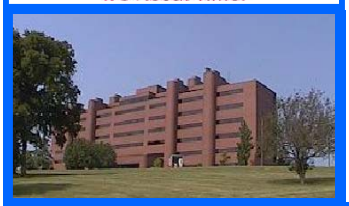
TENNESSEE DEPARTMENT OF HEALTH
It's About Time!



Tennessee Department of Health Public Health Laboratories Newsletter

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Commissioner of Health

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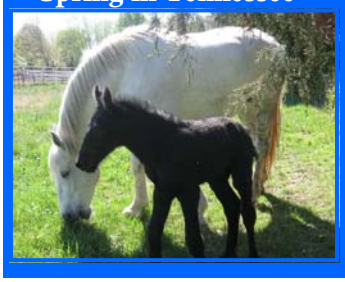
Inside this issue…

Influenza Update 2
Newborn Screening 2
State Holidays
Physician Instant Access to NBS 3
Update on Bordetella 4
Packaging and Shipping 4
Continuing Education Opportunities 4
Personnel News 5
What Goes On in Radiochemistry? 8

Spring in Tennessee



2010-2011 Season Influenza Update

Influenza may not be making as many headlines as it did a year or two ago, but it has not disappeared either. The Influenza season commonly runs October through March, although the 2009 A/H1N1 experience taught us that this is not a rule set in stone. For most people the virus causes fever, cough, sore throat and body aches, however annually complications are deadly for an average of 36,000 Americans.

The best protection from acquiring influenza is to receive the seasonal influenza vaccine. For the 2010-2011 season, FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC) recommended that the vaccine contain the following three influenza strains:

- A/California/7/09 (H1N1)-like virus commonly known as influenza 2009 A/H1N1
- A/Perth /16/2009 (H3N2)-like virus commonly known as influenza A/H3N2, and
- B/Brisbane/60/2008-like virus commonly known as influenza B.

Continued on Page 2

Two New Test Methods Added to Newborn Screening

2011 is going to be an exciting year for newborn screening due to changes to two of our testing methodologies. We are validating a screening method for Galactose 1-Phosphate Uridyl Transferase or GALT. With our current algorithm, we only test for GALT on patients with a total Galactose value ≥5 mg/dL or when a GALT screen is ordered. The new method will screen all patients for GALT regardless of the Total Galactose value or the infant's feeding status. This continuous flow method for Total Galactose manufactured by Astoria-Pacific International, was implemented on February 16, 2011.

Also during the months of December 2010 and January 2011, we were busy validating a new reagent kit and instrumentation for Tandem Mass Spectrometry (MS/MS). The new instrumentation is manufactured by Waters Micromass, whereas the new reagent kits are manufactured by Perkin Elmer. These new reagent kits allow the addition of three analytes to our testing repertoire. These analytes are:

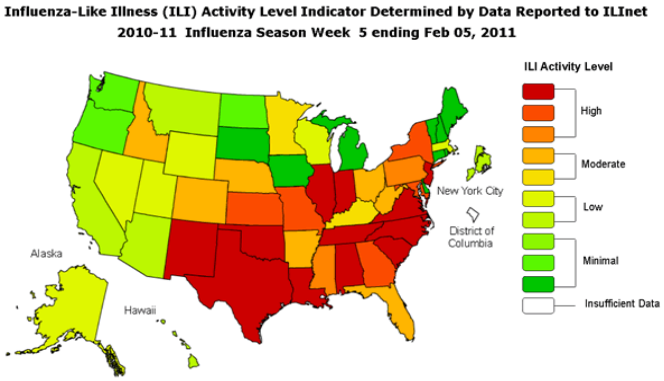
Succinylacetone (SUAC),
3-Hydroxy-butyrlcarnitine (C4-OH) and,
3-Hydroxy-hexanoylcarnitine (C6-OH).

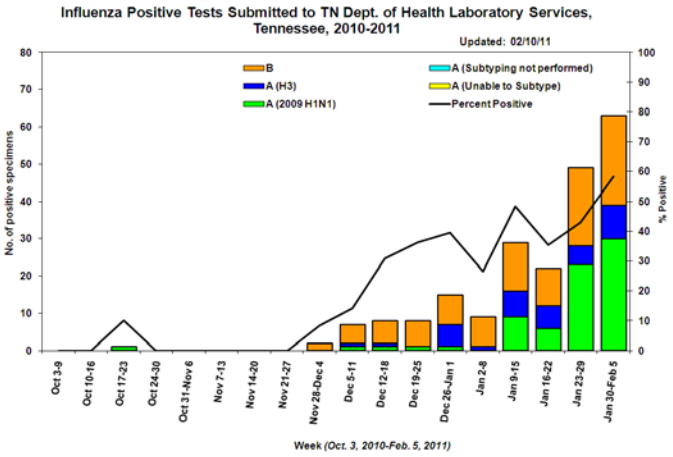
Succinylacetone is the primary marker for Hepatorenal Tyrosinemia Type I (HTT-I). C4-OH and C6-OH allow for detection of 3-hydroxyacyl Co-A dehydrogenase deficiency (M/SCHAD). The MS/MS changes were implemented on March 5, 2011.

Submitted by Christine McKeever, Manager, Tandem Mass Spectroscopy

2010-2011 Season Influenza Update *(Continued from Page 1)*

Each week, the Department of Health has 61 healthcare providers, evenly distributed across the state, collect specimens on patients exhibiting influenza-like symptoms. These 61 providers form a Sentinel Provider Network (SPN) to assess the presence and strains of influenza circulating in the community. Influenza specimens collected through the SPN have demonstrated that the VRBPAC suggestions were on target for this year. As of February 14, the circulating strains detected in Tennessee are the same strains of influenza included in the vaccine.





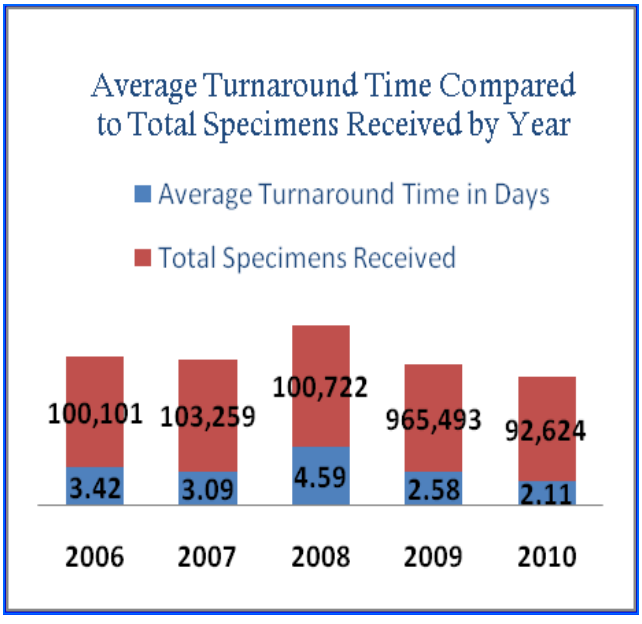
Images reprinted on February 14, 2011 from:
http://health.state.tn.us/Downloads/week05ILI_spnreport_2011.pdf **and** http://www.cdc.gov/flu/weekly/

Submitted by Amy M. Woron PhD, MS, Molecular Biologist Manager, Molecular Biology and Enterics

Newborn Screening Section Significantly Decreases Turn Around Time: Where There is a Will There is a Way

The Division of Laboratory Services, Newborn Screening (NBS) is glad to report a significant decrease in turnaround time (TAT) for reporting screening results. Our Newborn Screening laboratory standard has always been to report all positive, or suspected positive, results to the Follow-up Program, Women's Health and Genetics (WHG), within 1 to 2 working days after the specimen is received in the laboratory. WHG then notifies the provider by telephone to initiate treatment of the patient, confirmation testing and follow-up of the patient. The reports of normal and presumptive positive specimens are mailed within 5 to 7 working days from time of receipt. We felt positively that we could improve our turnaround time for reporting results.

To achieve this goal several factors had to come together. We looked at our process and refined it to accomplish the goal of reporting and mailing normal and presumptive positives specimens in less than 2.5 days after the receipt of the specimen. On the first day, the specimens are received and removed from the envelopes.



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Newborn Screening Section Significantly Decreases Turn Around Time: Where There is a Will There is a Way *(Continued from Page 2)*

Each specimen is stamped with the date and time of receipt. Each specimen is checked twice by two different technologists for quality and quantity. Next, a unique identifier (Tennessee Department of Health lab number) is assigned to each sample. Subsequently, the blood cards are separated from the form, and then the punching and processing of each specimen occurs. Next, data entry staff begin entering demographic information from the specimen form into Natus, our laboratory information management system (LIMS) and simultaneously, testing of the specimens begins in the laboratory. Once keyed, this information is verified for accuracy and completeness using double entry of key fields by a different data entry staff member.

On day two, once all specimens received on the previous day are keyed and verified, the lab is notified that the batch is complete and ready for reporting. Consistently Data Entry meets a goal of keying and verifying all specimens by 10:00 A.M. the following day. After a final LIMS demographic check is done by the lab, results and demographics are merged and released to the Follow-up Program. Mailers have a set run time to print at the end of the second day.
On the third day (day 2.5), mailers are reviewed for accuracy by NBS management and are processed by data entry staff where they are readied for mail pickup by 9:30 A.M. The major refinement in the workflow was instituting the automatic merging of results into our LIMS, and the cooperation of our data entry staff ensuring that demographics are keyed in a timely fashion. The chart (at left) illustrates our success in decreasing our turnaround time.

Submitted by Thomas Childs, Manager, Newborn Screening

State Holidays (When Routine Reports Will Not Be Available by Telephone)

For your convenience we wanted to let you know what days to avoid when calling to get a newborn screening result. These are days when only emergency calls can be addressed. Routine calls can be made every other day of the year with the exception of the following holidays:

Good Friday - April 22
Memorial Day -May 30
Independence Day - July 4
Labor Day - September 5
Columbus Day - October 10*
Veteran's Day - November 11
Thanksgiving - November 24
Christmas Day – observed on December 26*

If you have any questions, please contact Christine McKeever (615-262-6352, Chris.McKeever@tn.gov) or Thomas Childs (615-262-6446, Thomas.Childs@tn.gov).

*At the Governor's discretion, Columbus Day may be observed the Friday after Thanksgiving (November 25). Additional days may be added at Christmas and New Years.

Physician Instant Access to Newborn Screening Reports

Healthcare professionals can retrieve NBS results through the Voice Response System (VRS). The VRS only stores results on patients in which testing has been completed by the laboratory. Licensed physicians in Tennessee are required to register to receive a pin number for access. If you do not have access to the VRS and would like to have access to the system, please contact Women's Health and Genetics at 615-262-6304.

Update on Bordetella: What Have We Seen Lately in Tennessee?

During the past year the Tennessee Department of Health Public Health Laboratory has performed culture and real time polymerase chain reaction (PCR) assays for the diagnosis of pertussis in 405 patients. Of these, there were twenty-six laboratory confirmed cases of pertussis reported. PCR assays detected more cases than culture. PCR methods provided the diagnosis of pertussis when culture was negative. All results must be interpreted in conjunction with patient symptoms, treatment status, and epidemiological factors.

The specimens of choice from patients that meet the clinical case definition of pertussis include nasopharyngeal (NP) swabs and aspirates. Collect two swabs; one for culture and one for PCR methods. Transport swabs in Regan-Lowe (RL) or Amies medium with charcoal. Regan-Lowe transport also serves as an enrichment medium for *Bordetella pertussis*. Dacron or rayon swabs must be used for collection of specimens, which supports both culture and PCR test methods. Cotton swabs with wooden shafts are not acceptable for specimen collection of *B. pertussis*.

For more comprehensive information consult the CDC guidance "Best Practices for Health Care Professionals on the Use of Polymerase Chain Reaction (PCR) for Diagnosing Pertussis" found at:

http://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-pcr-bestpractices.html

		PCR	
		Pos	Neg
Culture	Pos	11	1
	Neg	14	379

Submitted by Henrietta Hardin, Manager
General Bacteriology and Environmental Microbiology

Continuing Education Opportunities

Join us for classes in Packaging and Shipping, Bioterrorism Preparedness and the *2011 Living in a Small World: Health Effects for Humans, Animals and the Environment* workshop.
Register at http://health.state.tn.us/Lab/workshops.htm

Packaging and Shipping Category A Infectious Substances - 2011 Updates

Federal Department of Transportation (DOT) regulations state that it is the responsibility of all persons who are involved in packaging and shipping infectious substances to keep up with changes in regulations.

- There are changes in the International Air Transport Association (IATA) Dangerous Goods Regulations 52nd edition that affect the shipping of laboratory specimens.
- FedEx has new requirements for completing a Shipper's Declarations for hazardous materials.
- DOT has increased the liability fines for

New IATA 52nd Editions Revisions

Retention Requirements for Shipper's Declaration
A shipper must retain a copy of the shipper's declaration form for a minimum of 3 months.

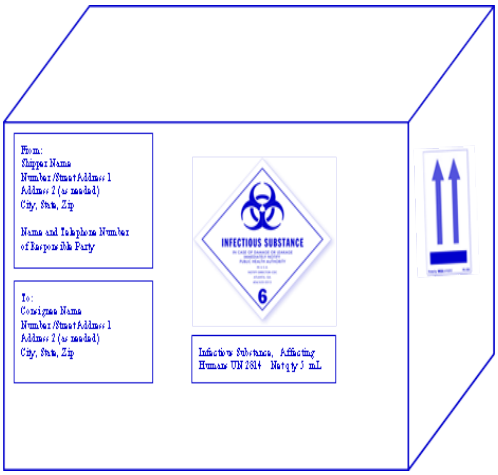
Labels on the Outer Package
The name and address of the shipper and consignee should be on the same surface as the marking for the UN number and proper shipping name when the package size is adequate.

If the package size is not adequate, the labels must be on an adjacent side.

The net quantity of dangerous goods must be shown on all packages regardless of the class of dangerous goods.

Packing Instructions (PI)
Category A: the PI is now 620 (formerly 602)
Dry ice: the PI is now 945 (formerly 904)

Note: These changes were made to the numbers only, not to the actual packing instructions. The PI number must be listed on the Shipper's Declaration for Dangerous Goods.



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Packaging and Shipping Category A Infectious Substances - 2011 Updates *(Continued from Page 4)*

Transporting a Category A Infectious Substance using your facility's courier:
Regardless of the method of transporting a Category A Infectious Substance, the specimen must be packed following regulations for Category A substances and a shipper's declaration must be completed and sent with the shipment.

Shipping Dry Ice
IATA eliminated the Packing Group III designation for dry ice. This change relates to the Shipper's Declaration.
If you are shipping a Category A infectious substance and dry ice, you must complete a shipper's declaration and list the infectious substance and the dry ice. Do not list a packing group for the dry ice.

New FedEx Requirements for Shipping Category A Infections Substances
Beginning January 10, 2011, "Shipper's Declaration for Dangerous Goods" forms for all FedEx Express dangerous goods shipments originating in the United Sates must be prepared using software with dangerous goods compliance edit checks.

FedEx has implemented this change to help prevent errors in paper work so that fewer dangerous goods shipments will need to be returned due to non-compliance with regulations.

You can use a FedEx approved compatible program or use FedEx Ship Manager Software that can be downloaded at http://fedex.com/us/ship-manager/software/downloads.html.

FedEx Ship Manager Software requires a color printer or you must use paper with red border hatchings.
You may order free paper with red border hatchings from FedEx to print the Shipper's Declaration for Dangerous Goods forms. Customers in the U.S. can order the paper by calling **1.800.GoFedEx 1.800.463.3339**.
For Laser Printer order FedEx LZR DG DEC forms (part No. 157295) For Dot Matrix Printer order FedEx 1421C (Part No. 146491)

New DOT Liabilities

"A person who knowingly violates a requirement ... is liable for a civil penalty of not more than $55,000 and not less than $250 for each violation, except the maximum civil penalty is $110,000 if the violation results in death, serious illness or severe injury to any person or substantial destruction of property, and a minimum $495 civil penalty applies to a violation relating to training. When the violation is a continuing one, each day of the violation constitutes a separate offense." 49 CFR parts 100-185 S 107.329(a)

Hotline Telephone Numbers and Web Addresses

US DOT (Department of Transportation) 800-467-4922

FedEx Dangerous Goods 800-463-3339 and www.fedex.com/us

IATA (International Air Transport Association) 514-390-6770

http://www.iata.org/whatwedo/cargo/dangerous_goods/Documents/DGR52-significant-changes.pdf

Personnel News: Division of Laboratory Services

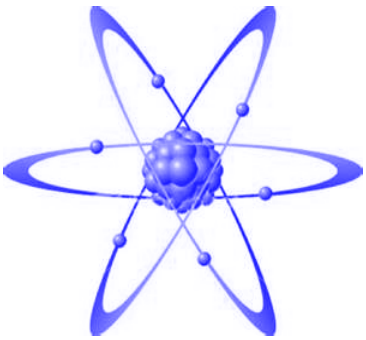
Employee Name	Hire Date	Section	Job Title
Tresa Lamay-Aguilar	January 2, 2011	Reporting Office	Office Supervisor I
William Shain Gilliam	January 9, 2011	Newborn Screening	Microbiologist 2 - Certified
Promotion	**Date Promoted**	**Section**	**Job Title**
Amelia Foust	January 9, 2011	Molecular Biology	Microbiologist 3 - Certified
Shannon Spence	February 27, 2011	Chemistry	Chemist 2

What Goes on in Radiochemistry?

This article is dedicated to all those curious people who have popped their heads in the radiochemistry door, asking the question, "So what exactly goes on in here?" Well, that is a very good question! Radiochemistry is the chemistry of radioisotopes, the unstable isotopes of elements that undergo nuclear decay and emit some form of radiation. When an unstable atom decays, it is almost always by emitting alpha, beta or gamma radiation. Providing a basic knowledge regarding these three types of radiation is the first step in answering the question, "What goes on in Radiochemistry?"

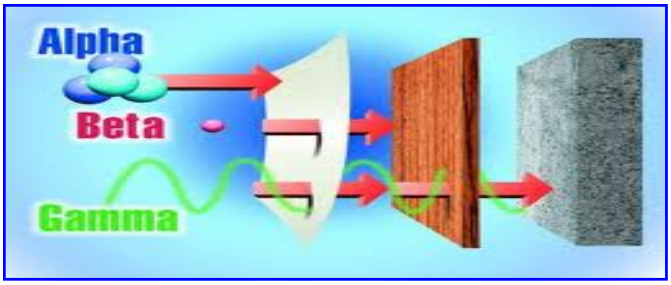
α Since alpha radiation is named after the first letter in the Greek alphabet, it seems appropriate to discuss it first. Alpha radiation is the emission of an alpha particle from an atomic nucleus. This alpha particle is a helium nucleus consisting of two protons and two neutrons, but without the electrons, thus resulting in a charge of +2. These highly charged particles are extremely ionizing and can do much damage in a short distance by knocking electrons off atoms. They deposit a lot of energy in a small volume, which in living tissue results in cell destruction. But because of their large mass, they have low speed and penetration power. Alpha particles can be stopped by few centimeters of air, tissue or skin. Just be careful to avoid ingestion!

β Beta particles, named after the second letter in the Greek alphabet, are subatomic particles ejected from the nucleus of some radioactive atoms. They are equivalent to electrons, differing in the fact that beta particles originate in the nucleus and electrons originate outside the nucleus. There are two types of beta decay, electrons and positrons, carrying a charge of -1 and +1 respectively. Their mass is very small, approximately 1/2000 the mass of a proton or neutron. Beta particles given off by different radioactive material will vary widely in energy. This energy will determine the speed of the beta particle. It is their excess energy, in the form of speed, that causes harm to living cells by breaking chemical bonds and forming ions. Compared to alpha and gamma radiation, beta radiation has medium ionizing and penetration power. Though less ionizing, beta particles are 100 times more penetrating than alpha particles. Beta particles can travel several feet in air, but are stopped by a few millimeters of aluminum.



Lastly, gamma radiation is the emission of electromagnetic energy from the nucleus of an atom, which occurs when a nucleus is in an excited state. When a neutron or proton is excited to a higher unoccupied level, the nucleus becomes unstable. The excited nucleus decays to a lower state and a packet of shortwave electromagnetic energy, a photon, is emitted. Gamma photons are the most energetic photons in the electromagnetic spectrum. They have no mass and no charge, just pure electromagnetic energy. Because of their high energy, gamma photons travel at the speed of light and can cover hundreds to thousands of meters in air before spending their energy. Non-charged gamma rays cause ionization as a result of transfer of energy via momentum. They are highly penetrating, including human tissue, and are only shielded by dense materials such as lead.

γ



Amounts and types of radiation in humans and the environment are of public health interest in Tennessee. Radiation sickness is illness and symptoms resulting from excessive exposure to radiation. Exposure may be accidental or intentional (as in radiation therapy). Of the two basic types of radiation: ionizing and non-ionizing, ionionizing radiation comes in the form of light, radio waves, microwaves and radar. This kind of radiation usually does not cause tissue damage. Ionizing radiation is radiation that produces immediate chemical effects on human tissue. X-rays, gamma rays, and particle bombardment (neutron beam, electron beam, protons, mesons, and others) give off ionizing radiation. This type of radiation can be used for medical testing and treatment, industrial and manufacturing purposes, weapons and weapons development, and more. Radiation sickness results when humans (or other animals) are exposed to very large doses of ionizing radiation. Radiation exposure can occur as a single large exposure (acute), or a series of small exposures spread over time (chronic). Radiation sickness is generally associated with acute exposure and has a characteristic set of sympoms that appear in an orderly fashion. Chronic exposure is usually associated with delayed medical problems such as cancer and premature aging, which may happen over a long period of time.

Understanding these three different types of radiation should begin to answer the question, "What goes on in radiochemistry?" More later when we talk about interesting matrices from humans and the environment that contain radiation and what that means to you and public health in Tennessee. It is a very interesting science!

Submitted by Sarah Driskell, Supervisor, Radiochemistry