# Tennessee Department of Health Public Health Laboratory Newsletter

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COMMISSIONER OF HEALTH

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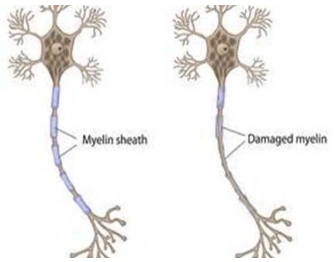
## Inside this issue:



## A LOOK INTO KRABBE DISEASE

Every baby born in the state of Tennessee is required by law to have a newborn screen performed. The Tennessee state lab currently screens for more than 64 genetic disorders that could cause serious harm to the infants if not diagnosed early and treated. In 2017, the State lab is adding 6 additional screening tests. One of these tests detects Krabbe Disease or Globoid Cell Leukodystrophy.[1]

Krabbe disease is an inherited disorder that destroys the protective coating (myelin) of nerve cells in the brain and throughout the nervous system.[1] When this coating is not functioning properly the nerves are unable to pass proper signals throughout the body. In order for this disease to occur, both parents have to carry one copy of the mutated gene. The disease has been reported to affect 1 in 100,000 individuals in the United States.[2] Individuals who are affected with Krabbe usually suffer from stiffness, muscle weakness, feeding difficulties, slow mental and physical development, failure




to thrive, and seizures.[3] The onset of the disease usually begins before age one but can sometimes have a later onset during childhood up to adulthood. As the disease progresses, hearing loss,

*See KRABBE Page 6*

## CHEMICAL TERRORISM LABORATORY VALIDATES RICININE/ABRINE TESTING

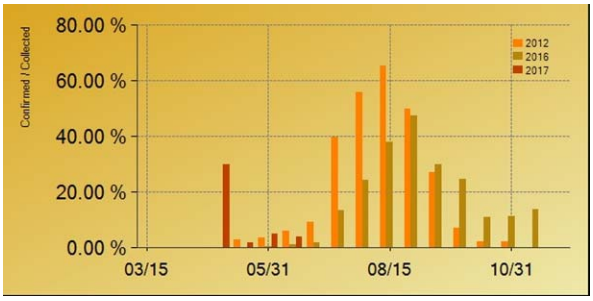
The Chemical Terrorism Laboratory recently validated the CDC method for Ricinine/Abrine in urine by Liquid Chromatography/ Tandem Mass Spectrometry (LC/MSMS). Our first proficiency testing (PT) will be in August, 2017.

Ricin and abrin are toxic proteins derived from two plants: Castor bean plant (*Ricinus communis)* and the Crab's eye plant (*Abrus precatorius)* respectively. Ricin has become a focus of interest as an agent of illicit poisoning. Abrin is thought to pose a similar level of threat. Lethal doses for ricin vary by route of exposure and are estimated to range from 0.70 mg by inhalation or injection to 70 mg by ingestion for a 70 kg adult. The toxic dose of abrin is similar to that of ricin.

Ricinine is a small molecule (1.64 g/mol, 3-cyano-4-methoxy-N-methyl-2-pyridone) that shares a common plant source with ricin, and its presence can be used as a marker for ricin exposure. Ricinine exhibits its own inherent toxicity manifested primarily by central nervous system excitation and seizures. Depending on preparation of the plant material, it would be expected to exist in varying ratios with ricin. It is not a metabolite of ricin and, theoretically, ricin could be purified to contain no ricinine but this is thought to be impractical.

*See Ricinine Page 6*

# WEST NILE SURVEILLANCE PREDICTIONS FOR SUMMER 2017




Because of the recent mild winter, vector-borne diseases are likely to be more prevalent this summer. One such disease that has already shown potential to be at an increased rate this season is West Nile Virus (WNV), a mosquito-borne flavivirus found in birds and capable of causing severe disease in humans, horses, and birds. 99% of all WNV cases are from the *Culex* species of mosquito. The risk factors for WNV include exposure to infected mosquitoes, proximity to dead birds, older age, immunosuppression, and occupational exposure to the virus.

Mosquito surveillance data from Shelby County has shown a significant increase in the presence of West Nile Virus this year compared to 2016 YTD data. At the end of May 2017, 5% of the mosquitoes collected were confirmed to have West Nile Virus, while in 2016 at this point, none of the mosquitoes collected tested positive for the disease. In 2012, which had the highest numbers of WNV infected mosquitoes, only 3.7% of the mosquitoes collected at the end of May had tested positive for West Nile. At the peak of the season in August 2012, 65% of the mosquitoes collected were confirmed to have West Nile Virus. 2017 could be on track to reach or go beyond this percentage. The spike in April 2017 represents the targeted mosquito trapping that was completed in the vicinity where two human cases of WNV were reported. It does not accurately represent the entire Shelby county mosquito population.

Mosquito surveillance is vitally important because it provides data that allows for identification of areas of WNV activity, assessment of the threat to humans, identification of need for vector control and determination of mosquito control efficacy. The surveillance data provides quantifiable information about the virus and its threat to humans. The Department of Health has three dedicated employees who trap, collect, and identify mosquitoes in both metro and rural counties across Tennessee. They also work in conjunction with the metro health departments and the University of Tennessee, Knoxville. Many different types of traps are used to collect the entire range of mosquito species that inhabit Tennessee, but gravid traps are used mostly to capture the *Culex* species mosquitoes. Once the mosquitoes are trapped, they are sent to the Tennessee Department of Health Vector Borne Disease laboratory in Nashville where they are tested for WNV, as well as St. Louis encephalitis virus and Flanders virus. The results are reported no later than four days after the mosquitoes were received. They are also reported to the CDC ArboNET submission site weekly.

Mosquito surveillance and prevention are of the utmost importance this season. You can stay up to date on surveillance numbers and WNV positive mosquito pools by visiting:

https://apps.health.tn.gov/wnv/wnvhome.asp

Also, don't forget to wear mosquito repellent when outside and take the proper precautions if you start to experience symptoms of WNV. For more information on West Nile Virus in general, visit:

https://www.cdc.gov/westnile

*Submitted by Katherine Gelfand*
*Vector-Borne Disease Unit Intern*
*Vanderbilt University Student*

# PARASITOLOGY STOOL COLLECTION KIT UPDATE

Laboratory Services will be updating stool collection kits for the following test: Fecal parasitology ,also known as O&P testing.

Each kit will consist of the Total-Fix specimen collection vial, collection instruction (English or Spanish), latex gloves, stool collection device, plastic bag and a trash bag liner.

It is important to note that the Total-Fix collection vials are the only vials acceptable for testing for parasites at TDOH Laboratory Services. Specimens submitted in any other transport media are not acceptable. Collection vials are test specific and are not interchangeable.


Ova and Parasite Testing

*Submitted by Dorothy Baynham*
*Manager, Special Microbiology*

## CRYPTOSPORIDIUM SAMPLE SUBMISSION

Submission of positive *Cryptosporidium* stool samples is required by Tennessee Reportable Disease guidelines. Testing is performed at the Knoxville Regional Lab, therefore all specimens should be submitted to TDH Knoxville Regional Laboratory. Please send a minimum of 2 ml of stool per sample in original vials. Samples should be submitted on cold packs.

Acceptable samples are:

- Unfixed stools
  - Stored at 4°C for less than one month
  - Frozen at –20°C to –70°C
- Stools stored in the following transport mediums for less than a month
  - Cary Blair (4°C)
  - ZincPVA (Room Temperature)
  - Total Fix (Room Temperature)
  - Potassium dichromate (4°C)

PLEASE NOTE: *Stools submitted in FORMALIN are UNACCEPTABLE*

Questions concerning *Cryptosporidium* samples can be directed to the Knoxville Regional Laboratory at 865-549-5201.

**Shipping Address for *Cryptosporidium* samples**

**By FedEx, UPS, Courier or Hand Delivery to the Knoxville Laboratory**

Knoxville Regional Laboratory
2101 Medical Center Way
Knoxville, TN 37920

**By USPS Mail to the Knoxville Laboratory**

Knoxville Regional Laboratory
P.O. Box 59019
Knoxville, TN 37950

**Did you know?**

From July 2015 to June 2016, Laboratory Services* received:

- 81,682 samples for RPR testing
- 87,582 samples for HIV testing
- 130,156 samples for Gonorrhea and Chlamydia testing

*Nashville, Knoxville Regional Laboratory and Shelby County Health Department

## SUSPICIOUS SAMPLE COLLECTION KITS—REAGENT POUCH REPLACEMENT

The current lot number of Suspicious Sample Collection kits, used by first responders for environmental sample collection, expires July 31, 2017. The reagent pouch is the only component of the kit that is expiring. New reagent pouches, with an expiration date of May 24, 2018, have been distributed to regional TEMA offices which will coordinate receipt/pickup with first responders in their respective regional areas. Also, first responders in the Metro Nashville area have been notified that new reagent pouches are available at the Tennessee Department of Health Lab for replacement in their current kits.

For assistance with the reagent pouch replacement process, and/or replacement pouches, please contact Renee Johnson at 615-262-6359.

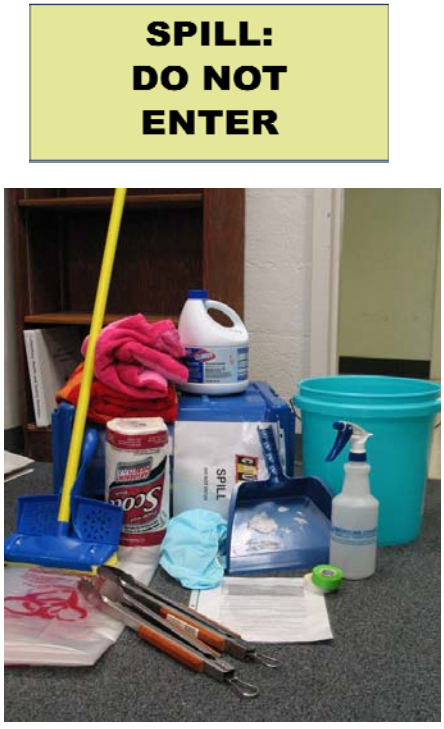
## SPOTLIGHT ON SAFETY

# Biological Spill Preparedness in the Laboratory

Advanced preparedness and training for management of spills in the laboratory is essential. Spill kits should be strategically located throughout each laboratory section and should contain all items needed for the clean up to be performed expeditiously. Only trained staff should be responsible for spill clean-up.

**Spill kit should contain:**

- 1 gallon of undiluted EPA approved disinfectant
- 2 cloth towels (bath size or larger)
- Latex/ nitrile gloves
- Warning signs and tape
- Dust pan
- Autoclave bags
- Booties
- Tongs
- Spill dedicated bucket and mop
- Written instructions for spill clean-up




An example of appropriate procedure for biological spill contents and clean-up:

**Biological Spill Clean-up Procedure**

1. Immediately inform others working in the area of potentially infectious aerosols or other hazards. Clear the area if risk is unacceptable for workers to continue while spill is managed. Post spill warning sign. Report to Lab manager, supervisor, and safety officer. Clean-up should be initiated only by trained personnel who are properly donned with appropriate personal protective equipment.
2. If aerosols are possible, allow aerosols to be eliminated by air handling system by waiting 30 minutes before re-entering spill area to begin clean-up. If spill risk did not result in this step, proceed to step number 3.
3. Obtain spill kit.
4. Pour disinfectant into bucket after preparation according to manufacturer recommendation.
5. Immerse towels into bucket of disinfectant.
6. Place disinfectant soaked towels over spill.
7. Allow appropriate contact time (usually a minimum of 20 minutes, but follow disinfectant manufacturer's directions).
8. If sharps are present under the towels, use long handled tongs to lift back the towel and transfer any broken glass/sharps, if present, to sharps containers. If not, skip to step number 9.
9. Transfer wet towels to large autoclave bag using long handled tongs.
10. Repeat the process of disinfection with cloth or paper towels as necessary.
11. Use the mop to wipe up excess disinfectant from surface, working from edges toward center of spill site.
12. Clean and decontaminate surrounding floor and work surface areas where splashes may have settled from the spill.
13. Don new pair of gloves and place all discard material in autoclave bag.
14. Close autoclave bag/s and place in appropriate secondary container ready for autoclave or for external vendor pick-up.
15. Be sure you notify and give a report to those in the vicinity during the spill and who managed the spill.
16. Depending on the nature of the spill, notification and a trip to occupational health may be required.
17. Perform a risk assessment and document the incident in order to allow the process to be examined for future efforts of prevention.

*Submitted by Rolinda Eddings*
*Biosafety Officer*

# COUNTY HEALTH DEPARTMENT PTBMIS SPECIMEN BARCODE LABELS

Laboratory Services relies on the state PTBMIS barcode labels to accession clinical specimens. Remember to be sure the barcodes that are printed from PTBMIS for specimen labels can be scanned *and* can be read by the human eye. Receiving illegible barcodes, barcodes that cannot be scanned and barcodes that are cutoff increases the accessioning process and drastically reduces turnaround time for patient results. A minimum of two unique identifiers is required to correctly accession a specimen. It is the specimen sender's responsibility to ensure labels are readable so the public health laboratory can accession the specimen, perform the correct test, and send the results in a timely fashion. If barcode labels are not printing correctly, please contact your PTBMIS system administrator.

Please see the photos below demonstrating problems associated with incorrect printing of barcode labels.



## Vector-Borne Disease Training Sessions and Grant Opportunity

Throughout the month of May, vector-borne disease training sessions were held in each region of Tennessee. The training was provided to regional and local officials to increase their knowledge base of arboviral diseases. Participants learned about disease prevention and mosquito trapping methods. The history of vector-borne diseases in the US, and a look to the future, especially regarding Zika Virus, were also included. This information allows a better understanding in the event local transmission of an arbovirus were to occur. The Zika virus outbreak in Miami, FL was used as a case study to show how a city would need to respond if an outbreak occurred. Attendees were also informed of a mosquito control grant opportunity. Any county in the state of Tennessee may apply. The $500,000 will be divided among the counties with the best applications. If you would like more information about the training sessions or the grant, please contact vbd.health@tn.gov.

## Ricinine *continued from page 1*

L-abrine (also known as N-methyl tryptophan) is an analogous marker for abrin, and shares a common plant source to the toxin. This marker does not have any known level of toxicity because it is similar in structure to tryptophan.

The primary objective of this method is to serve as a rapid tool to assess possible exposure to ricin or abrin. Both markers are excreted predictably in urine and can be monitored with a noninvasive collection. Levels obtained by this method are used to identify those people who may be exposed and the relative extent of exposure. Ricin and abrin exposures are treated symptomatically and no antidotes are currently available.

Ricinine and L-abrine are monitored via HPLC separation followed by mass spectrometry analysis. Two internal standards are used with this method: C6 labeled ricinine and CD3-labeled L-abrine.

*Submitted by R. Mark Young*
*Chemical Terrorism*
*Laboratory Coordinator*

## KRABBE *continued from page 1*

blindness, and muscle impairment can occur.

Krabbe is life threatening and there is no known cure.[2] Once an infant develops symptoms the damage is already done. Treatment is used to manage symptoms including medications for seizures, muscle spasms and nutrition. Physical therapy can help to reduce muscle deterioration.[3] Another form of treatment is stem cell transplantation. This can allow for normal healthy myelin to be formed. This treatment only helps the outcome of infants, if it is performed before the onset of symptoms. Once symptoms occur, the damage cannot be reversed.

The only recommendation for prevention is genetic counseling for prospective parents before considering having children.[1] Without newborn screening, the outcomes of an early onset are usually poor and babies rarely survive past the age of two. Early detection can allow for treatment of symptoms and understanding of patient care.[3]

Screening for Krabbe disease is extremely important in newborns due to the fact that a stem cell transplant can be done before nerve damage occurs. This allows the infant to have a better prognosis and outcome.

*Submitted by Sara Wolgemuth, MLT*
*Newborn Screening*

**References:**

1. Wenger, David. "Krabbe disease - Genetics Home Reference." *U.S. National Library of Medicine*. National Institutes of Health, May 2012. Web. 23 Mar. 2017. <https://ghr.nlm.nih.gov/condition/krabbe-disease#sourcesforpage>.
2. Haldeman-Englert, Chad, MD. "Krabbe disease." *MedlinePlus Medical Encyclopedia*. A.D.A.M. inc., 20 Apr. 2015. Web. 23 Mar. 2017. <https://medlineplus.gov/ency/article/001198.htm>.
3. "Krabbe disease." *Mayo Clinic*. MFMER, n.d. Web. 23 Mar. 2017. <http://www.mayoclinic.org/diseases- conditions/krabbe-disease/basics/definition/CON-20029450>.
4. Image: https://www.galbraithchiropractic.com/articles

# EMPLOYEE NEWS

## Welcome New Employees


**May 2017**

Stacy Johnson — Laboratory Technician 2 — Reporting

Katherine Legg — Procurement Officer 1 — Inventory

Richard Millwood — Laboratory Technician 2 — Media Prep

Crystal Edwards — Laboratory Technician 2 — Newborn Screening

Katie Nixon — Microbiologist 2C — Molecular Biology

Tori Donahue — Procurement Officer 1 — Inventory

**June 2017**

Lawrence Pastor — Laboratory Technician 2 — Support Services

Carl Hayes — Microbiologist 2C — Newborn Screening

Sheila Speakman — Administrative Secretary — Administration

## Congratulations on your promotions!

**March 2017**

Jeannette Dill — Molecular Supervisor

**April 2017**

Laurita Gaines — Laboratory Technician 2

Emily Holodnick — Microbiologist 2C

Gabriell Gassaway—Public Health Educator 2

**Congratulations on Your Retirement!**


**DeAnne Sharp**

**To Find Employment Opportunities with TDH Laboratory Services, please visit :**

**http://www.tn.gov/hr/topic/employment-opportunities**

# TRAINING NEWS

## UPCOMING TRAINING OPPORTUNITIES

**2017 TDH Packaging and Shipping Workshops**

- July 28—Nashville
- August 22—Johnson City
- August 23—Knoxville

**2017 LRN Roadshow Workshops**

- July 12—Knoxville
- July 25—Memphis

For more information on TDH Lab Services continuing education opportunities or download workshop flyers, please visit:

https://www.tn.gov/health/article/lab-education

## ARLN Southeast Regional Laboratory Training


From left: Tiffany Rivers (GA), Crystal Smith (AL), Nailah Smith, Davina Campbell (CDC), Ilsa Villegas Correa (PR), Kitty Anderson (CDC), Kendra Edwards (FL), Linda Thomas, Tracey Woodard, Xiaorong Qian, Allison Chan, Nikki Marchan (APHL)

Public Health laboratory staff from Alabama, Florida, Georgia, and Puerto Rico attended training related to Antimicrobial Resistance Testing of CRE on June 20-21, 2017. The training was held at Laboratory Services in Nashville. TDH Laboratory and Epidemiology staff were assisted by CDC and APHL staff to host this workshop.

## 2017 Blood Parasitology: Is it Malaria? Workshop

From left: Jacqueline Taylor, Margaret Clopton, Dorothy Baynham, Kathy Siliven, Jessica Schroeder
Back: Meagan Batchelor, Natasha Lindhal, Danaille Gustafson

Laboratorians from 4 facilities across TN participated in a Blood Parasitology Workshop on June 15, 2017. The training was held at Laboratory Services in Nashville. The workshop focused on safe detection of Malaria by the use of microscopy and rapid tests.

**Tennessee Department of Health**
**Division of Laboratory Services**

630 Hart Lane
Nashville, TN 37216
615-262-6300

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

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