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Editorial

The Hidden Health Crisis Following Chamchamal's Floods: A Call for Comprehensive Public Health Response

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The catastrophic floods that struck Chamchamal between 8 and 10 December 2024, resulting in three fatalities and the destruction of more than 1,000 homes, should not be understood solely as an acute humanitarian emergency. Rather, they mark the onset of a broader and potentially enduring public-health crisis. As visible flood damage subsides, less immediately apparent—but no less consequential—risks are likely to emerge through compromised water quality, disrupted sanitation, and the mobilization of environmental contaminants.

Foremost among the immediate public-health concerns is the destabilization of water security. Flood-related increases in turbidity in the Little Zab River reportedly necessitated the temporary shutdown of water-treatment facilities across multiple districts, leaving substantial segments of the population without access to safe tap water for several days. In such circumstances, households commonly rely on untreated surface water, tanker supplies of uncertain quality, or private wells—sources that are particularly vulnerable to microbial contamination following flooding. The health implications of these exposures are well established. Post-flood environments are consistently associated with outbreaks of waterborne disease, including cholera and leptospirosis, while storm-related rainfall has been linked to increased incidence of Escherichia coli infections and Legionnaires' disease in the weeks following inundation (Lynch and Shaman, 2023). In Chamchamal, these risks are likely amplified by widely documented deficiencies in sewage infrastructure, which enable direct mixing of floodwaters with untreated domestic wastewater in several neighborhoods.

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Importantly, the hazards generated by flooding extend beyond biological pathogens. Floodwaters can mobilize hazardous household waste, medical residues, and industrial effluents, including solutions containing heavy metals and other toxic substances capable of causing both acute and chronic illness (Aziz et al., 2025). When drainage and sanitation systems are overwhelmed, such contaminants are deposited into surrounding soils and sediments and may subsequently migrate into groundwater aquifers that serve as drinking-water sources. Evidence from comparable post-

flood settings indicates that soil cadmium contamination is positively correlated with inundation depth, suggesting that areas experiencing the most severe flooding may also bear the greatest long-term toxic burden (Kong et al., 2024).

By contrast with many microbial hazards, heavy metals such as cadmium, lead, and zinc do not attenuate over time through natural degradation. They persist in soils for decades, accumulate within agricultural systems, and can enter the human food chain through crops cultivated on contaminated land (FAO and UNDP, 2021; Qurbani et al., 2022). The destruction of agricultural areas and damage to commercial properties therefore, represent not only economic losses but also potential sources of prolonged exposure via food, dust, and drinking water. These risks disproportionately affect children, owing to behavioral factors and heightened physiological susceptibility.

Taken together, these intersecting threats illustrate how longstanding infrastructural deficits can transform extreme weather events into preventable public-health emergencies. Chamchamal has, for many years, awaited completion of a comprehensive water-supply project, while numerous neighborhoods remain without sewage networks and rely on drainage channels that are frequently obstructed by accumulated solid waste due to irregular municipal collection, as reflected in regional planning assessments and municipal reports. In this context, flooding functions not merely as a meteorological event but as a systemic stress test—one that has exposed chronic weaknesses in water, sanitation, and environmental governance.

Currently, systematic post-flood health surveillance data from Chamchamal remain limited. This absence of comprehensive early data underscores the importance of proactive public-health intervention rather than a delayed, outbreak-driven response.

Accordingly, an effective response must integrate immediate risk mitigation with sustained environmental and epidemiological monitoring. First, comprehensive testing of all drinking-water sources, including private wells and tanker supplies, should be undertaken to assess microbiological and chemical contamination, alongside the provision of household water-treatment options until safety can be reliably confirmed. Second, systematic assessment of heavy-metal and chemical contamination in residential areas, agricultural land, and zones surrounding damaged industrial infrastructure is essential, coupled with clear guidance for residents regarding safe food production and consumption. Third, strengthened disease-surveillance systems are required to detect and respond rapidly to outbreaks of waterborne illness, which typically emerge in the one-to-three-week period following flooding. Finally, long-term remediation strategies should prioritize highly contaminated soils, particularly in areas where children play and where households depend on local food production.

This flooding episode was not produced by rainfall alone. Rather, it reflects the predictable consequences of prolonged underinvestment in core public-health infrastructure, through which natural hazards are converted into health catastrophes. As climate change increases the frequency and intensity of extreme weather events, the public-health costs of such inaction are likely to escalate—manifesting not only as infrastructural damage but also as avoidable disease burden and chronic environmental exposure.

The humanitarian response from aid organizations and neighboring communities has been commendable. However, short-term relief cannot substitute for a sustained, science-driven public-health strategy capable of addressing the less visible risks that follow flooding. The residents of Chamchamal—including children living in flood-affected neighborhoods and families relying on local water and food sources—require protection through monitoring, transparent risk communication, and targeted remediation.

The international public-health community possesses extensive experience in managing post-flood disease risk and environmental contamination. Applying this knowledge decisively in Chamchamal is therefore essential to prevent a transient natural disaster from evolving into a long-term and preventable public-health tragedy.

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References

Aziz, F., Wang, X., Mahmood, M.Q. and Juliette, O.K. (2025) "Assessing human health risks associated with wastewater flooding," Environmental Impact Assessment Review, 115, p. 108031. Available at: https://doi.org/10.1016/J.EIAR.2025.108031.

FAO and UNDP (2021) Global Assessment of Soil Pollution. Rome. Available at: https://doi.org/10.4060/CB4894EN.

Kong, F., Guan, D.X., Huang, P., Lu, S., Xu, J. and Wang, H. (2024) "Unveiling the barriers of Cd translocation from soil to rice: Insights from continuous flooding," Science of The Total Environment, 946, p. 174265. Available at: https://doi.org/10.1016/J.SCITOTENV.2024.174265.

Lynch, V.D. and Shaman, J. (2023) "Waterborne Infectious Diseases Associated with Exposure to Tropical Cyclonic Storms, United States, 1996–2018," Emerging Infectious Diseases, 29(8), p. 1548. Available at: https://doi.org/10.3201/EID2908.221906.

Qurbani, K., Khdir, K., Sidiq, A., Hamzah, H., Hussein, S., Hamad, Z., Abdulla, R., Abdulla, B. and Azizi, Z. (2022) "Aeromonas sobria as a potential candidate for bioremediation of heavy metal from contaminated environments," Scientific Reports, 12(1), p. 21235. Available at: https://doi.org/10.1038/s41598-022-25781-3