

North Carolina Wastewater Monitoring Report: Influenza A (Flu A), Influenza B (Flu B) and Respiratory Syncytial Virus (RSV) Levels Measured in Wastewater Influent and Solids

Date: 09/6/2023

Methods Summary:

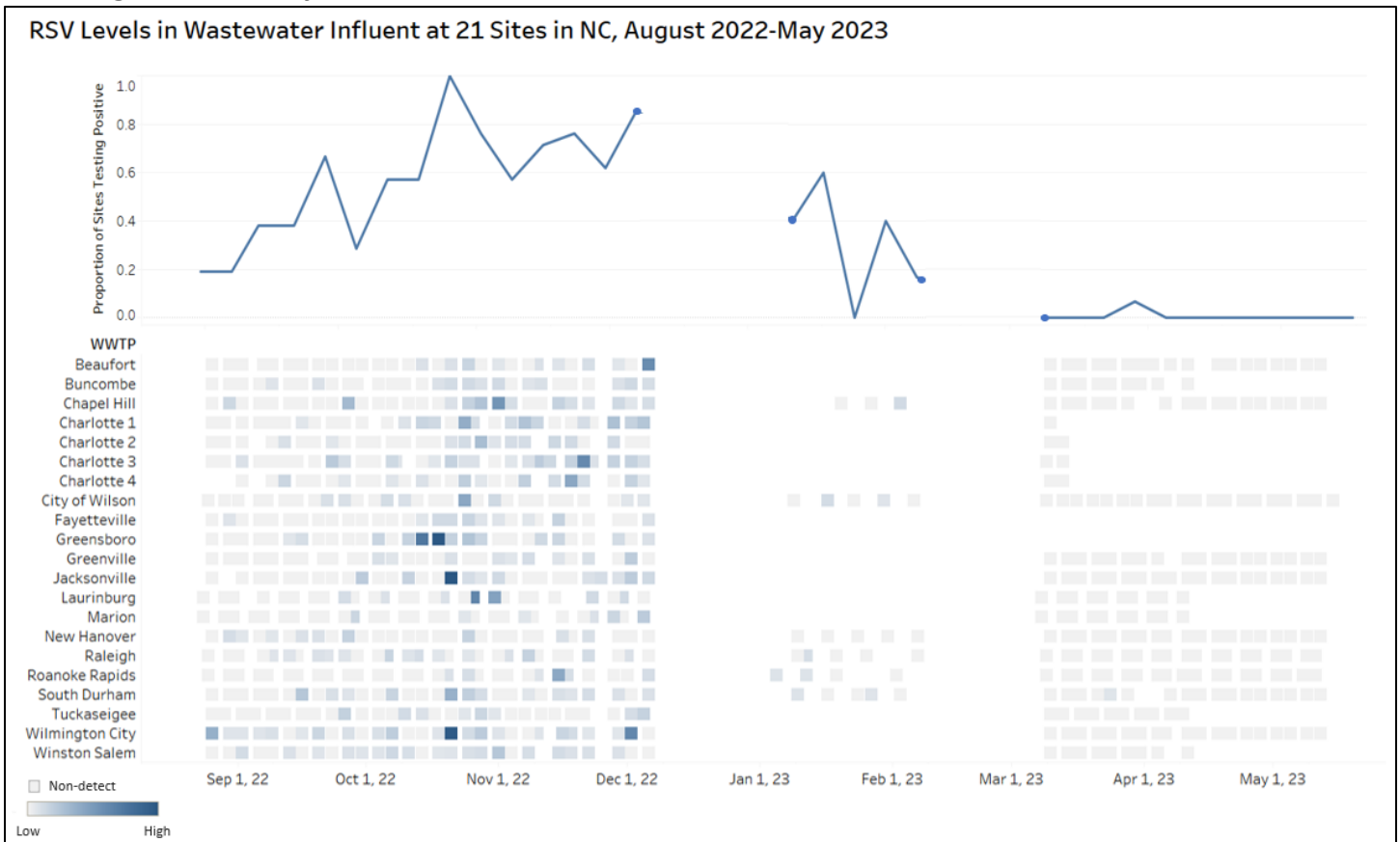
- From August/September 2022– May 2023, the North Carolina Wastewater Monitoring Network (NCWMN) measured Respiratory Syncytial Virus (RSV), Influenza A (Flu A), and Influenza B (Flu B) levels in wastewater influent samples from 21 wastewater sites across the state.
- From January–May 2023, the NCWMN measured Flu A, Flu B and RSV levels in wastewater solids samples at six wastewater sites across the state.
- Wastewater influent samples are collected by diverting wastewater flowing into each participating wastewater treatment plant into sample containers.
- Wastewater solids samples are obtained as primary solids from wastewater treatment plants.
- Samples were analyzed by the NCWMN’s partner laboratory at the University of North Carolina Chapel Hill.

Key Takeaways:

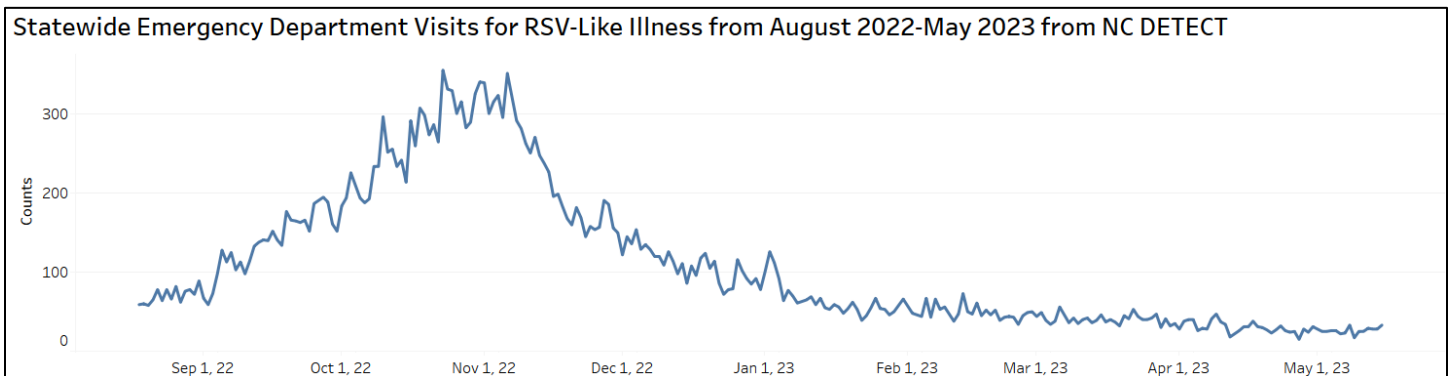
- RSV detections in wastewater influent peaked during the week beginning with October 20, 2022, and ending with October 26, 2022, where RSV was detected at 100% of the sites and in 80% of the samples tested. This peak occurred at the same time as a peak in ED visits for RSV-like illness was observed.
- Flu A detections in wastewater influent peaked during the week beginning with November 17, 2022, and ending with November 23, 2022, where Flu A was detected at 57% of the sites and in 35% of the samples tested. This peak was observed after the peak in ED visits for influenza-like illness.
- Flu B detections in wastewater influent were sporadic throughout the flu season.
- With a large number of non-detects, we are unable provide a single statewide metric for RSV and Flu A/B like we do for SARS-CoV-2 on the [respiratory virus summary dashboard](#). Laboratory and epidemiologic methods to develop similar metrics are still in development.
- In both wastewater influent and solids, RSV, Flu A and Flu B detections were low during January–May 2023, which correlated with low numbers of ED visits for RSV-like illness and influenza-like illness.

Respiratory Viruses Detected in Wastewater Influent

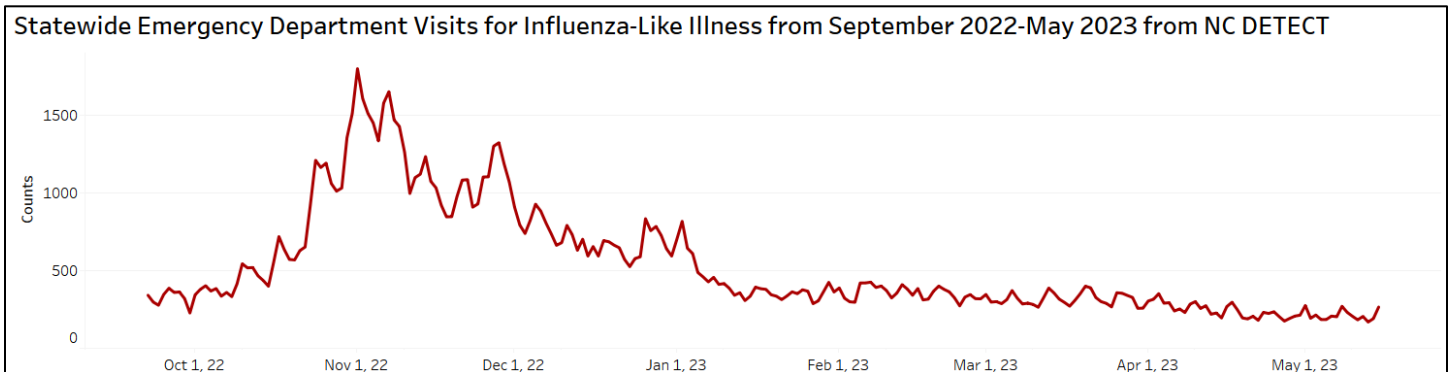
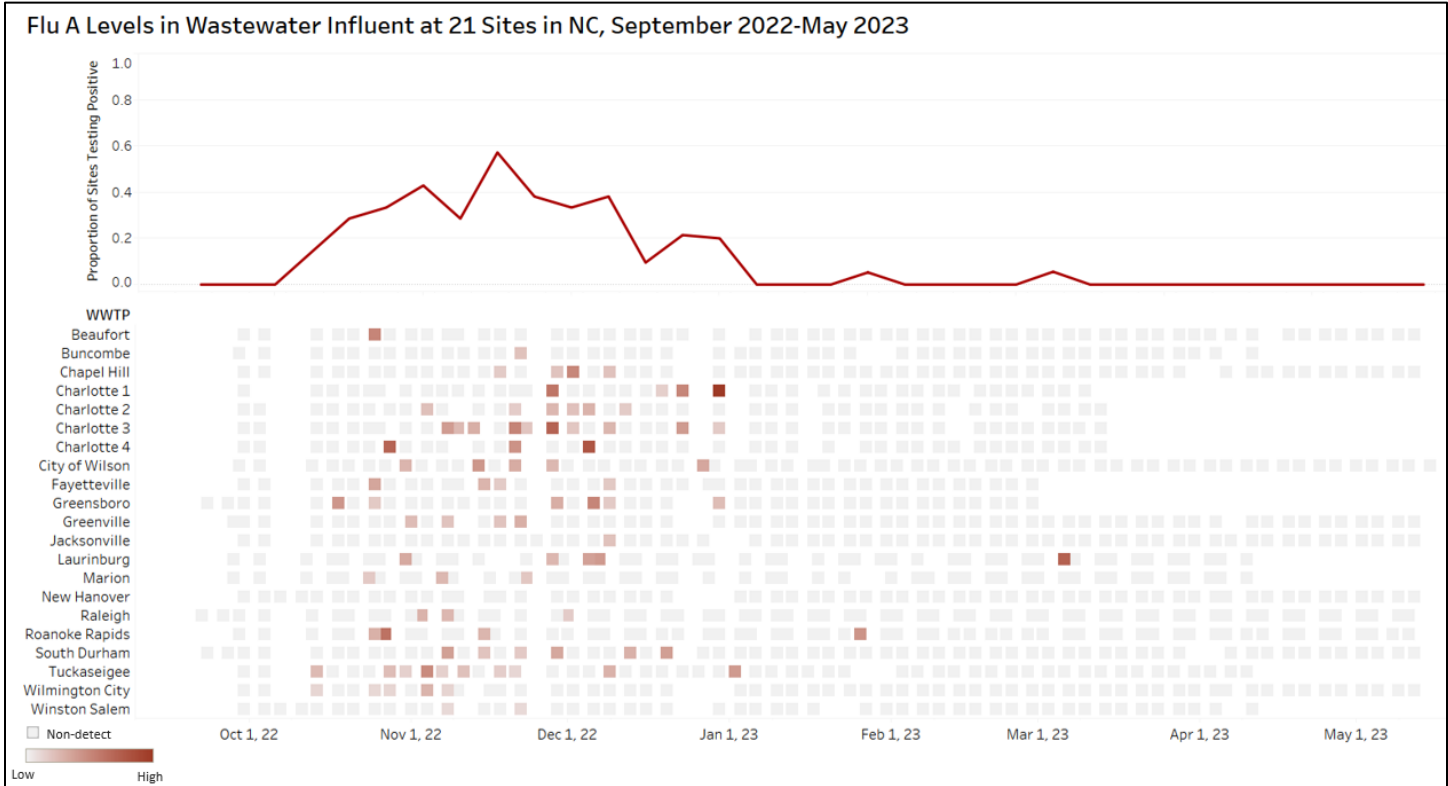
RSV (August 2022-May 2023)*



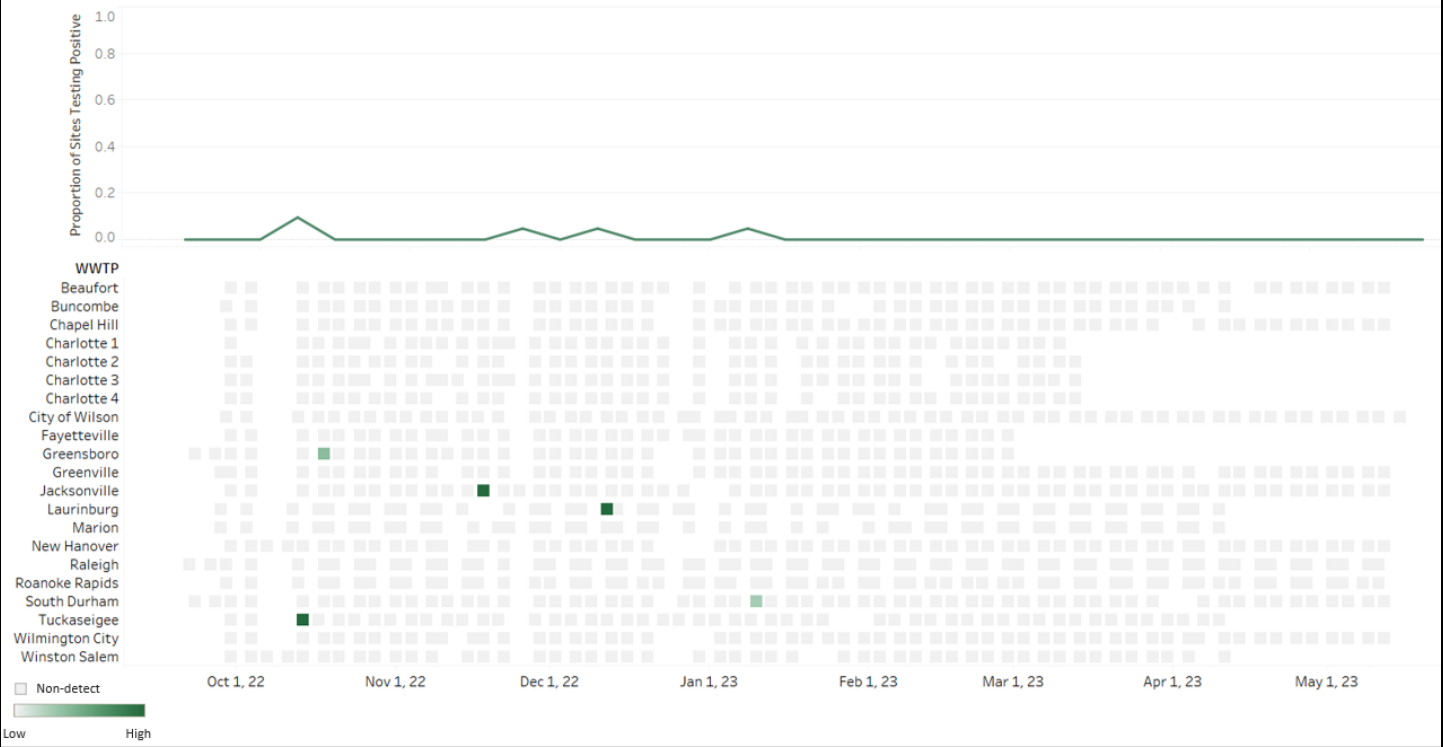
*RSV measurements in wastewater influent were stopped in December 2022 as the peak of infections subsided. During December 2022–February 2023, the laboratory transitioned their methods to a multiplex system and resumed monitoring in March 2023.



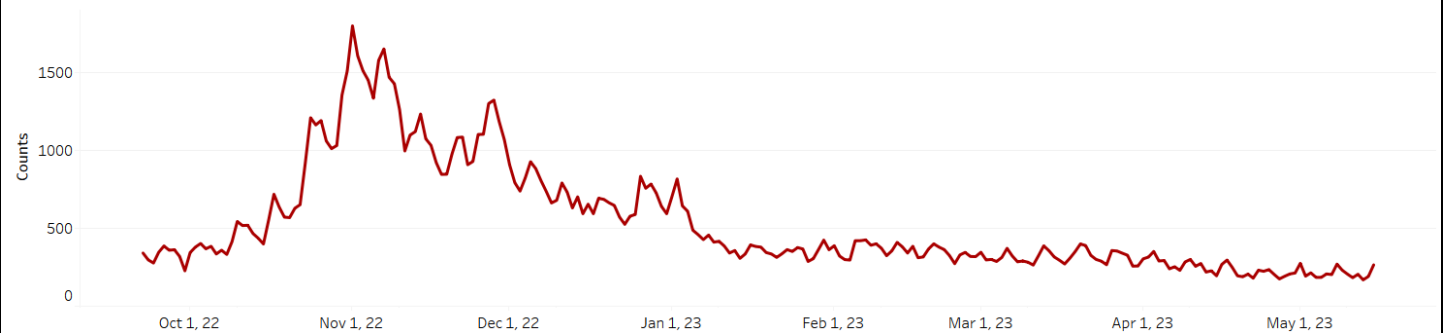
FLU A/B (September 2022-May 2023)



Flu B Levels in Wastewater Influent at 21 Sites in NC, September 2022-May 2023

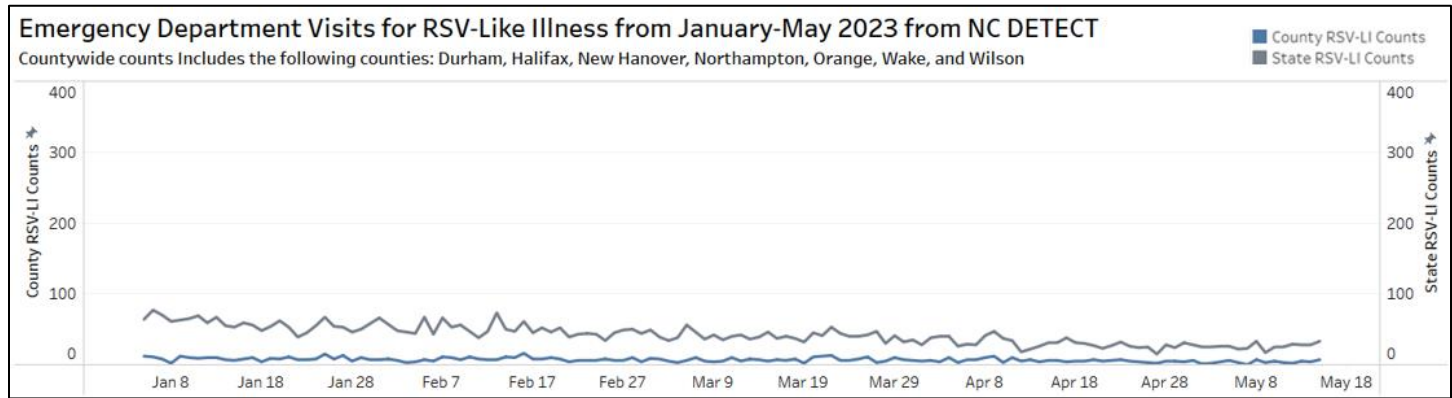
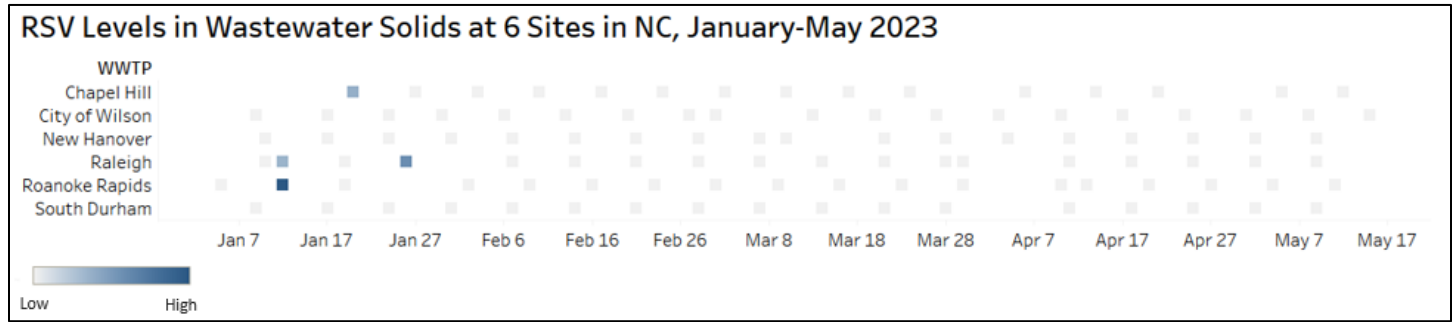


Statewide Emergency Department Visits for Influenza-Like Illness from September 2022-May 2023 from NC DETECT

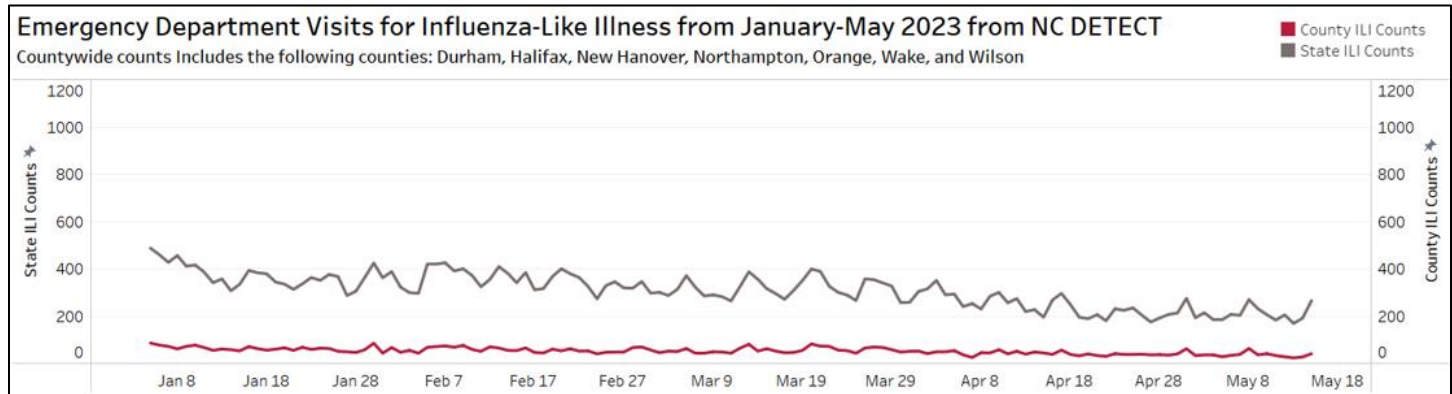
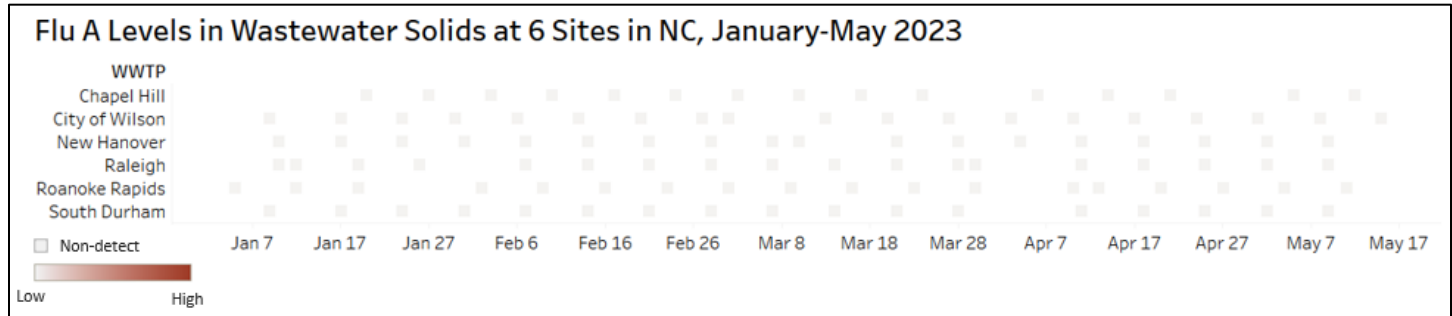


Respiratory Viruses Detected in Wastewater Solids

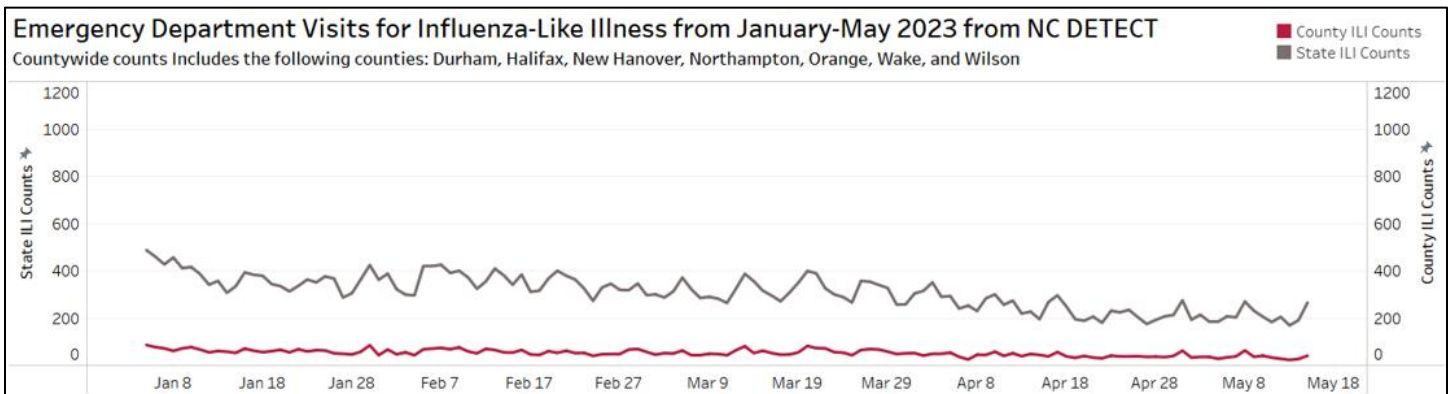
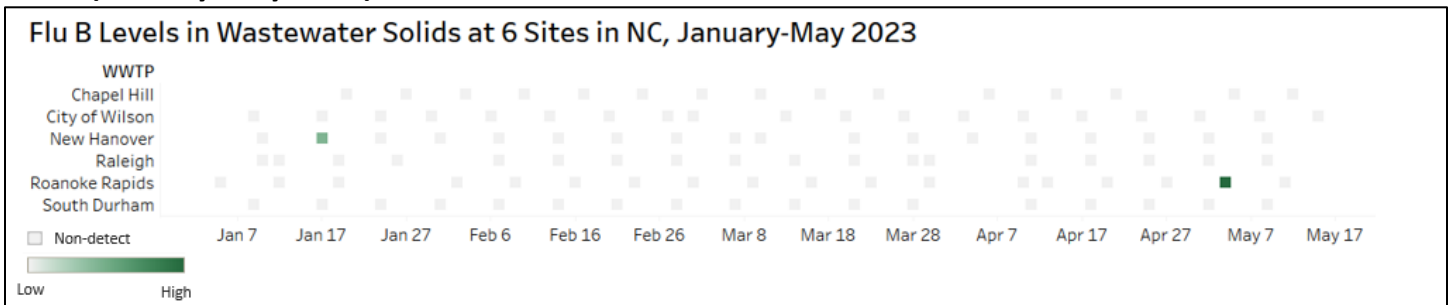
RSV (January-May 2023)



FLU A (January-May 2023)



FLU B (January-May 2023)



Methodology:

- Influent samples were provided twice per week for analysis. Solid samples were provided once per week for analysis.
- Samples are shipped to the University of North Carolina at Chapel Hill for Flu A, Flu B or RSV RNA analysis by digital PCR.
- Influent data are normalized by the wastewater flow rate measured during the sampling period (typically 24 hours) and the estimated population served by that wastewater system. The calculation is $(\text{concentration} \times \text{flow rate}) / (\text{population served})$. Wastewater solids data are reported as copies per gram of dried solid. For more information, please visit our [FAQ](#).
- Wastewater data are being displayed as detections over time with darker colors indicating higher concentrations of virus in wastewater. Non-detects are colored light gray.
- Proportion of sites testing positive is being displayed as the number of individual wastewater treatment plants detecting a given pathogen during a sampling week. Detection proportions cannot be considered as an aggregate measure given the difference in the populations being sampled at each site. Instead, they reflect the number of sites with at least one positive detection during the sampling week.

NC DETECT Data:

- Emergency department visits are provided as counts per day for RSV and Influenza-like illness as reported to the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT).
- Each ED visit is grouped into syndromes based on keywords in several different fields and/or diagnosis codes.
- RSV- and Influenza-like illness data track the number and percent of emergency department visits that are for illnesses compatible with infection due to RSV or Influenza. This includes visits that do not have positive test results for either disease.

Disclaimer: NC DETECT is a statewide public health syndromic surveillance system, funded by the NC Division of Public Health (NC DPH) Federal Public Health Emergency Preparedness Grant and managed through collaboration between NC DPH and the UNC-CH Department of Emergency Medicine's Carolina Center for Health Informatics. The NC DETECT Data Oversight Committee is not responsible for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.