

# Cooler temps and northern climes associated with increased diabetes diagnoses in dogs

August 16 2022, by Katherine Unger Baillie

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In people, Type 1 diabetes mellitus diagnoses are more common in northern latitudes and during winter. Now a new study shows a similar pattern in dogs.

The research, published in the journal *PLOS ONE*, looked at 960 pet [dogs](#) with [diabetes mellitus](#) living across the United States. A team of University of Pennsylvania School of Veterinary Medicine researchers found that diabetes diagnoses were significantly more likely to occur in the winter and in the northern U.S. compared to any other season or region. Though the findings don't explain the underlying cause of this correlation, the link with cold weather hints at future possibilities to pursue.

"This link is something that has been discussed in regard to humans with Type 1 diabetes, but it's never been rigorously looked at in dogs," says Rebecka Hess, a professor at Penn Vet and senior author on the study. "It's important to explore because dogs and people live in the same world. If the environment—[cold temperatures](#) and seasonality—are important in this disease in both species, it gives us something to look at with further research."

To investigate the relationships between geography, seasonality, and diabetes, Hess and Penn Vet colleagues recruited dogs with the condition from across the U.S., reaching out to all of the nation's veterinary schools, the American Kennel Club, and breed clubs and leveraging social media to gain the broadest sample possible. Owners filled out surveys about their pets, including their dog's age, date and age at the time of diabetes diagnosis, and state of residence.

For 669 dogs, the date of diabetes diagnosis was known. Of those, 33% were diagnosed in the winter, compared to 24% in the spring, 24% in the summer, and 19% in the fall. When the research team looked at geographic regions of the U.S., the North stood out, with 46% of diagnoses occurring in dogs in this region, compared to 27% in the South, 15% in the central U.S., and 12% in the West. This is despite the fact that many more dogs—more than 31 million—reside in the South compared to about 24 million in the North and about 13 million each in

the central and West regions.

"To be honest, I was surprised we found this connection, even though it had been hinted at before. I was always skeptical of the data," says Hess. "But when I saw our results, it was quite clear. The findings were strengthened by the fact that diabetes diagnoses were more prevalent in both the winter and the North. Results would have been more difficult to interpret if, for example, we had found increased prevalence in the winter but also in the South."

Three percent of the dogs in the study developed diabetes before they were 1 year of age. Like the diagnoses made in adulthood, these juvenile-onset cases were also more common in colder months and in the North but did not correlate to any particular breed, the researchers found.

Hypotheses about the connection between colder and more northerly climates and diabetes diagnoses in humans include links to vitamin D deficiency, diet, lifestyle, and [viral infections](#). In dogs, the diet connection seems unlikely, Hess says, as most dog owners feed their pets a commercially available kibble, no matter their location or the season. In addition, she says, overweight and obese dogs aren't at higher risk of developing diabetes, so a connection with exercise, or lack thereof, seems unlikely.

In Hess' view, the culprits are more likely to involve how the body processes either vitamin D or insulin. In [human studies](#), lower levels of vitamin D have been connected with an increased likelihood of diabetes. And [lower temperatures](#) lead to declines in insulin sensitivity. Hess also says some researchers have floated a connection to a viral infection that may be more prevalent in [cold weather](#).

In future work, Hess says she hopes to delve into the vitamin D connection, perhaps exploring how [genetic variability](#) in the vitamin D

receptor correlates with diabetes risk. A study that examines a prior history of viral infection could also be revealing, she says.

"Given the close relationship between humans and dogs, and the parallels we see when it comes to [diabetes](#), it behooves us to look."

**More information:** Liang N. Y. Qiu et al, Seasonality and geography of diabetes mellitus in United States of America dogs, *PLOS ONE* (2022). [DOI: 10.1371/journal.pone.0272297](https://doi.org/10.1371/journal.pone.0272297)

Provided by University of Pennsylvania

Citation: Cooler temps and northern climes associated with increased diabetes diagnoses in dogs (2022, August 16) retrieved 2 May 2024 from <https://phys.org/news/2022-08-cooler-temps-northern-climes-diabetes.html>

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