White Paper -Health Impacts in Residents Exposed to Tijuana River Pollution

A Community-Based Assessment of Environmental and Public Health Risks

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Disclaimer

This white paper presents preliminary results from a community health survey conducted between October 2024 and July 2025. These findings are shared for community engagement and policy planning purposes. A peer-reviewed publication with expanded data analysis is in development.

Executive Summary

The Tijuana River Valley, in San Diego County just north of the border with Mexico, represents one of the most severe public health and infrastructure crises in the United States. Millions of gallons of untreated sewage along with urban and industrial runoff flow daily into the United States, which is exacerbated by failing cross-border infrastructure to treat the wastewater. Severely impacted communities in San Diego County, especially San Ysidro, Imperial Beach, and other South Bay neighborhoods, have long reported health effects from exposure to the contaminated water and the gases emanating from the pollution. In addition, there is a strong economic impact as the contaminated water flows into the ocean and affect recreation and tourism dollars for these communities.

This white paper presents preliminary findings from a bilingual community health survey of 340 residents and 140 workers (some participants lived and worked in the region) in environmentally impacted areas, conducted from October 2024 through July 2025. This survey is still ongoing however preliminary results show serious health concerns that need to be addressed urgently. These results show high rates of the following reported health symptoms among participants taking the survey, including:

- Upper respiratory issues (76%)
- Headaches (84%)
- Sleep disturbances (70%)
- Gastrointestinal illness (68%)
- Allergic reactions (69%)
- Cognitive symptoms like difficulty concentrating (51%)

The survey asked about participants perception of their environment. Residents reporting exposure to poor or very poor air quality were significantly more likely to report sleep disturbance (4 times), gastrointestinal symptoms (3.4 times), and allergic reactions (1.9 times). Those reporting being exposed to very strong odors five or more times per week were up to 5.3 times more likely to experience appetite loss than those exposed less often.

These findings are consistent with results from the County of San Diego and CDC's CASPER assessment, conducted in October 2024 [18]. The study found similar rates of respiratory symptoms, headaches, and sleep problems [18]. The CASPER study also documented significant behavioral health impacts: over 65% of households reported mental health distress such as anxiety, insomnia, and appetite loss, and 12–14% of individuals screened positive for anxiety or depression. Together, these complementary survey results confirm what residents have long reported: that the sewage pollution crisis is not only a persistent environmental hazard but a daily public health emergency.

When asked in our survey about how participants think their environment has changed over time, 91% of respondents report being more concerned about pollution in their community this year when compared to one year ago. Many (81%) also report making changes in response to poor air quality, such as spending less time outdoors, keeping windows closed, and inviting people over less often, after experiencing or being informed of the conditions. Despite recent actions, such as air filter distribution programs, expanded hourly hydrogen sulfide monitoring in three community locations, and the allocation of over $650 million in federal and state infrastructure funding, major

gaps remain. Frontline workers and vulnerable families continue to live and work in hazardous conditions without consistent protection, recognition, or relief.

This white paper calls for **urgent and coordinated local, state and federal action**, including:

- Immediate emergency response measures to reduce sewage discharges
- Long-term binational infrastructure solutions
- Ongoing environmental monitoring using advanced technologies, including people's exposure where they live and work
- Culturally responsive healthcare access and education
- Longitudinal epidemiologic surveillance to measure impacts and progress over time

The crisis in the Tijuana River Valley is impacting the entire region. The communities bearing the brunt of this pollution deserve the same urgency and investment that would be expected in any other part of the country. This is a public health and environmental emergency.

The Crisis at the Border: What's Happening and Why It Matters

The Tijuana River flows from Mexico into the United States, discharging into the Pacific Ocean via the Tijuana River Estuary. Decades of inadequate binational wastewater infrastructure and unchecked sewage, urban runoff and industrial discharges have led to chronic contamination of water, soil, and air in the region. Heavy rains and aging infrastructure have exacerbated the situation, resulting in beach closures, degraded air quality, and increasing health complaints from surrounding communities [1-4].

Scientific studies conducted in the region have documented widespread environmental contamination. Water sources contain viruses such as SARS-CoV-2 and Hepatitis B/C, antibiotic resistant bacteria and hundreds of chemicals including pesticides, solvents, and flame retardants [1, 5-8]. Air contamination studies have shown aerosolized pathogens and hydrogen sulfide gases that are measured at concentrations far above urban norms [3,9-11]. Soil analysis has found over 170 hazardous compounds including arsenic, cadmium, PAHs, PCBs, and banned pesticides like DDT [12, 13]. These exposures potentially present major health risks for communities, particularly given recent understanding of the transfer of bacteria and chemicals from contaminated water to air [1, 14,15].

Community Health Findings: What Residents Are Experiencing

To better understand the public health implications of this crisis, a bilingual, cross-sectional (participants take only one time) community survey was conducted from October 2024 through July 2025. Eligibility was restricted to individuals over 18 years of age and who lived or worked in southern San Diego County near the Tijuana River Valley or potentially impacted coastal waters, including San Ysidro, Imperial Beach, National City, Coronado and other surrounding neighborhoods (see Figure 1).

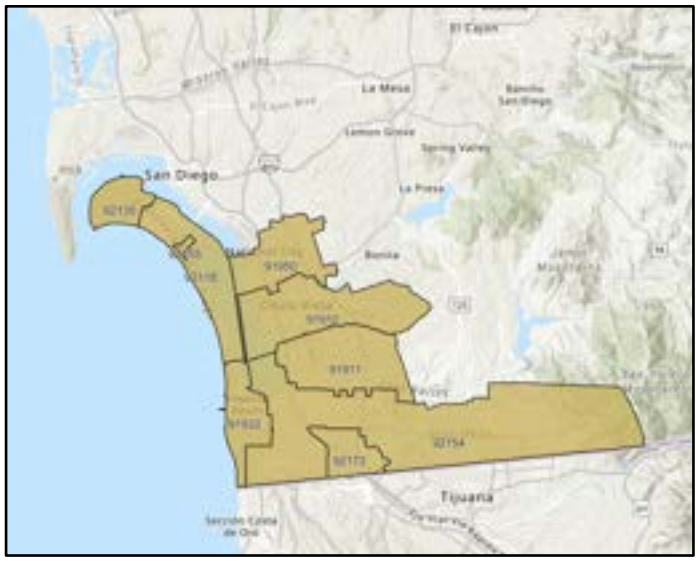

Figure 1: Map of zip codes in San Diego County where survey is being conducted

Participants were recruited through partnerships with community organizations, flyer distribution, social media outreach, website (tjriver.sdsu.edu) and door-to-door engagement. The online survey is collecting information on socio-demographics, environmental perceptions, and health symptoms participants have experienced over the previous 2 weeks from when they took the survey.

Survey Findings

The sample at the time of this paper included 405 respondents. Approximately 36% of participants identified as Hispanic or Latino and represented a range of ages and occupations. Reported symptoms over the previous two weeks from when taking the survey included upper respiratory issues (76%), headaches (84%), allergic reactions (69%), sleep disturbances (70%), gastrointestinal illness (68%), and cognitive complaints such as trouble concentrating (51%). Environmental concerns were also prevalent: 90% rated air quality as unhealthy, very unhealthy, or hazardous, 97% perceived the water quality as poor or very poor, and 25% experienced daily strong odors consistent with sewage or chemicals.

Deeper Look: How Pollution Affects Health

Statistical analysis revealed significantly positive associations between some of the health symptoms and higher levels of perceived pollution and odors (Figure 1) (adjusted for age, gender, race/ethnicity, insurance, education, and working/residence status). People exposed to perceived poor air quality were over 3 times more likely to report sleep problems and more than 3 times as likely to report diarrhea in the past two weeks. Perceived poor air quality was also linked to 1.5 times respiratory issues and almost 2 times reports of allergic reactions. Those who reported smelling strong chemical or sewage-like odors five or more times a week were up to 5 times more likely to report losing their appetite and about 1.5 times more likely to suffer from headaches.

Figure 1: Prevalence ratios of reported health symptoms for unhealthy air quality (top) and higher frequency of environmental odors (bottom). Controlled for age, gender, race, ethnicity, education, insurance coverage, and residence/working status. A value greater than 1 on the y-axis means that the symptoms were more frequent than reported by residents who reported more moderate air quality concerns and fewer odors.

This analysis shows a clear and consistent connection between perceived poor environmental conditions and community health. The high rates of reported symptoms, especially respiratory, sleep, and digestive issues, were strongly linked to perceived poor air and water quality, as well as frequent exposure to strong chemical or sewage-like odors. These findings track with reports of levels of hydrogen sulfide frequently exceeding acceptable levels and logs of community reports to the local air district. These results offer community-level evidence of what many residents already know from lived experience: the Tijuana River pollution crisis is not just an environmental issue, but a public health emergency [3]. The data confirm that community perceptions of risk are grounded in real and measurable health impacts [14-17].

Longitudinal Follow-Up (Surveying Participants Monthly)

We now have a longitudinal version of the survey underway, where we give the same survey to a group of participants every month. This will allow us to assess trends in exposure perception and health status over time and compare these results to environmental monitoring. Results will be released in future reporting.

Economic & Worker Impacts: How Pollution Affects Daily Life

The environmental and public health crisis in the Tijuana River Valley is imposing a significant economic burden on residents, workers, and the broader regional economy. Our survey data reveal that 22% of residents living and/or working in the affected areas reported missing work due to illness attributed to pollution-related symptoms such as gastrointestinal distress. These absences reflect lost wages, job insecurity, and reduced productivity, particularly for hourly or gig workers without paid leave or health insurance. The economic toll extends beyond individual households. Businesses in Imperial Beach and South San Diego, especially those dependent on coastal tourism, have experienced downturns due to prolonged beach closures, malodor complaints, and negative media coverage surrounding the sewage crisis [19]. Anecdotal stories of real estate values being negatively affected in areas where environmental degradation is widely heard, further reducing the wealth of families already facing structural disadvantages.

Occupational Health Risks and Effects on the Military

Outdoor and frontline workers face elevated occupational health risks. Lifeguards, border patrol agents, military personnel, and construction workers who operate near the river or coastline are frequently exposed to airborne and waterborne contaminants [20]. These workers have reported symptoms consistent with hydrogen sulfide exposure, including headaches, nausea, and respiratory irritation [3].

Most notably, recent national media coverage has spotlighted reports that Navy SEALs training off the San Diego coast became ill from exposure to raw sewage discharges. Multiple military service members reported vomiting, fever, and gastrointestinal distress after waterborne training exercises near Imperial Beach, further illustrating the severity of the pollution problem and its reach into federal operations [21, 22]. The Department of Defense has acknowledged these cases, and public health officials have called for urgent remediation to prevent further military exposure. This is another example of how this crisis is far reaching and is even impacting our national security.

Comparison with San Diego County CASPER Survey Findings

Our survey findings closely align with results from the *Community Assessment for Public Health Emergency Response (CASPER)* conducted by the County of San Diego and the CDC over two days in October 2024 [18]. That assessment surveyed 189 households near the Tijuana River Valley using door-to-door outreach and found widespread concern about health and environmental conditions related to sewage contamination.
Both our study and CASPER found high rates of reported health symptoms, especially:

- Respiratory issues (76% in our survey; 62% in CASPER)
- Headaches (84% vs. 80%)
- Sleep disturbances (63% vs. 56%)
- Cognitive symptoms like difficulty concentrating (51% in our survey; 33% reported lack of energy or difficulty concentrating in CASPER)

Community concern about their environment was also nearly universal. In both surveys, over 90% of respondents reported poor air and water quality, and many described strong sewage odors and changes to daily routines. About three-quarters of participants in each study reported reducing outdoor activity due to pollution. Together, these two assessments provide complementary evidence of the ongoing public health impacts of sewage contamination in the Tijuana River Valley and reinforce the urgent need for action. There was another survey done by the CDC and the Agency for Toxic Substances and Disease Registry (ATSDR) called the Aces survey that has recently released results. Our team will be comparing results in the near future.

Interventions Underway

In response to worsening environmental conditions and rising community health concerns, several interventions have been initiated. The San Diego Air Pollution Control District (SDAPCD) launched the *Air Improvement Relief Effort (AIRE) Program* to help residents reduce indoor air pollution exposure. This initiative provides free air purifiers and replacement filters to households in the most heavily impacted neighborhoods, particularly in San Ysidro and Imperial Beach. The program aims to create cleaner indoor environments, especially during high-pollution events when outdoor air becomes hazardous.

To further support public health, SDAPCD also expanded its environmental monitoring efforts in late 2024 with the release of an hourly hydrogen sulfide monitoring dashboard. This publicly accessible tool delivers near real-time air quality data at three locations for people living and working in or near the Tijuana River Valley, empowering them with timely information about exposure risks. While the dashboard represents a significant advancement in transparency and awareness, there are currently no binding regulatory thresholds or automatic enforcement actions tied to hydrogen sulfide concentrations, limiting its practical protections.

On a broader scale, long-overdue investment in cross-border infrastructure is finally underway. In early 2025, nearly $650 million in federal and state funding was secured to modernize the failing binational wastewater systems through the International Boundary and Water Commission (IBWC). This funding will support major upgrades to pump stations, sewage diversion systems, and wastewater treatment capacity, aiming to reduce the chronic overflows that send raw sewage from Tijuana into the United States. However, these infrastructure projects are still in planning or early implementation phases, and the health consequences for residents remain ongoing.

The San Diego County Board of Supervisors have also recently voted to approve a 5-point Sewage Action Plan authored by the newly elected Supervisor Paloma Aguirre (district 1). The plan proposes to eliminate toxic hot spots along the river, enhance filtration and ventilation in schools and childcare facilities, conduct a large scale epidemiological study, assess economic impacts and establish a committee to coordinate cross-agency actions to stop the contaminated flows.

Community Health Disparities & Gaps

The communities most affected by the Tijuana River Valley pollution, particularly San Ysidro, Imperial Beach, and parts of South San Diego, are predominantly low income and working middle class. These areas face entrenched social, economic, and infrastructure inequities that compound the effects of chronic exposure to pollutants. Historically under-resourced and overlooked in resource planning these neighborhoods lack the protective infrastructure, healthcare access, and environmental enforcement that wealthier regions often take for granted.

This environmental crisis limits opportunities for outdoor recreation for many residents. Even when outdoor spaces are technically accessible, the persistent presence of sewage odors, beach closures, and poor air quality makes them unsafe or undesirable for children and families. Approximately 64% of survey participants reported reducing outdoor activities for elderly family members and/or children due to environmental concerns. Community members describe feeling “disgusted,” “ignored,” and “abandoned,” citing unsafe beaches, contaminated air, and strong chemical smells as reasons for keeping children indoors and avoiding physical activity [23]. These psychosocial impacts are deeply intertwined with physical health consequences and economic hardship, including missed work, increased medical visits, and chronic stress. The scale and persistence of contamination in the Tijuana River Valley would likely prompt immediate federal intervention if it occurred in a more affluent community. The lack of proportional attention, funding, and regulatory enforcement reflects systemic infrastructure neglect in underserved communities. In this context, the Tijuana River Valley crisis is not only a public health and environmental issue, but also a matter of national public health and infrastructure responsibility. Continued failure to act exposes communities to disproportionate and preventable risks due to long-standing infrastructure failures.

What Needs to Be Done Now: Recommendations for Action

Addressing this crisis requires bold, sustained, and coordinated action across federal, state, and local agencies. First and foremost, the **federal and state governments could declare a public health and environmental emergency in the Tijuana River Valley**. Such a designation would unlock emergency resources, facilitate cross-agency coordination, and signal the national urgency of this binational pollution crisis. In the short term, emergency measures must be implemented to reduce the immediate flow of untreated sewage into neighborhoods and coastal waters. These include expanding sewage diversion capacity, reinforcing stormwater control systems, and installing temporary physical barriers at known overflow points. Such interventions are especially critical during extreme weather events when overwhelmed infrastructure allows large volumes of contaminated water to enter the coastal zone.

Longer-term solutions require robust investment to replace and modernize the aging binational wastewater infrastructure. Transboundary pollution cannot be resolved without joint United States-Mexico infrastructure solutions and a shared commitment to long-term operation and maintenance. Federal funding secured in 2025 is an essential step forward, but it must be matched by effective implementation, maintenance and binational oversight. Comprehensive environmental monitoring must also be institutionalized, with year-round sampling of air, water, and soil for pathogens and chemical contaminants. This includes use of advanced technologies such as metagenomic sequencing and non-targeted chemical analysis to identify emerging contaminants not captured by traditional testing methods. San Diego State University and the University of California San Diego are currently conducting these types of studies for research purposes, but the appropriate government agencies should be conducting these measurements and/or coordinating with local academic scientists on these efforts. The expansion of air quality monitoring tools, like the hydrogen sulfide dashboard launched by SDAPCD, should be scaled to include more communities and standardized across the region with appropriate warning systems in place for exceedances that may impact health.

To protect public health, impacted communities must be provided with no-cost medical screenings, improved access to culturally competent care, and environmental health education tailored to community needs. Special attention should be given to high-risk populations, including children, elders, and outdoor workers, who face heightened vulnerability to both acute and chronic exposures. Binational coordination is essential. The United States must work closely with Mexican authorities to reduce raw sewage discharges and industrial runoff at their sources. This effort will require transparent data sharing, joint accountability frameworks, and continued diplomatic pressure to ensure compliance and sustained progress. Occupational health protections remain inadequate. There are still no standardized safety guidelines or compensation mechanisms for workers such as lifeguards or border patrol agents exposed to pollution-related hazards in the Tijuana River Valley. The lack of formal recognition of exposure-related illnesses in affected workers, including military personnel, delays treatment and denies justice. Moreover, the burden on residents accessing local healthcare systems, especially in San Ysidro and South Bay, continues to strain resources, with many symptoms such as “difficulty concentrating” or “fatigue” going unrecognized or untreated. Without further policy, occupational safety, and healthcare investment, the cycle of exposure, illness, lost work, and financial strain will persist. Targeted relief from these chronic exposures and environmental enforcement are essential to reversing this trend and protecting the health and livelihoods of the region’s residents and workers.

Finally, environmental restoration must be matched by longitudinal health surveillance. Chronic long-term exposure to environmental contaminants carries long-term health consequences, and without a sustained public health monitoring system, new threats may go undetected and mitigation efforts unmeasured. Establishing this surveillance will allow communities and policymakers to track improvements, identify emerging risks, and hold systems accountable over time.

Conclusion

These health effects reported in the white paper and other studies do not occur in a vacuum. They intersect with economic insecurity, occupational exposure, and systemic inequities that compound the burden on already vulnerable populations. Survey findings show that illness from pollution is interfering with people’s ability to work, care for their families, and participate in daily life. The crisis is affecting local economies, workers, our military and the healthcare system, underscoring the multifaceted nature of the harm and the urgent need for comprehensive, equity-centered solutions.

The Tijuana River Valley crisis is a pressing environmental emergency in the United States today. The ongoing convergence of contaminated water, polluted air, and toxic soil in the region presents a clear and present danger to public health, community well-being, national security and ecological resilience. This white paper provides robust, community-driven evidence of the health harms experienced by residents, backed by scientific data and

real-world testimony. Without decisive and sustained intervention, the human, economic, and environmental toll will only deepen, disproportionately affecting the region. The time for action is now. Federal and State leadership, strategic investment, and sustained binational collaboration are essential to restoring safety and dignity to the communities of the Tijuana River Valley.

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