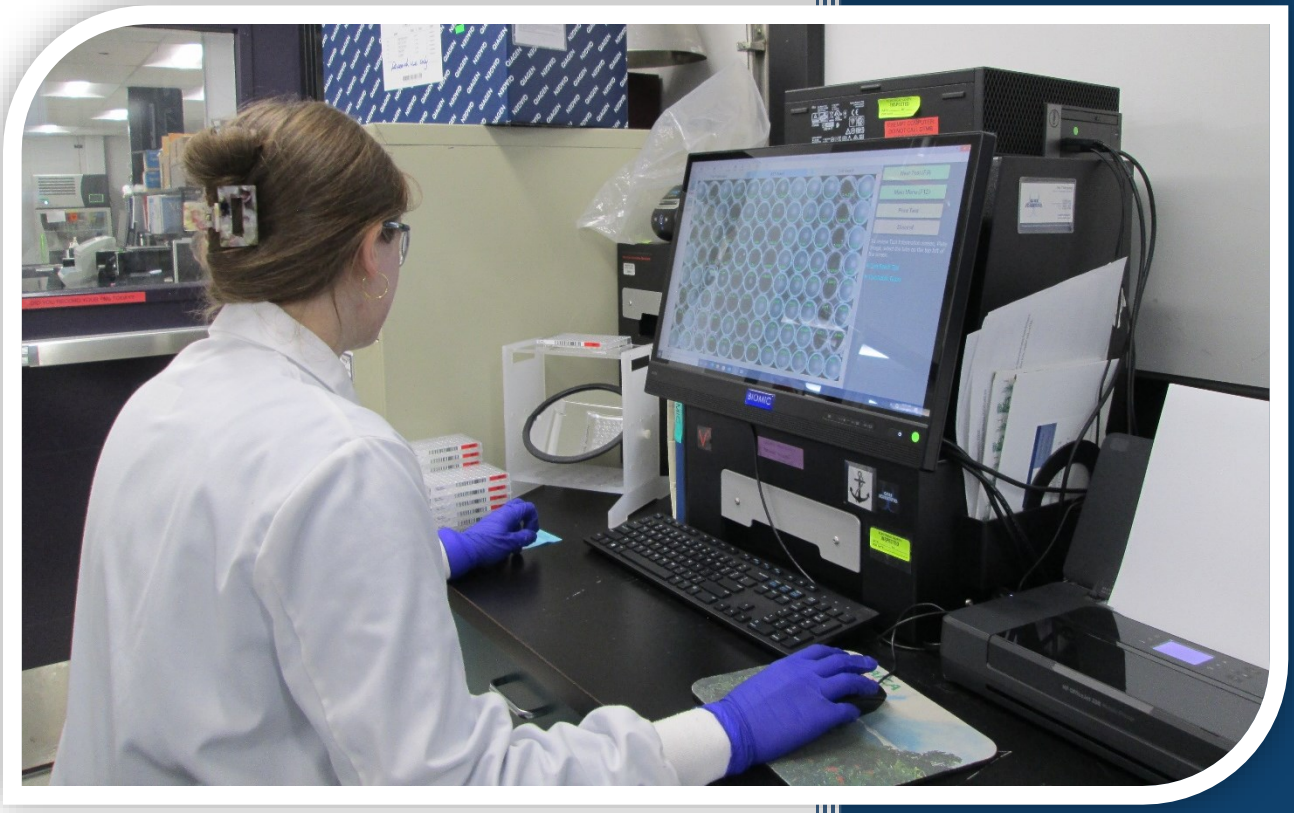
MDHHS

Michigan Department of Health & Human Services

Bureau of Laboratories

Annual Report



FY2024

Laboratory Director

Sandip Shah, PhD., HCLD (ABB)

Mission

The Bureau of Laboratories is dedicated to continuing leadership in providing quality laboratory science for healthier people and communities through partnerships, communication and technical innovation.

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.

Values

Professionalism
Integrity
Teamwork
Excellence
Communication

The Bureau of Laboratories was established under provisions of the revised Public Health Code – Act 368 of 1978, Part 96 (333.9601).

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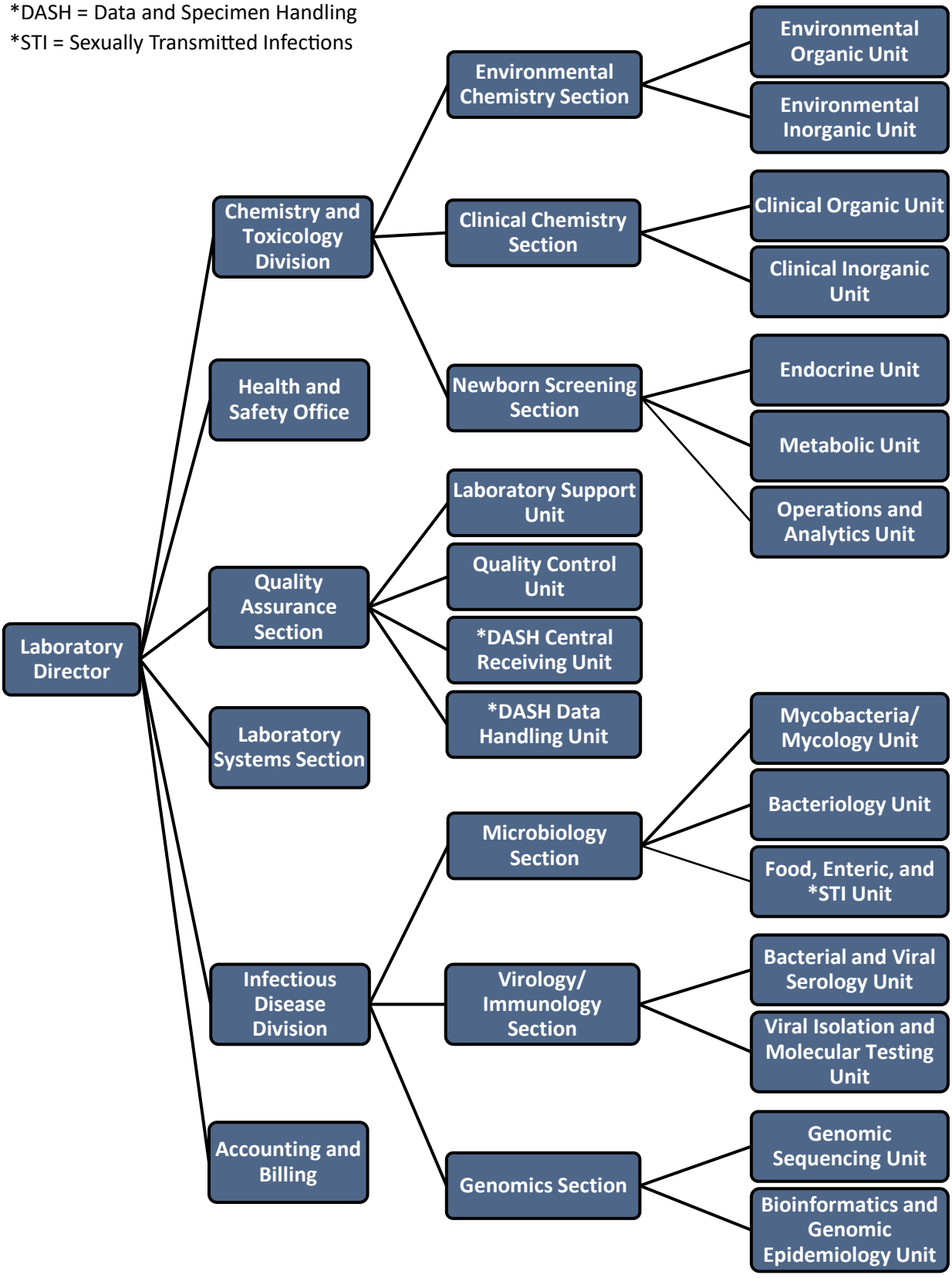
Organizational Chart

*DASH = Data and Specimen Handling

*STI = Sexually Transmitted Infections



Testing by the Numbers

7.1 million total tests performed in FY2024

Newborn Screening Section

- **6,116,013** tests for **109,341** newborns.

Infectious Disease Division

- **145,693** Microbiology Section tests.
- **163,881** Virology Section tests.

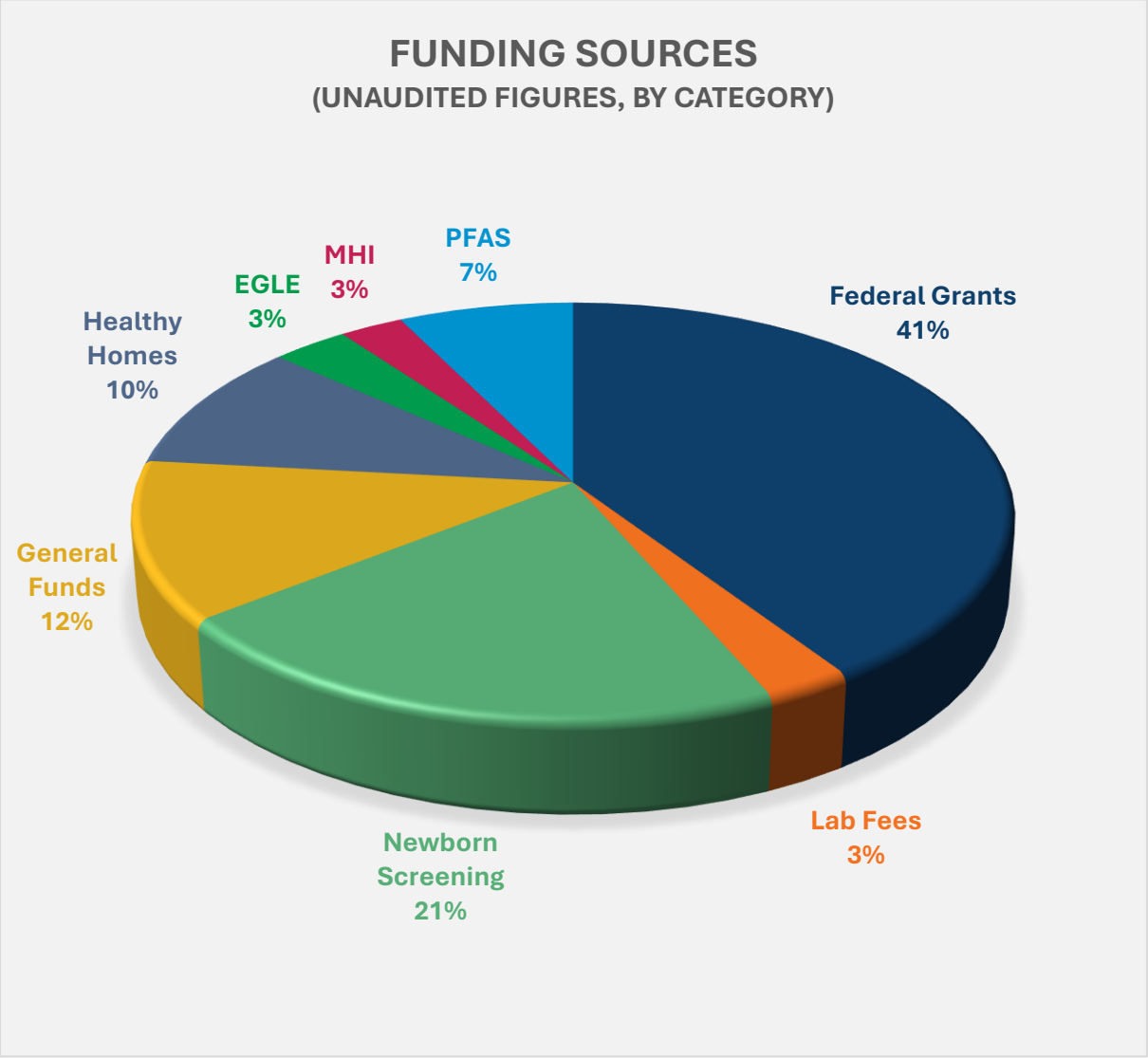
Chemistry and Toxicology Division

- **332,854** Clinical Chemistry Section tests.
- **386,128** Environmental Chemistry Section tests.

Funding

Federal grants comprise the largest amount of funding for the Bureau of Laboratories (BOL). Federal partners include Centers for Disease Control and Prevention (CDC), Federal Drug Administration (FDA), Department of Agriculture (USDA), Department of Homeland Security (DHS) and Department of Health and Human Services (HHS).

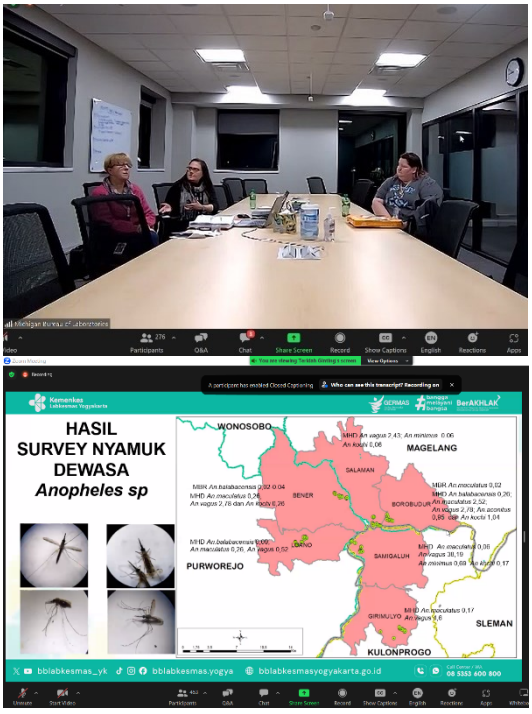
The remaining funding derives from BOL newborn screening (NBS), lead testing and sexually transmitted infection (STI) laboratory fees, State of Michigan general funds, Healthy Homes Program, PFAS response funding, Department of Environment, Great Lakes, and Energy (EGLE) and Michigan Health Initiative (MHI).



Year in Review

The Bureau of Laboratories (BOL) continued planning and design for a new multi-agency laboratory facility this year, with groundbreaking taking place April 19, 2024, and completion expected by late 2026. The new facility will be shared with the Michigan Departments of Environment, Great Lakes, and Energy (EGLE) and Labor and Economic Opportunity (LEO) (see article, p. 26). While most of the renovations on the existing facility have wrapped up, a few improvements are still in progress. Projects include a redesign and expansion of laboratory space for select agent testing and the addition of exterior storage facilities for supplies and chemical waste disposal.

The BOL upheld its high standards and commitment to testing and surveillance amidst nationwide surges in infectious diseases such as measles and tuberculosis, concerns with chemical exposures and continued screening of Michigan's newborn population for congenital conditions. The laboratory excelled in proficiency testing and in both internal and external regulatory and accreditation audits. These continuous tests and audits are crucial for implementing quality improvements to maintain the highest standards.

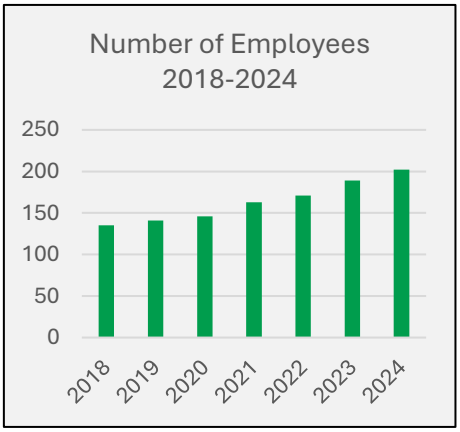


Overall quality was also improved through collaboration with partners. One initiative paired the BOL with colleagues from Indonesia in a twinning project through the Association of Public Health Laboratories (APHL). Dr. Shah and Infectious Disease Division Director Dr. Marty Soehnlen visited Indonesia in 2023 to meet laboratory staff, tour their laboratories and share challenges and best practices. The collaboration continued through a series of monthly webinars with presentations from the BOL on tuberculosis (TB) testing, biorepository handling and environmental testing for per- and polyfluoroalkyl substances (PFAS). Indonesian colleagues presented a talk on their response to vector-borne diseases. Each virtual presentation had more than 300 attendees with participants from both countries. The series wrapped up with the Indonesian cohort visiting the BOL as well as public health partners across the state (see article, p. 29).

Another opportunity to collaborate with public health partners involved the APHL sponsored Next Generation Sequencing Quality Initiative (NGS QI) Peer-to-Peer Program. The program expands and enhances the quality of sequencing operations by partnering public health laboratories with differing strengths and challenges to foster collaboration and knowledge sharing. As part of the NGS QI Peer-to-Peer Program, five staff members from the BOL travelled to Florida's public health laboratory and they, in turn, visited the BOL.

Staff administered and engaged in many presentations and trainings. With the new training laboratory and classroom up and running, the BOL began hosting on-site activities, including point-of-care and biothreat agent workshops for Michigan health care partners. APHL and Centers for Disease Control and Prevention (CDC) also partnered with the BOL to host additional training and workshops on topics such as influenza and parasitology. Visitors to the laboratory were welcomed with tours of each testing unit and notable visits included staff representing CDC Public Health Emergency Preparedness and OutbreakNet Enhanced Programs, State of Michigan administrators and program staff, and post-secondary institution educators with their students.

The BOL workforce continued to climb to just over 200 employees near the end of the fiscal year in September. Along with State of Michigan and Michigan Public Health Institute affiliates, the BOL hosted interns and student assistants and added two strategist positions. The first, a health equity strategist, assists with addressing ways the laboratory can identify disparities in health care access and outcomes from a testing and data perspective. The second, a data strategy administrator, assists MDHHS and the BOL in standardizing cross-cutting, department-wide data management.



Several BOL employees continued to serve on subject matter committees with public health partners such as APHL and CDC. Committees included Biosafety and Biosecurity, Environmental Health, Infectious Diseases, Knowledge Management, Newborn Screening, Public Health Preparedness and Response, Workforce Development and Laboratory Systems and Standards. Internally, the BOL monitored and improved laboratory core functions through committees such as Safety, Biosafety, Quality Steering and the Process Improvement Team.

In addition to workforce engagement through partnerships and committees, the BOL offered opportunities for staff to connect with each other and the community. Regular American Red Cross blood drives continued on-site, and staff also participated in a “Care Blanket” project for people experiencing homelessness. Several employees crocheted or knit squares and then joined them together to create two warm and unique blankets to donate. A food drive was organized with donations going to the Greater Lansing Food Bank. Casual lunch and learn sessions were held regarding accessibility topics that affect our work, our communities and each other. Topics reflected monthly recognitions such as health conditions awareness, understanding disabilities, domestic and global festivals and celebrations and social and historical information. APHL also provided the BOL with an on-site professional development seminar in emotional intelligence centering on skills in communication, coaching and providing feedback in an effective manner.

Along with community connections and educational experiences, the BOL prioritized employee wellness and team building by encouraging stress-relieving art projects and games during lunch breaks and by forming a committee to coordinate lab-wide activities and events throughout the year. These included Medical Laboratory Professionals Week, a lunch to celebrate the groundbreaking of the new laboratory and group seating at a local baseball game after work. The creation of the BOL band also gave staff an opportunity to both perform and enjoy live music during the annual BOL holiday open house. These initiatives ensured all staff had opportunities to form relationships within and between sections to work more effectively together.

As the BOL looks to the future, it will continue its dedication to excellence through assessment, improvement and collaboration and will remain ready to tackle all challenges to deliver quality testing and surveillance to protect Michigan citizens.

Chemistry and Toxicology Division

Clinical Chemistry, Environmental Chemistry and Newborn Screening Sections

The Chemistry and Toxicology Division is designated as a CDC Laboratory Response Network-Chemical (LRN-C) Level 1 laboratory that tests clinical samples in the event of a regional chemical exposure. The Clinical Chemistry Section provides testing for clinical specimens in cases of human exposures and for biomonitoring projects. The Environmental Chemistry Section is responsible for environmental sample testing, including drinking and recreational water, soil and food for the Food Emergency Response Network (FERN) and some species of wildlife including fish for the Eat Safe Fish Program. Both sections test for contamination from chemical agents, toxins and metals, including lead. These results are used to determine the course of action for environmental mitigation through the MDHHS Mi Lead Safe Program and the treatment of individuals who have a confirmed elevated blood lead concentration. The Newborn Screening (NBS) Section tests for 57 congenital metabolic and endocrinologic disorders such as cystic fibrosis and sickle cell anemia for every infant born in Michigan. This laboratory testing program is part of a comprehensive state program for newborns including referral to specialty clinics and follow-up care to prevent and treat serious health problems.

Key events and activities in FY2024 include:

- Produced the video, "Lead Specimen Collection Using Microtainers," in conjunction with MDHHS Communications to assist health care providers with blood lead collection.
- Around 5,000 blood samples and 6,000 environmental samples were analyzed for lead.
- Participated in biomonitoring and surveillance activities through the PFAS in Firefighters of Michigan (PFOMS) Surveillance Project, the Michigan Chemical Exposure Monitoring (MiChEM) Program and the Michigan PFAS Exposure and Health Study (MiPEHS). The PFOMS Project included visits to 122 fire stations and specimens from 1,090 participants. Biomonitoring activities brought in close to 10,000 specimens.
- Coordinated a response to PFAS contamination along with six other state agencies as a member of the Michigan PFAS Action Response Team (MPART).
- Completed the first round of specimen collection for MiCHEM. The lab received specimens from 1,786 participants, amounting to about 16,000 individual tests being performed. This also included additional specimens from 1,561 participants for the biorepository. Specimens were received and logged by technicians and included 72 weeks of on-site clinic support by field technicians.

- Collaborated with the MDHHS Environmental Health Bureau (EHB) and CDC to set up an H5N1 Influenza Serostudy Clinic to survey migrant workers at three exposed dairy farms. Laboratory Technicians Ethan Zaerr, Abigail McNitt, Derek Miltner and Jason Spoelman worked at the clinic to process the specimens and accommodate the daily changes to the schedule to keep everything running smoothly.
- Analyzed 150 specimens for sulfur mustard metabolites for the CDC LRN-C surge exercise in nine hours and eighteen minutes from the time of receipt of specimens. Reported results were a 100% match with the network target values.
- Successfully completed HNPAA (4-hydroxy-3-nitrophenylacetic acid) and Ricinine Emergency Response Exercises for the CDC LRN-C Program.
- Clinical Organic Unit Manager Tim Karrer attended an LRN-C presentation at the Battle Creek Fire Department and assisted with questions.
- Laboratory Scientists Lauren Rosquin, McKenzie Scheffler and Brooke Nelson attended the 2024 Winter Conference on Plasma Spectrochemistry.

- McKenzie Scheffler was awarded a Radiochemistry Graduate Certificate Program scholarship from the University of Iowa. She will be in the inaugural cohort of this new program that facilitates future involvement in the CDC Laboratory Response Network-Radiological (LRN-R) Program.
- Nearly 4,000 samples were analyzed for the Fish Monitoring Program. Representatives from EGLE and MDHHS EHB visited for a presentation on where samples come from and what happens to the data once the laboratory reports it out.
- Analyzed around 3,000 harmful algal bloom samples.
- Invited by the MDHHS EHB to a meet-and-greet with CDC National Center for Environmental Health Director Ari Bernstein to discuss environmental health issues and how the laboratory is integrated into multiple facets of health services and provides support at the local, state and federal levels.
- Hosted and shared PFAS testing expertise with Hiyoshi, a company based in Japan and part of the Michigan-Shiga sister state program, to assist with their interest in bringing PFAS testing to their country.
- Analyzed 260 samples for the FERN Program. USDA Food Safety and Inspection Services National Program Officer Kevin Vought visited for a presentation on the program.
- Laboratory Technician Supervisor Andrea Decker assisted the Quality Assurance Section with implementation of the MediaLab document management application.
- Hired Milica Bowman as the Environmental Technical Supervisor.

- A representative from MDHHS EHB visited and presented a talk on environmental lead testing and how it may lead to testing spices, teas and supplements. They talked about how many samples are collected in a home and why, the type of samples that are collected and how the lab results are used and shared with homeowners.
- Laboratory Scientists Bree Koslowski and Emily Garner attended Pittcon, a conference focused on analytical chemistry.
- Laboratory Scientist Brie Lamb was featured in the MDHHS employee newsletter for her work in the Environmental Organic Unit as part of a series highlighting various jobs throughout the department.

- Added lead paint, mercury in tissue, PFAS in tissue and polychlorinated biphenyls (PCBs)/pesticides in tissue methods to the American Industrial Hygiene Association Laboratory Accreditation Program, LLC (AIHA LAP) accreditation testing menu.
- Diagnosed more than 300 infants with congenital disorders through newborn screening testing.
- The NBS Section Operations and Analytics Unit was formed with Heather Wood as manager.
- NBS Section Manager Shawn Moloney attended the APHL Newborn Screening Technical Assistance and Evaluation Program (NewSTEPS) steering committee meeting and spoke about higher-tier workgroup updates.
- NBS Metabolic Unit Manager Eric Wotring attended the Hunter's Hope Symposium focusing on Krabbe Disease and related Leukodystrophies.

Testing Updates:

- ✓ Completed the metals in drinking water surveillance validation.
- ✓ Worked on expanding testing capabilities to perform organics in drinking water in support of surveillance testing throughout the state.
- ✓ Worked on inclusion of saxitoxin in the harmful algal blooms in drinking and recreational water testing.
- ✓ Quantification of dioxins, furans and non-ortho (co-planar) PCBs in fish tissue using gas chromatography-high resolution mass spectrometry (GC-HRMS).
- ✓ Quantification of pesticides and PCBs in fish tissue using gas chromatography-triple quadrupole mass spectrometry (GC-QQQ).
- ✓ Metals in food and tissue by inductively coupled plasma-mass spectrometry (ICP-MS) and inductively coupled plasma-atomic emission spectroscopy (IC-AES).
- ✓ Verification of a new instrument for blood lead testing.
- ✓ LRN-C:
    - Verification and characterization of two instruments for toxic metals in blood.
    - Quality control (QC) characterization of two instruments for HNPAA.
    - QC characterization of two instruments for cyanide.
    - Verification and characterization of two instruments for Lewisite metabolites.
- ✓ Biomonitoring:
    - Verification and characterization of two instruments for biomonitoring urine and blood.
    - Verification of a new instrument for arsenic speciation.
    - Validation for aluminum and chromium in blood.
    - Validation for thyroid hormones in dried blood spots by liquid chromatography-tandem mass spectrometry (LC-MS/MS).
    - Verification of a second instrument for persistent organic pollutants in serum.
    - PFAS dried blood spot method update and validation for two instruments.
- ✓ Validated a next generation sequencing assay for cystic fibrosis testing while adapting it to high throughput needs.
- ✓ Worked on validating new mass spectrometer instruments for Neobase2 that covers testing for 44 of the newborn screening disorders.
- ✓ Validated new instruments for galactosemia testing.

Infectious Disease Division

Microbiology, Virology and Genomics Sections

The Infectious Disease Division is designated as a CDC Laboratory Response Network Biological (LRN-B) Advanced Tier laboratory that tests biological samples for CDC, the Federal Select Agent Program and the Food Emergency Response Network (FERN). It also provides quality reference and specialized testing services for rapid and effective detection and surveillance of emerging and existing communicable diseases. The Microbiology Section performs testing for a variety of threats such as foodborne illness, sexually transmitted infections (STI), fungal disease, as well as respiratory diseases like tuberculosis (TB) and pertussis. The Virology Section handles viral public health threats such as SARS CoV-19, West Nile virus, Jamestown Canyon virus, rabies and Eastern Equine Encephalitis (EEE) virus. The Genomics Section assists epidemiologic efforts to trace and monitor emerging infectious diseases and their variants via genetic sequencing and data analytics. The laboratory also functions as the National Tuberculosis Molecular Surveillance Center and the National Hepatitis C (HCV) Nucleic Acid Test (NAT) Reference Center.

Key events and activities in FY2024 include:

- Developed the Division Strategic Priorities Plan for 2024-2028.
- Hosted a four-day CDC workshop titled, “Introduction to Diagnostic Parasitology” with 20 total participants, including BOL Microbiologists Julius Kuya and Matt Vogel.
- Responded to surges in Mpox and highly pathogenic avian influenza (HPAI) cases.
- The Mycobacteria/Mycology Unit faced the challenge of unavailable pyrazinamide (PZA) for tuberculosis susceptibility testing from a nationwide manufacturer.
- Hosted a CDC workshop on influenza and severe acute respiratory syndrome (SARS) molecular detection with around 20 attendees. Laboratorians from across the U.S., including Hawaii and Guam, attended the training. The course included both lecture and hands-on laboratory methods to provide diagnostic surge capacity and routine seasonal surveillance of these respiratory pathogens.

- Received visitors from CDC Public Health Infrastructure (PHI), Public Health Emergency Preparedness (PHEP), OutbreakNet Enhanced (OBNE) and Epidemiology and Laboratory Capacity (ELC) Programs.
- Hosted a Northern Michigan University student for clinical rotations towards their Clinical Laboratory Science degree.
- Microbiologists Julius Kuya, Brady Parr, Ashley Rogers, Matt Vogel and Chong Vue assisted with teaching a BOL workshop for hospital staff titled "Recognize, Rule-out, Refer: Identification of Biothreat Agents."
- Veteran Laboratory Scientists Stephen Dietrich and Julie Day retired.
- The Microbiology Section Food/Enterics/STI Unit was formed with Nicole Ayres as manager.
- Hired Dr. Katie Margulieux as the HIV, Molecular and Rabies Unit manager in the Virology Section after completion of her CDC Laboratory Leadership Service Fellowship role with the BOL.
- Laboratory Technician Alyssa Lopez attended a mycology workshop at the spring meeting of the South Central Association of Clinical Microbiologists (SCACM).
- The 2024 CDC U.S. TB Elimination Champion Award was presented to the National TB Molecular Surveillance Center team at the BOL.

- Mycobacteria/Mycology Unit staff assisted the state of Ohio while their biosafety level three laboratory was down, performing all processing, identification and susceptibility testing for about three-and-a-half weeks. The unit helped the state of New Jersey catch up on their identifications and susceptibility testing, processing about 30 tuberculosis drug susceptibility tests and close to 60 identifications. They also performed susceptibility testing for the Pennsylvania state laboratory while their MGIT instrument was down. The staff put in extra effort to maintain turnaround times and provide the same level of excellence for all.
- Microbiologist Tonya Heyer attended a mycology workshop at Mayo Clinic titled "2nd FDLC/Atlas Course in Clinical Fungi."
- Microbiologist Dan Gard attended training for the Tecan automated sampling platform.
- Virology/Immunology Section Manager Dr. Diana Riner took over directorship of the Kalamazoo and Gaylord Regional Laboratories after receiving her CLIA Laboratory Director Certificate.
- Genomics Section Manager Dr. Heather Blankenship earned her CLIA Laboratory Director Certificate and served as director of the Western Upper Peninsula Regional Lab.

- Dr. Blankenship and Bioinformatics and Genomic Epidemiology Unit Manager Dr. Ariana Miles-Jay attended and assisted with the development of the Council of State and Territorial Epidemiologists Pre-Conference Workshop.
- Dr. Soehnlen, Dr. Blankenship, Genomic Sequencing Unit Manager Becky Kramer and Laboratory Scientists Yasir Nawaz and Ellie Yoon attended the NGS QI Peer-to-Peer Initiative Program with the Florida Bureau of Public Health Laboratories through APHL.
- The Genomics Section hosted an Advanced Molecular Detection Symposium at the BOL as part of their training lead role for the CDC Midwest Region Bioinformatics Program. The day-and-a-half event had 50 attendees, including 26 from out of state representing 11 jurisdictions.
- Microbiologist Elizabeth Burgess received the 2024 PulseStar Award, which recognizes exceptional contributions to The National Molecular Subtyping Network for Foodborne Disease Surveillance, at CDC PulseNet's National InFORM Conference.
- Laboratory Scientist Steve Dietrich received the 2024 PulseNet Lifetime Achievement Award at CDC PulseNet's National InFORM Conference for his 25 years of contributions to the PulseNet Program.

Testing Updates:

- ✓ Revalidation of polymerase chain reaction (PCR) methods in preparation for laboratory renovation.
- ✓ Verification of updated Aptima Combo 2 Assay on the Panther System for *Chlamydia trachomatis* (CT) / *Neisseria gonorrhoeae* (GC) testing.
- ✓ Changed from ethambutol discs to ethambutol powder for agar plate susceptibility testing of *Mycobacterium tuberculosis* complex.
- ✓ The Virology Section developed a very sensitive and specific layered multiplex real-time PCR assay for the detection of five arboviruses likely to cause disease in human and animal populations.
- ✓ Whole genome sequencing analysis of *Salmonella sp.*
- ✓ Performance verification of a new BioRad Geenius reader for HIV-1 and HIV-2 testing.
- ✓ CDC Human Influenza Virus RT-PCR Diagnostic Panel.
- ✓ *Candida auris* PCR and culture confirmation from axilla and groin swab samples.

Quality Assurance

The Quality Assurance (QA) Section supports laboratory operations across all phases of testing and manages the laboratory quality management system and accreditation maintenance. The Data and Specimen Handling (DASH) Central Receiving Unit receives specimens and samples for laboratory testing, resolves specimen errors and handles all packing and shipping for send outs. The DASH Central Receiving Unit Warehouse disseminates newborn screening cards, packaging, shipping and collection supplies to laboratory submitters as well as other items in support of Public Health Administration programs. The DASH Data Handling Unit performs demographic data entry, resolves data inaccuracies and completes all legal requests. The Laboratory Support Unit manages glassware washing, preparation and dissemination to testing areas. The Quality Control Unit tracks proficiency testing and laboratory competency events, manages the logistics for preventive maintenance on general laboratory equipment and systems and performs quality checks on incoming media.

Key events and activities in FY2024 include:

- MediaLab was implemented to allow the BOL to move some forms and most competencies from a paper-based method to an electronic platform.
- The American Industrial Hygiene Association Laboratory Accreditation Program, LLC (AIHA LAP) approved the BOL for reaccreditation.
- The BOL internal audit team completed 10 AIHA LAP internal audits.
- The BOL internal audit team, unit managers, and QA Section completed the College of American Pathologists (CAP) interim inspection. This is required to be completed in years when there is no external CAP inspection.
- QA implemented the eSignature program for secure, efficient electronic routing and signing of documents to multiple individuals.
- New scanners were installed in DASH.
- The BOL and the EHB collaborated with CDC to set up an H5N1 Influenza Serostudy Clinic to survey migrant workers at three exposed dairy farms. Once frozen samples were sent to the BOL, the DASH Unit quickly sent out the much-anticipated samples to CDC with ample amount of dry ice, which proved to be prescient as the shipper temporarily misplaced the package. DASH Central Receiving Unit Manager Matthew Bashore and his team contacted the shipper and the driver to start the search on their end, and the samples were found and received at CDC still frozen.

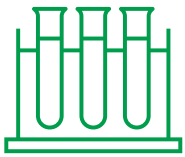
Laboratory Support Unit:

- Ran 71 oven sterilizations.
- Ran 294 loads of glassware.
- Filled 93 glassware orders from all testing areas.
- Prepped 58,800 pieces of glassware.

Quality Control Unit:

- Addressed 4,166 emails.
- Tracked and routed 282 proficiency testing (PT) events.
- Coordinated and completed 56 vendor visits.
- Tracked and processed 834 competencies.
- Evaluated 858 shipments of media.
- Tracked 137 corrective action reports.

DASH Data Handling Unit and the DASH Central Receiving Unit:



- Completed data entry 4,310,784 times.
- Accessioned 306,194 specimens for more than seven million requested tests.
- Resolved 2,409 specimen level errors.
- Shipped out 386 dangerous goods packages.
- Processed 4,029 requests for information.

Warehouse Unit:

- Compiled and shipped 754,286 kit components for 5,055 order requests through the Laboratory Kit Order Tracking System (LKOTS).
- Shipped 1,045 harmful algal bloom (HABs) kits.
- Shipped 2,520 newborn screening cards.
- Sent out 981 antibiotic orders.

Laboratory Systems Section and Safety Office

The Laboratory Systems Section (LSS) administers two laboratory information management systems (LIMS) ensuring real-time reporting of laboratory results to hospital laboratories, veterinary clinics, physician offices, clinical laboratories, environmental agencies, as well as local, state and federal health officials to track outbreaks and prevent illness, disease and deaths. LSS outreach staff provides training in packing and shipping for biological and chemical threat agents and laboratory biosafety, represents the BOL in public health emergency preparedness activities, and manages a laboratory science education program for K-12 students.

Key events and activities in FY2024 include:

- Electronic Test Ordering and Results (ETOR) by HL7 went live for Allegan County Health Department in March 2024.
- Implemented the MediaLab electronic platform for the LIMS Request for Change (RFC) workflow.
- Completed 190 RFCs for end users.
- Completed 16 STARLIMS site acceptance test (SAT) for new tests.
- STARLIMS support was provided to around 200 users, including six distinct regional laboratory sites.
- Replaced the Newborn Screening (NBS) transfer PC, changing configurations to work better with Windows 11.
- Added high-performance liquid chromatography (HPLC) instruments to the NBS firewall transfer PC workflow.
- Made major improvements in the Revvity LIMS for managing NBS user roles and permissions.
- Hosted two APHL interns who learned about BOL operations while working on assigned projects.
- Biosafety Officer Carrie Anglewicz and the biosafety sub-committee coordinated laboratory training activities during Biosafety Month with the theme, “Escape from Biohazard Island.” Training activities focused on biosafety topics including proper personal protective equipment (PPE), spills, best work practices and risk assessments. To boost engagement, the laboratory section with the highest participation received the coveted “Golden Flask” award.

- Carrie Anglewicz organized a point-of-care “Testing Best Practices” workshop for 20 local health department nurses utilizing the new BOL training lab space. She also taught waived testing fundamentals to the Calhoun County Health Department.

- Carrie Anglewicz represented APHL on the Council of State and Territorial Epidemiologists' (CSTE) *Brucella* position statement workgroup to update the national brucellosis standardized surveillance case definition for health departments.
- Chemical Threat Training Coordinator Teresa Miller organized a successful CDC Specimen Packaging and Shipping Exercise (SPaSE) for the BOL with a 100% passing score.

- Teresa Miller provided chemical threat packing and shipping training at Henry Ford Jackson Hospital for 20 attendees, contributed to production of an LRN-C hospital training video, gave an LRN-C presentation to the Battle Creek Fire Department and co-authored the new Clinical and Laboratory Standards Institute (CLSI) PRE07 document "Collection and Handling of Anterior Nares, Nasogastric, Nasopharyngeal, Midturbinate, Oropharyngeal and Saliva (Oral Fluid) Specimens."
- Biological Threat Training Coordinator Jason Wholehan delivered 17 in-person packing and shipping training courses for BOL partners and, combined with the online MI-TRAIN learning module, reached 316 students. He also provided select agent refresher training to BOL employees.
- Jason Wholehan, Carrie Anglewicz, APHL intern Allyssea Smith and several Microbiology Section staff organized and gave presentations for a "Recognize, Rule-Out, Refer" workshop hosted on-site. About 22 hospital staff attended and learned how to identify biothreat agents through a series of lectures covering safety best practices and identification details of the biothreat bacteria. There was also an opportunity to see the live organisms up close in the training lab. Teresa Miller and Laboratory Outreach Analyst Heather Seymour provided additional coordination during the workshop.

- Heather Seymour attended the Great Lakes Homeland Security Conference hosted by the MDHHS Division of Emergency Preparedness and Response, a CDC science ambassador regional training workshop called "Teaching Public Health with CDC," and, along with Carrie Anglewicz, the Michigan Association of Laboratory Science Educators (MALSE) presentation "Connecting Labs and Classrooms: Insight and Innovation to Engage Secondary Students and Ignite Scientific Curiosity."

- Heather Seymour, along with 11 college interns, provided activities and presentations through the BOL Explore Lab Science (ELS) Program for 23 events this year and reached approximately 22,000 students. Events included seven elementary STEM nights, six career fairs, three classroom presentations, a Scout meeting and a summer camp. She also provided information tables at Oakland University's Healthology Symposium and Farmington High School's Health Occupations Students of America (HOSA) Conference.

- The ELS Program provided a set of special awards for the Flint Regional Science and Engineering Fair and assisted with judging health and biological science related student projects.
- An informational video about the ELS Internship Program was completed.
- An ELS intern completed a job shadowing experience across all laboratory units and described it as a valuable opportunity for career exploration.
- Heather Seymour partnered with the Saginaw County Health Department and the Saginaw Regional Lab to present material and activities for the Mid Central Area Health Education Center and Central Michigan University College of Medicine's Health Careers Pipeline Program for ninth and 10th grade students enrolled in Saginaw area schools. The program provides opportunities to explore a variety of health careers, pathways to post-secondary education and networks of support to achieve their goals. This year's program had 20 high school students from nine Saginaw County schools and 12 Saginaw Valley State University college mentors participating.
- Health and Safety Officer Judith Smith retired after 37 years of service.
- Coordinated 21 BOL tours for 120 people.

Publications and Presentations

Publications:

- Goodfellow SM, Nofchissey RA, Arsnoe D, Ye C, Lee S, Park J, Kim W, Chandran K, Whitmer SLM, Klena JD, Dyal JW, Shoemaker T, **Riner D**, Stobierski MG, Signs K, and Bradfute SB. Case of Human Orthohantavirus Infection, Michigan, USA, 2021. *CDC Emerging Infectious Diseases (EID) journal,* Vol. 30, No. 4, p 817 (2024). http://doi.org/10.3201/eid3004.231138
- **Geiger MJ, Morrison JM, Carmack DJ, Lockwood-O'Brien SY, Stagliano MC, Karrer TA.** A high-throughput small volume matrix based calibration using isotope dilution liquid chromatography tandem mass spectrometry analysis for 42 per and polyfluoroalkyl substances in groundwater. *J Chromatogr A.* Vol. 1716, 464633 (2024). https://doi.org/10.1016/j.chroma.2024.464633
- Nichols M , Stapleton GS , Rotstein DS , Gollarza L , Adams J , Caidi H , Chen J , Hodges A , Glover M , Peloquin S , Payne L , Norris A , DeLancey S , Donovan D , **Dietrich S** , Glaspie S , McWilliams K , **Burgess E** , **Holben B** , Pietrzen K , Benko S , Feldpausch E , Orel S , Neises D , Kline KE , Tobin B , Caron G , Viveiros B , Miller A , Turner C , Holmes-Talbot K , Mank L , Nishimura C , Nguyen TN , Hale S , Francois Watkins LK. Outbreak of multidrug-resistant *Salmonella* infections in people linked to pig ear pet treats, United States, 2015–2019: results of a multistate investigation. *Lancet Reg Health Am.*, 34, 100769 (2024). https://doi.org/10.1016/j.lana.2024.100769
- Suleyman G, Shallal A, Ruby A, Chami E, Gubler J, McNamara S, **Miles-Jay A**, Tibbetts R, Alangaden G. Use of whole genomic sequencing to detect New Delhi metallo-B-lactamase (NDM)-producing *Escherichia coli* outbreak associated with endoscopic procedures. *Infect Control Hosp Epidemiol.* Mar 18:1-8 (2024). https://doi.org/10.1017/ice.2024.36
- **Morrison JM.** PFOMS: PFAS in Firefighters of Michigan Surveillance. The article appeared in the Winter 2024 LabLink and Guardian of Public Health newsletters to highlight laboratory testing and support of this project.
- **Yeleti, S.** Harmful Algal Blooms, Determination and Quantitation. The article appeared in the Fall 2024 LabLink and Guardian of Public Health newsletters.

Presentations:

- APHL/BOL twinning program virtual presentations with Indonesia:
    - Mycobacteria/Mycology Unit Manager Angie Schooley, Microbiology Section Manager Dr. Kimberly McCullor, and Dr. Soehnlen presented tuberculosis testing information.
    - Chemistry and Toxicology Division Director Dr. Matthew Geiger presented newborn screening biorepository specimen processing and storage procedures.
    - Tim Karrer and Dr. Geiger presented PFAS testing information.
- Tim Karrer presented "Lessons learned: building public health laboratory capacity for the analysis of biomarkers to support biomonitoring projects" at the APHL National Biomonitoring Meeting.

- Microbiologist Jolene Vanneste taught two classes of "*Mycobacterium tuberculosis*: diagnostic principals and procedures" in collaboration with CDC, APHL and the Alabama Bureau of Clinical Laboratories.
- Jolene Vanneste and Angie Schooley did a short presentation on pyrazinamide (PZA) phenotypic testing in Michigan at the APHL National Call on Infectious Disease Issues.
- Jolene Vanneste did a presentation on nucleic acid amplification testing (NAAT) at the World Tuberculosis Day meeting.
- Carrie Anglewicz and Dr. Riner taught waived testing fundamentals for the Calhoun County Health Department.
- Drs. McCullor, Riner and Soehnlen provided a "Lab 101" talk for Livingston County, Huron County and the Mid-Michigan Health Department in Midland.
- Dr. Riner presented "HIV pre-exposure prophylaxis (PrEP): navigating testing strategies and considerations" for an APHL webinar.
- Microbiologist Kristen Finch presented the poster "Development of sensitive and specific layered multiplex RT-PCR assay for five arboviruses" at CDC's Vector Week Conference.
- Laboratory Scientist Dr. Mark Lemos presented a poster "Hindsight is 2022: Michigan's experience implementing an MS/MS-based method for GAMT deficiency screening in newborns" at the APHL NBS Symposium.
- Shawn Moloney presented "How to increase higher-tiered testing in NBS laboratories" for the APHL Higher-Tier Testing Workgroup.

- Teresa Miller and Clinical Chemistry Section Manager Jessica Pruett spoke at the Chemical Industry Outreach Workshop for an audience including the Michigan National Guard's 51st Civil Support Team and the Federal Bureau of Investigation.
- Bioinformatics Specialist Dr. Muhammad Nawaz, Dr. Blankenship and Dr. Miles-Jay presented a poster "Genomic analysis of *Blastomyces* outbreak in Michigan" at the APHL/CDC Advanced Molecular Detection (AMD) Days.
- Laboratory Scientist Sneha Yeleti presented "Overview of harmful algal blooms" at the MDHHS Public Health Administration Epidemiology Seminar.
- Dr. McCullor presented a continuing education virtual talk on "Updates for *Candida auris* screening recommendations" through SCACM.
- Dr. McCullor spoke at the APHL/CDC parasitology workshop hosted by BOL.
- Fall SCACM Meeting:
    - Jason Wholehan presented "Bio-What!? Crime, terrorism, weapons and war."
    - Dr. Riner presented "Novel influenza viruses isn't just for the birds: detection of high pathogen avian influenza in humans."
- APHL Annual Conference:
    - Environmental Chemistry Section Manager Keri Fisher moderated, and Dr. Blankenship spoke on "The climate crisis: public health laboratories' call to action."
    - Jason Wholehan spoke with the Public Health Preparedness and Response Committee about "Trials and tribulations: Packing and shipping high-consequence and emerging threats."
    - Drs. Shah and Soehnlen presented "Building capacity and sustainable laboratories through twinning in Indonesia."
    - Carrie Anglewicz presented "Strategies and model practices for hiring and retaining the best PHL workforce talent."

- CDC PulseNet National InFORM Conference:
    - Elizabeth Burgess presented "Modernizing traceability in the WGS workflow."
    - Laboratory Scientist Dr. Kristin Jacob presented "Lessons learned in validating use of NextSeq 2000 for routing PulseNet surveillance."
- Teresa Miller presented "Merging missions: partnerships to protect the public's health" and a townhall on BOL's cross border partnerships with Canada at the National Association of County and City Health Officials (NACCHO) Preparedness Summit.

- Dr. Margulieux spoke on a panel about pathways to public health careers for the CDC Science Ambassador Regional Training Workshop, “Teaching public health with CDC.”
- Laboratory Scientist Dr. Scott Smith was a panelist speaking about gas chromatography (GC) and tetramine method for an LRN-C troubleshooting call with 80 attendees.
- Chong Vue presented “*C. botulinum* toxin detection by MALDI-TOF” at the Laboratory Flexible Funding Model (LFFM) cooperative agreement program grantee technical meeting hosted by APHL, FDA, Office of Regulatory Affairs, Center for Food Safety and Applied Nutrition and Center for Veterinary Medicine.
- Dr. Blankenship gave two talks at the American Society for Microbiology microbe meeting.
- Laboratory Scientist Krystyna Weiss-Pawlak presented “Addition of GAMT deficiency to Neobase2 kit” at the World View Summit NBS Meeting.

Featured Articles

State breaks ground on new, state-of-the-art public health and environmental science laboratory

Public Press Release from Michigan Department of Technology, Management & Budget (DTMB), April 19, 2024. DTMB video of the groundbreaking ceremony.

Officials from the State of Michigan break ground on a new state lab being built at the State Secondary Complex in Dimondale, Michigan. Photo credit: Steve Barosko, Michigan Department of Health & Human Services.

April 19, 2024
Media Contact: Laura Wotruba, wotrubal@michigan.gov, 517-282-9753

LANSING, Mich. – The state officially broke ground today on a new, state-of-the-art public health and environmental science laboratory to be constructed at the State Secondary Complex in Dimondale. The new 300,000-square-foot facility will house consolidated lab space for the Michigan Department of Health & Human Services (MDHHS); the Michigan Department of Environment, Great Lakes, and Energy (EGLE); and the Michigan Department of Labor and Economic Opportunity (LEO).

"The Bureau of Laboratories performs expansive testing to protect the health and safety of the public – including newborn screenings, testing for infectious diseases like tuberculosis or legionellosis, testing for infectious agents and toxins like rabies or harmful algal blooms,

and monitoring for chemicals in fish," said MDHHS Director Elizabeth Hertel. "We are incredibly proud of the work performed by our employees at the Bureau of Laboratories and are excited for this new facility to support our life-saving efforts."
The new facility will expand upon and enable testing and other laboratory functions in a safe, secure environment designed to promote efficiency, collaboration, and innovation. The MDHHS Bureau of Laboratories currently provides a wide variety of clinical and environmental public health testing. Its total volume of all testing is close to 7 million tests per year, making it one of the top seven state public health laboratories in the nation. Examples of testing include:

- Infectious diseases in humans, such as tuberculosis or legionellosis, to include more than 400,000 tests annually, as well as processing more than 200,000 specimens, including bioterrorism and chemical terrorism specimens submitted by law enforcement and the FBI.
- Infectious agents and toxins in materials humans have been exposed to, such as testing for the presence of rabies in a bat that bit someone or testing for toxins from harmful algal blooms. Rabies testing alone saves the state around $30 million by avoiding the administration of unnecessary post exposure prophylaxis (PEP).
- Every newborn baby in the state gets screened for 58 different potential life-threatening disorders within 36 to 72 hours of birth.
- More than 500,000 tests to measure biomarkers of chemical exposures in humans, including blood lead testing and testing for per-and polyfluoroalkyl substances (PFAS) in blood.

"More than 10 million people rely on EGLE to monitor the quality of their air, soil, and water, and we serve as Michigan's principal drinking water laboratory under the Safe Drinking Water Act," said EGLE Director Phil Roos. "This new laboratory will increase the speed and efficiency of our handling of more than 100,000 samples and 2.5 million test results that EGLE currently processes every year, which is critical to protecting the public health of all Michiganders."

LEO's Michigan Occupational Safety and Health Administration (MIOSHA) helps protect the safety and health of Michigan workers by striving to work collaboratively with employers and employees to better prevent workplace injuries, illnesses, and fatalities. With two enforcement divisions covering general industry and construction industry employers, MIOSHA consultation and enforcement staff collect samples during their field activities and send them to the MIOSHA laboratory for analysis.

"Laboratory testing for occupational hazards is a critical component of our work to protect employee health and safety," said MIOSHA Director Bart Pickelman. "With 300,000 employers and 4 million employees in Michigan under MIOSHA jurisdiction, this new laboratory will further our ability to protect workers and provide a valuable service for years to come."

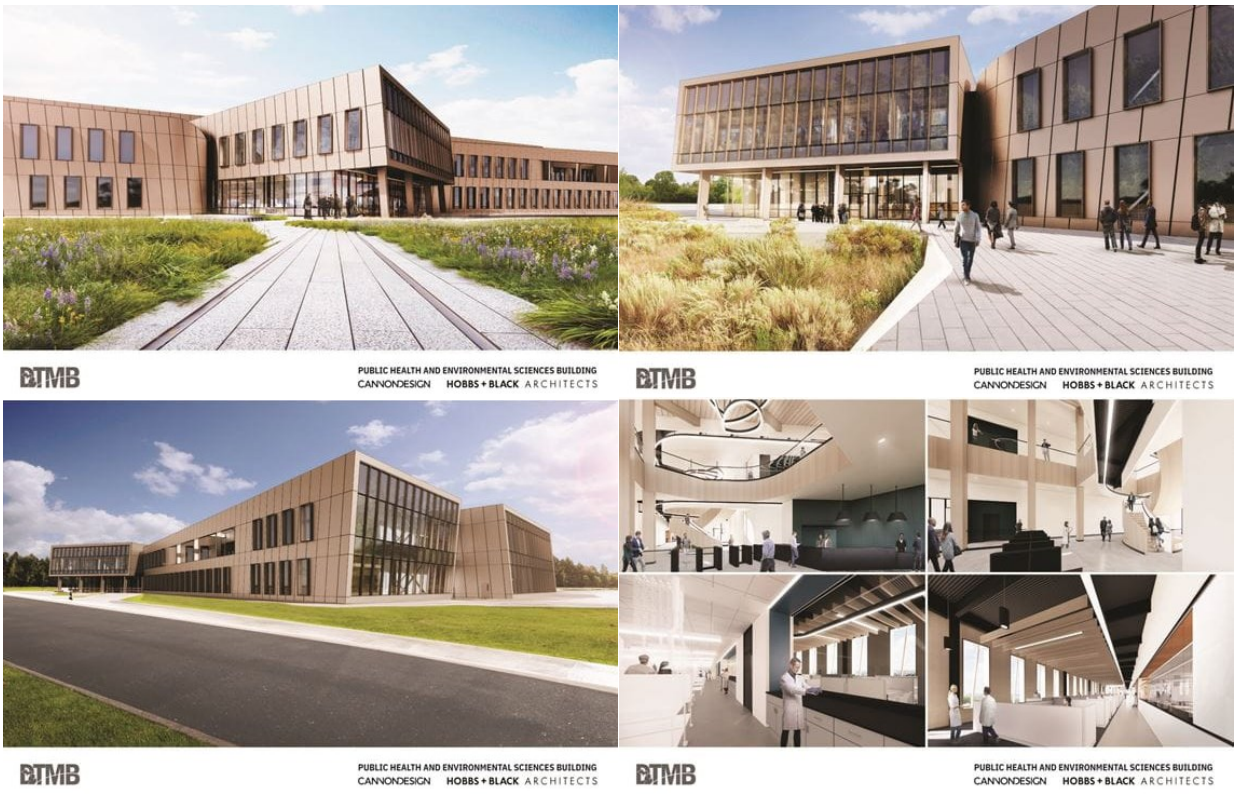
The total budget for the new lab is $326 million, which includes $260 million in federal funding from the American Rescue Plan Act's Coronavirus State and Local Fiscal Recovery Funds.

“Thanks to President Biden, members of our congressional delegation, and Gov. Whitmer’s leadership, Michigan has the opportunity to make this transformative investment that will benefit Michiganders for decades to come,” State Budget Director Jen Flood said. “Today’s groundbreaking is a monumental step toward making a state-of-the-art health and environmental science laboratory a reality and ensuring Michigan remains a national leader.”

The lab is expected to be completed by late 2026 and will feature sustainable design elements, including a geothermal based heating and cooling system, extensive use of daylighting and energy efficient LED lighting, water-saving plumbing fixtures, and cross-laminated timber on the exterior wall panels, which offers high carbon sequestering to help reduce the facility’s carbon footprint. The new building will be maintained and operated by the Michigan Department of Technology, Management & Budget.

“The new consolidated state lab will be a shining example of innovation through collaboration,” said DTMB Director Michelle Lange. “Without the efforts of Gov. Whitmer, the state legislature, and the federal government, we would not be able to deliver a state-of-the-art facility, giving us increased capacity to meet the health and safety needs of state residents.”

The images below are architectural renderings of the new state lab being built at the State Secondary Complex in Dimondale, Michigan.



Indonesia twinning visit to Michigan a success

Article from Association of Public Health Laboratories (APHL) Global Health Newsletter, August 2024, Issue 4.

In the April 2024 newsletter, we introduced you to Francie Downes, Ida Ginting and Shannon Emery. At the time, the three were busy with upcoming travel plans — not only for themselves, but for the reciprocal visit that rounded out a successful year-long twinning program between the Michigan Public Health Laboratory (PHL), Palembang Regional Public Health Laboratory, Yogyakarta Regional Public Health Laboratory and the Indonesia Ministry of Health.

During the five-day visit, Michigan PHL provided presentations, documentation and laboratory walkthroughs. Participants visited the data and specimen handling unit, warehouse, specimen shipping unit, mobile laboratory, tuberculosis (TB)/mycology unit and the training laboratory at the Michigan PHL. The participants also had the opportunity to visit Michigan PHL's partner laboratories, including the Michigan State University Veterinary Diagnostic Laboratory, the Biomedical Program Laboratory of MSU, Saginaw County PHL and Covenant Hospital.

On the last day of the visit, Indonesian counterparts were able to participate in the Lab-Epi weekly call at the Michigan PHL. On that occasion, Sarah Lyon-Callo, the senior deputy director of the Michigan State Department of Health, gave remarks on this activity. She highlighted that this twinning activity was valuable not only for Indonesia but also for the U.S. It provided an opportunity for self-reflection and exploration of key lessons learned.

APHL Manager Shannon Emery noted that both the host laboratory and visitors were incredibly welcoming, gracious and engaged and, of course, took the opportunity to enjoy some traditional Michigan ice cream.

The twinning relationship has been blossoming since September 2023, when a contingency from Michigan PHL visited Palembang to identify potential areas of collaboration. The laboratories have so far held four webinars on TB testing, biorepository, malaria testing and per- and polyfluoroalkyl substances (PFAS) testing that engaged a total of 2,015 participants.

“This visit really helped build the relationship,” says Emery. “They know each other now.” A strong partnership has been established.

All participants shared that they planned to bring ideas from the visits back to their home laboratories and plan to continue communicating through email, WhatsApp and webinars. Two additional webinars on basic next-generation sequencing and on bioinformatics will be hosted this summer. Emery stressed, “The twinning doesn’t stop now. We look forward to continued engagement between these laboratory partners.”

Curious About Twinning?

Are you a U.S. laboratory director with staff who are interested in strengthening global laboratory capacity? The APHL Global Health Twinning Program offers mutually beneficial partnerships, providing ongoing learning and development opportunities for staff from state or local public health laboratories and international laboratories. U.S. laboratory directors are invited to inquire about and apply for future opportunities by emailing us at global.health@aphl.org. Let's build a healthier world together!

Developing new capabilities for surveillance testing of metals in drinking water

Article from BOL LabLink Summer 2024, Volume 31, Number 3.

In response to Michigan Executive Directive 2021-9, which underscores the critical importance of providing safe drinking water to all Michiganders, the BOL Chemistry and Toxicology Division, Environmental Inorganic Unit (EIU) has been working diligently to enhance surveillance testing capabilities by validating methods for the analysis of metals in drinking water. Specifically, we are focusing on quantification of various metals using United States Environmental Protection Agency (EPA) Methods 200.7 and 200.8 (modified) with collision gas technology.

Both EPA methods are designed to analyze drinking water samples for the presence of metals. For EPA Method 200.7, we will be analyzing for the presence of sodium and iron employing inductively coupled plasma-optical emission spectrometry (ICP-OES). For EPA Method 200.8 (modified), we expand our surveillance capabilities by detecting a broader range of metals such as Aluminum, Arsenic, Silver, Barium, Beryllium, Cadmium, Chromium, Copper, Manganese, Nickel, Lead, Antimony, Selenium, Thallium and Vanadium employing inductively coupled plasma mass spectrometry with collision gas technology (ICP-MSMS). The modified version of EPA Method 200.8 allows for improved sensitivity and selectivity during the analysis.

As an overview of the method, water samples are collected by our partners and submitted to BOL for analysis. Prior to analysis, all water samples require the measurement of turbidity, a measurement of the water sample clarity. This dictates if the sample can be analyzed directly or needs to be digested using a mixture of acids to break down the matrix and release the metals of interest which are then are quantified using ICP-MS or ICP-OES.

As part of our commitment to excellence, we are actively preparing for accreditation through the National Environmental Laboratory Accreditation Program (NELAP). This accreditation will further validate our testing capabilities and ensure compliance with rigorous standards.

Our commitment to water safety drives us to develop cutting-edge capabilities for surveillance testing. Together with the Environmental Health Bureau (EHB), we are working to safeguard Michigan's water resources and protect public health. If you have any questions or need further information, please reach out to:
Kelley Freed, BOL EIU unit manager, at 517-335-8357 or email Freedk1@michigan.gov or Jerry Tiernan, EHB Chemical Preparedness & Response Section manager, at 517-338-7471 or email Tiernang@michigan.gov.

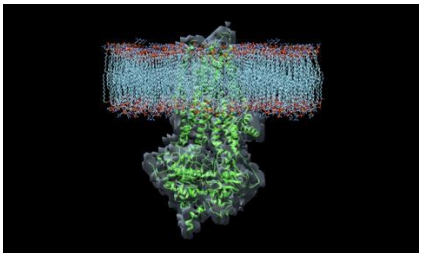
Cystic fibrosis newborn screening by next generation sequencing

Article from BOL LabLink Summer 2024, Volume 31, Number 3.

Cystic fibrosis (CF) is a progressive, genetic disease caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene. CFTR is a membrane protein anion channel that regulates the electrolyte composition of mucus. With mucus homeostasis disrupted, CF patients experience digestive issues that reduce nutrient absorption and respiratory complications with frequent lung infections, to name a few symptoms. Early diagnosis, facilitated by a positive newborn screening, results in substantially improved outcomes through various proactive treatments – unfortunately, there is no cure.

CF is inherited in an autosomal recessive fashion and affects all racial and ethnic groups at varying rates and with varied mutations but, is most prevalent in Caucasians. In 2007, Michigan's Newborn Screening (NBS) laboratory screened for CF using a 1st tier Immunoreactive Trypsinogen (IRT) assay, which is elevated in the blood of CF patients. Then, as a 2nd tier test, the top 4% of elevated IRT samples are reflexed to a DNA assay for mutations in CFTR. Since 2017, the NBS laboratory has utilized a 60-variant CFTR panel as the 2nd tier DNA assay however, there are over 2000 known CF variants. To improve screening for Michigan newborns, we are currently validating a Next Generation Sequencing (NGS) method. This new assay replaces the 60-variant panel with an 139-variant panel.

Optimization was necessary for the 139-variant panel because dried blood spot specimens (DBS) yield less DNA than whole blood specimens. Additionally, the assay has been adapted for automation on the NBS laboratory's Eppendorf epMotion® liquid handling robots to increase workflow efficiency and reduce the possibility of analytical errors. These adaptations have resulted in a robust and accurate sequencing method for the analysis of CFTR in NBS specimens. The expansion of our panel to 139 variants through transition to this NGS-based assay for 2nd tier CF screening will increase detection rates, reduce false negatives, and improve health equity for Michigan's newborns.



CFTR gene
Image by the Cystic Fibrosis Foundation

Bureau of Laboratories presents at national meeting for the Laboratory Response Network

Article from The Guardian of Public Health - Public Health Preparedness Monthly Newsletter, July 29, 2024.

The Bureau of Laboratories (BOL), a Level 1 Laboratory Response Network-Chemical (LRN-C) laboratory, is a national asset that acts as a Centers for Disease Control and Prevention (CDC) surge capacity laboratory and a chemical identification support laboratory during emergency response to chemical exposures. The BOL has served in this capacity since the inception of the LRN-C in 2003.

The CDC Laboratory Response Network (LRN) hosted the Spring 2024 LRN-C Technical Meeting April 8-12th in Jacksonville, Florida. Members from the BOL Chemistry and Toxicology and Laboratory Outreach Section attended the meeting and to hear speakers from other LRN-C laboratories across the country. The theme of the meeting, Rockin' Outreach, was a segue for a panel of subject matter experts to present "Train the Trainer-Chemical Threat Outreach" session, given by Jimmy LaPalme (South Carolina), Teresa Miller (Michigan BOL), and Angela Ren (Florida).

Presidential Decision Directive 39 (PDD 39), U.S. Policy on Counterterrorism, was signed on June 21, 1995, by President Clinton. This directive defined the policies regarding the federal response to threats or acts of terrorism involving nuclear, biological, or chemical materials or weapons of mass destruction. "We shall have the ability to respond rapidly and decisively to terrorism directed against us wherever it occurs… ensure that States' response plans are adequate, and their capabilities are tested…and The United States shall give the highest priority to developing effective capabilities to detect, prevent, defeat and manage the consequences of nuclear, biological or chemical (NBC) materials or weapons used by terrorists."

In response to this directive, the CDC, the Federal Bureau of Investigation (FBI), and the Association of Public Health Laboratories (APHL), formed the Laboratory Response Network or LRN in 1999, with the mission to ensure a local and national asset for laboratory response to a wide range of chemical emergencies and emerging threats. In 2003, federal funding became available to establish the Laboratory Response Network for Chemical Threats, LRN-C, to respond to chemical emergencies. Both the LRN and LRN-C provide collaborative and interconnected analytical testing abilities that enhance the national public health infrastructure and have become valuable resources for our national emergency preparedness capability.

The CDC developed many laboratory test methods for identifying exposures to chemical threat agents listed in the Chemical Weapons Convention. Development of the LRN-C was crucial in order to expand laboratory testing capacity and to provide substantial state and local support for a small- or large-scale response to a chemical release event.

With the support of CDC's Public Health Emergency Preparedness funding, city, regional, and state public health laboratories ensure national laboratory preparedness and provide readiness and expertise for local public health programs.

Contact Us

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BUREAU OF LABORATORIES

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