



Environmental Contamination in the Tijuana River Valley:

Evaluation of Hydrogen Sulfide in Outdoor Air



Jona Johnson, PhD, MPH, REHS

Lead Author

Western Section

Office of Community Health Hazard Assessment
Agency for Toxic Substances and Disease Registry
September 30, 2026



Photo taken by ATSDR staff member during June 2025 site visit

Meeting Agenda

- Background
- What did ATSDR do?
- What did ATSDR find?
- Limitations and Uncertainties
- Recommendations
- Next Steps



Photo taken by ATSDR during June 2025 site visit

Background

ATSDR
Tijuana River Valley
Congressional Request
Previous CDC/ATSDR Activities
Community Concerns

ABOUT US

Agency for Toxic Substances and Disease Registry

*Non-regulatory federal public health agency
headquartered in Atlanta, GA*

Mission: To protect communities from harmful health effects related to exposure to natural and man-made hazardous substances





Photo taken by ATSDR during June 2025 site visit

TIJUANA RIVER Background

- Tijuana River and tributaries flow **from Mexico into USA**.
- The Tijuana River is an **intermittent river**.
- For decades, untreated wastewater has flowed from Mexico into the Tijuana River Valley and Pacific Ocean, causing beach closures.
- **Hydrogen sulfide** is released from wastewater, producing air quality and odor issues in nearby communities.
- The community has **long-standing health concerns** related to air quality and odors from untreated flows of sewage.
- Wastewater infrastructure is inadequate - **upgrades** are in process in US and Mexico, but they **will take time**.



Photo taken by ATSDR during June 2025 site visit

TIJUANA RIVER CONGRESSIONAL REQUEST

California Congressional Delegation

- Request to CDC/ATSDR (May 2024):
 - “Investigate public health impacts of wastewater contamination in the Tijuana River and the surrounding communities”
- ATSDR petition acceptance (January 2025)
 - Committed to assessing hydrogen sulfide in air and other pathways if data is adequate.
 - Decided to split the analysis into two reports:
 1. Exposures to chemicals in air
 2. Exposures to chemicals in water, soil, sediment, etc.
- Consistent with ATSDR’s congressional mandate, public health assessment activities focus on potentially harmful **chemical exposures**.

PREVIOUS ACTIVITIES

September
- November
2024

ATSDR Hydrogen Cyanide Technical Assistance

ATSDR's technical assistance to the County helped show that airborne hydrogen cyanide was not a threat in the community, but hydrogen sulfide should be more closely monitored. ATSDR supported the development of the County's Community Hydrogen Sulfide Guidance.

October
17-19, 2024

Community Assessment for Public Health Emergency Response (CASPER)¹

County and CDC conduct
CASPER survey.

October 21-
November
25, 2024

Assessment of Chemical Exposure (ACE)²

County and ATSDR
conduct ACE survey.

March 2025

NIOSH Health Hazard Evaluation (HHE)

At the request of the City of
Imperial Beach, an HHE was
completed in March 2025.

¹CASPER survey: https://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs/community_epidemiology/south-region-health-concerns/casper-study.html

²ACE survey: https://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs/community_epidemiology/south-region-health-concerns/ACE.html

Community Concerns

During ATSDR's June 2025 site visit, we heard the following community concerns:



Human Health

- Physical symptoms
- Chronic exposure to hydrogen sulfide
 - Chronic worry and stress
- Child health
 - Children's unique exposures and chronic exposures
 - Exposures at school and during sports



Quality of Life

- Frustration and stress
- Reduced feeling of security and comfort at home, in yard
- Need to change home maintenance behaviors related to fresh air
- Reduced enjoyment of outdoor recreation on trails



Animal Health

- Physical symptoms among equestrian horses boarded near the river



Economy

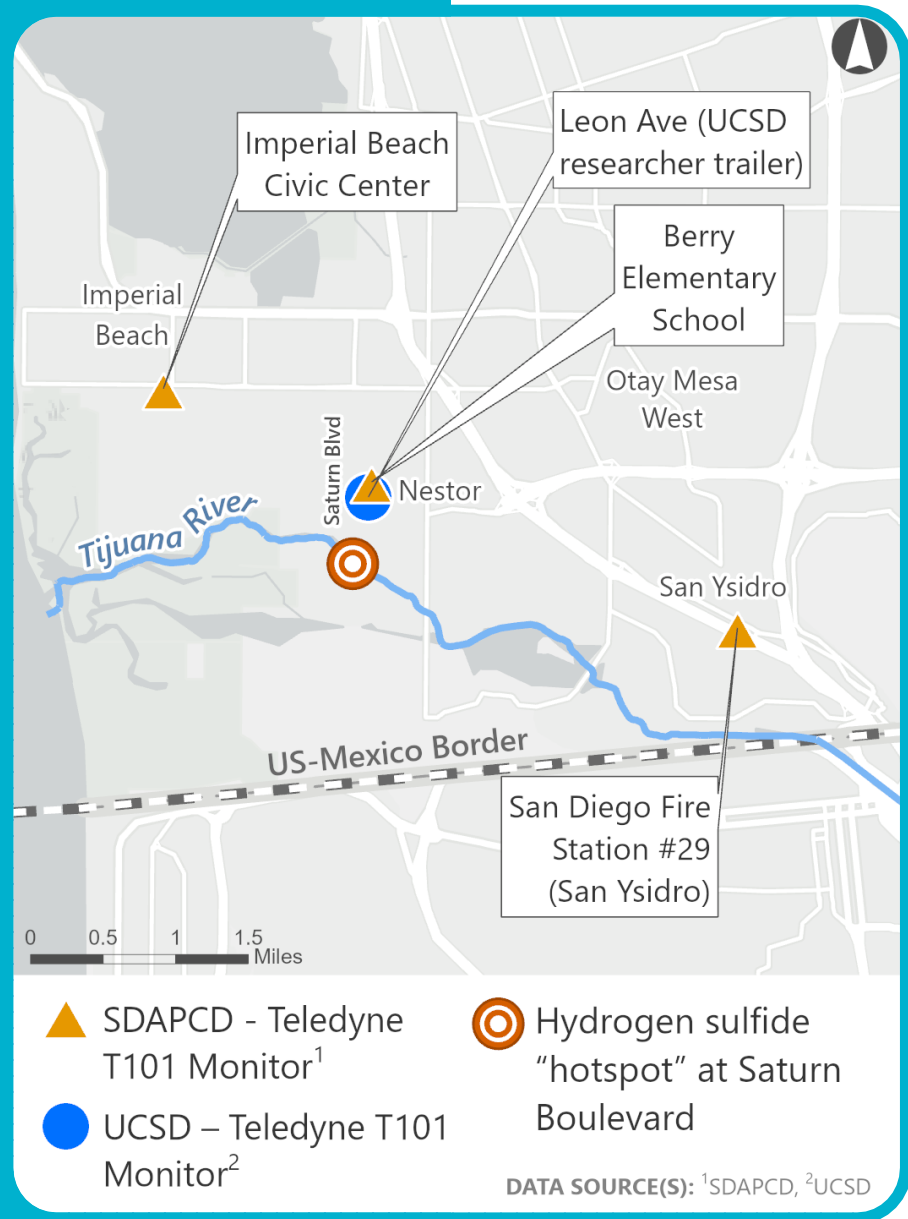
- Odors reduce tourism and local business



Photo taken by ATSDR during June 2025 site visit

What did ATSDR do?

Outdoor air data analysis



ATSDR DATA ANALYSIS Hydrogen Sulfide in Outdoor Air

- ATSDR assessed whether **hydrogen sulfide in outdoor air** in the Tijuana River Valley could harm **people's health**.
- ATSDR analyzed data from **four monitoring sites** provided by the San Diego Air Pollution Control District (SDAPCD) and the University of California San Diego (UCSD).

Monitoring Location	Date Range Analyzed
San Diego Fire Station #29 (San Ysidro)	9/17/24–5/2/25
Berry Elementary School	10/9/24–5/5/25
Leon Ave (UCSD)	9/1/24–5/1/25
Imperial Beach Civic Center	12/24/24–5/5/25

- ATSDR **compared the data to the toxicological literature** to determine if hydrogen sulfide exposures could harm people's health.



What did ATSDR find?

Conclusions

CONCLUSION 1

Environmental odors in the Tijuana River Valley can negatively affect people's health and well-being.

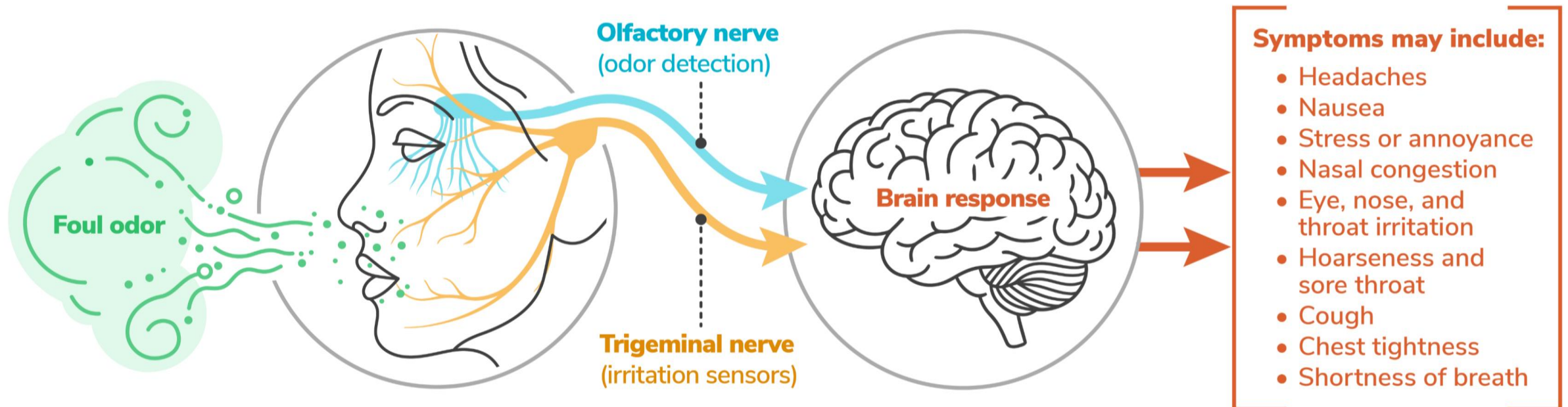
- Hydrogen sulfide levels in outdoor air were measured above the level where people can begin to smell it (0.5 ppb) at all four air monitoring sites in the Tijuana River Valley up to 93% of the time.
- As a result, people in the Tijuana River Valley may experience the following odor-related health symptoms:
 - Headaches
 - Nausea
 - Stress or annoyance
 - Nasal congestion
 - Eye, nose, and throat irritation
 - Hoarseness
 - Sore throat
 - Cough
 - Chest tightness
 - Shortness of breath

Environmental Odors – Signs and Symptoms

- An environmental odor comes from something in the air that you can smell.
- You might have symptoms if your brain reacts to the smell.
- Your body can react to a smell even when the chemical is not present at levels indicated in the literature to have toxicological effects.

Odors Trigger a Response in the Brain

- Odors activate the olfactory nerve; stronger odors may activate the trigeminal nerve.



CONCLUSION 2

Hydrogen sulfide in outdoor air at the Leon Avenue monitoring site, and likely the Berry Elementary monitoring site, has reached a level for short periods of time that could harm people's health. Exposure to hydrogen sulfide at this level is a public health hazard.

- **September 2024:** Hydrogen sulfide at Leon Avenue site exceeded health effect level (associated with headaches, respiratory irritation, and possibly difficulty breathing in sensitive people).
- **Berry Elementary School monitoring site:** Due to proximity to Leon Avenue, hydrogen sulfide levels at the Berry Elementary School monitoring site were likely similar to levels at Leon Avenue in September 2024.
 - Berry Elementary monitoring began in October 2024.

CONCLUSION 3

Longer-term hydrogen sulfide exposures (14 days or more) at the four monitoring locations are not expected to pose a public health hazard or result in additional health effects beyond those linked to short-term elevated exposures; however, they may still be associated with odor-related symptoms.

- Calculated hydrogen sulfide levels for exposures lasting 14-364 days (e.g. intermediate exposures) were at least nine times lower than the level shown to cause health effects.
- Calculated hydrogen sulfide levels for exposures lasting >365 days (e.g. chronic exposures) were at least 58 times lower than the level shown to cause health effects.

CONCLUSION 4

ATSDR cannot conclude whether breathing hydrogen sulfide in outdoor air in the Tijuana River Valley before September 2024 could have harmed people's health. Sufficient data were not collected prior to this time.

- Air monitoring in the Tijuana River Valley using instruments adequate for public health assessment began in September 2024.
- Data prior to this time are not available to assess health risks.



Photo taken by ATSDR during June 2025 site visit

Limitations & Uncertainties



Photo taken by ATSDR during June 2025 site visit

LIMITATIONS AND UNCERTAINTIES

Sampling Limitations

- Data from **four monitoring locations** are used in this assessment. Other relevant locations may exist that are not currently monitored.
- **Sampling** did not begin at **Berry Elementary School** until October 2024.

Chronic Exposures

- The **toxicological database** for hydrogen sulfide lacks chronic-duration studies.



Photo taken by ATSDR during June 2025 site visit

LIMITATIONS AND UNCERTAINTIES

Children's Susceptibility

- There is **very little information** available on possible health effects in children from hydrogen sulfide exposures, and **we do not know if they are more sensitive** to hydrogen sulfide than adults.

Exposure Assumptions

- Data was analyzed from **only four locations**.
- The **highest exposures** were usually during the **nighttime hours**, when people are inside their homes. This means that exposures could be overestimated in this evaluation.
 - Hydrogen sulfide levels measured at Leon Ave. during the daytime were still a health concern.



Recommendations & Next Steps

Photo taken by ATSDR during June 2025 site visit

Recommendations

Federal & State Agencies

- Take action to **prevent transboundary flows** so that hydrogen sulfide levels remain as low as possible (ideally below the odor threshold of 0.5 ppb).
- **Improve and maintain wastewater treatment** infrastructure.
- Collaborate with local agencies to **reduce hydrogen sulfide** releases at the Saturn Boulevard hydrogen sulfide “**hotspot**”.

Recommendations (cont'd)

Local Agencies

- Continue to **monitor hydrogen sulfide air levels** and communicate them to the public.
- **Maintain signage** through the Tijuana River Valley.
- Continue to **offer air purifiers** and filters.
- Continue to **collect and monitor odor complaints** with a focus on identifying hotspots.
- **Consider expanding air monitoring** to other locations and chemicals of interest.
- Ensure any **interventions are health protective**.
- Collaborate with state and federal agencies to **reduce hydrogen sulfide releases at the Saturn Boulevard hydrogen sulfide “hotspot”**.
- Maintain the Community Hydrogen Sulfide Guidance. Consider engaging with state and federal agencies to **add recommendations for workers** who cannot leave the area or go indoors during their work shift.

Recommendations (cont'd)

Community Members

- **Monitor** levels of hydrogen sulfide in air on SDAPCD's website.
- **Limit outdoor activities when odors are bothersome**, keeping windows and doors closed when odors outside are bothersome, or leaving the area as needed when monitoring indicates hydrogen sulfide levels are elevated.
- **Obtain an air purifier** through SDAPCD's Air Improvement Relief Effort Program (if eligible).
- **Submit odor complaints** to SDAPCD.
- **Speak to your doctor** if you are concerned about the health effects of hydrogen sulfide exposure. Consider providing a copy of the fact sheet summarizing this report.

Recommendations (cont'd)

Schools

- **Monitor** levels of hydrogen sulfide in air on SDAPCD's website.
- **Follow the San Diego County's guidance for schools** to make informed decisions about students' outdoor activities.



Photo taken by ATSDR during June 2025 site visit

ATSDR

Next Steps

- ATSDR is soliciting public comments for this report until November 21, 2026.
- ATSDR may also provide additional technical assistance to agencies upon request.
- ATSDR intends to release a second report that will address other potential exposure pathways in the Tijuana River Valley, like exposures to chemicals in surface water, sediment, and soil.



Photo taken by ATSDR during June 2025 site visit

ADDITIONAL INFORMATION

Document Location

- Full report, factsheet, and additional information available on ATSDR website:
<https://wwwn.cdc.gov/TSP/PHA/PHAListing.aspx?StateIndicator=CA>

Public Comment Period

- Public comment period open until November 21
- Submit written comments to ATSDR by
 - *Email:* OCHHAPublicComment@cdc.gov
 - *Postal mail:* Agency for Toxic Substances and Disease Registry, Attn: Records Center, 4770 Buford Highway NE, MS S106-5, Atlanta, Georgia 30341

Questions?

You can contact Ben Gerhardstein in the ATSDR Region 9 office with questions about this report: bgerhardstein@cdc.gov

For more information, contact ATSDR
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 <https://www.atsdr.cdc.gov/>

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Agency for Toxic Substances and Disease Registry.

