

EVALUATING WASTEWATER SEASONAL ONSET METHODS TO IMPROVE EARLY DETECTIONS OF INFLUENZA A

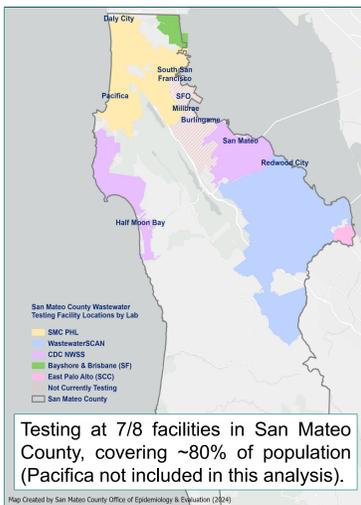
Heather Eastwood PhD, Hanley Kingston PhD
San Mateo County Health, San Mateo, California



SAN MATEO COUNTY HEALTH
**PUBLIC HEALTH,
POLICY & PLANNING**
Office of Epidemiology & Evaluation

BACKGROUND

Prior research has shown the ability of wastewater surveillance to identify trends in respiratory viruses' seasons, but these studies usually rely on large datasets and often have a uniform testing approach. We explored the use of wastewater data to help guide identification of Influenza seasonal onset within San Mateo County, incorporating data from six sites tested by two labs that use different methods.



METHODS

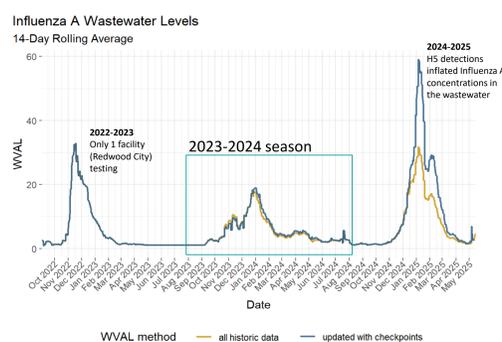
Compared trends in 14-day rolling averages during 2023-2024 season for:

- Influenza A wastewater viral activity levels (WVAL)
- Wastewater Influenza A percent detections
- Influenza percent test positivity

Tested correlation and lag between wastewater levels & test positivity

Wastewater concentrations over 3 respiratory seasons

WVAL is a CDC-developed normalization method for wastewater concentration data that is recommended for standardizing data across different sources. The blue line is after updating the WVAL calculation, following guidelines, to use one season's worth of data in the baseline calculation.

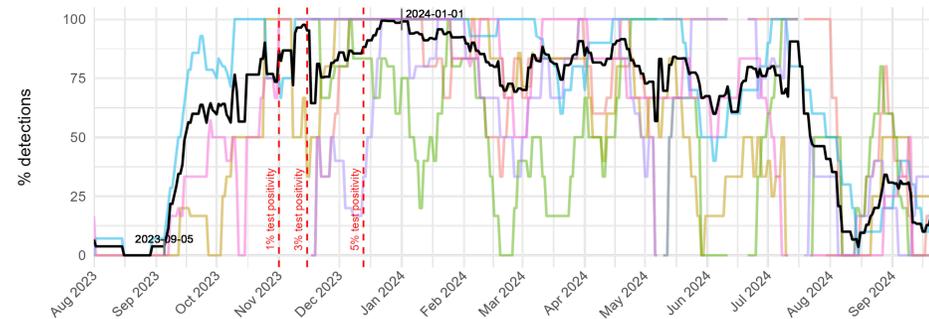


RESULTS

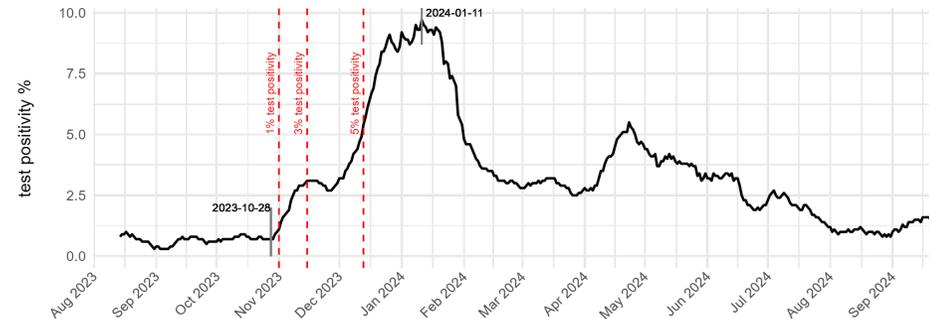
Influenza A Wastewater Levels
14-Day Rolling Average



Influenza A Wastewater Detections
14-Day Rolling Average



Influenza Test Positivity
14-Day Rolling Average



14-day rolling average of influenza A wastewater concentration, influenza A wastewater % detections, & influenza test positivity. Colored lines are values from 6 facilities & the black line is the population-based weighted average. Dates are labeled for: a) peak activity for each metric and b) visually-identified inflection points during the early season.

Wastewater detection data (averaged across six facilities) has the earliest & most defined increase. The peak wastewater concentration occurs before the peak percent test positivity.

Correlation Between Wastewater Levels & Test Positivity

Season	R ²	Lag between WW & test positivity*	Correlation Method	Notes
2023-2024 (July 1, 2023 – July 1, 2024)	0.33	-	Spearman	Correlation before correction
2023-2024 (July 1, 2023 – July 1, 2024)	0.40	14 days	Spearman	Primary analysis
2023-2024 (July 1, 2023 – July 1, 2024)	0.35	18 days	Pearson	Alternative correlation method
2023-2024 (Sept 1, 2023 – May 1, 2024)	0.30	1 day	Spearman	Excluding months with minimal flu activity

*pos value = WW leads test positivity, neg value = test positivity leads WW.
Wastewater data limited to 1 facility; Method credit: California Wastewater Surveillance Working Group (07/17/2024)

Test positivity data correlates most strongly with wastewater data from 14 days prior, but lead time estimates are sensitive to the choice of time period.

CONCLUSIONS

Wastewater data may improve early detection of Influenza seasonal activity, particularly if concentration data is paired with percent detection data; however, these findings are based on only one season of data.

NEXT STEPS

- Incorporate trend calculations
- Assess consistency of inflection points and metric lead/lag times between seasons
- Compare to other pathogens
- Develop alerts based on important metric thresholds

CONTACTS

Heather Eastwood
Supervising Epidemiologist
Office of Epidemiology and Evaluation
San Mateo County Health, San Mateo, CA
harata@smcgov.org

Hanley Kingston
Association of Public Health Labs (APHL) Fellow
San Mateo County Health, San Mateo, CA
c_hkingston@smcgov.org