DELAWARE HEALTH AND SOCIAL SERVICES

Division of Public Health

DELAWARE LABORATOR

Winter 2013-2014
Volume 38, Issue 1

DPHL Demonstrates Excellence in Collaborative Food Testing Methodology.

Shemeeakah Powell, Microbiologist II

In August 2013, the Delaware Public Health Laboratory participated in a mock BSL-3 exercise with the Food Emergency Response Network (FERN) to screen food for high risk unknown agents. FERN's mission statement is to integrate the nation's food testing laboratories at the state, local, and federal levels into a network that is able to respond to emergencies involving biological, chemical, and radiological contamination of food. The exercise entitled "Strawberries and Milk, Anyone?" consisted of five milk samples that were screened for 10 different pathogens and toxins including: *Bacillus anthracis, Clostridium toxins, Francisella tularensis, Ricin, and Yersinia pestis.* This nationwide exercise was implemented to test public health laboratory proficiency and testing capabilities in the event that the food supply should ever become contaminated.

This large event required a tightly coordinated collaboration between Molecular Virology and Clinical Microbiology, including staff members Brenda Chandler, Marion Fowler, Jordan Hudson, Nancy Valeski, Jessica McKnight, Gregory Hovan, Emily Outten, and Shemeeakah Powell. To ensure that all staff members were on the same page and that test scheduling was properly executed Shemeeakah Powell assumed the responsibility for leadership and organization during the exercise. Ms. Powell took the lead in organizing meetings that covered methodology, reagents, test scheduling, communication with FERN and work flow.

Beginning on Wednesday August 14th, staff processed the samples and immediately began testing. Microbiology began plating samples after a 5 hour incubation period and Molecular Virology staff initiated PCR and toxin testing. Staff from both departments worked additional weekday and 30 weekend hours in order to get results reported in a timely manner. Thanks to two months of careful planning and organization, all FERN testing parameters for Polymerase chain reaction (PCR), Enzyme-Linked Immunosorbent Assay (ELISA), biochemical testing, and culture resulted in the laboratory receiving 100% for all answers and outcomes in the detection of Y. pestis and Ricin toxin. All testing was completed by Monday August 19th.

Inside this issue:

www.dhss.delaware.gov/dhss/dph/lab/labs.html

Laboratory Preparedness Advisory Committee Fall 2013Meeting

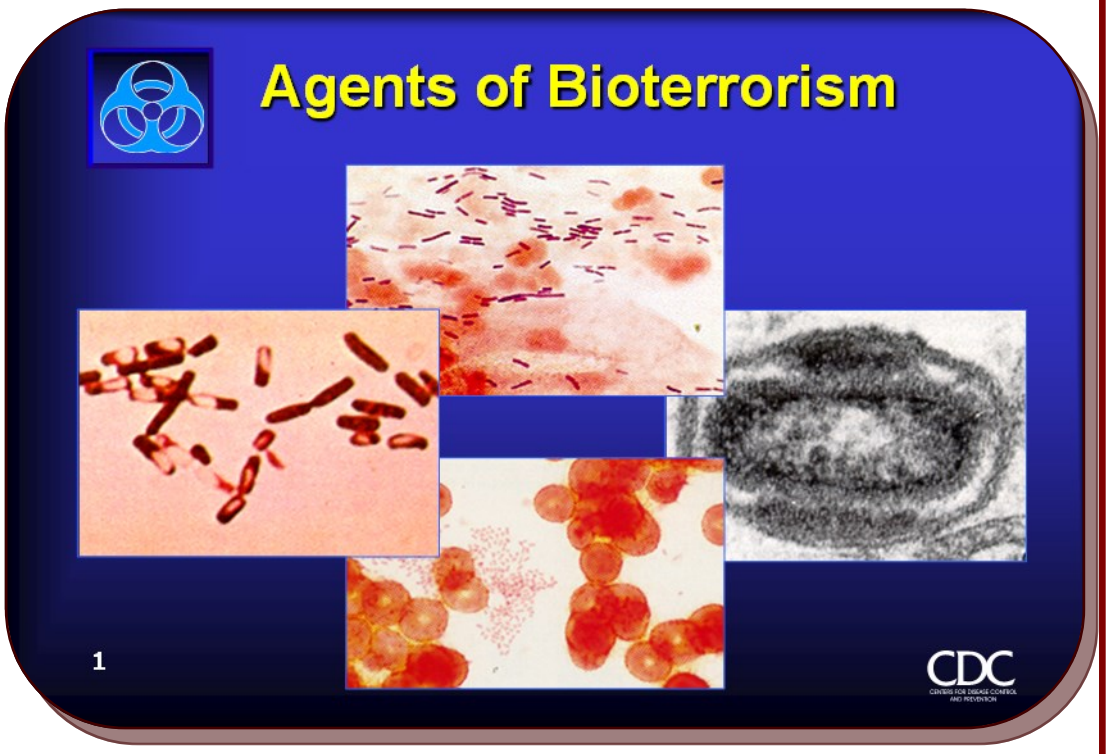
Marion T. Fowler, MT(ASCP), Microbiologist II

The Laboratory Preparedness Advisory Committee (LPAC) meeting was held on November 10, 2013 at the Delaware Public Health Laboratory (DPHL). The meeting was well attended by our partners from the Division of Public Health (DPH), Dover Air Force Base (DAFB), the Delaware Department of Natural Resources and Environmental Control (DNREC), and sentinel microbiology laboratories.

Har Ming Lau, DPM, Chief Toxicologist, Office of Environmental Health and Toxicology, Health Systems Protection Section, presented the "Medical Aspects of Methamphetamine". Nationally, methamphetamine (meth) is readily obtainable, cheaper than many other drugs, and more powerful than cocaine. A 'hit' of meth is roughly ¼ of a gram and costs about $25.00 vs. $250.00 for cocaine. Meth combines the "high of cocaine with the delusion of LSD" and the extent of use is estimated to involve more than 12 million Americans, at least once in their lifetime.

Methamphetamine use impacts the human body with many major side effects. Loss of appetite leads to malnutrition, anorexia, and bone loss from mineral and vitamin deficiencies. There may be an extreme rise in body temperature and loss of dopamine transporters that can result in brain damage. Tooth decay, dry mouth, permanent nerve damage and loss of vision are also side effects of methamphetamine use.

Due to the hallucinatory dryness and infection effects of meth on skin, addicts dig and pick their skin while trying to remove so called "meth bugs". When meth is taken, huge amounts of dopamine are released into the blood stream, producing a high. The body naturally fights back by shutting down the stimulated nerve synapses. Each successive time meth is used, it becomes more difficult to attain the same high intensity, which leads meth addicts to increase dosage and to binge.



Jamie Bethard, Environmental Scientist IV, from the Emergency Response Team of DNREC, spoke next. He discussed the field work implemented by the team in response to meth lab events. This team provides statewide response support to local and state law enforcement agencies in identifying clandestine lab types (i.e. drug, explosive), protecting investigators from chemical hazards, gathering precursors and finished products (chemical evidence), and the rendering safe of chemical reaction containers and eventual disposal of waste. DNREC is assisted by the county decontamination units. After an incident, DNREC refers the location to the Division of Public Health for follow up.

Emily Outten (Lab Manager I) gave an overview of this year's influenza testing algorithm and the "Right Size Influenza Virus Surveillance Project," implemented by Center of Disease Control in conjunction with the Association of Public Health Laboratories (APHL). The Delaware Public Health Laboratory (DPHL) has been encouraged to implement this project as part of a broader statistical approach in flu surveillance. The project applies three "calculators" to determine the number of specimens to test based on Delaware's population. The first calculator (A) involves Situational Awareness to monitor the start and the end of flu season and to monitor the prevalence of viruses circulating within the season. The second calculator (B) covers Rare/Novel Influenza Detection to determine the appropriate number of positive flu specimens that need to be tested to reliably detect a novel viral strain. The third calculator (C) is used to determine the appropriate amount of testing to be done during a novel event. DPHL hopes to avoid using calculator C during the 2013-14 influenza season. As part of the "Right Size" component of the project, DPHL requested that providers submit no more than three specimens per day, and that specimen submission be randomized rather than sending specific specimens to DPHL for sub-typing. The testing algorithm used for the 2013-14 season will be the same as that used for the 2012-13 season.

Continued on page 3

Continued from page 2

Marion Fowler (Microbiologist II) provided an update regarding the bioterrorism (BT) program activities. All sentinel laboratories were able to properly identify the BT agents present in the unknown labeled 2013 CAP LPX-A and they passed the packaging and shipping exercise. Organisms present in the CAP LPX-A exercise were *Francisella tularensis* and *Bacillus anthracis.* As a BT grant measure, this exercise included the packaging and shipping of a BT organism for rule out testing or confirmation by DPHL. Packages were graded and returned to their originator at the spring LPAC meeting and through DPHL couriers.

In April of 2013, DPHL participated in a statewide preparedness exercise using the select agent *Bacillus anthracis* as the BT agent of interest. Both the Beebe and A.I. DuPont laboratories agreed to work with DPHL by submitting "simulated" clinical specimens (blood tubes) for preparedness testing. The requirements and the forms used for submission of clinical specimens for preparedness testing are more comprehensive than those used for BT rule-out isolates.

As a result of this exercise, it was determined that a practice drill was needed to prepare sentinel laboratories and DPHL staff for the possibility of a real event in which specimens submitted for testing are isolates **or** clinical specimens. From this, many of the BT forms used by sentinel laboratories and DPHL were revised and streamlined to make them easier to use . Information and forms for use in exercises or an event are found in the DPHL website: http://dhss.delaware.gov/dph/lab/labs.html

Starting in November 2013, after the completion of the CAP LPX-B survey, DPHL will include the BT clinical specimen exercise as a completed part of the required measures for the BT grant. Beebe and A. I. du Pont are exempt from this year's BT clinical specimen exercise since they participated during the April 2013 statewide preparedness exercise. When the BT clinical specimen exercise is complete, visits were scheduled in November and December 2013 with the sentinel laboratories to discuss and review the exercise and other pertinent information

Lt. Col Douglas Riley, Dover Air Force Base (AFB), Public Health Veterinarian, did a presentation regarding the "One Health" initiative. One Health refers to a national and international, locally focused, multi disciplinary collaborative effort to attain sustainable and optimal health in the ecosystem – i.e., livable ecosystem. One Health is not new. It was originally the method of practice prior to human and veterinary medicine becoming two separate and distinct professions. Then, it was common for the family doctor to also treat domesticated and farm animals. There was good reason for this – animals, like humans, suffer from many of the same conditions. In fact, upwards of 80% of the new and or re-emerging diseases seen today are of animal origin – i.e., zoonoses. One Health, therefore, is based on the concept of combining the knowledge and skills applied in human medicine, veterinary medicine, and environmental health.

Debbie Rutledge, Infectious Disease Laboratory Manager II & Bioterrorism Coordinator, provided an update of recent changes in the bioterrorism and infectious disease practices in our laboratory. She reviewed the CDC's Laboratory Response Network (LRN) infrastructure and role in testing for infectious diseases and discussed the most recent changes regarding the select agent and toxins program and how they affect Delaware. Debbie also provided an update of DPHL's infectious disease capabilities and discussed the advances that the lab has experienced from funding provided by the Public Health Emergency Preparedness grant since 2002. She shared a power point presentation about testing methods and sample requirements available from the Vaccine Preventable Disease Centers. Recently updated regulations for communicable diseases, appendix II, was shared with attendees. This contains a list of organisms and clinical material that are required for submittal to DPHL by laboratories for advanced testing.

Overall, this meeting was well attended and very informative. There was significant discussion and contribution by people in the group. If anyone would like to receive more information or handouts that may have been distributed, contact the laboratory at 302-223-1520. This meeting is held twice each year, normally in May and October. Contact Pat Selg at the laboratory if you would like to be included in our mailing list for future meetings.

Emerging Infectious Disease Update: Influenza A/H7N9 (Eurasian Lineage) and Middle Eastern Respiratory Syndrome (MERS) Diagnostic Testing

Emily Outten, Laboratory Manager

In May of 2013, the Centers for Disease Control and Prevention (CDC) obtained an Emergency Use Authorization (EUA) from the Food and Drug Administration (FDA) to distribute molecular methods and verification panels to qualified laboratories (like the Delaware Public Health Laboratory (DPHL)): for influenza A/H7N9 and the Middle Eastern Respiratory Syndrome. Both EUAs were authorized as *in vitro* diagnostic (IVD) assays because of the significant potential for public health emergencies from these viruses.

MERS was initially detected in April of 2012 as caused by a coronavirus. It is also known as MERS-CoV. As of December 2013, there have been 163 laboratory confirmed cases of the virus and 19 probable cases. The Middle Eastern countries of Jordan, Saudi Arabia, United Arab Emirates, Qatar, Oman, and Kuwait have all reported cases. Additional countries also reporting cases, include: France, Germany, Spain, the United Kingdom, Italy, and Tunisia. No human cases of MERS-CoV have been confirmed in the United States. Of the laboratory confirmed cases, most developed a severe acute respiratory illness with fever, cough, and pneumonia. The virus has a high rate of morbidity and mortality (43%) among those infected.[1]

Since only qualified laboratories, such as public health laboratories and CDC, are capable of performing the testing method of real-time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) for the detection of MERS-CoV, it is essential that health care professionals contact the Office of Infectious Disease Epidemiology (OIDE) at (888)295-5156 to ensure that patients meet the criteria for testing as a "Patient Under Investigation (PUI)". The case definition for a PUI includes: fever, history of travel within 14 days of symptom onset, close contact with a symptomatic traveler, or a cluster of patients with severe acute respiratory illness with unknown cause. Once epidemiologists determine that a patient can apply for testing, DPHL can accept the following clinical specimens: nasopharyngeal swabs, oropharyngeal swabs, bronchoalveolar lavage (BAL), bronchial washes, tracheal aspirates, sputum, serum, or stool. A positive test result from the rRT-PCR assay indicates only that the patient is *presumptively* infected with MERS-CoV and specimens will be sent to CDC for confirmation. The assay was validated and distributed by CDC's Laboratory Response Network (LRN). DPHL qualified to run the assay after passing a verification panel.[2] In October of 2013, DPHL received a specimen to test for MERS-CoV. The patient was the child of a military contractor who had recently returned from Qatar. Fortunately, the child tested negative.

Similar to the LRN's method for MERS-CoV, the Influenza Division of CDC's Virus Surveillance and Diagnosis branch issued an In Vitro Diagnosis (IVD)) for the emerging influenza A/H7N9 Eurasian strain. Although cases of this influenza strain have been rare, two additional cases were detected in October, 2013. This brings the total number of cases for H7N9 to 137 with 45 confirmed fatalities (about 1/3 of infected patients). Like MERS-CoV, H7N9 usually causes severe, acute, respiratory illness. The good news is that, so far, there is no evidence of sustained human to human transmission with this strain (WHO 2013). Most infections are believed to come from poultry or environmental contamination. No cases of H7N9 have been reported outside of China.

The detection assay for H7N9 was only distributed to laboratories who have the capability to also detect the H7N9 strain through additional rRT-PCR. DPHL successfully passed this verification panel for H7N9 in May, 2013. All routine influenza surveillance specimens submitted to DPHL are screened first for influenza A or B. Then, influenza A strains are subtyped accordingly for A/H1N1 seasonal, A/H3N2 seasonal or A/H1N1 pandemic. If DPHL receives influenza A positive results that do not subtype with the first line assay and are below the assay limit of detection, the lab will notify CDC and proceed with additional testing. DPHL has also maintained, for several years, the capability to test for influenza A/subtype A/H5N1 (Asian Lineage). Since the 2009 H1N1 pandemic DPHL has not received any unsubtypeable influenza A specimens. The same specimen matrices that are acceptable for the influenza A and B typing kit are also acceptable for the A/H7N9 and A/H5N1 assays.

If a submitter has a patient considered to be high-risk for avian influenza, personnel should contact the OIDE at the toll free number (888)595-5156. Cases under investigation include people who may have traveled to areas where avian influenza has been known to circulate in animals and those who may have had close and prolonged contact with a confirmed case. DPHL can confirm cases of avian influenza and will immediately notify CDC of anything unusual.[3]

Laboratory specific questions can be directed to DPHL at (302)223-1520. It is unknown at this time how long the FDA may allow the EUA for these rRT-PCR methods. Expedited testing for MERS-CoV and influenza A/H7N9 may be performed in as little as three hours. Any specific medical and/or patient questions regarding influenza should be directed to the OIDE.

References: 1. http://www.who.int/csr/don/2013_12_02, 2014.

2. http://www.cdc.gov/coronavirus/mers/, 2014.

3. http://www.cdc.gov/flu/avianflu/h7n9-virus.htm

Sentinel Laboratory Workshop
Agents of Bioterrorism:

March 20, 2014
or

Sponsored by the Delaware Public Health Laboratory

Description

This hands-on laboratory workshop begins with an overview of laboratory safety and a review of the Laboratory Response Network (LRN) structure to include discussion on select agents. The afternoon will include hands-on exercises based on case studies using "mimic" and attenuated or vaccine strains of select agents. These exercises are designed to enhance the microbiologist's capability to recognize the cultural and microscopic characteristics of potential agents of bioterrorism.

Audience

This one-day, intermediate-level workshop is designed for clinical microbiologists with bench-level experience from designated "sentinel" laboratories within the Delaware Laboratory Response Network.

Location

Delaware Public Health Lab (DPHL)

30 Sunnyside Road

Smyrna, DE 19977

Faculty

Sergio Huerta, MD, Director

Debbie Rutledge, MBA, MT (ASCP),

Lab Manager II, BT Coordinator

Marion Fowler, BS, MT (ASCP), BT, Microbiologist II

Diane Hindman, BS, MT (ASCP), SM, Microbiologist II

Bela Patel, BS Microbiology, Microbiologist II

Objectives

At the conclusion of this program the participant will be able to:

- Discuss the proper usage of available safety equipment and the safety implications of handling suspected agents of bioterrorism in clinical specimens and isolates.
- Recognize culture, staining, and biochemical characteristics of suspected agents of bioterrorism.
- Discuss the role of the clinical laboratorian to "rule out or refer" suspicious isolates according to ASM guidelines to DPHL
- Outline the process for contacting appropriate personnel and

Registration required. *Seating is limited so register early!*

Fee: NO CHARGE!

Registration Deadline: March 7, 2014

To register email Pat Selg at pat.selg@state.de.us

For Program Content and Information: Contact Marion Fowler at the DPHL by email at marion.fowler@state.de.us. Agenda, directions and further instructions will be emailed after workshop registration is complete.

Employee News

John Caldwell, Sr. (Laboratory Technician II) was sworn in as President of Citizen's Hose Fire Company of Smyrna, DE on January 6, 2014. John serves on the Board of Directors, and had served as Vice President for the past 3 years. In 2011, John was awarded the Calvin E. Foxwell Memorial Award Fireman of the Year. He actively participates in public relations, photography, and related activities promoting the volunteer fire service. In addition, John continues as an active volunteer member of the company. Congratulations to John and thank you very much for your continued community service.

Continued on page 6

Continued from page 5

Victoria Johnson has joined our Environmental Analytical Chemistry Lab as an Analytical Chemist III. She was previously our contract chemist for the Chemical Preparedness Lab where she cross-trained into the Environmental Analytical Chemistry Lab. Prior to starting the contract position, she graduated from The Richard Stockton College of New Jersey with a bachelor's degree in chemistry- focus on environmental chemistry. Originally from South Jersey, she now resides in Newark, DE with her Great Dane-mix, Moose. She is very excited to be officially joining her colleagues at DPHL as a state employee.

Shelby Greentaner joined DPHL as an Operations Support Specialist. She attended Rutgers, the State University of New Jersey, from which she received her Bachelors of Arts in Psychology and English. She is currently attending graduate school in the evenings at Wilmington University to earn her Masters in Clinical Mental Health Counseling. Prior to joining DPHL, she worked as a patient coordinator at a dentist's office in Dover. She enjoys reading, cooking, and board games. She also enjoys spending time with her fiancé and her family.

Continued on page 7

Continued from page 6

Nick Rapp is currently a contract Microbiologist working in the Molecular Virology Laboratory at the Delaware Public Health Laboratory (DPHL). Nick graduated from Dickinson College in May, 2013 with a Bachelors of Science in Biology. He began interning at DPHL in July, 2013 and officially began as a contractor in October. Nick is interested in many different aspects of molecular biology including gene therapy, detection of pathogens, regenerative medicine, oncology research and molecular neuroscience and he plans to one day earn a masters degree in one of these fields. Nick is very active and loves to run, swim, lift weights, and play lacrosse. He also enjoys traveling and has had the privilege to visit many different areas of the U.S. and different countries throughout the world including a 6 month study abroad program in Brisbane, Australia.

Victoria (Tori) Ruckman is DPHL's newest intern in the Molecular Virology Lab. She is a graduate of Delaware State University with a B.S. in Forensic Biology. Outside of work Tori has a wide array of interests that include animals, photography and crafting. She has a bubbly personality and loves to meet new people.

DELAWARE'S DIVISION OF PUBLIC HEALTH LABORATORY

Delaware 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
- Epidemiology
- Newborn Screening
- STD prevention
- TB Elimination
- Drinking water
- Preparedness

Karyl Rattay, MD, MS, FAAP, FACPM, Director, Delaware's Division of Public Health

Sergio Huerta, M.D., Director, Department of Natural Resources and Delaware Public Health Laboratories

Christina Pleasanton, MS Deputy Director, Delaware Public Health Laboratory

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.

Edited by Emily Knearl, director, OHRC

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