ARIZONA COMPANION ANIMAL TOXICITIES

By

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ABSTRACT

Exposures to toxic substances can be a life threatening or a permanent life altering event among companion animals in Arizona households. Many of these poisonings can be avoided with preventative measures, however there is a significant lack of knowledge among animal owners on these measures and how to respond when these events occur. The Arizona Poison and Drug Information Center receives thousands of calls concerning animal poisonings every year. The goal of this study was to provide some insight on how Arizona animal toxicities compare to those most commonly seen across the United States. I hypothesized that the substances causing exposures would be slightly different and unique to Arizona considering the access to other types of toxicants that would not be a nationwide issue. Data from the Arizona Poison Center was obtained from the years of 2018-2020 and classified into broader categories to understand where reported toxicities came from. I found that Arizona is very comparable with the national toxicants for both dogs and cats. These results suggest that despite Arizona having its own set of widely known toxicities, they are not as frequent as originally thought. This can be used to educate pet owners and veterinary hospitals on what is actually the most prevalent toxic sources causing illness in their animals in order to prevent them from happening.

INTRODUCTION

Due to the nature in which pets inhabit our homes, exposures to toxic substances are regularly occurring because of the lack of owner knowledge and/or inquisitive animals that get into things when bored or anxious. The regular occurrence of toxic substances to household pets such as chocolate and grapes for dogs has led to the universal knowledge among pet owners that these things need to be looked out for because they can cause great harm. However, there are many other sources of toxicity that can require emergency vet visits that are not as widely known and yet they account for the vast majority of cases. By studying toxicities that are on the rise and the primary agents putting animals at risk, we can increase awareness regarding less known toxic exposures.

The goal of this study was to evaluate the incidence of exposures in Arizona, explore trends, and provide information to better prepare for these cases at the veterinary and ownership level. Similar studies have been performed using national US data, but the present study was unique in that it focused on harmful exposures and the clinical signs that occur at the highest rate amongst dogs and cats in Arizona. Because toxicities can vary depending on geographical location, I hypothesized that Arizona would have more toxicities related to the desert than other places across the US. Data from the Arizona Poison and Drug Information Center was obtained and analyzed from 2018-2020 in order to determine exposures and clinical signs reported for Arizona cats and dogs.

METHODS

Data collection

The Arizona Poison and Drug Information Center gets about 1,200 calls concerning poisonings in pets each year[1]. I emailed the Community Outreach Coordinator, Laura Morehouse, to get access to the exposure calls that they have received. Each exposure that is called in is recorded on a database which includes the following information: the county the caller is calling from, the date, species, specific substance name, generic substance name, substance route, and clinical effects. The data for both dogs and cats from 2018-2020 on the source of toxicity as well as the clinical effects was sifted through and put in to broader, more encompassing categories for better analysis. The category criteria were as follows:

- an OTC and/or prescribed medication or vitamin made for human consumption= human medications and vitamins
- common products that people have around the house including cleaning items= household products
- wounds that occur from insects and snakes= bites and stings
- products made for pest control and weeds= pesticides
- any foods and drinks intended for human consumption= food and drink
- plants and weeds = plants
- hygiene and beauty products= personal care
- illegal drugs= illicit drugs
- consumed plants and animals that have poisonous attributes= poisonous organisms
- products used for building and construction or cars= construction and automotive
- any form of nicotine, tobacco, or marijuana preparations= cigarettes, tobacco, and marijuana
- products made for enjoyment, painting, or arts and crafts= hobby items
- unspecified chemical agents= other chemicals
- unspecified drugs= unknown drugs
- called in but the source is unknown= miscellaneous
- any source that accounted for less than 5% of total= other

Clinical sign criteria:

- vomiting= emesis
- seizures, tremors, or brain injury= neurological
- excess secretions, abdominal pain, or constipation= gastrointestinal
- redness, puncture wounds, or dermal irritation= physical irritation
- renal, hepatic, muscular, cardiovascular, or pulmonary symptoms= systematic
- depression or agitation= behavioral
- muscle weakness/rigidity= muscular
- choking
- swelling and inflammation= edema
- eye irritation or conjunctivitis= ocular

- clinical sign that was unspecified= miscellaneous
- any sign that accounted for less than 5% of total= other

RESULTS

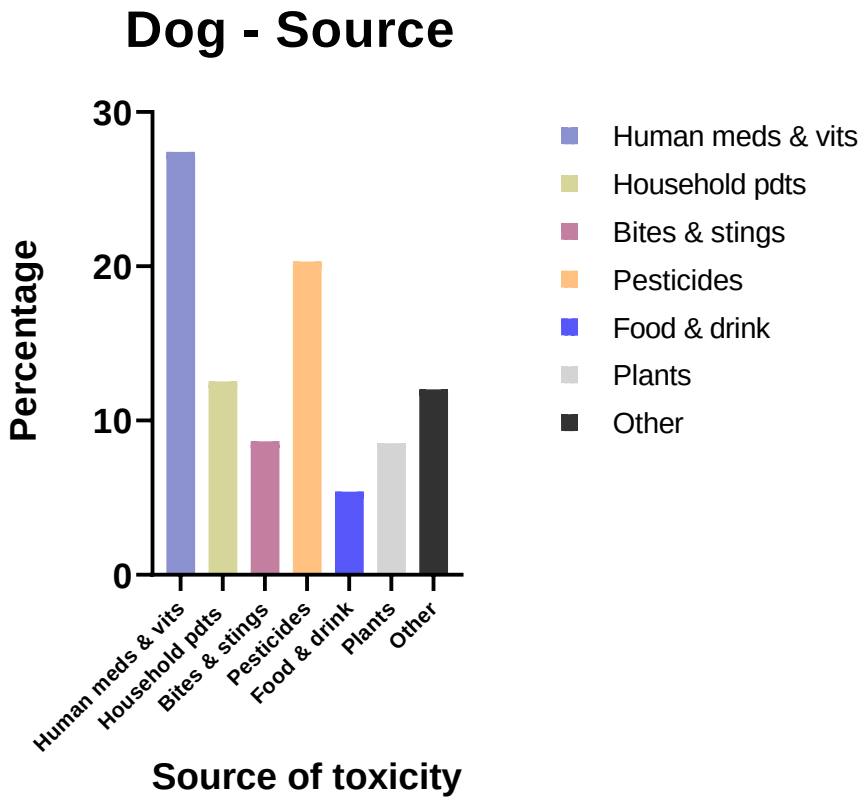

Fig. 1. Percentage distribution of toxicity source reports for dogs from 2018-2020. Categories are as follows: (1) human medications and vitamins, (2) household products, (3) bites and stings, (4) pesticides, (5) food and drink, (6) plants, (7) other

Dog exposures

From highest to lowest percentage: human medications and vitamins (27.4%), pesticides (20.3%), household products (12.5%), other (12%), bites and stings (8.6%), plants (8.5%), food and drink (5.4%). There was a total of 3,519 calls concerning these dog exposures from 2018-2020. The number of exposures in each category was divided by this total number and made into a percentage value.

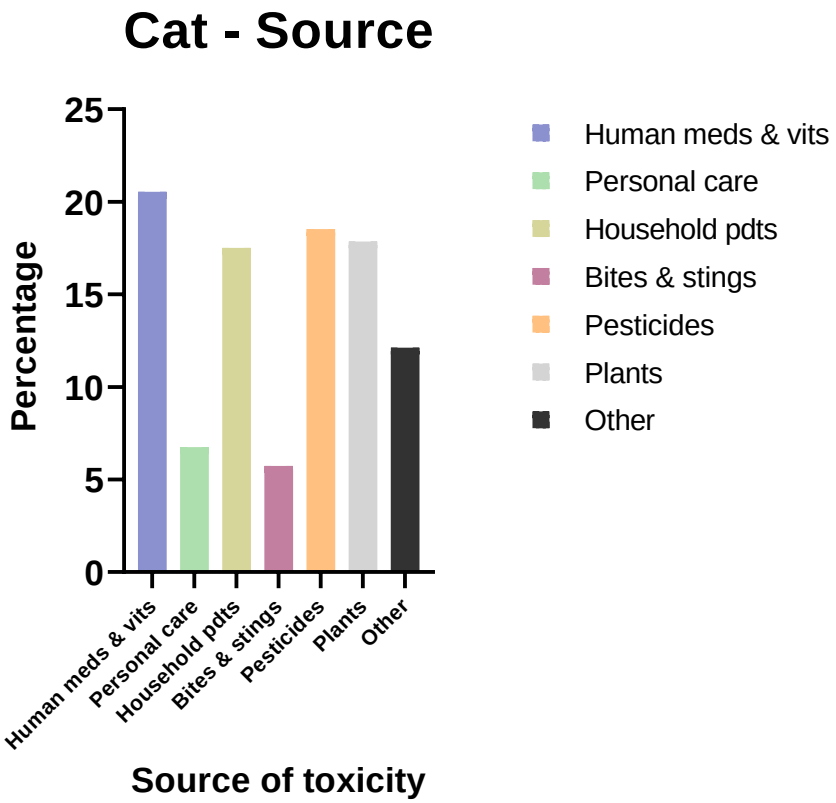

Fig. 2. Percentage distribution of toxicity source reports for cats from 2018-2020. Categories are as follows (1) human medications and vitamins, (2) personal care, (3) household products, (4) bites and stings, (5) pesticides, (6) plants, (7) other

Cat exposures

From highest to lowest percentage: human medications and vitamins (20.5%), pesticides (18.5%), plants (17.8%), household products (17.5%), other (12.1%), personal care (6.7%), bites and stings (5.7%). There was a total of 297 calls concerning these cat exposures from 2018-2020. The number of exposures in each category was divided by this total number and made into a percentage value.

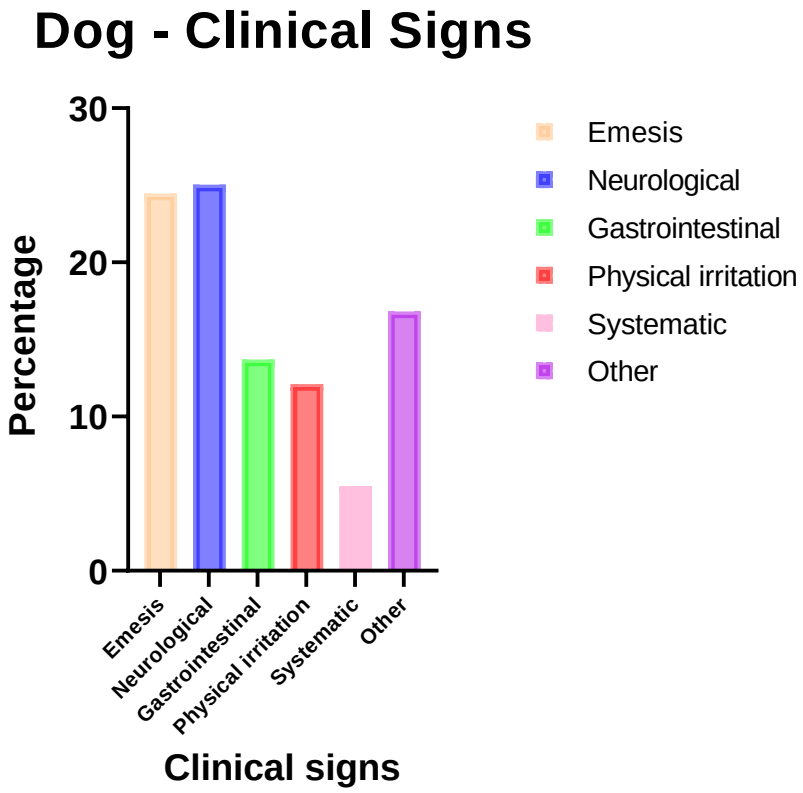

Fig. 3. Percentage distribution of clinical sign presentation in dogs after substance exposure from 2018-2020.

Dog clinical signs

From highest to lowest percentage: neurological (25%), emesis (24.4%), other (16.8%), gastrointestinal (13.7%), physical irritation (12.1%), systematic (5.5%). There was a total of 1,029 documented clinical signs in dogs after exposure from 2018-2020. The number of signs in each category was divided by this total number and made into a percentage value.

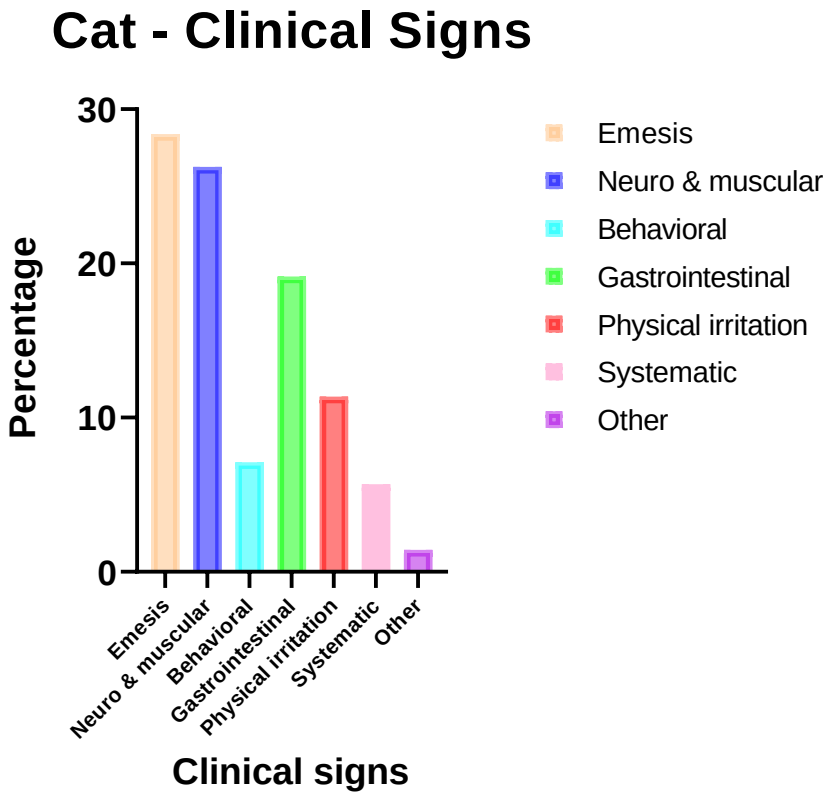

Fig. 4. Percentage distribution of clinical sign presentation in cats after substance exposure from 2018-2020.

Cat clinical signs

From highest to lowest percentage: emesis (28.4%), neurological and muscular (26.2%), gastrointestinal (19.1%), physical irritation (11.3%), behavioral (7.1%), systematic (5.7%), other (1.4%). There was a total of 141 documented clinical signs in cats after exposure from 2018-2020. The number of signs in each category was divided by this total number and made into a percentage value.

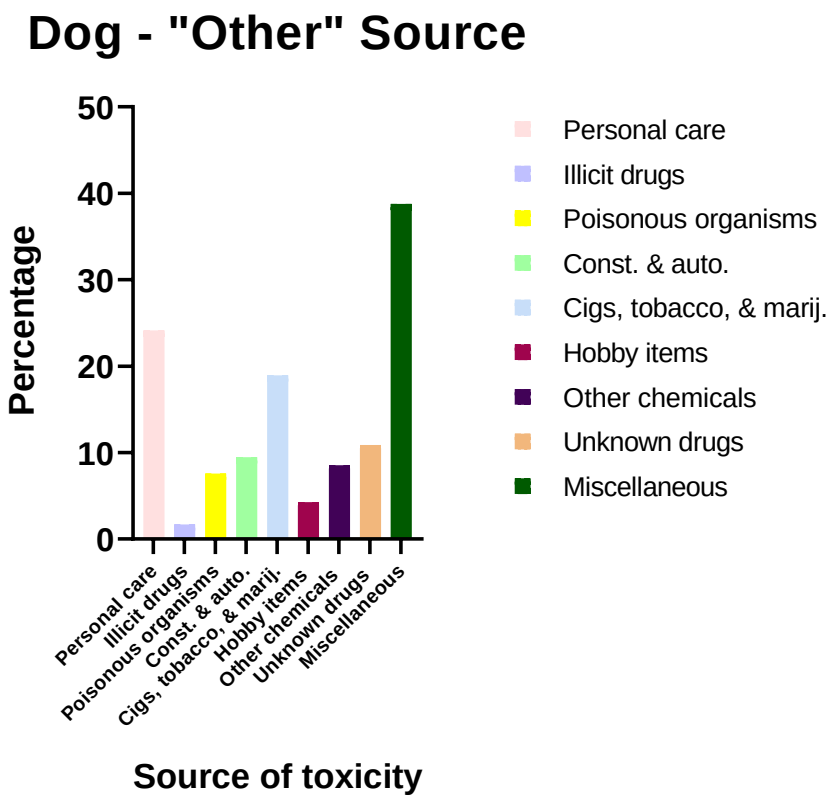

Fig. 5. "Other" category expansion from Figure 1; percentage distribution of toxicity source reports for dogs. Any exposure that accounted for less than 5% of all exposures was put into the "Other" category, then expanded on in this figure. Categories are as follows (1) personal care, (2) illicit drugs, (3) poisonous organisms, (4) construction and automotive, (5) cigarettes, tobacco, and marijuana, (6) hobby items, (7) other chemicals, (8) unknown drugs, (9) miscellaneous

Dog "Other" exposure expansion

From highest to lowest percentage: miscellaneous (38.8%), personal care (24.1%), cigarettes, tobacco, and marijuana (18.9%), unknown drugs (10.9%), construction and automotive (9.5%), other chemicals (8.5%), poisonous organisms (7.6%), hobby items (4.3%), illicit drugs (1.7%). There was a total of 423 exposures in these categories that each made up less than 5% of the total exposures in Figure 1. The number of exposures in each category was divided by this total number and made into a percentage value.

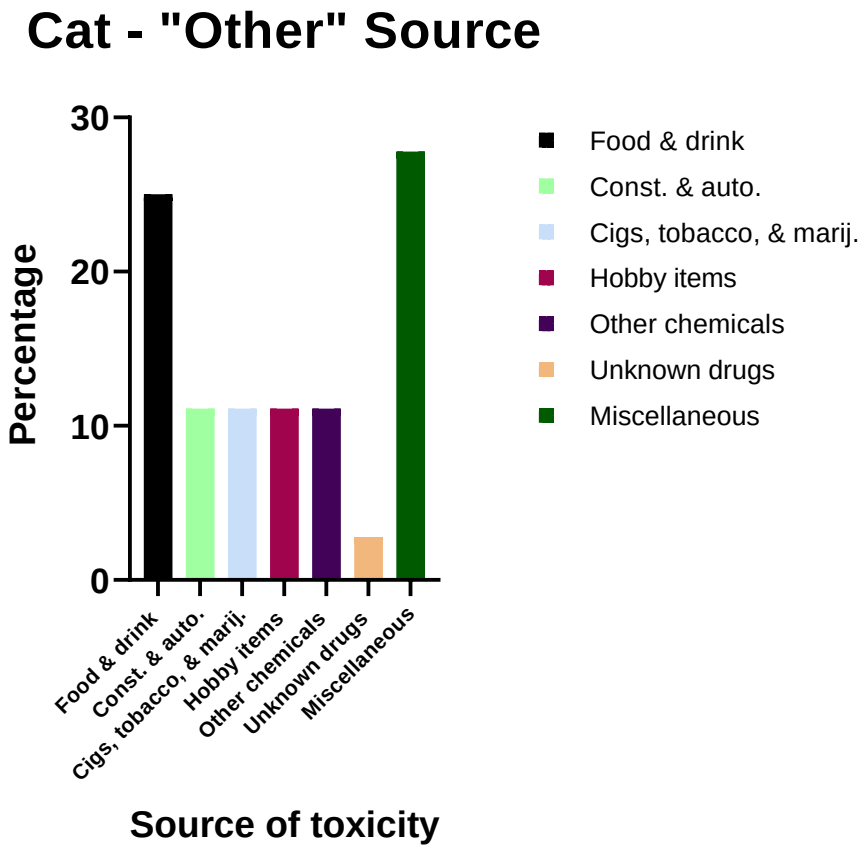

Fig. 6. "Other" category expansion from Figure 2; percentage distribution of toxicity source reports for cats. Any exposure that accounted for less than 5% of all exposures was put into the "Other" category, then expanded on in this figure. Categories are as follows (1) food and drink, (2) construction and automotive, (3) cigarettes, tobacco, and marijuana, (4) hobby items, (5) other chemicals, (6) unknown drugs, (7) miscellaneous

Cat "Other" exposure expansion

From highest to lowest percentage: miscellaneous (27.8%), food and drink (25%), construction and automotive (11.1%), cigarettes, tobacco, and marijuana (11.1%), hobby items (11.1%), other chemicals (11.1%), unknown drugs (2.8%). There was a total of 36 exposures in these categories that each made up less than 5% of the total exposures in Figure 2. The number of exposures in each category was divided by this total number and made into a percentage value.

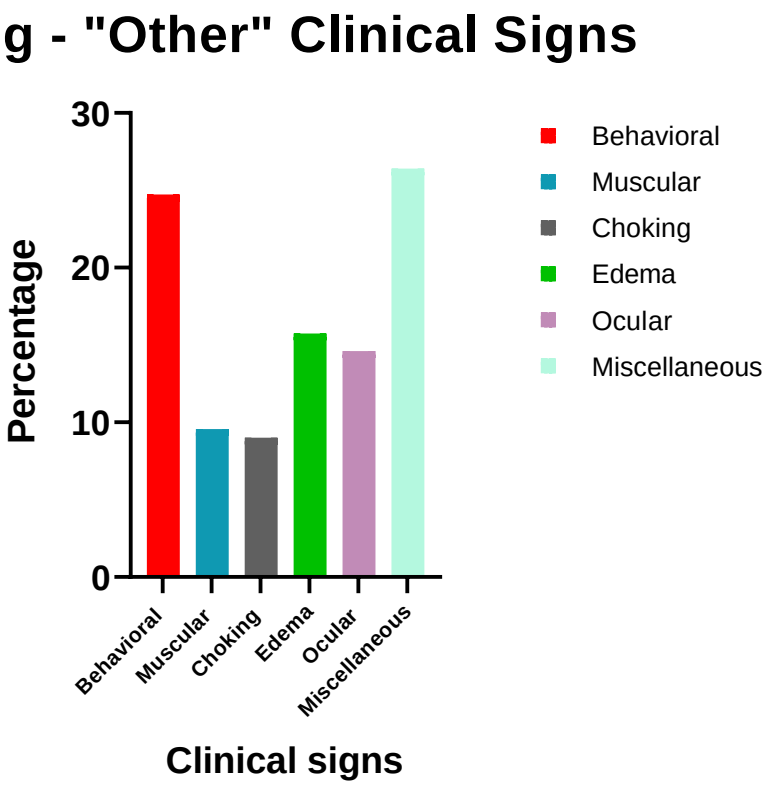

Fig. 7. "Other" category expansion from Figure 3: percentage distribution of clinical sign presentation in dogs after substance exposure.

Dog "Other" clinical effects expansion

From highest to lowest percentage: miscellaneous (26.4%), behavioral (24.7%), edema (15.7%), ocular (14.6%), muscular (9.6%), choking (8.9%). There was a total of 178 clinical signs in these categories that each made up less than 5% of the total number of clinical signs in Figure 3. The number of signs in each category was divided by this total number and made into a percentage value.

DISCUSSION

Over the span of the previous two years, 2018-2020, human medications and vitamins have made up 27.4% of all toxicities in dogs in Arizona. This category includes a wide variety of common over-the-counter and prescribed drugs made for human consumption and relief including: acetaminophen, albuterol, supplemental vitamins (i.e. calcium, vitamin c, iron, etc.), pain medications, decongestants, ibuprofen, laxatives, melatonin, antidepressants, antibiotics, among others. These toxicities most likely come from accidental exposure, however there can be administration from owners with good intent that are unaware of the potential toxicities that may occur[2]. Compared to the national average, human medications made up about 17% of exposures[3]. This category almost doubled for the state of Arizona, making human medications a serious cause for concern for pet owners in this region.

The other top category was pesticides. These trends are consistent with the United States trends in animal poisonings with human medications and pesticides being two of the top running exposures in dogs[2]. Pesticide exposures make up about 20% of the calls to the Arizona Poison Control Center. This pesticide category also included rodenticides, insecticides, animal/insect repellant, and herbicides that animals can come in contact with from exposure via outdoor administration or finding them in areas such as garages and outdoor sheds that are not properly blocked from animal exploration.

The third most prevalent category for dogs was household products. Accounting for 12.5% of exposures, this category consisted of items such as cleaning items, detergents, pool accessories, desiccants, deodorizers, shoes, furniture, and batteries. Products like these are easily accessible items that are within the reach of dogs that they tend to find when they do not know how to direct their energy or stress. Dog owners who are gone for long periods of time throughout the day are more likely to experience these behaviors. Compared to the national average, household products came in sixth place, showing that Arizona dogs have a much larger issue in this category.[3]

With human medications, pesticides, and household products being the leading causes of toxicity in Arizona dogs, the associated clinical signs that dogs present with support this conclusion. Neurological deficits such as confusion, mydriasis, paralysis, seizures, and tremors are conditions associated with certain drugs or medications. Emesis is also an extremely common, nonspecific symptom that occurs in many instances of toxicity. Since human medications are typically ingested, neurological and behavioral symptoms along with vomiting due to high dosages and the type of medication are most common.

Other sources categories that occur in significant numbers include:

- bites and stings- ants, bees, spiders, snake or rodent bites, scorpions
- plants
- food and drink- alcohol, food products

The desert environment in Arizona poses a greater threat of bites and stings. Dogs tend to see these toxic insects and animals as playtime or a hunting experience. People that take their dogs hiking or live on properties that are mountainous or have a lot of land have much more potential for exposure to insects and pests that are venomous.

The remainder of toxicity sources in dogs aren't the most recognized or obvious, however they make up approximately 12% of exposures. Designated the "Other" category, this includes:

- personal care items- deodorants, lip balms, sunscreen, lotions and oils, hair dye
- illicit drugs- cocaine, heroine
- poisonous organisms- caterpillars, mushrooms
- construction and automotive- construction putties, building products, heavy metal
- cigarettes, tobacco and marijuana- edibles, chewing tobacco, Juuls
- hobby items- artist paints, clays, fireworks, glow products
- other chemicals and drugs that are not specific
- miscellaneous- exposures that caused clinical effects but the caller did not know what the source of exposure was

While these exposures currently occur in small numbers, we will most likely see an upward trend in these types of exposures as substances continue to be introduced into society. In Arizona, the legalization of marijuana took place at the end of 2020. This is going to lead to an increase in marijuana exposures as it is easily attainable and no longer needs to be stashed or hidden, so negligence with this substance is likely to occur.

Cats have slightly different commonalities and trends in the most common exposures they encounter. Similar to dogs, human medications and vitamins, pesticides, and household products are most often reported, however cats have an additional category that is extremely prevalent- plants (17%). These results are not consistent with the national average, as plants only represented a small percentage of 5.4% in 2017[3]. The added agility and ability for cats to access much higher, harder to reach items like household plants can account for this large percentage. Cats are typically picky eaters, but even playing with these plants can lead to accidental ingestion. Very small amounts of plants, such as lilies that are included in a large variety of plant arrangements, can be very destructive to the feline kidney and can cause irreversible damage.

Other source categories include:

- personal care
- bites and stings
  *note: for specific examples refer to above breakdown for dogs

Again, because cats have the ability to get on to counters, the personal care category in comparison to dogs has more bathroom items like shampoos, toothpaste, and oils. Additionally, cats that go outdoors or spend most of their time outside are susceptible to bites and stings due to their hunting instincts.

The remainder of toxicity sources in cats from the “Other” category include:

- food and drink
- construction and automotive
- cigarettes, tobacco, and marijuana
- hobby items
- other chemicals
- unknown drugs
  *note: for specific examples refer to above breakdown for dogs

Emesis and neurological symptoms remain the most common because the sources of exposure are very consistent among dogs and cats. Cats are known to vomit quite frequently from factors outside of toxicity, so knowing a cat’s regular behaviors and when is a cause for concern is vital for feline health. Gastrointestinal signs often occur alongside these other symptoms because the majority of cat exposures are through ingestion. Noticing changes in fecal consistency and bathroom habits can be indicative of exposure.

CONCLUSION

Continuing to look at these exposures on a yearly basis to identify new, ongoing, and increasing trends to better inform pet owners on how to avoid these occurrences as well as the veterinarians that are treating these animals so they can be prepared and can continue to conduct therapeutic research can significantly decrease the likelihood of these exposures. Veterinary treatments and therapies change and advance in order to suit the needs of the animals needing care from toxicity exposures. As new toxicants arise as more things are introduced to society, tracking these changes will provide a positive impact on animal welfare and quality of life.

ACKNOWLEDGEMENTS

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[1] Arizona Poison and Drug Information Center https://azpoison.com/

[2] McLean MK, Hansen SR. An overview of trends in animal poisoning cases in the United States: 2002-2010. Veterinary Clinics of North America: Small Animal Practice (2012) 42(2):219-28, v. doi: 10.1016/j.cvsm.2011.12.009

[3] Means C, Wismer T. An overview of trends in animal poisoning cases in the United States: 2011-2017. Veterinary Clinics of North America: Small Animal Practice (2018) 48(6):899-907. doi: 10.1016/j.cvsm.2018.07.010