

Greater Swiss Mountain Dog Club of America Breed Health Survey 2000 & 2001

GSMDCA Health Committee
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ABSTRACT

PURPOSE: The purpose of this survey was to determine the health status of Greater Swiss Mountain Dogs (Swissys) in the United States. **METHODS:** Swissys living for any portion of 2000 and 2001 were eligible. A two-page questionnaire was made available to Swissy owners on-line or through the Greater Swiss Mountain Dog Club of America newsletter between March and July 2002. **RESULTS:** A total of 846 valid entries were submitted. Of the 846 entries, 775 (91.6%) were alive at the time of entry and 71 (8.4%) had died. The Swissys that were living ranged in age from 7 to 146 months (12 years, 2 months), with a median age of 42 months. For Swissys that had died, the age of death ranged from 1 to 157 months (13 years, 1 month), with a median of 81 months (6 years, 9 months). The three most common known general causes of death, together accounting for approximately 70% of the deaths, were cancer (26.8%), gastrointestinal conditions (21.4%), and neurologic conditions (21.4%). The most common specific causes of death were gastric dilatation-volvulus (bloat) (6 Swissys), unspecified cancers (4), seizures without a cause (idiopathic epilepsy) (5), splenic torsion (4), and unspecified seizures that may or may not represent additional deaths from idiopathic epilepsy (3). The most common conditions reported were: distichiasis (19.4%), licking episodes (17.3%), urinary incontinence (11.0%), umbilical hernia (9.6%), pica (9.1%), hip dysplasia (9.1%), cystitis (8.0%), seizures without a cause (idiopathic epilepsy, including fly-snapping) (5.9%), osteochondritis dissecans (5.4%), food allergies (5.4%), irritable/inflammatory bowel syndrome (5.1%), gastric dilatation-volvulus (bloat) (5.3%), panosteitis (4.7%), skin allergies (4.6%), elbow dysplasia (4.4%), splenic torsion (4.4%), cataracts (4.3%), crooked tail (3.7%), chronic ear infections (3.3%), and entropion (2.8%). The most common descriptions of Swissy temperament were very friendly (67.6% of Swissys), confident (49.9%), and protective (31.4%). Potentially dangerous temperament characteristics were reported as follows: dog aggressive (7.0%), aggressive (1.8%), has bit a person (1.8%), and rage syndrome (0.4%). **CONCLUSIONS:** Swissys, like other large breed dogs, are relatively short-lived, although some do live to 12 or 13 years of age. Bloat, epilepsy, and splenic torsion are among the most common and fatal health conditions exhibited by Swissys. Cancers, while not common overall, were among the most common causes of death. Of the remaining common conditions, some have an impact on the quality of life of the Swissy (hip dysplasia, for example), others also have an impact on the quality of life of owners (urinary incontinence, for example), and some typically have little impact for Swissy or owner (distichiasis and crooked tail, for example). Although a majority of Swissys were described as "very friendly," the presence of Swissys described as having potentially dangerous temperament characteristics reminds Swissy owners and breeders of their responsibility to breed and raise Swissys in ways that promote temperaments and behaviors appropriate to stable working dogs and safe family pets.

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Photo: Paradise Enterprising August, CD, owned by Beth and Gary Shoemaker*

PURPOSE

The purpose of this breed health survey was to determine the health status of Greater Swiss Mountain Dogs (Swissys) living in the United States during 2000 and 2001. Descriptive data from the survey were summarized and reported by the Greater Swiss Mountain Dog Club of America (GSMDCA) Health Committee. Estimates of disease gene frequencies will be generated in 2003 by veterinary consultant George Padgett, DVM, from information collected through the survey.

METHODS

Subjects and Instrument

Swissys living for any portion of 2000 and 2001 were eligible. Our consultant estimated that 650 entries would be needed to be able to generate valid disease gene frequencies. A two-page questionnaire was designed by the Health Committee, in consultation with Dr. Padgett.

Procedures

Data collection was done over a 4-month period from March 15, 2002 through July 15, 2002. The questionnaire was made available to Swissy owners in two formats. The on-line format enabled owners to enter data electronically. The on-line format was announced in mid-March through two different on-line forums of interest to Swissy fanciers. In addition, a link to the on-line survey site was made available at the web site of the GSMDCA. Frequent reminders to participate in the survey were distributed through these on-line forums. A final push for submission of on-line entries was made in late June by sending an e-mail survey reminder to all GSMDCA members for whom the membership secretary had a valid e-mail address. To ensure that the survey was available to all members regardless of their access to the Internet, a hard-copy format of the questionnaire was reproduced in two issues of the club newsletter. Completed hard-copy questionnaires were sent to a member of the Health Committee who entered them into the on-line format.

Data Analysis

First, the data set was checked for duplicate entries. Duplicates were eliminated if, in addition to having the same items checked across the survey, they also had identical narrative comments. Eleven duplicate entries were not eliminated; these duplicates had the same items checked throughout, but no comments that would help determine whether they represented a single Swissy or different Swissys with the same health information. All of these possible duplicate entries had very few conditions and none had histories of rare conditions. Therefore, we chose to err on the side of including this small number of possible duplicates.

Second, the narrative sections of the survey were categorized. Narrative responses were requested for cause of death, for detailed information on a limited number of diseases or conditions, for "other" conditions in each survey category, and in a final "additional information" category. Two members of the Health Committee with health care backgrounds (a veterinarian and a physical therapist) reviewed the comments and made decisions about categorizing the information. Comments that did not add information beyond what was already checked were eliminated. Comments related to variations in conformation (e.g. overbite, cow-hocked) were also eliminated.

Third, response patterns across 5 different dates were examined to test for the systematic biases that can be introduced when using non-random sampling. The 20 most common diseases or conditions were compared across 5 different dates during the data collection period. The difference between the highest and the lowest calculated percentage for each condition was compared against the mean percentage across the 5 dates to give a "percent change" indicator of the stability of survey responses across the data collection period.

Fourth, the demographic variables (including reproductive status, age of Swissys living at the time of the survey, age of Swissys that had died, and causes of death) were summarized. For the age variables, the median (the middle point of the data set) was calculated.

Fifth, we computed a summary variable by adding up the number of health conditions marked for each Swissy, excluding the coloring conditions and the reproductive conditions. Means and medians were then calculated for the total group and various subgroups.

Sixth, descriptive analyses were conducted for each condition. The frequency (number) and percentage of Swissys with each condition (except the female and male reproductive conditions) were calculated for all Swissys in the data

set. To give a sense of how the conditions were distributed across the lifespan, the complete data set was divided in fourths according to age at the time of the survey or age at the time of death. Because the survey did not ask for the age of the Swissys at the time a condition developed, the breakdown by age—while interesting—does not give definitive information about when the condition typically develops. For example, a pattern whereby younger Swissys have a history of the condition far more often than older Swissys may mean that Swissys with that condition do not survive into old age. However, it can also mean that the condition is more common today than it was previously or that the condition is diagnosed more often today because of enhanced awareness or improved diagnostic techniques. Conversely, a pattern whereby older Swissys have a history of the condition far more often than younger Swissys may mean that the disease does not develop, or does not become symptomatic, until old age. However, it can also mean that the condition is less common today than previously or that diagnostic criteria have changed in recent years and narrowed the definition of the condition.

For some conditions, the frequencies and percentages are reported for various subgroups. The percentage with reproductive conditions that apply to all females or males regardless of whether or not they have been bred (for example, vaginal infections and undescended testicles) was calculated based on the total number of females and males, respectively. For reproductive conditions that only apply to Swissys with attempted breedings (for example, difficulty whelping and sterility), the percentage was calculated based on the number of females and males with attempted breedings. The percentage with the orthopedic conditions of hip dysplasia, osteochondritis dissecans, and elbow dysplasia was calculated for the sample overall and for the subgroups with hip, shoulder, and elbow radiographs, respectively. Additional subgroup comparisons are described within the body of the results.

For some of the subgroup analyses, we used statistical tests to help determine whether there were significant differences among the subgroups. The tests we used were the independent *t*-test and analysis of variance for differences between means and the chi-square test for differences between frequencies. In brief, statistical tests enable researchers to determine which differences among subgroups are likely to be due to chance (nonsignificant differences) and which are unlikely to be due to chance and can be inferred to represent “true” differences among groups (significant differences). For this report, probabilities less than .05 (5%) were considered to represent significant differences. In some cases, generally when analyzing conditions that had low prevalence rates, the statistical tests were not valid because the mathematical assumptions required of the tests were not met. In general, the statistical probabilities (*p* values) are reported only when a significant difference was identified or when a seemingly large difference was not statistically significant.

RESULTS AND DISCUSSION

Responses and Response Patterns

A total of 846 valid entries were submitted. To test for the systematic biases that can be introduced when using non-random sampling, we examined the stability of response patterns for the 20 most common conditions across 5 dates. Prevalence rates differed by 25% or less for 18 of the top 20 conditions. The remaining two conditions, chronic ear infections and splenic torsion, had changes of 38.2% and 59.7%, respectively. In both cases, a disproportionate number of Swissys with these conditions were entered late in the survey period. Readers should keep this response instability in mind when interpreting the data for chronic ear infections and splenic torsion. Appendix A provides detail on the calculation of response stability.

Sex and Reproductive Status

More females (444, 52.5%) than males (402, 47.5%) were entered. The reproductive status of 798 entries was indicated. Of these, 391 were intact (49.0%) and 407 (51.0%) were neutered. Table 1 shows reproductive status in more detail. A higher proportion of females (31.2%) than males (19.9%) were bred ($p = .000$).

Age of Swissys

Of the 846 entries, 775 (91.6%) were alive at the time of entry and 71 (8.4%) had died. For Swissys that were living, age was calculated based on June 2002, the approximate mid-point of the survey. The Swissys that were living ranged in age from 7 to 146 months (12 years, 2 months), with a median age of 42 months (3 years, 6 months). For Swissys that had died, the age of death ranged from 1 to 157 months (13 years, 1 month), with a median of 81 months (6 years, 9 months). One quarter of Swissys died before the age of 44 months (3 years, 8 months), another quarter died between the ages of 45 and 80 months (3 years, 9 months and 6 years, 8 months). Another quarter died between the ages of 81 months and 114 months (6 years, 9 months and 9 years, 6 months), and the final quarter between the ages of 115 months and 157 months (9 years, 7 months and 13 years, 1 month).

Table 1. Reproductive Status						
		Intact, attempted breedings	Intact, no attempted breedings	Neutered, attempted breedings	Neutered, no attempted breedings	Total
Females	Frequency	74	132	54	150	410
	% of Females	18.0	32.2	13.2	36.6	100.0
Males	Frequency	55	130	22	181	388
	% of Males	14.2	33.5	5.7	46.6	100.0
Total	Frequency	129	262	76	331	798
	% of Total	16.2	32.8	9.5	41.5	100.0

Of the Swissys that had died, 37 were females (8.3% of the females) and 34 were males (8.5% of the males). The median age of death for females was 86 months (7 years, 2 months) and for males was 70 months (5 years, 10 months). Although the difference between the sexes in age at the time of death appears large, it was not statistically significant ($p = .421$) because of the small number of Swissys in each group and the wide variability in ages at the time of death.

Causes of Death

General causes of death are given in Table 2 and more specific causes of death are listed in Table 3. When “euthanasia” was listed as the cause of death without any other explanation, this was coded “unspecified.” When “euthanasia” was listed with an explanation, that explanation was coded as the cause of death. For two Swissys, two causes of death were listed. In these instances the cause of death is coded with the first listed cause for Table 2, but both causes are listed in Table 3.

The three most common known general causes of death, together accounting for approximately 70% of the deaths, were cancer (26.8%), gastrointestinal conditions (21.4%), and neurologic conditions (21.4%). The most common specific causes of death were bloat (6 Swissys), epilepsy (5), splenic torsion (4), unspecified cancers (4), and unspecified seizures that may or may not represent additional deaths from epilepsy (3).

For the four most common specific causes of death, we also determined the median age of death (of any cause) for Swissys with histories of these serious conditions. For 20 Swissys who had had cancer, the median age of death was 114 months (9 years, 6 months). For 15 Swissys who had had bloat, the median age of death was 112 months (9 years, 4 months). For 14 Swissys who had had splenic torsion, the median age of death was 110 months (9 years, 2 months). For 9 Swissys with idiopathic epilepsy, the median age of death was 45 months (3 years, 9 months).

Number of Conditions

A summary measure of overall health was created by adding up the number of conditions, excluding coloring conditions and reproductive conditions, for each Swissy. The median number of health conditions was 1.0; the mean was 1.6, and the range was from 0 to 11 conditions. Table 4 shows that more than one-quarter of the Swissys had no health conditions and more than half had one or fewer conditions. Not surprisingly, the average number of conditions increased with the age of the Swissy. The youngest quarter had an average of 0.9 conditions, the next quarter 1.4, the next quarter 1.7, and the oldest quarter had an average of 2.3 conditions. There was a significant difference in the average number of health conditions across age groups ($p = .000$), with the oldest groups having more health conditions than the younger groups.

Most Common Conditions

Table 5 shows the 20 most common conditions for all Swissys, with comments to help readers interpret some of the findings. The survey, Appendix B, is annotated with summary data for those who wish to view an overall "snapshot" of the survey findings, including those conditions that were not reported for any Swissys.

Cause	Frequency	Percent
Cancer	15	26.8
Gastrointestinal	12	21.4
Neurologic	12	21.4
Kidney	5	8.9
Medical/Surgical	3	5.4
Other	3	5.4
Temperament	2	3.6
Orthopedic	2	3.6
Endocrine	1	1.8
Cardiac	1	1.8
Total	56	100.0

Number of conditions	Frequency	Percent
0	239	28.3
1	261	30.9
2	151	17.8
3	85	10.0
4	57	6.7
5	23	2.7
6	9	1.1
7	10	1.2
8	6	0.7
9	3	0.4
11	2	0.2
Total	846	100.0

Cause	Frequency	Cause	Frequency
Cancer, unspecified	6	Kidney, glomerulonephritis	1
Cancer, hemangiosarcoma	2	Kidney, kidney failure	1
Cancer, brain tumors	1	Kidney, mesangial proliferative glomerulonephritis	1
Cancer, kidney	1	Kidney, renal dysplasia	1
Cancer, lymphosarcoma	1	Kidney, underdeveloped kidneys	1
Cancer, malignant histiocytosis	1		
Cancer, mast cell tumor	1	Medical/surgical, drug reaction	1
Cancer, osteosarcoma	1	Medical/surgical, exsanguination after surgery	1
Cancer, spinal	1	Medical/surgical, surgical complications	1
GI, bloat	6	Other, drowned	1
GI, splenic torsion	4	Other, accidental	1
GI, unspecified	1	Other, Rocky Mountain Spotted Fever	1
GI, aspiration pneumonia due to megaesophagus	1		
		Temperament, euthanized	2
Neuro, seizures	3		
Neuro, epilepsy	3	Ortho, spinal arthritis	1
Neuro, stroke	2	Ortho, spinal degeneration and epilepsy	1
Neuro, epilepsy and wobblers	1		
Neuro, hydrocephalus	1	Endocrine, pancreatitis	1
Neuro, meningitis	1		
Neuro, spinal cord disease.	1	Cardiac, heart attack	1

Coloring Conditions

Table 6 shows the frequency of coloring conditions that do not meet the AKC standard for Swissys. Three of the blue-coated Swissys also had blue eyes. Because some question the overall health and temperament of Swissys with nonstandard coloring, we did some additional analyses. Compared to the 1.6 average for Swissys with standard coloring, the mean number of health conditions for the blue-eyed Swissys was 2.2, for the blue-coated Swissys was 1.7, and for the red-coated Swissys was 1.4. These differences were not statistically significant. Compared to a median age of death of 82 months for Swissys with standard coloring, 3 blue-eyed Swissys died at the ages of 52, 65, and 116 months. There were no deaths among blue-coated Swissys and only one death (at the age of 33 months) for a red-coated Swissy. The Swissys with nonstandard coloring had very few reported temperament problems.

Table 5. Twenty Most Common Diseases/Conditions			
Disease/Condition	Overall Frequency	Overall Percent	Comment
Distichiasis (extra lashes)	164	19.4	
Licking episodes	146	17.3	See relationship to bloat and prophylactic gastropexy, Table 7.
Urinary incontinence	93	11.0	Higher percent in females (20.0%), particularly the oldest quarter of females (34.7%), Table 12.
Umbilical hernia	81	9.6	
Pica	77	9.1	Based on comments included by respondents, some reported cases may represent expected chewing as a puppy rather than clinical pica.
Hip dysplasia	77	9.1	More prevalent among Swissys with hip radiographs (15.7%) and older Swissys. Table 8. Compare with 19.4% hip dysplasia for Swissys in the OFA data base.
Cystitis	68	8.0	More prevalent among females (13.1%), Table 12.
Seizures without a cause (idiopathic epilepsy + fly snapping)	50	5.9	Also a leading cause of death (Tables 2 and 3). Prevalence is 4.6% if fly-snapping behavior is not included.
Osteochondritis dissecans	46	5.4	More prevalent among Swissys with shoulder radiographs (15.3%), Table 8.
Food allergies	46	5.4	
Irritable/inflammatory bowel syndrome	43	5.1	
Gastric dilatation-volvulus (bloat)	45	5.3	Also a leading cause of death (Tables 2 and 3). More prevalent in older Swissys (Table 6). Also, see relationship to licking episodes and prophylactic gastropexy, Table 7.
Panosteitis	40	4.7	
Skin allergies	39	4.6	
Elbow dysplasia	37	4.4	More prevalent among Swissys with radiographs (9.6%), Table 8. Compare with 12.5% elbow dysplasia for Swissys in the OFA data base.
Splenic torsion	37	4.4	Also a leading cause of death (Tables 2 and 3). More prevalent in older Swissys (Table 6). Prevalence rates not stable across survey (Appendix B).
Cataracts	36	4.3	More prevalent in older Swissys, Table 9.
Crooked tail	31	3.7	
Chronic ear infections	28	3.3	Prevalence rates not stable across survey (Appendix B).
Entropion	24	2.8	

Congenital Conditions

Table 6 also shows the prevalence of the congenital conditions of umbilical hernia and cleft palate. Umbilical hernias were fairly common, at 9.6% of all Swissys. Ten other congenital conditions were identified: 3 congenital foot deformities, 2 inguinal hernias, 2 hypoplastic soft palates, 1 “short” soft palate that may be another hypoplastic soft palate, 1 diaphragmatic hernia, and 1 congenital eye deformity.

Gastrointestinal Conditions

Table 6 also shows the prevalence of gastrointestinal conditions. We recoded two of the gastrointestinal variables based on our analysis of the narrative comments. First, we noted that some respondents indicated that their Swissy had frequent licking episodes, but that they would not characterize them as the “violent licking episodes” included on the survey. To capture this phenomenon, we renamed the condition “licking episodes” and included those with a narrative comment related to licking episodes. However, it should be noted that it is not clear whether all owners who checked “licking episodes” are referring to the same phenomenon. Second, there were several respondents who noted that their Swissy had “inflammatory” but not “irritable” bowel syndrome. We renamed this condition “irritable/inflammatory bowel syndrome” and included those with a narrative comment related to inflammatory bowel syndrome.

Several gastrointestinal conditions are quite prevalent among Swissys: licking episodes (17.3%), pica (9.1%), bloat (5.3%), irritable/inflammatory bowel syndrome (5.1%), and splenic torsion (4.4%). Bloat, irritable/inflammatory bowel syndrome, and splenic torsion were more prevalent in older Swissys ($p = .000, .032, \text{ and } .000$, respectively). The median age of death for Swissys that had had bloat or splenic torsion was 112 and 110 months, respectively. Pica was more prevalent in younger Swissys ($p = .020$). Since pica was defined on the survey as “eats non-food items often” it may be that the high prevalence overall and the higher prevalence among younger Swissys represents typical chewing as a puppy rather than true clinical pica. Forty-five entries listed “other” gastrointestinal conditions: frequent vomiting (26 Swissys), sensitive stomach (7), enlarged or inflamed spleen (3), excessive gas (3), loose stools (3) and one each enzymatic disorder, poor appetite, and pyloric stenosis.

Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Coloring: Blue Eyes	Frequency	17	7	4	4	2
	Percent	2.0	3.3	2.0	1.9	0.9
Coloring: Blue Coat	Frequency	12	3	6	3	0
	Percent	1.4	1.4	3.0	1.4	0.0
Coloring: Red Coat	Frequency	14	4	5	1	4
	Percent	1.7	1.9	2.5	0.5	1.9
Congenital: Umbilical Hernia	Frequency	81	17	21	20	23
	Percent	9.6	8.0	10.3	9.3	10.7
Congenital: Cleft Palate	Frequency	4	0	2	1	1
	Percent	0.5	0.0	1.0	0.5	0.5
GI: Irritable/Inflam Bowel Syndrome	Frequency	43	5	8	18	12
	Percent	5.1	2.3	3.9	8.4	5.6
GI: Intussuception	Frequency	3	1	0	2	0
	Percent	0.4	0.5	0.0	0.9	0.0
GI: Bloat	Frequency	45	7	5	5	26
	Percent	5.3	3.3	2.5	2.3	12.1
GI: Splenic Torsion	Frequency	37	1	1	9	26
	Percent	4.4	0.5	0.5	4.2	12.1
GI: Megaesophagus	Frequency	4	1	1	0	2
	Percent	0.5	0.5	0.5	0.0	0.9
GI: Licking Episodes	Frequency	146	31	39	39	37
	Percent	17.3	14.6	19.2	18.1	17.2
GI: Pica	Frequency	77	26	25	13	13
	Percent	9.1	12.2	12.3	6.0	6.0

Prophylactic gastropexy is an elective procedure thought to decrease the incidence of bloat. In our sample, 87 Swissys had undergone prophylactic gastropexy. Of these, 70 were females (15.8% of the females) and 17 were males (4.2% of the males). Furthermore, of the 70 females who had undergone prophylactic gastropexy, almost all (61) had also been spayed. Though the timing of the spaying and gastropexy were not determined in this survey, our data seem to support the known practice of having a prophylactic gastropexy performed at the time of the spaying surgery. We explored several relationships between prophylactic gastropexy, bloat, deaths from bloat, and two possibly related conditions—splenic torsion and licking episodes.

Table 7 shows that the prevalence of bloat was approximately the same for Swissys undergoing prophylactic gastropexy as for those who had not undergone the procedure. In addition, 16% of Swissys who bloated without prophylactic gastropexy died from bloat, while no Swissys who bloated with prophylactic gastropexy died from bloat. We cannot draw strong conclusions about the benefit of prophylactic gastropexy from these data because the numbers are too small, the simple relationship between the two conditions does not account for variables such as age and risk for bloat, and the numbers do not represent lifetime bloat statistics. Owners considering prophylactic gastropexy should consult their veterinarians and published research for more definitive information about the benefits and risks of prophylactic gastropexy.

Splenic torsion and licking episodes were significantly more likely to be present in Swissys with prophylactic gastropexy than for those who had not undergone the procedure ($p = .000$ and $.001$, respectively). Although it is impossible to determine cause and effect from survey data, it seems plausible that Swissys with licking episodes are viewed as “at risk” for bloat and are therefore more likely to undergo prophylactic gastropexy than Swissys without licking episodes. It also seems likely that some Swissys with splenic torsion have a prophylactic gastropexy performed at the time the torsed spleen is removed.

		Prophylactic Gastropexy	No Prophylactic Gastropexy	Total
		n = 87	n = 759	n = 846
Bloat	Frequency	5	40	45
	Percent	5.7	5.3	5.3
Splenic Torsion	Frequency	12	25	37
	Percent	13.8	3.3	4.4
Licking Episodes	Frequency	26	120	146
	Percent	29.9	15.8	17.3
		Bloated with Prophylactic Gastropexy	Bloated without Prophylactic Gastropexy	Total
		n = 5	n = 38	n = 45
Died of Bloat	Frequency	0	6	6
	Percent	0.0%	15.0 %	13.3%
Did Not Die of Bloat	Frequency	5	34	39
	Percent	100.0%	85.0%	86.7%

We also did a crosstabulation of licking episodes and bloat. Overall, about 17% of Swissys had licking episodes and approximately 5% of Swissys had bloated. However, among the subset of Swissys who had bloated, almost 42% had licking episodes and among the subset of Swissys who had licking episodes, approximately 12% had bloated. These findings were statistically significant ($p = .000$), providing preliminary support for the hypothesized relationship among the two conditions.

Furthermore, we did a crosstabulation of splenic torsion and bloat. Overall, about 4% of Swissys had splenic torsion and approximately 5% of Swissys had bloated. However, among the subset of Swissys who had bloated, about 22% had splenic torsion and among the subset of Swissys who had splenic torsion, about 27% had bloated. These

findings were statistically significant ($p = .000$), providing preliminary support for a possible relationship between the two conditions. Further study of the possible relationships among licking episodes, bloat, and splenic torsion is needed.

Orthopedic Conditions

Table 8 shows the results for the orthopedic conditions. For hip dysplasia, osteochondritis dissecans, and elbow dysplasia, two prevalence rates are given: one for the overall sample and one for each of the subsets that had undergone hip, shoulder, or elbow radiographs, respectively. The rates of all three conditions were consistently higher for Swissys who had radiographs.

There were significant differences across age groups for hip dysplasia ($p = .000$), anterior cruciate ligament tears ($p = .044$), and osteochondritis dissecans (OCD) ($p = .005$). Higher proportions of older Swissys were reported to have hip dysplasia and anterior cruciate ligament tears and higher proportions of younger Swissys were diagnosed with OCD. The high prevalence (47.8%) of OCD among the youngest Swissys who had had shoulder radiographs could indicate a recent increase in prevalence within the breed, but is likely explained by the fact that young Swissys are unlikely to have their shoulders radiographed unless they are symptomatic. All of the patterns seen across age groups need to be interpreted conservatively since the age at onset of the conditions was not collected.

We tested for an association between hip and elbow dysplasia among the 358 Swissys with radiographs of both hips and elbows. Twenty percent of Swissys with hip dysplasia also had elbow dysplasia and 29.0% of Swissys with elbow dysplasia also had hip dysplasia, indicating a significant association between the two conditions ($p = .008$).

Thirty-two entries listed other orthopedic conditions, including: spondylosis (17 entries), spinal arthritis (8), fracture (2), tendinitis (2), and one entry each for hemivertebra, limb growth abnormality, and persistent open fontanel.

Neurologic Conditions

Table 9 shows the prevalence of neurologic conditions. The questionnaire had three separate listings for different types of seizure activity: seizures of known cause, seizures without a cause (parenthetically defined as idiopathic epilepsy), and “fly-snapping” behavior. The prevalence of seizures without a cause increased across age groups ($p = .003$), with quite low prevalence in the youngest Swissys, lending support to the common belief that idiopathic epilepsy is rarely expressed before the age of 2 years.

The prevalence of seizures without a cause was 4.6% (39 Swissys) and of fly-snapping behavior was 1.9% (16 Swissys). Five of the respondents who checked “fly-snapping behavior” also checked “seizures without a cause.” Because some consider fly-snapping behavior to be a form of idiopathic epilepsy, we also calculated the prevalence of dogs with either seizures without a cause and/or fly-snapping behavior: 5.9% (50 Swissys). As noted previously, one of the most common causes of death was epilepsy (5 Swissys) or unspecified seizures (3 Swissys) and the median age at death for Swissys with epilepsy was 45 months (3 years, 9 months).

Because some have hypothesized that licking episodes may be a neurologic rather than gastrointestinal phenomenon, we looked for—but did not find—an association between licking episodes and seizures without a cause.

Respondents listed 7 different causes for “seizures of known cause”: toxin, ketamine reaction, heartworm medication, attack by other dog, brain tumor, gag-related, and hypoglycemia. Four other neurologic conditions were identified, one each of cervical radiculopathy, stroke, viral encephalopathy, and myelopathy.

Eye and Ear Conditions

Table 9 shows the prevalence of eye and ear conditions. Distichiasis (extra lashes) was noted for almost 20% of Swissys and entropion was noted for almost 3%. The prevalence of cataracts increased with age ($p = .000$). Sixteen other eye and ear conditions were identified: allergic conjunctivitis (eye allergies) (3), eye lid cyst/tumor (2), benign eye lesion (2), and one each of blind eye, perforated cornea, recessed eye, micropapilla, malaligned eyes, eye infection, Horner’s syndrome, keratoconjunctivitis sicca, and deafness.

Table 8: Orthopedic Conditions						
Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Ortho: Hip Dysplasia ^a	Frequency	77	4	12	25	36
	Percent	9.1	1.9	5.9	11.6	16.7
Ortho: Osteochondritis Dissecans ^b	Frequency	46	11	16	10	9
	Percent	5.4	5.2	7.9	4.7	4.2
Ortho: Panosteitis	Frequency	40	10	11	11	8
	Percent	4.7	4.7	5.4	5.1	3.7
Ortho: Anterior Cruciate Ligament Tear	Frequency	19	0	4	7	8
	Percent	2.2	0.0	2.0	3.3	3.7
Ortho: Patellar Luxation	Frequency	16	1.0	4	5	6
	Percent	1.9	0.5	2.0	2.3	2.8
Ortho: Elbow Dysplasia ^c	Frequency	37	3	12	12	10
	Percent	4.4	1.4	5.9	5.6	4.7
Ortho: Spinal Myelopathy	Frequency	4	0	0	0	4
	Percent	0.5	0.0	0.0	0.0	1.9
Ortho: Cervical Vertebral Instability	Frequency	9	0	1	3	5
	Percent	1.1	0.0	0.5	1.4	2.3
Ortho: Luxating Tarsus	Frequency	9	0	0	2	7
	Percent	1.1	0.0	0.0	0.9	3.3
Ortho: Intervertebral Disc Disease	Frequency	5	0	1	1	3
	Percent	0.6	0.0	0.5	0.5	1.4
Ortho: Crooked Tail	Frequency	31	9	8	5	9
	Percent	3.7	4.2	3.9	2.3	4.2
Ortho: Hypertrophic Osteodystrophy	Frequency	1	0	1	0	0
	Percent	0.1	0.0	0.5	0.0	0.0
^a Swissys with Hip Radiographs		n = 466	n = 37	n = 107	n = 149	n = 173
Ortho: Hip Dysplasia	Frequency	73	4	12	23	34
	Percent	15.7	10.8	11.2	15.4	19.7
^b Swissys with Shoulder Radiographs		n = 236	n = 23	n = 60	n = 82	n = 71
Ortho: Osteochondritis Dissecans	Frequency	36	11	11	7	7
	Percent	15.3	47.8	18.3	8.5	9.9
^c Swissys with Elbow Radiographs		n = 375	n = 24	n = 86	n = 126	n = 139
Ortho: Elbow Dysplasia	Frequency	36	3	12	12	9
	Percent	9.6	12.5	14.0	9.5	6.5

Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Neuro: Bacterial Meningitis	Frequency	1	0	0	0	1
	Percent	0.1	0.0	0.0	0.0	0.5
Neuro: Hydrocephalus	Frequency	1	1	0	0	0
	Percent	0.1	0.5	0.0	0.0	0.0
Neuro: Seizures of Known Cause	Frequency	8	0	1	4	3
	Percent	0.9	0.0	0.5	1.9	1.4
Neuro: Seizures without a Cause (Idiopathic Epilepsy)	Frequency	39	2	8	18	11
	Percent	4.6	0.9	3.9	8.4	5.1
Neuro: Fly-Snapping Behavior	Frequency	16	0	5	5	6
	Percent	1.9	0.0	2.5	2.3	2.8
Eye: Entropion	Frequency	24	2	7	7	8
	Percent	2.8	0.9	3.4	3.3	3.7
Eye: Ectropion	Frequency	2	0	0	0	2
	Percent	0.2	0.0	0.0	0.0	0.9
Eye: Distichiasis	Frequency	164	35	35	41	53
	Percent	19.4	16.4	17.2	19.1	24.7
Eye: Cataracts	Frequency	36	0	5	13	18
	Percent	4.3	0.0	2.5	6.0	8.4
Eye: Progressive Retinal Atrophy	Frequency	1	0	0	1	0
	Percent	0.1	0.0	0.0	0.5	0.0
Ear: Hematomas	Frequency	4	0	0	2	2
	Percent	0.5	0.0	0.0	0.9	0.9
Ear: Chronic Ear Infections	Frequency	28	2	5	11	10
	Percent	3.3	0.9	2.5	5.1	4.7

Skin Conditions and Allergies

Table 10 shows the prevalence of skin conditions and allergies. Food and skin allergies were identified for about 5% of Swissys and nasal allergies for almost 2%. The prevalence of skin allergies varied across age groups ($p = .023$). Sixteen other skin conditions and allergies were identified: flea allergies (5), drug allergy (2), sebaceous cyst (2), calcinosis cutis, discoid lupus, ear allergy, fatty cysts, folliculitis, mange (undetermined type), and papilloma.

Cancers

Table 11 shows the prevalence of cancers. Mast cell tumors were the most common form of cancer, reported in almost 2% of Swissys in the survey. Most of the cancers appeared to show age-related patterns, with almost no reports in younger Swissys and almost all of the reports in the oldest quarter of the sample. Mast cell tumors, for example, were not reported in Swissys 64 months of age or younger, but were present in 7% of Swissys aged 65 months and older. The cancer data did not, however, meet the mathematical assumptions necessary to test statistically the association between cancer and age. For 20 Swissys who had had cancer, the median age of death was 114 months (9 years, 6 months). Eight other cancers were reported: thyroid (2), unspecified (2) and one each of hemangiopericytoma, renal, stomach mass, and testicular cancer.

Blood Disorders

Table 11 shows the prevalence of blood disorders. None were reported in more than 0.6% of Swissys. The causes of the 5 cases of anemia were reported as post splenic torsion (2), and one each of internal bleeding, old age, and reaction to prednisone. Only one other blood disorder was reported, a severe bloody nose.

Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Skin: Chronic Hot Spots	Frequency	13	1	4	3	5
	Percent	1.5	0.5	2.0	1.4	2.3
Skin: Seborrhea	Frequency	3	1	1	1	0
	Percent	0.4	0.5	0.5	0.5	0.0
Skin: Demodectic Mange	Frequency	11	5	2	2	2
	Percent	1.3	2.3	1.0	0.9	0.9
Skin: Sarcoptic Mange	Frequency	1	0	0	0	1
	Percent	0.1	0.0	0.0	0.0	0.5
Skin: Pyoderma	Frequency	4	2	0	2	0
	Percent	0.5	0.9	0.0	0.9	0.0
Allergies: Food Allergies	Frequency	46	8	14	15	9
	Percent	5.4	3.8	6.9	7.0	4.2
Allergies: Skin Allergies	Frequency	39	5	17	9	8
	Percent	4.6	2.3	8.4	4.2	3.7
Allergies: Nasal Allergies	Frequency	16	2	7	4	3
	Percent	1.9	0.9	3.4	1.9	1.4
Skin: Calcinosis Circumscripta	Frequency	1	0	0	1	0
	Percent	0.1	0.0	0.0	0.5	0.0
Skin: Systemic Lupus Erythematosus	Frequency	1	0	0	1	0
	Percent	0.1	0.0	0.0	0.5	0.0

Endocrine and Liver Conditions

Table 12 shows the prevalence of endocrine conditions. Only one condition, hypothyroidism was reported in more than 1% of Swissys. The only other reported endocrine condition was one case of diabetes insipidus. Neither of the listed liver conditions was reported. Only 2 other liver conditions were noted, one each of hepatic torsion and liver failure of undetermined origin.

Kidney and Urinary Conditions

Table 12 shows the prevalence of kidney and urinary conditions. Cystitis and urinary incontinence were both common, reported for 8% and 11% of Swissys, respectively. The reports of urinary incontinence may be slightly exaggerated by 7 cases of what owners referred to as “puppy incontinence.” These may represent difficulty housebreaking rather than a health condition. However, because most of the cases were reported in older Swissys, this possible over-reporting has very little impact on the prevalence rate.

Because both cystitis and urinary incontinence are thought to occur more often in females than males, we also ran these analyses separately for the sexes. Our findings support this conventional wisdom, as cystitis was reported in 13.1% of females compared to 2.5% of males ($p = .000$) and urinary incontinence in 20.0% of females and 1.0% of males ($p = .000$). There was an age-related pattern of urinary incontinence in the females, reported in 34.7% of the oldest group of female Swissys ($p = .000$). As with other differences across age groups, interpretation is difficult because age at onset of incontinence was not collected. Nine other kidney and urinary conditions were noted: kidney failure (2), and one each of ectopic ureter, pelvic bladder, scarred kidney, underdeveloped kidney, unspecified renal disease, urate crystals, and membranoproliferative glomerulonephritis.

Heart Conditions

Table 12 shows the prevalence of heart conditions. There was only one reported case each of subaortic stenosis and heart murmur.

Table 11: Cancers and Blood Conditions						
Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Cancer: Mammary Gland	Frequency	5	0	0	0	5
	Percent	0.6	0.0	0.0	0.0	2.3
Cancer: Skin and Subcutaneous	Frequency	7	0	0	0	7
	Percent	0.8	0.0	0.0	0.0	3.3
Cancer: Mouth (Viral Papillomas)	Frequency	4	0	0	0	4
	Percent	0.5	0.0	0.0	0.0	1.9
Cancer: Osteosarcoma	Frequency	1	1	0	0	0
	Percent	0.1	0.5	0.0	0.0	0.0
Cancer: Leukemia	Frequency	1	0	0	1	0
	Percent	0.1	0.0	0.0	0.5	0.0
Cancer: Lymphoma	Frequency	1	0	0	0	1
	Percent	0.1	0.0	0.0	0.0	0.5
Cancer: Hemangiosarcoma	Frequency	3	0	0	0	3
	Percent	0.4	0.0	0.0	0.0	1.4
Cancer: Cutaneous Histiocytosis	Frequency	1	1	0	0	0
	Percent	0.1	0.5	0.0	0.0	0.0
Cancer: Malignant Histiocytosis	Frequency	1	0	0	0	1
	Percent	0.1	0.0	0.0	0.0	0.5
Cancer: Mast Cell Tumor(s)	Frequency	15	0	0	0	15
	Percent	1.8	0.0	0.0	0.0	7.0
Blood: Anemia	Frequency	5	0	0	1	4
	Percent	0.6	0.0	0.0	0.5	1.9
Blood: von Willebrand's disease	Frequency	3	1	0	1	1
	Percent	0.4	0.5	0.0	0.5	0.5
Blood: Idiopathic thrombocytopenia purpura	Frequency	1	0	0	1	0
	Percent	0.1	0.0	0.0	0.5	0.0

Female Reproductive Conditions

Table 13 shows the prevalence of female reproductive conditions. Depending on the condition, it was analyzed for either all of the females or just for those who had been bred. Almost 20% of females who had been bred were reported to have failure to conceive or difficulty whelping. Almost 40% of females who had been bred required a Caesarean section. Note that this is simply a proportion of females who had been bred and does not, therefore, provide precise information about the proportion of litters carried to term that required a Caesarean section for delivery. There were 6 other conditions noted: false pregnancy (3), hormone-releasing cyst, infection from retained puppy, and uterine inertia.

Male Reproductive Conditions

Table 13 shows the prevalence of male reproductive conditions. Depending on the condition, it was analyzed for either all of the males or just for those who had been bred. Prostatitis was reported in more of the older than younger male Swissys ($p = .000$). About 9 percent of the males were reported to be sterile, but this sterility was only noted in the oldest quarter of Swissys in the survey. Three other male reproductive conditions were noted: torsed testicle during breeding, scrotal hernia, and epididimitis.

Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Endocrine: Pancreatitis	Frequency	4	1	0	2	1
	Percent	0.5	0.5	0.0	0.9	0.5
Endocrine: Addison's	Frequency	1	0	0	1	0
	Percent	0.1	0.0	0.0	0.5	0.0
Endocrine: Hypothyroidism	Frequency	10	0	1	2	7
	Percent	1.2	0.0	0.5	0.9	3.3
Endocrine: Hyperthyroidism	Frequency	2	0	0	2	0
	Percent	0.2	0.0	0.0	0.9	0.0
Kidney: Cystitis	Frequency	68	16	15	21	16
	Percent	8.0	7.5	7.4	9.8	7.4
Kidney: Familial Glomerulonephritis	Frequency	1	0	0	0	1
	Percent	0.1	0.0	0.0	0.0	0.5
Kidney: Kidney Stones	Frequency	1	0	0	0	1
	Percent	0.1	0.0	0.0	0.0	0.5
Kidney: Urinary Incontinence	Frequency	93	9	18	22	44
	Percent	11.0	4.2	8.9	10.2	20.5
Kidney: Renal Dysplasia	Frequency	1	1	0	0	0
	Percent	0.1	0.5	0.0	0.0	0.0
Heart: Stenosis (subaortic)	Frequency	1	1	0	0	0
	Percent	0.1	0.5	0.0	0.0	0.0
Heart: Murmur	Frequency	1	1	0	0	0
	Percent	0.1	0.5	0.0	0.0	0.0
		n = 444	n = 104	n = 108	n = 108	n = 124
Females with Cystitis	Frequency	58	14	13	17	14
	Percent	13.1	13.5	12.0	15.7	11.3
Females with Urinary Incontinence	Frequency	89	9	18	19	43
	Percent	20.0	8.7	16.7	17.6	34.7
		n = 402	n = 109	n = 95	n = 107	n = 91
Males with Cystitis	Frequency	10	2	2	4	2
	Percent	2.5	1.8	2.1	3.7	2.2
Males with Urinary Incontinence	Frequency	4	0	0	3	1
	Percent	1.0	0.0	0.0	2.8	1.1

Temperament

Table 14 shows the temperament characteristics reported for Swissys. The most common descriptions were very friendly (67.6% of Swissys), confident (49.9%), and protective (31.4%). Fewer older Swissys were described as confident ($p = .018$), more Swissys in their middle years were described as protective ($p = .010$), and fewer Swissys in their middle years were described as very friendly ($p = .000$). Potentially dangerous temperament characteristics were reported: dog aggressive (7.0%), aggressive (1.8%), has bit a person (1.8%), and rage syndrome (0.4%). Dog aggression was significantly associated with age, with older Swissys being more likely to be described as dog aggressive ($p = .023$). Four of the reported bites were explained in some way: the animal was ill or provoked, the bite was inhibited, or the bite occurred while protecting the owner. Although many owners gave lengthy descriptions of their Swissy's temperament, only two additional themes emerged from these comments: food guarding was reported for 9 Swissys and a strong prey drive, often directed at cats, was reported for 6.

Table 13: Reproductive Conditions						
Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
All Females		n = 444	n = 104	n = 108	n = 108	n = 124
Female: Irregular Heats	Frequency	30	3	8	8	11
	Percent	6.8	2.9	7.4	7.4	8.9
Female: Vaginal Infections	Frequency	11	2	3	3	3
	Percent	2.5	1.9	2.8	2.8	2.4
Females with Attempted Breedings		n = 128	n = 1	n = 22	n = 40	n = 65
Female: Refusal to Accept Male	Frequency	5	0	0	0	5
	Percent	3.9	0.0	0.0	0.0	7.7
Female: Failure to Conceive	Frequency	24	0	2	10	12
	Percent	18.8	0.0	9.1	25.0	18.5
Female: Mastitis	Frequency	3	0	0	0	3
	Percent	2.3	0.0	0.0	0.0	4.6
Female: Difficulty Whelping	Frequency	25	0	1	8	16
	Percent	19.5	0.0	4.5	20.0	24.6
Female: Caesarean Section	Frequency	48	0	5	19	24
	Percent	37.5	0.0	22.7	47.5	36.9
Female: Pyometria	Frequency	4	0	0	1	3
	Percent	3.1	0.0	0.0	2.5	4.6
All Males		n = 402	n = 109	n = 95	n = 107	n = 91
Male: Undescended Testicle(s)	Frequency	4	0	3	1	0
	Percent	1.0	0.0	3.2	0.9	0.0
Male: Prostatitis	Frequency	22	0	1	4	17
	Percent	5.5	0.0	1.1	3.7	18.7
Males with Attempted Breedings		n = 77	n = 2	n = 4	n = 28	n = 43
Male: Lack of Interest in Female	Frequency	4	0	0	3	1
	Percent	5.2	0.0	0.0	10.7	2.3
Male: Sterility	Frequency	7	0	0	0	7
	Percent	9.1	0.0	0.0	0.0	16.3
Male: Abnormal Sperm	Frequency	3	0	0	2	1
	Percent	3.9	0.0	0.0	7.1	2.3

CONCLUSIONS

Swissys, like other large breed dogs, are relatively short-lived, although some Swissys live to be 12 or 13 years of age. Bloat, epilepsy, and splenic torsion are among the most common and most fatal health conditions exhibited by Greater Swiss Mountain Dogs. Of the remaining common conditions, some may have an impact on the quality of life of the Swissy (hip dysplasia, for example), others may also have an impact on the quality of life of owners (urinary incontinence, for example), and some typically have little impact for Swissy or owner (distichiasis and crooked tail, for example). Cancers, while not among the most common conditions of Swissys, were among the most frequent causes of death. Although a majority of Swissys were described as “very friendly,” the presence of Swissys described as having potentially dangerous temperament characteristics reminds Swissy owners and breeders of their responsibility to breed and raise Swissys in ways that promote temperaments and behaviors appropriate to stable working dogs and safe family pets.

Condition		Total	1-24 mos	25-43 mos	44-64 mos	65-157 mos
		n = 846	n = 213	n = 203	n = 215	n = 215
Temperament: Very Shy	Frequency	10	2	2	5	1
	Percent	1.2	0.9	1.0	2.3	0.5
Temperament: Timid	Frequency	59	21	16	14	8
	Percent	7.0	9.9	7.9	6.5	3.7
Temperament: Reserved	Frequency	131	39	33	27	32
	Percent	15.5	18.3	16.3	12.6	14.9
Temperament: Confident	Frequency	422	121	109	95	97
	Percent	49.9	56.8	53.7	44.2	45.1
Temperament: Protective	Frequency	266	55	82	67	62
	Percent	31.4	25.8	40.4	31.2	28.8
Temperament: Very Friendly	Frequency	572	165	131	125	151
	Percent	67.6	77.5	64.5	58.1	70.2
Temperament: Aggressive	Frequency	15	1	7	4	3
	Percent	1.8	0.5	3.4	1.9	1.4
Temperament: Dog Aggressive	Frequency	59	6	13	21	19
	Percent	7.0	2.8	6.4	9.8	8.8
Temperament: Has Bit a Person	Frequency	15	2	2	9	2
	Percent	1.8	0.9	1.0	4.2	0.9
Temperament: Rage Syndrome	Frequency	3	0	1	2	0
	Percent	0.4	0.0	0.5	0.9	0.0

Disease/Condition	7-15	7-8	6-15	5-23	4-26	Mean	Hi	Lo	Diff	Diff %
Urinary incontinence	11.0	10.9	11.0	11.0	10.8	10.9	11.0	10.8	0.2	1.8%
Panosteitis	4.7	4.7	4.9	4.7	4.7	4.7	4.9	4.7	0.2	4.2%
Licking episodes	17.3	17.9	17.8	17.7	16.7	17.5	17.9	16.7	1.2	6.9%
Cataracts	4.3	4.3	4.4	4.1	4.3	4.3	4.4	4.1	0.3	7.0%
Pica	9.1	9.9	9.9	9.7	9.9	9.7	9.9	9.1	0.8	8.2%
Cystitis	8.0	7.8	8.6	8.6	8.6	8.3	8.6	7.8	0.8	9.6%
Osteochondritis dissecans	5.4	5.5	5.1	5.0	5.6	5.3	5.6	5.0	0.6	11.3%
Entropion	2.8	2.6	2.6	2.5	2.5	2.6	2.8	2.5	0.3	11.5%
Idiopathic seizures	4.6	4.1	4.1	4.1	4.1	4.2	4.6	4.1	0.5	11.9%
Irritable bowel syndrome	5.1	4.5	4.8	5.0	4.7	4.8	5.1	4.5	0.6	12.4%
Hip dysplasia	9.1	9.4	9.2	9.9	10.6	9.6	10.6	9.1	1.5	15.6%
Distichiasis	19.4	16.9	16.6	17.1	18.3	17.7	19.4	16.6	2.8	15.9%
Food allergies	5.4	6.1	6.4	6.3	5.9	6.0	6.4	5.4	1.0	16.6%
Bloat	5.3	5.5	6.3	6.3	5.6	5.8	6.3	5.3	1.0	17.2%
Umbilical hernia	9.6	8.1	8.1	8.4	8.1	8.5	9.6	8.1	1.5	17.7%
Elbow dysplasia	4.4	3.8	3.6	3.7	3.8	3.9	4.4	3.6	0.8	20.7%
Crooked tail	3.7	3.4	3.0	3.2	2.9	3.2	3.7	2.9	0.8	24.7%
Skin allergies	4.6	5.4	4.9	5.2	5.9	5.2	5.9	4.6	1.3	25.0%
Chronic ear infections	3.3	2.6	2.5	2.4	2.3	2.6	3.3	2.3	1.0	38.2%
Splenic torsion	4.4	3.3	2.5	2.8	2.9	3.2	4.4	2.5	1.9	59.7%
	n=846	n= 705	n= 607	n=537	n=443					

Appendix B: Survey Instrument (Summary data in italics, rounded to nearest whole percent)

GSMD Health Survey 2000 & 2001 (Page 1 of 2)		
<p>This survey elicits health information about Greater Swiss Mountain Dogs who were living at any time during the years of 2000 and 2001. It is important that a broad representation of the breed be included in the study--including dogs that are healthy as well as those that have various health conditions. Dogs deceased before January 1, 2000 and dogs born on or after January 1, 2002 are NOT eligible for inclusion in the study. Individual survey responses are anonymous and all information will be presented in aggregate form. DO NOT submit a hard copy form if an on-line survey has already been submitted for this dog. Co-owners should work together to ensure that each dog is entered only once. Complete a separate survey for each dog.</p>		
<p>Mail surveys to: Tracey Brant, Cornell University College of Veterinary Medicine, Box #39, Ithaca, New York 14853-6401</p>		
<p>1. CHARACTERISTICS OF DOG 1.01 Sex of this dog : <i>Females--444 (53%)</i> <i>Males--402 (47%)</i> 1.02 Dog's year of birth (list year): <i>Median age of 775 living Swissys = 42 months</i> 1.03 Dog's birth month (list month): 1.04 Dog's year of death, if applicable (list year): <i>Median age of 71 Swissys that had died = 81 months</i> 1.05 Dog's month of death, if applicable (list month): 1.06 Dog's cause of death, if applicable (write in cause): <i>Most common causes were cancer, gastrointestinal, and neurologic</i> 1.07 Indicate the reproductive status of this dog (check status) 33%(a) Intact with no attempted breedings 16%(b) Intact with attempted breedings 42%(c) Neutered before any attempted breedings 10% (d) Neutered after any attempted breedings 6% <i>Missing information</i> 1.08 Indicate which of these tests or procedures this dog has undergone. 55% (a) Hip x-ray 28% (b) Shoulder x-ray 44% (c) Elbow x-ray 10% (d) Prophylactic gastropexy (stomach tacked before any bloat episode)</p>	<p>Indicate whether this dog has a history of the conditions below: (check conditions) 2. COLORING CONDITIONS 2% (a) Blue eyes 1% (b) Blue coat main color 2% (c) Red/brown coat main color ___ (d) Other (list below): 3. EXTERNAL CONGENITAL 10% (a) Umbilical hernia 1% (b) Cleft lip or palate ___ (c) Other (list below): 4. GASTROINTESTINAL 5% (a) Irritable bowel syndrome <1%(b) Intussuception 5% (c) Gastric dilatation and volvulus (bloat) 4% (d) Splenic torsion 1% (e) Megaesophagus 17% (f) Violent licking episodes 9% (g) Pica (eats non-food items often) ___ (h) Other (list below): 5. ORTHOPEDIC CONDITIONS 9% (a) Hip dysplasia 5% (b) Osteochondritis dissecans (OCD) 5% (c) Panosteitis 2% (d) Cruciate ligament tear(s) 2% (e) Patellar luxation 4% (f) Elbow dysplasia 1% (g) Spinal myelopathy</p>	<p>1% (h) Cervical vertebral instability (wobblers) 1% (i) Luxating tarsus (popping hock) 1% (j) Intervertebral disc disease 4% (k) Crooked tail (kink) <1% (l) Hypertrophic osteodystrophy (HOD) ___ (m) Other (list below): 6. NEUROLOGIC CONDITIONS 0% (a) Aseptic meningitis <1% (b) Bacterial meningitis 0% (c) Viral meningitis <1% (d) Hydrocephalus 0% (e) Hypomyelination (tremblers) 1% (f) Seizures of known cause (list causes below): 5% (g) Seizures without a cause (idiopathic epilepsy) 2% (h) Fly-snapping behavior ___ (i) Other (list below) 7. EYE AND EAR CONDITIONS 3% (a) Entropion <1% (b) Ectropion 0% (c) Ectopic cilia 19% (d) Distichiasis (extra lashes) 4% (e) Cataract(s) <1% (f) Progressive retinal atrophy (PRA) 0% (g) Optic nerve hypoplasia 1% (h) Ear hematomas 3% (i) Chronic ear infections ___ (j) Other (list below):</p>

