

Policy Brief: Binational Health Risks of Pacific Coastline Exposure

San Diego–Tijuana–Rosarito

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Audience: Binational Policy Makers (EPA, IBWC/CILA, CDPH, COFEPRIS), NGOs, academics and general public

Summary

This exploratory study assessed coastal exposure in the San Diego–Tijuana–Rosarito region and self-reported health conditions. Findings suggest that polluted marine aerosols (sea spray) and sand are possible pathways for illness, extending risk beyond direct water contact. To mitigate this shared binational health burden, the study provides specific recommendations for immediate US-Mexico collaboration to upgrade failing infrastructure and standardize environmental monitoring, while also recommending the adoption of a unified "Planetary Health" approach.

What is the problem?

The Pacific coastline shared by the US and Mexico is increasingly affected by pollution from the Tijuana River. Wastewater discharges, storm runoff, and urban waste contaminate coastal waters and nearby environments on both sides of the border. While the environmental degradation is well-documented, there has been a lack of unified, binational epidemiological data to understand how this contamination might be impacting human health across the region.

What did the study do?

This exploratory, hypothesis-generating mixed-methods study investigated associations between coastal environmental exposure and human health. Researchers analyzed a non-probability online survey alongside secondary governmental water quality data, while also integrating a qualitative component comprising ethnographic field notes on coastal conditions and semi-structured interviews with local healthcare professionals. The study included 390 participants, with 45% residing in Tijuana, 38% in San Diego, and 13% in Playas de Rosarito. The average participant age was 39, with a majority identifying as female (67%) and Hispanic or Latinx (66%). Highlighting the intersection of environmental risk and social vulnerability, 8% of the cohort reported having a disability and about 3% reported experiencing housing instability. Notably, 12% of coastal users reported coastal visits (1:8) involving a crossing of the US-Mexico border.



What did the study find?

Participants reported a high frequency of acute conditions in the 30 days prior to the survey. The data revealed several statistically significant associations:

- **A Shared Regional Burden:** The most prevalent self-reported issues were respiratory conditions (47%), eye allergies (16%), gastrointestinal conditions (15%), and ear infections (11%).
- **Aerosolized Exposure Pathways:** Findings indicate that respiratory risks exist even for individuals who did not contact ocean water. This suggests that passive environmental exposure through marine aerosols (sea spray) and contaminated sand may contribute to the region's health burden.
- **The "San Diego Gap":** In adjusted multivariable models, San Diego County residents reported significantly higher odds of experiencing diarrheal diseases (9.7x) and ear infections (5.1x) compared to residents in Mexico. This highlights a need to investigate differences in baseline immunity, exposure patterns, or reporting behaviors.
- **Site-Specific Associations:** Visiting specific beaches correlated with higher reports of illness. For example, in Mexico, visitors to *La Bardita/El Bebe/Santa Monica* in Rosarito had higher odds of reporting diarrheal and ear infections. In the US, *Imperial Beach* and *Border Field State Park* were strongly associated with eye and respiratory allergies.
- **Aquatic Sports Correlation:** Engaging in recreational activities like swimming or surfing was significantly associated with increased reports of ear infections across the binational region.

Health risks and cross-border environmental exposure at the Pacific Ocean coastline

San Diego-Tijuana-Rosarito

Why does this matter?

The Pacific Ocean serves as a primary environmental, cultural, and economic resource for populations in Tijuana, Playas de Rosarito, and San Diego. However, localized pollution threatens to erode the typical health benefits of coastal proximity. As noted in the study's discussion, exposure to contaminated coastal environments disproportionately affects marginalized populations within these border communities.

Mitigation is currently complicated by stark differences in environmental regulations, institutional capacity, and infrastructure between the US and Mexico. Because coastal waters, marine aerosols, and pathogens do not respect international borders, understanding and addressing this binational pollution is essential for protecting overall ecosystem health, sustaining regional economic activities, and reducing shared public health risks across the coastline.



What can be done?

To mitigate these emerging health risks, it is essential to implement a "Planetary Health" approach. This overarching framework shifts policy from reactive management to holistic integration, recognizing the deep interconnectedness between human well-being and the health of the coastal ecosystem.

Based explicitly on the study's findings, the following specific binational actions are recommended:

- 1. Improve wastewater treatment and infrastructure:** Address capacity overloads and system failures in facilities to reduce ongoing, untreated discharges into the shared ecosystem.
- 2. Enhance environmental monitoring across both countries:** Implement a unified, cross-border surveillance system with standardized water-quality metrics to better assess microbial contamination.
- 3. Expand public health education about safe coastal practices:** Update public advisories to warn communities about potential aerosolized risks (sea spray) and sand exposure, moving beyond traditional "no swimming" alerts.
- 4. Strengthen collaboration between the US and Mexico:** Increase coordinated efforts and policy alignment between nations to sustainably manage this transboundary environmental crisis.

This study was led by Dr. Calderón-Villarreal, assistant professor in the Public Health Department, at California State University San Marcos (CSUSM). It is part of the One Coastal Community initiative, a collaborative effort by *Proyecto Fronterizo de Educación Ambiental* and San Diego Coastkeeper partially funded under the Border Resilience Initiative launched by the San Diego Foundation. This study is also part of the Socio Environmental Tijuana River Project.

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