

LabLink

Director, Bureau of Laboratories
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In this issue...

<i>Candida Auris</i> Genomics Surveillance	3
Infectious Substances Transport and Training Opportunities	4
Virology Testing Discontinued	5
Pyrazinamide Susceptibility Testing Resumes	5
Harmful Algal Blooms, Determination and Quantitation	6

Bureau Vision

The Bureau of Laboratories is a stronger, more diverse team within an integrated public health system. We utilize advanced technology and innovative leadership to provide comprehensive public health services in our dynamic global community.

Bureau Mission

We are dedicated to continuing leadership in providing quality laboratory science for healthier people and communities through partnerships, communication and technical innovation.

Stay Current

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Editor: Teresa Miller

Candida Auris Genomic Surveillance

by Heather M. Blankenship, PhD, Genomics Section Manager

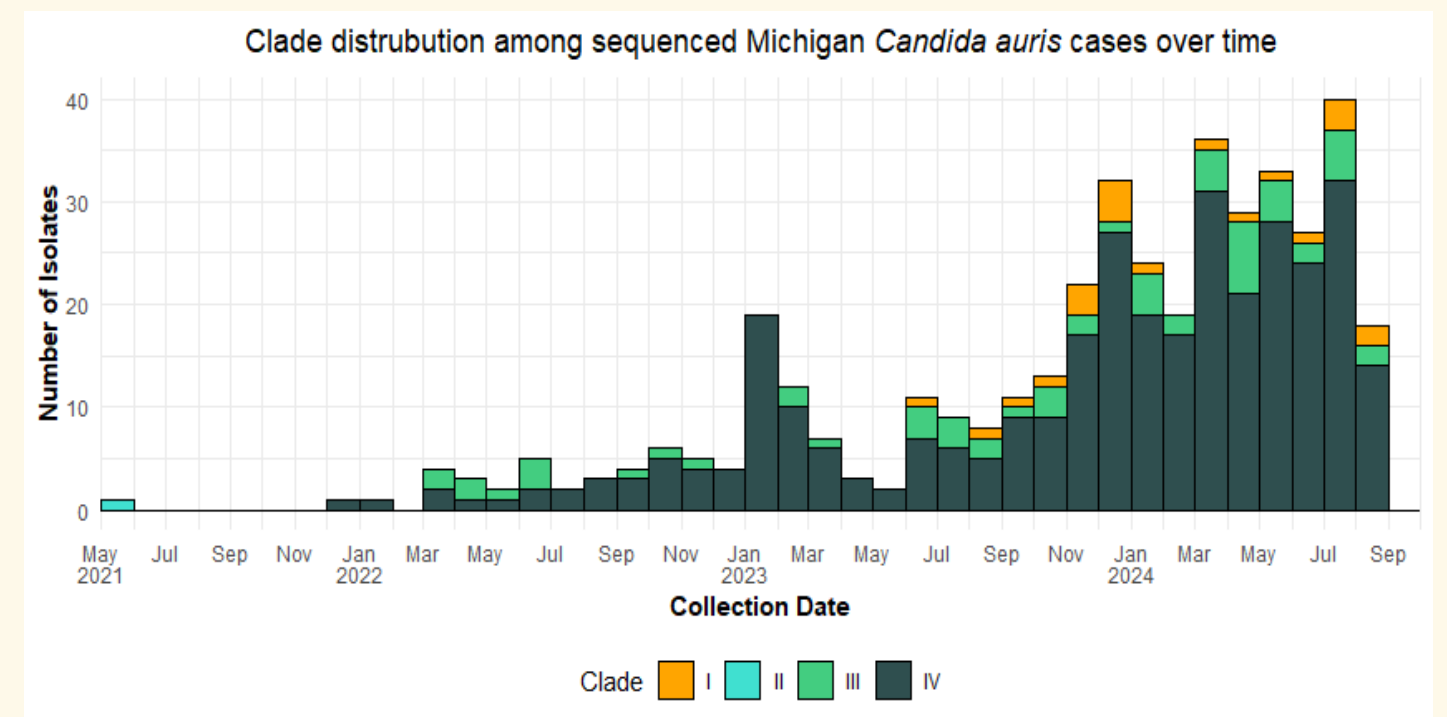
Over the past year, MDHHS Bureau of Laboratories (BOL) has been developing the capacity to perform *Candida auris* whole genome sequencing (WGS) and analysis to better understand the genomic epidemiology of *C. auris* in Michigan. *C. auris* is an emerging, multidrug-resistant fungal pathogen capable of causing invasive infections and healthcare-associated outbreaks. Since identification in 2009, *C.auris* has since been detected in over 30 countries on 6 continents.

In Michigan, 435 *C.auris* isolates have undergone WGS and analysis to examine the genomic epidemiology of *C.auris* within Michigan. Further characterization of *C.auris* isolates through whole genome sequencing can discriminate *C. auris* isolates into one of six genetically distinct clades to help facilitate the detection of new introductions into a region and provide insights to better understand transmission patterns. Initially these clades clustered within global geographic regions: South Asia, East Asia, Africa, and South America (clades I-IV). The four predominant clades have all been identified in the U.S., suggesting multiple, separate introductions of *C. auris* followed by local transmission within the U.S.. Within Michigan, Clade I, II, III, and IV have been detected, with Clade IV the most prevalent (n=356, 81%). Additionally, WGS allows for further examination of certain genetic mutations associated with azole and echinocandin antifungal resistance. While some antifungal resistance has been associated with specific clades, the molecular determinant of antifungal resistance is still incompletely understood. Virulence and environmental persistence may also vary by clade. For example, clade II strains are often associated with ear infections and have not been described as a cause of healthcare outbreaks, unlike clade I, III, and IV strains.

While a large proportion of *C. auris* isolates have undergone WGS, the proportion is slowly declining as new cases are identified in Michigan. As *C. auris* has continued to emerge in Michigan and active surveillance activities to detect *C. auris* cases have increased, new case detections increasingly represent screening cases rather than

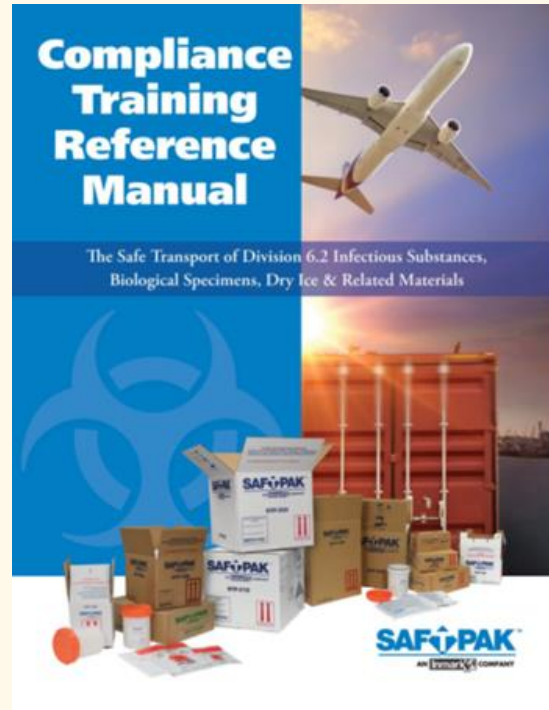
clinical cases. Most of the active surveillance screening for *C. auris* conducted by both clinical and public health laboratories use molecular-based detection methods which are more sensitive in detecting the presence of *C. auris* in a sample. However, molecular-based methodologies do not produce an isolate for downstream public health surveillance unless additional culture-based methods are subsequently performed on positive samples by the testing laboratory. This lack of isolate availability limits the ability of current genomic surveillance strategies to detect introductions of new strains, make inferences about epidemiologic trends, or examine potential transmission patterns.

Therefore, WGS of *C. auris* isolates, submitted to the MDHHS BOL, has been able to examine the initial introductions and emergence within Michigan, however, gaps in genomic surveillance information may limit the ability to perform future surveillance efforts. Future surveillance and analyses will additionally investigate genotypic markers and mechanisms of antifungal resistance, which are still incompletely characterized by the global community, and higher-resolution genomic epidemiological analyses within clades for intra-facility and inter-facility investigations. Together, this work can help inform public health surveillance, response, and prevention activities within the state for *C.auris*.



Infectious Substances Transport and Training Opportunities

by Jason Wholehan, Bioterrorism Training Coordinator



Are you involved in transportation of infectious substances? Ensuring safe and compliant transport of these materials is important to public health and for safety. MDHHS Bureau of Laboratories (BOL) is pleased to announce a continuing education opportunity in the transport of infectious substances. APHL has partnered with Saf-T-Pak to provide free comprehensive training for safe transport of infectious substances, biological specimens, Dry ice, and related materials. Join APHL and Saf-T-Pak for a comprehensive training program and become an expert in handling infectious substances with

confidence. This full day virtual seminar is a great way to designate an internal laboratorian or two as experts in shipping regulations.

Please choose from multiple time slots that fit your schedule, eliminating the need for travel and time away from work. See the attached table for available training times, then email Jason Wholehan, wholehanj@michigan.gov to finalize training plans.

But wait, that's not all! We understand that different learners have different preferences. That's why MDHHS BOL continues to offer multiple learning options to cater to your needs. Prefer in-person learning? In-Person Training is available and can be scheduled in-house and at a convenient time.

Can't make it to the live sessions? No problem! MDHHS BOL also maintains an asynchronous online module. This self-paced online module allows learning at your own pace and access to high-quality content on-demand. MI-TRAIN course **1094582** is a recorded lecture about Packing and Shipping material. Simply visit [Home - MI-TRAIN](#) and search for course number **1094582** to get started.

safety. Contact Jason Wholehan, wholehanj@michigan.gov, to register for either the live virtual training or schedule an in-person presentation. BOL offers convenient choices for the best learning option and environment.

Class Date	Time (EST)	Registration Deadline
Tuesday, November 12, 2024	9 AM to 4 PM	Tuesday, October 22, 2024
Thursday, November 14, 2024	9 AM to 4 PM	Thursday, October 24, 2024
Tuesday, November 26, 2024	9 AM to 4 PM	Tuesday, November 5, 2024
Thursday, December 5, 2024	9 AM to 4 PM	Thursday, November 14, 2024
Wednesday, December 11, 2024	11 AM to 6 PM	Wednesday, November 20, 2024
Wednesday, December 18, 2024	9 AM to 4 PM	Wednesday, November 27, 2024
Tuesday, January 7, 2025	9 AM to 4 PM	Tuesday, December 17, 2024
Wednesday, January 8, 2025	9 AM to 4 PM	Wednesday, December 18, 2024
Wednesday, January 29, 2025	9 AM to 4 PM	Wednesday, January 8, 2025
Thursday, February 6, 2025	2 PM to 9 PM	Thursday, January 16, 2025
Tuesday, February 11, 2025	9 AM to 4 PM	Tuesday, January 21, 2025
Thursday, February 27, 2025	11 AM to 6 PM	Thursday, February 6, 2025
Wednesday, March 5, 2025	9 AM to 4 PM	Wednesday, February 12, 2025
Thursday, March 6, 2025	9 AM to 4 PM	Thursday, February 13, 2025
Wednesday, March 12, 2025	9 AM to 4 PM	Wednesday, February 19, 2025
Wednesday, March 19, 2025	9 AM to 4 PM	Wednesday, February 26, 2025
Wednesday, April 2, 2025	11 AM to 6 PM	Wednesday, March 12, 2025
Wednesday, April 9, 2025	9 AM to 4 PM	Wednesday, March 19, 2025
Wednesday, April 16, 2025	9 AM to 4 PM	Wednesday, March 26, 2025
Thursday, May 1, 2025	2 PM to 9 PM	Thursday, April 10, 2025
Wednesday, May 7, 2025	9 AM to 4 PM	Wednesday, April 16, 2025
Tuesday, May 20, 2025	9 AM to 4 PM	Tuesday, April 29, 2025
Thursday, May 22, 2025	9 AM to 4 PM	Thursday, May 1, 2025
Wednesday, May 28, 2025	9 AM to 4 PM	Wednesday, May 7, 2025

Don't miss the opportunity to enhance your skills and contribute to public health and

Test Discontinuation Notice

by *Diana Riner, PhD, Virology Section Manager*

Katie Margulieux, PhD, Viral Molecular Unit Manager

MDHHS Bureau of Laboratories (BOL) Virology Section sent Test Discontinuance Notices for three separate test assays described below.

1. May 30, 2024, the laboratory unit discontinued testing for HIV-1 antibodies from adult dried blood spots using the Western Blot Confirmatory Assay because the test kit was no longer available. BOL continues to offer adult dried blood spot screening, HIV diagnostic panels, treatment monitoring tests, and tests for PrEP patients. If a dried blood spot tests positive for HIV, a request to collect and send serum samples to the BOL for confirmatory testing will be sent to the submitter.
2. September 10, 2024, the laboratory unit discontinued Ebola virus testing using the LRN Ebola RT-PCR Assay. BOL continues to offer Ebola testing using the BioFire® Film Array® Warrior Panel® with prior approval. The Warrior Panel® has expanded detection to all four orthoebolaviruses that are known to cause disease in humans. The LRN RT-PCR Assay detection was limited solely to *orthoebolavirus zairensis* or *Zaire ebolavirus*.
3. September 10, 2024, the laboratory unit discontinued testing for Rickettsia using the LRN RT-PCR Assay. This test is not offered due to low demand for testing however, MDHHS BOL offers assistance with transport of specimens to the CDC for testing upon request from the submitter.

For questions regarding MDHHS BOL Virology Section test changes, please contact:

Virology Section Manager, Diana Riner, PhD, RinerD@michigan.gov, (517) 335-8099,

or

Viral Molecular Unit Manager, Katie Margulieux, PhD, MargulieuxK@michigan.gov,

(517) 335-8098.

Pyrazinamide Susceptibility Testing Resumes

by *Angie Schooley, TB/Mycology Unit Manager*

Kimberly McCullor, PhD, Bacteriology Section Manager

MDHHS Bureau of Laboratories (BOL) TB/ Mycology Unit and the Bacteriology Section sent notification that phenotypic (liquid culture) Pyrazinamide (PZA) susceptibility testing resumed effective September 26, 2024.

Becton, Dickinson and Company (BD), the manufacturer of the BD, BACTEC™ MGIT™ 960 pyrazinamide (PZA) kit, determined the root cause of the intermittent false resistance was due to a raw material change. BD worked with the raw material supplier to resolve issues allowing BD to release new kits.

For questions, please contact:

TB/Mycology Unit manager, Angie Schooley, SchooleyA@michigan.gov, (517) 335-9637,

or

Bacteriology Section Manager, Kimberly McCullor, McCullorK@michigan.gov, (517) 335-9641.



Harmful Algal Blooms, Determination and Quantitation

by Sneha Yeleti, M.S., Laboratory Scientist, Environmental Organic Unit

**Publisher's Note: This article was originally published with Keri Fisher as the author and was corrected on 4/25/25.*

Harmful algal blooms, or HABs, are dense layers of single-celled, toxin producing, blue green algae, known as Cyanobacteria. Blue-green algae proliferate bodies of freshwater such as ponds, lakes, reservoirs, and slow-moving streams. Many species of cyanobacteria have the capability to produce algal toxins, known as Cyanotoxins. It is important to verify and monitor that a toxin is being produced in a specific waterway or drinking water system to determine the true risk to a population. Cyanotoxins vary in structure and toxicity and are classified by the toxic effect they have on organisms.

Cyanotoxin exposure pathways are by consuming contaminated drinking water, aerosol inhalation, and direct contact. After ingestion or exposure, these toxins are actively absorbed by mammals, fish, and birds. For humans, the exposure routes are direct contact with contaminated recreational waters and consuming inadequately treated drinking water. Water treatment plants using surface water must be aware of the hazards of toxin producing cyanobacteria.

Cyanotoxins could cause various health effects ranging from mild skin rash to serious illness or in rare circumstances, death.

MDHHS Bureau of Laboratories (BOL), Chemistry and Toxicology Division, Environmental Chemistry Section's Environmental Organic Unit performs determination and quantitation of Cyanotoxins in drinking water. Cyanotoxins that tested in BOL are:

1. Hepatotoxins, affects liver- Microcystins-11 congeners, Nodularin, and Cylindrospermopsin.
2. Neurotoxins, affects central nervous system- Anatoxin-a

Analysis of Microcystins and Nodularin in drinking water uses cellular lysis to release toxins from cells and solid phase extraction to capture the analytes followed by high-pressure liquid chromatography multiple reaction monitoring tandem mass spectrometry (HPLC-MS/MS) to quantitate the toxin level.

MDHHS BOL is the preferred laboratory for the analysis of the Statewide Public Water Supply Monitoring for Cyanotoxins Related to Harmful Algal Blooms Program, which is carried out by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Drinking Water and Environmental Health Division, Emerging Contaminants Unit. The data is generalizable to the State's surface water systems with results available quickly, within 7 days from the collection of the sample thereby, enabling immediate action to protect the population health. There are 52 sites across Michigan participating this program, with 12 of these sites enrolled in weekly analysis for Microcystins, Nodularin, Anatoxin and Cylindrospermopsin and 30 sites enrolled in biweekly analysis for Microcystins and Nodularin. On the average, BOL performs over 21,000 tests annually in support of the Statewide Public Water Supply Monitoring for Cyanotoxins Related to the Harmful Algal Blooms Program.



Aerial view of harmful algal bloom in Lake Michigan-- Department of Environment Great Lakes, and Energy