

PFAS found in blood of dogs, horses living near Fayetteville, NC

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In a new study, researchers from North Carolina State University detected elevated PFAS levels in the blood of pet dogs and horses from Gray's Creek, N.C.—including dogs that only drank bottled water. The work establishes horses as an important sentinel species and is a step toward investigating connections between PFAS exposure and liver and

kidney function in dogs and horses.

The study included 31 dogs and 32 [horses](#) from the community, and was conducted at the behest of community members concerned about their pets' well-being. All of the households in the study were on well water, and all of the wells had been tested and deemed PFAS contaminated by state inspectors.

The animals received a general veterinary health check and had their blood serum screened for 33 different PFAS chemicals. These PFAS were chosen based on compounds that were present in the Cape Fear River basin and the availability of analytical standards.

From the targeted list of 33 PFAS of interest, researchers found 20 different PFAS in the animals. All of the animals in the study had at least one chemical detected in their blood serum, and over 50% of the dogs and horses had at least 12 of the 20 detected PFAS.

PFOS, a long-chain PFAS used for years in industrial and commercial products, had the highest concentrations in dog serum. The perfluorosulfonic acid PFHxS, a surfactant used in [consumer products](#) and firefighting foams, was detected in dogs, but not horses. Consistent with wells being the known contamination source, some ether-containing PFAS including HFPO-DA (colloquially known as GenX), were detected only in dogs and horses that drank well water.

In dogs who drank well water, median concentrations of two of the PFAS—PFOS and PFHxS—were similar to those of children in the Wilmington GenX exposure study, suggesting that pet dogs may serve as an important indicator of household PFAS. Dogs who drank bottled water, on the other hand, had different types of PFAS in their [blood serum](#). However, 16 out of the 20 PFAS detected in this study were found in the dogs who drank bottled water.

Overall, horses had lower concentrations of PFAS than dogs, though the horses did show higher concentrations of Nafion byproduct 2 (NBP2), a byproduct of fluorochemical manufacturing. The finding suggests that contamination of the outdoor environment, potentially from deposition of the PFAS onto forage, contributed to their exposure.

"Horses have not previously been used to monitor PFAS exposure," says Kylie Rock, postdoctoral researcher at NC State and first author of the work. "But they may provide critical information about routes of exposure from the outdoor environment when they reside in [close proximity](#) to known contamination sources."

Finally, the veterinary blood chemistry panels for the animals showed changes in diagnostic biomarkers used to assess liver and kidney dysfunction, two [organ systems](#) that are primary targets of PFAS toxicity in humans.

"While the exposures that we found were generally low, we did see differences in concentration and composition for animals that live indoors versus outside," says Scott Belcher, associate professor of biology at NC State and corresponding author of the work.

"The fact that some of the concentrations in dogs are similar to those in children reinforces the fact that dogs are important in-home sentinels for these contaminants," Belcher says. "And the fact that PFAS is still present in [animals](#) that don't drink well water points to other sources of contamination within homes, such as household dust or food."

The work, title "Domestic Dogs and Horses as Sentinels of Per- and Polyfluoroalkyl Substance (PFAS) Exposure and Associated Health Biomarkers in Gray's Creek North Carolina," appears in *Environmental Science and Technology*.

More information: Domestic Dogs and Horses as Sentinels of Per- and Polyfluoroalkyl Substance (PFAS) Exposure and Associated Health Biomarkers in Gray's Creek North Carolina, *Environmental Science & Technology* (2023). [DOI: 10.1021/acs.est.3c01146](https://doi.org/10.1021/acs.est.3c01146)

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