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PFAS in Drinking Water and Implications for Latino Health

By **Gabriela Albavera,** CHCI-Health Postgraduate Fellow

Executive Summary

- Per- and polyfluoroalkyl substances, known as PFAS, are used to manufacture a variety of nonstick, stain-repellent, and waterproof consumer products
- PFAS can get into drinking water when products containing them are used or spilled onto the ground or into lakes and rivers.
- Most wastewater treatment plants are not equipped to remove PFAS, resulting in them ending up in treated drinking water. At least 45% of the nation's tap water is estimated to have one or more types of PFAS[1]
- Epidemiological studies have linked exposure to PFAS and a variety of health effects, including immune and thyroid function, insulin dysregulation, adverse reproductive and developmental outcomes, and cancer[2]
- Studies indicate that community system watersheds with PFAS served higher proportions of Hispanic/Latino and non-Hispanic Black residents compared to those without PFAS sources[3]

Background:

Perfluoroalkyl and polyfluoroalkyl substances, commonly referred to as PFAS, belong to a class of thousands of man-made chemicals. Their resistance to oil, heat, and water causes these chemicals to build up in people, animals, and the environment over time.[4] While various routes contribute to human exposure to these substances, industrial pollution emerges as the primary culprit. Improper dumping and polluted PFAS runoff has significantly contaminated water sources nationwide, disproportionately impacting Latino communities.

The primary sources of PFAS contamination are (1) Aqueous film-forming foam (AFFF) used at civilian and military airports, industrial sites, and firefighting training centers to suppress fires; (2) industrial PFAS production by eight major industries in the U.S.; and (3) manufacturing sites of PFAS-containing products, such as carpets or car parts.[5] PFAS that is improperly dumped or leached from manufacturing and industrial sites can make its way into rivers, lakes, and groundwater supply. Once PFAS gets into the groundwater, it can impact the food chain and make its way into municipal and private wells.

One-third of Americans — more than 102 million people — get their drinking water from public water systems that use groundwater. The EPA is entrusted to regulate drinking water quality in public water systems.[6] Thousands of contaminated drinking water sites referred to as "Superfund Sites" exist nationally due to hazardous waste being dumped, left out in the open, or otherwise improperly managed. Currently, 180 Superfund Sites have been identified by the Environmental Protection Agency (EPA) as having PFAS contamination.[7] Over 80 percent of Superfund sites have groundwater that is contaminated with PFAS.[8] A review of more than 140,00 public water systems across the U.S and county-level demographic data found that water systems in counties that are 25 percent or more Latino are violating drinking water contamination rules at twice the rate of those in the rest of the country.[9]

For nearly a century, discriminatory laws and policies have situated polluting industries near low-income communities of color and have led to subsidized and affordable housing on or close to Superfund sites. The US Department of Housing and Urban Development (HUD) owns, operates, or subsidizes 18,158 properties located within one mile of a Superfund site.[10] Latinos make up 18% of the U.S. population but as much as 27% of those living below the poverty line. They account for 24% of households in public housing. Today, minorities are 75 percent more likely to live near waste-producing facilities, or within fenced-lined communities,

than a White non-Hispanic. Moreover, living, working, or going to school near a superfund site has been linked to various health concerns. Finding policy solutions that mitigate this harm is essential to moving the needle on health disparities within the Latino community.

Policy Problem

Latinos are more likely than White non-Hispanics to be exposed to harmful levels of PFAS in their drinking water systems due to a disproportionate proximity of manufacturers, airports, military bases, wastewater treatment plants, and landfills near their watersheds.[13] Due to decades of federal housing discrimination, large populations of Latinos continue to reside within miles of polluting plants and industrial areas.[14]

The proximity to a high concentration of industrial pollution is often compounded by other socio-economic vulnerabilities, including limited access to healthcare services, green recreational spaces and low levels of social capital. Latino communities are facing multiple health disparities at once. It is imperative that policy to address this environmental justice issue is crafted within the broader context of the social determinants of health.

Health Implications

Exposure to PFAS through contaminated drinking water has been associated with a diverse range of adverse health effects. These include cancer, reproductive system and fertility issues, liver diseases, and thyroid diseases. Within the Latino community, the concerning impact of consuming contaminated water is particularly evident in an elevated risk of developing diabetes, cardiovascular disease, and cancer. It is crucial to note that these chronic diseases already stand as leading causes of non-Covid related deaths among Latino men and women. Drinking contaminated water further exacerbates the risk factors of developing diseases that are already extremely prevalent among Latinos.

Cardiovascular Disease

According to the American Heart Association, from 2015 to 2018, 52.3% of Hispanic men and 42.7% of Hispanic women aged 20 years and older have cardiovascular disease (CVD).[15] Almost 50% of Mexican men and women older than 20 years have a total cholesterol level greater than 200 mg/dL which is considered high. Almost 40% have an LDL cholesterol level (bad cholesterol) greater than 130 mg/dL which is also considered high, increasing the risk of developing CVD.[16]

Data analyzed from 29 studies on PFAS and blood lipid levels in adults, specifically identified two types of PFAS—PFOA and PFOS—as significantly associated with elevated blood lipids. The researchers suggest that higher exposure to PFAS may lead to a higher risk of cardiovascular disease. Blood lipids include substances like total cholesterol, triacylglycerols, and low-density lipoprotein cholesterol. High levels of these blood lipids are associated with an increased risk of developing cardiovascular disease (CVD).[17]

Diabetes

Researchers identified a link between PFAS exposure and increased glucose levels and insulin resistance in individuals with multiple risk factors for diabetes. Longitudinal studies of PFA S manufacturing workers and people residing near PFAS producing plants identified positive a associations between higher levels of PFAS in the blood and increased levels of cholesterol.[18]

A separate study examined over 310 Latino children aged eight to 13 as part of a research project focused on Latino adolescents at risk of developing Type 2 Diabetes. [19] The researchers checked the levels of certain chemicals (PFAS) in each child at the beginning of the study. Then, they followed these children for up to 12 years, conducting yearly checkups to see how their bodies processed glucose.

The study found that girls who had high levels of a PFAS chemical called perfluorohexane sulfonate (PFHxS) during childhood, especially in late puberty, tended to have more difficulties with how their bodies handle glucose. This connection between high PFHxS levels and glucose issues became stronger after puberty and continued until the girls reached 18 years old. The research suggested a link between early exposure to PFAS and the risk of developing diabetes could have serious implications for health in adulthood.

Cancer

Testicular, uterine, thyroid, liver, ovarian, and kidney are all among the lengthy list of cancers associated with exposure to these toxic chemicals. Mount Sinai researchers recently discovered a link between certain per- and polyfluoroalkyl substances (PFAS) and an increased risk for thyroid cancer. Separate studies at the Keck School of Medicine found that various PFAS and phenols were linked with higher rates of previous melanoma, ovarian cancer and uterine cancer diagnoses.[21]

One of the most pressing health

implications of exposure to PFAS is the growing concern for increased cancer risk. Cancer is the leading cause of death among Latinos in the United States. Latinos also have higher rates of dying from cancer when compared to members of other races and ethnicities. Latinas have the second highest rate of death from cervical cancer. As a group Latinos are a group with one of the highest rates of liver and stomach cancer.[22]

Policy Landscape

Although PFAS chemical production began in the 1930's, it wasn't until the late 1990's when the Environmental Protection Agency (E.P.A) began to regulate specific PFAS chemicals. In 2002, the EPA published a new rule called A Significant New Use Rule (SNUR), that required notification to EPA to limit future manufacturing, including importation, of PFOS, a type of PFAS, and its precursors, without first having EPA review the new use. They finalized a SNUR list of 183 PFAS chemicals in 2007.[23]

Significantly, in 2015 the EPA proposed another rule under the Toxic Substances Control Act to require manufacturers of PFOA and PFOA-related chemicals to notify the EPA at least 90 days before starting or resuming new uses of these PFAS chemicals in any products. The hope was that this would allow the EPA to have time to evaluate the new use and prohibit its use if necessary.

The EPA recently released a Lifetime Health Advisories document, describing health advisory levels for exposure to PFOA and PFOS. In cases where the health advisory exceeded in drinking water EPA recommended that water utility entities expand monitoring to assess the characterization, communicate with consumers about the levels and health concerns of PFOA and PFOS and/or consider steps to limit exposure.[24]

In 2019, the EPA published their PFAS Action Plan which was their approach to identify and understand PFAS, prevent future contamination, and effectively communicate with the public about PFAS. The Action Plan also denoted various actions to address PFAS water contamination. It suggested actions towards declaring national drinking water quality standards, designating PFOA and PFOS as hazardous substances, developing approaches to groundwater cleanup and further research efforts to research and detect a new generation of PFAS chemicals.[25]

Policy Recommendations

Green Infrastructure

There are various approaches to address drinking water contamination in Latino communities. Policymakers must use a lens that takes into account the social determinants of health to craft solutions to this issue. Major areas of concern include funding challenges to update aging infrastructure, low levels of community engagement in decision-making processes and weak chemical regulation and enforcement.

Traditionally, most communities have what is known as gray infrastructure —systems of gutters, pipes, and tunnels—to move stormwater away from people and to treatment plants or straight to local water bodies. However, in many low-income areas this type of infrastructure is aging and struggling to keep up with increasingly severe weather patterns. For instance, in California, where 39.4% of the state's population identifies as Hispanic or Latino,[26] 620 public water systems and 80,000 domestic wells are at risk of failing to provide affordable and uncontaminated water. California would need $4.7 billion of extra funding to update its waste water infrastructure.[27]

Removing PFAS from drinking water is extremely costly and difficult. A report from the Minnesota Pollution Control Agency estimated that the projected cost of removing PFAS from Minnesota's wastewater and biosolids over the course of 20 years would range between $14 billion - $28 billion. Despite the market value of PFAS ranging from $50 to $1,000 per pound, the costs associated with treatment and removal per pound of PFAS spanned from $2.7 million to $18 million. The costs of smaller capacity wastewater treatment plants could be up to six times upgrade their waste water systems. This type of infrastructure uses plants or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduces flows to sewer systems or to surface water.[29] These systems come with multiple benefits to communities as they serve the function of filtering water but also add recreational green space and revitalize communities. Neighborhood scale green infrastructure could include increasing tree canopy coverage in a city center, planting rain gardens, green roofs or constructing a wetland near a densely populated neighborhood.

Equitable representation

Latino communities faced with environmental challenges such as drinking water contamination are often unjustly excluded from policy development and decision-making bodies.

"The environmental justice movement focuses on ensuring communities receive equitable protection from natural and human-induced environmental hazards. It embodies the principle that all communities should be heard and represented in decision making." [30]

Land use and zoning decisions which dictate which, where and how industrial manufactures can operate near people's homes are often made by local and state agencies. These decision-making positions are primarily filled by people with extensive resumes who do not live in the communities that will experience the consequences of their decision-making. Therefore, more efforts must be made to ensure that the most vulnerable Latino communities have a say in dictating whether they will allow a new cement factory, smelting plant or landfill to open up near their home.

Efforts have been made in some states to enhance equitable representation. For instance, in California, the Governors Proposed Budget sought to improve transparency and strategic guidance by appointing a review board to oversee the decisions of the California Department of Toxic Substances Control.[31] This strategy allows for oversight and a second opinion when it comes to granting land use permits and facilitating public participation in these decisions. However, although it establishes some oversight, the board is still composed of people who do not live in the neighborhoods that these policies will impact. Therefore, these types of boards would benefit from additional committees predominately composed of community residents.

Conclusion

Although PFAS chemicals have been in existence for nearly 100 years, we are only beginning to learn about the long-term impacts that they have on Latino health and the environment. From contaminated drinking water to the disproportionate placement of industrial sites near their home, Latinos are unfairly burdened with the consequences of PFAS contamination in their drinking water systems. The intersectionality of environmental injustice, discriminatory housing policies, and socio-economic vulnerabilities exacerbates the challenges faced by Latino communities.

The alarming health disparities, ranging from cardiovascular diseases to an increased risk of diabetes and cancer, underscore the urgency for comprehensive policy solutions. While the Environmental Protection Agency (EPA) has taken steps to address PFAS, there is a need for more robust regulations, equitable representation, and enhanced avenues for community engagement.

In crafting policies to tackle PFAS contamination, it is imperative to consider the broader social determinants of health and acknowledge the historical injustices that have led to the current environmental disparities. By addressing these issues comprehensively, policymakers can contribute to mitigating the harm caused by PFAS exposure and advancing environmental justice for Latino communities.

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