



Wastewater Surveillance and Mass Gatherings in Las Vegas

Public Health Advisory Board
Monday, October 13, 2025

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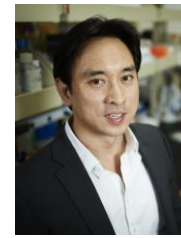
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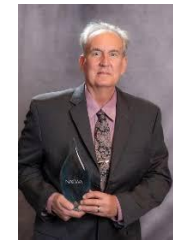
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Agenda

- **Las Vegas:** Unique Public Health Challenges
- **Case Studies:** HLTH Conference, Formula 1, New Year's Eve, Superbowl
- Data Findings & Lessons Learned
- Conclusion & Recommendations



Learning Objectives

- Illustrate the utility of wastewater-based epidemiology (WBE) as a sentinel surveillance system for the early detection of infectious disease outbreaks at the population level.
- Examine approaches for integrating wastewater surveillance indicators with conventional epidemiologic data

Introduction

- Wastewater surveillance in Las Vegas provides a non-invasive, community-wide method to monitor the prevalence of infectious diseases, including COVID-19 and other pathogens.
- This approach offers a cost-effective and comprehensive tool to assess public health trends across different neighborhoods and populations within Las Vegas.
- Wastewater data can help inform targeted public health interventions, resource allocation, and policy decisions to control disease spread.
- Implementing wastewater surveillance in Las Vegas enhances preparedness and response capabilities for current and future public health challenges.



Las Vegas Public Health Landscape

- 42+ million annual visitors
- Frequent major events:
- Population Density & Transience: Large gatherings create concentrated, short-term populations that challenge traditional case-based surveillance.
- Early Warning Capacity: Wastewater surveillance provides near real-time detection of pathogens (e.g., SARS-CoV-2, influenza, norovirus, poliovirus) in mass gatherings where clinical reporting lags.
- Non-Intrusive & Inclusive: Captures health signals from both residents and visitors, including those not seeking medical care.
- Resource Optimization: Enables targeted deployment of public health interventions (testing, vaccination, Narcan Distribution communication) during high-profile events.
- Collaborative Infrastructure: Strong partnerships between SNHD, utilities, UNLV, and event organizers provide a scalable model for integrating wastewater into emergency preparedness.



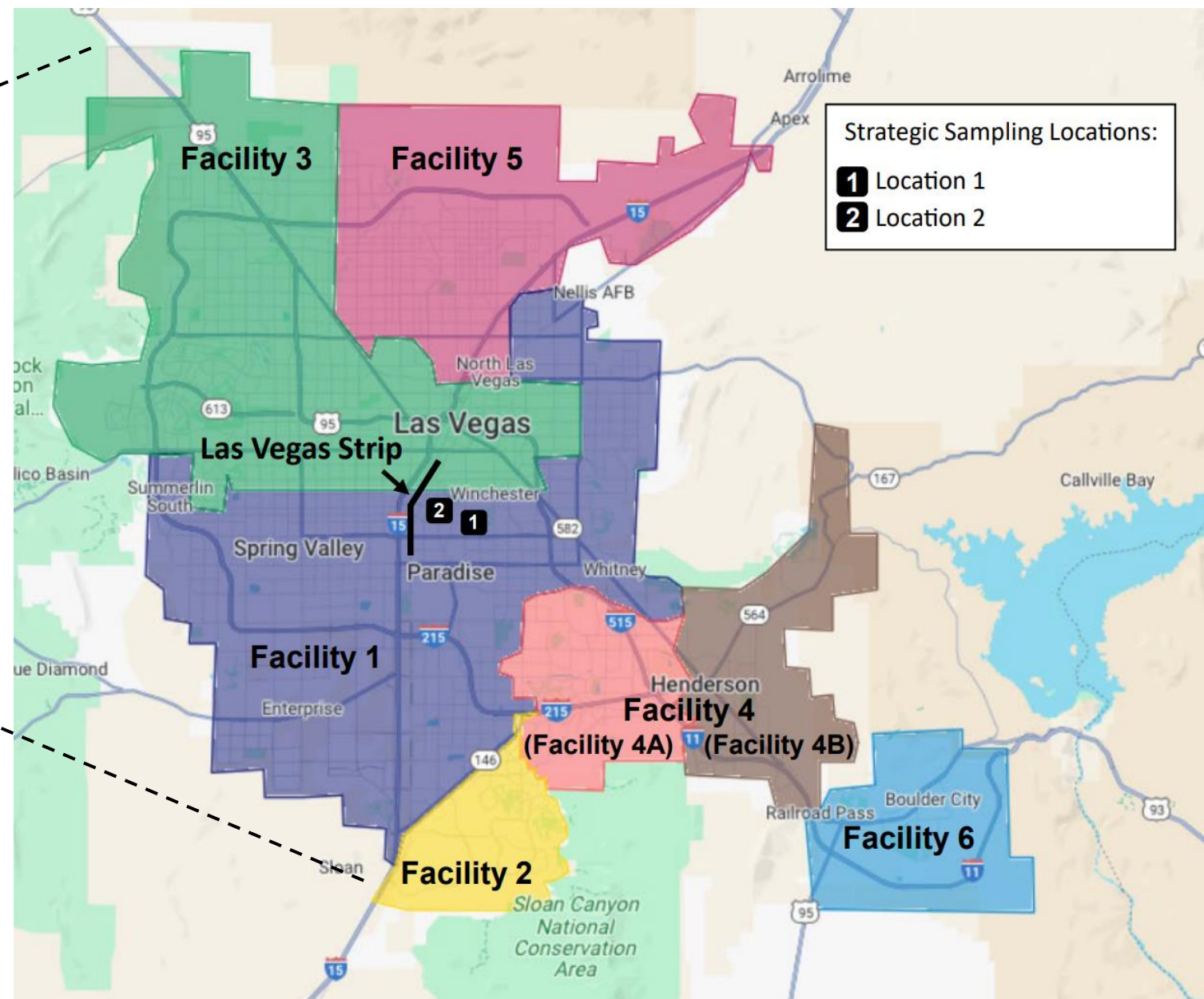
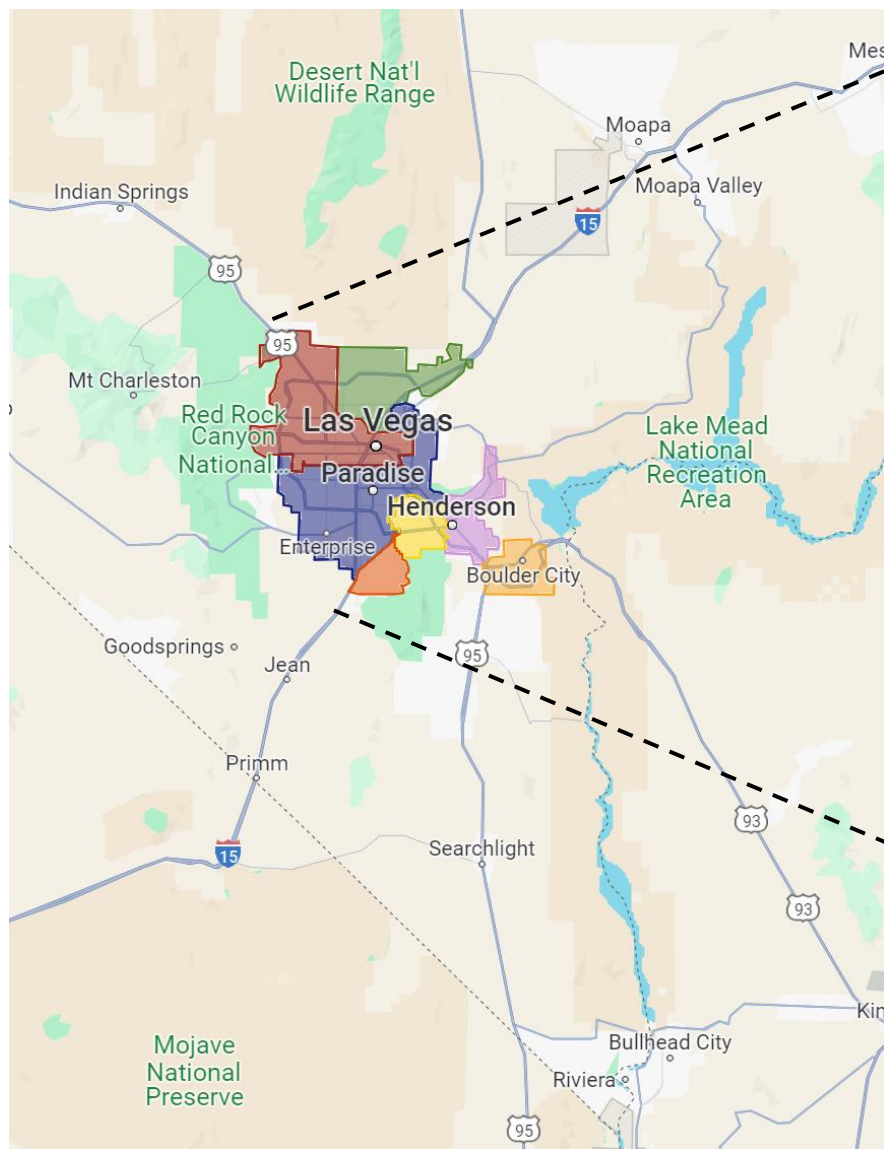
Event	SEAR rating	Venue	MMWR Week	Total Attendance
Electric Daisy Carnival	3	Las Vegas Motor Speedway	20	550,000
National Association of Broadcasters	3	Las Vegas Convention Center	14	515,000
Formula 1: Las Vegas Grand Prix	3	Grand Prix Plaza	47	360,000
Automotive Aftermarket Industry Week	3	The Venetian Expo	1	320,000
Las Vegas New Year's Eve	2	Las Vegas Strip	1	300,000

There were at least 26 events in Las Vegas during 2025 with a total attendance greater than 100,000

Truncated List of Events in Las Vegas

2025 SEAR Level 2 and 3 Events

Event Name	SEAR	Venue Address	Start Date	End Date	Daily Attendance
AWS re:Invent	3	Various	12/1/2024	12/6/2024	50000
Amazon Web Services - re:Invent	3	3355 S Las Vegas Blvd	12/2/2024	12/6/2024	50000
Winterfest Parade	3	S. Water St	12/5/2024	12/6/2024	35000
George Strait @ Allegiant Stadium	3	3333 Al Davis Way	12/7/2024	12/7/2024	50000
Gartner IT IOCS Conference	3	3355 South Las Vegas Boulevard	12/10/2024	12/12/2024	40000
NFL: 2024-2025 Las Vegas Raiders Game 6	3	3333 Al Davis Way	12/16/2024	12/16/2024	63132
NFL: 2024-2025 Las Vegas Raiders Game 7	3	3333 Al Davis Way	12/22/2024	12/22/2024	63132
Las Vegas New Year's Eve	2	Las Vegas Blvd	12/31/2024	1/1/2025	300000
Consumer Electronic Show (CES)	3	3150 Paradise Road	1/7/2025	1/10/2025	80000
SHOT Show	3	201 Sands Avenue	1/21/2025	1/24/2025	55000
World of Concrete	3	3150 S Las Vegas Blvd	1/21/2025	1/23/2025	37000
UNLV: Men's Basketball	3	4505 S Maryland Pkwy	2/7/2025	3/9/2025	18000
Rock 'n' Roll Marathon Weekend	3	Las Vegas Blvd, East Harmon Ave, Audrie St.	2/22/2025	2/23/2025	25000
International Builders Show	3	3150 S Las Vegas Blvd	2/25/2025	2/27/2025	68000
Rugby League Las Vegas	3	3333 Al Davis Way	3/1/2025	3/1/2025	50000
ASD Las Vegas	3	3150 Paradise Rd	3/9/2025	3/12/2025	44000
NASCAR Penzoid 400	3	7000 N Las Vegas Blvd	3/14/2025	3/16/2025	30000
NASCAR: NCTS Race at Las Vegas	3	7001 Las Vegas Blvd N	3/14/2025	3/14/2025	80000
St. Patrick's Day Weekend (Las Vegas)	3	E Fremont St	3/14/2025	3/17/2025	25000
NASCAR: Xfinity Series Race at Las Vegas	3	7001 Las Vegas Blvd N	3/15/2025	3/15/2025	80000
Southern Nevada Sons & Daughters of Erin St. Patrick's Day Festival and Parade	3	S. Water St	3/15/2025	3/17/2025	35000
NASCAR: Cup Series Pennzoid 400	3	7001 Las Vegas Blvd N	3/16/2025	3/16/2025	80000
Aviation Nation	3	4900 N Las Vegas Blvd	4/5/2025	4/6/2025	100000
National Association of Broadcasters Show	3	3150 Paradise Rd	4/5/2025	4/9/2025	60000
Clark County Fair and Rodeo	3	1301 Whipple Ave	4/9/2025	4/13/2025	50000
WrestleMania	3	3333 Al Davis Way	4/19/2025	4/20/2025	50000
Sick New World	3	311 W Sahara Ave	4/26/2025	4/26/2025	65000
Sick New World Festival	3	2880 S Las Vegas Blvd	4/26/2025	4/26/2025	60000
Lovers and Friends	3	311 W Sahara Ave	5/3/2025	5/3/2025	65000
Lovers and Friends Festival	3	2880 S Las Vegas Blvd	5/3/2025	5/3/2025	60000
ServiceNow	3	3799 S Las Vegas Blvd	5/6/2025	5/8/2025	25000
Henderson Art Festival	3	S. Water St	5/11/2025	5/11/2025	35000
Electric Daisy Carnival	3	7000 Las Vegas Blvd North	5/16/2025	5/18/2025	185000
4th of July Celebration (Henderson)	3	350 E Racetrack Rd	7/4/2025	7/4/2025	35000
4th of July Parade (Las Vegas)	3	3rd st	7/4/2025	7/4/2025	20000
CosmoProf North America	3	3950 S Las Vegas Blvd	7/15/2025	7/17/2025	35000



Sampling Locations



Wastewater Treatment Plant



Hospital



Residential



Las Vegas Strip



Airport



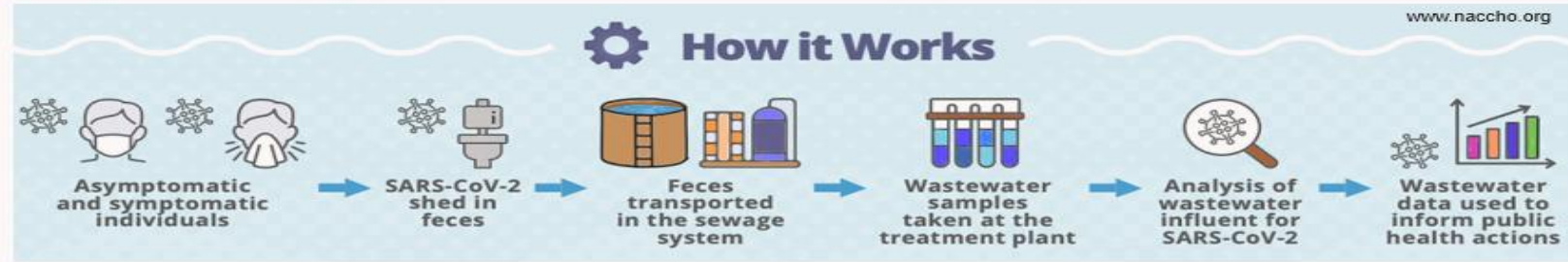
Bars



Flamingo Wash
(Unsheltered Individuals)



Tropicana Wash
(Unsheltered Individuals)



Communities



Airport



Large events & F1



Super Bowl

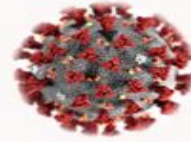


Schools



Respiratory Viruses

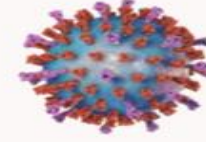
SARS-CoV-2



Influenza



RSV



(Re)Emerging Public Health Threats

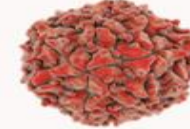
Mpox



Candida auris



Poliovirus



Historical Water Industry Targets

Drugs (Fentanyl)



Legionella



Norovirus



Sexually Transmitted Infections

Syphilis



Gonorrhea



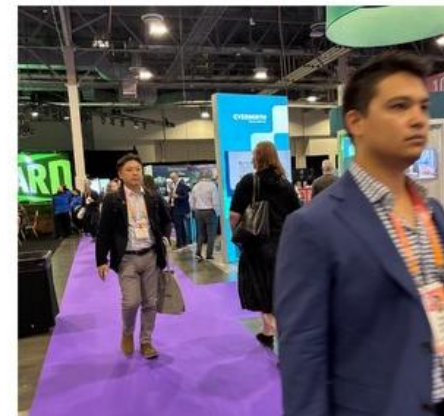
Chlamydia



Case Study 1: HLTH Healthcare Conference Preparation

- **Date:** July 2025
- **Identified Targets:** SARS-CoV-2
- RSV, Influenza A and B, Enterovirus D68, Norovirus, Mpox, Hepatitis A
- **Messaging:** Collaborated with Verily on a daily basis for data interpretation.

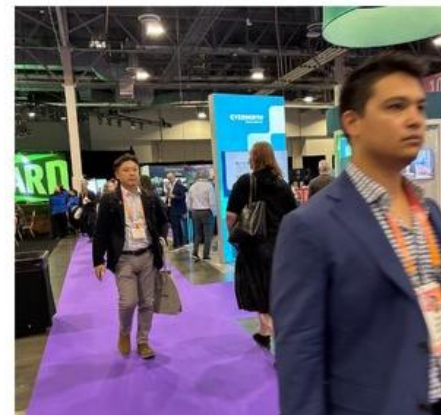
KEY TAKEAWAYS – HLTH CONFERENCE 2024



Case Study 1: HLTH Healthcare Conference Outcome

- **Event Date:** 19-22, October 2024
- **Population:** 15,000+ health professionals.
- **Surveillance:** WWS at convention center and surrounding hotels.
- **Findings:** Mild Norovirus and COVID-19 uptick post-event.

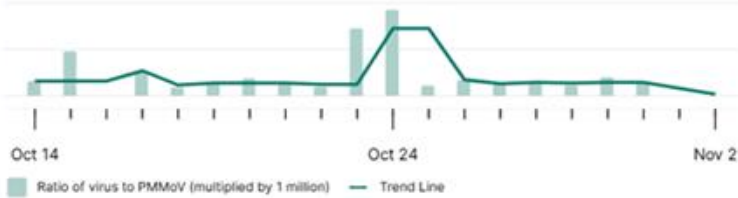
KEY TAKEAWAYS — HLTH CONFERENCE 2024



Case Study 1: HLTH Healthcare Conference

SARS-CoV-2

☐ Highlight HLTH dates



For more information about wastewater data, [visit our FAQ](#)

From the Southern Nevada Health District:

What is SARS-CoV-2?

SARS-CoV-2 is the virus that causes COVID-19 which can spread from person to person. Symptoms can range from mild to severe illness. People can be asymptomatic and still spread the virus to others. [Find more information](#)

Mpox virus

☐ Highlight HLTH dates



For more information about wastewater data, [visit our FAQ](#)

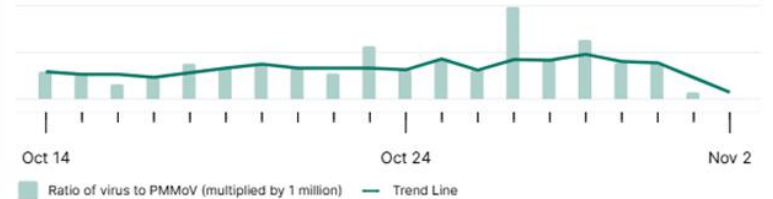
From the Southern Nevada Health District:

What is Mpox virus?

Mpox is a rare disease that can make you sick, including a rash and flu-like symptoms. It is spread through direct contact with infected wild animals, through close contact (including intimate or sexual contact) with a person with mpox, and through contact with contaminated materials. [Find more information](#)

Norovirus GI

☐ Highlight HLTH dates



For more information about wastewater data, [visit our FAQ](#)

From the Southern Nevada Health District:

What is Norovirus GI?

Norovirus is the leading cause of vomiting and diarrhea, and foodborne illness in the U.S. It is very contagious and infects people of all ages. While it lasts only a few days, there is no specific treatment. Those ill are at risk of dehydration and should drink plenty of liquids. [Find more information](#)

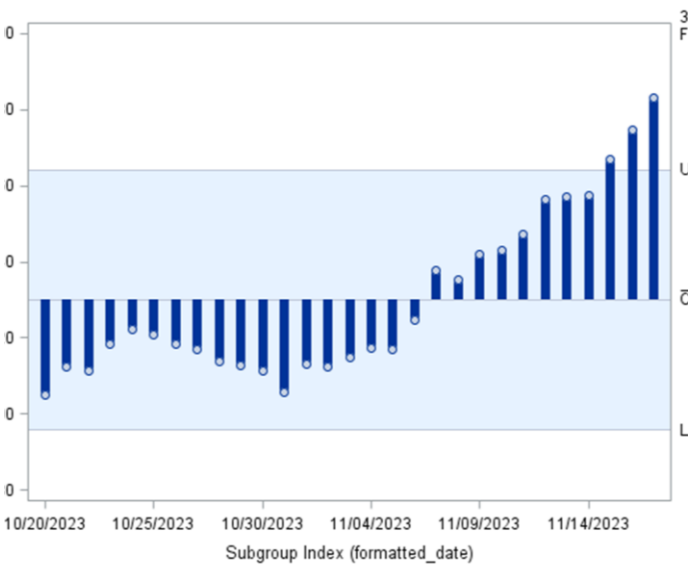
Case Study 2: Formula 1 Grand Prix



- **Event Date:** November 2024
- **Population:** 300,000+
- **Surveillance Points:** Stadium, major hotels, and strip.
- **Findings:** Increased opioid detection, influenza, RSV, and Norovirus signals.

Daily Situational Awareness Report (DSAR)

c Chart for MA



Daily Situational Awareness Report

12/26/2024

Overall Alert Level:

LOW

BioWatch:

Green

No actionable results

Alert Level =

Low

Yellow

Actionable result, not pursued

Red

Actionable result, response required

ESSENCE:

Syndromes monitored over the past 72 hours: gastrointestinal illness, respiratory illness (ILI, COVID) and injury (overdose, MVC, firearm)

Green

No Essence Warning or Alert

Alert Level =

Low

Yellow

Essence Warning

Red

Essence Alert

Syndrome	Alert Level
CDC All Drug V3	Low
CDC Opioid V4	Low
CDC Fentanyl V2	Low
CDC Stimulants V4	Low
CDC Alcohol	Low
Norovirus	Low
ILI (ESSENCE)	Low
CDC ILI	Low
CDC Fever Cough SOB Neg Flu	Low
CDC Firearm	Low
CDC Pneumonia	Low
CDC Food Poisoning	Low
CDC Measles CCDD V1	Low
CDC COVID	Low
CDC Pertussis V1	Low
CDC RSV V1	Low
CDC Smallpox V1	Low
Heat V2	Low
CDC MPOX DD V1	Low

Foodborne Illness Reporting (Weekdays only, no weekends or holidays)

Foodborne illnesses will be investigated if there are reports in ≥2 ill in unrelated groups, OR ≥ 3 ill not in a shared household, OR ≥4 ill in a shared household within the last 14 days.

Green

≤ 2 Standard deviations

Alert Level =

Low

Yellow

>2 and < 3 Standard deviations

Preliminary Death Reports:

Report of preliminary causes of death related to violent injury or overdose

Green	Overall numbers and causes at baseline	Alert Level = N/A
Yellow	Abnormalities in numbers or causes, not pursued	
Red	Abnormalities in numbers or causes, response required	

EMS Reports:

Overall number of calls reported

Green	≤ 2 Standard deviations	Alert Level = Low
Yellow	>2 and < 3 Standard deviations	
Red	≥ 3 Standard deviations	

Wastewater Surveillance:

Green	No actionable results
Yellow	Actionable result, not pursued
Red	Actionable result, response required

Pathogen	Clark County Water Reclamation District (CCWRD) Flamingo Water Resource Center (FWRC) Alert Level
SARS-CoV-2	Medium
RSV	High
Influenza A	High
Norovirus	High
Note – These wastewater data derive from Wastewater Scan – January 8	

Notes: Poison Control Feed is down, not sure how long it will take to get the new system set up. BioWatch surveillance for NYE has concluded.

Communication and Messaging



FOR IMMEDIATE RELEASE:
November xx, 2024

Norovirus — It's not the flu!
Health District reports increase in norovirus

LAS VEGAS – The Southern Nevada Health District is reporting an increase in norovirus detected in community wastewater. Often referred to as the “stomach flu,” norovirus is not related to the influenza virus. It is the leading cause of vomiting, diarrhea and foodborne illness in the United States.

Cases of norovirus typically begin to increase in November. The most common symptoms include diarrhea, vomiting, nausea and stomach pain. Other symptoms can include fever, chills, headache, muscle aches and fatigue. Most people who contract the virus recover within one to three days. However, older adults, young children and people with other medical conditions may be at higher risk of severe infections. Frequent vomiting and diarrhea can also lead to dehydration.

Norovirus spreads easily and quickly. People can contract it from direct contact with someone who is infected, such as when caring for them or sharing food or eating utensils. The virus can also be spread by consuming contaminated food or drinks or by touching contaminated objects or surfaces and then putting unwashed hands in the mouth. It is possible to spread norovirus for up to two weeks or more after symptoms have resolved.

The Health District urges the public to take the following precautions to protect themselves and others:

- Wash hands frequently with soap and running water for 20 seconds, especially after going to the bathroom, changing a diaper or before preparing food.
- Thoroughly cook shellfish and wash fruits and vegetables before consumption.
- Clean and disinfect contaminated surfaces after someone is sick.
- Don't eat food prepared by someone with norovirus or prepare food if experiencing symptoms.
- Stay home if symptoms develop and for two days (48 hours) after symptoms stop.

“As we approach the holiday season people will be spending more time at gatherings with family and friends,” said Dr. Fermin Leguen, District Health Officer for the Southern Nevada Health District. “I encourage everyone to take steps to keep themselves and their loved ones healthy, including getting their updated flu and COVID-19 vaccines if they haven't already done so.”

More information about norovirus is available on the Centers for Disease Control and Prevention website at [CDC | Norovirus](https://www.cdc.gov/norovirus). For flu and COVID-19 vaccine information, visit the Health District website at www.snhd.info.

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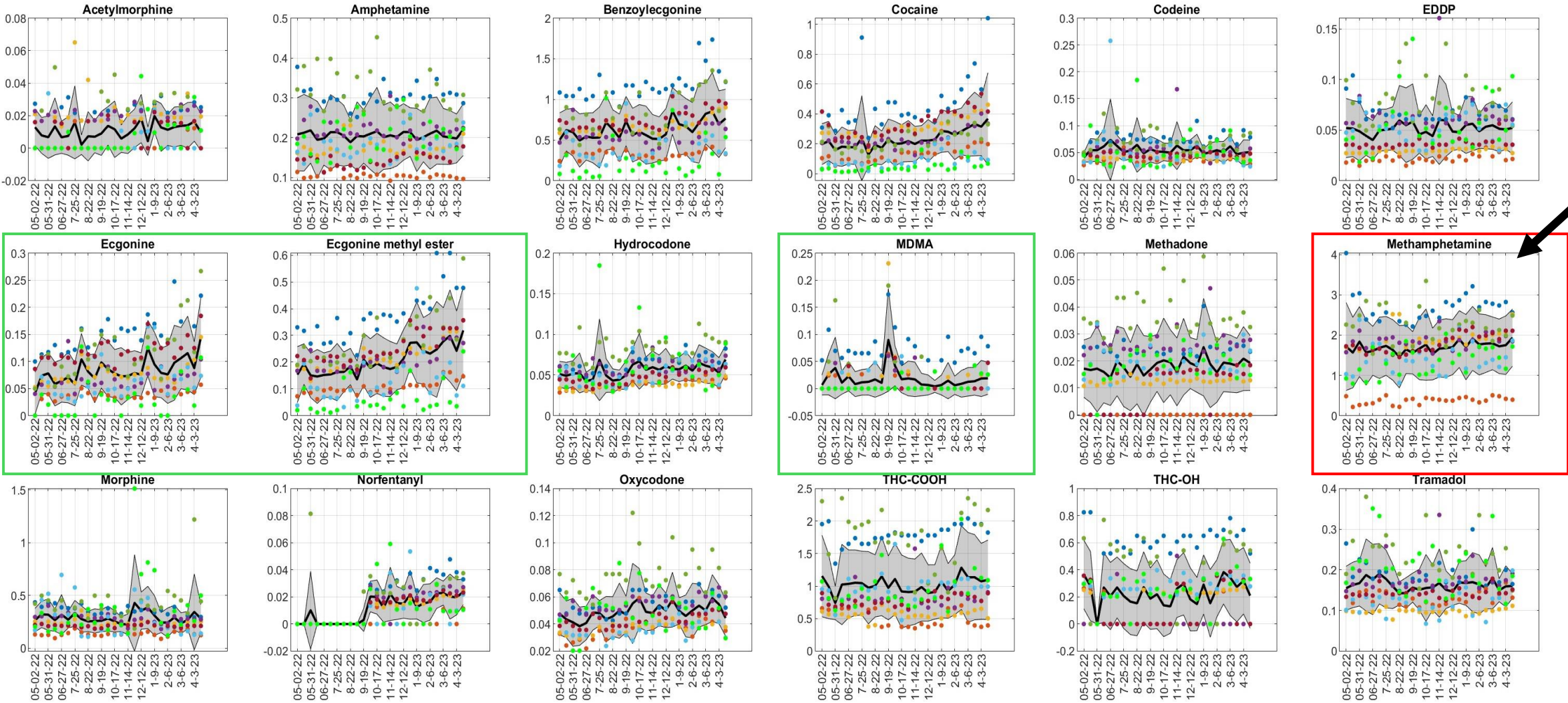
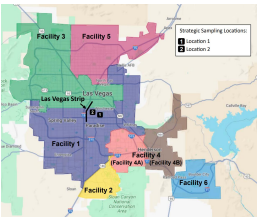
The Southern Nevada Health District serves as the local public health authority for Clark County, Boulder City, Henderson, Las Vegas, Mesquite and North Las Vegas. The agency safeguards the public health of the community's residents and visitors through innovative programs, regulations, and initiatives focused on protecting and promoting their health and well-being.

Case Study 3: New Year's Eve 2025



- **Event Date:** December 31, 2024
- **Population:** 400,000+ attendees on the Strip.
- **WWS Focus:** SARS-CoV-2, RSV, Influenza.
- **Findings:** No major outbreak detected; increased RSV shedding.

Drug Use



1

Opioids Wastewater Monitoring



REPORTING DATE	OVERALL DETECTION FREQUENCY (N = 9 samples per site to date)			DETECTIONS IN MOST RECENT WEEK (N = 3 samples per site)		
4/24/25	West	South	East	West	South	East
Target						
Fentanyl	0%	0%	0%	0	0	0
Norfentanyl	0%	0%	0%	0	0	0
Xylazine	0%	0%	0%	0	0	0
Heroin	0%	11%	11%	0	0	0
Acetylmorphine	0%	11%	11%	0	0	0
Morphine	0%	33%	56%	0	1	1
Codeine	0%	0%	11%	0	0	1
Hydrocodone	0%	0%	0%	0	0	0
Oxycodone	0%	0%	0%	0	0	0
Tramadol	0%	0%	11%	0	0	0
Methadone	0%	0%	0%	0	0	0
EDDP	0%	0%	0%	0	0	0
Methamphetamine	22%	56%	56%	2	1	1
Amphetamine	56%	100%	100%	2	3	3
Cocaine	0%	0%	0%	0	0	0
Benzoylcegonine	0%	11%	11%	0	1	1
Ecgonine Methyl Ester	0%	0%	0%	0	0	0
Ecgonine	0%	0%	0%	0	0	0
Norcocaine	0%	0%	0%	0	0	0
THC	0%	11%	22%	0	1	1
THC-COOH	44%	89%	100%	2	3	3
THC-OH	22%	56%	89%	1	3	3
MDMA	0%	0%	0%	0	0	0
MDA	0%	0%	0%	0	0	0

*Samples collected every 2 weeks on Sundays, Mondays, and Tuesdays

Color Code	Overall Detection Frequency	Detections in Most Recent Week
Green	0%	0 / 3
Yellow	1-49%	1 / 3
Red	≥50%	2 or 3 / 3

Lessons Learned

Need for event-specific baseline samples.

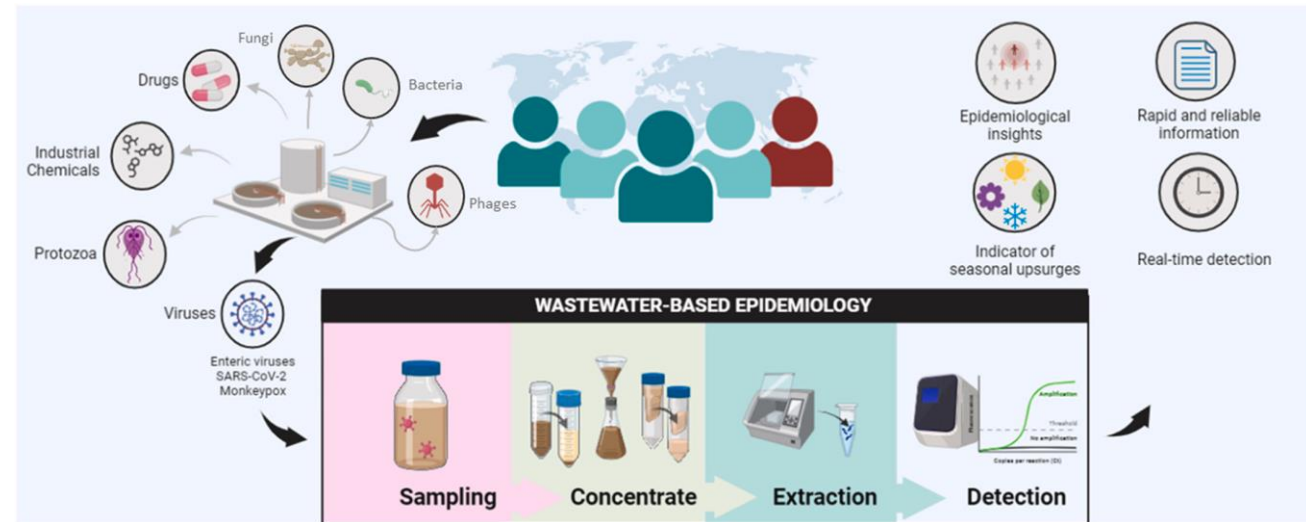
Importance of targeted sampling (stadiums, hotels, airports).

Rapid reporting critical for public health action.



Conclusion

- Wastewater surveillance is an invaluable tool for safeguarding public health during mass gatherings.
- Las Vegas' unique context provides a replicable model for other tourist-centric cities.



Establish reporting of wastewater surveillance test results related to infectious pathogens and other biological substances.





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