

health & genetics

2011 Deerhound Health Survey Results – Part 2

In this month's column, I continue sharing the results for Deerhounds in North America that shed light on the sorts of health problems that occur in this population.

As in the last column, I will use the terms "male" and "bitch" when designating dogs of a particular sex, and the terms "hound" or "Deerhound" when referring to dogs of either or both sexes.

What Are the Most Common Problems?

The 2011 Health Survey contains data on health problems for 273 male Deerhounds and 315 Deerhound bitches. Tables 1 and 2 summarize the health problems that were reported in at least 3% of the Deerhounds in North America, listed in decreasing order by incidence.

Table 1. Most Common Health Problems Reported for 273 MALE North American Deerhounds

| Type of Health Problem | Number Reported | Incidence | | Onset Age (yrs) | |
|--|-----------------|-----------|---------|-----------------|----------|
| | | % | Odds | Average | Range |
| Cardiomyopathy (possible/confirmed) | 28 | 10% | 1 in 10 | --- | |
| <i>Heart failure due to cardiomyopathy</i> | 19 | --- | --- | 6.4 | 3 to 11 |
| <i>Heart arrhythmia</i> | 13 | --- | --- | 5.4 | <1 to 10 |
| Bone tumors (presumed osteosarcoma) | 24 | 9% | 1 in 11 | 7.1 | 4 to 11 |
| Head or neck pain – "Deerhound neck" | 21 | 8% | 1 in 13 | 4.8 | <1 to 9 |
| Torsion | 17 | 6% | 1 in 16 | --- | --- |
| <i>GDV/Bloat/Stomach torsion</i> | 12 | --- | --- | 4.1 | <1 to 9 |
| <i>Splenic torsion</i> | 5 | --- | --- | 3.1 | 1 to 5 |
| Allergic dermatitis (not fleas) | 15 | 5% | 1 in 18 | 1.8 | <1 to 4 |
| Pneumonia or recurrent pneumonia | 14 | 5% | 1 in 20 | 4.4 | <1 to 12 |
| Lyme disease | 13 | 5% | 1 in 21 | 4.4 | 2 to 9 |
| Bladder stones/cystinuria | *12 | 4% | 1 in 23 | 4.7 | 2 to 9 |
| Enlarged prostate gland | 12 | 4% | 1 in 23 | 6.8 | 4 to 10 |
| Seizures/epilepsy | 11 | 4% | 1 in 25 | 6.8 | 3 to 9 |
| Cryptorchidism | 9 | 3% | 1 in 30 | --- | --- |
| Anal sac infection | 8 | 3% | 1 in 34 | 5.1 | <1 to 8 |
| Elbow hygroma | 7 | 3% | 1 in 39 | 0.9 | <1 to 2 |

* In 11 of 12 dogs that had bladder stones, the stones were composed of cystine; the other was uric acid secondary to a liver shunt. Another dog had cystinuria, but no

stones.

Table 2. Most Common Health Problems Reported for 315 North American Deerhounds BITCHES

| Type of Health Problem | Number Reported | Incidence | | Onset Age (yrs) | |
|--|-----------------|-----------|---------|-----------------|----------|
| | | % | Odds | Average | Range |
| Bone tumors | 37 | 11% | 1 in 9 | | |
| <i>Osteosarcoma</i> | 35 | --- | --- | 8.2 | 5 to 11 |
| <i>Other bone tumor</i> | 2 | --- | --- | 9.9 | 10 |
| Cardiomyopathy (possible/confirmed) | 25 | 8% | 1 in 13 | | |
| <i>Heart failure due to cardiomyopathy</i> | 14 | --- | --- | 7.7 | 4 to 12 |
| <i>Heart arrhythmia</i> | 14 | --- | --- | 7.4 | 3 to 11 |
| Torsion, stomach or spleen | 23 | 7% | 1 in 14 | | |
| <i>GDV/Bloat/Stomach torsion</i> | 18 | --- | --- | 6.5 | <1 to 14 |
| <i>Splenic torsion</i> | 6 | --- | --- | 5.6 | <1 to 10 |
| Allergic dermatitis (not fleas) | 21 | 7% | 1 in 15 | 2.1 | <1 to 5 |
| Fracture/broken bone | 17 | 5% | 1 in 19 | 1.6 | <1 to 6 |
| Head or neck pain – “Deerhound neck” | 17 | 5% | 1 in 19 | 4.2 | <1 to 8 |
| Anal sac infection | 13 | 4% | 1 in 24 | 2.8 | <1 to 8 |
| Seizures/epilepsy | 12 | 4% | 1 in 26 | 5.1 | <1 to 11 |
| Pneumonia or recurrent pneumonia | 12 | 4% | 1 in 26 | 5.1 | 1 to 12 |
| Lyme disease | 11 | 3% | 1 in 29 | 5.3 | 2 to 11 |
| Cystitis | 10 | 3% | 1 in 32 | 4.5 | <1 to 9 |
| Metritis/pyometra | 9 | 3% | 1 in 35 | 6.1 | 1 to 10 |
| False pregnancy | 9 | 3% | 1 in 35 | 1.6 | <1 to 3 |

Take-home Messages

I think there are several messages to take away from Tables 1 and 2. I will discuss them in no particular order of importance.

- 1) **Osteosarcoma and cardiomyopathy are the most common health problems in our breed.**

Many of you already knew this, but you may not have known just how common these problems are. The information is disturbing.

One must be careful not to over-interpret the incidence numbers for these two health problems. On the one hand, any survey that is not randomly conducted tends to overestimate the incidence of a health problem because people whose dogs have experienced a problem are more likely

to participate in the survey than people whose dogs are healthy. Our health survey did not randomly sample the Deerhound population, and we cannot know how much bias that introduced.

On the other hand, for health problems that tend to occur later in life, like osteosarcoma and cardiomyopathy, there is also a bias in the other direction. This bias arises because the survey results include many dogs that were still alive and too young to have had a chance to develop late-onset health problems. Some of those dogs will go on to develop osteosarcoma or cardiomyopathy. Thus, our survey will tend to underestimate the true incidence of these problems in Deerhounds.

To get an idea of how much bias was introduced by including dogs that are still alive, we need to analyze data only from a sub population of Deerhounds in which every member has died. For the 2011 survey, the appropriate sub populations are bitches born before January 10, 1999 and males born before July 20, 2000, because all of them have died. These sub populations consist of 118 bitches and 93 males. Table 3 compares the incidence of osteosarcoma and cardiomyopathy in the entire survey population and these sub populations.

Table 3. Incidence of Osteosarcoma and Cardiomyopathy in 2011 Survey

| | Males | Bitches |
|-----------------------|--------------|----------------|
| Osteosarcoma | | |
| Entire population | 9% | 11% |
| Subpopulation* | 12% | 16% |
| Cardiomyopathy | | |
| Entire population | 10% | 8% |
| Subpopulation* | 16% | 14% |

* Subpopulation is 93 males born before 7/20/2000 and 118 bitches born before 1/10/1999, all of which have died.

This analysis suggests that the bias introduced by including data from all dogs (alive and dead) in calculating the incidence

of late-onset health problems is not trivial. But don't forget that we also have a bias in the other direction because our survey was not randomly conducted.

It is impossible to know how these two biases—one that favors overestimation and other that favors underestimation—play out when it comes to osteosarcoma and cardiomyopathy. For our purposes, I think we can assume that the biases cancel each other out and that the true incidence is more or less as shown in Tables 1 and 2.

2) The incidences of osteosarcoma and cardiomyopathy seem to have increased in one or both sexes since 1995.

How do our 2011 results compare with those from our 1995 survey? Again, the answer is a disturbing. As shown in Table 4, the incidence of osteosarcoma seems to have increased over the intervening 16 years in both sexes, and the incidence of cardiomyopathy seems to have increased in bitches.

Table 4. Incidence of Osteosarcoma and Cardiomyopathy in Health Surveys from 1995 and 2011

| | Males | Bitches |
|-----------------------|--------------|----------------|
| Osteosarcoma | | |
| 1995 | <5% | 6% |
| 2011 | 9% | 11% |
| Change | Increase | Increase |
| Cardiomyopathy | | |
| 1995 | 14% | <5% |
| 2011 | 10% | 8% |
| Change | Decrease | Increase |

Although we need to be careful not to over-interpret these results because of the biases I discussed earlier, I think it is safe to assume that the same biases were operating for both the 1995 and 2011 surveys. For that reason, there is a good chance that the changes in incidence over the intervening 16 years are real.

3) Osteosarcoma is more common in bitches than males.

The difference in incidence between sexes is relatively small and might be due to chance, but I doubt it. For one thing, the same difference showed up in our 1995 health survey. For another, the same sex difference has been reported in published studies of osteosarcoma in dogs.

4) Cardiomyopathy is more common in males than bitches.

Again, the difference in incidence between sexes is relatively small and might be due to chance, but it mirrors the results of our 1995 health survey. Also, in a recent abstract, researchers who analyzed phenotypic data from 1,753 Deerhounds reported the same sex difference (Eddy *et al.*, 2011).

The SDCA is presently discussing how we might collaborate with the same researchers to pursue the genetic basis for cardiomyopathy in Deerhounds. One challenge will be how to find Deerhounds that are not affected with the disease. As you can see from the survey results, we cannot simply use old age as a criterion, since some dogs were 11 years old before the disease appeared.

5) Smaller males may be at greater risk for osteosarcoma, and larger bitches may be at greater risk for cardiomyopathy.

The data that lead me to make this statement are summarized in Tables 5 and 6.

Table 5. Effect of Mature Height on the Incidence of Osteosarcoma and Cardiomyopathy

| | Males | Bitches |
|----------------------------|--------------|----------------|
| Osteosarcoma | | |
| Total | 24 | 35 |
| Total with height reported | 19 | 30 |
| Shorter hounds* | 13 | 13 |
| Taller hounds* | 6 | 17 |

| | | |
|----------------------------|----|----|
| Height not specified | 5 | 5 |
| Cardiomyopathy | | |
| Total | 29 | 25 |
| Total with height reported | 28 | 22 |
| Shorter hounds* | 12 | 7 |
| Taller hounds* | 16 | 15 |
| Height not specified | 1 | 3 |

* The median heights in the survey population were 32.3 and 30.0 inches for males and bitches, respectively. Shorter hounds were less than or equal to the median height, and taller hounds were greater than the median height.

These correlations between size and chances of osteosarcoma or cardiomyopathy do **not** imply a cause-and-effect relationship; that is, I am not saying that height or weight somehow affects the development of either disease. I want to emphasize the distinction between correlation and cause-and-effect because the distinction is so often missed, even by scientific researchers. Why? Partly because when an epidemiology study (like our health survey) identifies a correlation between some characteristic (like height) and a disease (like osteosarcoma), the characteristic is referred to as a "risk factor" for the disease. Unfortunately, the common usage of the term "risk" implies a cause-and-effect relationship, and that leads people to assume that the epidemiology term "risk factor" also implies cause and effect. It does not.

Table 6. Effect of Mature Weight on the Incidence of Osteosarcoma and Cardiomyopathy

| | Males | Bitches |
|----------------------------|--------------|----------------|
| Osteosarcoma | | |
| Total | 24 | 34 |
| Total with weight reported | 24 | 33 |
| Lighter hounds* | 15 | 14 |
| Heavier hounds | 9 | 19 |
| Weight not specified | 0 | 1 |
| Cardiomyopathy | | |

| | | |
|----------------------------|----|----|
| Total | 29 | 25 |
| Total with weight reported | 28 | 24 |
| Lighter hounds | 12 | 8 |
| Heavier hounds | 16 | 16 |
| Weight not specified | 1 | 1 |

* The median weights in the survey population were 105 and 85 pounds for males and bitches, respectively. Lighter hounds were less than or equal to the median weight, and heavier hounds were greater than the median weight.

6) Torsion of the stomach and/or the spleen is the third most common health problem in Deerhounds.

This also will come as no surprise to many of you. The incidence of torsion is pretty similar in dogs of both sexes. The good news is that the incidence of torsion seems to have decreased since 1995 in both sexes. These data are shown in Table 7,

Table 7. Incidence of Stomach and/or Splenic Torsion in Health Surveys from 1995 and 2011

| | Males | Bitches |
|--------|--------------|----------------|
| 1995 | 8% | 12% |
| 2011 | 6% | 7% |
| Change | Decrease | Decrease |

7) Allergic dermatitis (not due to fleas) and head or neck pain ("Deerhound neck") are virtually tied for fourth place in the list of common health problems.

While I knew that these health problems occurred in our breed, I did not realize that they were as common as the survey results show. That said, the survey may overestimate the incidence of these two health problems, since they tend to occur relatively early in life. In other words, the bias introduced by the non-random nature of our survey is not offset by the bias introduced by including young dogs, as is the case for late-onset health problems.

8) The incidences of allergic dermatitis (not due to fleas) and head or neck pain ("Deerhound neck") seem to have increased in one or both sexes since 1995.

As shown in Table 8, the incidence of "Deerhound neck" seems to have increased since 1995 in both sexes and the incidence of allergic dermatitis seems to have increased in bitches.

Table 8. Incidence of Allergic Dermatitis (Not Due to Fleas) and "Deerhound Neck" in Health Surveys from 1995 and 2011

| | Males | Bitches |
|---------------------|--------------|----------------|
| Allergic dermatitis | | |
| 1995 | 8% | <5% |
| 2011 | 5% | 7% |
| Change | Decrease | Increase |
| "Deerhound neck" | | |
| 1995 | 5% | <5% |
| 2011 | 8% | 5% |
| Change | Increase | Increase |

As mentioned earlier, it seems likely that the same biases were operating for both surveys and that therefore the changes in incidence are real.

Next month I will share more information from the 2011 Deerhound Health Survey pertaining to North American Deerhounds and, if space allows, I will also present information on Deerhounds from other regions.

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