Missouri State Public Health Laboratory enhances next-gen sequencing capacities

CSTE Stories FROM THE Field

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CATEGORY: **Epidemiology and Laboratory Capacity (ELC)**

The Missouri State Public Health Laboratory purchased new laboratory analysis equipment and expanded partnerships, which helped increase SARS-CoV-2 testing capacity by 300% and made the laboratory more efficient in responding to future outbreaks.

The "What"

The Missouri Department of Health and Senior Services (DHSS) State Public Health Laboratory (SPHL) used Epidemiology and Laboratory Capacity for the Prevention and Control of Emerging Infectious Diseases (ELC) funding to purchase additional next-generation sequencing equipment and two (2) additional liquid handlers, to enhance their ability to keep up with both PulseNet organisms and SARS-CoV-2 samples. This equipment included:

- A DiaSorin Liaison XL, which improved COVID-19 antibody testing and antigen detection for large outbreak assistance. The instrument is accurate and can test samples at a pace of around 170 samples an hour for some tests.
- A BioFire Torch FilmArray system, which is a multiplexing Polymerase Chain Reaction (PCR) machine with the ability to test for multiple organisms in a single sample in approximately an hour.
- A Bruker Maldi-TOF, which provides SPHL with the additional capacity and capability to identify viral pathogens in food, environmental, and bioterrorism toxins.

Additionally, ELC funds were used to help establish a partnership with the University of Missouri, which provides access to state-of-the-art bioinformatics services that are vital to enhancing efforts for public health monitoring of genomic disease data.

The "So What"

Before purchasing the equipment, Missouri SPHL was meeting the weekly PulseNet responsibilities and was able to sequence an average of 94 SARS-CoV-2 samples per week. With the new equipment, the laboratory was able to increase the maximum sequencing capacity for COVID-19 surveillance to an average of 376 SARS-CoV-2 specimens per week. This was a 300% increase in the laboratory's SARS-CoV-2 analysis capacity.

This new equipment and bioinformatics capacity aid in finding the causative agent for an illness on platforms ranging from respiratory, gastrointestinal, and health-acquired infections. They have increased efficiencies and turnaround time. Being able to quickly and accurately identify the responsible organism allows epidemiological and medical staff to respond earlier - saving time and improving recovery time.

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The "Now What"

With this increased capacity, the Missouri SPHL can meet the current sequencing needs and expand capabilities into other areas such as antimicrobial-resistant organisms, influenza, tuberculosis, and applications for newborn screening. Continued ELC funding will provide Missouri SPHL the ability to maintain, enhance, and expand its testing and bioinformatics capacity to inform disease surveillance in the state, which will assist in efforts to contain future outbreaks more rapidly.

Key contributors to this project include Anne Bloemke-Warren, Missouri Department of Health State Public Health Laboratory; Laura Kliethermes, Missouri Department of Health and Senior Services.

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