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FALL 2024

The Pathogen Detection Tool: A Method for Whole-Genome Sequencing Surveillance and Cluster Detection

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Harnessing the power of whole-genome sequencing (WGS) data for infectious disease surveillance and public health action can be a daunting task. WGS data can provide an additional layer of information in the investigation of clusters of a particular disease, but the technology is currently outpacing the availability of standardized guidelines for implementation.

However, the National Center for Biotechnology Information (NCBI) has developed a tool, known as Pathogen Detection, for making sense of the vast amount of sequencing data that are routinely publicly deposited in their GenBank database. Through its bioinformatics pipeline, the sequences of nearly 100 pathogens are analyzed, creating genetically similar clusters. These clusters can then provide a starting point for public health investigators to identify potential outbreaks that traditional epidemiological methods may have missed.



In South Carolina, Pathogen Detection is used for many foodborne, enteric, waterborne, health care-associated, and multi-drug-resistant pathogens. The Public Health Laboratory regularly uploads sequences to GenBank, which are put through the Pathogen Detection pipeline.

When a South Carolina case is genetically similar to another case in the tool, a notification is sent to the Communicable Disease Epidemiology Section (CDES) Genomic Epidemiologist. Clusters warranting further investigation are then sent to CDES epidemiologists, who review case data for potential commonalities. These clusters and their outcomes (such as whether the cluster was redesignated as an outbreak or revealed no commonalities) are documented in the South Carolina Infectious Disease and Outbreak Reporting Network (SCION), our state’s electronic disease surveillance system.

While Pathogen Detection is a powerful tool, it is not without its limitations. First, due to GenBank housing sequences from across the country and the world, clusters for particular pathogens can get quite large and difficult to interpret. Second, while epidemiologic data can be obtained related to South Carolina sequences of interest that are genetically similar, it can be difficult to get similar information from other states and jurisdictions. Lastly, the criteria for determining whether sequences are genetically similar enough for investigation is not well-defined for all pathogens of interest.

Pathogen Detection serves as one method for WGS surveillance, not only at the state and local level, but also nationally. As more standardized guidelines for interpreting WGS data develop, South Carolina will continue to use and refine WGS tools, leading to more efficient and effective responses to potential outbreaks. If you have any questions or are interested in learning more about WGS, please reach out to **Julia Nelson, CDES Genomic Epidemiologist**, at nelsonjs@dph.sc.gov.



***TB Today!* Course Offered**

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The Tuberculosis Today! workshop is a two-day course provided by the South Carolina Department of Public Health's Tuberculosis Control program, with support from the American Lung Association. It is offered twice annually, with the 2024 workshops occurring in May and August. The course focuses on a practical approach to the current base of knowledge surrounding tuberculosis treatment and control.

Course materials and classroom sessions focus on various topics such as:

- The difference between TB infection and TB disease
- Transmission and pathogenesis
- Diagnosis and treatment of TB infection and TB disease
- Laboratory principles
- Contact investigation, infection control, the referral process, and more

The course is designed primarily for nurses and physicians with significant responsibilities in tuberculosis control activities within their facilities, whether through patient care, infection control, or staff management. However, professionals in other roles, such as social workers, health educators, managers, and supervisors are also encouraged to apply.

The most recent workshop was held Aug. 27-28, 2024, at the Lexington County Health Department in Lexington, S.C., bringing together 20 participants from across the state. In addition to gaining valuable insights into tuberculosis control, attendees who completed both days of the course earned continuing education units (CEUs).

The next Tuberculosis Today! workshop is scheduled for Spring 2025, with specific dates to be determined. If you are interested in attending or would like more information about the course, please contact **Morgan Seganti, TB Health Educator and Course Coordinator**, at SegantMK@dph.sc.gov.

STI, HIV & Viral Hepatitis Academic Detailing

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We are excited to invite providers to participate in our Academic Detailing program. This initiative offers a unique opportunity for providers to engage in one-on-one educational sessions tailored to their specific needs. Our aim is to equip providers with the latest evidence-based information and practical advice to enhance their clinical practice and patient care.

Join us in this collaborative effort to improve health outcomes and to end the epidemics in South Carolina.

[Visit our website](#) to learn more about the Academic Detailing program.

Providers: Scan to complete a brief survey regarding their current STI/HIV practices.



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New Guidance about Respiratory Viruses in South Carolina

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While respiratory virus activity typically increases during the fall and winter months, since the COVID-19 pandemic, respiratory virus activity has become less predictable. To properly monitor illness trends, the South Carolina Department of Public Health (DPH) conducts routine disease surveillance and produces weekly data reports that contain information about the status of commonly circulating respiratory illnesses in the state.



Every Wednesday, the [Flu Watch](#) report and [Respiratory Disease Watch](#) report are published on the DPH website.

The Centers for Disease Control and Prevention (CDC) transitioned from disease-specific guidelines and prevention to a comprehensive pan-respiratory messaging model noted by their respiratory virus guidance published in March 2024. We encourage citizens to visit [cdc.gov/respiratory-viruses/data](https://www.cdc.gov/respiratory-viruses/data) as a way to check on the status of respiratory illnesses and how they may be spreading at any given time.

DPH's Communicable Disease Epidemiology Section (CDES) continues to innovate and explore ways to share relevant state-level data about respiratory viruses like COVID-19, Influenza (Flu), and Respiratory Syncytial Virus (RSV).

Each respiratory season, DPH produces guidance for identifying, reporting, preventing, and responding to respiratory illness outbreaks. The new core strategies highlighted in the guidance are simple, actionable steps to protect yourself and others, including staying up to date with immunizations, practicing good respiratory hygiene, staying away from others when sick, improving airflow, and cleaning high touch surfaces regularly. These core strategies do not apply only to one respiratory virus, but also to common respiratory viral illnesses like COVID-19, Flu, and RSV. To learn more about how to better protect yourself this respiratory season, we encourage South Carolinians to visit the [Respiratory Disease Watch](#), where you can also find respiratory outbreak guidelines for schools, childcare centers, long-term care facilities, and general settings.



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Epi Notes is published by the South Carolina Department of Public Health
Bureau of Communicable Disease Prevention and Control.

00110-ENG-CR 11/24