Pets Vs. Plastics

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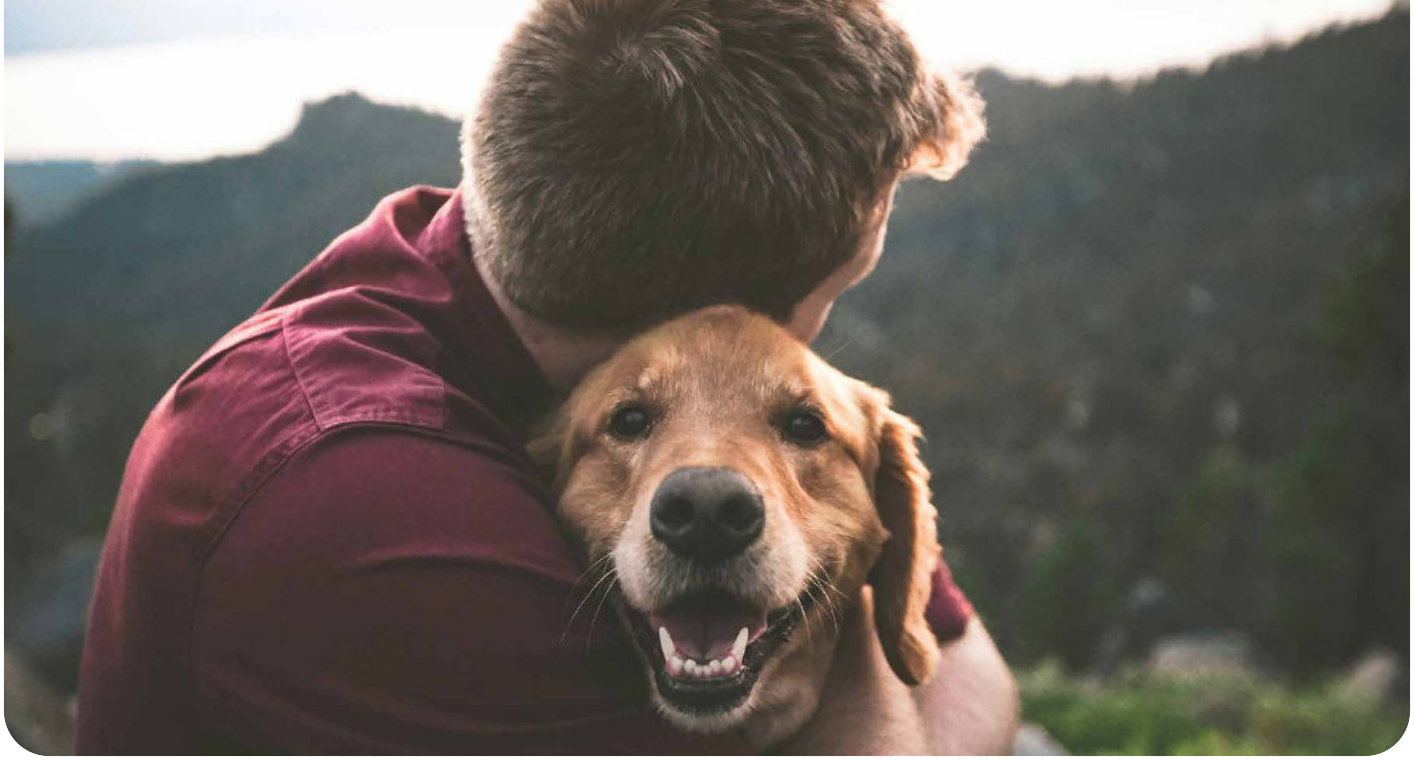


EXECUTIVE SUMMARY

There are over one billion pets worldwide[1], and according to the Global Animal Health Association's 2022 report[2], the U.S., Brazil, the European Union and China alone account for half a billion pets globally.[3] In Argentina,[4] 66% of homes own a dog, with Mexico not far behind at 64% and Brazil at 58%. The Middle East, Africa and Eastern Europe have all seen pet ownership rise and in Korea[5] it increased by 50% from 2014 to 2018.

According to research from 2024, 66% of households[6] in the U.S. own a pet, which equates to just under 90 million homes. 65.1 million of them own a dog, and 46.5 million own a cat. The third most popular pets globally are fish! In fact 50%[7] of the world's population owns a pet.

FOR THE LOVE OF PETS

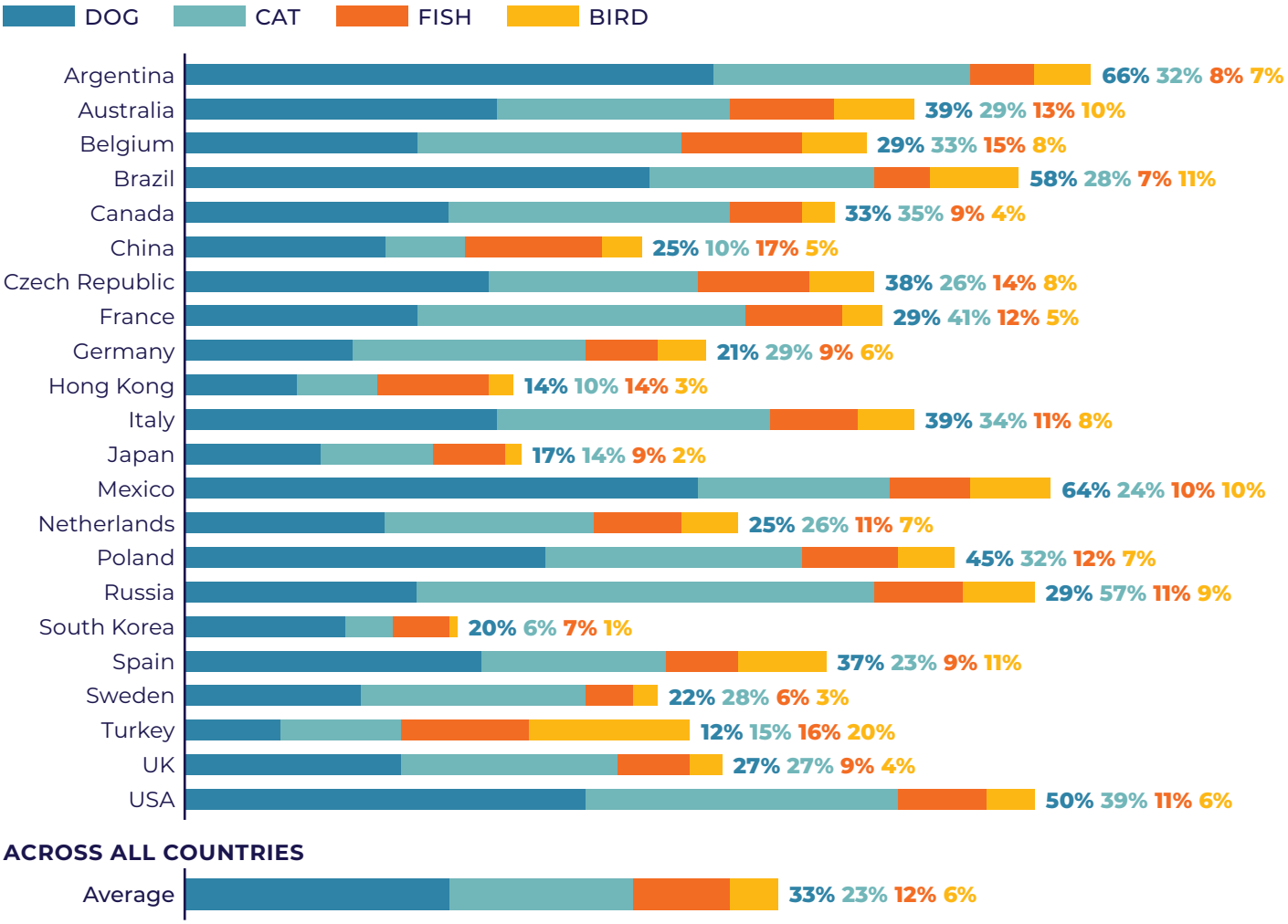
While there's a vast array of animals in the pet category, it is the world's most popular pets, cats and dogs, that this report is focused on — and the impact that plastics in all their forms are having on their health.

The popularity of pets has been fueled by a few factors — a rising middle class with a larger disposable income has been a major factor in the rise of pet ownership. The Covid-19 pandemic ignited an explosion in pet ownership as people sought the calming influence of animals to ease both their anxiety and a growing feeling of isolation. For example, the UK saw the adoption of two million pets during the Covid crisis, while Australia saw over one million dogs adopted since 2019.[8]

How we regard our pets has evolved dramatically as well. For many people blessed to have dogs and cats in their lives, they are not merely 'pet owners' but 'pet parents.'[9] In some South Asian countries[10] birth rate appear to be falling as young people delay marriage and having kids in favor of getting a dog or a cat.

PET OWNERSHIP INTERNATIONALLY

PERCENTAGE OF PEOPLE LIVING WITH DIFFERENT PETS IN 22 COUNTRIES



ACROSS ALL COUNTRIES

GfK survey among 27,000+ internet users (ages 15+) in 22 markets — multiple answers possible — rounded.

SOURCE: gfk.com

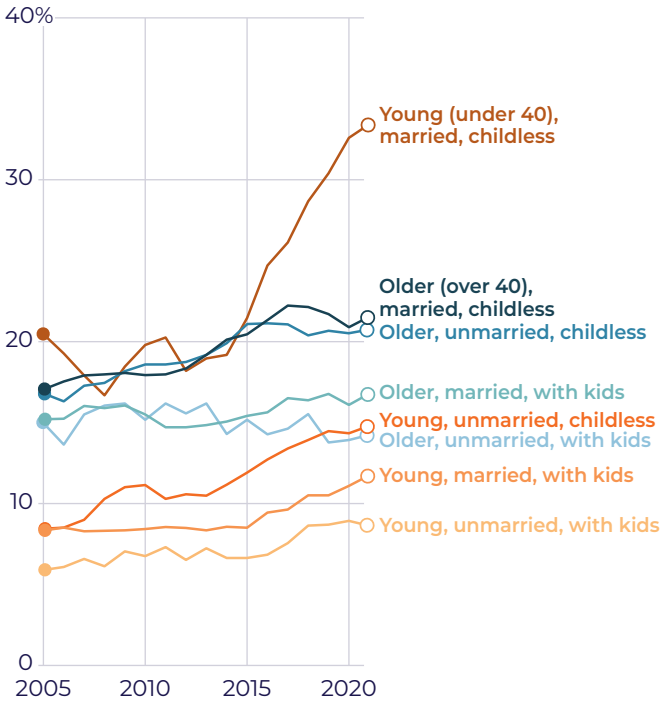
In fact, research has shown that the **majority** of pet owners regard their relationship[11] with their pets, especially dogs and cats, as akin to a relationship with a child. Millennials and Gen Z[12] are most likely to feel this way about their pets. Millennials in particular have been touted as the **"fur-baby-boom generation"** because they own more pets than any other. According to the most recent National Pet Owners Survey, by the American Pet Products Association[13] (APPA), of the 66% of U.S. households with a pet, a staggering 33% are Millennials, followed by Generation X at 25% and Baby Boomers at 24%.

It is hard to believe that back in the 1960's one quarter[14] of all dogs in America were living on the streets and up to 20 times the number of dogs in shelters were euthanized compared to today. Pets have come a long way — fast!

> *"The vast majority of us truly love our pets as members of our own family. I'm not ashamed to admit that I love my dogs, Jack and Riley, like this and I only want the best for them.*
>
> Kathleen Rogers, President of EARTHDAY.ORG

ONE GROUP HAS EMBRACED PETS FASTER THAN ANY OTHER

SHARE WHO SPEND ANY TIME WITH PETS IN A GIVEN DAY, THREE-DAY AVERAGE



Data Source: Bureau of Labor Statistics

SOURCE: Washington Post

PETS ARE GOOD FOR HUMANS

Whether they are companion animals, considered members of the family, working farm dogs, guard dogs, or support and service animals, their impact on our lives is irrefutable. Pets reduce anxiety[15] and loneliness, increase self-esteem, and improve overall mood.

Dogs in particular even improve our physical health[16], according to a recent Special Health Report from Harvard Medical School and the Angell Animal Medical Center finding that dog owners have lower blood pressure, healthier cholesterol levels, and a lower risk of heart disease, than non-dog owners. The American Heart Association[17] has stated that dog ownership "may have some causal role in reducing cardiovascular disease risk." New research has recently discovered pets are even good for cognitive function[18] as we age. Our love for them has seen the pet industry explode.

THE BUSINESS OF PETS

In 2023, the U.S. saw $143.6 billion spent on pets with no slow down on the horizon. In the global market, trends are shockingly similar. In 2023 we spent $320 billion on our pets[19] from food to toys to clothes to services and veterinary care. In recent years the pet care market has been projected to grow at a rate of around 5.1% each year,[20] and the global market's pet trajectory is conservatively predicted to hit $500 billion by 2030.[21]

Alongside increased spending on toys and food, the U.S. veterinary care market alone was worth $34.3B in 2021,[22] increasing to $37 billion by 2023.

2022 EXPENDITURE BREAKDOWN IN THE U.S.

Pet Food and Treats	$58.1 billion
Supplies, Live Animals and OTC Medicine	$31.5 billion
Vet Care and Product Sales	$35.9 billion
Other Services*	$11.4 billion
Total	$136.8 billion

*Other Services include boarding, grooming, insurance, training, pet sitting and walking and all services outside of veterinary care. SOURCE: APPA

WHEN PETS AND PLASTICS COLLIDE

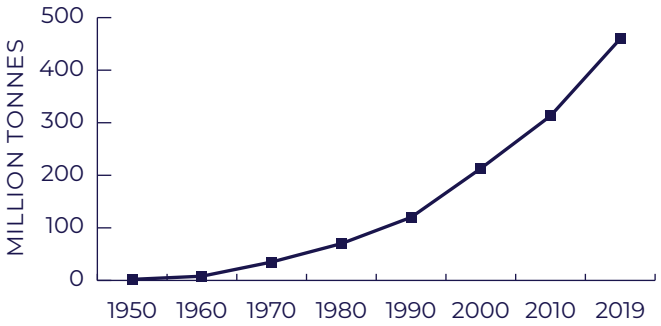
Like nearly every other market in the 21st century, the pet industry relies on plastics. Which means that pets have many opportunities to ingest and inhale plastics — either as visible plastic pieces, tiny microplastics or plastic's additive chemicals — through their toys, supplies, and even their food.

From the 1950's onwards,[23] plastic became ubiquitous. Our household items, our computers, our plumbing pipes, cars, tires, trucks, farm machinery, packaging, furniture, medical equipment, toiletries, utensils, play parks, even our clothes — all of them are made partially or completely from plastics.

Back in 1950,[24] the world produced just over two million tons of plastics. Now we produce over 500 million tons of it annually. Plastic production has doubled in the last 20 years alone and is set to nearly triple[25] by 2060.

GLOBAL PLASTICS PRODUCTION

ANNUAL PRODUCTION OF POLYMER RESIN AND FIBERS



Data source: Geyer et al. (2017)

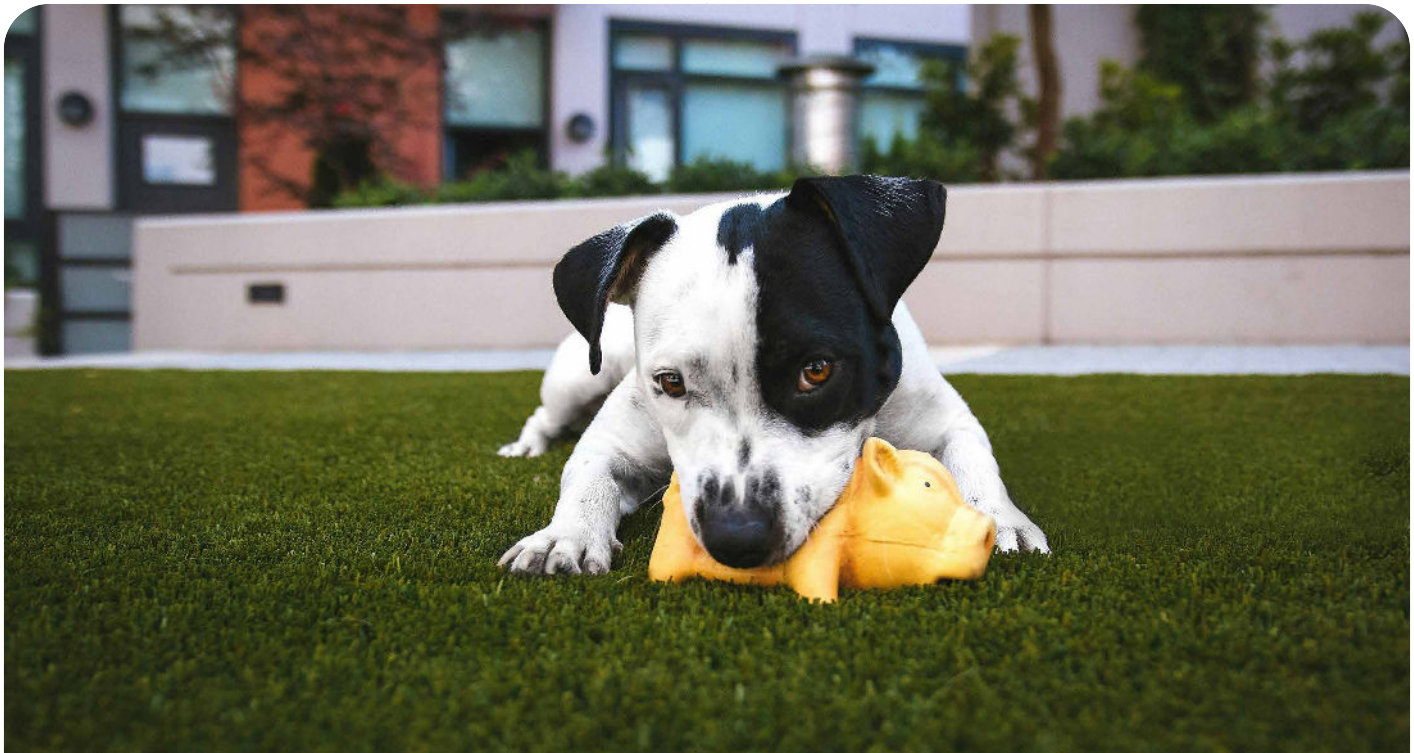
SOURCE: Our World in Data

Over half of all the plastic we have made[26] collectively across the planet has been made since 2000 alone, but only 9%[27] of ALL the plastic ever made has been recycled. But while the impact of microplastics and their additive chemicals on human health is gradually building, the research on their impact on our pets' health is much more nascent.

HEALTH RISKS ASSOCIATED WITH HUMANS AND SENTINEL ANIMALS

Plastic is derived from a cocktail of oil and additive chemicals,[28] common ones being bisphenol A and phthalates.[29] Both of which are toxic.[30] We know that pets come into contact with plastics in a variety of ways and while the research on how this impacts the health of our pets is still limited, there is a growing body of evidence that plastics, microplastics and their additive chemicals, are associated with a range of health issues in human beings.

It has already been discovered that pets ingest these plastic particles and their toxic chemicals too and they have been found in the internal tissue of pets and in their feces.



A recent study[31] by a team of scientists at the College of Nursing at the University of New Mexico discovered microplastics in the testes of both dogs and humans and it is helping researchers understand declining sperm counts in men. Dogs were specifically chosen to be part of the experiment because they are so much a part of our lives that they are considered "sentinel" animals for exposure to plastic chemicals and particulates. The sperm count in the dogs' testes was lower in samples with higher contamination of Polyvinyl chloride, a form of plastic.

> *"We find out more every day about how plastics and the chemicals used to treat them affect human health, so it should be no surprise that they can also have detrimental effects on our pets as well.*
>
> ***Studies**[32] have shown BPA exposure can disrupt normal hormone cycles in rats, potentially affecting the reproductive tract, organization of the brain and metabolic cycles. Since rats are often used as models for both humans and other animals, exposure to plastics can also cause these changes in our pets.*
>
> Dr. Chyrle Bonk (DVM) from PetKeen.com

Microplastics and their additive chemicals have been associated with a frightening array of health risks in humans from heart attacks, to strokes,[33] to some cancers,[34] Alzheimer's,[35] obesity,[36] miscarriage,[37] a range of endocrine-disrupting illnesses,[38] male infertility[39] and beyond.[40] Babies appear to be most at

risk from microplastics and their additive chemicals as outlined in our report, Babies VS. Plastics.[41]

The truth is that plastics are not inert but they degrade over time into tiny physical fragments called microplastics.[42] The additive chemicals used to make them, like phthalates and bisphenol A, leach out of these microplastics (MP's) into the environment and into us — our babies, our children, and our pets.

Microparticles can also absorb[43] other contaminants such as metals and organic substances that can make our pets ill, and we also know that microplastics can carry bacteria[44] and potentially even viruses. These can cause disease and illness in humans and animals alike. Exposing pets to bacteria via plastics can cause a variety of health problems or exacerbate existing conditions. Intestinal toxicants in particular have been linked[45] to microplastics, which interfere with gut microbiota and critical intestinal functions.

WHAT EXACTLY ARE MICROPLASTICS AND MICROFIBERS?

Typically MP's are tiny fragments of plastic measuring less than 5 mm in length with a diameter the size of a grain of rice. As larger pieces of plastic slowly erode, degraded by weather, water, and usage over time, trillions of microplastics are created. Additionally, microfibers[46] shed off items made of synthetic fabrics, like our pets' clothes and bedding. This includes materials like nylon and polyester.

Collectively these microfibers and microplastic particles, as well as the toxic chemicals used to make them, are ingested and inhaled by our pets in a range of ways.

- Microplastics and microfibers shed into the atmosphere from plastics and synthetic materials like polyester and nylon and become a component of household dust[47] — which our pets, like us, inhale. Studies have found high levels of plastic-related flame retardant chemicals (PBDEs) in the blood serum of dogs[48] and cats.[49]
- These microplastic particles wash into our rivers and waterways, which our pets can drink.
- The inside of cat food cans have been found to have a PVC-based coating while dog food cans have been discovered to have a BPA-based coating.[50] Both BPA and PVC are plastics.
- Discarded human food can still be in its original plastic packaging when it is used in animal feed[51] and potentially pet food.
- Ear tags on carcass heads[52] are often not removed and will go into pet food.
- Pets chew and ingest plastic from their plastic pet toys and plastic bones.
- Plastic additive chemicals in these pet toys, such as phthalates and bisphenol A (BPA), leach into our pets' gums,[53] stomachs and skin.

> *We know that certain chemicals leaching out of plastics in the environment mimic and disrupt the endocrine system and have been recognized as harmful carcinogens. This includes BPA, phthalates, and even lead, which affect human, and animal health.*
>
> Dr. Paola Cuevas — Senior In-House Veterinarian, MVZ from Dogster.com

Furthermore, these microplastics, microfibers and their additive chemicals have already been associated with a variety of health issues, from embryo development in dogs,[54] to potential infertility,[55] liver failure and miscarriage issues in our pets.

AIM OF THE REPORT

Pets vs. Plastics is a meta-analysis of some of the available research to date studying the impact of plastics, micro-plastics and their additive chemicals on the health of our pets. While there may be a limited amount of data on how plastics, microplastics and their additive toxic chemicals impact our pets' health, there is more than enough to be alarmed.

> *As we continue to see numerous pet foods recalled for questionable ingredients or potential contaminants, it should be safe to say that regulation could be stepped up. As pet food companies try to use different ingredients from various sources as a way to make their food more sustainable or less expensive, it can also become more questionable as to the quality.*
>
> Dr. Chyrle Bonk (DVM) from PetKeen.com

What will become clear is that the pet industry needs far stricter regulation when it comes to what it can put in our pets' food and what it uses to make their toys. With much clearer and more honest labeling, with active monitoring and effective accountability for when things go wrong. **Right now pet toys and clothes are unregulated and pet food is, in effect, largely unregulated — across the globe.**

More research needs to be undertaken to determine the impact of plastic in all its forms on our pets. Not least because our pets act as unwitting sentinels[56] for gauging human exposure to microplastics and microfibers. Why? Because our pets share common living spaces with us, they breathe the same air and often drink from the same water sources.

Pets are peculiarly at risk from plastics, because much like babies,[57] they chew[58] and teethe on plastic toys and bones — which means they are often inadvertently and directly consuming microplastics and plastics. Pets, also, due to their size, are often closer to the ground, and therefore exposed to household dust,[59] which contains microplastics and microfibers. Plus, plastics can get directly into the pet food chain.

Right now there is little dedicated research on the impact of plastics, micro-plastics and their toxic additive chemicals on the wellbeing of our pets. We hope this report draws attention to this fact. The pet industry is worth billions and it is booming — our pets deserve that their food, their toys, their bedding and everything we buy for them, is all regulated and safe.

01:

PET TOYS

It is a sobering thought, but every year an estimated 634 million dog toys[1] end up in U.S. landfills, which is equivalent to **40,500 tons of largely plastic waste**. But it wasn't always so; like most things, pet toys have changed over time.

PET TOYS — A BRIEF HISTORY

Department stores in the U.S. didn't really start selling dog toys until the 1920s, and even then there was very little variety on offer — leather balls were pretty much all you could find. But over time as pet ownership increased, the range of toys for dogs and cats increased. Rubber balls and rawhide, made from dried animal skin, were popular and in 1955 toys made from a new synthetic product known as Nylabone[2] appeared. These artificial bones, made from nylon, were created to cater to a dog's instinctual need to chew. Nylon is a form of plastic.

Puppies chew,[3] as part of a developmental stage, similar to human babies' teething. But dogs of all ages chew — it's good for their jaws and teeth, and it also relieves anxiety. So, unlike babies, dogs don't grow out of this love of chewing and are therefore more at risk of extended exposure to plastics via toys.

Rope toys began appearing in earnest in the 1980's with the first major pet store[4] opening in 1987. By the 2000's interactive toys had emerged on the market. Toys that squeaked became popular as they catered to a dog's natural 'hunting' instincts and sounded like prey animals.

Pet toys exploded with plush toys and then pet clothes and pet bedding followed — all of it largely made with plastic synthetic textiles like polyester.[5] These plastic materials and textiles all shed microplastic particles and/or fibers — which our pets inhale from the air and household dust.

As our relationship with our pets evolved into a parental role, the amount we were happy to spend on them increased.

The pet market obligingly delivered more and more plastic products for us to buy from them. Pet 'parenting'[6] was perhaps most elegantly exemplified in January 2023,[7] when PetSmart and Fisher-Price jointly launched a line of Puppy Toys available in-store. The collection mimicked baby toys, i.e. teething, soothing, and engagement. Ironically exactly the same behaviors that put our babies[8] at a higher risk of consuming microplastics and their additive chemicals.

REGULATING PET TOYS

With this explosion of the pet industry over the last decade, you might assume that all pet toys on the market[9] have been vetted by federal, state or global agencies. You would be wrong to think this.

The Consumer Product Safety Commission,[10] CPSC, which is dedicated to reducing 'the unreasonable risk of injuries and deaths associated with consumer products,' **has never recalled a pet toy because it was deemed to be hazardous**. The Commission argues that it could only do that if a pet toy was deemed dangerous to a human as it has **no authority to protect pets**.

The **U.S. Food and Drug Administration** (FDA) does not regulate[11] pet accessories, toys, beds, crates, grooming aids, cat litter, etc.

"There are virtually no federal or state laws, which expressly apply solely to the manufacture and sale of pet toys. However as a result of past consumer concerns it is possible that in the future there may be limitations on the amount of lead and/or other chemicals contained in pet toys." American Pet Products Association (APPA)[12]

The APPA also goes on to say: "In addition, even though pet toys are "consumer goods" the US Consumer Products Safety Commission (CPSC) has stated that the agency does not have the resources or the mandate to regulate pet products unless a person is injured from the product."

GLOBAL PET TOY REGULATIONS

According to the APPA, "European Regulation[13] of pet products mainly relates to product labeling requirements and to the legal responsibility of manufacturers for allegedly defective products." This effectively means that there are very few requirements.

In general, the law requires manufacturers to say on the label what the filling material of their products is made of, such as the type of stuffing in a dog bed or a toy.

Plus, in the US, importers and manufacturers alike have to ensure that their textile products conform to the Flammable Fabrics Act.[14]

In the EU there are few regulations[15] regarding pet toys and accessories specifically and only two regulations that ALL manufacturers have to abide by when selling products in the EU:

1. They must verify whether their products require the "CE" mark, the abbreviation for the French phrase "Conformité Européene," which means "European Conformity". If a label has a CE on it, the manufacturer has declared that the product complies with the essential requirements of the relevant European health, safety and environmental protection legislation.

   Unfortunately, there is no comprehensive list of all the products that require a CE mark. The vast majority of pet products do not have the CE mark and experts advising importers from China[16] for example suggest they only need the CE mark if the product is electronic in some way.

2. Manufacturers can be held liable 'without fault' for selling defective pet toys in the EU — meaning that a manufacturer may be held strictly liable for any damage caused to a pet by a defective product, regardless of whether or not there is proof of actual negligence.

   But note this ONLY applies if the toy was defective. If the toy is made with plastics and your dog chews and eats it, and becomes ill as a result, that's on the pet owner — even if the toy is designed to be chewed.

The EU and the U.S. are not outliers — the pet toy and accessory industry is essentially unregulated across the world. According to industry experts in quality control testing this lack of regualtion goes beyond just safety regulations[17]:

"Unlike products meant for human consumption, there are no safety regulations on pet toys and accessories. Not only is there no minimum standard for what is allowed to be put on the market, marketers can make any claims they like about a product. "Indestructible" for example, has no regulatory definition."

HOW CAN TOYS DESIGNED FOR PETS HURT THEM?

First off, it is worth remembering that our pets, just like all of us, are involuntarily ingesting and inhaling microplastics all the time from the water they drink, to the house dust they paw through and lie in, to the soil they dig up and play in. It is in the environment all around them. Let's call that the 'background' or baseline plastic exposure, that they and we, are all breathing in and eating plastics in a whole raft of ways.

But pets face additional risks from plastics. Many pet owners know from first hand experience that our pets chew,[18] bite and inadvertently consume their plastic toys. These can cause physical internal obstructions.

Plus, plastics can leach toxic chemicals into our pets. Even rope toys are often made with synthetic material that shed microplastic fibers that can cause obstructions and/or leach plastic additive chemicals.

PLASTIC OBSTRUCTION — CASE STUDIES

Somewhat surprisingly there is very little formal research examining the health risks pets face after consuming larger pieces of plastics that break off from pet toys, however it is not hard to find anecdotal cases of how damaging it can be. These two cases are indicative of how pets can and do ingest their plastic toys and suffer the consequences.

CASE STUDY 1: Gina Mazzotti's[19] dog Bella ate a large chunk of her plastic mint-flavored bone. Bella became violently ill and Gina rushed her to the vet. Bella vomited the plastic chunk up but the manufacturers of the toy told Gina that their label stating that it was "100 percent safe" only meant the nylon was non-toxic by FDA standards, not that the toy was unbreakable.

CASE STUDY 2: Jessica Taylor's[20] six-month black lab puppy Rupert was playing with his favorite pumpkin squeaky toy when he managed to swallow some of it. Rupert was rushed to the vet where he had to undergo an emergency laparotomy. Under sedation the plastic was manually removed from his gut.

One report published in Applied Animal Behavior Science in 2021 backs these anecdotal reports up — it concluded that 83% of dog owners gave their pets inedible chew toys, with 4%[21] of dogs needed veterinary treatment after a problem chewing on some kind of material. A small study in 2022[22] appeared to back this up. Giving our dogs the wrong toys can clearly cause health problems.

"Dogs, cats, and other pets are great models for human health since they live so close to us and are exposed to many of the environmental chemicals and toxins. However, since our plastics not only stay in our homes but have made their way to our oceans and land, the concerning discoveries are a global health problem.

Not only humans and our accompanying pets but wildlife are being greatly affected by our love for the convenience that plastics present. And we are slowly discovering that plastic pollution besides looking ugly is having a greater impact on our health.

Dr. Paola Cuevas — Senior In-House Veterinarian, MVZ from Dogster.com

SO WHAT *IS* YOUR PET *ACTUALLY* CHEWING ON?

The physical damage your pets suffer after consuming squeakers and parts of plastic toys is not the only problem with plastic pet toys. Both puppies and human babies[23] love to mouth on inanimate objects, especially when they're teething. But, whereas babies eventually outgrow[24] this tendency, most dogs keep chewing for the rest of their lives. Which puts them at an increased risk of eating plastics in the form of microplastics and the additive chemicals that leach out of them. So what is leaching out of them?

PVC AND PHTHALATES

Polyvinyl Chloride (PVC)[25] is a hard form of plastic which is most commonly called 'vinyl.' It's too hard for dogs to chew and could potentially even damage their teeth, so toxic chemicals known as phthalates,[26] often referred to as plasticizers, are added to PVC pet toys to make them softer, flexible and essentially more chewy. The issue is that when your dog or cat chews on a toy made from this plastic cocktail, the phthalates leach out[27] of the toy and can be absorbed through our pets' gums and skin.[28]

Phthalates that leach out of PVC can cause bioaccumulation to pets' livers and kidneys[29] and fetal exposure[30] in other male animals has been associated with infertility, decreased sperm count, undescended testes, and malformations of the penis and urethra.

A study in 2019[31] was the first to find phthalates in samples of cat and dog urine, in every single sample tested. The levels of phthalate found were similar to the levels found in human beings.

The Whole Dog Journal[32] reports that governments and municipalities around the world have banned or advised against the use of PVC additives, like phthalates, in the manufacture of children's toys: The state of California (2007), the European Union (2005), Japan (2003), Fiji (2000), Argentina (1999), and Mexico (1998). Canada (1998) and Australia (1998) have asked for voluntary measures or issued health advisories about additives in PVC. **There is no such regulation for pet toys or accessories.**

> *"With regards to plastic material in pet toys in the U.S. there is currently no control over the number of phthalates or bisphenol A (BPA) that might be present in pet toys.*
>
> Dr. Marta Vidal-Abarca — In-House Veterinarian, BVSc GPCert (Ophthal) MRCVS from Catster.com

THE DANISH STUDY

There have been increasing numbers of studies looking at the impact of phthalates on mice, primates and humans — far fewer on dogs and cats. However, in 2006, the **Danish Ministry of the Environment** (MoE) published a report known as the Danish Study[33] that did examine the consequences of dogs and cats playing with toys that contained phthalates.

Researchers discovered that vinyl toys that had been marketed for dogs and cats in Denmark contained 10 to 54% of two phthalates known as DEHP or DINP. Both of these had been banned by the EU in children's toys.

They noted that vets had discovered that when pets swallow soft PVC plastic toys they often become hard and/or sharp in the gastrointestinal tract. This indicates that the phthalates are leaching-out while the plastic is inside the dog.

In the end, they resolved that the greatest danger lay with dogs playing with toys containing phthalates, since repeated chewing and the presence of saliva sped up the phthalates' release. In summary,[34] the **Whole Dog Journal** concluded that the 'Danish Study' determined that:

- Dogs that eat small amounts of PVC toys can be exposed to doses of a phthalate called DEHP, which can cause reproductive damage, and one called DINP, which can cause liver damage with sufficient exposure.
- Phthalates migrate into dogs' saliva at rates that increase toxicity.
- The exposure of pregnant/nursing dogs (for even a very short time) to toys containing DEHP can put their puppies' reproductive health at risk.

VINYL CHLORIDE, BPA AND MELAMINE

Vinyl Chloride,[35] this is another toxic chemical compound used in PVC and was officially classified as a human carcinogen in 1974[36] and consequently banned in hair sprays, refrigerants, cosmetics and drugs. But not children's or pet toys. Chlorine constitutes one of PVC's primary chemical building blocks[37] and under certain conditions produces dangerous pollutants known as dioxins. Dioxins[38] are known to cause some cancers, reproductive and developmental problems, as well as immune system damage in animals.

In the U.S., in December 2023,[39] the Environmental Protection Agency (EPA) announced a review of PVC and a year-long consultation — they will either decide to do nothing or place additional restrictions on PVC or they could ban PVC in the U.S. outright. Right now the EPA is deliberating their options.

As well as in pet toys, PVC is used in the production of dogs' collars, leashes, clothing, bedding and carriers. And of course pets come into contact with it on vinyl linoleum flooring. Phthalates measure at higher levels of intensity close to the floor, where pets and kids spend their time, and this might be because house dust contains substantial amounts of phthalates. Scientists now believe that it's a very significant source of exposure to pets, who wash themselves by licking and ingesting internally what they clean off their fur.

Bisphenol-A (BPA):[40] BPA is a plasticizer chemical often added to plastics that use phthalates to stop them from breaking down. Bisphenol-A (BPA) is associated with forms of cancer and endocrine disruption in human beings. In fact it is an endocrine disruptor[41] chemical found in many items in the average home. For example, BPA is found in canned goods, water bottles and even on till receipts.

Research[42] from 2017 suggested BPA can also impact the health of our pets too and was associated with changes to their gut microbiome and metabolism.

A study,[43] albeit from 2013, conducted by researchers at **Texas Tech University** found that aging and worn dog toys contained increased concentrations of both BPA and phthalates.

According to a 2022[44] study there is evidence BPA might trigger the progression of prostate tumorigenesis as shown in experiments done on beagle dogs tested in laboratory settings.

Even if we don't care about damage being done to our pets from exposure to phthalates, it is worth noting that dogs and cats are often referred to as 'sentinel animals'.[45] This means they are species that can help us determine the health consequences of human exposure to harmful substances: in this case, chemicals used in the making of certain plastics.

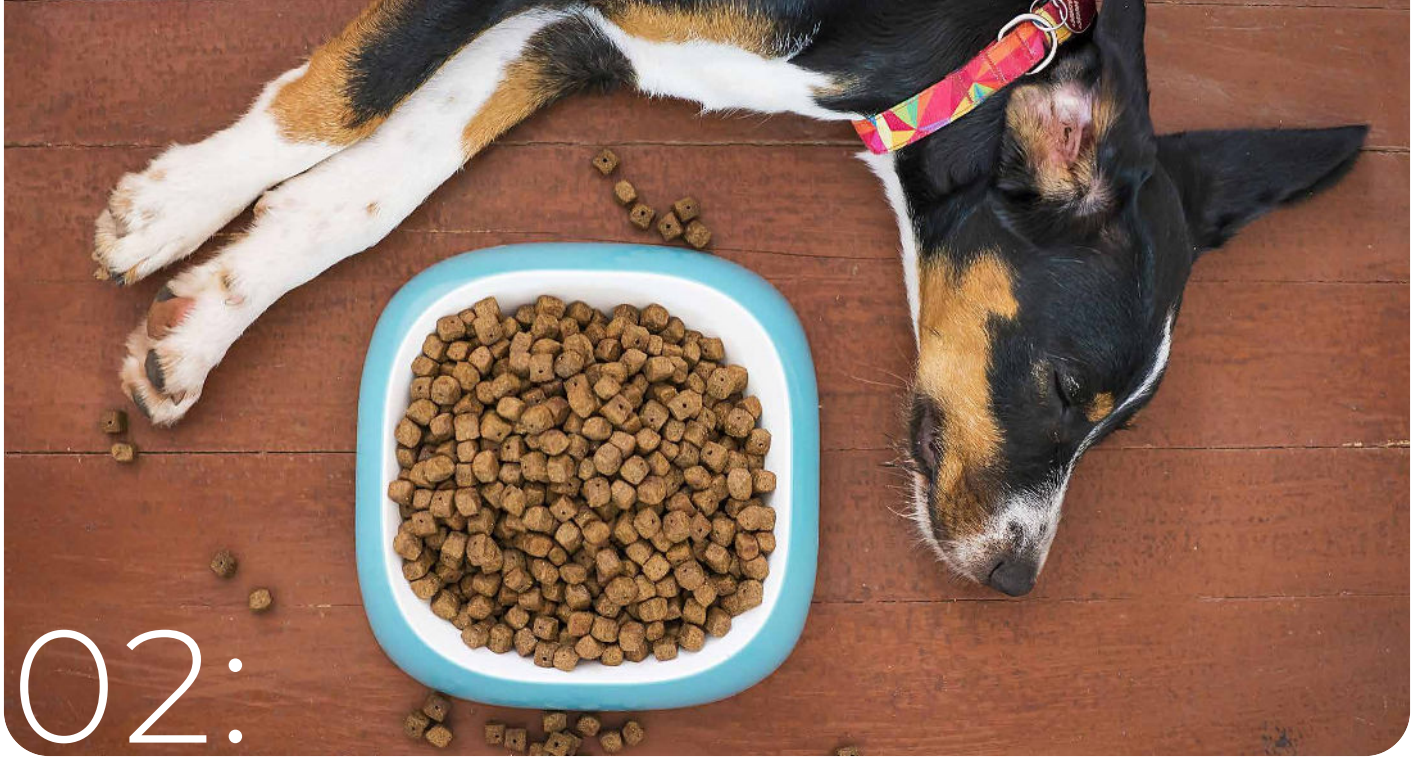
Canaries in coal mines are the most famous example of this. Which means this research is worth doing for two key reasons — altruistically for the love of our pets and as pure common sense for the health of ourselves.

In this case we cannot determine what percentage of the phthalate exposure to the tested cats and dogs was from their pet toys versus what percentage was from the homes these pets were living in — but it gives us yet more evidence that if dogs and cats are ingesting these chemicals, then we are too. Perhaps further study into pet exposure will help determine human exposure.

This chapter has been focused on pet toys, but we could have written another chapter solely on the exploding market in pet clothes and bedding. The global pet clothing market alone is expected to grow to $6.3 billion by 2028[46] with the pet bed sector reaching $4.25 billion in 2022,[47] with a projection to reach $8.23 billion by 2030.

The former is essentially fast fashion for our pets, but both pet clothes and pet bedding largely utilize synthetic, plastic based materials like nylon,[48] polyester[49] and acrylic.[50] Meaning these items, which come into close contact with our pets, shed microfibers of plastic that our dogs and cats are inhaling.

What is clear is that there are enough studies for pet owners to be concerned about the plastic-related chemicals pets are coming into contact with, but much more research is needed.



02:

PET FOOD AND PLASTICS

Not surprisingly, as the number of pets in homes globally has risen, so too has the value of the global pet food[1] market — in 2023 it was valued at $120.87 billion, rising to $126.66 billion in 2024 with predictions that by 2032 it will reach $193.65 billion.

But the pet food industry has been found guilty of mislabeling ingredients,[2] adding ingredients not listed on the label.[3] Also, there's a lack of proactive in-field quality control testing. Is the pet food industry putting profit before pet health? Can we be sure that what we are feeding our dogs and cats is healthy and safe? It's an industry with an opaque and confusing regulatory system.

US REGULATION OF THE PET FOOD INDUSTRY

Within the U.S., the **Food and Drug Administration** (FDA) regulates the safety of our pets' food by enforcing the U.S. Federal Food Drug and Cosmetic Act (FFDCA) (1938),[4] Section 301(a), which states, "It is unlawful to introduce into interstate commerce any food, including food for pets and for other animals, which is adulterated."

This law requires:[5]

1. Pet food is safe to eat
2. Pet food is produced under sanitary conditions
3. Pet food is free of harmful substances
4. Pet food is truthfully labeled

However, it should also be noted that food made for pet consumption does not need to go through any pre-market review before being sold to the general public. The only true regulation is around food additives.

There have only been a few updates since 1938, notably in 2011, as outlined by The Regulatory Review[6] (which is affiliated with the Penn Program on Regulation[7] at the University of Pennsylvania Law School[8]). After a dozen dogs and cats died in 2007 and thousands more were made sick after eating tainted pet food imported from China, Congress passed the Food Safety Modernization Act[9] (FSMA). This expanded[10] the FDA's ability to issue pet food regulations.

While the FDA has regulatory authority at the federal level, an individual state's department of agriculture can also regulate pet food and treats. So how do we know exactly what our cats and dogs are eating?

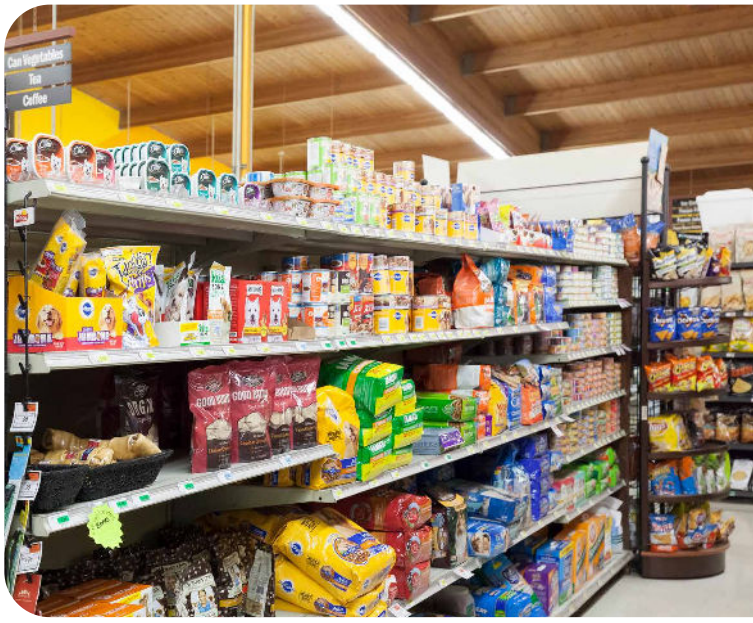
US PET FOOD LABELING

The big questions for most pet owners are — do pet food labels help determine what we are feeding to our dogs or cats and is it good quality food? In our opinion, probably not.

WHY? Because the FDA only mandates that pet food includes on the label[11]:

- Proper identification of the product (i.e., is it dog food or cat food?)
- Net quantity statement (i.e., how much product is in the container).
- Name, and place of business of the manufacturer or distributor.
- Proper listing of all the ingredients in the product from most to least, based on weight.

The FDA works with the Association of American Feed Control Officials (AAFCO)[12] to try and ensure uniform interpretation and enforcement of state regulations. AAFCO is a non-profit that describes its role as setting standards for



animal feeds and pet foods in the US. So, who can join AAFCO?

In their own words, AAFCO membership[13] "...is limited to employees of state, dominion or other governmental agencies who enforce animal-feed regulations, including those for pet food. The state departments of agriculture as well as the U.S. Food and Drug Administration (FDA), the Canadian Food Inspection Agency (CFIA), Costa Rica and Puerto Rico are all AAFCO members."

Membership of AAFCO however is entirely voluntary — with typically Feed Control Officers (FCOs) joining. But there are potentially other influences on AAFCO. According to the online cat expert site, Little Big Cat:[14] *"In order to obtain the information about every imaginable aspect of pet food, AAFCO allows experts from many different fields to join the conversation, as it were, to educate the FCOs in the finer details of associated specialties. Formerly called "liaisons," these advisors do come from the pet food industry, including the Washington DC lobbying group Pet Food Institute,[15] as well as the grain and feed industries, the rendering industry, laboratories, farm co-ops, and other groups with an interest in AAFCO's decisions."*

We don't know how much of any pressure is brought to bear on AAFCO by the pet food industry or lobbyists but we do know that AAFCO has no actual regulatory powers at all. On their own website they state:[16] **"AAFCO does not regulate, test, approve or certify pet food. It establishes model language that states and other governing bodies may adopt into law."**

The relationship between the FDA and the AAFCO is based on a Memorandum of Understanding[17] only. According to a research paper[18] from 2024 in the Journal Of Food Protection, AAFCO offers "...guidance to state, federal, and international feed regulators, approving ingredient definitions, label standards, and laboratory protocols to ensure the health and safety of people and animals."

This is an attempt to give coherence across state lines because the states often have their *own* additional pet food labeling guidance. But this lack of uniformity can lead to confusion and opens the door for discrepancies in labeling.

The other issue with labeling, is what do the labels actually mean? Here's a snapshot of just some of the bizarre phrases you might find defined if you invest in the AAFCO Online Database of Ingredients, for pet food and animal feed. It is 590 pages long. For reasons we do not understand the full report is behind a paywall. Because this Database is behind a paywall we cannot hyperlink to it.

However the Truth About Pet Food website published[19] an article on their site in 2019 that gives us an insight into the ingredients that seemingly are allowed to be used as ingredients in pet food and livestock animal feed, and it doesn't paint a pretty picture. It says:

"Every single ingredient used in a pet food/treat or animal feed is VERY different than its counterpart in human food, many don't have a counterpart in human food. Because this agreement denies public access to these ingredient definitions (AAFCO charging $120.00 per year[20]), the public doesn't get to see the absurd legally defined ingredients approved to be fed to animals – approved by FDA and State Department of Agriculture members of AAFCO.

In the year 2000 — the AAFCO book of pet food/animal feed ingredient definitions included the ingredient: "Dehydrated Garbage"

In 2000 – "Dehydrated Garbage" was allowed to be included in any feed. Because the ingredient definition was/is copyright protected by AAFCO – allowed to be copyright protected by FDA agreement – the full definition of "Dehydrated Garbage" cannot be shared. Our interpretation of the ingredient definition is: dried animal and/or vegetable waste.

In the current AAFCO book (2019), the same ingredient has been renamed. Today, Dehydrated Garbage is termed "Food Processing Waste". And AAFCO has added two more food waste ingredients: "Restaurant Food Waste" and "Recovered Retail Food". These pet food/animal feed ingredient names are descriptive of their definitions – they are recycled garbage sourced from just about anywhere.

What the poop? 2019 AAFCO and FDA pet food/animal feed ingredient definitions include an entire category of Animal Waste Products. This group includes the legal definition of various...processed... animal poop definitions, such as:

- *"Dried Poultry Waste"*

- *"Dried Poultry Litter"*
- *"Dried Ruminant Waste"*
- *"Dried Swine Waste"*
- *"Undried Processed Animal Waste Products"*
- *"Processed Animal Waste Derivatives"*

To be clear, all of the above ingredients ARE animal poop — and all have been approved by FDA as "food" for animals.

- ***Dust:*** *Under the AAFCO category of ingredients of Screenings, is the legally defined pet food/animal feed definition "Chaff and/or Dust." Chaff — per Wikipedia[21] — is "the dry, scaly protective casings of the seeds of cereal grain." Dust, per the AAFCO definition is... well, anything swept up from the floor, including dirt and sand.*
- ***Plastic:*** *Within the AAFCO category of ingredients Special Purpose Products, we find the legal definition of "Polyethylene Roughage Replacement." Polyethylene[22] is "the most popular plastic in the world. This is the polymer that makes grocery bags, shampoo bottles, children's toys, and even bullet proof vests." A 'roughage' is fiber (in this case a plastic being used as fiber in an animal's diet)."*

For clarification — we do not have access to the 2019 or 2020 versions of the AAFCO Online Database of Ingredients to which the above is referring to. However we have read the 2024 version of this report and can confirm the ingredients, as outlined above, are indeed listed.

While Polyethylene Roughage Replacement is listed as a roughage replacement food ingredient, it is specifically for slaughter cattle. It does not reference that this is allowed in pet food, but why is it allowed in cattle food, given we and our pets could eat these animals at some point in the food chain? Polyethylene[23] is a non biodegradable plastic polymer more commonly used for the production of plastic bags, plastic films, and containers including some plastic bottles.

We also found Polyvinyl Alcohol (PVA)[24]

listed as an animal feed ingredient, which can be used up to certain percentages. It is described as biodegradable. It is most commonly used in toiletries and laundry pods. But there is controversy over PVA, because after many years of research, there is still no definitive proof that PVA/PVOH is actually biodegradable.[25]

AAFCO Database does include the two 'new' food waste ingredients that the Truth About Pet Food flags — they could be open to interpretation or possibly even 'abuse' when it comes to plastics. Here's why:

Restaurant Food Waste:[26] This is essentially uneaten food waste from restaurants and cafeterias and while it explicitly states it must not contain crockery, glass, metal, string and similar materials, it does not mention explicitly that plastics cannot be included. Plus, it begs the question who is ensuring that plastic trash, like plastic food wrappings and utensils, don't make their way into this ingredient?

Recovered Retail Food:[27] This listing appears to be in specific reference to recovered retail food that can be used as an ingredient in feed for livestock (i.e. farm animals) but interestingly in the list of what is **NOT** allowed for this food, 'plastic', is specifically mentioned as banned.

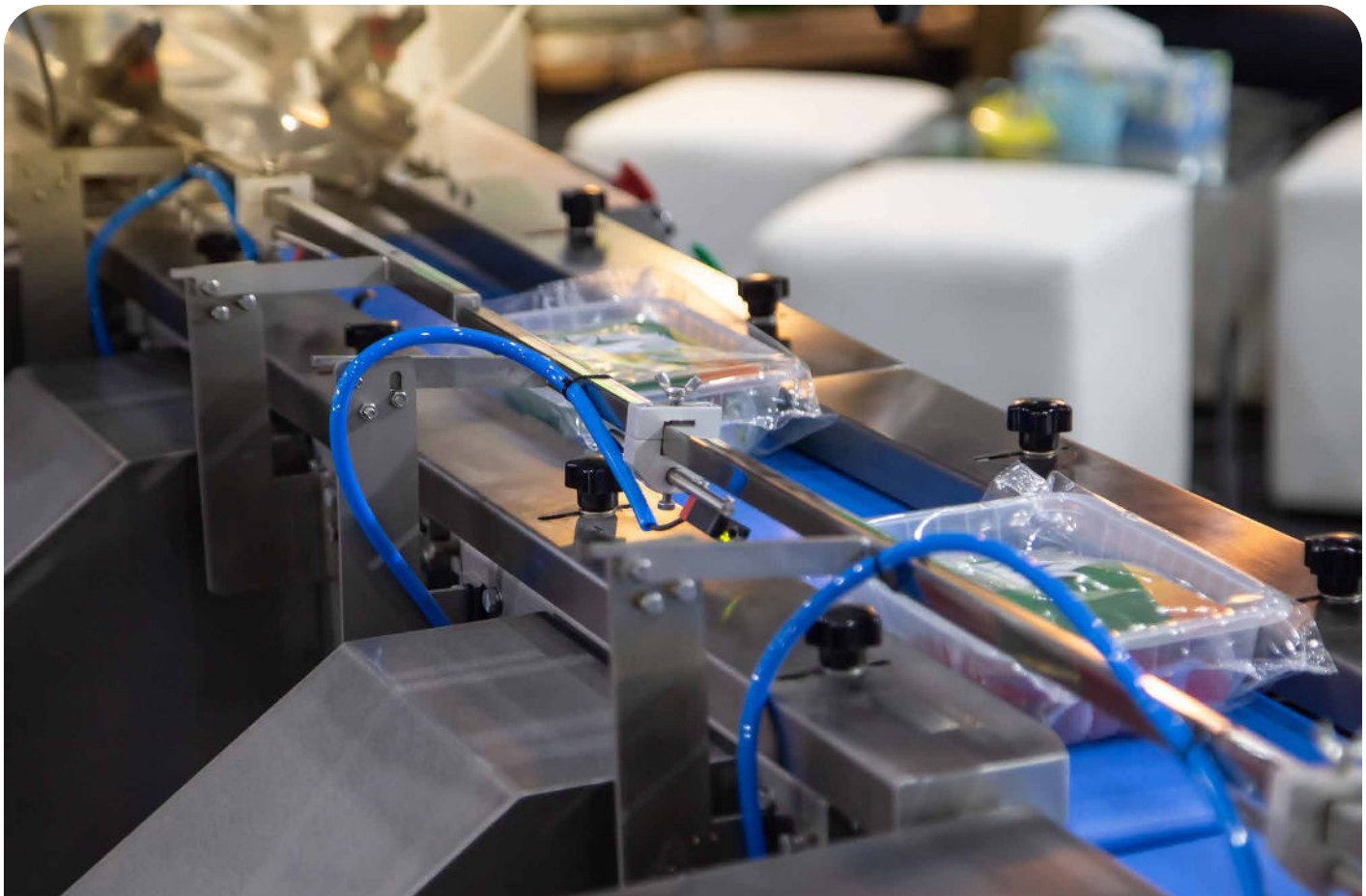
The U.S. Federal Food Drug and Cosmetic Act (FFDCA),[28] states this: "The Food and Drug Administration (FDA) regulates pet food similar to that for other animal foods. The Federal Food, Drug, and Cosmetic Act (FD&C Act) requires that all animal foods, like human foods, be safe to eat, produced under sanitary conditions, contain no harmful substances, and be truthfully labeled."

How can the inclusion of excrement be considered sanitary?

EU REGULATION OF THE PET FOOD INDUSTRY

The EU's Animal Feed legislation[29] covers food for companion animals (i.e. pets), as well as food for all other animals, and the European Pet Food Industry Federation (FEDIAF)[30] plays a pivotal role, akin to AAFCO in the United States, in establishing guidelines and standards for pet food production.

The EU has stricter regulations, particularly concerning the sourcing of ingredients. Only materials from animals that have gone through veterinary inspection are allowed to enter the "compound feed" food chain. Such regulations include that animal by-products that are unfit for human consumption cannot be introduced into pet food.



EU PET FOOD LABELING

The European Union's labeling requirements for pets are, unsurprisingly, much more comprehensive[31] than in the U.S., requiring this information:[32]

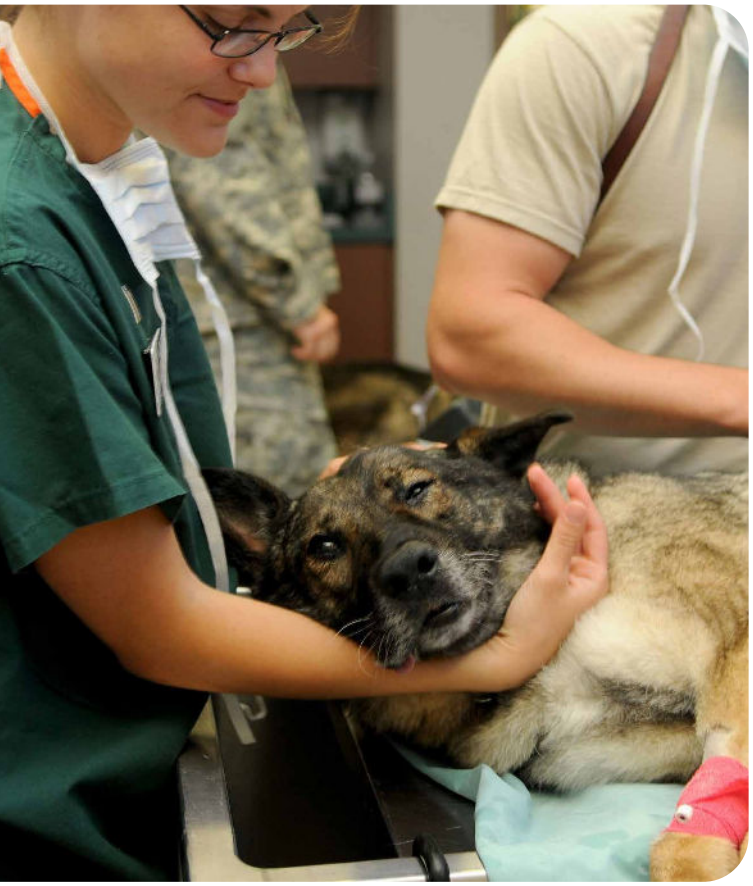
- Name/Address of feed business responsible for labeling
- Registration number or address of the manufacturing plant
- If the producer is not the one labeling, the business name and address of the label manufacturer
- Batch number
- Net quantity in units of mass (g, kg) for solid and volume for liquid (ml, L)
- Min. storage life or expiry date
- Animal species intended for
- Directions for use, mainly feeding but also storage
- Composition — list of feed materials
- Food labeled organic[33] has to be 100% if wet food and 95% if dry food
- General advertising rules
- Raw materials of animal and vegetable origin
- The use of additives according to their utility, efficacy and safety
- Health and sanitary measures (including specific health certificates for trade and processing of meat products)
- Sampling and methods of analysis for the control of raw materials and finished products
- Specific sanitary and safety controls and controls of labeling declarations
- The use of dietetic pet food for animals whose metabolism is temporarily or irreversibly impaired

EU regulations demand disclosure of this information so that pet owners can make informed decisions about what they feed their pets and do not have to seek veterinarian guidance.

GLOBAL PET FOOD REGULATIONS

- Carolyn Macgill,[34] the executive officer of the **Pet Food Industry Association of Australia (PFIAA)**, reports that there is simply "no pet food regulation at all" in Australia — the industry claims to abide by voluntary regulations, but there's no law holding them to account for what they use to make pet food.
- Hong Kong[35] has an increasing pet population but as of 2024 no dedicated legislation to ensure the safety of pet food specifically. Pet food is regulated by general legislation, which outlaws any person from applying false or misleading trade descriptions, including descriptions as to composition and place of origin, to goods in the course of trade or business.
- China[36] regulates pet food imports through the Ministry of Agriculture and Rural Affairs of the People's Republic of China.

  China is expected like any other importer to abide by the regulations of the country it is exporting to, but enforcing the regulations[37] has proven difficult. There are cases[38,39,40] that offer anecdotal evidence of China breaking country specific guidelines.



PLASTICS *ARE* GETTING INTO PET FOOD — HOW?

Dog food has four main categories:[41] dry foods (kibble, which is the most popular food type for dogs), canned meat, raw pet food and snacks. For cats[42] the main categories are dry food, semi-moist and canned. Whatever the type of category of food it is, the majority of meat used for pets is the by-product of the human food industry and is therefore not considered "human grade."

Our dogs and cats are largely not getting the tasty cuts of meat and fish we see displayed on pet food packaging. They are getting mainly muscle tissue,[43] fat and other horrible sounding[44] ingredients.

Unfortunately, the reality is too, their food can and does sometimes contain, amongst a host of other dubious ingredients, plastics. Here's how:

PLASTIC EAR TAGS

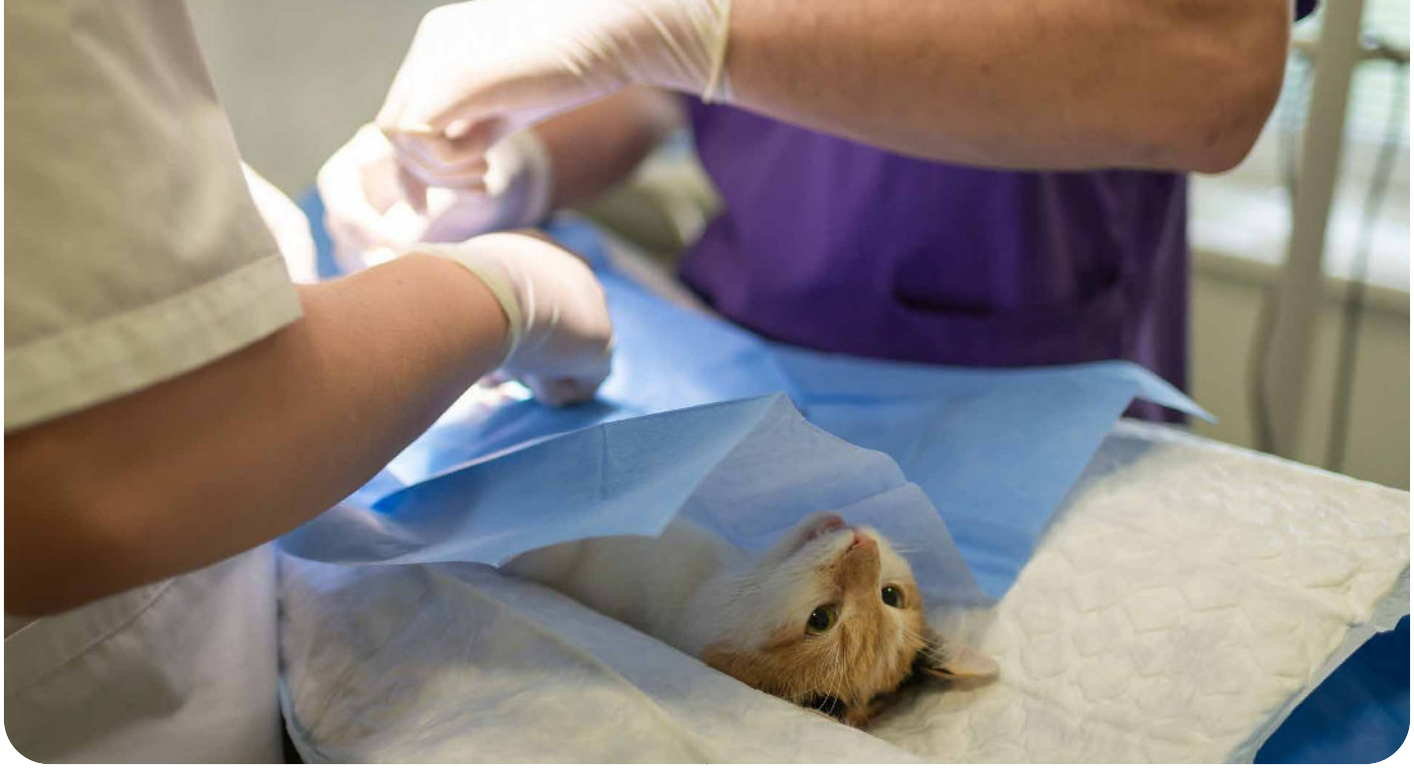
The body parts of slaughtered livestock animals, that humans do not traditionally wish to eat, will often be used in the pet food trade. For example, sheep heads. But since around 2004 it has become commonplace, and in some parts of the world even compulsory, that livestock animals are ear tagged. This means that when sheep heads[45] come to pet food rendering plants, it has been reported[46] in Australia and in the U.S.[47] that they have ear tags still in place and the plastic is simply left on and processed directly into the pet food.

These tiny fragments of plastic pieces may be small — plastics can break down to a fraction of a micrometer[48] in size — but your pet is still consuming them. Some plastic pieces are not always ground down either, which is why in 2015, one company received 295 complaints[49] from customers who had found large and visible foreign plastic materials in their pet food. Either way, it means our cats and dogs are potentially eating plastics.

PLASTIC FOOD WRAPPINGS IN PET FOOD

Another route that can let plastics into your pet's food is the use of human waste food — food that we have thrown out, which could be collected from landfills, restaurants, cafes or supermarkets. But in some countries if this food waste is still wrapped in plastic, that can end up in our pets' food too.

- In the UK, plastic is legally allowed to be included in animal feed up to 0.15%.[50] Why? Because the machines designed to strip off the plastic wrappings from human waste food are not foolproof. As a result, the UK's Food Standards Agency[51] has set the 0.15% figure.



- The official EU level for plastic permitted in animal feed is zero, but many EU countries unofficially use the same metric as the UK. Even with the EU's stricter regulations, labeling has remained an issue in EU pet food. Often, even the meat used[52] in a product is ambiguous.
- The (FFDCA)[53] in the U.S. prohibits the addition of plastics in pet food, but is the FDA or any other mandated body, proactively checking for plastic getting into the pet food chain — via ear tags, for example?

We know that microplastics are in the human food chain — one study[54] published in February 2024, reviewed a wide range of meat, fish and vegetarian meat alternatives and reported that 88% of them contained microplastics. Isn't it fair to assume if microplastics are in the human food chain, they are almost certainly in the highly processed pet food chain too?

We know too that the FDA does not routinely check pet food manufacturing establishments, tending to inspect them only after there has been a complaint.[55]

OTHER NASTY CHEMICALS IN PET FOOD

There can be a lot of other troubling ingredients inside your pet food.

Melamine[56] is a nitrogen-containing organic compound used in the production of a wide-range of products, including plastics. Following a number of deaths of cats and dogs from kidney failure in 2007, melamine was discovered to have been deliberately added to pet food to increase its protein levels.

This case made headlines[57] because two Chinese and one American pet food manufacturer were actually indicted as a result.

Pentobarbital[58] also known as the euthanizer drug for pets, is not a plastic-related chemical, but it's a timely reminder that your pet's food can contain potentially poisonous substances. Pentobarbital was discovered in pet food in the 1990's after vets began voicing their concerns that it was not working as effectively as it had been, to put pets down. They wondered if that was due to some kind of exposure to the drug, perhaps in pet food for example?

As outlined in the article What's Killing Our Pets?[59] the FDA's Center for Veterinary Medicine, (FDA/CVM), carried out two investigations[60] that both concluded the drug was present in a range of pet food.

However, they also did DNA testing on the pet food but could not find traces of dog or cat DNA in the pet food that contained the pentobarbital and therefore concluded the drug was not coming from the bodies of euthanized pets.

The FDA offered no concrete explanation for where the drug was coming from other than potentially euthanized cows and horses. But this drug is rarely used in live-stock.

In 2002[61] the FDA released another report saying: "Thus, the results of the assessment led CVM to conclude that it is highly unlikely a dog consuming dry dog food will experience any adverse effects from exposures to the low levels of pentobarbital found in CVM's dog food surveys."

This seems cavalier given that in sections 402 and 403 of the Federal Food, Drug and Cosmetic Act (FFD&C Act),[62] it clearly says with regard to food for animals, it is adulterated if — "food is packaged or held under unsanitary conditions, food or ingredients are filthy or decomposed, and foods contain any poisonous or deleterious substance." Pentobarbital would be considered poisonous by most vets.

In 2018[63] the issue reared its ugly head again when another pet food manufacturer was forced to carry out a major pet food recall. Steven Solomon, D.V.M., by then in his second year as director of the Center for Veterinary Medicine[64] in the U.S. Food and Drug Administration (FDA), was reported in PetFood Industry[65] as being "startled" by the discovery and he confirmed that the problem may be more widespread than he first thought.

It was reported in the same article that he acknowledged that: "Pentobarbital simply should not be found in pet food. The American public, especially pet owners, demand this of us as regulators. They deserve to know the comforting fact that their animal's food does not contain a substance that is intentionally used to euthanize animals."[66]

In 2019[67] the U.S. Food and Drug Administration, ORA Denver Laboratory and Animal Drugs Research Center did another study concluding again that pentobarbital was present in some pet foods and this time laid the blame on beef tallow.

The National Renderers Association acknowledged that same year, 2019,[68] that pentobarbital in rendered live-stock meat had been used to make pet food, which had resulted in the death of "several dogs".

Wherever this drug is coming from it is not safe for our pets to consume it. It can make them ill and potentially kill them if there are large enough traces of it.

This whole story is another example of how the FDA is slow to respond and simply not able to fully track the ingredients used in our pets' food. In fact they were only alerted to its presence back in 1998 by vets, not their own inspectors.

Aside from melamine and pentobarbital, other unsavory elements and toxic chemicals[69] have been found in pet food, including lead, salmonella, listeria and heavy metals. Typically these have only been discovered after outbreaks[70] of pet death, not proactively by the FDA.

03: PLASTIC PACKAGING

According to Plastics Today[1], the pet food industry accounts for 300 million pounds of plastic every single year in the U.S. alone and over 99% of it is not recycled. So, love of our pets is creating its very own plastic problem which on its own should be concerning.

BISPHENOL-A (BPA)

While we probably all know that the vast majority of pet food packaging utilizes plastics, what is perhaps less known is that pet food cans are lined with plastic in the form of bisphenol A[2] (BPA). In a research paper[3] from the University of Missouri, published in The Science of The Total Environment, in 2017, scientists reported finding bisphenol A (BPA) in canned pet food. BPA is a known endocrine-disrupting chemical.[4]

The study discovered:

- Two canned dog food brands tested, including one thought to be BPA-free, contained BPA[5]
- After two weeks of feeding either of these two canned dog food brands to canines, they could detect increased BPA levels in dogs

BPA is used to line the inside of pet food (and some other packaging) cans to stop the can's metal casing from migrating directly into the can's contents — the thin layer of BPA acts as an effective barrier between the food and the can. However, as the research found, this does not prevent the BPA itself from migrating into the contents of the can, i.e. the pet food.

Studies[6] have found that laboratory animals exposed to even low levels of BPA have elevated rates of some cancers, diabetes, obesity, low sperm count, reproductive and neurological problems as well as early puberty.

“There is a high possibility of bisphenol A (BPA) migrating into pet foods from cans. Due to its properties, BPA can be easily released from the coating especially when exposed to heat as it is done during the sterilization process and canning of the contents.

*In fact, a **study**[7] performed in 26 samples of pet food found concentrations of BPA ranging from 13 to 136 ng/g in canned cat food and from 11 to 206 ng/g in dog food. Bisphenol A is well absorbed by the oral route. In a **study**[8] performed in 14 healthy dogs after two weeks of feeding them with canned dog food, they had increased circulating BPA concentrations. This change correlated with changes in their blood serum chemistry tests and their gut microbiome.*

Dr. Paola Cuevas — Senior In-House Veterinarian, MVZ from Dogster.com

In a 2023 paper from the University of Cordoba, in Spain, published in Perspectives in Veterinary Toxicology and Pharmacology, entitled An Overview of the Health Effects of Bisphenol A from a One Health Perspective[9] they outline how: ”Exposure to BPA through different routes has demonstrated its impact on both human and animal health, describing effects on different systems and organic levels.

Prominent effects described are (1) those on reproduction, (2) those on development, (3) transgenerational and multigenerational effects, (4) those on the metabolism, (5) immunological effects, (6) those on the thyroid function, and (7) those on oxidative stress and inflammation, among others.”

Unfortunately BPA is not the only toxic chemical lurking in our pets’ food.

PHTHALATES

Phthalates,[10] as outlined in Chapter 1 are often referred to as plasticizers. They are commonly used in plastics to make them more pliable and less prone to breaking or cracking. In pet food packaging, phthalates can help create a seal that keeps the food fresh and prevents leakage or contamination.

The issue is that the phthalates leach out of plastic food containers,[11] and into your pets’ food where they will be ingested by your pet.

As flagged in Chapter 1 phthalates can bioaccumulate in the livers and the kidneys[12] and fetal exposure[13] in other male animals has been associated with infertility, decreased sperm count, undescended testes, and malformations of the penis and urethra.

“It will likely be a slow process, but plastic alternatives should be looked into. It may make for more expensive pet food packaging and other pet products but it is well worth it in order to provide healthier products for our pets.

Dr. Chyrle Bonk (DVM) from PetKeen.com.

FOREVER CHEMICALS

> *I think the concern is rising as we are continually finding out more and more about what is in our pet's food and how it affects their health. As mentioned, canned foods tend to be the most concerning due to the plastic linings of the metal cans. However, dry food can also be a concern as some brands are packaged in plastic bags or have had plastic contaminates found in them.*
>
> Dr. Chyrle Bonk (DVM) from PetKeen.com

In a recent study[14] published in 2022, by the Environmental Working Group (EWG), PFAS,[15] also known as per- and polyfluoroalkyl, but most frequently referred to as forever chemicals, were found in pet food packaging. (There are over 10 000 different types of PFAS — in this study specifically the tests uncovered these chemicals: PFBA, PFPeA, PFHxA, PFHpA, x62FTCA, x62diPAP and PFPrA).

PFASs are frequently used in plastic packaging because they are grease and water resistant. They are known as "forever chemicals'' because they don't naturally break down over time. Unfortunately PFAS are linked to serious health issues[16] like cancers, birth defects, kidney disease and liver disease in humans. The 2022 study did not test to see if the PFAS had leached into the pet food itself.

When the Department of Pediatrics, New York University School of Medicine, and Department of Environmental Medicine, New York University carried out a study in 2021[17] they also found forever chemicals in pet food packaging.

Their researchers tested 37 pet food packages and 11 pet food samples for 13 specific PFAS chemicals. They found that one type of PFAS was present in the plastic packaging and the pet food itself.

RECOMMENDATIONS FOR LIMITING YOUR PETS' PLASTICS EXPOSURE

Pet toys need to be clearly labeled so that pet owners know exactly what kind of materials their pets' toys are made from and there needs to be clear guidelines on what the pet toy industry can and cannot say about their toys — with warnings that plastic toys are NOT safe to eat.

Pet toy manufacturers should be mindful that dogs (and puppies especially) chew on their toys; therefore, there should be much more consideration given to the materials they use to make these toys. Regulations need to be implemented that take a common sense approach to pet toys. Using plastics to make plastic chew bones, the squeakers that go inside pet toys and the stuffed animals themselves seems inappropriate.

Until the pet toy/clothing/accessory industry is regulated, here are some options to try and lower your pets' exposure to plastics, microplastics and their additive chemicals:

Pet Toys: When picking out toys for your pets, pick natural materials! Opt for toys made from organic cotton, hemp, natural rubber, wood, bamboo, or wool that ensures safety for your pet and planet. Steer clear of artificial fibers like polyester,[18] nylon, and acrylics, as these materials can pose health risks to your furry companion as they shed microfibers that they will inhale. It is possible to make toys out of old cotton t-shirts or from household items like tin foil balls in a box for our feline friends!

Pet Bedding: For bedding, avoid beds and bedding made of artificial fibers. These fibers are almost certainly plastic, which sheds microfibers that can pose health risks to your dog or cat. Choose bedding made from natural fibers, like cotton, hemp, and wool, which provide more breathability and are safer than their plastic counterparts.

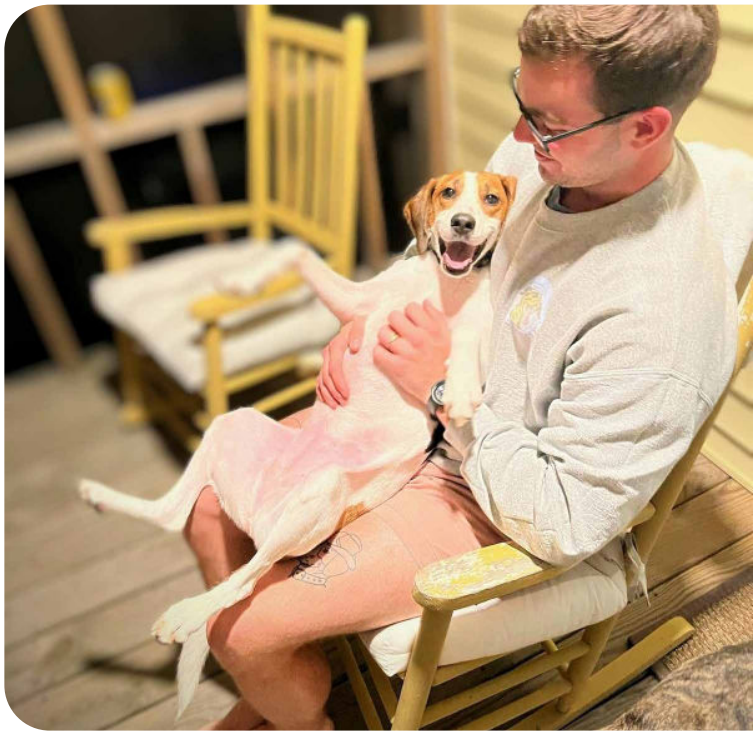
Grooming: When grooming your pets look for brushes made up of natural bristles that break down in the environment and that have a handle made of materials found in nature, like wood, to protect not only your pets' health, but your own. Look for shampoo bars that are animal-friendly for bath time, instead of plastic bottles of shampoo.

Vacuuming and Dusting: Try to sweep or vacuum as much as possible in your home because dust[19] is full of plastic fibers and particles and your pet is much more likely to be inhaling it, due to their proximity to the floor!

PET FOOD

Feeding your pets a guaranteed 'plastics' free diet is not easy. Here's some tips:

- Consider making your own pet food if you can. But always take veterinary advice as changing the diet of your pet quickly can cause issues in and of itself. Dogs need protein, fat, minerals and vitamins to stay healthy. Dogs especially love cooked carrots, squash and sweet potatoes mixed with protein. This may end up being a viable option for your pet too if cooked in bulk and potentially frozen in batches.
- Cats[20] have unique dietary needs of their own, that are different to the dietary needs of dogs. Plus dogs and cats have evolving nutritional needs dependent on their age as well.
- Note there are some foods that dogs especially cannot eat, like onions, grapes and chocolate for example. There's a full list HERE.[21]
- Cats too have a list of food that are poisonous to them — HERE.[22]
- Please always check what ingredients you can safely use before making your homemade pet food. **There are some pet food cookbooks on the market too.**
- If you are buying processed pet food try and avoid single-use servings of food that come from a plastic container if you can, as this not only potentially exposes your pets' food to plastic chemicals, but the plastic waste it creates is also bad for the planet.
- When feeding your pets try to use something other than plastic bowls, because plastic bowls and food storage containers[23] shed microplastics. Stainless steel ones are more common these days, are less likely to stain, and are safer for your pet.



- The water that we put in our pets' bowls contains microplastics[24] and plastic fibers[25] but favor tap water as bottled water[26] contains higher concentration of microplastics.
- Consider using pet foods with alternative methods of packaging such as biopolymers,[27] which are made from plant-based and organic materials, and biodegrade relatively quickly.
- Plant-based materials: Packaging made from materials such as cornstarch, sugarcane, or bamboo can provide a more eco-friendly alternative to traditional plastics.
- Wax-coated paper: Paper packaging coated with wax can provide a protective barrier for pet food while avoiding the use of phthalates or other synthetic chemicals.
- Finally, using less plastic in the household overall reduces the amount of microplastics in the indoor environment and will hopefully lead to healthier humans[28] and healthier pets.

ACTION NEEDED

Regulation around the production of pet food hasn't been updated in decades and it is confusing and dense. The organization relied upon to standardize pet food labeling descriptions for example — AFFCO — is a voluntary body with no regulatory powers.

Plus there is no specific regulation of pet toys, bedding and pet clothes aside from universal regulation that refers to flammability and heavy metal[29] restrictions. This needs to change.

1. We need an industry standard, globally, for the labeling of all pet toys, clothes, bedding and accessories (including harnesses, leads and collars) so that pet owners KNOW what they might be exposing their pets to at the point of sale.

2. All unsubstantiated claims regarding performance, such as 'indestructible' on any items made for pets - should be banned.

3. FDA should be given primary authority of regulating pet food ingredients and that a special task force be established to streamline the process and create appropriate enforcement mechanisms.

4. Pet toys and food safety goes beyond labeling. There has to be proactive enforcement of existing and future laws governing all pet products. So for example pet food rendering factories and plants should be aggressively inspected, not just when they have been reported to the FDA. Extending regulation to supply chains should be an option.

5. We need new state and federal legislative and regulatory action to eliminate unnecessary uses of PFAS, phthalates and BPAs in all pet food packaging.

6. Repeat offenders that trigger pet food recalls, should be put under a schedule of routine inspections that they have to pay for.

It may seem strange to some people that pets have become so beloved and considered by many to be members of the family. But the reality is they have and it is not going to change. As business profits off this love, they need to be held accountable. We have a right to feel confident about what we buy for our pets. That the food we feed them is safe and healthy and that the toys, clothes and bedding we buy for them are too.

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