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Swiss association for tobacco control

Domestic animal exposure to passive smoking

Key Messages

- Passive smoking exposes pets and laboratory animals to harmful substances, including nicotine and carcinogens.
- Exposure leads to measurable physiological, histological, and immunological changes in animals.
- Biomarkers such as cotinine in urine, serum, and hair confirm passive smoke exposure in pets.
- Passive smoking is associated with increased risk of respiratory diseases, immune suppression, and cancer in animals.

Background

While the dangers of secondhand smoke (SHS) to humans are well-documented, the impact on animals has received less attention. As domestic animals and pets share indoor environments with their owners, they can be involuntarily exposed to SHS. Recent studies have begun to quantify and characterize the health risks of passive smoking in pets, including dogs, cats, and rodents.

Biomarkers of Exposure

Dogs subjected to passive smoking have shown elevated levels of cotinine, a nicotine metabolite long established as a reliable biomarker for secondhand smoke, in urine (Bertone-Johnson et al., 2007; Roza & Viegas, 2007), serum and hair (Groppetti et al., 2023). Higher levels of cotinine correlate linearly with reported household smoking and number of cigarettes smoked (Bertone-Johnson et al., 2007).

Consequences for animal health

Though less studied than consequences to humans, multiple effects of SHS on animals have been documented. Passive inhalation of cigarette smoke has led to noticeable changes in vocal cords of rats, including abnormal cell growth that could potentially

lead to cancer (Duarte et al., 2006). Similarly, guinea pigs exposed to passive cigarette smoke showed signs of inflammation, oxidative stress, and impaired lung function, including reduced airway clearance and increased sensitivity in the airways (Vasconcelos et al., 2016).

Additionally, chronic exposure to tobacco smoke in animals has been shown to have immunosuppressive effects, with reduced antibody production and increased vulnerability to infections and tumours (Johnson et al., 1990). In cats, such exposure also disrupts the oxidant/antioxidant balance and triggers inflammatory responses, as evidenced by elevated oxidative stress markers and pro-inflammatory cytokines (Demirtas et al., 2023).

Furthermore, cancer risk is elevated for domestic animals confronted with passive smoking. Cats exposed to household passive smoke have a significantly increased risk of developing malignant lymphoma, with the risk rising dependant on the duration and intensity of exposure (Bertone et al., 2002). Certain breeds of dogs—particularly those with short or medium-length noses—appear to be more susceptible to lung cancer when exposed to passive smoke (Reif et al., 1992).

Beyond the risks to animals' health, passive smoking has also been linked to behavioural changes in dogs, including increased fearfulness, anxiety, aggression, reduced activity, and diminished trainability—highlighting its impact not only on physical but also on emotional well-being (Alaie et al., 2025).

Implications

- Veterinarians and public health professionals should raise awareness about the risks of passive smoking to pets.
- Cotinine testing in pets could serve as a tool for assessing household smoke exposure.
- Smoke-free home policies should consider the health of all household members, including animals.

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