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Dog Tips

Second-Hand Smoke's Unseen Victims

Think your smoking only affects you? Think again. Groundbreaking research shows how the smoke you bring home could be silently harming your most loyal companion. Discover steps to shield them from harm.

Analysis by Dr. Karen Shaw Becker

STORY AT-A-GLANCE

- A study involving Scottish terriers revealed many more insights into how environmental factors like cigarette smoke influence disease development
- The three-year study compared dogs that got bladder cancer and those that didn't, looking at different factors to see which ones increased the risk
- Dogs living with smokers were six times more likely to develop bladder cancer than dogs not living with smokers
- In households where humans smoke, dogs may be exposed to second-hand smoke from the cigarette and exhalations, as well as third-hand smoke made up of particular material that contaminates furniture, carpet and other household materials
- Cotinine, a nicotine metabolite, showed up in the urine of some dogs living with non-smoker owners, leading the scientists to suggest it may have been due to smoke residues on clothing

It probably doesn't come as a surprise that exposure to cigarette smoke leads to cancer in dogs, much as it does in humans. But a study involving Scottish terriers revealed many more insights into how environmental factors like cigarette smoke influence disease development, even in small doses, like residues on clothing.[1]

The Purdue University researchers chose Scottish terriers because they're prone to bladder cancer, also known as urothelial carcinoma, with a 20-fold higher risk than other breeds. Even taking this into account, the study found exposure to smoking increased bladder cancer rates six-fold — above and beyond their already heightened risk.

Exposure to Cigarette Smoke — Even Residues on Clothing — Raises Cancer Risk in Dogs

The three-year study involved asking owners of 120 Scottish terriers, all older than 6 years, questions about their dogs' lives and health. Researchers compared dogs that got bladder cancer and those that didn't, looking at different factors to see which ones increased the risk.

"Cancer is a combination of what you are born with — your genetics — and what you are exposed to — your environment," lead study author Dr. Deborah Knapp said in a news release. "In this case, we studied these dogs for years at a time, and then we went back and asked, 'What was different between those that developed cancer and those that did not develop cancer? What were the risk factors?'"[2]

They also analyzed the dogs' urine, looking for the nicotine metabolite cotinine to check for second-hand smoke exposure. Cotinine showed up in the urine of some dogs living with non-smoker owners, leading the scientists to suggest it may have been due to smoke residues on clothing. Lead study author Dr. Deborah Knapp told New Atlas:[3]

> *"If someone goes out to a smoky concert or party, then comes home and their dog hops up on their lap to snuggle with them, the dog can be exposed to the particulate material in smoke through the person's clothing."*

Out of the 120 dogs, 32 developed bladder cancer. Dogs living with smokers were six times more likely to develop bladder cancer than dogs not living with smokers. Among dogs living with smokers, those that developed bladder cancer were exposed to a median of 10 pack-years of smoke, while those that did not were exposed to a median of 1.5 pack-years of smoke.

One pack-year of smoke is equivalent to smoking one pack of cigarettes, which typically contains 20 cigarettes, every day for one year. In the context of the dogs in the study, those that developed cancer were exposed to an equivalent of 10 pack-years of smoke, meaning their exposure was akin to being around smoke from 10 packs of cigarettes per day for one year.

In households where humans smoke, dogs may be exposed to second-hand smoke from the cigarette and exhalations, as well as third-hand smoke made up of particular material that contaminates furniture, carpet and other household materials.[4] Dogs living within a mile of a marsh or wetland also had an increased risk of bladder cancer in the study, likely due to the use of insecticides and other chemicals in such areas.

How Smoke Exposure Increases Cancer Risk

The link between smoke exposure and the risk of bladder cancer in dogs aligns with what's known about human health. Smoking is a major cause of bladder cancer in people, with smokers three to four times more likely to develop the condition compared to non-smokers. This is because tobacco smoke contains harmful substances like NNK, beta-naphthylamine, and polycyclic aromatic hydrocarbons.[5]

These toxins are processed by the kidneys and then come into contact with the bladder's lining, causing inflammation and changes to DNA that can lead to cancer. Being around second-hand smoke also increases the risk of bladder cancer in humans, although the evidence isn't consistent in all studies.

Certain genetic differences in humans that affect how the body deals with toxins can increase the risk of cancer when combined with smoke exposure. Research is ongoing to find out if dogs have similar genetic differences that might affect their risk of developing bladder cancer when exposed to smoke.[6]

In the meantime, pet guardians can help protect both their own health and their pet's by not smoking. "What we hope pet owners will take from this is that if they can reduce the exposure of their dogs to smoke, that can help the dogs' health," Knapp said. "We hope they stop smoking altogether, both for their health and so they will continue to be around for their dogs, but any steps to keep smoke from the dogs will help."[7]

Other Household Chemicals Can Also Be Toxic to Pets

In addition to smoke, other pollutants are also common in households with pets. **Cleaning chemicals**, for instance, can also leads to a buildup of toxins in indoor air. Air freshener sprays, upholstery sprays, plug-ins, gels, **scented candles** and incense also produce dangerous indoor pollutants that dramatically affect our pets' health.

I don't recommend using these types of products, especially if you have any type of pet in your home. Birds and cats in particular are highly sensitive to airborne toxins, but if you have any animals in the home at all, keep in mind that the use of chemicals could be harming their health. Further, if it's toxic for your pet, it's likely toxic for you, too.

"With shared chemical exposures, dogs can also serve as potential 'sentinels' for environmental risks important to humans," the researchers explained. While it takes decades for humans to develop bladder cancer after being exposed to carcinogens, dogs might develop the disease within just one to a few years. Therefore, identifying risks in dogs could provide an opportunity to reduce harmful exposures for humans.[8]

In addition to eliminating chemical cleaning products and synthetic home scenting products from your immediate environment, investing in a good quality air purifier helps to remove airborne contaminants our pets are exposed to. This is especially important for indoor-only cats, who can't escape household pollutants and don't have regular access to fresh, outdoor air.

Sources and References

[1,4,5,6,8] The Veterinary Journal February 2024, Volume 303, 106044

[2,7] Purdue University January 3, 2024

[3] New Atlas January 4, 2024