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Tennessee Department of Health Public Health Laboratory Newsletter

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COMMISSIONER OF HEALTH

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INSIDE THIS ISSUE

ARLN REGIONAL LABORATORY TRAINING HELD IN NASHVILLE

The Tennessee Antibiotic Resistance Lab Network (ARLN) Southeast Regional Lab, held a southeast regional training on June 21-22, 2017. This training was funded by CDC and supported by the Association of Public Health Laboratories (APHL). Trainees consisted of representatives from four jurisdictional state public health laboratories located in Georgia, Florida, Alabama and Puerto Rico. Two CDC subject matter experts (SME) also attended the training to offer instructions on Antimicrobial Susceptibility Testing and real-time PCR detection of Carbapenem genes.

The trainees were offered various hands-on lab activities and instructional classes during this in-depth training. The training included the latest methods to screen for Carbapenem-resistant Enterobacteriaceae and *Pseudomonas aeruginosa* (CRE/CRPA) detection, PCR detection of genes of screened positive organisms, drug susceptibility testing and reporting requirements of non-Klebsiella pneumoniae Carbapenemase (KPC)-producing CRE. The preferred screening test is the Modified Carbapenem Inactivation Method (mCIM), which replaces the often used and inaccurate Modified Hodge Test (MHT). The PCR detection focuses on the five most common CR genes such as KPC, NDM, OXA-48-like, IMP and VIM. The Tennessee State public health laboratory currently uses the Cepheid GeneXpert® Carba -R for rapid detection of all genes at once or CDC lab developed PCRs. Drug susceptibility testing used are Kirby Bauer disk diffusion, Etest or broth microdilution with a standard panel containing colistin.

See ARLN page 6

NEWBORN SCREENING PROGRAM REFINES LYSOSOMAL DISORDERS REPORTING

The Tennessee Department of Health Genetic Advisory Committee met on August 16th and adopted recommended changes to the Newborn Screening Laboratory Lysosomal Disorders (LD) test cutoffs and repeat testing protocols. The Tennessee Department of Health Newborn Screening Laboratory implemented these changes for reporting with specimens received on or after August 12, 2017.

Changes for Lysosomal Disorders are as follows:

- Infants less than 1500 grams birth weight will require a repeat screen on day 30 of life or greater. Lysosomal enzyme activities are unreliable for infants with less than 1500 gram birth weight.
- The normal cutoff for GALC (Krabbe Disease) changed from >12% to >10% of the daily median.
- The normal cutoff for GAA (Pompe Disease) changed from >20% to >15% of the daily median.

If you have any questions, please contact:

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Gwendolyn McKee	615-262-6472	Gwendolyn.Mckee@tn.gov)
Amanda Ingram	615-741-0355	Amanda.D.Ingram@tn.gov)

TN Department of Health

MOSQUITO SURVEILLANCE AND CONTROL GRANTS

With mosquito-borne viruses on the rise, the Tennessee Department of Health (TDH) is encouraging government entities in developing or strengthening mosquito control programs to protect their communities from mosquito-borne diseases. TDH offered a limited number of one-time grants to government entities for mosquito control activities. Entities with large populations (>90,000) received up to $100,000. Entities with smaller populations received up to $40,000. Funds may be used to purchase mosquito traps, equipment, pesticides, supplies for submitting samples for testing, other expendables, and temporary seasonal hires.

Mosquito University Attendees receiving training on mosquito species identification earlier this year .

Priority was given to entities demonstrating:

1. Plans for mosquito control program with the requested budget.
2. Commitment to attend training sessions given by TDH.
3. Plans to submit mosquito samples to TDH for species identification (esp. *Aedes aegypti*) and arboviral testing.
4. Plans to work with local health departments to communicate control activities.

Submitted by:
Abelardo Moncayo, PhD
Director, Vector Borne Disease Laboratory

FROM THE SENTINEL LABORATORY COORDINATOR:
EMERGENCY PREPAREDNESS UPDATE

The Sentinel Laboratory Coordinator is responsible for informing, educating, and preparing our Sentinel Labs for the unexpected. By continuously updating the TDH Sentinel Lab contact list, conducting Packaging and Shipping trainings, holding Plan of Action Bioterrorism Preparedness Workshops, and making numerous site visits to facilities throughout the state, we build relationships and create a network of coordination from all our Sentinel Lab partners. The TDH Division of Lab Services offers the CAP Laboratory Preparedness Exercise (LPX) twice a year, free of charge, to all TN Sentinel labs that perform high complexity diagnostic microbiology procedures in their facility i.e., gram stains of blood cultures, lower respiratory cultures, wounds, and sterile body sites. The CAP LPX is an educational tool, ungraded by CAP, that provides Technologists with Select Agent look-alike organisms to enhance their ability to recognize trigger points associated with, morphology, biochemical reactions, and other unique characteristics of these organisms. It gives the bench tech added confidence, while improving proficiency, when handling plates and performing biochemical tests at the bench or under a biosafety cabinet (BSC). Within the lab, it is essential that technologists have the ability to realize the importance of utilizing best practices when confronted with an unusual organism, or gram stain, and to take the necessary precautions to ensure everyone's safety. Some of the organisms on the Select Agent list have very low infectious doses, thus making it even more important to recognize the need to move under a biosafety cabinet (BSC). All work performed should be under the BSC until the suspicious organism in question is ruled out as potentially harmful. I encourage all Sentinel labs that perform microbiology to sign up for the LPX in the coming year and allow your staff to experience this invaluable tool for themselves and consequently improve the overall safety within your lab. For those labs already enrolled in the LPX, please adhere to the communication protocol pertaining to contacting your LRN lab regarding a possible rule out. I will be sending out notifications for LPX sign up after the first of the year. Please continue to be diligent and attentive to the gold standard of micro, the gram stain, and act according to that interpretation to utilize best practices in your lab. It is my goal, as Sentinel Lab Coordinator, to provide our Sentinel Lab partners with all the tools, training, and educational information necessary to remain safe and secure within the lab. Thanks for all your support throughout the year! I look forward to visiting your facilities in the coming months. Our goal here at the TDH Division of Lab Services is to continue to build strong relationships with our Sentinel Lab partners letting them know we are here to serve.

Submitted by:
Rusty Bowden
Sentinel Laboratory Coordinator

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SPOTLIGHT ON BIOSAFETY

MALDI-TOF Technology and Safety Considerations

Matrix Assisted Laser Desorption Ionization - Time of Flight – Mass Spectrometry (MALDI-TOF)

MALDI – Irradiation of the sample matrix by a laser produces ions

TOF – Electro-magnetic force is applied to the ions simultaneously, resulting in ionic acceleration in a flight tube. Ions travel through the flight tube at speeds based on mass. Lowest mass ions will reach the detector first - heaviest mass ions reach the detector last.

MALDI-TOF analysis creates a protein fingerprint spectra unique to the organism and the spectra is compared to a known spectral database for the organism identification. Prior to implementation of the testing, a safety risk assessment should be completed for the MALDI-TOF instrumentation set up, use and clean up procedure. With the increasing use of MALDI-TOF technology it is important to be aware of safety and misidentification concerns.

Safety Considerations:

- Safe handling of organism isolate during sample preparation, extraction and target slide preparation including proper PPE (face shield) and / or engineering controls such as Class II Biosafety Cabinet (BSC)
- Proper PPE, use of fume hood and safe handling of hazardous chemicals such as Acetonitrile (ACN)
- Complete Inactivation of organism – verify inactivation protocols - some organisms may survive extraction method
- Avoid analysis of suspected high-risk infectious agents (*Brucella spp., Francisella tularensis, Coxiella burnetii*, etc.)
  - Consult with LRN reference lab
  - Look for trigger points prior to analysis on MALDI
  - Follow ASM protocols for ruling out and referring potential select agents
  - Gram stain and biochemical
  - Patient history- travel?

Missed Identification Concerns:

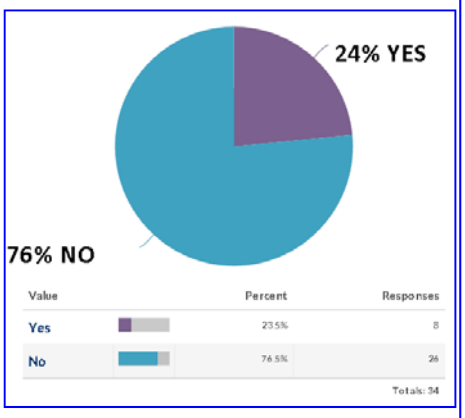
- Laboratories must be aware of software limitations
- Result limited by the database (library)
- Multiple libraries improve capability
- Beware of results that do not make sense – question
- Potential for exposure to highly infectious disease
- MALDI not reliable for identification of select agents

MALDI is cheaper, faster, and simpler than conventional microbial identification methods. It requires less labor and is generally accurate. It is important to educate those who are using this new technology to be aware of the limitations and be respectful of the potential safety hazards.

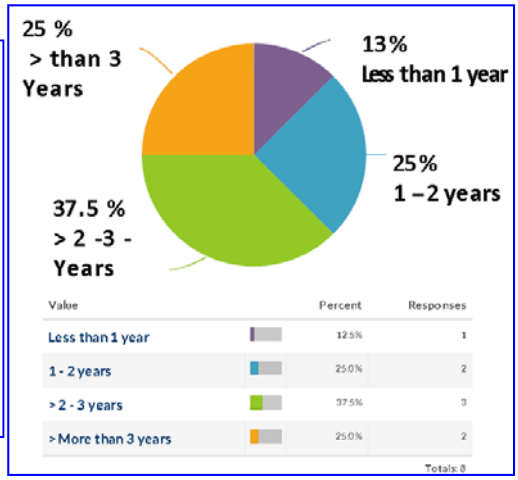
A survey regarding MALDI-TOF technology was recently sent to sentinel labs in TN who perform microbiological identification of microorganisms. Approximately 50% of the labs queried responded to the survey. We appreciate the time taken by each lab that responded! Below are some of the results of this survey.

Submitted by:
Rolinda Eddings
Biosafety Officer

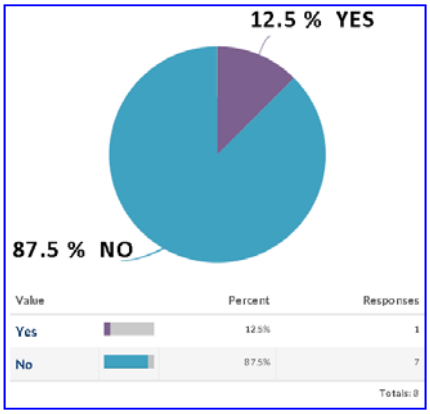
Does your facility currently use a MALDI-TOF instrument for microbiological identification?



How long has your facility been using MALDI-TOF instrumentation?



Does your facility plan to purchase a MALDI-TOF instrument for microbiological ID?



Questions related to MALDI safety will be addressed to facilities per survey responses.

ETEC IN MOTION

Enterotoxigenic *Escherichia coli* (ETEC) was first recognized as a cause of human diarrheal disease in the 1960's and has since been implicated as a major cause of diarrhea amongst travelers and also children in developing countries. ETEC is the most common cause of diarrhea among children <5 years of age in developing countries. In Bangladesh and Egypt, the majority of cases of ETEC occur in children <2 years old, and is less prevalent in children older than 5 years, but the elderly also can be vulnerable to ETEC.

Enterotoxigenic *E. coli* can colonize the small intestines. Even though this illness is usually self-limiting, it can develop into a life threatening illness because of the profuse amount of fluid loss which can result in dehydration. ETEC is the leading cause of traveler's diarrhea. Enterotoxigenic *E. coli* produce toxins which adhere to, and stimulate, the small intestines to produce excessive fluid which causes the diarrhea. The toxins that are produced by this organism can either be heat stable (ST) and/or heat labile (LT). These toxins are not related to *E. coli* O157:H7.

Diagnosis for this illness is usually based upon symptoms, which mainly include profuse watery diarrhea and abdominal cramping. Lesser documented symptoms can include fever, nausea with or without vomiting, chills, loss of appetite, headache, muscle aches and bloating. The illness can usually develop within 1-3 days after exposure and commonly lasts about 3-4 days. Some patients have documented symptoms for as long as 3 weeks. Treatment is predominately supportive therapy. No hospitalization or antibiotics are recommended for routine cases.

The Tennessee Department of Health Division of Laboratory Services is participating with the CDC and two other states as a pilot site to test for ETEC in stool samples. ETEC was chosen because little is *known* of its epidemiology and resistance profiles. Due to the duration of the illness, ETEC can be lengthy which can make it a good candidate for further investigation. This project will help to reduce the negative impact of culture independent diagnostic testing (CIDTs) by demonstrating a laboratories' ability to be able to culture and isolate the suspected organisms after CIDTs are performed.

CDC Photomicrograph of Enterotoxigenic E. coli

Submitted by:
Jeannette Dill
Supervisor, Molecular Biology

References:

http://www.globalhealthprimer.emory.edu/diseases/enterotoxigenic-e-coli.html

https://www.cdc.gov/ecoli/etec.html

CDC Training Resources

CDC Laboratory Training (CDC TRAIN) is a free online learning platform. CDC TRAIN offers many online courses for laboratory personnel. Many courses offer P.A.C.E. continuing education credit.

To access CDC TRAIN and sign up for a free account, visit: www.train.org/main/welcome and click on "Log-in or Create Account" in the top right hand corner. Two great online courses for sentinel laboratory personnel include:

- **Biological Terrorism Training Courses**:

www.cdc.gov/labtraining/cdc-lab-training-courses/bioterrorism-training-courses/bt_training_home.html

- **Fundamentals of Working Safely in a Biological Safety Cabinet**:

www.cdc.gov/labtraining/cdc-lab-training-courses/cdc_biosafety_courses.html

Visit the TDH Laboratory Services "Laboratory Safety" webpage. The webpage has many helpful resources for biosafety, including posts, downloads, and links!

The webpage can be found at:

http://www.tn.gov/health/article/lab-services-safety

EMPLOYEE NEWS

WELCOME NEW EMPLOYEES

JUNE 2017

Ashley Carroll	Microbiologist 2—Knoxville Regional Lab
Holly Jones	Laboratory Technician 2—Sample Receiving/Inventory
Taneka Joyner	Microbiologist 2—Bacteriology GC ARLN
Rasheeda Hogg	Microbiologist 2—Newborn Screening

AUGUST 2017

Christina Dudash	Microbiologist 2—Special Microbiology
Tracy McLemore	Microbiologist 4—Manager, Enterics and ARLN Core

CONGRATULATIONS ON YOUR PROMOTION!

- **Julie Viruez**—Supervisor, General Bacteriology
- **Gwendolyn McKee**—Manager, MSMS and LD, Newborn Screening
- **Lakisha Prowell**—Supervisor, MSMS and LD, Newborn Screening
- **Amy Butts**—Laboratory Technician 2, Newborn Screening

Congratulations on your Retirement!

Juliet Laury

Tennessee Department of Health
Employment Opportunities may be found at:
http://www.tn.gov/hr/topic/employment-opportunities

TRAINING NEWS

The Laboratory Services Directory of Services has recently been redesigned.

Please visit www.tn.gov/health/article/lab-directory to access the new interactive test menu, downloadable resource personnel phone lists, fillable PDF requisition forms, Newborn Screening Program Toolkit, and other laboratory information!

Did You Know?

Special Microbiology

2016:

- 4294 Acid Fast Bacilli samples tested
- 63 confirmed cases of TB in TN

January 1 - June 30, 2017:

- 2382 AFB samples tested
- 55 confirmed cases of TB in TN

ARLN Regional Laboratory Training Held in Nashville *(continued)*

The ARLN Core Lab is a collaborative effort of sentinel labs, state public health labs, state HAI coordinators, and the CDC to survey bacterial populations that may harbor carbapenem-resistant (CR) genes. One of the highlights of this training include ARLN epidemiologist to explain epidemiologists' work in communication with laboratories. TDH Laboratory Services also prides itself on the value of having great partners like APHL and CDC for resources and assisting with this huge task in a short timeframe. Good communication and teamwork played a huge part in coordinating this training.

One SE state attendees commented after the training "I thought this course was really great for those of us just getting our labs set up to perform CRE testing. It was really helpful to see how the TN lab implemented their testing and workflow and to also get input from CDC. I especially appreciated the hands on training as I think that is essential to fully understand the process."

If you have any questions/interests regarding ARLN or if your facility would like to bring onboard any new screening testing, contact Tracey Woodard, the ARLN lab supervisor at 615.262.6340 or by email tracey.woodard@tn.gov.

Submitted by:
Tracey Woodard
ARLN supervisor

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The Mission of Laboratory Services is to provide high quality analytical services of medical and environmental testing and to achieve the Mission of the Department of Health.

www.tn.gov/health/topic/lab

TN Department of Health

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