DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health
Laboratory

DELAWARE LABORATOR

Fall 2007

An InFLUential Direction

Rebekah Parsons, Lab Manager

The Delaware Public Health Laboratory (DPHL) is an integral part of influenza surveillance not only on a state level, but also on the national level. In order to stay at the forefront of evolving detection methods, treatment of, and vaccination for mutating influenza strains, DPHL must stay current with advances in research and development. Although viral cell culture has always been the gold standard for influenza testing, more scientists are looking toward using Polymerase Chain Reaction (PCR) as an exceptionally sensitive, specific, and rapid method for diagnosis and subsequent treatment.[3] Studies have shown the molecular methods, specifically Reverse Transcriptase - PCR (RT-PCR), are gaining ground as highly sensitive diagnostic methods with shell vial methods considered a fast alternative to viral culture when further strain characterization is necessary.[4] PCR has the advantage of functioning successfully independent of viable cells, stringent specimen transport requirements, and optimal storage conditions, unlike viral culture.[5]

As with the adaptations in detection methods, the CDC is also reporting adaptations in treatment in response to mutating influenza strains. Due to a point mutation in the influenza A M gene which determines species specificity, resistance to the anti-viral drugs amantadine (Symmetrel) and rimantadine (Flumadine) has skyrocketed.[1, 6] A comprehensive analysis of influenza strains indicated that 96 percent of the H3N2 strains as well as 15 percent of the H1N1 viruses currently circulating worldwide are amantadine resistant.[2] These drugs, which have been in use for years to combat influenza A, are no longer recommended by the CDC. As of the 2005-2006 season, two new drugs, oseltamavir (Tamiflu) and zanamivir (Relenza), are now being supported. These drugs function differently by binding to the neuraminidase protein, subsequently blocking viral release from infected cells.[1] Currently, there is little known resistance to the new drugs.

Expeditious diagnosis and treatment is key to containing influenza outbreaks and continuing the decrease in mortality rates. With this in mind, on Nov. 1 2006, the DPHL embarked on a new direction for influenza testing using molecular methods for front line screening. Once received at the lab, the specimens were tested for influenza A and B, using real-time RT-PCR. Positive specimens were subtyped using cell culture. Any positive influenza A specimens which could not be typed by cell culture were further subtyped using real-time RT-PCR. DPHL has the capability to detect the common H1 and H3 influenza A subtypes using real-time RT-PCR and also maintains the resources and competence to detect H5 and H7 strains. Capacity for potential H5 testing has increased during the past year with the number of staff trained now at 13 as compared to 10 previously.

Typically, the influenza season falls between October 1 and May 31; however, specimens for influenza testing are routinely received at the lab and surveillance continues year round. Nationwide, the 2006-2007 influenza season closed end of May 2007. Influenza activity across the United States peaked in mid-February when the

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World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NEVSS) laboratories received 9499 specimens in week seven. Influenza surveillance in Delaware peaked mid-March, with the DPHL receiving 575 specimens within one week. According to the final 2006-2007 influenza report published by the CDC, WHO and NREVSS collaborating laboratories tested 172,735 specimens for influenza. A total of 23,181 (13.4 percent) specimens tested positive for influenza, of which 18,392 (79.3 percent) were influenza A and 4,789 (20.7 percent) were Influenza B. Of the influenza A specimens that were subtyped, the viruses were predominantly H1 (63.5 percent). In contrast, the final 2006-2007 influenza reports for Delaware indicated an initial emergence of influenza B followed by a predominantly H3N2 season.

Of the 2130 specimens submitted to DPHL, 498 (23.4 percent) specimens tested positive for influenza, with 414 (19 percent) testing positive for Influenza A and 84 (4 percent) testing positive for influenza B. Further subtyping of the Influenza A isolates revealed the majority (70 percent) to be H3N2 and the remaining 30 percent to be H1N1. The number of specimens submitted to the DPHL is a slight increase over the 2,097 specimens submitted for the 2005-2006 influenza season.

In collaboration with laboratories worldwide and in line with WHO influenza vaccine recommendations, the DPHL sent 22 isolates to the CDC. Reports submitted to the WHO collaborating center for influenza at the CDC provided information on patient age distribution, number of specimens tested, influenza strain and subtyping results for statistical analysis. Confirmation was received from Dr. Alexander Klimov, Deputy Director of WHO Collaborating Center for Surveillance, Epidemiology and Control of Influenza that the CDC was also unable to grow particular specimens in cell culture. The CDC also diagnosed these specimens as "Influenza A (H3) by PCR".

Information from participating laboratories resulted in the WHO recommending a change in the H1N1 component of the trivalent influenza 2007-2008 vaccine.[7] The H3N2 and B components have remained the same.[7] The importance of surveillance is substantiated by the approximately 31,000 Influenza A related deaths annually. Approximately 90 percent of these deaths occur among the elderly with the CDC reporting 60 pediatric deaths during the 2006-2007 season.[1]

During the past influenza season, DPH recruited 10 sentinel physicians to participate in the influenza sentinel provider surveillance network — four in New Castle County and three each in Kent and Sussex Counties. The sentinel physicians, hospitals, and health clinics were provided with over 2500 influenza specimen collection kits. This year, DPH is again recruiting physicians to participate in the program. In addition to courier services to sentinel sites, DPHL will provide specimen collection kits and instructions. For information about pick-up sites or to receive a supply of collection kits please contact the laboratory kit room at 302/223-1520 or e-mail labsupplies@state.de.us.

References:

[1]Bright R.A., Shay D.K., Shu B., Cox N.J., and A.I. Klimov. Adamantane resistance among influenza A viruses isolated early during the 2005-2006 influenza season in the United States. JAMA. 2006 Feb 22;295 (8):891-4. Epub 2006 Feb 2.

[2]Deyde V.M., Xu X., Bright R.A., Shaw M., Smith C.B., Zhang Y., Shu Y., Gubareva L.V., Cox N.J., and A.I. Klimov. Surveillance of resistance to adamantanes among influenza A(H3N2) and A(H1N1) viruses isolated worldwide.J Infect Dis. 2007 Jul 15;196(2):249-57. Epub 2007 Jun 7.

[3]Leland DS., and CC Ginocchio. Role of cell culture for virus detection in the age of technology. Clin Microbiol Rev. 2007 Jan;20 (1):49-78. Review.

[4]Pérez-Ruiz, M., Yeste, R., Ruiz-Pérez, M-J., Ruiz-Bravo, A., de la Rosa-Fraile, M., and José María Navarro-Marí. Testing of Diagnostic Methods for Detection of Influenza Virus for Optimal Performance in the Context of an Influenza Surveillance Network. Journal of Clinical Microbiology, September 2007, p. 3109-3110, Vol. 45, No. 9.

[5]Syrmis M.W., Whiley D.M., Thomas M., Mackay I.M., Williamson J., Siebert D.J., Nissen M.D., and T.P. Sloots. A sensitive, specific, and cost-effective multiplex reverse transcriptase-PCR assay for the detection of seven common respiratory viruses in respiratory samples. J Mol Diagn. 2004 May;6 (2):125-31.

[6]Widjaja, L., Krauss, S., Webby, R., Xie, T., and Robert G. Webster. Matrix Gene of Influenza A Viruses Isolated from Wild Aquatic Birds: Ecology and Emergence of Influenza A Viruses. Journal of Virology, August 2004, p. 8771-8779, Vol. 78, No. 16.

[7]www.cdc.gov/flu/weekly

New Employees at DPHL

WELCOME

Please welcome **Har Ming Lau,** DPM to DPHL. Dr. Lau is the acting lab manager overseeing the environmental chemistry and chemical preparedness sections. He joins us from Health Systems Protection in Dover where he worked as a public health treatment program administrator for six years. Dr. Lau grew up near Philadelphia. He received his Bachelor of Science degree in chemistry, computer science and mathematics from Albright College in Reading, PA, and his DPM degree from Temple University School of Podiatric Medicine. In addition to his medical degree, Dr. Lau has clinical laboratory experience working as a resident in a hospital laboratory. Dr. Lau supervised, mentored and trained medical professionals and technical staff. Dr. Lau currently serves as the alternate State Health Operations Center deputy chief for the planning section. The lab is very happy to have Dr. Lau join our team!

Charity Mabrey began working in the virology and environmental and molecular microbiology sections at the Public Health Laboratory in August. She graduated from

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Delaware's Sentinel Labs Perform Rule Out Testing for BT Agents

Debra Rutledge, Microbiology Laboratory Manager, Bioterrorism Laboratory Coordinator

Delaware's Sentinel Laboratories participated in a mini exercise this past May, using the newly revised College of American Pathology's (CAP) Laboratory Preparedness Survey (LPS). Successful participation in proficiency testing surveys is a requirement for laboratory licensure. Ensuring that sentinel laboratories can recognize a potential bioterrorism (BT) agent , perform rule out testing , and appropriately refer testing to the State Public Health Laboratory are requirements for the CDC Public Health Preparedness Cooperative Agreement.

In December 2005, the Association of Public Health Laboratories (APHL) at the request of several state laboratories approached CAP with concerns about the effectiveness of the LPS survey. CAP had developed this survey as a means for laboratory response network (LRN) reference laboratories to test their sentinel laboratories' competency in ruling out BT agents. CAP had incorporated several photomicrographs of stains or slides that a bench microbiologist would not normally read. Many of the organisms used were not part of sentinel lab's training for ruling out BT agents. Also, the list of responses to choose from on the answer sheet was not appropriate for sentinel laboratories and conflicted with the training and guidelines provided by the state labs.

Feedback provided to CAP led to the formation of a working group consisting of 10 state laboratory representatives to help improve the survey. In January 2007, the group had completed the modifications to more effectively serve the needs of the sentinel labs. Photomicrographs were eliminated, a list of surrogate organisms that mimic the true BT agents was provided, and a new list of appropriate responses for all levels of laboratories was developed. A new feature to the survey required sentinel laboratories to contact their LRN reference laboratories if they were unable to rule out BT agents following the sentinel lab algorithms. LRN reference laboratories had the option to request that sentinel laboratories actually package and ship the isolate as a potential BT agent.

The May survey consisted of five isolates and four of them needed referral to the LRN reference laboratory. Delaware Public Health Laboratory is a LRN reference laboratory. Sentinel laboratories were instructed to package and ship these isolates as if they were using a commercial air courier (to simulate sending to CDC in a real emergency). Packaging and shipping, utilizing International Air Transport Association regulations, is also a requirement for sentinel laboratories. We asked the sentinel laboratories to not actually ship these packages but to send them to our laboratory using our daily couriers. Each sentinel laboratory was graded on this process.

Delaware has nine sentinel laboratories, the majority located in hospital labs throughout the state. Seven sentinel laboratories correctly contacted, packaged and shipped isolates to the Delaware Public Health Laboratory. The two labs that did not perform this process were not aware of the changes in the CAP LPS survey. Seven laboratories were willing to allow CAP to share results with our lab. Five of the seven laboratories correctly identified the isolates. Two laboratories had one or two incorrect responses and we will be working to assist those laboratories if needed.

The next CAP LPS survey will be sent out in mid October. Sentinel laboratories are urged to contact DPHL when they are ready to refer isolates . They will not be required to package and ship if they participated successfully in the May packaging and shipping exercise.

DIVISION OF PUBLIC HEALTH LABORATORY
EMPLOYEE RECOGNITION CEREMONY
AUGUST 21, 2007

CONGRATULATIONS TO:

GROUP OF THE 1ST QUARTER
Cheryl Jones and Michele Young

ABOVE AND BEYOND

Tara Lydick
Gaile McLaughlin
Debra DeRocili
Marion Fowler
Debra Rutledge
Clover Carlisle
Brenda Pernol
Mary Ann Lustfield
Anthony Tata
Jay Schuman
Susan Dee
Bela Patel
Donna Colatrella
Diane Hindman
Mary Ann Brown
Pat Scott
Cindy Pearson
Billie Jean Scott
Amir Saad
Emily Outten
Frederick Franze

GOVERNOR'S EXCELLENCE AWARD
Nominees: New Born Screening Team

Clover Carlisle
Brenda Pernol
Billie Jean Scott
Jane Getchell
Patricia Scott
Cindy Pearson

March of Dimes Recognizes State of Delaware

Patricia Scott, NBS laboratory manager

On August 1, 2007, Delaware Governor Ruth Ann Minner happily accepted an award from the March of Dimes to the State of Delaware for **Commitment to Excellence in Newborn Screening**. Across the nation, March of Dimes chapters are recognizing states that have been able to expand their newborn screening programs to include the 29 core disorders recommended in the 2002 report - *Newborn Screening: Toward a Uniform Screening Panel and System* by American College of Medical Genetics and commissioned by Maternal and Child Health Bureau of the Health Resources and Services Administration of the United States Department of Health and Human Services. Twenty-five additional secondary disorders are recommended in this report. Delaware presently is monitoring 38 disorders. To see a list of diseases tested by the state, please visit the National Newborn Screening and Genetics Resource Center web site at: http://genes-r-us.uthscsa.edu/. The award was presented during a bill-signing ceremony for Senate Bill 78. The bill provides that certain medical formulas and food expenses in the on-going treatment of Phenylketonuria (PKU) and other inherited metabolic diseases shall be covered in health insurance contracts and also in group and blanket health insurance policies, effective July 1, 2008. Several families of PKU-affected children were also in attendance to celebrate

CONGRATULATIONS

the passing of this bill in Delaware.

Pictured from left: Senator Margaret Rose Henry, lead sponsor of the Senate Bill 78 in the Delaware Senate; Governor Ruth Ann Minner; Betsy Voss, Newborn Screening Pprogram manager and advocate for PKU affected families in Delaware; Patricia Scott, Newborn Screening Laboratory manager, and Lesley Kosek, director of the Delaware chapter of the March of Dimes. Representative Pamela S. Maier (missing from picture), was the lead sponsor of the bill in the Delaware House of Representatives.

HIV Testing Using "Rapid" Test Methods

Fred Franze, QA Laboratory Manager

In January 2003, the Food and Drug Administration approved the OraQuick rapid HIV-1 antibody test as a Clinical Laboratory Improvements Amendments (CLIA) waived test. In March 2003, the director of the Division of Public Health gave approval to the HIV program office and the Public Health Laboratory to begin implementing rapid HIV-1 testing throughout the state. The rationale for granting quick approval to implementation was because in 2002, approximately 10,000 HIV tests were performed (both anonymous and confidential), but 46 percent of the clients tested failed to return for their results. This created a situation where a large population, potentially at risk of infection, did not know their infection status. It is believed that the primary reason for this high failure-to-return rate was the long turn around time — (two weeks) for results. By implementing rapid testing at the clinic sites, clients would be able to learn their HIV status immediately, allowing clinic staff an opportunity to discuss risk reduction and behavior change. Confirmation of all preliminary positive rapid test results was done using the Western blot method at the Public Health Laboratory.

Beginning in March 2003, sexually transmitted disease (STD) clinics were authorized to begin testing, a site at a time. As each site began testing, close, coordinated communication was maintained between the HIV program office, the public health lab and the clinic staff to resolve any problems or issues as they occurred. By June 2003, all four of the state STD clinics were performing testing. In December 2003, the Beautiful Gate Outreach Center, a community-based organization located in Wilmington, was authorized to begin testing.

To facilitate implementation of rapid HIV testing, the HIV program office worked with the Public Health Laboratory to develop a coordinated approach. Responsibilities for each included :

- **HIV Program Office**
  - Provide the funding to purchase test kits, controls, training materials and proficiency testing surveys.
  - Determine which clinic sites would be authorized to perform the testing and who, other than lab staff, would be trained to perform testing (clinicians, counselors, etc.).
- **Public Health Laboratory**
  - Designate the STD clinic lab technical supervisor as the authorized individual to train and certify public health staff to perform rapid testing.
  - Develop the appropriate logs and training materials.
  - Monitor the following quality assurance activities at each of the authorized testing locations: quality control, proficiency test surveys, and technician performance.

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- Maintain and distribute rapid testing supplies to test sites.

The OraQuick rapid HIV-1 antibody test training program was implemented in the following manner:

- Orasure Technologies provided initial training to the technical supervisor for the STD clinic labs.

- The technical supervisor provided training to the laboratory technicians at each of the STD labs utilizing a video tape of the test procedure and hands-on training.

- To be certified to begin patient testing, lab staff had to demonstrate proficiency by accurately interpreting the results of several unknown specimens.

- Documentation was accomplished using a modified version of the CDC Training Checklist for the OraQuick rapid HIV-1 Antibody Test.

- After testing personnel were certified to perform testing, the HIV program office and the Public Health Lab held a meeting with clinicians, counselors and testing personnel to discuss protocols for testing and reporting.

In the fall of 2005, the decision was made to expand testing to all community based organizations (CBO) throughout the state. The HIV program office developed a list of eligible CBOs and identified key employees to train. The Public Health Laboratory was asked to provide training and technical oversight to each CBO as it began testing. Initially, only a few CBOs were authorized to perform testing and were selected based upon their location, the number of patients in their care, and the prevalence of risk factors. By the end of 2006, twenty-fiveCBOs were performing testing throughout the state. Tables 1 and 2 illustrate the results of testing.

Recently, the HIV program office and the Public Health Laboratory decided to switch testing methods from the OraSure Technologies *OraQuick Advanced* test to the Trinity Biotech *Uni-Gold Recombigen Rapid HIV* test. Several factors influenced this decision, including cost per test, shelf life and length of time required to perform the test. With this change, oral fluid testing is no longer available.

Rapid HIV testing has proven to be an extremely valuable tool in identifying HIV positive patients. Its use as a screening tool for at risk patients has enabled Public Health to counsel these individuals about the dangers of HIV and the ways to prevent infection.

Community Based Organizations	**2005**	**2006**	**2007***
Total tests performed	1800	4707	5274
Preliminary positives that were confirmed	22	31	40

Public Health STD clinics	**2005**	**2006**	**2007***
Total tests performed	5666	5784	4054
Preliminary positives that were confirmed	40	34	30

* January 2007 – August 2007

DPHL Tests Private Drinking Water for the Delaware Cancer Consortium

Har Ming Lau, DPM, Acting Lab Manager

On April 3, 2007, Delaware's Division of Public Health Office of Drinking Water (ODW) received approval to move forward with the Delaware Cancer Consortium's water monitoring project. This project involves analyzing private well water for volatile organic compounds (VOCs) to determine if cancer causing contaminants are present in the Columbia aquifer. This project will help to validate a private well water study conducted by the Delaware Geological Survey.

The Cancer Consortium, along with ODW, purchased 200 kits to collect and analyze shallow private residential wells for volatile organic pollutants. Water samples were collected through the coordination of ODW's administrator, Edward Hallock, with the assistance of the Strong Communities Initiatives and Llamar Walker, a Delaware State University student intern. The collected samples were then analyzed by DPHL for 61 regulated and unregulated compounds. These compounds are either known or suspected

carcinogens. These samples, collected in a short amount of time, had an overwhelming impact on testing at DPHL. Staff of the environmental chemistry section, together with the environmental molecular microbiology section at DPHL went above and beyond to help meet the goals of the Cancer Consortium and complete the testing. Currently, 159 of the 200 water test kits have been analyzed and logged into the Laboratory Information Management System (LIMS).

To date, only one sample has exceeded the maximum contamination level (MCL) of 10 ug/L set by the State. This particular sample produced a result of 25.8 ug/L methyl-t-butyl ether (MTBE). One other sample gave interesting results although no MCLs were exceeded. The results from this sample were (in ug/L) 1.27 MTBE, 0.66 p-dichlorobenzene (PDCB), 0.56 total xylene (TXY) and 0.94 naphthalene (NAP).

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This sample also contained traces of many other purgeable compounds.

In conjunction with the VOC project, ODW worked closely with the DPH's Office of Health and Risk Communications to launch an outreach media campaign, distribute water testing kits, collect samples and test 1,000 private drinking wells for routine inorganic compounds throughout Delaware. Samples of drinking water were tested for nitrates, nitrites, fluoride, chloride, sulfate, alkalinity, iron, sodium, and calcium. Simultaneously, bacteriological tests were conducted on these samples for the presence of total coliforms, including escherichia coli (E. coli). As of Sept 30, DPHL has analyzed and logged into LIMS a total of 676 samples for the presence of total coliforms and 658 samples for inorganics. At the conclusion of the project DPH's ODW will compile all the results and present their findings to the Delaware Cancer Consortium.

New Employees, continued from page 2

the University of Delaware in 2002 with a BA in biological sciences and spent two summers working in a casual/seasonal position for Delaware Natural Resources and Environmental Control 's Mosquito Control program as a biological aide. For the past three years, Charity has worked as a laboratory technician in the quality assurance lab of Clariant Performance Plastics. We're very glad to have her with us!

Pat Selg joins the DPHL family as an operations support specialist, focusing on LIMS water sample data entry, and cheerfully holding down the front desk. She was previously employed for 16 years as a reporting analyst with MBNA. Pat and her husband have a son and daughter and a grandson, Tyler, who just turned one in August. Pat is treasurer of the Del Rods Car Club of Dover. Welcome Pat!

Steve Snow is a CDC/APHL emerging infectious disease fellow, originally from Mount Laurel, NJ, who began his one-year fellowship at DPHL in September. Steve graduated from the University of Delaware in May 2007 with a BS in medical technology. Last summer, Steve worked as a research and development intern at Medical Diagnostics Laboratory working on the development of a real-time PCR assay for the detection of respiratory syncitial virus. Steve will be rotating through the newborn screening lab, the microbiology lab, and the molecular and virology lab. A focus of his fellowship will be on the validation of Norovirus sequencing methods. We welcome him to the lab!

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New!!! Specimen Collection Procedures
Test Requisition Form

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

DELAWARE DIVISION OF
PUBLIC HEALTH LABORATORY

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

Built: 1990

Business Hours: 8 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

Jaime "Gus" Rivera, MD, FAACP
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Delaware's Division of Public Health

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

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