Glyphosate 2020 – No public exposures

[2] Glyphosate Causes Cancer – in laboratory animals

Our pets are sentinels for environment exposures to toxic chemicals. Like humans, some pets have greater genetic risk tendencies while others have less.

Animal Cancer Risk.

In 2015 the International Agency for Research on Cancer (IARC Working Group, 2015) concluded that:

'There is sufficient evidence in experimental animals for the carcinogenicity of glyphosate'.

To put it simply, there were enough laboratory studies with experimental animals (usually rodents) to be able to say that glyphosate causes cancer in experimental animals.

However, when regulators looked at those same studies, they concluded that they were due to chance. Professor Christopher Portier has suggested that 'Had regulatory authorities conducted a full reanalysis of all of the available evidence from the 13 animal carcinogenicity studies as was done here, it is difficult to see how they could reach any conclusion other than glyphosate can cause cancers in experimental animals' (Portier, 2020).

High Urinary Levels

Urinary studies show exposures of glyphosate in pets are much higher than that for humans.

Pets carry herbicide residues with them, even when restricted to home lawns that are unsprayed. When herbicides are applied to lawns, they are absorbed by the family pet, and can be detected in their urine. Pets can also be exposed after application in a neighbouring area, due to chemical drift. There does not appear to be an association between the amount of time dogs spend on herbicide sprayed areas and their urine levels. (Knapp, et al., 2013) Scientists have detected herbicides in urine from pets exposed to lawns more than 48 hours after treatment (Reynolds, Reif, Ramsdell, & Tessari, 1994).

In a 2019 study of 30 cats and 30 dogs in New York state, glyphosate was found to be the most common compound in urine, followed by its breakdown metabolites methyl glyphosate (Me-Glyp) and aminomethylphosphonic acid (AMPA). Younger pets had higher concentration than older animals; female dogs had higher concentration of glyphosate and its metabolites and male cats were observed to have higher concentrations than female cats (Karthikraj & Kannan, Widespread occurrence of glyphosate in urine from pet dogs and cats in New York State, USA, 2019). Studies of other chemicals have found cats contain higher concentrations than dogs (Karthikraj & Kannan, Widespread occurrence of glyphosate in urine from pet dogs and cats in New York State, USA, 2019).

It's important to realise that like children (Landrigan & Goldman, 2011; Watts, 2013), puppies and kittens are more vulnerable to toxic chemical exposures. As with children, puppies and kittens have higher concentrations of glyphosate in their urine (Karthikraj & Kannan, 2019).

Exposures can arise from dermal and inhalation of glyphosate-based herbicides (GBHs) in public parks, home gardens and through food. Glyphosate-based herbicides commonly occur in U.S.A. pet foods. Higher fibre pet foods have been found to have higher concentrations of GBH. It was considered that plant materials were the source of glyphosate in the food in a recent study (Zhao, et al., 2018).

Glyphosate is more persistent than assumed

Glyphosate lasts longer in the environment than previously considered (Myers, et al., 2016).

Glyphosate can take 143 days, and the toxic breakdown metabolite AMPA can take 514 days to breakdown to half the initial substance (EFSA, 2013). This is much longer than most councils or regulatory authorities acknowledge. And note, it is the time taken for half the substance to breakdown.

Lawn conditions can affect the time an herbicide takes to breakdown. Herbicides can breakdown more slowly in dry conditions, however wet conditions can also encourage persistence, possibly because humidity delays herbicide liquid drying time. Lawn mowing does not appear alter residue persistence (Knapp, et al., 2013).

Unfortunately, even though it is 2020, there is still no accessible technology for the public or council staff to test grass and soil, to understand if it is safe for pets (or humans) to be walked or played on.

Council policies may require that warning signs stating that toxic agrichemicals have been sprayed must remain in place for 48 hours after the time of application. These signs, placed in good faith by local contractors and applicators rarely indicate the length of time the chemical remains toxic. Frequently, residents may spray out the front of their house, but there are no formal requirements to place a warning sign to indicate a toxic chemical has been sprayed.

Studies show that herbicides can be tracked into the home and lodge in home environments. Because the 'weathering factors' of sun, rain and soil microbes are not present, carpets and furnishing can accumulate residues over the long term, exposing families and pets to chemical mixtures (Nishioka, Burkholder, Brinkman, Gordon, & Lewis, 1996).

However exposures are not limited to GBHs.

Mixtures, or 'chemical cocktails' are an increasing problem (Kortenkamp & Faust, 2018; EEA, 2013). Glyphosate-based herbicides are not the only pesticides pets will be exposed to. Onehunga (prickleweed) sprays are applied seasonally. Grass seed coatings often contain neonicotinoid insecticides. Furthermore, pesticide formulations are commonly identified to be more toxic than regulators indicate (Mesnage, Defarge, de Vendômois, & Séralini, 2014; Myers, et al., 2016). Organosilicon surfactants are added to herbicides to improve efficacy, but may be more harmful than considered by regulators (Chen, Fine, & Mullin, 2018). Other chemicals may contribute to the pet 'exposome' and enhance disease risk, such as phthalates (Karthikraj, Lee, & Kannan, 2019).

Medical toxicologists in the United Kingdom have noted that common symptoms of toxicity of GBH following exposure include vomiting, diarrhoea and lethargy in dogs and vomiting, anorexia and lethargy in cats. Respiratory distress, pulmonary oedema appear less common. Cats are observed to be more at risk of death, particularly due to respiratory complications (Bates & Edwards, 2013). Other clinical signs after accidental ingestion can include hypersalivation, and in severe cases increased muscular activity and renal impairment.

Increasing disease rates in pets

As with toddlers and children, our pets are closer to the ground, having more contact for longer periods, which places them at greater risk of increased exposure. Diseases in pets are increasing, including cancer, hypothyroidism, diabetes, heart diseases and kidney diseases (Karthikraj, Lee, & Kannan, 2019). Many of these diseases may be associated with increasing rates of environmental chemicals. Chemicals can mimic or perturb human hormones at very low hormonally relevant doses, much lower than regulators consider harmful (Kortenkamp A., 2014). As an example, increases in feline hyperthyroidism (Peterson, 2012) may be connected to chemicals that interfere with thyroid function.

Studies have shown that chemical exposures to pets are associated with urinary bladder cancer (Glickman, Raghavan, Knapp, Bonney, & Dawson, 2004) hypothyroidism, obesity, and kidney disease (Karthikraj & Kannan, Widespread occurrence of glyphosate in urine from pet dogs and cats in New York State, USA, 2019). Canine malignant lymphoma exhibits similar clinical, pathologic features as non-Hodgkin's lymphoma, and responds similarly to treatment. A 2011 study showed an association between lawn care chemicals and canine malignant lymphoma (Takashima-Uebelhoer, et al., 2012).

As with human families, our pets are vulnerable to environmental exposures. New evidence from rodent trials may help explain why grandad can apply glyphosate-based herbicides, and appear unharmed, but younger, and future generations are more at risk, Harm can be passed down not through genetic mutations, but by the chemicals altering the way genes function. This can result in higher rates of disease in future generations (Kubsad, et al., 2019).

The problem with environmental exposures is that they are not detectable. This places pets directly at risk – owners cannot avoid unknown exposures. There is plenty of evidence that glyphosate is harmful to mammals, including dogs, rodents and humans. Protecting our family pets is one of the many reasons Soil and Health want to limit glyphosate-based herbicides in public spaces in Aotearoa New Zealand.

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