



DELAWARE LABORATOR

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BLOOD LEAD TESTING AT DPHL UPDATE

Tara Lydick, B.S., Chemical Terrorism Coordinator

Blood lead screening for all children 12 months and older prior to admission into any child care, learning or school environment is mandated under the 1995 Childhood Lead Poisoning Prevention Act. Under this statute “for every child born on or after March 1, 1995, and who has reached the age of 12 months, child care facilities and public and private nursery schools, pre-schools and kindergartens shall require screening for lead poisoning for admission or continued enrollment... A statement shall be provided from the child's primary health care provider that the child has been screened for lead poisoning.”

Screening, screening-related services and diagnostic evaluations are reimbursable under health insurance contracts and group and blanket health plans under this act. To satisfy this need, the Delaware Public Health Laboratory (DPHL) provides screening to all uninsured, Medicaid or disadvantaged children. Children covered under private insurance are tested at commercial laboratories. In addition, all laboratories, clinicians, or providers involved in blood lead level analysis are required to participate in a universal reporting system through the Childhood Lead Poisoning Prevention Program (CLPPP).

DPHL has participated in blood lead testing for over two decades, testing over 100,000 children. During the past few years, DPHL has received approximately 3,500 specimens of a total 11,000 specimens tested in Delaware per

year. Of the 3,500 specimens, more than 85 percent are received from Nemours Children’s Clinics, and nearly half of those are from uninsured children.

With the implementation of DPHL’s LIMS (Laboratory Information Management System), changes in sample submission and reporting are underway. The first change is that submission sites need to utilize LIMS generated barcodes and the new LIMS Test Requisition form instead of the older triplicate form. This allows specimens to be entered, received, and tracked into LIMS. The new barcode sticker (shown below) replaces the older typed blood lead stickers. One sticker is marked “S” for sample, while the other is marked “F” for form. Stickers are applied to both the specimen and the form at the draw site. The stickers have a testing identifier, “L” for Blood Lead, followed by a five digit number. Only two stickers are provided per specimen, rather than four or more with the older system. In addition, the new stickers are generated directly from LIMS, decreasing the chances of any duplication.

F



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Special Points of Interest

Front Page Article:

Blood Lead Testing at DPHL Update

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UPDATE YOUR LIST OF NOTIFIABLE DISEASES AND REPORTING REQUIREMENTS

Debra Rutledge, Laboratory Manager I

The Division of Public Health made changes to the Regulations for the Control of Communicable Diseases in February 2006. Copies of these regulations have been mailed to laboratories and infection control sections. These regulations can also be viewed on the internet at:

<http://www.state.de.us/research/AdminCode/title16/4000/4200/4202.shtml> or <http://www.dhss.delaware.gov/dhss/dph/dpc/rptdisease.html>

To Report or contact Epidemiology - Call 1-888-295-5156 or 302-744-4541.

To contact the Delaware Public Health Laboratory - Call 302-223-1520.

APPENDIX II (from the website above)

Organisms and Samples to be sent to the Division of Public Health Laboratory

1. Clinical or hospital laboratories, or other facilities, that presumptively identify or are unable to rule out the following organisms shall send an isolate or specimen to the Delaware Public Health Laboratory for testing immediately:

- Brucella species
- Burkholderia mallei
- Burkholderia pseudomallei
- Clostridium botulinum
- Francisella tularensis
- Yersinia pestis
- Bacillus anthracis

2. Any environmental samples deemed as credible threats for harboring a toxin or a biological agent of terrorism shall be sent to the Delaware Public Health Laboratory for testing immediately upon identification.

3. Clinical specimens from patients potentially exposed to a chemical agent of terrorism shall be sent to the Public Health Laboratory for testing immediately upon identification.

4. Clinical specimens from suspect human cases of the following infections shall be sent to the Delaware Public Health Laboratory for testing immediately upon identification

- Monkeypox
- Variola (Smallpox)
- Vaccinia
- SARS

5. The following isolates from humans shall be sent to the Delaware Public Health Laboratory for testing within 24 hours of identification:

- Enterohemorrhagic E. coli, including 0157
- Haemophilus influenzae, sterile sites
- Mycobacterium tuberculosis
- Listeria monocytogenes
- Neisseria meningitidis, sterile sites
- Salmonella species
- Shigella species
- Streptococcus pneumoniae, sterile sites, Penicillin resistant
- Staphylococcus aureus, sterile sites, Methicillin resistant
- Staphylococcus aureus, Vancomycin intermediate or resistant (VISA, VRSA)
- Vancomycin resistant Enterococci, (VRE) sterile series
- Vibrio cholerae and Non-cholerae

9 DE Reg. 1188 (2/1/06)

*April comes like an idiot, babbling
and strewing flowers*

Edna St. Vincent Millay



UPCOMING EVENTS AT THE DELAWARE PUBLIC HEALTH LABORATORY



Meeting: Laboratory Preparedness Advisory Committee (LPAC) Thursday, May 3, 2007

The Laboratory Preparedness Advisory Committee (LPAC) was established to provide guidance and direction for the Division of Public Health Laboratory's preparedness efforts. This meeting is scheduled for Thursday, May 3, 2007 from 9 a.m. to 3 p.m. in the Training Room at the Delaware Public Health Laboratory in Smyrna. There will be a split agenda. The morning session discussions will center on bioterrorism and clinical preparedness, along with general public health concerns and information. Chemical terrorism and environmental issues will be discussed in the afternoon session. Lunch will be provided. Members are invited to attend one or both sessions.

We look forward to meeting with you or your designated representative at this important meeting. Please respond to Elizabeth Moore by Thursday, April 19 by telephone 302-223-1529 or e-mail liz.moore@state.de.us

Workshop: Agents of Bioterrorism: Training for the Sentinel Lab Date to be Determined

This half-day, intermediate-level wet workshop is designed for clinical microbiologists from designated "sentinel" laboratories within the Delaware Laboratory Response Network. The program will include lecture presentations of potential bioterrorism agents, laboratory safety, the Laboratory Response Network and select agent protocols. In addition,

COMING EVENTS

Continued from page 2

there will be hands-on exercises based on case studies using "mimic" and avirulent bioterrorism agents. These exercises are designed to enhance the microbiologist's capability to recognize the culture and microscopic characteristics of lethal strains. Delaware hospital laboratories may register online at <http://www.nltn.org/229-07>, email to neofice@nltn.org or call 617-983-6285.

NATIONAL MEDICAL LABORATORY PROFESSIONALS WEEK

APRIL 23-27, 2007



**LABORATORY
PROFESSIONALS**
The Heart Of The Medical
Investigation Team

FOOD, FUN, FELLOWSHIP!

Delaware Public Health Laboratory employees will celebrate National Laboratory Professionals Week, April 23-27. The 2007 theme will emphasize the women and men in public health who provide answers, perform research and guide cures in healthcare.

PESTICIDE PROGRAM AT THE DIVISION OF PUBLIC HEALTH LABORATORY

Foday Turay, Analytical Chemist III

The Environmental Chemistry Section of the Delaware Public Health Laboratory (DPHL) analyzes drinking water for pesticides in support of the Safe Drinking Water Act. Pesticides can be classified as chemical, biological or antimicrobial. Examples of chemical pesticides are: organophosphate and carbamate pesticides. At the DPHL we analyze for organophosphate pesticides in drinking water as per the US Environmental Protection Agency (EPA) method 505. These pesticides have been determined to be health risks. They affect the nervous system by disrupting the enzyme that regulates acetyl choline, which is a neurotransmitter. Most organophosphates are insecticides. Organochlorine pesticides were commonly used in the past, but many have been removed from the market (e.g., DDT and Chlordane). Organonitrogen pesticides are used mostly as herbicides. Biopesticides are derived from natural materials such as animals, plants, bacteria and certain minerals (e.g., canola oil and baking soda).

The EPA evaluates pesticides to ensure that they will meet stringent federal safety standards designed to protect human health and the environment. The EPA places a high priority on registering lower-risk pesticides, pesticides with public health benefits and pesticides that are of particular economic importance to crop producers. Prior to making a registration decision for any particular pesticide, the EPA considers and evaluates the pesticide ingredients, the site or crop where it is to be used, storage and disposal practices. The EPA also requests supporting scientific data and identification of potential risks to the environment and human health.

The pesticide program at the Delaware Public Health Laboratory was re-established on June 1, 2006. The pesticides currently being tested for using EPA method 505 Rev. 2.7 by gas chromatography with two dissimilar columns and electron capture detectors are:

Hexachloropentadiene	Lindane
Dieldrin	Heptachlor
Simazine	Alachlor
Hexachlorobenzene	Aldrin
Endurin	Heptachlor Epoxide
Atrazine	Methoxychlor
PCBs (AR 1016, AR 1221, AR 1232, AR 1242, AR 1248, AR 1254, AR 1260)	

The pesticides listed above, except Aldrin and Dieldrin, are regulated by the EPA. Since June 1, 2006 the laboratory has tested approximately 250 drinking water samples from the public drinking water supply and has not found any of these pesticides.

DPHL has purchased a solid phase extractor and solvent evaporator to be used with EPA method 508.1. This process is automated and requires very little analyst interaction in sample preparation. In the future, the laboratory plans to use EPA method 525 for pesticides using GC/MS.

BLOOD LEAD TESTING AT DPHL UPDATE

Continued from page 1

The LIMS Test Requisition Form is now utilized for the majority of testing performed at DPHL. All information listed on the form is required, including a clinician's name. For blood lead testing, check the box in the section marked Chemistry – Blood Lead. Sites which need additional LIMS Test Requisition Forms or barcodes should contact the Childhood Lead Poisoning Prevention Program office at 302-995-8693.

Blood Lead Reports are generated directly through LIMS. As a result, the major change is a reporting form that is separate from the submission form. Patients with elevated levels (above 10ug/dL) have **bolded** results. Currently reports are provided to the CLPPP, additional notes or instructions are appended, and the reports are mailed to clinicians and providers. As CLPPP staff are trained and brought online with LIMS, they will be able to directly enter comments and instructions on the form.

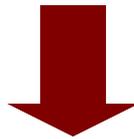
LIMS has been implemented at the state service centers and clinics, and will be rolled out to hospitals, clinics, and health care providers in the future. Facilities will need to sign a Memorandum of Agreement with DPH. With this system, clinicians will be able to order the test, enter patient information, barcode the specimen and form, look up specimen status, as well as view and print patient and specimen reports in their own facility. All that is required is an internet-ready computer, a barcode printer, state provided software and a LIMS specific state account. Training for the LIMS is provided through DPHL prior to usage.

A major change in the blood lead screening process is under discussion - retiring our 19 year old graphite furnace atomic absorption spectrometer (GFAA) and transferring blood lead to inductively coupled plasma mass spectroscopy (ICP/MS). ICPMS methodology offers the simultaneous monitoring of multiple analytes including cadmium and mercury in blood. The

ICPMS also provides a 10-100 fold decrease in limits of detection, monitoring in the sub ppb and ppt levels. However, with ICPMS an increase in the volume of blood is required necessitating a change in the capillary collection to a larger completely filled capillary or the collection of venous specimens. The use of LeadCare II portable screening analysis units is also under consideration as well as sending specimens to a contract laboratory.

Once a decision has been reached, a letter regarding impending changes and process will be provided to all clinics and submitters by the CLPP office. Individuals with concerns or desire to comment are asked to contact Thom May, Health Protection Services Chief, at 302-744-4705 or by email at Thom.May@state.de.us.

While these changes may seem sudden, our GFAA has served Delaware well, and beyond its projected lifespan. The decision to potentially change a successful blood lead screening program is not lightly considered. The chance to better the program and provide a more accessible and stronger screening tool for Delawareans is a chance we cannot miss!



DELAWARE HEALTH ALERT NETWORK

The Delaware Health Alert Network (DHAN) is part of a nationwide network of public health agencies used to communicate terrorism and other public health threats via email or telefax. The Delaware Division of Public Health manages the DHAN. We encourage you to register for this service today by submitting an application so we can provide you with timely updates.

To Register for the Delaware Health Alert Network, fill out your information at the website below:

http://www.dhss.delaware.gov/main/mailforms/dph_hanform.aspx

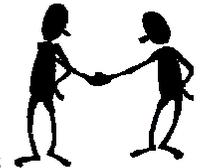
Employees at DPHL



CONGRATULATIONS MARYANN BROWN!

Congratulations to MaryAnn Brown for her recent promotion to Microbiologist III in the Microbiology Section at the Delaware Public Health Laboratory. MaryAnn came to DPHL in 2000 as a Laboratory Technician in the Virology Section. She was promoted to a microbiologist II and performed testing methods for West Nile Virus and Influenza. MaryAnn is a graduate of the University of Delaware, Medical Technology Program. She was the microbiology manager for 20 years at St. Francis Hospital prior to coming to DPHL. MaryAnn obtained her Specialist in Microbiology (SM) certification from the American Society of Clinical Pathologists (ASCP). MaryAnn enjoys reading, crafts and traveling in her spare time.

WELCOME LIZ MOORE & KELLY FOY



The DPHL welcomes Liz Moore into our Lab family as an Administrative Specialist III. Liz has many years of administrative experience and, prior to moving to Sussex County, worked for Habitat for Humanity. She moved to Milford in 2001 and worked as the Case Manager of Casa San Francisco, a homeless shelter administered by the Catholic Diocese of Wilmington. She volunteers at Prime Hook National Wildlife Refuge and enjoys camping, hiking, reading, writing and spending time with her dog and cats.

Kelly Foy began working in the Environmental and Molecular Microbiology section during the first week of March. She graduated from Washington College in 2000 with a Bachelors of Science Degree in Biology. After graduating, Kelly accepted a position at Strategic Diagnostics, Inc. (SDI), a small biotech company located in Newark, Del. During the 4 1/2 years she was employed by SDI, Kelly worked in their research and development department developing immunoassays for food safety testing. Prior to joining us here at DPHL, Kelly worked in the Vaccines and Biologics department at Merck & Co., Inc. performing *in vivo* and *in vitro* analysis of potential vaccine formulations. Welcome Kelly!

NEW CHEMICAL PREPAREDNESS METHODS AND INSTRUMENTATION

Tara Lydick, B.S., Chemical Terrorism Coordinator

DPHL now offers two new validated clinical methods by ICP/MS (Inductively Coupled Plasma Mass Spectrometer): Determination of Arsenic and Selenium in Urine by DRC-ICP/MS and Blood Metals [Cadmium, Mercury, and Lead] by ICP/MS. These methods also can be utilized for routine biomonitoring or suspected chemical exposure. Unlike other methodologies; these methods provide sub parts per billion (ppb) level quantitation in clinical specimens from potentially exposed patients. ICP/MS methods allow simultaneous monitoring of multiple analytes without a significant increase in analysis time. In fact, the current Trace Elements in Urine by ICP/MS method simultaneously detects and reports 12 analytes in clinical samples, while the EPA Trace Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma - Mass Spectrometry can simultaneously detect a minimum of 21 different elements. In addition, DPHL also performs trace element analysis by ICP/MS which screens 14 analytes in urine (Arsenic, Barium, Beryllium, Cadmium, Cobalt, Cesium, Molybdenum, Selenium, Lead, Platinum, Antimony, Thallium, Uranium, and Tungsten) and 3 analytes in blood (Lead, Mercury, and Cadmium). Contact DPHL for specimen cost, routine analysis may be implemented for facilities based on need and volumes. DPHL staff is beginning validation of a new SPME (solid phase micro-extraction) GC/MS (gas chromatography mass spectrometer) method, Volatile Organic Compounds (VOCs) in Blood. Initially, DPHL will be able to provide analysis of 10 analytes (Chloroform, 1,2-Dichloroethane, Benzene, Carbon tetrachloride, Toluene, Tetrachloroethene, Ethyl benzene, m-Xylene, p-Xylene, o-Xylene, Styrene). Depending on need and interest, additional analytes can be considered for method expansion. A biomonitoring method allowing up to 65 different analytes does exist, but it requires significantly more funding than is currently available as well as additional laboratory modifications. It is anticipated

that this method will be available on request by summer 2007.

DPHL has also acquired the Gilson SPE215 automated solid phase extraction system. This system provides rapid, automated extraction of a variety of specimens with differing solvents simultaneously. The current manual system provides a maximum of 12 samples at a time, while this system is capable of 96 or more samples per plate. It utilizes nitrogen to drive the sampling system and has its own software and hardware interface for system control. Staff has participated in first round training and, upon completion of CDC Technology Transfer training for the Nerve Agent Metabolite method, will begin utilizing the system. This system will also be utilized for the upcoming Pesticides in Whole Blood by GC/MS method and serves as a backup for the Environmental Chemistry VOCs and Pesticides in drinking water methods.

DPHL continues to work with Public Health Preparedness to offer a variety of training courses, including Collection, Shipping, Packaging and Documentation Training, Chain of Custody Procedures, Agent-Material Specific Modules (e.g. Smallpox, Cyanide) and Sample Specific Training (e.g. Environmental Collection and Processing, All-Hazards Approach). We are working to transfer all of the courses to an electronic format with a hands-on send in or practical evaluation. If you are interested in scheduling any of these courses, please contact Liz Moore at 302-223-1520 or by email at Liz.Moore@state.de.us.

While the CPL was designed for use in chemical terrorism response, DPHL can provide routine and suspected exposure analysis for a variety of different materials and components. Routine background or biomonitoring is available upon request or by arrangement. Special studies or screening protocols can be developed based as needed and provided on a fee for service basis. One such method, Pesticides in Whole Blood by GC/MS, is designed as a biomonitoring and exposure methodology.

Facilities, groups, or laboratories interested in pursuing this and other methods are asked to contact DPHL. For more information about DPHL's role in responding to chemical terrorism or chemical exposure events, contact Tara Lydick at 302-223-1520, or send an email to Tara.Lydick@state.de.us.



DELAWARE DIVISION OF PUBLIC HEALTH LABORATORY

30 Sunnyside Road
Smyrna, DE 19977
(302) 223-1520

Built: 1990

Business Hours: 8:00am – 4:30pm

Purpose: The Division of Public Health Laboratory currently offers consultation and laboratory services to state agencies, Delaware Health and Social Services (DHSS) and Division of Public Health (DPH) Programs including:

- HIV Surveillance and Prevention
- Immunization Program
- Lead Programs
- Epidemiology
- Newborn Screening Program
- STD Prevention Program
- TB Elimination Program
- Water Supervision Program
- Preparedness

WHAT IS FERN?

Rebekah Parsons, Lab Manager

The Food Emergency Response Network (FERN) was developed in conjunction with the Food and Drug Administration (FDA) and the US Department of Agriculture (USDA) for the rapid detection of food-borne pathogens in the event of a potential terrorist attack on our nation's food supply. The rapidly growing field of molecular biology and the surge in technology have created a testing bottleneck with dozens of new methods and platforms available and few completed validation studies. New methods and protocols are continually being designed and old methods are being revamped in an effort to provide enhanced sensitivity, decreased testing times, and a wider range of sample sources (e.g. environmental, clinical). FERN is comprised of a network of federal, state and local laboratories, including many Department of Agriculture and Department of Health laboratories. FERN is in its infancy, having been established in 2005, but the Delaware Public Health Laboratory (DPHL) has participated in FERN since its inception.

DPHL began the 2005-2006 cooperative agreement with the validation of two methods: FERN's "7 Hour Protocol to Detect Serotype O157:H7 Shiga-toxin *Escherichia coli* (STEC) and other STEC in Foods" and The Harmonized Food Emergency Response Network/ Laboratory Response Network (FERN/LRN) Method for Isolating and Detecting *Shigella* using Nested PCR. The Environmental & Molecular Microbiology (EMM) section of the lab conducted several experiments evaluating the specificity, sensitivity, and capability for detecting and isolating *E. coli* and *Shigella* subtypes in various food matrices.

The completion of the *E. coli* experiments served to evaluate the feasibility of a real-

time PCR method using a SmartCycler II to detect the presence of STEC and *E. coli* O157:H7, specifically *stx1* and *stx2* virulence factors and the +93 *uidA* mutation. Although many strains of *E. coli* bacteria are harmless, *E. coli* O157:H7 infection can cause hemolytic uremic syndrome (HUS) in the young or elderly which can lead to severe kidney and blood vessel damage. *E. coli* contamination in a food supply is a public health concern. Liquid/raw eggs were chosen as a matrix and the sensitivity of the assay was tested by creating a dilution series. Results revealed detection in concentrations as low as 12.5 cfu/ml in the 24-hour enrichment aliquot.

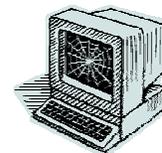
DPHL initiated validation studies of the FERN/LRN harmonized method to isolate and detect *Shigella* in food matrices with the intention of determining the sensitivity of the assay in three different food matrices: eggs, sprouts and hotdogs, and to evaluate the procedure for the detection of *Shigella* in various food matrices and at various dilutions using conventional, nested PCR. With *Shigella* being the third most reported cause of food-related illness in the US, behind *Salmonella* and *Campylobacter*, the capability to detect and identify *Shigella* in contaminated food sources is important to the public health. *Shigella* infection can lead to shigellosis which is characterized by fever, diarrhea, and abdominal pain. Children and those with compromised immune systems are particularly vulnerable. The low infectious dose of 10 to 200 organisms and ease of person-to-person transmission make it a likely candidate for use as a biological weapon.

According to the results, the FERN/LRN method of FTA filter-based PCR is capable of detecting the lowest concentration of

bacteria in the hotdog matrices. However, seemingly more difficult is the detection of *Shigella* in alfalfa sprouts possibly due to the presence of PCR inhibitors in sprouts. The *Shigella* nested PCR protocol provides a presumptive positive on the first round of PCR and a confirmatory positive on second round of nested PCR.

In the current 2006-2007 cooperative agreement, DPHL joined a network of laboratories across the country in a multi-lab validation to increase the ability for surveillance of foodborne pathogens. This multi-lab validation was designed as a four part series to validate detection methods involving *B. anthracis*, *E. coli*, *Shigella*, and *Y. pestis*. The DPHL Microbiology Section recently completed the first round of validation experiments involving FERN cultural methods for *B. anthracis* detection. Both the Microbiology and the EMM Sections will collaborate for the next round of validation studies that include comparisons of various cultural and real-time PCR molecular methods for detecting *E. coli* in food. The FERN multi-lab validation has required tremendous dedication and personnel time as well as the ability of the Micro and EMM sections to work together collaboratively. They have done a great job and, because of our involvement with FERN, the laboratory was able to respond quickly to the Taco Bell *E. coli* outbreak with real-time PCR results.

The methods for the final two validations have yet to be determined, but will involve the detection of *Shigella* and *Y. pestis*. DPHL is pleased to be an integral part invalidating methods.



VISIT US ON THE WEB:

<http://www.dhss.delaware.gov/dhss/dph/lab>

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If you have questions regarding these articles or would like to receive a hard copy of this newsletter, contact the Delaware Public Health Laboratory at 302-223-1520. To receive this publication via email, contact liz.moore@state.de.us.

*"To Protect and Enhance the Health
of the People of Delaware"*



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