Havanese Final Health Survey 2012

December 2012

By Elsa J. Sell, MD and W. Jean Dodds, DVM

Table of Contents

Introduction

Planning for the 2012 Havanese Health Survey began in September 2010. A first step was to complete an anonymous preliminary survey of Havanese owners and breeders about their opinions on what health problems were of most importance and should be the subject of future research. See Appendix I for a list from the Preliminary Survey of the top 10 problems for either breeders or owners that were considered as most important and/or as a focus for future research.

After completion of the Preliminary Survey, the Board, the Health Committee, and the Authors exchanged ideas about content and design for this Final Survey. While the Authors asked that they be allowed to contact an owner directly for clarification or to gather additional information in support of moving forward with research efforts and requesting pedigrees, final decision ultimately was that the survey remain totally anonymous.

The survey began in May and ended on November 1, 2012. Owners completed a survey for each of the included 1,721 dogs. It is not known how many owners entered more than one dog.

Data Management

SurveyMonkey was used to design the survey and to collect the data. To assure total anonymity no IP addresses were collected,

The database was downloaded periodically for local computer backup. The download format was CSV files. These were converted to Excel spreadsheet format and then imported into MS Access for analysis. Numbers were compared with the analysis available on SurveyMonkey; on the rare occasion of differences, the downloaded data were used.

Participants didn't answer all questions and that is indicated in the tables. Some answers had been placed into the wrong field by participants; for example, exact dates of birth were put into the field for incomplete dates. Those data were transferred to the correct field prior to starting the data analysis.

It should be noted that in the survey development, when listing ages for onset of health problem, we inadvertently omitted the age group 4-5 yrs. It is impossible to know whether participants selected the 3-4 yr age group or the 5-6 yr age group if a dog was between 4 and 5 years. Thus, when presenting information about ages of onset, it is by using the exact age groups as in the survey. It is unlikely that there would be differences between those age ranges that would significantly impact the outcome or drive research in one direction or another.

Owner Demographics

Breeder

Breeder – 641 (37.3%)
Owner – 1,079 (67.7%)
No answer – 1

HCA Member

Member of HCA – 535 (31.1%)
Not member of HCA – 1,185 (68.9%)
There are 346 HCA members in 2012, which does not reconcile with the listed number of member participants here; except if some were past but not current HCA members.

Dog Demographics

Age

Date of Birth was given for 1,455 (84.6%); 11/23/12 was used as the reference point for age calculation.
< 1 yr – 79 (5.4%)
1-4 yr – 601 (41.3)
5-9 yr – 553 (38.0%)
9 yr and > - 222 (15.3%)

Sex

Male – 674 (43.6%)
Female – 873 (56.4%)
No answer – 174

Purebred Havanese

Yes – 1,534 (99.2%)
No – 13 ((0.8%)
No answer – 174

Age Spay/Neuter

n=1,020 (59.3%). The dogs with 0 entered for age were excluded.
< 1 yr – 384 (37.7%)
1-2 yr – 231 (22.7%)
2-3 yr – 126 (12.4%)
3-4 yr – 101 (10.0%)
> 4 yr – 286 (28.0%)

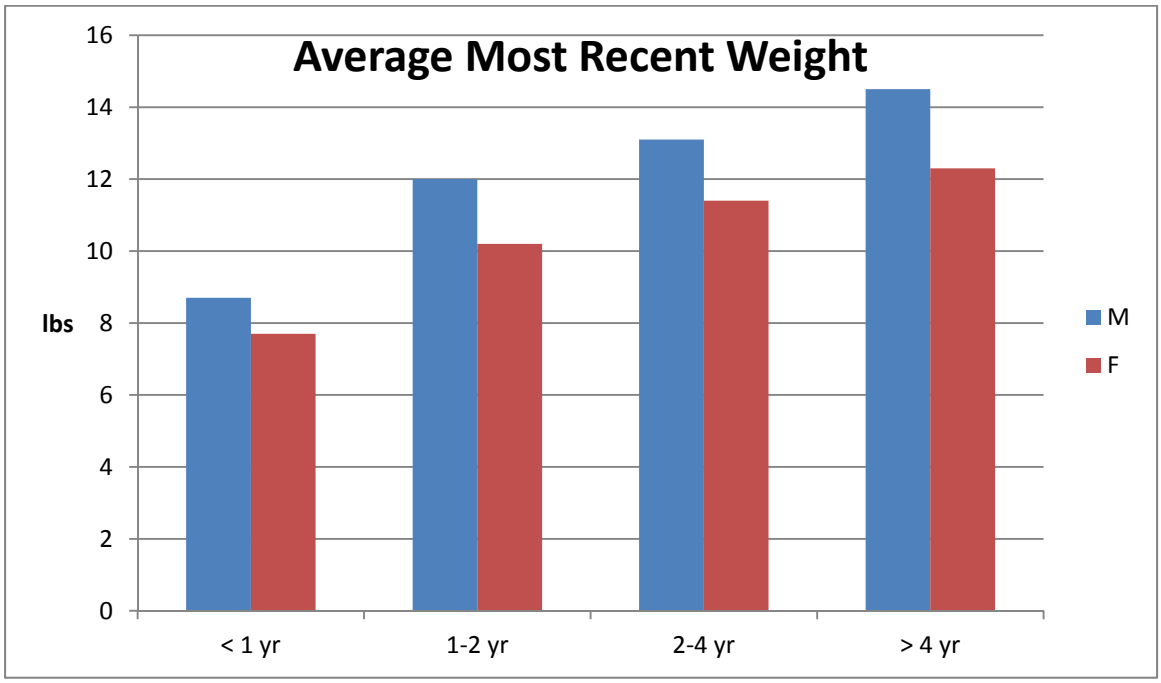
Weight of Dog

The question asked for the most recent weight of the dog at a vet visit. Because there are inherent inaccuracies with this approach, if weight of dogs is of importance, a formal study with a well-defined protocol for taking measurements

should be developed. For this question 1,490 (86.6%) gave an answer. Because age and sex influence weight, data are sorted that way.

Age and Sex	n	Weight – Ave (range)
< 1 yr, male	28	8.7 (4.5 – 18)
< 1 yr, female	50	7.7 (2 – 12.6)
1-2 yr, male	88	12 (6-22)
1-2 yr, female	67	10.2 (5-15)
2-4 yr, male	141	13.1 (7-23)
2-4 yr, female	161	11.4 (6.3-19)
>4 yr, male	367	14.5 (5.5-28)
>4 yr, female	522	12.3 (3.5-25)

The following graph shows the above data.



Preventive Practices

Vaccinations.

The question asked about vaccination procedures after puppy vaccines.

Titers As a Measure of Protection

Yes	577 (38.9%)
No	906 (61.1%)
No answer	238

Vaccination Frequency

For those not using titers, others were vaccinated with a variable schedule. 521 did not answer this question.

Vaccine	Frequency (%)				
	Yearly	Every 2 yrs	Every 3 yrs	Never	Other
Distemper, parvo (n=1040)	37.7	11.4	30.8	10.6	9.5
Corona virus (n=880)	19.0	6.5	8.0	56.7	9.9
Lyme's disease (n=908)	19.6	3.7	3.2	65.5	8.8
Lepto (n=896)	18.9	4.4	3.2	64.7	8.8
Hepatitis (n=876)	14.8	6.1	17.7	49.0	12.4
Rabies (n=1179)	14.2	8.4	67.7	4.4	5.3

Heartworm Preventive Use

Yes n=1,124 (75.8%)
No n=359 (24.2%)
No answer n= 238

Flea Preventive Use

Yes n=1,060 (71.5%)
No n=423 (28.5%)
No answer n=238

Health Problems

Frequency of Health Problems

Footnote references are given in ( ) after the problem. This includes information given in the "other" problem field.

Problem	#	%
Itchy skin (1, 2)	156	9.1
Decayed teeth, pulled	127	7.4
Bad breath	126	7.3
Patella abnormalities (3)	126	7.3
Separation anxiety	124	7.4
Shyness	92	5.4
Heart murmur (1)	93	5.4
Food intolerance	80	4.7
Fearful	76	4.4
Missing incisors	76	4.4
Vaccine reaction	73	4.2
Chronic ear infections	69	4.0
Dominance toward dogs	66	3.8
Leg bowing	65	3.8
Elevated liver enzymes	64	3.7

Problem	#	%
Cherry eye (4)	63	3.7
Difficulty socializing	58	3.4
Bad gums	56	3.3
Cataracts	51	3.0
Atopy (2)	42	2.4
Bladder stones	41	2.4
Aggressiveness	36	2.1
Hypothyroidism	33	1.9
Cancer	31	1.8
Mitral valve insufficiency	27	1.6
Pancreatitis	26	1.5
Seizures	22	1.3
Elbow dysplasia	21	1.2
Cryptorchidism	20	1.2
Allergies (5)	20	1.2
Hip dysplasia (6)	19	1.1
Deafness (7)	19	1.1
Congestive heart failure (1)	19	1.1
Dominance toward people	18	1.1
Dental, other (8)	18	1.1
Inflammatory bowel disease	17	1.0
Chondrodysplasia	17	1.0
Liver shunt (9)	16	0.9
Anal gland issues (10)	15	0.9
Sebaceous adenitis	13	0.8
Hemorrhagic gastroenteritis	13	0.8
Cushing's disease	12	0.7
ACL surgery	12	0.7
Legg-Calve-Perthes	11	0.6
Urine/bladder (11)	10	0.6
Lymphoma	7	0.4
Pulmonic stenosis	4	0.2

There were 3 cases of AIHA.

There were 2 cases each of testicular cancer, spinal cord cancer, and hemagiosarcoma; dilated cardiomyopathy, diabetes, IMTP, symmetrical lupoid onychodystrophy (SLO) and blue color.

There was 1 case each of these cancers: liver, spleen, leukemia, skin, lung, adrenal, mast cell, pituitary, prostate, and GI lymphoma; and 1 case each of myasthenia gravis, nose depigmentation, pemphigus, Addison's disease, and unspecified type of thrombodytopenia.

There were no cases of these cancers - stomach, nasal, kidney, bone, or other abdominal, and no myocarditis, renal dysplasia or patent ductus arteriosus. Some other miscellaneous single problems are not listed to conserve space.

1 Itchy skin, heart murmur and congestive heart failure are clinical signs and non-diagnostic of the underlying structural or physiological abnormality
2 There were 42 cases of atopy and 156 cases of itchy skin – 25 of the dogs were reported in both categories. The number of cases and % frequency were not adjusted for those 25 duplicates in either problem category.
3 OFA data: Patellar luxation is abnormal in 2.8% of Havanese (n=3492) and in 2.3% (n=203) of Havana Silk.
4 CERF: The average frequency of cherry eye for females is 0.6% and for males is 0.4%; the average frequency of heritable cataracts for females is 3.2% and for males is 2.8%. (See Appendix II for data). In this survey, cherry eye was slightly more frequent in females (n=38) than males (n=25), a finding similar to CERF.
5 Allergies. This information was gleaned from the "other" disease text field. These issues ranged from flea bite allergy, to asthma, to identified food or environmental allergens, to "seasonal", to general. Additionally, there were cases of runny eyes and tearing not included in the number.
6 OFA data: 10.0% hip dysplasia in Havanese (n=2276) and 13.7% dysplasia in Havana Silk (n=183).
7 Deafness. Two had normal BAERs as puppies yet were deaf by 3-6 yr; one deaf dog had unillateral deafness.
8 Dental, other included 10 with retained puppy teeth requiring surgery, lost teeth, 6 underbite, fused central incisors, 1 produced underbite in puppies.
9 In addition to the liver shunt cases, there were 7 with a diagnosis of microvascular dysplasia (all 7 also had elevated liver enzymes) and 1 case of portosystemic liver shunt.
10 Anal gland issues included impacted glands, abscess, rupture, and surgical removal.
11 Urine/bladder problems included oxalate crystals (3), struvite cyrstals (1), unidentified crystals (2), chronic urinary tract infections (3).

Age at Diagnosis and Who Made Diagnosis

	Age Diagnosis				Who Made Diagnosis		
Problem	**< 1 yr (%)**	**1-4 yr (%)**	**5-9 yr (%)**	**9 yr & > (%)**	**General Vet (%)**	**Specialist Vet (%)**	**Owner (%)**
Orthopedic							
Patella abnormalities 123 (7.2%)[1]	38 (30.9)	67 (44.5)	15 (12.2)	3 (2.4)	83.3	15.0	1.7
Chondrodysplasia 16 (0.9%)	9 (56.3)	7 (43.8)	-	-	33.3	13.3	53.8
Leg bowing 65 (3.8%)	31 (47.7)	38 (43.1)	4 (6.2)	2 (3.1)	36.7	11.7	51.7
Elbow dysplasia 21 (1.2%)	5 (23.8)	13 (61.8)	4 (20)	1 (5)	47.4	36.8	15.8
Hip dysplasia (1.2%)	1 (5)	15 (75)	3 (15)	1 (5)	22.2	45.5	18.2
Legg-Calve-Perthes 11 (0.6%)	9 (81.8)	1 (9.1)	1 (9.1)	-	76.5	23.5	-
Cardiac							
Dilated cardiomyopathy 2 (0.1%)	-	-	0	2 (100)	50	50	-
Mitral valve insufficiency 27 (1.6%)	1 (3.7)	4 (14.8)	10 (42)	12 (44)	10	61.5	-
Myocarditis	-	-	-	-	-	-	-
Pulmonic stenosis 4 (0.2%)	-	1 (25)	-	3 (75)	75	25	-
Patent ductus arteriosus	-	-	-	-	-	-	-
Congestive heart failure 21 (1.2%)	-	-	4 (19)	17 (81)	63.2	23.5	-
Heart murmur 91 (5.3%)	9 (9.9)	22 (24.2)	31 (34)	27 (29.7)	76.5	23.5	-
Gastrointestinal							
Pancreatitis 26 (1.5%)	2 (7.7)	11 (42.3)	9 (34.6)	4 (15.4)	84	16	-
Hemorrhagic gastroenteritis 13 (0.8%)	-	11 (84.7)	2 (15.3)	-	83.3	8.3	8.3
Inflammatory bowel disease 16 (0.9%)	2 (12.5)	8 (50)	2 (12.5)	4 (25)	42.9	50	7.1
Liver shunt 16 (0.9%)	8 (50)	7 (43.7)	-	1 (6.3)	37.5	62.5	-
Elevated liver enzymes 64 (3.7%)	14 (21.9)	25 (39)	19 (29.7)	6 (9.4)	71	27.4	1.6

Allergy Problems							
Chronic ear infections 68 (4.0%)	20 (29.4)	38 (55.9)	7 (10.3)	1 (1.5)	93.8	3.1	3.1
Food intolerance 78 (4.5%)	27 (34.6)	43 (55.1)	8 (10.3)	-	38.4	11	50.7
Atopy 42 (2.4%)	10 (23.8)	27 (64.3)	4 (9.5)	1 (2.4)	63.9	25	11.1
Itchy skin 156 (9.1%)	38 (24.4)	97 (62.2)	3 (4.2)	-	57.1	6.4	36.4
Vaccine reaction 71 (4.1%)	37 (51.2)	31 (43.7)	3 (4.2)	-	72.9	2.9	24.3
Behavioral Problems							
Separation anxiety 124 (7.4%)	76 (1.3)	42 (33.9)	3 (2.4)	-	13.4	0.9	85.7
Shyness 92 (5.3%)	54 (58.7)	35 (38)	-	-	2.5	0	97.5
Difficulty socializing 57 ((3.3%)	30 (52.6)	26 (45.6)	-	-	4	-	96
Aggressiveness 36 (2.1%)	11 (30.6)	21 (58.3)	4 (11.1)	-	12.5	-	87.5
Fearful 66 (3.8%)	49 (64.5)	25 (33.9)	1 (1.3)	-	6.1	-	93.9
Dominance toward dogs 57 (3.3%)	21 (31.8)	38 (57.6)	7 (10.6)	-	1.8	-	98.2
Dominance toward people 18 (1.1%)	9 (50)	9 (50)	-	-	5.6	-	94.4
Dental Problems							
Missing incisors 75 (4.4%)	47 (62.7)	17 (22.7)	6 (8)	4 (5.3)	41.4	4.3	54.3
Bad breath 124 (7.2%)	11 (8.9)	64 (54)	15 (12.1)	5 (4)	28.8	1.8	59.4
Bad gums 53 (3.1%)	3 (5.7)	18 (34)	26 (49.1)	6 (11.3)	72.2	9.3	18.5
Decayed teeth, pulled 125 (7.3%)	3 (2.4)	23 (18.4)	57 (45.6)	41 (33.1)	83.1	11.9	5.1
Cancer							
Abdominal	-	-	-	-	-	-	-
Bone	-	-	-	-	-	-	-
Hemangiosarcoma 2 (0.1%)	-	-	1 (50)	1 (50)	50	50	-
Kidney	-	-	-	-	-	-	-
Liver 1 (0.1%)	-	-	-	1 (100)	100	-	-
Mammary 2 (0.1%)	-	1 (50)	1 (50)	-	50	50	-
Nasal	-	-	-	-	-	-	-

Other 13 (0.8%)	2 (15.4)	-	4 (30.7)	7 (53.9)		46.2	53.8	-
Spinal cord 2 (0.1%)	-	1 (50)	-	1 (50		-	100	-
Spleen 1 (0.1%)	-	-	-	1 (100)		100	-	-
Stomach	-	-	-	-		-	-	-
Testicular 2 (0.1%)	-	1 (50)	-	1 (50)		50	50	-
Lymphoma 7 (0.4%)	-	-	5 (71.4)	2 (28.6)		14.3	85.7	-
Leukemia 1 (0.1%)	-	-	-	1 (100)		100	-	-
Miscellaneous Problems								
Bladder stones 40 (2.3%)	3 (7.5)	17 (42.5)	15 (37.5)	5 (12.5)		85	15	-
Cherry eye 63 (3.7%)	28 (44.4)	27 (42.9)	5 (7.9)	3 (4.8)		55.2	37.0	6.9
Diabetes 2 (0.1%)	-	-	1 (50)	1 (50)		100	-	-
Hypothyroidism 29 (1.7%)	-	11 (37.9)	12 (41.4)	9 (31)		87.5	12.5	-
Cushing's disease 12 (0.7%)	-	3 (25)	-	9 (75)		83.3	8.3	8.3
Cryptorchidism 20 (1.2%)	20 (100)	-	-	-		89.5	0	10.5
Sebaceous adenitis 13 (0.8%)	-	8 (61.5)	4 (30.8)	1 (7.7)		25	75	-
Deafness 18 (1.1%)	1 (5.6)	6 (33.3)	2 (11.1)	9 (50)		6.7	40	53.3
Seizures 22 (1.3%)	2 (9.1)	11 (50)	7 (31.8)	2 (9.1)		75	5	20
Renal dysplasia	-	-	-	-		-	-	-
Cataracts 50 (2.9%)	1 (2)	14 (28)	15 (30)	19 (38)		43.2	52.3	4.5

Surprisingly, the diagnosis of chondrodysplasia was made by 8 owners, 5 general veterinarians, 2 specialist veterinarians, and 2 didn't specify who made the diagnosis. While the condition is clinically obvious, it would be prudent to have confirmation by a veterinarian. All cardiac and cancer diagnoses listed a veterinarian diagnosis.

Diagnosis of any dental problems can certainly be made by an owner. Given the high frequency of this group of problems overall, some of the problems could be addressed by educational efforts. Missing incisors, though by no means lethal or a serious health problem, might be amenable to genetic study.

Over 85% of behavioral problems were diagnosed by the owner. This is quite reasonable, given that the owner and family members are the ones who are impacted by the behavior. Some would have more tolerance, and some would have less

tolerance for the offending behavior, so the same "behavior" in different families might or might not have been checked off as a problem. Beyond that there is the eternal conundrum of whether the behavior is most influenced by genetics or the environment. Also, one has to decide whether studying a behavioral topic is warranted in order to determine a potential genetic predisposition.

Problem Rank Based on Frequency versus Opinion

In the preliminary survey, participants ranked health problems on a scale from least (1) to most important (5) according to their concerns and prior experience. The percentage of participants who ranked a problem as 4 or 5 is given in the table below, alongside the rank found in this survey on individual dogs.

Comparison of Ranking of Major Health Problems

Problem	Health Problem Frequency Final Survey (n=1721)			Most Important on Preliminary Survey	
	%	Rank		Breeders Rank (n=139)	Owners Rank (n=310)
Itchy skin	9.1	1		17	11
Decayed teeth, pulled	7.4	2		(7)	(1)
Bad breath	7.3	3		(7)	(1)
Patella abnormalities	7.3	3		5	2
Separation anxiety	7.2	4		30	10
Shyness	5.4	5		27	32
Heart murmur	5.4	5		14	18
Food intolerance	4.6	6		28	19
Missing incisors	4.4	7		(7)	(1)
Fearful	4.4	7			
Vaccine reaction	4.2	8		3	4
Chronic ear infection	4.0	9		23	25
Dominance toward dogs	3.8	10		41	35
Leg bowing	3.8	10		9	17
Cherry eye	3.7	11			44
Ease of socializing	3.4	12		35	31
Bad gums	3.3	13		(7)	(1)
Cataracts	3.0	14		2	5
Atopy	2.4	15		12	14
Bladder stones	2.4	15			
Aggressiveness	2.1	16		31	34
Cancer	1.8	17		19	7
Hypothyroidism	1.7	18		15	22
Mitral valve insufficiency	1.6	19		8	13
Pancreatitis	1.5	10			
Seizures	1.3	22		13	16
Cryptorchid	1.2	22		38	
Hip dysplasia	1.2	22		18	20
Elbow dysplasia	1.2	22		24	15
Congestive heart failure	1.2	22		10	8
Dominance toward people	1.1	23		42	39
Deafness	1.1	23		36	30
IBD	1.0	24		26	23

Chondrodysplasia	1.0	24		6	12
Liver shunt	0.9	25		1	6
Sebaceous adenitis	0.8	26		11	28

Disparity Between Frequency and Opinion

Disparity is evident for some problems between opinion rank (most important on the Preliminary Survey) and frequency in the Final Survey. Cancer was not included in the rankings list because the general term cancer was used in the Preliminary Survey (most important rank for breeders was 19; for owners, 7) and individual organ cancers were listed in the Final Survey and were quite low in frequency. Dental care is not exactly comparable because the general term was used in the Preliminary Survey (ranked 7 for breeders and 1 for owners), while individual dental problems were used in the Final Survey where several ranked high (decayed teeth requiring pulling – 2; halitosis – 3; missing incisors – 7). Agreement or not between opinion and reality is shown in the table below.

Some of the disparities observed between disease frequency and the opinion view could be due to the consequences of the health problem and/or its possible causes leading to a higher opinion ranking.

Agreement or Not	Problem Frequency > 2%	Problem Frequency < 2%
Good agreement	Most dental issues Patella abnormalities Vaccine reaction Atopy	IBD Deafness Hip dysplasia Elbow dysplasia Hypothyroid Seizures
Frequency higher than opinion	Itchy skin Separation anxiety Shyness Heart murmur Food intolerance Chronic ear infection Dominance toward dogs Ease of socializing Aggressiveness	Dominance toward people
Frequency lower than opinion	Cataracts	Mitral valve insufficiency Congestive heart failure Deafness Chondrodysplasia Liver shunt

Health Screening Tests

Number Screens Done

The number having a health screen done at least once are given in the next table.

Health Screen	# Dogs Having Screen	% of Total Dogs in Survey
Thyroid panel	291	16.9
Heart	492	28.6
Patella	609	35.4
Hearing (BAER)	639	37.1
Hips	471	27.4
Elbows	331	19.2
Eyes	751	43.6
Other	110	6.4

The AKC CHIC requirements for Havanese include hip evaluation (OFA, OVA, or Penn Hip), eye evaluation (CERF; in future, the OFA registry), patella luxation (OFA), and hearing (BAER test – OFA or GDC). There are 1795 Havanese with an AKC CHIC number as of the OFA website early November 2012.

Screening Panel Results

Panel	# tested	Normal (%)	Abnormal (%)	Equivocal (%)	Unknown* (%)
Thyroid	291	232 (79.7)	30 (10.3)	3 (1)	26 (8.9)
Heart	492	412 (85.9)	31 (6.3)	5 (1)	35 (7.1)
Patella	609	528 (86.7)	36 (5.9)	6 (1)	39 (6.4)
Hearing	639	589 (92.2)	6 (1)	-	44 (6.9)
Hips	471	418 (88.8)	15 (3.2)	4 (1)	34 (7.2)
Elbows	331	298 (90)	9 (2.7)	1 (0.3)	23 (7)
Eyes	751	658 (87.7)	34 (4.5)	6 (1.2)	53 (7.1)

* Unknown means the participant did not indicate normal, abnormal, or equivocal findings.

Other Health Screens

N=102

Screen Type	Results
Liver	liver panel, bile acids, or both 45 normal 2 abnormal 1 biopsy, US, x-ray, scintigraphy – confirmed portosystemic shunt
Legg-Calve-Perthes	33 OFA normal
Sebaceous Adenitis	4 normal

There were a few entries for miscellaneous other screens, some off topic, some already covered in another section, and others not contributing to better understanding.

Number of Times Screening Panels Were Done

Panel	1	2	3	4	5	>5
Thyroid	144	57	28	49	56	8
Heart	309	45	16	13	10	0
Patella	421	46	21	17	6	0
Hearing	534	13	3	2	0	0
Hip	360	43	3	2	0	0
Elbow	265	17	1	0	0	0
Eyes	171	107	94	70	66	0

Health Problem and Health Screen

The percentage of dogs with a health problem who had the related screening test done varied from 41% for patella to 86% for hypothyroid. Possible reasons may be other methods of diagnosis or that the owner forgot to check this in the survey.

Health Problem	# and (%) with screening test for the problem
Patella abnormality	50/123 (40.7)
Cherry eye	41/63 (65.5)
Cataract	40/50 (80)
Hypothyroidism	25/29 (86.2)
Elbow dysplasia	11/21 (52.4)
Hip dysplasia	15/20 (75)
Deafness	12/18 (66.7)

Female Reproduction

287 females produced one or more litters. Of these, 187 (65.2%) were owned by HCA members.

Reproductive Problems

Problem	n (%) of breeding females
Stillbirths	26 (9.1)
Fading pup syndrome	22 (7.7)
Eclampsia	20 (7.0)
Irregular heat cycles	20 (7.0)
Failure to conceive	6 (2.1)
Vaginal stricture	5 (1.7)
Vaginitis	4

Abortion	3
Inability to conceive	2
Herpes infection during pregnancy or in pups	1
Prolapsed vagina	1
Vaginal ring	1

Infectious Agents

Brucella canis n=14 (positive screening test; unknown if not confirmed)
Protozoa n=7
Parasites n=6
Spirochetes n=1

Prebreeding Assessments

Assessment	n (%) of breeding females
Progesterone levels	116 (40.4)
Vaginal culture & sensitivity	31 (10.8)
Estrogen (estradiol levels)	11 (3.8)

Health Screens

Females who had a breeding method for litter #1 listed (n=287) were evaluated for whether or not they had had the health screens that the HCA defined as requirements for a CHIC # - namely, CERF, hip, patella, and BAER. It is not known if the health screens were done in a timely fashion (i.e., prior to breeding) or not.

- All females (n=287) 218 had all 4 screens (76%)
- All females belonging to HCA Members (n=187) 151 had all 4 screens (80.7%)

Breeding Method

Litter #	Breeding Method (%)					
	Natural	Natural & AI fresh	AI fresh	AI chilled	AI frozen	AI operative
1	251 (87.5)	10 (3.5)	19 (6.6)	3 (1)	3 (1)	1
2	177 (90.3)	2 (1)	12 (6.1)	4 (2)	1 (0.5)	0
2	120 (93.0)	1 (0.8)	5 (3.9)	3 (2.3)	0	0
4	62 (89.9)	3 (4.3)	4 (5.8)	0	0	0
5	27 (100)	0	0	0	0	0
6	8 (100)	0	0	0	0	0

Delivery (Whelping) Method

Litter #	Natural (%)	C-Section (%)
1	247 (87.3)	36 (12.7)
2	162 (83.1)	33 (16.9)
3	110 (85.9)	18 (14.1)

Litter #	Natural (%)	C-Section (%)*
4	57 (83.8)	11 (16.2)
5	23 (85.2)	5 (18.8)
6	8 (100)	0

Number of Litters

The number of dams pregnant and number of litters and pups produced for 1-6 litters is given below. There is a limitation to the data analysis of litters with more than 6 pups because the exact "n" was not asked for.

- 0 litters – 8
- 1 litter – 281 dams (n pups = 1021)
- 2 litters – 194 dams (n pups = 718)
- 3 litters – 126 dams (n pups =456)
- 4 litters – 67 dams (n pups = 251)
- 5 litters – 27 dams (n pups = 94)
- 6 litters – 8 dams (n pups = 30)
- There were 69 litters with more than 6 pups per litter

The average # of pups per litter registered with AKC was 4.3 for years 1999-2011 (see Appendix III for yearly registration numbers).

Number of Pups Lost Between Birth and 6 Wks

The average loss rate in the 6 week period per litter with 1-6 pups in a litter was 4.8%. The loss rate could not be calculated for litters with more than 6 pups because the exact number of pups was not asked for.

When the loss rate was determined by litter number (i.e., first litter or third litter), the average loss was higher for the first litter than the others (with exception of #5):

- Litter 1 – 7.6%
- Litter 2 – 3.5%
- Litter 3 – 2.0%
- Litter 4 – 1.8%
- Litter 5 – 9.6% (4 deaths in 1 litter probably skewed this average)
- Litter 6 – 1.4%

Problems In Pups

Undescended testicle(s)	n=30 (4 dams had 4; 1 had 3; 4 had 2; the rest had 1)
Open fontanelle	n=13 (1 dam had 4; 4 had 3; 1 had 2; 7 had 1)
Cleft palate	n=6 (1 dam had 3; the rest had 1)
Other heritable problem	n=25 (1 dam had 4; 2 had 3; 7 had 2; 10 had 1; 5 were not specified)

Other problems are listed below; they were evident at different ages from the newborn period on:

- Congenital malformations
    - Cleft palate – 2

    - Spina bifida – 1
    - Kidney
        - Kidney failure – 1
        - Renal dysplasia – 1
        - Deformed kidney – 1 (removed 8 wk; normal at 3 yr)
    - No anus; no tail – 1; little to no tail & no penis - 1
    - Gastroschisis (intestines on outside) – 1
    - Deformed hearts – 2 littermates (mother to son breeding)
    - Abnormal heart (diagnosis not known) – 1
    - MVD (microvascular dysplasia) - 1
    - Hydrocephalus – 2
    - Hernia (location not specified) - 1
- Dental
    - Undershot bite – 14
    - Overshot bite - 3
- Orthopedic
    - Patella problem – 2
    - LCP (we believe Legg-Calve-Perthes was intended here) – 8
    - Missing carpus, metacarpus & foot on 1 foreleg; doing well – 1
    - Badly bowed front, chondrodysplasia syspected – 1
    - Weird gait – couldn't trot; hopped like a bunny (? Hip dysplasia) - 1
- Eye
    - Cherry eye – 2
    - Cataracts – 2
    - Retinal folds - 1
- Liver shunt – 2
- Kidney stones – 1
- Seizures – 1
- Blue dilute alopecia – 1
- Cardiac
    - Murmur – 1
- Behavioral
    - Shy – 5
- Very small – 2
- Green eye, chocolate nose & eye rims – 1
- Sebaceous adenitis - 2

Male Reproduction

204 dogs produced one or more litters.

Reproductive Problems

These were infrequent. There were 2 each with sterility or prostatitis and 1 each with aspermia, hypospermia, prostatic hyperplasia, and prostatic tumor.

Infections

These too were infrequently reported. Positive *Brucella canis* screening test results (but not confirmed as positive) was the most common (n=39), followed by parasites in 9, protozoa in 6, mycoplasma in 4, fungi in 2, and spirochetes in 1.

Reproductive Evaluation

This was done in 88 dogs (43%); no exam was done in 109; no answer was checked in 7. When done, the evaluation consisted of:

- Exam of external organs – 51
- Sperm count – 24
- Sperm motility – 22
- Semen color – 18
- Sperm morphology – 13
- Exam for scrotal torsion or prolapse – 10

Comprehensive Reproductive Evaluation (Pre-Breeding)

For both female and male dogs intended for breeding, a complete medical examination, laboratory profiles for thyroid function, CBC, serum chemistry and urine should be performed including vaccine titers to assess the amount of maternal immunity to be transferred to puppies and the degree of protection against clinically important infectious diseases.

Bitches. If breeders plan to automatically give females a vaccine booster before breeding (usually not necessary for well-vaccinated animals), it should be done during anestrus or at least 30 days before the anticipated breeding. Screening should also be done for known heritable traits in the breed. Bitches should have vaginal examinations (vaginal strictures and rings can be heritable) and anterior vaginal cultures for bacteria including mycoplasma/ureaplasma with a "guarded" swab – if there has been any prior uterine infection, pseudopregnancy or weak, dying or stillborn pups. Brucellosis screening with confirmatory testing, if the screening test is positive, should be done on both sexes.

Males need evaluation of sperm count, color, morphology and motility. A palpation of the testes and prostate is also recommended. These ideal evaluations and laboratory tests are important to ensure the best possible fertility and conception of live, healthy puppies.

Health Screening

Dogs that produced at least 1 litter were evaluated for health screens that the HCA defined as requirements for an AKC CHIC # - namely, CERF, hip, patella, and BAER. It is not known if the health screens were done in a timely fashion (i.e., prior to breeding; CERF within 1 year) or not.

- All dogs (n=204) 139 (68%) had all 4 tests

- Dogs belonging to HCA members (n=113) 88 (77.9%) had all 4 tests

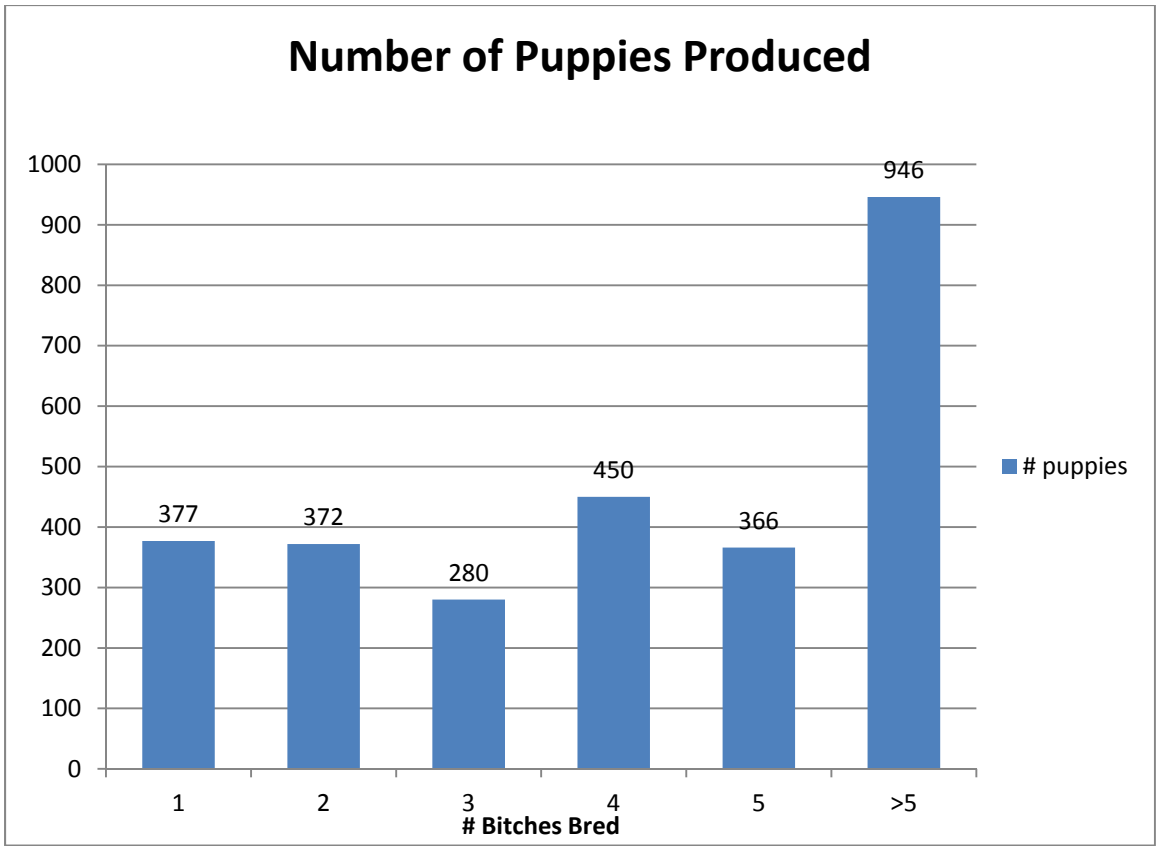
Bitches Bred

A total of 520 bitches were bred resulting in 648 litters and 2749 puppies; 39 dogs had recorded 0 bitches bred; presumably the breeding occurred, but no pregnancies resulted. To explain the data shown below: taking row 1 of the data, for example, it means that 59 dogs bred 1 bitch (some more than once) to produce 88 litters for a total of 377 puppies. Likewise, the last row means that 1 dog bred 25 bitches (some more than once) to produce a total of 40 litters and 170 puppies.

# bitches bred	# dogs	Total # litters	Total # puppies
1	59	88	377
2	37	102	372
3	21	67	280
4	19	103	450*
5	11	80	366
6	5	32	153
7	3	22	99
9	1	9	Not listed
10	4	40	170
11	1	11	58
15	1	13	90
20	1	19	77
22	1	22	87
25	1	40	170

*# pups not listed for 1 litter

The total number of puppies was not given for 1 dog and for 1 litter, so the average # pups per litter by AKC registration stats (4.3) was substituted for the graph below. It shows the % contribution to total pups by # bitches bred. Not unlike other breeds, a few popular sires (n=18) bred more than 5 times contributed to approximately 34% of the puppies. Fifteen of the 18 had all 4 health screens done. Thirteen of the 18 belonged to HCA members.



Mortality

Causes of Death by Age (n=65)

There were 79 deaths reported, 70 with a date of death, and 65 with both dates of birth and death. The latter allowed calculation of age of death and details on those cases are reported below. The percentage is calculated by using 65 as the denominator.

Age (Yr)	N (%)	Cause
< 2	6 (9)	1 each osteogenesis imperfecta, probably liver shunt, vertebral spindle cell cancer, closed pyometra, retained surgical sponge after C-section, accidental
2-4	5 (7.7)	1 each liver shunt, accidental, red cell aplasia, pyometra, unknown
4-6	7 (10.8)	1 each accidental, eclampsia, mediastinal mass probable cancer, back injury, IMHA, lymphoma (with sepsis), unknown
6-8	5 (7.5)	1 each accidental, congestive heart failure, Addison's, cancer, unknown
8-10	11 (16.9	5 cancer (spleen, possible brain, adrenal, bladder, spinal nerve sheath), 2 liver failure, 1 each - heart failure, aneurysm, small bowel bacterial infection, sudden heart event (had history of heart murmur

10-11	11 (16.9)	4 congestive heart failure (one secondary to complications of aggressive skin cancer), 2 thrombocytopenia,1 each mitral valve disease, perforated bowel, cancer, sudden collapse, heart attack or stroke
>11	21 (32.3)	5 kidney failure, 4 cancer, 2 congestive heart failure, 3 unknown, 1 each – pericardial effusion, seizures, spine injury, perforated bowel, mitral valve insufficiency, AITP, Cushing/s

The other 14 deaths where age couldn't be determined were due to: accidents, 3; 1 each – old age, bleed in heart wall, seizures/SA reduced life quality, kidney failure/old age, congestive heart failure, congestive heart failure from mitral valve insufficiency, pyometra, anesthesia reaction, liver disease, liver shunt, and unknown.

Necropsy was done on nine, 11.4% of all deaths. Findings as to cause of death are listed below for 8/9.

- large blood clot in pericardial sac; thickened edges of mitral valve; several broken chordae tendonae in left ventricle
- not identifiable
- severe small intestinal bacterial infection; elevated liver enzymes
- adrenal tumor; 1 kidney atrophied
- osteogenesis imperfecta confirmed
- cancer of pericardium (lining of heart)
- pyometra
- aneurysm (location not stated)

Discussion

Havanese breeders and owners should be congratulated by their commitment to maintaining the health and longevity of the breed as evidenced by this survey response (1,721 dogs were entered).

Survey Demographics

Of the 1,721dogs entered, about 405 were breeders and about 70% were owners (some were both). About 30% were HCA members and the rest were non-members. The message here for the benefit of growing the parent HCA club as an organization for the betterment of the breed, is to mount a concerted effort to solicit and attract more members.

Most of the dogs entered into the survey were adults between 1-9 years of age (about 80%) and of 44% of the total were males and 56% were females. Only a few dogs were not purebred Havanese (0.8%). Fifty-nine % of the dogs were spayed or neutered. As expected, males weighed more than females.

Preventive Practices

- **Vaccinations.** After puppy vaccines, most respondents indicated that about 40% gave annual boosters for distemper and parvovirus, whereas about 30% gave these boosters every 3 years. This likely reflects a growing awareness that annual boosters of well-vaccinated adult dogs in not necessary. For rabies boosters, about 70% gave them every three years, although surprisingly, 14% gave them annually when no legal requirement exists in North America for annual rabies boosters after the initial 2-dose series. Perhaps that reflected those dogs that received the second rabies vaccine a year later, after the initial puppy dose. Another encouraging response was the fact that about 40% used vaccine antibody titers to assess disease protection rather than just routinely giving vaccine boosters.
- **Heartworm preventive**. About 75% of those responding used heartworm preventive. Failure to give it may reflect a very low incidence /risk of heartworm disease exposure where they live.
- **Flea (and tick ?) preventive** About 70% of those responding used flea preventive (and possibly tick preventive as well), although this wasn't asked.

Prevalence of Health Problems

The most prevalent problems were still reported at relatively low incidence (7-9%). These included itchy skin; decayed, excised teeth; bad breath; patella abnormalities; and separation anxiety. The bad teeth could be a contributor to the bad breath.

Please note the Table (page 13) listing the disparity between the data listing the frequency of a health problem (reality) as compared to the opinion of respondents as to what problems were most important (belief). This is a key perspective and should be a focus for HAC member educational efforts.

Health Screening Tests/Exams

The most commonly screened health measure was eye examinations (44% of total dogs surveyed), followed by hearing (BAER) tests (37%) and patellar abnormalities (35%). Next came heart (29%), hip (27%), and elbow (19%) checks, and thyroid profiles (17%). **Results** of these health examinations showed that most of the dogs where data were given had normal hearing (92%), elbows (90%), hips (89%), eyes (88%), patellas (87%), hearts (86%), and thyroid function (80%).

Reproductive Assessment and Issues

Please note that for both females and males, a relatively large number of responses indicated positive results for brucellosis testing (not brucellosis disease). This likely reflected a positive *Brucella canis* screening test rather than a positive *Brucella canis* confirmatory test, as brucellosis is considered a serious permanent condition leading to sterility, and the recommendation for euthanasia to prevent further spread.

- **Females.** Stillbirths were most frequent (9%) followed by fading puppies (7.7%), eclampsia (7%) and irregular heat cycles (7%). The remaining problems were of low prevalence. Pre-breeding assessments most often (40%) involved testing progesterone levels to time breedings, followed by vaginal culture and sensitivity (11%). The most common mating method was natural breeding (86-100% for first and subsequent litters), followed by fresh artificial insemination (AI) (6.6% for first litter). Whelping was most often natural (87-100% for first and subsequent litters, with 13-19% having C-sections for their first and subsequent litters).
- **Males.** Reproductive problems were infrequently reported for males.

Mortality

Only 79 deaths were reported and of these, 65 had a specific age of death. For those 65 dogs, the highest number (21 = 32%) was more than 11 years of age, followed by 11 =17% for both the 8-10 and 10-11 year age groups. In the 4-6 year age group, there were 7 deaths (11%). Nine dogs (11%) had necropsies performed, and the cause of death was determined for 7 of them.

Conclusions

The Havanese breed is basically healthy overall, although some health problems need more attention and further clinical research studies should provide useful information, especially for known or suspected heritable traits.

Results of this survey have led to the following recommendations:

- A concerted effort should be made by the parent club to attract more members, as non-members dominated the list of survey respondents (69%). The encouraging point about this high non-member response is that these Havanese owners wanted to participate for the benefit of the breed and to learn more about the health of the breed.
- As the most prevalent health issues focused on the skin, teeth and patellas, more preventive and early diagnostic attention should be given to these problems. For the skin and teeth, this may reflect the need for more emphasis on diet, including overall quality and identifying potential food intolerances, as well as skin and coat cleanliness. Preventive dentistry should be practiced regularly, as often as every 6 months, as Havanese appear to be prone to dental tartar and gingivitis.
- Educational efforts directed toward the importance of preventive dental maintenance should be promoted. Missing incisor teeth was another mouth-related issue (ranked 7th), and could lend itself to a study of potential inheritance patterns.
- The survey also identified separation anxiety as an issue, so positive training tips to help alleviate this problem should be addressed (e.g. aroma therapy with lavender and other calming botanicals, addressing boredom with play toys, soothing music and television, chew toys containing food treats).
- Special attention should be paid to those health and behavior problems that were found to be more frequent (reality) than the opinion of the survey respondents

(belief), namely, itchy skin, separation anxiety, shyness, heart murmur, food intolerance, chronic ear infection, dominance toward dogs and people, ease of socialization, aggressiveness. Please note that 5 of these 9 issues are behavioral in nature. Whether behavioral issues in the breed reflect a potential genetic predisposition or other causes, is moot, for they need to be addressed.

- Educational efforts should also be focused:
    - Upon the problems found to be more prevalent than realized by those responding to this survey.
    - On the rabies vaccination legal requirement. After the first two "puppy" vaccinations for rabies, given 12 months apart, the current legal requirement in all states (USA) is for boosters to be given every 3 years. It is unknown exactly how participants responded to this survey question (namely whether they considered the second of the initial series as a "1 year interval"; if the responses were correct (meaning yearly intervals after the initial series), there are still too many receiving rabies vaccines after the initial puppy shots – 14.2% yearly and 8.4% every 2 years – assuming all the responses were from the USA (yet another unknown, because owner location couldn't be obtained in the survey).

Review of supplementary resources leads to these other recommendations:

These resources provide valuable health-related information for consideration in addition to that of the survey proper.

- AKC Registration stats (Appendix III)
    - Havanese rankings have gradually increased over recent years. In terms of registered litters/pups; in 1999, the rank was 82 with 245 litters and 1,053 pups; in 2011, the rank was 25 with 2,930 litters and 12,310 pups. The rank of registered Havanese dogs increased from 92 (626 dogs) in 1999 to 32 (with 4,466 dogs) in 2011. These growing numbers emphasize the important responsibility of the parent club in insuring the health of an increasing number of dogs.
    - Given that there were 84,600 pups registered in litters and 36,831 individual dogs registered in the past 10 years (through 2011), it is not known how well the findings of this survey of 1,721 dogs extends to the general population of Havanese.
        - One approach to this uncertainty is to repeat a survey in about 4 years. This means prospective planning by the parent club to begin now for a similar future survey.
        - Future health surveys would be best conducted by the HCA Health Committee rather than by independent consultants. But, this will require intensive effort to reduce any barriers to the participation of an in-club administered survey, and to establish trust in the HCA Health Committee as being capable of managing such a survey.
- CERF Research Data (Appendix II)

- The percentage of normal exams for both sexes has improved since 2001 when it was around 75%. Since 2004, the percentage of normal exams has been near 85%.
- There has been a significant decline in the number of CERF exams between the 2006-08 period and 2011.
  - The average number of CERFs yearly for 2006-08 was 2,353 but only 1,338 were done in 2011.
  - If this decline has not been recognized heretofore, there has been no discussion of a reason for the decline.
  - One can speculate about contributing factors, such as: complacency (no apparent eye problems, so no need to screen), lack of awareness of the importance of yearly exams in breeding animals, lack of emphasis by the HCA Board and Health Committee to do these exams.
- Heritable problems include cataracts (other than category E), persistent pupillary membranes (PPM) other than iris-to-iris, or generalized retinal atrophy. For heritable problems, the ACVO recommendation is not to breed an afflicted dog.
- Other problems for which the ACVO recommendation currently is categorized as BREEDER'S CHOICE are: distichiasis, iris-to-iris PPM, vitreous degeneration, and retinal dysplasia folds.

Any decision by the HCA Board and Health Committee to pursue a known or suspected genetic health problem would wisely be made with the consultation of a veterinary geneticist. Does one tackle low frequency, early lethal disease, or higher frequency, less lethal disease that affects more dogs and their owners? Any effort to address genetic disease will require collecting pedigree information, health histories, and appropriate samples of family members and close relatives of affected dogs. It is a long process, usually taking years to gather sufficient information to convince scientists the cause is worthy of their attention. Beyond the information gathering work, there is the task of gathering adequate funds to do the work, either alone or in conjunction with other breed groups or health foundations. We believe that it would be pragmatic to begin laying the foundation now to overcome any reservations and anxieties held by any members of the HCA Board and Health Committee that prevented collection of some of this information in the 2012 survey.

Appendix I. Health Problems Considered Most Important and/or for Future Research (Source: Preliminary Havanese Survey 2011 Report).

There were 139 breeder responses and 310 owner responses.

Problem	Most Important Problem		Future Research	
	Breeder	Owner	Breeder	Owner
Liver (shunts, bile acids)	1	6	1	1
Allergies	-	-	-	2
Cataracts	2	5	3	6
Vaccination reaction	3	4	-	-
Vaccination frequency	4	3	-	-
Patella abnormalities	5	2	6	3
Hip dysplasia	-	-	6	8
Chondrodysplasia	6	-	8	5
Autoimmune	-	-	8	-
Dental	7	1	-	10
Eye	-	-	-	4
Mitral valve insufficiency	8	-	-	-
Leg bowing	9	-	-	-
Congestive heart failure	10	8	-	-
Skin	-	-	-	8
Cancer	-	7	-	-
Early death	-	9		
Separation anxiety	-	10	-	-
Heart	-	-	2	7
Sebaceous adenitis	-	-	4	-
Hypothyroid	-	-	5	-
Skin	-	-	-	9
Renal	-	-	10	-

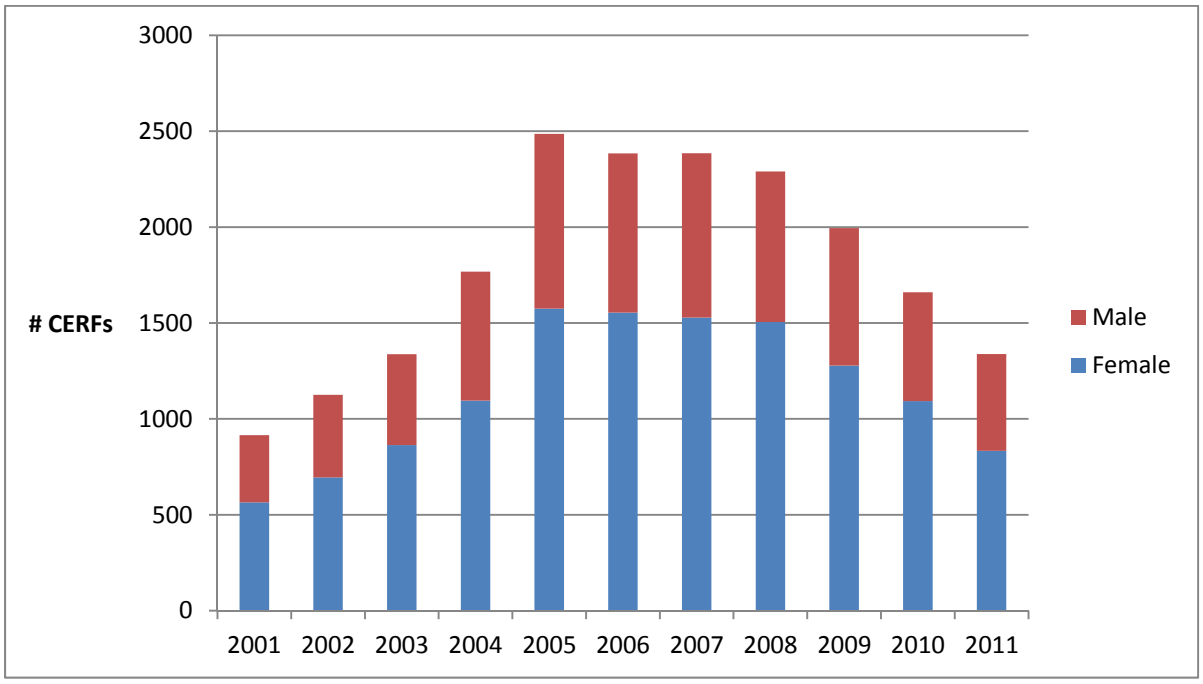
The list contains one clinical sign (congestive heart failure that in itself is not a diagnosis), one behavioral problem, vaccination issues, and a number of medical diseases that are suspected to be hereditary in Havanese or are proven to be hereditary in other breeds.

Appendix II. CERF Research Data for the Havanese Breed

Number Examined

Year	Total #		Normal #		Normal %	
	F	M	F	M	F	M
2001	565	350	424	268	75	76.6
2002	695	430	507	324	73	75
2003	863	474	638	370	73.9	78.1
2004	1095	673	942	561	86	83.4
2005	1575	911	1333	782	84.6	85.8
2006	1554	830	1348	717	86.7	86.4
2007	1528	857	1338	748	87.6	87.2
2008	1505	785	1289	680	85.7	86.6
2009	1278	717	1091	617	85.4	86.1
2010	1093	567	934	509	85.4	85.3
2011	833	505	706	428	84.8	84.8

While the percentage of exams that were normal has held steady since 2004, in the mid-80% there is a rather remarkable decline in the total number of dogs having CERF exams. That is quite evident in the graph below.



Problems Identified

The % of problems by sex are listed in the following tables. The denominator used to calculate the % is the number of dogs with a problem divided by total number of exams for that sex and that year. CERF reported data for PPMs as bilateral or

unilateral after 2004. The data for bilateral and unilateral PPM are combined together from 2005 forward so the numbers are comparable with prior years. The Health Committee can tease out unilateral vs bilateral, if desired; a zip file of the original CERF reports has accompanied this survey report.

Hereditary Disorders

Year	Retinal Atrophy Generalized (%)		Cataracts (%)		Hereditary PPMs *
	F	M	F	M	Both sexes
2001	-	-	3.9	4.6	0.3
2002	-	-	2.9	4.2	0.3
2003	-	-	3.0	2.1	0.5
2004	-	-	5.8	2.2	0.3
2005	0.1	-	2.2	2.3	0.4
2006	0.1	0.1	2.4	2.1	0.2
2007	-	0.2	2.8	1.6	0.1
2008	0.1	0.6	2.3	2.0	-
2009	0.1	0.4	3.0	2.4	0.1
2010	-	-	2.9	3.2	0.2
2011	-	-	3.7	3.6	0.2

*Hereditary PPMs include iris sheets, iris to cornea, and iris to lens –- these are combined for this table.

While the number of cases of retinal atrophy is very low, if a breed is found to have any cases, there is a high likelihood is good that the condition is heritable.

Disorders with ACVO Advice - Breeder's Choice

Year	Distichiasis (%)		Retinal Atrophy Suspicious (%)		Iris-to- Iris PPM (%)		3rd Eyelid Gland Prolapse (%)	
	F	M	F	M	F	M	F	M
2001	5.5	3.7	6.7	7.1	0.2	0.9	0.9	-
2002	5.3	3.5	8.8	7.2	-	0.9	0.4	-
2003	5.7	3.8	8.5	10.1	0.2	0.8	0.5	-
2004	5.8	4.2	8.1	10.6	0.5	0.6	0.4	0.3
2005	6.2	3.4	6.9	7.4	0.3	0.6	0.6	0.3
2006	5.7	4.5	5.5	8.9	-	0.6	0.6	0.2
2007	4.6	3.9	6.3	5.6	0.3	0.5	0.5	0.1
2008	5.8	5.0	6.9	5.9	0.2	0.5	0.5	0.1
2009	5.2	3.6	4.5	3.5	0.2	-	0.3	0.6
2010	5.7	4.8	5.8	6.5	0.2	-	0.5	0.9
2011	4.9	3.8	5.4	4.8	0.1	0.2	1.2	0.4

In 2009, most of the cases of distichiasis were reported as unilateral; previously they had been reported as bilateral. Whether this represents a change in the underlying database entry or not cannot be determined. Generally speaking, distichiasis and 3rd eyelid gland prolapse are slightly more frequent in females.

CERF Breeder Advice for Havanese

Breeder recommendation for distichiasis, iris-to-iris PPM, vitreous degeneration – syneresis (where vitreous gel shrinks and is replaced by a clear fluid), and retinal dysplasia folds is considered as BREEDER OPTION.

CERF does not recommend breeding dogs with any form of PPM other than iris-to-iris; with cataracts; or with generalized retinal atrophy.

Appendix III. Havanese AKC Registration Stats

The registration stats for litters and dogs registered from 1999 through 2011 is given below. Note that these represent year of registration rather than year of whelping.

	Litters			Dogs	
Year	Rank	# Registered	# Pups	Rank	# Registered
1999	82	245	1,053	92	626
2000	78	355	1,565	86	941
2001	72	465	2,143	75	1,272
2002	65	636	2,816	64	1,516
2003	56	908	4,056	55	2,156
2004	46	1,273	5,474	52	2,950
2005	43	1,597	6,904	43	3,595
2006	40	2,003	8,417	38	4,038
2007	35	2,457	10,404	37	4,460
2008	32	2,561	10,871	36	4,435
2009	28	2,753	11,494	32	4,660
2010	26	2,836	11,854	31	4,558