

# DELAWARE LABORATOR

Summer / Fall

2013

## National Medical Laboratory Professionals Week

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Lab Manager II, Infectious Disease and Bioterrorism Lab Coordinator



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Jordan Hudson, microbiologist II and Shemeeakah Powell, molecular biologist, explaining lab services to open house attendees

During the week of April 22, 2013, the Delaware Public Health Laboratory (DPHL) and the Division of Public Health Emergency Medical Services and Preparedness Section (EMSPS) co-sponsored an open house event to celebrate National Medical Laboratory Professionals Week. 'Lab Week' is an annual celebration to recognize the important role that medical laboratory professionals play in public health, in environmental health, and in related fields. This week provides an opportunity to increase the public's awareness, understanding, and appreciation for laboratory organizations and for the staff of these organizations to demonstrate to others how they work to identify diseases and protect citizens.

The Division of Public Health (DPH) hosts this annual open house for the general public, legislators, officials, and students. During this time, lab tours are provided and displays

are shown by lab staff, DPH programs, and partner organizations. This is the second year in which the open house was co-sponsored by the emergency medical services and preparedness section, whose offices are located across from the laboratory building, in Smyrna, on the campus of the Delaware Hospital for the Chronically Ill.

The theme for this year was "50 Years of Newborn Screening" and "Preparedness Efforts to Maintain Critical Testing in the Event of an Emergency or Disaster." Records were found that confirmed that newborn screening testing for phenylketonuria (PKU) has been done in Delaware for over fifty years. Today, 39 tests for disorders are performed on each child born in Delaware.

There was an outstanding turnout and many public health and emergency partners showcased their services and equipment. Students from St. Georges Technical High School and Delaware Technical Community College learned about science and public health careers. Over 150 people toured the laboratory throughout the day. Students, citizens, and officials learned about emergency response and preparedness testing, planning, and other related activities and how these help to protect and enhance the health of Delaware citizens.



Bobbi Turner, microbiologist II and Debra Rutledge, lab manager II and Sergio Huerta, MD, DPH and DNREC laboratories director

*Lab Week continued*

The open house also had a welcoming ceremony featuring remarks that highlighted the importance of services to the public by DPHL, EMSPS and many partners. Speakers included: Sergio Huerta, MD, director of the DPH Laboratory and the Delaware Department of Natural Resources and Environmental Control (DNREC) Laboratory; Steven Blessing, chief, EMSPS; Karyl T. Rattay, MD, MS, Director, DPH; and Louis Bartoshesky, MD, MPH, chairman of Christiana Care's Department of Pediatrics.

On April 16, 2013, Delaware Lt. Governor Matt Denn signed a National Medical Laboratory Professionals Week Proclamation at the Tatnall building



*Sergio Huerta, MD, DPH and DNREC laboratories, director; and Crystal Webb, DPH, deputy director; and Bobbie Jo Turner, DPHL, microbiologist II; and Matt Denn, Lt. Governor; and Mary Ann McLane, PhD, MLS(ASCP), UD, professor, ASCLS-DE president; Debra Rutledge, MBA, MT(ASCP), DPHL, lab manager II; and Kathy Gibney, Siemens Healthcare Diagnostics, ASCLS-DE member*



*Sergio Huerta, MD, DPH and DNREC laboratories, director; and Christina Pleasanton, deputy director, DPHL; and Susan Dee, microbiologist III; and general public during a tour of the Virology Lab*

in Dover. Representatives from DPHL, and the American Society of Clinical Laboratory Scientist, Christiana Care Delaware Chapter, attended the signing ceremony and had an opportunity to speak with the Lt. Governor about laboratories and lab-related matters. The Lt. Governor was very gracious. He was impressed upon hearing about the complexity, variety, and quality of testing being done in Delaware laboratories.

This year's open house was, once again, a major success. It served as an opportunity to partner with the EMSPS group in promoting public awareness and educational activities. We greatly appreciate the interest and the participation from our many partners, vendors, and program representatives. Our gratitude also goes to everyone from our EMSPS and the DPHL Lab Week Committee who volunteered their time and effort to plan and manage this event. There was a great amount of positivity and enthusiasm throughout this process and the resultant event was fun and insightful for many people.

A special thank you is extended to all of our staff who gave tours and covered work responsibilities of those involved in other duties throughout this event.

Most importantly, a huge thank you to each and every professional who works in a laboratory for helping to protect, sustain, and improve the health and safety of so many people.



*Amy and Joel, family of Jill Walters, microbiologist II; and Shemeekah Powell, molecular biologist seeing where family works during Lab Week Open House*

## *Lab in a Bag.....*

*Jordan Hudson, Microbiologist II*  
*Shemeekah Powell, Molecular Biologist*

Upward Bound is a national program for low-income families in which neither parent has attended college. Students enrolled in the program in Delaware receive assistance preparing for higher education, gaining admission to college and earning a four-year degree. Delaware has two Upward Bound programs administered by the University of Delaware; Classic Upward Bound and Upward Bound Math/Science. Each program hosts 54 students annually and includes a six-week residential academic summer program at the University of Delaware.

DPHL hosted two groups of Upward Bound Students in July. Students received a tour of the working laboratory spaces, and attended hands-on activity sessions. Each laboratory section was represented at the activity session. Activities included:

- ◆ Pipetting
- ◆ Newborn screening blood spot punching
- ◆ Acid/base chemistry
- ◆ Water bacteriology demonstration
- ◆ Gram stain demonstration, microscopy, and chromogenic agar for bacterial selection
- ◆ Gel electrophoresis and rabies specimen exhibit

The students also received a Lab-in-a-Bag. Developed by DPHL, this new outreach tool introduces students to laboratory science and encourages interest in the field. The Lab-in-a-Bag contains various laboratory supplies including:

- ◆ Lab coat
- ◆ Nitrile gloves
- ◆ Hair net
- ◆ Specimen bag
- ◆ Bacterial culture loops
- ◆ Microcentrifuge tubes
- ◆ Test tubes
- ◆ Transfer pipettes



Also included in the Lab-in-a-Bag is an activity booklet detailing two experimental protocols that students can perform at home, using items included in their Lab-in-a-Bag.

Based on the success of the Upward Bound visits, DPHL has future plans to expand the outreach program to invite more academic institutions and groups to participate in laboratory open houses to increase the visibility of the lab and foster a positive view of science and public health around the state.

## ELC Foodborne Disease Surveillance Update- 2013

Gregory Hovan, Microbiology Lab Manager

The Delaware Public Health Laboratory (DPHL) focuses on detection of foodborne diseases. The Centers for Disease Control (CDC) estimates that as of 2011, roughly 1 in 6 Americans (or 48 million people) get sick annually from foodborne diseases. Of these, 128,000 are hospitalized and 3,000 die. As the population increases, the demand for food and food handling is also increasing. Suppliers are changing the way they process food to feed the growing public demand. Thus, the potential for the occurrence of diseases that infect consumers through food sources is increasing. Technology has evolved with rapid testing becoming the new way for identifying foodborne illness. This has become a more effective way to identify specific organisms that can potentially contaminate food sources and thereby protect not only citizens, but also others who are less directly exposed to a source.

The Delaware Public Health Laboratory (DPHL) and the Office of Infectious Disease Epidemiology (OIDE) collaborate with The Centers for Disease Control and Prevention (CDC), through the Epidemiology and Laboratory Capacity for Infectious Diseases Cooperative Agreement (ELC-COAG), as part of national surveillance of communicable diseases.



The ELC-COAG provides DPHL with funding to focus on an array of detection methods for Delaware citizens. DPHL also coordinates with CDC, through PulseNet. Part of DPHL's agreement is also to work with the OIDE and Delaware's healthcare providers to develop a standardized list of communicable diseases that, based on the healthcare professional's assessment of a patient, must have an isolate or sample sent to DPHL for testing. DPHL uses culture methods to identify disease-causing bacteria.



Speciation of an organism is done by serotyping. For example, Salmonella subtypes are differentiated by identifying the antigens found on the organism. Along with serotyping, DPHL also defines the DNA "fingerprint" of the organism using pulse field gel electrophoresis (PFGE). This "fingerprint" allows for a comparison to be made between organisms. This helps to establish whether organisms are related among outbreaks. DPHL performs PFGE on all samples of Salmonella, Shigella, E. coli O157 and E. coli non-O157 species.

DPHL uses identification methods such as serotyping, (PFGE) and polymerase chain reaction (PCR) to identify pathogenic organisms and to populate an epidemiological tracking system that is used to determine if an infection is associated to a unique food source or a commercially distributed product. These methods provide immediate and reliable data and information.

In addition to PFGE, DPHL performs multi-locus variable number tandem repeat analysis (MLVA). MLVA is also based on foodborne pathogen DNA, but uses a different approach than PFGE. While PFGE uses the entire genome within an organism for analysis, MLVA focuses on 7 or 8 specific repeating areas within that genome.



[www.dhss.delaware.gov/dhss/dph/lab/labs.html](http://www.dhss.delaware.gov/dhss/dph/lab/labs.html)

## *ELC Foodborne Disease Surveillance Update—2013 Continued*

These areas become the reference for tracking purposes. DPHL performs MLVA tests for *Salmonella typhimurium* and typhimurium variants, *S. enteritis*, and *E. coli* O157. Additional foodborne pathogens, including *Campylobacter* species, *Listeria* species and *Vibrio cholera*, are tested on a limited basis given the low prevalence in Delaware.

To test for *E. coli* infections, DPHL uses PCR technology that identifies two different Shiga toxin genes associated to foodborne illness. Shiga-like toxin-producing *E. coli* (STEC) can cause serious foodborne illness. The most common STEC is O157. Since STEC's can have high pathogenicity, CDC requires a four-day turnaround time for *E. coli* PFGE.

In order to ensure consistency in foodborne disease surveillance and epidemiological investigations, CDC also recommends that all positive STEC samples found by health care providers in Delaware be sent to DPHL for isolation and characterization. Samples are then cultured for STEC and when necessary, PCR, PFGE, and serotyping are also done.

The testing methods developed and used by the laboratory are time consuming, complex, and require a high level of training, experience, and expertise. Even so, new technology is constantly evolving, particularly in methods for the rapid identification of organisms using molecular techniques. Although this is positive in many ways, it can also lead to setbacks if the traditional culture methods, which are time-tested and reliable, are lost.

DPHL and the foodborne testing services that are provided constitute a vital asset that helps to protect, through early disease identification and prevention, the citizens of Delaware as well the country. The ability to readily and correctly identify pathogens is an essential component of programs that protect people from acquiring diseases.



### Statistics from foodborne testing from January 1, 2012, to December 31, 2012:

- ◆ 193 foodborne isolates by pulse field gel electrophoreses (PFGE)
- ◆ 52 foodborne isolates by multiple-locus variable analysis (MLVA)
- ◆ Identified 12 STEC's, most common O157 and O103 (3)
- ◆ Performed serotyping on 25 *Shigella* species, most common *S. sonnei* (16)
- ◆ Performed serotyping on 174 *Salmonella* species, most common *S. newport* (39)
- ◆ Performed serotyping on 1 *Vibrio cholerae*, Non-01, non-0139

# Healthiest Lab Award

*Tara Lydick, Chemical Terrorism Coordinator*

On June 4, 2013, the Delaware Public Health Laboratory (DPHL) was awarded an honorable mention for the Association of Public Health Laboratories' (APHL) Healthiest Laboratory Award during the awards breakfast at APHL's 2013 Annual Meeting. The Healthiest Laboratory Award celebrates excellence in environmental stewardship and health promotion in both practice and policy. It recognizes APHL member laboratories demonstrating outstanding efforts to reduce their collective environmental impact and to promote health and wellness programs.

Laboratories are graded based on the submitted scores from the Healthiest Laboratory Initiative Self-Assessment Checklist and are only eligible to receive the award once every three years. This year's winner and runner-up are the Utah Public Health Laboratory and the Hawaii State Laboratories Division respectively. The self-assessment fields include three main areas of focus within the laboratory framework: health promotion, environmental sustainability, and policy implementation. The measures chosen illustrate and promote improvement of the environment and personal health promotion within the laboratory, and were selected for ease of implementation and relative low cost for laboratories.

The winning laboratory receives a choice of various laboratory-related prizes associated with environmental sustainability and health promotion from the Healthiest Lab Award sponsor HDR, Inc. HDR, Inc. chooses the prize based on the needs of the winning laboratory.

DPHL's specific policies and programs have reinforced a strong continuum for health development. The promotion of exercise programs, healthy food competitions, and staff influenza vaccinations helped DPHL score high in the health promotions areas. There are designated lactation areas, staff changing areas, outdoor trails and walkways, trees for cooling and wind blockage and recently a green roof was installed.

DPHL's consistent reinforcement of topics such as laboratory safety, as illustrated in safety protocols and training, provide a solid foundation for reducing potential injuries, illnesses, and impacts to the environment and the community.

For example, staff is not permitted to work alone in high risk areas, first responders are invited to visit and learn about the hazards associated with a laboratory prior to and after significant process changes.

The DPHL safety program contains an environmental stewardship component that includes: eliminating mercury thermometers, a laboratory-wide recycling program, maintaining laboratory hood sashes at the best levels for optimum airflow, using green cleaning products, participating in green product purchases, purchasing only amounts needed for lab operations, developing a surge capacity processes and contracts, placing bulk gases outside the facility, using motion sensor lights, turning lights off when not needed, and encouraging staff to turn off or use standby mode for computers when not in use.



*Front row, third from right: Tara Lydick, chemical terrorism coordinator, and Debra Rutledge, lab manager II  
Also pictured are other award recipients from around the country.*



*Front Row, third from left: Tara Lydick, chemical terrorism coordinator  
Back Row, fourth from left: Debra Rutledge, lab manager II  
Also pictured are other award recipients from across the country.*

While DPHL has a strong and healthy laboratory, there is always opportunity for further improvement. Some areas identified thus far include; developing an ergonomics program, including morning stretch times, creating bike lockers/storage areas, posting “last day since accident/incident” information, use of solvent waste recapture or re-distillation, use of gas compressors instead of gas cylinders, exploring the recapture of heating and cooling for daily and seasonal use, on-site uses of alternative energy, carbon offset credits eligibility, grey water collection, and LEED certification. Other options, such as alternative therapies, telecommuting, or on-site child/pet care will require coordination with other State of Delaware agencies and DelaWELL programs.

If you are interested in performing a laboratory or organization self-assessment, a copy of the checklist, can be found at:

<http://www.aphl.org/AboutAPHL/awards/Documents/HLIChecklist.pdf>

## Laboratory Preparedness Advisory Committee Meeting

*Marion Fowler, MT(ASCP), Microbiologist II*

The Laboratory Preparedness Advisory Committee (LPAC) met May 23, 2013 at DPHL. Staff from the EMSPS and Preparedness Section, Health Systems Protection, Office of Infectious Disease Epidemiology (OIDE), Delaware's sentinel microbiology laboratories and DPHL attended. DPH speakers presented two interesting cases in which both public health and the laboratory worked towards diagnosis and treatment of serious diseases.

The presentation, "An Unprecedented Rabies Investigation" was given by Tabatha N. Offutt-Powell, Dr.Ph., (OIDE). In 2004, Tabatha was involved in a case from Texas which included three human rabies deaths. These patients were all organ transplant recipients from a donor who had undiagnosed rabies at the time of death. For more information, the presentation is available on the DPHL website. ([www.dhss.delaware.gov/dhss/dph/lab/labs.html](http://www.dhss.delaware.gov/dhss/dph/lab/labs.html))

Jeanette R. Rodman, MSN, RN, tuberculosis nurse consultant/program manager reviewed the latest advancements to Delaware's tuberculosis (TB) program. The TB program has made major improvements to data storage and reporting in the past few years. A few of the many projects and databases added, at the behest of the Centers for Disease Control and Prevention (CDC) include: a national genotyping database (TB-GIMS), the National TB Indicators Project (NTIP) which tracks outcome measures, program evaluation, which focuses on improving an NTIP outcome not being met, and the development of an electronic TB registry for all cases. Fortunately, the TB program has the extraordinary talents of Jenn Zambri-Dickerson, administrative specialist, who developed interactive reporting forms, and organizes and manages all this data. The program holds biannual cohort reviews each June and December during which all three TB clinics and guests gather to hear nurses present their cases from the previous six months. Delaware's TB program also conducts active quality assurance, checking each reported variable against test results to ensure accuracy, before transmitting to CDC. In 2012, a genotyping report showed a man who had moved to Delaware following residence in a shelter was one of only 39 identical cases nationwide. All other cases resided in a single county in the referring state, the majority living in homeless shelters. Delaware's TB program forwarded the report to their CDC program officer, who reported back that the state in question had been unaware of the outbreak.

Marion Fowler presented a review of DPHL preparedness forms that are required from all submitters when requesting bioterrorism testing of clinical specimens or isolates for rule-out of a bioterrorism (BT) agent. The web navigation process was demonstrated for locating pertinent forms and information (BT Collection Specimen Charts, LPAC meeting presentations, chain of custody and preparedness forms). As part of the BT grant requirements, sentinel laboratories were required to package and ship (via DPHL courier), an uninoculated agar plate using information from the College of American Pathologists (CAP) Laboratory Preparedness Exercise (LPX). This exercise prepares sentinel laboratories for the possibility of a bioterrorism event where the DPHL may be overwhelmed by environmental or clinical samples. Sentinel laboratories must be prepared and trained to be able to properly package and ship, via UPS or FedEx, specimens to CDC's choice of reference laboratories. Corrected packages were distributed. During the next sentinel laboratory site visits, the packages and CAP LPX results will be reviewed.



BT Sentinel Laboratory Guidelines

Continued, page 9



## Laboratory Preparedness Advisory Committee Meeting - Cont.

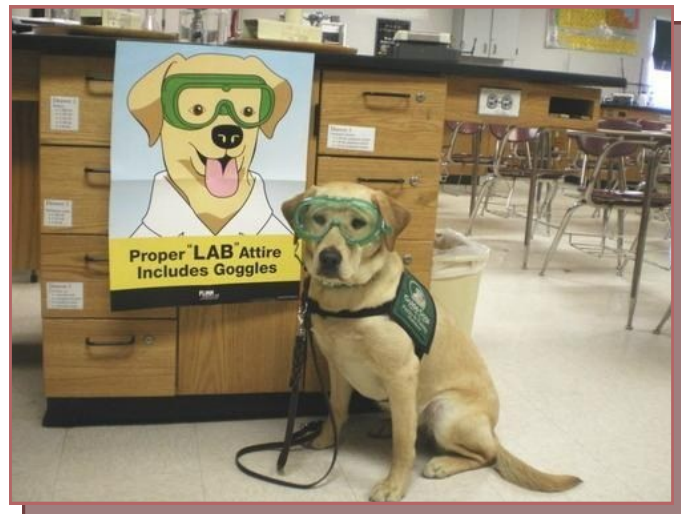
Jordan Hudson, Microbiologist II presented the Molecular Virology department's validation of two real-time RT-PCR assays for the measles and mumps viruses. Both assays were validated from protocols received from the CDC. Maintaining testing for rare and vaccine-preventable diseases is one of the core functions and responsibilities of public health labs like DPHL and allows for faster diagnosis of potentially dangerous infections.

Due to the rarity of measles and mumps clinical samples in Delaware, all validation specimens were prepared from vaccine strains of the measles and mumps viruses grown in viral culture. The automated extraction of clinical samples, accuracy, precision, and analytical sensitivity were all validated. DPHL also extended the invitation to our partners to submit urine and nasopharyngeal swabs for testing suspected measles and mumps cases.

Emily Outten, molecular virology lab manager, gave an overview of the 2012-2013 influenza season. Everyone agreed it had been a very busy and stressful flu season. The predominant strain continued to be seasonal influenza A/H3N2, but there was surge in influenza B incidence late in the season (March – May). From the influenza B specimens sent from DPHL to CDC for characterization, approximately 50 percent matched the vaccine formulation. Emily shared a CDC poster that demonstrated this was true for most of the Mid-Atlantic region. The quadrivalent vaccine will be available in 2013, and will contain both influenza B lineages. Hopefully this will encourage influenza vaccination and result in less vaccine failures for the 2013-14 season.

Jessica McKnight, microbiologist II, presented and discussed a new assay, a molecular respiratory virus panel (RVP), now available at DPHL. The panel is made by Luminex and can detect 12 respiratory viruses including: influenza A (subtypes H3 and seasonal H1), influenza B, rhinovirus, adenovirus, Human metapneumovirus, para influenza 1, 2 and 3, and respiratory syncytial virus A and B.

Jessica explained the Luminex xMAP bead technology and the applications of this assay to public health. Furthermore, she described the pros and cons of using this assay to conduct epidemiological research to determine circulating respiratory viruses in Delaware. For example, the pros included increasing and strengthening Delaware's surveillance of circulating respiratory viruses and providing health care partners a rapid screening method for detection, as opposed to relying on traditional viral culture methods which can take several days for results. The cons of the xMAP technology include cost, labor intensity, the inability to properly identify the novel 2009 influenza H1N1, and other cross reactivity issues from viruses of the same family.



## Tips and Tricks for Public Health Laboratory Scientists

- ◆ Always wear appropriate PPE and remember to wash your hands.
- ◆ Always follow established laboratory procedures- keep yourself safe.
- ◆ Maintain your annual proficiencies.
- ◆ Remember to perform and document all required QA/QC measures.
- ◆ Document, document, document.
- ◆ If you have any questions about an assay or analysis, consult your technical supervisor.
- ◆ Don't be afraid to admit your mistakes- everybody messes up.
- ◆ Help out your fellow technicians- fill in as needed.
- ◆ Never stop learning.
- ◆ Constantly strive to maintain high public health standards.

# Employee News

Anita Kettlehake joined DPHL as our new Administrative Specialist I. Prior to joining DPHL, she worked at the Department of Natural Resources and Environmental Control, Division of Water, Well Permitting Branch, and the Department of Energy and Climate. She is a member of the International Association of Administrative Professionals (IAAP) and attends monthly meetings. She enjoys cooking, and taking meals to those in need through the Meal Care Ministry at her church, and spending time with her husband and grandsons, ages 5 and 7. She also enjoys deer hunting and walking through the woods.



Paul Gibbs joined DPHL as a Data Entry Technician for the Newborn Screening Program. He attended the University of South Carolina majoring in Accounting, and also played three years of basketball, before pursuing a career overseas for Italy's Milan Bennetton professional team. He currently works for Citi Lockbox (overnight) as a supervisor contracted by the government to process passport books and cards. He previously coached and organized an AAU basketball program (Delaware Heat), and he regularly attends his youngest child's college basketball games at Philadelphia University. In his spare time, Paul enjoys cooking, baking, and is a cupcake aficionado. He also writes poetry and enjoys life to the fullest.

## DELAWARE'S DIVISION OF PUBLIC HEALTH LABORATORY



**30 Sunnyside Road  
Smyrna, DE 19977  
302.223.1520  
Fax: 302.653.2877  
Built: 1990**

**Business Hours: 8:00 a.m. – 4:30 p.m.**

**Purpose:** The Division of Public Health Laboratory currently offers consultation and laboratory services to state agencies, Delaware Health and Social Services and Division of Public Health programs including:

- HIV surveillance and prevention
- Immunization
- Lead
- Epidemiology
- Newborn screening
- STD prevention
- TB elimination
- Drinking water
- Preparedness



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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 newsletter by email, contact Anita Kettlehake, Editor, at [anita.kettlehake@state.de.us](mailto:anita.kettlehake@state.de.us). Edited by Emily Knearl, director, OHRC

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

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