Stenosis				0		
Renal Dysplasia				0		
Sick-Sinus Syndrome				3	0.4(0.1 – 1.1)	
Average	464	2.9(2.6 – 3.2)		360	2.2(2.0 – 2.4)	

\*Statistically significant difference, p < 0.05

Table 12. Average Onset Ages for Targeted Diseases Among Surveyed Dogs, by Sex, 2005.

Disease Name	Females (N = 993)			Males (N = 804)		
	#	Mean(SD)	Range	#	Mean(SD)	Range
Addison's Disease	16	5.7(4.2)	1.2 – 15.0	7	3.0(1.3)	1.0 – 5.0
Aggression	30	1.6(2.0)	0.0 – 10.0	30	1.2(1.2)	0.0 – 5.0
Atopic Dermatitis	149	2.2(2.3)	0.0 – 12.0	153	2.2(2.1)	0.0 – 10.0
Copper Toxicosis	5	2.8(1.9)	1.5 – 6.0	2	4.0(2.8)	2.0 – 6.0
Craniomandibular Osteopathy	8	1.7(3.8)	0.3 – 11.0	5	0.5(0.3)	0.2 – 1.0
Deafness	6	6.8(5.8)	0.0 – 12.0	1	0.3	
Diabetes	7	9.6(2.2)	7.0 – 13.0	6	8.8(2.1)	7.0 – 12.0
Dry Eye	25	6.1(3.9)	0.8 – 14.0	8	5.1(3.2)	0.0 – 9.0
Globoid Cell Leukodystrophy	0			0		
Juvenile Cataracts	6	4.7(3.2)	3.0 – 11.0	6	3.0(1.5)	1.0 – 5.0
Legg-Perthes Disease	25	1.0(1.4)	0.2 – 7.0	12	2.7(2.9)*	0.7 – 8.0
Luxated Patella	53	2.5(2.4)	0.0 – 12.0	36	3.1(3.0)	0.0 – 12.0
Pulmonary Fibrosis	9	10.7(3.9)	1.3 – 14.0	5	9.3(2.9)	5.5 – 12.0
White Shaker Syndrome	16	3.0(2.9)	0.3 – 13.0	7	3.9(5.4)	1.0 – 16.0
Bladder Cancer	0	14.0		0		
Chronic Active Hepatitis	1	12.0	12.0	2	3.3(3.9)	0.5 – 6.0
Congestive Heart Failure	2	1.4(0.9)	0.8 – 2.0	5	10.8(6.5)	0.2 – 16.0
Cushings	4	9.0(4.8)	2.0 – 13.0	2	7.3(8.1)	1.5 – 13.0
Hemophilia A	1	6.0		0		
Inflammatory Bowel Disease	21	3.6(3.7)	1.0 – 15.0	18	2.1(2.1)	0.3 – 8.0
Lymphoma	3	10.3(3.8)	6.0 – 13.0	0		
Mammary Adenocarcinoma	6	7.5(2.9)	5.0 – 13.0			
Pancreatic Enzyme Deficiency	6	1.2(0.9)	0.5 – 3.0	7	6.3(6.0)	0.6 – 16.0
Portosystemic Shunts	0			2	3.3(3.9)	0.5 – 6.0
Pulmonic Stenosis	2	0.4(0.5)	0.0 – 0.8	0		
Renal Dysplasia	1	3.0		0		
Sick-Sinus Syndrome	2	5.5(6.4)	1.0 – 10.0	3	7.7(4.9)	2.0 – 11.0
Overall	404	3.3(3.5)	0.0 – 15.0	319	2.9(3.2)	0.0 – 16.0

\*Statistically significant difference, p < 0.05

Table 13. Comparison of Average Onset Ages for Targeted Diseases Among Surveyed Females.

Disease Name	2000 Survey (N = 1627)			2005 Survey (N = 993)		
	#	Mean(SD)	Range	#	Mean(SD)	Range
Addison's Disease	26	3.8(3.7)	0 – 13.3	16	5.7(4.2)	1.2 – 15.0
Aggression	60	1.5(2.3)	0 – 13.0	30	1.6(2.0)	0.0 – 10.0
Atopic Dermatitis	216	2.8(2.8)	0 – 15.0	149	2.2(2.3)*	0.0 – 12.0
Copper Toxicosis	13	6.2(3.9)	0 – 12.0	5	2.8(1.9)	1.5 – 6.0
Craniomandibular Osteopathy	23	1.5(3.3)	0.1 – 12.0	8	1.7(3.8)	0.3 – 11.0
Deafness	1	0.0( )	0 – 0	6	6.8(5.8)	0.0 – 12.0
Diabetes	27	9.0(3.3)	0 – 15.5	7	9.6(2.2)	7.0 – 13.0
Dry Eye	51	6.8(3.7)	0 – 14.0	25	6.1(3.9)	0.8 – 14.0
Globoid Cell Leukodystrophy	2	6.8(8.7)	0.7 – 13.0	0		
Juvenile Cataracts	11	2.4(1.4)	0 – 4.0	6	4.7(3.2)*	3.0 – 11.0
Legg-Perthes Disease	32	2.0(2.8)	0.3 – 12.0	25	1.0(1.4)	0.2 – 7.0
Luxated Patella	63	2.7(2.7)	0 – 9.0	53	2.5(2.4)	0.0 – 12.0
Pulmonary Fibrosis	27	8.3(4.4)	0 – 14.0	9	10.7(3.9)	1.3 – 14.0
White Shaker Syndrome	21	2.8(3.2)	0 – 12.0	16	3.0(2.9)	0.3 – 13.0
Bladder Cancer				0	14.0	
Chronic Active Hepatitis				1	12.0	12.0
Congestive Heart Failure				2	1.4(0.9)	0.8 – 2.0
Cushings				4	9.0(4.8)	2.0 – 13.0
Hemophilia A				1	6.0	
Inflammatory Bowel Disease				21	3.6(3.7)	1.0 – 15.0
Lymphoma				3	10.3(3.8)	6.0 – 13.0
Mammary Adenocarcinoma				6	7.5(2.9)	5.0 – 13.0
Pancreatic Enzyme Deficiency				6	1.2(0.9)	0.5 – 3.0
Portosystemic Shunts				0		
Pulmonic Stenosis				2	0.4(0.5)	0.0 – 0.8
Renal Dysplasia				1	3.0	
Sick-Sinus Syndrome				2	5.5(6.4)	1.0 – 10.0
Overall	573	3.4(3.6)	0 – 15.5	404	3.3(3.5)	0.0 – 15.0

\*Statistically significant difference, p < 0.05



Table 14. Average Onset Ages for Targeted Diseases Among Surveyed Males.

Disease Name	2000 Survey (N = 1146)			2005 Survey (N = 804)		
	#	Mean(SD)	Range	#	Mean(SD)	Range
Addison's Disease	9	2.9(3.4)	0 – 9.0	7	3.0(1.3)	1.0 – 5.0
Aggression	81	1.7(1.4)	0 – 7.0	30	1.2(1.2)	0.0 – 5.0
Atopic Dermatitis	214	2.2(2.4)	0 – 11.0	153	2.2(2.1)	0.0 – 10.0
Copper Toxicosis	6	6.6(4.1)	1.5 – 12.0	2	4.0(2.8)	2.0 – 6.0
Craniomandibular Osteopathy	20	0.7(2.0)	0 – 9.0	5	0.5(0.3)	0.2 – 1.0
Deafness	2	0.0( 0.0 )		1	0.3	
Diabetes	9	6.1(4.2)	0 – 12.0	6	8.8(2.1)	7.0 – 12.0
Dry Eye	25	5.0(3.4)	0 – 11.0	8	5.1(3.2)	0.0 – 9.0
Globoid Cell Leukodystrophy	2	0.4(0.2)	0.2 – 0.5	0		
Juvenile Cataracts	5	1.8(2.1)	0 – 4.0	6	3.0(1.5)	1.0 – 5.0
Legg-Perthes Disease	14	1.0(2.3)	0 – 5.0	12	2.7(2.9)	0.7 – 8.0
Luxated Patella	48	3.0(3.0)	0 – 12.0	36	3.1(3.0)	0.0 – 12.0
Pulmonary Fibrosis	13	7.3(5.2)	0 – 13.0	5	9.3(2.9)	5.5 – 12.0
White Shaker Syndrome	15	2.3(3.3)	0 – 14.0	7	3.9(5.4)	1.0 – 16.0
Bladder Cancer				0		
Chronic Active Hepatitis				2	3.3(3.9)	0.5 – 6.0
Congestive Heart Failure				5	10.8(6.5)	0.2 – 16.0
Cushings				2	7.3(8.1)	1.5 – 13.0
Hemophilia A				0		
Inflammatory Bowel Disease				18	2.1(2.1)	0.3 – 8.0
Lymphoma				0		
Mammary Adenocarcinoma						
Pancreatic Enzyme Deficiency				7	6.3(6.0)	0.6 – 16.0
Portosystemic Shunts				2	3.3(3.9)	0.5 – 6.0
Pulmonic Stenosis				0		
Renal Dysplasia				0		
Sick-Sinus Syndrome				3	7.7(4.9)	2.0 – 11.0
Overall	464	2.5(2.9)	0 – 14.0	319	2.9(3.2)	0.0 – 16.0

Table 15. Litters Bred Since January 1999.

	Number	Percent
None	859	83.9
1 – 4	124	12.1
5 – 10	28	2.7
10+	11	1.1