The Golden Retriever Club of America, Inc.

The GRCA Electronic Health Survey at 1 Year: Data on Longevity and Cancer

By The GRCA Health and Genetics Committee

On February 14, 2012, the GRCA Electronic Health Survey (http://www.offa.org/surveys/survey_golden.html) reached 1 year of age. This survey was intended to be something that we can all participate in to help the breed we love. While not a scientific survey, this survey helps to track major health problems and provides a snapshot of potentially emerging trends. However, there are many ways that bias can skew data from this kind of survey, such as a tendency for owners whose dogs have significant problems to complete the survey in greater numbers than owners of healthy dogs. At the opposite end of the scale, there was no control against entering very young dogs into the survey, perhaps prior to the development of health conditions that will only be evident as they age. Thus we must be careful not to weigh results from this survey too heavily and at this point in time the scientifically validated 1998-1999 Golden Retriever Health Survey (http://www.grca.org/pdf/health/healthsurvey.pdf) remains the gold standard for survey data about our breed. Nonetheless the Electronic Survey is valuable in its own way and owners are encouraged to continue entering dogs.

Survey data were entered for 1914 living Golden Retrievers and 1511 Goldens that had died. Slightly more females (1849) than males (1574) were recorded in the survey. Geographically, nearly all US states were represented, and just under 100 Canadian dogs were entered. Due to the nature of this type of survey, it probably is not possible to conduct a more complex statistical analysis of the data, but we hope this summary of the findings on longevity and cancer will be of interest. In addition, we plan to summarize findings on heritable diseases such as hip dysplasia, elbow dysplasia, subaortic stenosis, inherited eye disease, and other miscellaneous health conditions for a future issue of GR News.

The good news from the ongoing Electronic Survey is that there were more Golden Retrievers reported as having lived over 10 years (1026) than having lived less than 10 years (503). For comparison purposes, the mean age at death for all dogs in a British survey of all breeds was reported to be 11 years and a month, with age at death from natural causes being roughly a year and a half longer (Michell et al, 1999). However, large dogs tend to live shorter lives than small dogs (Egenvall *et* al, 2005; Jones *et al*, 2008; Chase *et al*, 2009) -- and clearly Golden Retrievers are not small dogs! Our 1998-1999 Health Survey indicated that the average Golden female lived 11.3 years and the average Golden male lived 10.7 years (Glickman et al, 1999). Thus, there is no evidence for a major shift in lifespan of Golden Retrievers since the 1999 survey. **Table 1**

Table 1
Estimated Comparison of Age at Death of Golden Retrievers
1998-1999 Scientific Survey : 2012 Electronic Survey

1998-9 Scientific Health Survey Based on 548 deceased dogs			Electronic Survey: 1 Yr Results Based on 1529 (a) deceased dogs			Approximate change from 1998-9 (b)
Age	**Number**	**% of deaths**	**Age**	**Number**	**% of deaths**	
0 – 2.9 Years	6	1.1 %	**0 – 2 Years**	21	1.4 %	No major change
3 – 7.9 Years	86	15.7 %	**2 – 5 Years**	57	3.7 %	
8 – 12.9 Years	291	53.1 %	**5 – 10 Years**	425	27.8 %	
			10 – 12 Years	436	28.5 %	
3 – 12.9 Yr Total (from above 2 age categories)	377	68.8 %	**2 – 12 Year Total (from above 3 categories)**	918	60.0 %	No major change
13+ Years	165	30.1 %	**12+ Years**	590	38.6 %	No major change

(a) This number does not match the 1511 dogs reported as being deceased at the time of the survey; however, it is the number for which an age at the time of death was reported.

(b) Age categories between the 1998-9 Health Survey and the 2012 Electronic Survey do not match identically; therefore the categories with the closest approximations were compared.

The bad news is not new: there are too many Golden Retrievers dying from cancer. The four most common types of cancer in the new survey were hemangiosarcoma (370), lymphoma (168), mast cell tumors (92) and osteosarcoma (54). These were also the top 4 cancers in the 1998-1999 Health Survey (Glickman et al, 1999). **Tables 2 and 3**

Table 2
Estimated Prevalence Comparison of Three Major Causes of Golden Retriever Cancer Deaths
1998-1999 Scientific Survey : 2012 Electronic Survey

	1998 Scientific Health Survey Based on 427 deceased dogs		Electronic Survey 1 Yr Results Based on 1511 deceased dogs		Change in prevalence from 1998-9 Survey (a)
Type of cancer	**# affected**	**% of deaths**	**# affected**	**% of deaths (a)**	
Hemangiosarcoma	80	18.7 %	370	24.5 %	31% increase
Lymphoma	49	11.5 %	168	11.1 %	3.5% decrease
Osteosarcoma	22	5.2 %	54	3.6 %	31% decrease
Total	151	35.3 %	586	38.8 %	10% increase

(a) Since these three cancers are considered to be nearly universally fatal diseases, an assumption was made that these dogs are deceased. It is acknowledged that this is an inherently flawed assumption because some of these dogs may still have been alive at the time they were entered into the Electronic Survey. The "Percentage of deaths" would be *decreased* when dogs die from these diseases after the time their data were entered, and this also would alter the "Change in prevalence" percentage. **Therefore figures from the "Percentage of deaths" column in the Electronic Survey and from the "Change in prevalence" column should not be considered to indicate a valid trend**, but are included here just as a *very rough* comparison to 1998-9 Survey data.

Table 3
Estimated Prevalence Comparison of Common Golden Retriever Cancers
1998-1999 Scientific Survey : 2012 Electronic Survey

	1998 Scientific Health Survey Based on 1444 total dogs (a)		Electronic Survey 1 Yr Results Based on 3425 total dogs (b)		Change in prevalence from 1998-9 Survey (c)
Type of cancer	**# affected**	**% of all dogs**	**# affected**	**% of all dogs**	
Mast Cell Tumors	65	4.5 %	92	2.7 %	40% decrease
Melanoma	25	1.7 %	39	1.1 %	35% decrease
Mammary	44	3.0 %	33	0.9 %	70% decrease
Liver	10	0.7 %	40	1.2 %	71% increase
All Cancers (including Table 1)	631	43.7 %	1097	32.0 %	26.8% decrease

(a) Dogs in this survey were a minimum of 5 years old, and the selection was further weighted toward older dogs by requesting that owners entering multiple dogs select their five dogs with the earliest birth dates.

(b) Dogs entered into this survey could be any age, and therefore many may not have yet reached ages for which a cancer diagnosis is most likely.

(c) Because (a) and (b) are extremely likely to have influenced this comparison, these changes in prevalence should not be considered to indicate a valid trend

In the 1998-1999 Health Survey, use of drop-on flea and tick prevention products or flea/tick shampoos and sprays significantly decreased the frequency of lymphoma; while a significant decrease in hemangiosarcoma was associated with the use of drop-on flea and tick prevention products. Similarly, a 2008 North Carolina-based scientific study showed that healthy Golden Retrievers were more likely to receive regular flea/tick prevention than those with lymphoma (Duncan et al, 2008). The data in the current survey did not show the same decreased risk with the use of flea/tick prevention drop-on treatments; however, this was not a scientific study and associations may have been missed because there was no ability to correlate specific dogs with specific results. **Table 4**

Table 4
Comparison of Drop-on Flea/Tick Prevention Products Usage
Dogs with Lymphoma or Hemangiosarcoma : Healthy Dogs

	Lymphoma		Hemangiosarcoma	
Drop-on Flea/Tick prevention usage	**Affected Number / %**	**Healthy Number / %**	**Affected Number / %**	**Healthy Number / %**
Regularly	51 / 31%	431 / 33%	122 / 33%	387 / 33%
Occasionally	67 / 40%	444 / 34%	139 / 37%	402 / 34%
Never	42 / 25%	405 / 31%	108 / 29%	378 / 32%

Percentages are similar across these groups.

The current survey did show a large number of cases of vector-borne disease (154, or nearly 5% of responses), although this is lower than the 18% of Goldens with vector-borne disease (*Bartonella spp*) reported in the 2008 Duncan et al study. Is it possible that vector-borne diseases play a role in Golden Retriever hemangiosarcoma and lymphoma? The answer is that we do not know. Vector-borne diseases can stimulate an immune response, and lymphocytes involved in immune response are the cell type of origin for lymphoma. In addition, some vector-borne diseases stimulate the growth of endothelial cells, which is a type of cell that proliferates in hemangiosarcoma. So the question of a possible association between vector-borne diseases and hemangiosarcoma and lymphoma may be worthy of further study, but is not something we should be overly concerned about at this time. However, knowing the right questions to investigate can lead to important breakthroughs. In the meantime, it is generally beneficial to keep our dogs free from fleas and ticks, and we can take comfort in knowing that current drop-on flea and tick prevention products do not appear to be associated with increased Golden Retriever cancers.

So what about those questions regarding water sources and toys? The basis for those questions was that most garden hoses are NOT approved for use as a source of drinking water. Many garden hoses are made of polyvinyl chloride, and lead used as a stabilizer can leach into the water (Mays, 2010); and workers in the polyvinyl chloride industry are at increased risk for angiosarcoma (the human equivalent of hemangiosarcoma) and lymphoma (Gennaro et al, 2008). Certainly dogs should not be drinking from hoses if they leach lead – but were Golden Retrievers drinking from garden hoses and could that be associated with cancer? The survey indicates that only a small percentage of Goldens (2 % of those with hemangiosarcoma and 3% of those without hemangiosarcoma) have water from the hose as their primary source of water, and hopefully those dogs are getting their water from the relatively small percentage of hoses labeled as safe for producing drinking water. With regard to toys,

obviously Goldens spend a great deal of time with toys in their mouths and thus may have high exposure to substances found in those toys, but no clear trends appeared to suggest different toy exposures among dogs with hemangiosarcoma as compared to healthy dogs. **Table 5**

Table 5
Comparison of Selected Lifestyle Factors
Dogs with Hemangiosarcoma (HSA) : Healthy Dogs

	Water Source				**Favorite Toy**				
	City, faucet	**Well, faucet**	**Hose**	**Rain, stream, etc.**	**Stuffed toy**	**Tennis ball**	**Squeaky**	**Hard rubber toy**	**Other**
HSA Number/ %	237 / 62%	132 / 35%	8 / 2%	5 / 1%	165 / 44%	122 / 33%	18 / 5%	22 / 6%	47 / 13%
Healthy Number/ %	772 / 66%	356/ 30%	36 / 3%	7 / < 1%	431 / 37%	394 / 34%	100 / 9%	81 / 7%	167 / 14%

Data are similar among dogs affected with hemangiosarcoma and healthy dogs with regard to their exposure to various water sources and with regard to their likely exposure to favorite toys.

So this quick snapshot indicates that our breed still has a problem with cancer and that is not a surprise. As most GRCA members understand, improvements in canine cancer prevention and treatment generally proceed at a measured pace, although canine cancer research does reap benefits from the war on human cancer that began in 1971. Successes in human cancer research often form a basis for advances in canine cancer research, and the synergy between the two moves us closer to a brighter future for Goldens. For example, toceranib (Palladia®, Pfizer Animal Health), approved by the FDA in 2009 as the first drug specifically designed to combat canine cancer, was developed as the sister drug to sunitinib, which is FDA approved to fight two kinds of human cancers. Palladia® is a tyrosine kinase inhibitor currently used as part of the treatment regimen for some aggressive mast cell tumors, and is under investigation for use against other kinds of canine cancer. On another front in canine cancer research, the Broad Institute website now indicates that they have identified several genetic regions associated with increased risk for hemangiosarcoma (http://www.broadinstitute.org/scientific-community/science/projects/mammals-models/dog/disease-research/hemangiosarcoma). Each new finding is an important step along the path of continuing advances in our ability to prevent and treat cancer in dogs.

In conclusion, the 1998–1999 Golden Retriever Health Survey has provided scientists with useful data to guide their research for over a decade. Likewise, the ongoing Electronic Survey is already proving helpful in establishing priorities for future research studies. We are also looking forward with great

excitement to a major new scientific study that may help to identify nutritional, environmental, and genetic factors that influence Golden Retriever cancers. Under the umbrella of Morris Animal Foundation's Canine Lifetime Health Project, The Golden Retriever Lifetime Study will collect scientific data that is much more valuable than survey data alone. The study will enroll Golden Retrievers under the age of two years and follow them for 10-14 years using an extensive battery of biologic tests and measurements coupled with survey data. An announcement of this study is online at http://www.morrisanimalfoundation.org/blog/category/dog/historys-largest-dog-study.html
and enrollment information is available at
https://www.caninelifetimehealth.org/#About/GoldenRetrieverLifetimeStudy

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