



The Impact of Pet Waste on Water Quality and Public Health



INTRODUCTION/BACKGROUND

The impact of pet waste on water quality and public health - Pet ownership brings joy and companionship to our lives, but it also comes with responsibilities. One crucial responsibility is managing your pet's waste properly. Pet waste is a common environmental concern in urban and suburban areas. While it may seem harmless, improperly managed pet waste can have detrimental effects on water quality and public health.

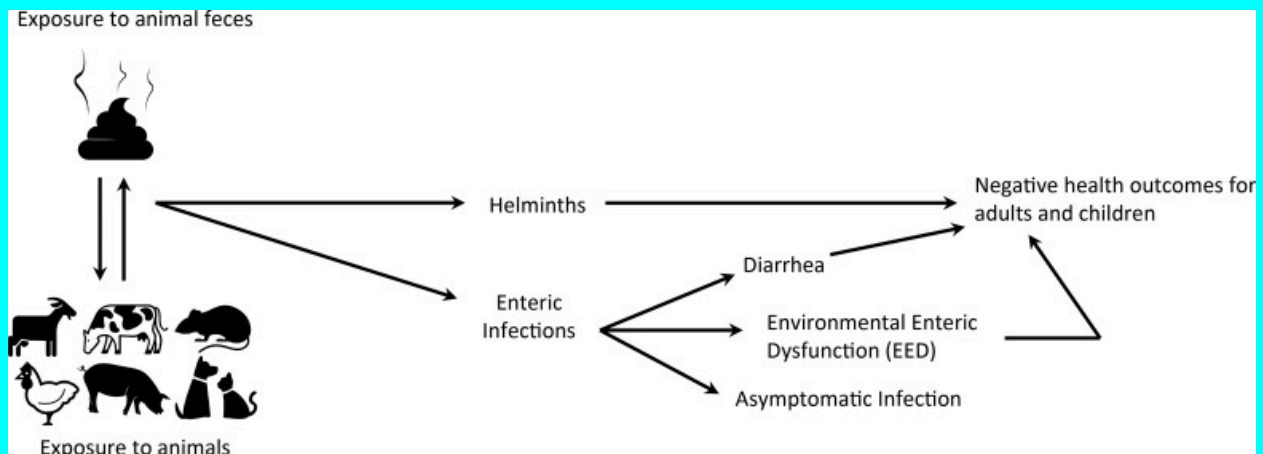


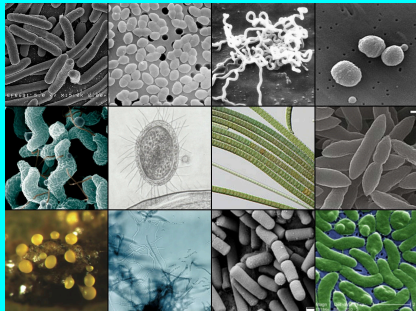
Figure 1. Impact of exposure to animal feces and/or contact with animals to human health. Source: Adapted from Penakalapati et al., 2017.

Figure 2. Sign encouraging/reminding pet owners to pick up any waste left by their pets.



THE PROBLEM WITH PET WASTE

Pet waste primarily consists of feces and urine, which contain bacteria, pathogens, parasites, and nutrients. When not properly managed, these contaminants can enter water bodies and pose risks to human health. “Dogs create about .75 pounds of waste every day, 365 days a year” (Philadelphia Water Department, n.d). According to the EPA, each gram of dog waste can contain 23 million fecal coliform bacteria. “Fecal coliform bacteria are microscopic organisms that live in the intestines of warm-blooded animals. They also live in the waste material or feces, excreted from the intestinal tract” (Water Research Center, n.d). The presence of fecal coliforms in pet waste is significant because it indicates the potential for fecal contamination in the environment. Contaminated water and environments with fecal coliforms pose health risks, as some strains of these bacteria can cause gastrointestinal illnesses if ingested or if they come into contact with open wounds (Lin et al., 2022). For instance, “diseases and illnesses that can be contracted in water with high fecal coliform counts include typhoid fever, hepatitis, gastroenteritis, dysentery, and ear infections” (Water Research Gate, n.d). Additionally, pet waste left in public spaces can attract flies and other pests, which can carry pathogens and contribute to the spread of diseases. Furthermore, airborne allergens from pet waste, such as dust particles contaminated with fecal matter, can exacerbate allergies and respiratory conditions like asthma in individuals who are sensitive to these allergens. Accumulated pet waste in public areas can also create unpleasant odors, negatively impacting the quality of life for nearby residents and discouraging people from using public spaces for recreation (Mori et al., 2023). Moreover, according to the Water Research Center, pet waste contributes to nonpoint source pollution, which is pollution that does not come from a single, identifiable source. This type of pollution is challenging to regulate and manage.



Figures 3 & 4. Provide visual

representations of bacteria.

Source (figure 4-coliform colony): Water Research Center, n.d

MAJOR STUDIES AND POLICIES

Numerous studies have identified the connection between pet waste and water quality issues. Research indicates that pet waste contains harmful bacteria such as *E. coli* and fecal coliform, which can contaminate water bodies when washed into stormwater systems. Also, pet waste is a source of nutrients, including nitrogen and phosphorus, which can lead to excessive algal growth and impaired water quality in lakes, rivers, and streams (EPA, 2023). In fact, “in one commonly cited study, just 2-3 days of droppings from 100 dogs can contribute enough bacteria, nitrogen, and phosphorus to temporarily close a bay to swimming and shellfishing” (Philadelphia Water Department, n.d). Pet feces can also contain parasitic pathogens such as *Giardia* and *Cryptosporidium*, which may threaten water quality and human health (Delahoy et al., 2018). For instance, research has shown that children are often more vulnerable to waterborne diseases due to their developing immune systems and a higher likelihood of engaging in activities that involve direct contact with water, such as playing in contaminated ponds, rivers, or streams (Lin et al., 2022). Moreover, “recently, there has been increased evidence that pets and their stools may be a reservoir for antibiotic-resistant bacteria, posing a new threat to public health” (Cinquelpalmi et al., 2012). Antibiotic-resistant bacteria are strains of bacteria that have developed the ability to withstand the effects of antibiotics, rendering these medications ineffective in treating infections caused by such bacteria. This resistance is often a result of genetic mutations that allow the bacteria to survive exposure to antibiotics that would typically eliminate or inhibit their growth. Infections caused by antibiotic-resistant bacteria are more challenging to treat, leading to prolonged illness, increased healthcare costs, and a higher risk of mortality.



Figure 5. Shows the impact of algal growth in a water source, which can have significant and multifaceted consequences on both ecosystems and human activities. These can include, water quality degradation, toxin production, fish kills and aquatic ecosystem disruption, economic impact on tourism and fisheries, etc.

KNOWLEDGE GAPS

An article from the Veterinary Science Research Journal mentioned that “the excretions from the animals have the residues of certain chemicals which are noxious for humans as well as for the environment. Further, the excretions of diseased animals may have certain zoonotic pathogens which are very harmful to humans and can remain in the soil for several days to weeks” (Singh & Rashid, 2017). Furthermore, for instance, “dog and cat stool can contain Giardia germs and may make people sick even when the pet appears healthy. Symptoms of Giardia infection in both people and pets can include diarrhea, gas, abdominal discomfort, nausea, and vomiting. It is possible to be infected and have no signs or symptoms of illness” (CDC, 2021). Despite existing research, several knowledge gaps persist. More research is needed to determine the extent of pet waste contamination in urban and suburban areas, as well as its contribution to water pollution. Gaps exist in public awareness and understanding of the environment and health risks associated with pet waste. “Some pet owners may not understand how pet waste pollutes waterways; others may have misconceptions that lead to improper waste management, such as the idea that dog waste is an ‘all-natural fertilizer and that it will ‘take care of itself’” (EPA, 2023). Research has also shown that most pet owners also contribute a lot to the plastic and microplastic pollution in the environment by not properly disposing of their pet waste bags which can in return pose human and ecological health risks (Walker, 2023). Research can further explore the effectiveness of existing pet waste management policies and their enforcement.

POLICY IMPLICATIONS

Addressing the impact of pet waste on water quality and public health requires multifaceted solutions. Pet owners can contribute significantly to reducing the impact of pet waste on water quality and public health by adopting responsible practices. This includes consistently cleaning up after their pets, using biodegradable waste bags, and disposing of waste in designated bins. Pet owners should also follow local regulations, participate in community cleanup events, and educate fellow pet owners about the environmental and health consequences of leaving pet waste unattended. Supporting the installation and use of pet waste stations in public areas, using vet-recommended preventive measures, and actively engaging in water quality monitoring initiatives are additional ways pet owners can play a vital role in safeguarding water sources and public health. By embracing these responsible practices, pet owners contribute to a cleaner environment and promote a culture of shared responsibility for the well-being of both their communities and the natural ecosystems.



Figures 6 & 7. Show a designated pet waste bin and a sign

indicating the fine of \$50.00 to be paid if pet owners fail to adhere to the rule.

FUTURE RESEARCH AND SOLUTIONS

To address the knowledge gaps and minimize the impact of pet waste, future research should explore the following:

- Best practices- Investigating the most effective pet waste management practices and technologies, such as pet waste composting or bioconversion
- Behavioral studies- Conducting studies on the motivations and behaviors of pet owners regarding waste disposal.
- Water treatment- Researching cost-effective water treatment methods to mitigate the impact of pet waste on water quality.
- Public-private partnerships- Collaborations between governments, environmental organizations, and the pet industry to promote responsible pet ownership and waste management.

In terms of solutions, pet owners should always be very proactive in picking up after their pets and disposing of their wastes properly (by using biodegradable bags when possible to minimize environmental impact). In addition, pet owners should also be consistent in scheduling regular vet check-ups. Regular veterinary care can help ensure that your pet is free from parasites and diseases that may be transmitted through their waste.

CONCLUSION

The impact of pet waste on water quality and public health is a significant environmental concern. When pet waste is not properly disposed of, it can contaminate water sources with harmful bacteria, parasites, and nutrients. These contaminants pose risks to both aquatic ecosystems and human health. Pet waste can be washed into storm drains, leading directly to rivers, lakes, and other water bodies. The bacteria, such as E. coli, and parasites found in pet waste can cause waterborne illnesses in humans, posing a threat to public health. Nutrient runoff from decomposing pet waste can also contribute to water pollution, leading to algal blooms and

oxygen depletion in aquatic environments. Responsible pet ownership practices, including proper waste cleanup and disposal, are crucial for safeguarding water quality and protecting the health of communities and ecosystems.



Figure 8. Provides a visual of the

responsibilities of pet owners when out with their pets.

Source: City of Durham, n.d



Figure 9. Is an illustration of how protected the earth will be if we all lend a helping hand and do our part in keeping the environment healthy.

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