Standard Schnauzer Club of America Health Survey of 2008 – Final Report

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Background

The Standard Schnauzer is generally considered a healthy breed. To insure the accuracy of this statement and more importantly, to protect the future health of the breed, it is imperative that breeders and owners understand health problems that may exist in the breed.

Thus, the Standard Schnauzer Club of America conducted a survey to document the health status of the breed in 2008. The health survey sought information on **all** Standard Schnauzers born in the U.S. or Canada who were alive at any time between January 1, 2002 and December 31, 2007.

The immediate goals of the survey were three-fold:

(1) Identify diseases/conditions that may exist in the breed;

(2) Enroll a sufficient number of dogs so that reliable estimates of the incidence of a disease/condition (% of all dogs that may be affected) could be obtained;

(3) To the extent feasible, confirm that some/many diseases probably do not currently exist in Standard Schnauzers

Summary of Results of Survey

The conclusions from analyses of the collected data can be summarized as follows:

1. Data collected for 10-15% of eligible dogs;
2. half of the dogs enrolled in the survey live to over 12.9 years;
3. only few serious diseases were noted;
4. (potentially) serious conditions affect only a few (less than 1%) dogs;
5. apparent progress has been made in reducing incidence of hip dysplasia;
6. **The health status of the breed is generally good!**

Most of the diseases reported in the survey are as expected for dogs that live to an older age. This is not to suggest that we should not continue to be concerned about health issues, BUT, overall, the health of our Standard Schnauzers, including our older dogs, is good.

The results of this survey are presented below, beginning on page 2.

The Future The collection and analysis of survey data is the beginning. The real goal of health surveys is to address conditions/diseases identified, leading to improvements in the health of all Standard Schnauzers. The challenge is to use the data from the survey most productively to understand several diseases/conditions as described at the end of the report, with more details in a separate document – **"Standard Schnauzer Health Survey - What Next?"** in the Health section.

A. Collection of health survey data.

To achieve the survey goals, the health survey needed to obtain information for a large number of dogs, not just dogs showing in conformation, participating in performance events or in breeding programs **or** dogs with health issues. To obtain maximum participation, the Health Survey Taskforce worked closely with breeders, fanciers and pet owners in gathering information and emphasized the **importance of having data on ALL dogs, healthy dogs** as well as dogs with health problems, so that information on the incidence of disease (% of all dogs affected) could be obtained.

The Health Survey Taskforce initiated distribution of information regarding the importance of conducting a health survey (advertizing) 6 months prior to distribution of the survey forms. Information regarding the health survey was distributed as widely as possible, using publications and websites of the national club as well as regional clubs, presentations at specialties, direct mail to members of the national or regional clubs and the relevant chat sites. A substantial effort was made to have breeders contact the folks to whom they had sold puppies (or to gather and submit the information themselves). The data were submitted by the breeders/owners to an Independent party (not associated with the SSCA) for removal of any and all personal identifiers; this process insured confidentiality and that no data could be linked to a breeder/owner. No list of names of individuals providing data was maintained nor were any names shared with the Health Survey Taskforce. Only de-identified survey forms were transferred to the Taskforce for analysis; only aggregate information for any disease/trait is being reported.

The health survey sought information on **all** Standard Schnauzers born in the U.S. or Canada who were alive at any time (be that one day or the entire period) during the period of January 1, 2002 through December 31, 2007. The collection of data on the incidence of disease was initiated on January 1, 2008 and completed in October of 2008.

Results of the Standard Schnauzer 2008 Health Survey

B. Demographic data

B.1. AKC registration data

The data for AKC registrations of Standard Schnauzers for the last 48 years (35 years for litters) are in Table 1. It is clear that the number of registrations, both dogs and litters, has been quite constant for the last 25 years.

Table 1. AKC registrations per year (averaged over 5 year periods)

years	dogs / year	litters /year	puppies/ litter
1960-64	342		
1965-69	865		
1970-74	1014		
1975-79	764	208	3.7
1980-84	652	162	4
1985-89	548	139	3.9
1990-94	549	121	4.5
1995-99	492	116	4.2
2000-04	582	137	4.2
2005-08	568	128	4.4

B.2. Number of Standard Schnauzers eligible for enrollment in 2008 health survey

Employing data for AKC registrations during the relevant time period and the life expectancy as calculated from the date provided by the 2008 health survey, it is possible to estimate the number of AKC registered dogs alive during the 2002-2007 time period and thus, the number of Standard Schnauzers eligible for enrollment.

The average number of puppies registered per year from 1990-2002, the period when most dogs alive on January 1, 2002 (the start of data collection) were born, is 540. Given the data that the average age of death for all dogs enrolled in the 2008 survey is 11.4 years, it can be calculated that 6100 dogs were alive at the start of the enrollment period. In addition, 3450 puppies were registered with the AKC during the 2002-2007 time period. (*see discussion of litter size in Section F.*) Thus, it can be calculated that ~9,500 AKC registered dogs were eligible for inclusion in the health survey. In addition, it is estimated that about 500 dogs were registered by the Canadian Kennel Club, but not the AKC, during this period.

A total of 10,000 AKC (CKC) registered dogs were estimated to be eligible for enrollment in the 2008 Health Survey.

You will note that the above discussion refers to AKC registrations; that is because not all Standard Schnauzer puppies are registered. In fact, employing the data on litter size collected during this survey (See Section F), only 65% of litter registrations are converted to completed registrations. This is consistent with the AKC data for all breeds (actually better than), where less than 50% of puppies in litter registrations are converted to completed registrations. It was not required that dogs be AKC registered to be enrolled in the survey. Thus, an additional 5,000 Standard Schnauzers – a total of 15,000 dogs- were eligible for enrollment in the survey. Registration status was not a question included in the survey.

B.3. Demographics of individuals submitting information for 2008 survey

Data were provided by 502 individuals. A substantial portion of the data was provided by breeders, rather than individual owners, thus it is not possible to estimate the number of different (or individual) owners for the dogs enrolled in the survey. It is also not possible to make any estimate of the average number of dogs owned per individual. Table 2 provides insight into the membership of individuals submitting data (again – not necessarily the owner of the enrolled dog).

Table 2. Membership of individuals submitting data

membership	number of submitters	number of dogs enrolled
SSCA only	148	584
Regional Club only	56	107
SSCA+Regional	109	449
Neither	172	247
Unspecified	17	68
Total	502	1455

Membership in the Standard Schnauzer Club of Canada was counted as membership in a regional club

As can be seen in Table 2, about 250 SSCA members (approximately 55% of SSCA members) provided data for the survey; these individuals supplied about 65% of the data collected. Although the participation by SSCA members was very substantial and very important, these individuals supplied information on only 6-10% of the dogs that were eligible to be enrolled in the survey. These numbers emphasize one of the major challenges for conducting successful health surveys, especially as we go forward with new initiatives; most of our dogs are owned by people without significant connection with the SSCA. These dogs are a substantial resource for tracking the health status of our breed, although it is very difficult to

make and maintain contact with these individuals. Breeders are critical in connecting with these individuals and were central to the success of these initiatives.

B.4. Dogs enrolled in the 2008 health survey – General data

Sufficient data were provided for enrollment in the health survey for 1455 dogs. Fourteen dogs were not enrolled for the following reasons: death occurred before 2001 (3 dogs); born after 01/2008 (6 dogs); insufficient information (2 dogs). Three of the dogs for which data were submitted were not born in the US or Canada; because of the small number of foreign born dogs, these 3 dogs were not included in the data set.

Thus, approximately14-15% of eligible AKC registered dogs (1455 of 10,000 registered dogs alive during the period) were enrolled in the survey, assuming the large majority of the enrolled dogs were AKC (or CKC) registered. This is 10% of all (registered and unregistered) Standard Schnauzers estimated to be alive at any point between 2002 and 2007. We enrolled 90% of the goal of collecting data for 1600 dogs.

1214 enrolled dogs were Pepper and Salt; 232 were Black; 9 were of unspecified coat color. The health survey data has been analyzed without separation by coat color as P'nS's and Black's are interbred in the U.S. – i.e. they do not constitute distinct or separate gene pools. Inspection of the incidence of the more common diseases/conditions did not suggest any association of a condition with coat color, an observation consistent with a common or at least generally related gene pool between the two coat colors.

781 bitches were enrolled; 667 dogs were enrolled; sex was unspecified for 7 individuals.

B.5. Age distribution and health status of dogs enrolled in survey

The distribution of dogs, all dogs and dogs alive at enrollment, by age, is presented in Table 3. The average age at enrollment (or age at death) for all dogs enrolled in the survey is 6.5 years, while the median age at enrollment was 5.9 years (50% of dogs enrolled were over 5.9 years of age). The median age for dogs alive at enrollment is 5.6 years. 25% of the enrolled dogs were over 10 years of age. The median age for dogs without a health issue is 8.0 years. For dogs with an indicated health issue, the median age is 10 years of age.

Of the 867 dogs without health problems at the time of enrollment, 473 were bitches, 390 were dogs and 4 were of unstated sex. 70% of the dogs enrolled reported no health problems. 33% of the dogs (195) over 10 years of age that were alive at the time of enrollment were without any reported health problems. Even our older dogs are generally in good health.

Table 3. Dogs enrolled in survey segregated by age at enrollment and disease status

Age (years)	all dogs [(1)] (%)	non-accidental death / accidental death	# alive at enrollment	# without health problems	# with health problems[(2)]
-1.9	241 (16.5)	6 / 7	230	218	23
2.0-3.9	251 (17.2)	3 / 1	247	203	48
4.0-5.9	259 (17.8)	8 / 1	249	182	77
6.0-7.9	188 (12.9)	15 / 0	173	125	63
8.0-9.9	147 (10.1)	23 / 0	122	66	81
10.0-11.9	118 (8.1)	34 / 1	83	36	82
12.0-13.9	135 (9.2)	56 / 1	73	24	111
14.0-15.9	98 (6.7)	66 / 0	34	12	86
16.0-	17 (1.2)	12 / 0	5	1	16
Total	1455	228 / 11	1215	867	588

(1) includes dogs dying accidental death; (2) includes dogs with even "minor" health issues;

These data are analyzed further in Section D.2. (Table 7), where health status includes a measure of disease severity.

B.4. Spay/neuter status of dogs enrolled in the survey

Table 4 presents the age of spay/neuter of dogs enrolled in the survey. Spay/neuter status was unknown for 35 dogs.

Seventy two percent of all bitches enrolled were spayed; sixty three percent of all dogs were neutered. Sixteen percent of both bitches and dogs were spayed/neutered before six months of age. The most common age for spaying is between 2 and 5 years while the most common age for neutering a dog is 6-12 months. The potential relationship of spay/neuter to the risk of specific diseases or conditions is discussed in Section E.

Table 4. Age of neutering of dogs in the survey.

Bitches age (years)	Neutered (number)	% of all bitches	Un-neutered [a] (number)
<0.5	120	16	21
0.5-1.0	113	15	30
1.0-2.0	43	6	34
2.0-5.0	103	19	108
>5.0	92	12	50
age unknown	42	5	
unspayed at death			14
TOTAL	513	72%	257 (29%)
Dogs age (years)	Neutered (number)	% of all dogs	un-neutered [a] (number)
<0.5	102	16	10
0.5-1.0	135	21	35
1.0-2.0	53	8	30
2.0-5.0	41	6	69
>5.0	52	8	67
age unknown	25	4	
unneutered at death			32
TOTAL	408	63%	243 (37%)

[a] The age for unneutered dogs/bitches is their age at enrollment in the survey.
Note: the age spans are not uniform across age groups

C. Results of clinical and diagnostic tests

C.1. Orthopedic Foundation for Animals OFA

OFA tests (radiologic evaluation of hips) were completed for 527 dogs enrolled in the survey (36% of enrolled dogs) (Table 5). Results of the OFA examine were not specified for 11 dogs, although it was indicated that the examination had been conducted. “OFA” in this report refers specifically to the evaluation of hips; note in other reports it could also refer to evaluation of elbows, etc, evaluations not usually conducted for Standard Schnauzers.

Table 5. OFA results reported in 2008 Health Survey

Rating	Number	percent
Excellent	50	9.7
Good	387	73.4
Fair	70	13.2
Poor	9	1.7

Penn-Hip data were reported for only 5 dogs, only one of which did not also have an OFA evaluation. The OFA data for dogs in breeding programs are summarized below in the section on Reproductive Performance (Section F).

Sixteen dogs (1.1% of dogs enrolled) were reported by the individual completing the survey to have hip dysplasia. Seven of these dogs were graded by OFA as "poor", 3 as "fair", 1 as "good" and 5 did not report an OFA evaluation grade. Employing OFA criteria described in the next paragraph, only the 7 dogs graded as poor would be considered as potentially dysplastic at the time of OFA evaluation. It was not clear from the data submitted that the dogs indicated as being dysplastic were clinically diagnosed, if the dog was assumed to be dysplastic based on the OFA evaluation or if mobility issues were assumed to be associated with hip dysplasia.

CHIC-OFA maintains a database that reports summaries of OFA evaluation data, by breed, for dogs undergoing OFA examination for selected periods. Data for 100-110 Standard Schnauzers were submitted each year since 1990, about 20% of the dogs born during the time period. It should be noted that these data are submitted by owners, so the data could be biased if owners of dogs with poor hips are less likely to submit results. The data for Standard Schnauzers is presented in Table 6.

Table 6. OFA results reported to OFA database for Standard Schnauzers

Time Period	before 1980	1990-92	2000-02	2003-04	% change
OFA grade					
Excellent (% of dogs)	7.1	6.2	8.1	5.7	-19.7
Dysplastic (% of dogs)	22.8	6.8	5.9	4.8	-59.3
Total dogs	743	338	356	209	

Dogs graded Excellent, Good or Fair are graded "normal" in the OFA database, Poor is graded borderline and dysplastic is graded Mild, Moderate or Severe. The summarized OFA analysis only provides the data above. It would appear that dogs with hip dysplasia might be under-reported in the 2008 Health Survey (only 1% of dogs enrolled were reported as dysplastic, while 4.8% of dogs reported to OFA were noted as dysplastic). On a positive note, it is clear that the incidence of hip dysplasia is relatively low in Standard Schnauzers, being ranked 99th among AKC breeds (#1 has highest incidence) in terms of incidence of hip dysplasia and more importantly, the incidence of hip dysplasia appears to have declined over the last 20 years. It is not obvious why the incidence of hip dysplasia is substantially less in the data submitted to the health survey (1.1%) than in the OFA data base (4.8-5.9%) for the period of the survey.

Given that approximately 550 Standard Schnauzers were born each year during the 1990-2004 time period, it can be estimated that approximately 20% of all dogs are undergoing OFA evaluation for hip dysplasia.

Note that the data in Table 6 only includes data submitted by Standard Schnauzer owners and it is possible that the decline in hip dysplasia reflects selective date submission rather than a real decline, although the number of submissions is quite constant over the time period (approximately 100/year).

C.2. CERF: CERF (Canine Eye Registration Foundation) exams were reported for 384 dogs. 376 were reported to be "Clear", while 8 did not report results (although indicated exam completed). No dogs were reported to have failed the CERF exam, although it will be noted later that two dogs were identified as being affected with progressive retinal atrophy (PRA) and several dogs exhibited retinal degeneration. Thus, the CERF evaluation, which is usually conducted at several years of age, does not predict later in life events. A number of dogs had multiple CERF exams.

It will be noted in the "Disease Summary" table that a number of older dogs were reported to have cataracts and two dogs were reported with PRA. The results from the "later in life" diagnosis of cataracts for example did not alter a previous CERF result – all CERF data are reported as provided, with the last CERF result being tabulated in the event of several exams.

C.3. Thyroid: Results of clinical tests for thyroid status were reported for 184 dogs. 18 dogs (10%) reported low/hypo or "abnormal" (presumably hypo) results. Dogs with both a normal and a later "low" result were classified as "low".

Hypothyroidism (disease code 0403) was indicated for 39 dogs. In two cases, the comments suggested this condition was secondary to another disease/condition. Among the remaining 37 dogs, 12 reported a "low/hypo" thyroid test result, 11 reported only a "normal" thyroid test result and 14 dogs did not have a reported thyroid test result. Presumably, the cases of "hypothyroidism" that were not supported by a clinical test were based upon an assumption that certain visual traits are sometimes associated with hypothyroidism. Approximately 50% of the reported cases of hypothyroidism were in dogs over 7-7.5 years of age.

It is not possible from the data to differentiate between results from a thyroid test that were for diagnostic reasons and the results that were a component of routine examination; that is, how many of the 184 dogs were suspected of being hypothyroid and thus, the extent to which the data represent a biased (non-random) sampling of the dogs of the breed is unknown.

C.4. Other: Only a small number of dogs reported results from other tests, for example- elbows and cardiac. The data sets for these tests are too limited for any meaningful analysis.

D.1. Age at and Cause of Death

Death reports are available for 239 dogs (including 11 dying of accidental causes). The following tables summarize and present analyses of these data.

In Table 1, it can be seen that registration numbers (puppies born) have not changed substantially over the last 20 years (~540 per year), thus it can be estimated that about 3400 puppies were born and, in the absence of a major change in the average lifespan for our dogs, it is expected that a similar number of dogs (3400) died during the 2002-2007 time period. Thus, the survey data base for age/cause of death represents only about 7% of all deaths expected to have occurred during the survey period. With the non-AKC registered dogs added to the pool of dogs eligible for enrollment, data were collected for 5% of dogs expected to have died during the 2002-2007 period.

The average age of death for ALL 239 dogs was 11.4 years. Excluding the 11 dogs dying of accidental causes, the average age of death for the remaining 228 dogs is 11.8 years. The few dogs dying at a young age skew the distribution and have a large impact on the average age of death.

The median age at death is a more meaningful indication of the lifespan for our dogs. The median age of death for the 228 dogs dying of non-accidental causes (50% of dogs are older at time of death) is 12.9 years. The median age for 109 dogs was 12.6 years; the median age for 117 bitches was 13.0 years. Over 75% of dogs live to be at least 10.0 years of age and only 8% die (non-accidentally) at less than 6.0 years of age.

Old age was the most common (single) cause of death (48 dogs/21%), with 40 of these dogs being older than 14 years of age at the time of death; 29 dogs (13%) died of unknown (unreported) causes (17 over the age of 12 years). Cancer as a general classification was the cause of death for 85 dogs, with liver cancer (10 cases/5% of non-accidental deaths), osteosarcoma (8 cases/4%) and hemangiosarcoma (8 cases/4%) being the most common specific cancers identified as a cause of death. Only 14 cancers were reported in dogs less than 8 years, with 9 additional cases in 8-10 year old dogs (six of these 23 cases of cancer in dogs less than 10 years of age were liver cancer). Most cancer occurs in older dogs, as expected for cancer without a strong genetic component.

Stroke (16 cases/7%) and heart attack (11 cases/5%) contribute significantly to mortality in older dogs. Cardiomyopathy was indicated as the cause of death for 10 dogs, 3 of who were over the age of 10 years. The cardiomyopathy in older dogs has characteristics that differ significantly from the pathology of the disease observed in young dogs and is probably a different disease.

A couple of other causes of death are noteworthy. von Willebrand's disease was reported as the cause of death for an 11 year old dog (diagnosed at 10 years). This is an age of diagnosis that is older than usually

observed for this disease in other breeds of dogs (and is possibly either a misdiagnosis or a miscoding in the survey form). Two relatively young dogs were euthanized because of aggression and/or unstableness.

No deaths were reports for four disease categories, dermatology, ophthalmology, female reproduction and male reproduction. Specific disease categories for which no events were reported have been deleted from Appendix Table 1 (but are listed in Appendix Table 2).

The complete data set on cause of death, tabulated by age, is presented in **Appendix Table 1 (Cause of death segregated by age at death).**

D.2. Frequency of disease diagnosis segregated by severity and age at diagnosis

In Table 7, the diseases/conditions are separated by severity and age at diagnosis. The classification of the severity of a disease/condition is somewhat arbitrary but generally is as follows: very severe – life threatening in the short term (cancer, heart attack), moderately severe – requires long term treatment / significant decrease in quality of life (progressive retinal atrophy, allergy over extended time), low severity – no significant impact on quality of life (undescended testicle, single incidence of food allergy). The age of onset was included in the assignment of severity, for example, arthritis in a 12-14 year old dog is less severe than hip dysplasia in a 5 year old dog.

Table 7. Dogs enrolled in survey segregated by age at enrollment and severity of disease.

Age (years)	all dogs [(1)]	# with health problems	Low severity	Moderately severe	Very severe	unclassified
-1.9	241	23	12	2	6	3
2.0-3.9	251	48	29	13	5	1
4.0-5.9	259	77	48	14	12	3
6.0-7.9	188	63	34	12	15	2
8.0-9.9	147	81	32	18	28	3
10.0-11.9	118	82	27	14	40	1
12.0-13.9	135	111	40	11	51	9
14.0-15.9	98	86	18	12	52	4
16.0-	17	16	4	5	7	1
Total	1455	588	244	101	216	27

[(1)] includes dogs dying accidentally

As can be observed in Table 7, almost 40% of the "health problems" reported in the survey would be expected to have minimal impact on either life expectancy or quality of life. Also, it is noteworthy that the diagnosis for a very severe classification is generally later in life, with 50% of the initial diagnosis for very severe conditions occurring after 10 years of age. Although all diseases/conditions are of concern, it seems quite apparent that the "typical" Standard Schnauzer has a long life span, and is generally healthy, even as an older dog.

D.3. Summary of frequency of disease diagnosis.

Disease issues were reported for 558 of the 1455 dogs enrolled in the survey. Dogs dying during the survey period are included in this summary. Some dogs exhibited more than a single disease/condition; each disease was counted as an event. Thus, more than 558 events were noted and included in the analyses. **Most of the diseases reported are as expected for dogs that live to an older age, e.g. cataracts, arthritis, cancer. This is not to suggest that we should not continue to be concerned about these and all other health issues. BUT, overall, the health of our Standard Schnauzers, including our older dogs, is good.**

1. Cancer

The most common disease group was cancer with 137 cases reported; this is 125 different dogs as several dogs reported multiple independent tumors. The most common tumor site was the mammary gland with 24 cases, followed by liver (11 cases – 6 diagnosed in dogs 6-10 years of age), osteosarcoma (10 cases – 4 in 4-8 year old dogs) and squamous cell (9 cases; in addition, 5 cases of cancer of the toe were reported. Many "toe cancers" are squamous cell tumors). Note that mammary cancer was indicated as the cause of death for only 5 dogs (4 over the age of 12 years), suggesting that the mammary tumors observed in Standard Schnauzers are not particularly aggressive.

2. Cardiovascular

Heart murmurs were detected at some time in the life of 27 dogs; approximately 50% of the cases were identified in young dogs.

Fifteen cases of cardiomyopathy were reported. Three of the cases were in dogs over 12 years of age; the disease in older dogs appears different from the juvenile onset disease. The nine reported cases of early onset cardiomyopathy (diagnosed before 2.5 years of age) involve dogs from 5 litters born between 1998 and 2006 (assuming cardiomyopathy dogs with same date of birth are littermates). The age at diagnosis (years) (age at death; x – alive at enrollment) for the 9 young dogs was: 1.0 (1.0), 1.3 (1.3), 1.5 (x), 1.5 (x), 1.6 (1.9), 2.0 (2.1), 2.1 (2.1), 2.5 (4.5), 2.5 (6.1), and for the three older dogs 4.8 (11.5), 6.0 (x), 9.0 (10.5) years. It is not obvious how to group the three cases diagnosed in dogs over 4.0 years of age. This is a condition requiring follow-up and additional analysis. (Two additional cases (littermates) of DCM in young dogs have been reported since the completion of survey data collection)

Seventeen cases of stroke were reported, with only three cases in dogs less than 10 years of age.

Eleven cases of heart attack were reported, with only one case in a dog less than 10 years of age.

3. Dermatology

Dermatology issues were reported in a number of dogs with 39 dogs reporting sebaceous cysts. The 19 reported cases of allergy were a diverse collection, with the most common being identified as food allergies; the specific foods inducing an allergic reaction were very varied.

4. Endocrinology

Only 2 cases of diabetes mellitus (insulin dependent) (age of diagnosis: 3 and 9 years) and 4 cases of diabetes insipidus (age of diagnosis 2, 3, 4, 6 years) were reported. ***This is very much in conflict with a report*** *(apparently employing data from veterinary clinic databases, where it is possible that miniatures and SSs are not always correctly designated)* ***suggesting Standard Schnauzers have a high incidence of diabetes.***

About 2% of dogs were reported to have hypothyroidism. As previously described in Section C.3., only about one third of these cases were confirmed by a laboratory test. Note that about 10% of dogs clinically tested were reported as hypo-thyroid, but is not possible from the available data to differentiate between results that were for diagnostic reasons (suspected hypothyroidism and thus a non-random sampling) and the results that were a component of routine examination. Thus it is difficult to evaluate the real incidence of this condition in the breed.

Addison's disease was reported for 5 dogs and Cushing's disease was diagnosed in 10 dogs, including 5 cases in dogs over 12 years of age. As the results of a laboratory test for adrenal function was not included in the survey, it can only be assumed that these diagnoses are based on clinical tests and are correct.

5. Gastroenterology

Chronic gastric conditions were most often seen in young dogs (less than 2 years). No specific cause, including a specific food, was apparent in most cases and none of these were noted to be life threatening.

6. Hematology

The one (only) case of von Willebrand's disease reported was previously discussed (Section D.1.) A case of "inherited" hemolytic anemia was reported, although the age of diagnosis (11 years of age), with death at 14 years due to other causes. This suggests that this is probably a miscoding and this is really a case of "acquired" autoimmune hemolytic anemia. If either von Willbrand's or inherited anemia diagnoses is correct (that is, they are really inherited /genetic conditions), they require close attention.

Four cases of autoimmune hemolytic anemia (plus the possible case above for a total of 5 cases) were reported, with age of diagnosis over 11 years for four of the cases.

7. Nephrology

A range of kidney/urinary tract diseases were reported, but without any clustering of disease or age at diagnosis. Two cases of "familial" renal disease were reported (age of diagnosis was 3 and 10 years of age). The dogs do not appear to be littermates, so the basis for indicating an inherited (genetic) disease is not obvious. An age of diagnosis of 10 years is suspect for a "genetic" condition.

8. Neurology/neuromuscular

Four cases of epilepsy were reported, 2 in young dogs (diagnosis at less than 2 years of age) and 2 in dogs of unknown age. One dog died at 4 years, while the other 3 lived till 7-13 years. Seizures (non-specific) were reported in 3 dogs, one under the age of 4 years.

9. Ophthalmology

Cataracts were noted in 31 dogs, all but 3 cases were diagnosed in dogs over 8 years of age. Two cases of progressive retinal atrophy (PRA) were reported (one dog 5 years and one dog 9 years of age). Three cases of retinal dysplasia were reported (all in young dogs). Eight cases of persistent hyaloid artery were reported, all diagnosed in dogs undergoing CERF evaluation at less than a year of age.

10. Orthopedic

Arthritis was reported in 66 dogs, almost all in dogs over 10 years of age. Nine cases of ruptured anterior cruciate ligaments (torn ACL) were reported, predominately in middle-age dogs. It is not possible, with available data as the questions were not asked, to associate this condition with participation in performance events, etc. Sixteen cases of hip dysplasia were noted. See Section E.1. for discussion of the potential relationship of ACL problems and age of spay/neuter.

11. Female reproduction

Although only two bitches are indicated as "infertile", it is noted in the data regarding reproduction that 13 bitches were bred but did not whelp a litter. In either case, infertility does not appear to be a major issue in the breed. The most common female reproduction (more accurately gynecological) issues appear to be pyrometria (10 cases) and abnormal estrus cycle (10 cases).

12. Male reproduction

Cryptorchidism was identified in 20 dogs (monochidism in 9 dogs; bilateral in 11 dogs). Five dogs were reported as not producing sperm (only one dog in the Reproduction data was indicated as being sterile).

13. Temperament

Eight dogs (6 male) were noted as aggressive, including 5 young dogs (less than one years of age). Aggressiveness was diagnosed in one additional dog at 13 years of age and comments suggest this is probably secondary to another condition. The indication of aggressiveness in the survey does not differentiate between "people" and "dog" aggressiveness. Although actual data are not available, the comments suggest that some dogs may be more accurately described as overly protective, rather than actually aggressive.

18 dogs (13 bitches) were noted as fearful and 14 dogs (11 bitches) were reported as exhibiting shyness. It is important to note that 10-12 dogs were noted as both fearful and shy.

14. Nonmalignant cysts

Eighty five cases of nonmalignant cysts were reported, most commonly in middle-aged dogs. It would appear that these cysts are more of a nuisance than a serious or life threatening medical condition. Although these cysts were generally not well described, it was obvious that some were a significant chronic problem requiring repeated treatment, while in other dogs they were more isolated cases.

The complete data set on disease incidence is tabulated by age in **Appendix Table 2 (Summary of incidence of disease/condition segregated by age at diagnosis).**

E. Relation of Spay/Neuter Status to disease/condition

E.1. Orthopedic conditions and potential relation to age of spay/neuter:

The potential that age of spay/neuter is associated with risk of two conditions was addressed. Eleven cases (8 bitches; 3 dogs) of ruptured anterior cruciate ligaments (torn ACLs) were reported. At least 2 of these animals reported multiple occurrences. Ages of occurrence were: less than 2 year (1 dog); 4-6 years (5 dogs); 7-8 years (3 dogs); more than 11 years (2 dogs). All of the affected dogs were spayed/neutered and with one exception were spayed/neutered at less than 8 months of age (5 of 11 at less than 6 months of age). As noted in Table 8 above, only about one third of all dogs are S/N by one year of age. Although the data are insufficient to draw firm conclusions, it is highly suggestive that early S/N is associated with an elevated risk of torn ACL. The data collected in the survey does not provide any information regarding other potential risk factors for ACL damage- for example, were these dogs participating in performance events associated with potential stress to the muscle/ligaments of the dogs when the incident occurred.

Eighteen dogs (8 bitches/10 dogs) in the survey were reported with hip dysplasia. Early S/N does not appear to be associated with risk of hip dysplasia in this small data set.

E.2. Potential relationship of (early) spaying and the risk of mammary cancer:

Questions have arisen regarding a potential relationship of (early) spaying to the risk of mammary cancer. Twenty three cases of mammary cancer were reported in 782 bitches enrolled; one case was reported in a male. All of the bitches were spayed but only two prior to 5 years of age. Coincidence of age of cancer diagnosis and age of spaying was commonly observed and suggests that spaying was a component of the treatment regime (rather than a risk factor). Fifteen of the 23 bitches (65%) whelped litters. Only 27% of all bitches enrolled in the survey whelped litters. This would suggest that pregnancy is a risk factor for mammary cancer. It is noteworthy that for only 5 of these 22 bitches with mammary cancer was cancer indicated as the cause of death. This suggests that the mammary cancer in our breed is not particularly aggressive and emphasizes the importance of early detection.

F. Reproductive Performance

Reproduction performance and characteristics of "breeding stock"

Data were provided for 209 bitches that were bred; 426 breedings resulted in the whelping of 379 litters. 13 bitches were bred but did not whelp a litter. Birth defects, most appearing to be incompatible with normal survival, were reported for 129 puppies in approximately 75 litters. The average litter size was 6.8 puppies without reported birth defects. 99 bitches whelped only 1 litter, 155 whelped 2 litters, 10 bitches whelped 5-7 litters.

Data were provided for 116 dogs that were used for breeding (434 matings); they sired 406 litters. Only one dog used for breeding did not sire a litter. Although male infertility does not appear to be a major issue in the breed, this very low number could be influenced by fertility testing prior to utilization as a stud or simply underreporting. The average litter size sired was 6.9 "normal" puppies per litter. Only 20 puppies with birth defects were reported to have been sired. If the number of birth defects reported for bitches (129 puppies) is employed (as it is probably a more accurate estimate), the number of normal puppies per litter sired is reduced to 6.6 per litter, very consistent with the size of litters whelped. 40 dogs

sired only a single litter, 40 dogs sired 2-4 litters, 25 dogs sired 5-9 litters, and nine dogs sired more than 10 litters (104 litters were sired by these 9 dogs).

It should be noted that not all of the litters in the health survey were whelped during the 2002-2007 time frame, only that the dog or bitch was alive during that period. Inspection of the age of dogs/bitches in this data suggests that probably 10% of the litters were likely to have been whelped prior to 2002. This does not impact the data collected but does impact the estimate of the percent of litters for which data were collected.

AKC records indicate that 780 litters were registered in the 2002-2007 period. Thus, data were reported in the health survey for an estimated 30-40% of the litters born during the period. During this period, 1170 puppies from 265 litters were registered with the AKC. This is an average of 4.3 AKC registered puppies per litter. The difference between AKC registration data and the Survey litter size data suggests that about 2 puppies per litter (35% of puppies) are not being registered. This rate of conversion of litter registrations to individual registrations is about 20 percentage points above the average for other breeds; for 2008, only 44% of the puppies in AKC litter registrations (all breeds) were converted to individual registrations during this time period.

The OFA grade was provided for most of the dogs and bitches included in breeding programs (Table 8). Note that litter size was not reported for several dogs and bitches, although OFA data were provided, thus the differences in numbers.

Table 8: OFA results for 209 bitches and 116 dogs in breeding programs

Rating	# of bitches	# of litters	# of dogs	# of liters
Excellent	17	33	10	18
Good	139	254	81	274
Fair	31	60	14	90
Poor	1	4	0	
Not tested	17	23	11	26

Obviously, the "not tested" could include some dogs that were evaluated but with results not reported. In either case, it is clear that from the sample of individuals participating in the survey, most breeders are complying with the Standard Schnauzer Club of America code of ethics with regard to having dogs/bitches OFAed prior to breeding. This is especially encouraging, as the litters in Table 8 account for a substantial fraction of the litters whelped.

CERF Data: 130 bitches whelping 240 litters were reported as "clear" for the CERF exam, while 79 bitches whelping 145 litters were apparently not CERFed. 75 dogs siring 279 litters were reported to be "clear" when CERFed, while 38 dogs siring 127 litters were apparently not CERFed.

G. Information from previous health surveys

Two other health surveys have been conducted in the last 11 years. The health survey of 1998, which enrolled dogs alive during the period of 1/1/92- 12/31/96 obtained data from 213 owners providing information on 574 dogs (450 alive at time of reporting). The health survey of 2004, which enrolled dogs alive between 1/1/97 and 12/31/2003 (7 year period) obtained responses from 57 owners and data on 120 dogs. Neither of these previous surveys suggested a significant incidence of any disease/conditions; the conclusions from the twp previous health surveys are very consistent with the conclusion of the 2008 survey.

H. The Standard Schnauzer Health Survey: "What next"

As the analysis of the 2008 health survey data approaches closure, it is important to consider **"what next".** The collection and analysis of the survey data is only the beginning. The more important outcome and goal of this health survey was to address conditions/diseases identified in the survey, leading to improvements in the health of all Standard Schnauzers and maintenance of the gene pool and the future of our breed. Thus, we are now challenged to use this collected data most productively to develop a better understanding of several diseases, even though these diseases affect only a small number of our dogs.

To accomplish this, (because only a small number of dogs are affected with each of these diseases/conditions) we are currently attempting to identify all dogs ***(even if they were not enrolled in the survey)*** with any of the following six diseases/conditions and to collect complete data for each dog affected with one of these diseases in order to build an inventory biological resources.

1. Dilative Cardiomyopathy (DCM)
2. Liver Cancer
3. Persistent Hyaloid Artery (PHA)
4. Torn Anterior Cruciate Ligament (ACL)
5. Epilepsy
6. Progressive Retinal Atrophy (PRA)

It is CRITICAL to understand that every dog and every bit of information is very important as we strive to understand these diseases/conditions and take we take the necessary steps to protect the future health of our breed.

More details, especially details regarding the need for additional information, is outlined in a separate document – **"Standard Schnauzer Health Survey - What Next?"** that can be accessed through the **Health** section on the homepage.

Maintaining the health of our breed is a mission for all the folks owned by Standard Schnauzers. The good work needs to continue!

Appendix Table 1. Cause of death segregated by age at death											
Deaths (Cause/age-yrs)		**0-1.9**	**2.0-3.9**	**4.0-5.9**	**6.0-7.9**	**8.0 - 9.9**	**10.0-11.9**	**12.0-13.9**	**14.0-15.9**	**16.0-**	**Total**
	Unknown				3	4	5	11	6		29
	Old Age				1			7	30	10	48
100	**Cancer**										
101	Hemangiosarcoma (blood)			1		1	3	2	1		8
102	Lymphosarcoma		1		2		1				4
104	Melanoma							1			1
105	Osteosarcoma (bone)			1	1		1	1	4		8
106	Squamous cell tumors (skin)							1			1
107	Mammary				1			1	2	1	5
109	Testicular					1		1			2
110	Stomach				1			3	1		5
111	Kidney								1		1
112	Liver				2	4	3	1			10
113	Leukemia					1	1				2
114	Bladder						3	1			4
115	Brain					1		1			2
116	Thyroid							1			1
117	lung							3	1		4
120	nasal						1	1			2
119	other			2		1	2	2	2		9
100	unknown site			1	1	1	3	6	3	1	16
	Total cancer		*1*	*5*	*8*	*10*	*18*	*26*	*15*	*2*	*85*
200	**Cardiovascular**										
201	Cardiomyopathy	3	2	1	1		2		1		10
207	Stroke			1		2	4	4	5		16
208	Heart failure/heart attack					1	2	2	6		11
219	other										
400	**Endocrinology**										
406	Addison's disease					1					1
407	Cushing's disease						1				1
419	other				1			1			2
500	**Gastroenterology (GI)**										
501	Bloat					2		1			3
519	other	1				1			1		2
600	**Hematology (blood)**										
605	von Willebrand's disease						1				1
606	Autoimmune anemia					1		2			3
619	other										

Appendix Table 1. Cause of death segregated by age at death (cont 1)											
Deaths (Cause/age-yrs)		**0-1.9**	**2.0-3.9**	**4.0-5.9**	**6.0-7.9**	**8.0 - 9.9**	**10.0-11.9**	**12.0-13.9**	**14.0-15.9**	**16.0-**	**Total**
700	**Nephrology (kidney/urinary**										
719	other						1		1		2
800	**Neurology / Muscular**										
801	Epilepsy							1			1
802	Seizures										1
819	other							1			1
	Orthopedic										
1019	other							1		1	2
1300	**Temperament**										
1301	Aggressive				1						1
1304	Unstable			1							1
	Other causes	2				2		1			5
	TOTAL	**6** (2.6%)	**3** (1.3%)	**8** (3.5%)	**15** (6.6%)	**24** (10.6%)	**34** (15.0%)	**58** (25.7%)	**65** (28.8%)	**13** (5.8%)	**228**

Appendix Table 2. Disease/condition segregated by age at diagnosis

"unkn" means that age of diagnosis is unknown

	disease / age (years)	-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0 - 13.9	14.0-	unkn	total
100	**Cancer**										
101	Hemangiosarcoma (blood)			1	2		3		1		7
102	Lymphosarcoma				2		3				6
103	Mast cell tumors (skin)			3			2				5
104	Melanoma				1	1	1	1			4
105	Osteosarcoma (bone)			1	3		1	2	2		9
106	Squamous cell tumors (skin)	1		1		2	3	1	1		9
107	Mammary		1	3	6	5	3	5	2		25
108	Ovarian										0
109	Testicular				1	1	1	1	1		5
110	Stomach	1			3		3	1			8
111	Kidney								1		1
112	Liver				2	5	3				10
113	Leukemia					2	1				3
114	Bladder				1		3	1			5
115	Brain			1		1		1			3
116	Thyroid							1			1
117	lung							3	3		6
118	toe			1		1	1	1		1	5
120	nasal						2			1	3
119	other		2	2		2	2	2	1		11
	cancer unknown				1	5	4	3	3		16
total cancer		*2*	*3*	*13*	*22*	*25*	*36*	*23*	*15*	*2*	***142***
200	**Cardiovascular**										
201	Cardiomyopathy	5	4	1	1	1		2	1		15
202	Heart murmur	13	1	1	3	1	4	4		2	29
203	Patent ductus arterious	1									1
204	Pulmonary valve stenosis										0
205	Valve dysfunction	1						3			4
206	Ventricular septal defects										0
207	Stroke			1		2	4		2	1	9
208	heart attack/failure						1	1	3		5
219	other				1	1		1			3
300	**Dermatology**										
301	Allergies	5	3	7	1	1	1			1	19
302	Pigment abnormalities					1	1			1	3
303	Sebaceous adenitis								1		1
304	Seborrhea (extreme dandruff)		1								1
305	Sebaceous cysts	2	7	6	4	7	7			6	39
306	Mange		2							1	3
319	other	4	5	2	2	3	1			2	19

Appendix Table 2. Disease/condition segregated by age at diagnosis (cont 1)

disease / age (years)		-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0 - 13.9	14.0-	unkn	total
400	**Endocrinology**										
401	Diabetes mellitus (insul depend		1			1					2
402	Diabetes insipidus	1	1	1	1		1				5
403	Hypothyroidism	2	8	7	5	5	5	3	1	3	39
404	Thyroiditis (inflammation)	2		2	2		1				7
405	Pancreatic insufficiency		1		1					1	3
406	Addison's disease		2		3						5
407	Cushing's disease				1	3		4	1	1	10
419	other			2		1	1	3		1	7
500	**Gastroenterology (GI)**										
501	Bloat					2	1	1	1		5
502	Irritable bowel syndrome	2	2	1	1						6
503	Chronic colitis	1			1				1	1	4
504	Gastritis - chronic	2								1	3
505	Vomiting - chronic	2									2
506	Diarrhea - chronic	2									2
519	other	2	2	2	2		1				9
600	**Hematology (blood)**										
601	Hemophilia A										0
602	Hemophilia B										0
603	Inherited hemolytic anemias						1				1
604	Platelet dysfunction									1	1
605	von Willebrand's disease						1				1
619	other		1	1		2	1	2			6
700	**Nephrology (kidney/urinary)**										
701	Bladder disease						1				1
702	Bladder/Kidney stones	1	1	1						1	3
703	Familial renal disease		1				1				2
704	Urinary tract disorder		1		1			1		1	4
705	Cystitis (bladder inflammation)		1								1
719	other		3	2	1		2		1	1	10
800	**Neurology / Muscular**										
801	Epilepsy	2								2	4
802	Seizures		1					1	1		3
803	Trembling/tremors			2	1		2		1	1	7
804	Muscle weakness					1	1		1	1	4
805	Nerve degeneration							3			3
819	other					1		2		2	5

Appendix Table 2. Disease/condition segregated by age at diagnosis (cont 2)

disease / age (years)		-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0 - 13.9	14.0-	unkn	total
900	**Ophthalmology**										
901	Cataracts		1		1	2	14	7	2	2	29
902	Progressive retinal atrophy			1		1					2
903	Retinal dysplasia	2	1								3
904	Retinal disease						1				1
905	Persistent hyaloid artery	8									8
919	other	6	1	3	1	2	3				16
1000	**Orthopedic**										
1001	Arthritis			1	1	12	28	18	2	3	65
1002	Hip dysplasia	1	12	2	2	1					16
1003	Elbow dysplasia	2									2
1004	cruciate ACL			4	1	1	2	1			9
1019	other			1	1	2	2	1			7
1100	**Female reproduction**										
1101	Anestrus			1	1		1				3
1102	Pyrometria		1	4	4					1	10
1103	Vaginitis (inflammation)	2								1	3
1104	Abnormal estrus cycle	2	3		4					1	10
1105	Primary uterine inertia		1	1	1					1	4
1106	Infertile			2						1	3
1119	other			2						1	3
1200	**Male reproduction**										
1201	Cryptorchidism		11								11
1202	Monochidism		9								9
1203	Testicular atrophy	1			1						2
1204	Lack of semen/sperm		3			1				1	5
1205	Abnormal sperm										0
1206	Congential defects										0
1207	Prostatitis (inflammation)		1	1						1	3
1208	Prostatic hypertrophy					1					1
1219	other					1	1				2
1300	**Temperament**										
1301	Aggressive	5		1	2			1			9
1302	Fearful	12	1							5	18
1303	Shyness	14		1						1	16
1304	Unstable	1		1							2
1319	other		1	1						1	3

Appendix Table 2. Disease/condition segregated by age at diagnosis (cont 3)											
disease / age (years)		-1.9	2.0-3.9	4.0-5.9	6.0-7.9	8.0-9.9	10.0-11.9	12.0 - 13.9	14.0-	unkn	total
1400	**Nonmalignant cysts**										
1401	Hemangiomia			1	1	1					3
1402	Histiocytoma	2		1	1	1					5
1403	Lipomas		5	8	7	9	11	1		4	44
1404	Mammary adenomas		1	3	1	5				1	11
	undefined	1		1	2						4
1419	other	1	3	2	3	4	4				17