Canine cancer claims analyses

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As part of a commitment to use policy and claims information to help pet owners and veterinary teams make informed decisions on better health for companion animals, Nationwide®'s veterinary analytics team in 2021 embarked on a series of studies on animal health and the economics of veterinary medicine. The first of these initiatives, a series of three white papers for which this paper serves as an explanation of methodology, analyzed policy and claims data on cancer in 1.61 million Nationwide-insured dogs over a six-year period.

With this expanded explanation of the methodology, everyone in the pet-care community has the ability to assess our findings. This openness is part of a larger effort in veterinary medicine Nationwide supports: The greater use of "big data" by industry players shared for the benefit of all. With these three white papers on canine cancer, Nationwide is additionally providing information both to help in choosing a pet and in increasing awareness of health risks so pet owners understand the value of preventive care that can improve or extend life for cancer-prone dogs. This information can also be integrated into veterinary recommendations for the care of pets at each life stage.

With more than 1 million pets insured in 2021 and 40 years of historical pet health data to analyze, Nationwide is in an ideal position to provide industry-leading analysis of pet health and veterinary business trends. Going forward, these studies are part of a larger effort by Nationwide to continue pioneering positive change for pets, pet owners, and veterinary healthcare.

Development of focus

In preparation for these analyses, the veterinary analytics team studied policy and claims data to ensure that the focus was aligned with statistical and biomedical standards. After such review, for these three studies of canine cancer the policy and claims data was limited to six years (October 2015 to September 2021). The result was a cohort of 1,612,884 individual dogs.

The recorded breeds of these dogs (identified by pet owners at policy inception, and checked against medical records by Nationwide staff at the time of claim) were mapped to multiple classifications:

- **Purebred or non-purebred**
  - **Purebred breed groups (i.e., sporting, working, etc).** Some breed groups were additionally broken into the functional sub-groups, such as hounds divided into sighthounds and scenthounds, or breaking retrievers out of the sporting group
  - **Non-purebred dogs.** These were broken into "random-bred" dogs of two or more breeds (mixed breeds) and purpose-bred offspring of two purebred dogs, such as Labradoodles (crossbreds or cross breeds)

- **Dog size**. All dogs and all breeds were mapped for size: toy (less than 10 pounds), small (11-30 pounds), medium (31-50 pounds), large (51-110 pounds) or extra-large/giant (greater than 110 pounds).

When examining an individual breed's cancer prevalence, only those with statistically significant representation were included. The veterinarians on the team then looked at internal claims coding for cancer diagnosis and treatment. Cancer claims linked to more than 24 body systems were included.

Calculation of relative risk

Unless otherwise specified, relative risk is in relation to "all other dogs" in the study population. By way of example, if a given breed (breed X) represents 150 dogs out of 1,000 dogs, the analysis focuses on dogs in that breed with at least one cancer claim, and then compares that rate to that of all dogs who are not members of that breed, also with at least one claim for cancer diagnosis or treatment. Prevalence and relative risk for breed X vs. "all other dogs" is calculated as in the example below.

Total number of dogs = 1,000
Total number of dogs in breed X = 150
Total number of dogs with at least one claim for cancer = 100
Total number of breed X with at least one claim for cancer = 30

Prevalence within breed X:

$$\frac{Number\ of\ dogs\ in\ breed\ X\ with\ cancer}{Number\ of\ dogs\ in\ breed\ X}$$

$$\frac{30}{150} = 20\%$$

Prevalence in "all other dogs":

$$\frac{Number\ of\ dogs\ with\ cancer\ in\ total\ population - Number\ of\ dogs\ in\ breed\ X\ with\ cancer}{Number\ of\ dogs\ in\ total\ population - Number\ of\ dogs\ in\ breed\ X}$$

$$\frac{100-30}{1000-150} = \frac{70}{850} = 8.23\%$$

Relative risk, or risk ratio, in breed X compared to "all other dogs":

$$\frac{Prevalence\ within\ breed\ X}{Prevalence\ in\ "all\ other\ dogs"}$$

$$\frac{20.00\%}{8.23\%} = 2.43\ (243\%)$$

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