

Tracking the “Tripledemic” in Pennsylvania with syndromic surveillance data



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CATEGORY: Epidemiology and Laboratory Capacity (ELC)

CATEGORY: Syndromic Surveillance

Pennsylvania relied on their robust syndromic surveillance system, which provides reliable, timely, and complete emergency department visit data to public health, to monitor disease trends during the “Tripledemic.”

The “What”

Influenza (flu), SARS CoV-2, and respiratory syncytial virus (RSV) are transmissible respiratory viruses capable of causing significant health impacts for all age groups and spreading rapidly over a wide geographic area. In the United States, CDC has estimated that flu has resulted in 9 million-41 million illnesses, 140,000-710,000 hospitalizations and 12,000-52,000 deaths annually between 2010 and 2020. RSV, which predominately affects children younger than 5 years of age, is estimated to cause over 100,000 hospitalizations and thousands of deaths each year. In Pennsylvania alone, SARS CoV-2 has resulted in over 3.5 million cases of reported COVID-19 infection including nearly 50,000 deaths since 2020.

During Fall 2022, all three of these dangerous viruses simultaneously circulated at elevated levels in Pennsylvania, resulting in a concerning scenario many referred to as a “tripledeemic.” To date, public health surveillance efforts to track trends in these conditions have mainly relied on collecting laboratory results reported by laboratories and healthcare providers. However, the landscape of COVID-19 has changed in regards to testing practices and availability (e.g., home testing has resulted in a large

proportion of cases not being reported to public health), and after the expiration of the federal Public Health Emergency in May 2023, COVID-19 will no longer be reportable in Pennsylvania. There are also legitimate concerns about reporting burden associated with high-volume diseases such as COVID and flu. The public health community needs to develop additional, non-lab-based methods that can monitor population health impacts (including severity of illness) due to respiratory viruses in a robust and timely manner.

Syndromic surveillance is a method of public health monitoring that relies on early indicators of disease activity in a population, before confirmatory information, such as laboratory results, can be obtained. Syndromic surveillance is often accomplished using health-related data already being collected in facilities’ Electronic Medical Record (EMR) systems and is often automated with minimal public health reporting burden to healthcare providers. In Pennsylvania, syndromic surveillance is accomplished through the collection, analysis and monitoring of hospital emergency department (ED) visits, which are received from 100% of hospitals in Pennsylvania with an ED; 95% of ED visits are reported to



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SUBMITTED JUNE 2023

public health within 24 hours of occurrence, and nearly 80% of visits include information on diagnosis codes associated with the ED visit. ELC funds, in conjunction with other state and federal funds, have been critical to the Department's ability to support and maintain the syndromic surveillance system and associated staffing. Specifically, ELC funds were used by the Department to help contribute to system maintenance costs and the salary of a staff person to perform syndromic surveillance analysis.

The "So What"

Through the continued availability of reliable, timely, and complete ED visit data in Pennsylvania, the Department has been able to perform effective near real-time monitoring of ED visits associated with co-circulating viral respiratory pathogens of public health importance, which has led to a better understanding of the timing and impact these viruses have on Pennsylvanians and Pennsylvania hospitals.

Department syndromic surveillance staff developed a code-based solution to identify ED visits with specific diagnoses for flu, COVID-19, or RSV, calculate the percentage of ED visits where these diagnoses were made over time by age group and geographic region, and display the information

in simple time series charts. These analyses were shared with epidemiology staff throughout the state in a weekly report which provided situational awareness of the progression of illnesses related to these viruses and increased the understanding of how the co-circulation of these viruses affected hospitals and communities in Pennsylvania.


For example, information gleaned from the ED visit data showed how RSV peaked in Pennsylvania in mid-November 2022, followed by peaks in influenza from late-November 2022 through late-December 2022 and COVID-19 in mid-January 2023; analysis of syndromic surveillance from ED visits in Pennsylvania during this period also provided valuable contextual information. For example, Department epidemiologists were able to visualize that the burden of ED visits for influenza and RSV were nearly identical among children under 5 years of age, that the percentage of influenza-diagnosed ED visits was highest among school-age children compared to other age groups, and that ED visit burden for COVID-19 was most significant among the elderly compared to RSV and influenza combined. Additionally, the Department was able to share syndromic surveillance ED visit data with CDC's National Syndromic Surveillance Program (NSSP) in a timely manner to contribute to similar insights from a regional and national perspective.

The "Now What"

The Pennsylvania Department of Health was an early adopter of syndromic surveillance and has collected ED visit data in near real-time for two decades. Syndromic surveillance capacity and use has expanded over time within the Department due, in part, to ELC funds, and efforts to use syndromic surveillance effectively to prospectively monitor emerging and persistent public health problems will continue. With each year, Department syndromic surveillance staff learn new skills and develop creative analyses and visuals to convey information about important public health trends regarding

a variety of public health hazards encompassing multiple epidemiological program areas. The Department plans to continue to monitor ED visit data associated with influenza, SARS CoV-2, and RSV infections to better understand their associated trends and inform stakeholders. Future efforts are planned to also capture inpatient hospital data, which will provide additional valuable insights regarding hospitalizations and other outcomes associated with these viruses and a plethora of other public health concerns.

Key contributors to this effort include: Kirsten Waller, Pennsylvania Department of Health

 Funding source: This work was supported in part by the Centers for Disease Control and Prevention (CDC) cooperative agreement #NU38OT000297. Its contents are solely the responsibility of the authors and do not necessarily reflect the views of the CDC.