



# DELAWARE LABORATOR

FALL

2008



## DELAWARE PUBLIC HEALTH LABORATORY RABIES TESTING POLICY

Jack S-C. Liou, Ph.D., Lab Manager II

Delaware Public Health Laboratory is the sole source for rabies diagnostic testing in Delaware. The detection of rabies virus antigens in brain tissue by fluorescent-labeled antigen (dFA) is the diagnostic tool for identification of rabies virus in animals suspected of being infected. This service is available to all health care providers within the state. Submission of specimens for rabies testing must meet the established testing criteria. **Specimens submitted for testing that fail to meet the testing policy will be rejected and destroyed.**

### Specimen Acceptance Policy

Testing resources are reserved for situations where the testing outcome will influence patient management decisions. Terrestrial animal submissions are limited to significant rabies vector species that expose humans, livestock, or **unvaccinated** pets. Significant rabies vector terrestrial species include raccoons, skunks, foxes, most other carnivores, and woodchucks. Exposure is defined as a bite that breaks the skin or contact of mucus membranes or broken skin with either animal saliva or nervous tissue. Domestic animals exhibiting signs of rabies and wild animals that have potentially exposed a person, unvaccinated pet, or livestock to rabies should be submitted for testing without delay.

Dogs, cats and ferrets that **do not exhibit signs of rabies** and which bite people, pets or livestock **should not be euthanized and instead should be confined and observed for 10 days** (1,2), unless circumstances demand otherwise. Observation is recommended because dogs and cats may excrete rabies virus in their saliva for up to five days prior to the onset of signs. The ten-day observation period for dogs and cats is twice the predicted time, allowing a 100% margin of safety. If a dog or cat shows no clinical signs of rabies after ten days of observation, one can be assured that the animal was not shedding

virus at the time of the exposure. Dogs, cats, and ferrets that survive the 10-day quarantine period should not be submitted to the rabies laboratory for testing. Conversely, if the dog, cat, or ferret does not survive the 10-day quarantine period, the specimen should be submitted to the rabies laboratory for testing.

In addition, any animal bitten or scratched by either a wild, carnivorous mammal or a bat that is not available for testing should be regarded as having been exposed to rabies. **Unvaccinated** dogs, cats, and ferrets exposed to a rabid animal should be euthanized immediately. If the owner is unwilling to have this done, the animal should be placed in strict isolation for 6 months and vaccinated 1 month before being released. Animals with expired vaccinations need to be evaluated on a case-by-case basis. Dogs and cats that are currently vaccinated should be kept under observation for 45 days (3).

Wild animals (unlike dogs, cats, and ferrets) do not have a predictable time for shedding of rabies virus prior to presentation of symptoms. Therefore, these animals should be caught, euthanized immediately, and the head submitted for rabies virus detection.

Bats that have interaction with humans should be submitted for testing only if the contact involves:

1. a bite
2. handling where a bite cannot be ruled out
3. presence in a domicile with access to humans while they were asleep, unconscious, or incapacitated

If one or more bats escape capture, do not submit the remaining bats because recommendations regarding post-exposure prophylaxis will not be altered by testing only some of the bats.

### Inside this issue:

<i>DPHL Rabies Testing Policy</i>	1
<i>Quantiferon: New Test For Diagnosis of TB</i>	2
<i>Blood Lead Testing at DPHL Update</i>	4
<i>DPH Laboratory Systems Assessment</i>	5
<i>Delaware Health Alert Network #163</i>	6

### SPECIAL POINTS OF INTEREST

Front Page Article:  
DPHL Rabies Testing Policy

Quantiferon : New Test for Diagnosis of TB  
page 2

DPH Laboratory Systems Assessment  
page 5

Continued, page 2

*DPHL Rabies Testing Policy, continued***IMPORTANT**

Small rodents (such as squirrels, rats, mice, hamsters, guinea pigs, gerbils, and chipmunks) and lagomorphs (such as rabbits and hares) are **almost never found to be infected with rabies** and have not been known to cause rabies among humans in the United States (4). **Bites by these animals are usually not considered a risk of rabies** unless the animal was sick or behaving in an unusual manner and rabies is widespread in your area. Woodchucks or groundhogs (*Marmota monax*) are the only rodents that may be submitted to the state public health lab because of a suspicion of rabies. In all cases involving rodents, the state division of public health should be consulted before a decision is made to initiate post-exposure prophylaxis (PEP).

**2008 – Present**  
**Rabies Tests conducted at DPHL**

Samples Received	209
Samples Tested	209
Negatives	194
Positives	15

**Specimen Collection**

Animals should be euthanized in a manner that will not destroy the brain tissue. Thus, only the animal's head should be submitted to the lab for diagnostic purposes. Small animals no larger than a squirrel (or < 6 lbs) may be submitted whole. For bats, the whole dead animal must be submitted and should be secured in a clear container such as a zip-lock bag or equivalent. **Treat any specimens with fleas, ticks, maggots, ants, etc. prior to packing.** Place each animal specimen for rabies diagnosis in a separate leak-proof container (i.e., can, double plastic bag, etc.) and securely seal. Place this container in a sturdy shipping carton (use sturdy styrofoam if possible) and enclose refrigerants to keep the specimen cold. Specimens should be kept cold but NOT FROZEN. DO NOT USE LOOSE WET ICE OR DRY ICE. Specimens inadvertently frozen may still be suitable for testing; however, testing may be delayed due to thawing and inaccurate diagnosis could occur due to freezing or cross-contamination.

All specimens (particularly large animal heads such as cows, horses, deer, large dogs, etc.) should be submitted to **the Delaware Dept. of Agriculture**, 2320 S. DuPont Highway, Dover; (302) 698-4525 as soon as possible. Please ensure proper rabies requisition forms are filled out completely and attached to the bag for each specimen submitted for testing. Delaware

Department of Agriculture will remove the brain tissue and forward the entire brain, including cerebellum and brain stem, to the DPHL Molecular Virology Laboratory for testing. Please **contact Kent County SPCA** (302) 698-3006 directly for specimen submission information. The anatomical tissues that DPHL requires for a satisfactory rabies test include cerebellum and a complete cross section of the brain stem. Specimens fixed in formalin cannot be tested and will be reported as unsatisfactory. (**Please note:** Once specimens are submitted for testing to the lab, samples will be destroyed after testing.)

**Rejection**

Rabies specimens are usually not rejected, but testing may not be performed for the following reasons:

- Decomposition - Brain decomposed upon receipt (e.g., insect ridden specimens)
- No brain tissue - No brain tissue and/or partial/incomplete brain tissue can be identified in animal head.
- Animal - Animals should be sent to the Delaware Department of Agriculture (DDoA). DDoA decapitates animals heavier than 6 lbs.

**Reference:**

1. Tepsumethanon V, Lumlertdacha B, Mitmoonpitak C, Sitprija V, Meslin FX, Wilde H. 2004. Survival of naturally infected rabid dogs and cats. *Clin Infect Dis.* 39:278-280.
2. Centers for Disease Control and Prevention. 2007. Compendium of Animal Rabies Prevention and Control: National Association of State Public Health Veterinarians, Inc. (NASPHV). *Morb. Mortal. Wkly. Rep.* 56(RR03): 1-8.
3. Niezgoda, M., Briggs, D. J., Shaddock, J., Dreesen, D. W., & Rupprecht, C. E. 1997. Pathogenesis of experimentally induced rabies in domestic ferrets. *American Journal of Veterinary Research.* 58(11), 1327-1331.
4. Childs, J. E., Colby, L., Krebs, J. W., Strine, T., Feller, M., Noah, D., Drenzek, C., Smith, J.S., & Rupprecht, C. E. 1997. Surveillance and spatiotemporal associations of rabies in rodents and lagomorphs in the United States, 1985-1994. *Journal of Wildlife Diseases.* 33(1), 20-27.

## QUANTIFERON: NEW TEST FOR DIAGNOSIS OF TB

*Diane M. Hindman, BS, MT(ASCP)SM, Microbiologist II*

QuantiFERON (QFT) is a new Food & Drug Administration approved blood test for the detection of tuberculosis (TB) infection. As a modern alternative to the 100 year old tuberculin skin test (TST), QFT may offer clinicians a simpler and more accurate, reliable, and convenient TB diagnostic tool. QFT is highly specific and a positive test result is strongly predictive of true infection with *Mycobacterium tuberculosis* (*M. tb*). The test is approved as an aid for diagnosing both active TB disease and latent TB infection (LTBI); however, it does not differentiate the two.

The QFT test is an indirect test for *M. tb* infection; it measures a cell-mediated immune response in infected individuals. The T-lymphocytes of infected individuals are sensitized to *M. tb* proteins. When whole blood is incubated with the *M. tb* specific antigens used in the test, the T-lymphocytes secrete interferon-gamma which is measured via a sensitive enzyme-

linked immunosorbent assay (ELISA). QFT-G specifically detects responses to two proteins (early secretory antigenic target-6 and culture filtrate protein-10), which are made by *M. tb*. and are absent from all Bacille Calmette-Guérin (BCG) vaccine preparations and environmental, i.e., nontuberculous mycobacteria (NTM), with the exception of *M. kansasii*, *M. marinum*, and *M. szulgai*. As a result, the QFT test is completely unaffected by BCG vaccination status and sensitization to the majority of NTMs, thus providing a more accurate test of TB infection.

QFT can yield cost savings in terms of medical staff time by elimination of a second patient visit for test interpretation, and the elimination of

*Continued, page 3*

### Quantiferon Testing, continued

common false-positive results, the latter involving both unnecessary follow-up testing and treatment for LTBI. QFT can eliminate the need for the repeat (i.e. 2 step) testing that is required when TST is used for screening health care workers and may lower the administrative cost of maintaining testing compliance in health care facilities, which may offset the slightly higher reagent cost in the tuberculin skin test.

QFT	TST
<i>in vitro</i> , controlled laboratory test with minimal inter-reader variability because positive and negative controls included on each patient test.	<i>in vivo</i> , subject to errors during implantation and interpretation of size and induration
<i>M. tb</i> specific antigens used	Less specific purified protein derivative antigen used
No boosting; 2 step testing not needed	Boosting with repeated testing
1 patient visit possible	2 patient visits minimum
Unaffected by BCG and most environmental mycobacteria	False-positive results can occur after BCG and environmental mycobacteria exposure
Most results are simple positive/negative. Indeterminate results are meaningful, may indicate immunosuppressed patient or collection problem.	False-positive results can occur after BCG and environmental mycobacteria exposure

High-risk populations to screen include:

- Immunocompromised individuals (e.g. HIV-infected persons or those receiving immunosuppressive medications, including TNF-alpha antagonists, pre-organ transplant patients)
- Contacts to cases of active TB
- Individuals with medical risk factors for TB reactivation (e.g. diabetes, chronic renal failure, silicosis, malnutrition, certain cancers)
- Recent immigrants (<5 years) to the U.S. from TB endemic areas, regardless of age
- Homeless individuals
- Injection drug users
- Patients with an abnormal chest x-ray consistent with old or active TB
- Residents and employees of high-risk congregate settings (e.g. shelters, nursing homes, jails, substance abuse treatment facilities)
- Health care workers, including screening following an exposure to *M. tb*. (2005 Center for Disease Control & Prevention

(CDC) guidelines introduced QFT as an alternative to the TST for initial and serial screening of health care workers for TB infection)

Test Interpretation: ***Like the TST, the QFT is a useful but imperfect diagnostic aide. It should not replace clinical judgment.***

- **Negative:** Same interpretation as negative TST. No further TB evaluation is needed unless indicated by clinical judgment.
- **Positive:** Same interpretation as positive TST. Medical evaluation and chest x-ray are needed to exclude TB disease and confirm LTBI.
- **Indeterminate:** Test failure. Repeat QFT or administer TST. QFT results may be indeterminate due to laboratory error or patient energy. If two different specimens from a patient yield indeterminate results, do not repeat QFT for that person.

Other Considerations:

- The QFT test has not been extensively studied in many groups, such as those with impaired immune function, contacts to active TB cases, and children. However, the CDC currently approves of its use even in these individuals, based on available data.
- The ability of QFT to predict the risk of LTBI progression to TB disease has not been determined. The risk may be different than in those with a positive TST.

The QFT test can be used to assess for the presence of LTBI in anyone who is a candidate for a TST. It can also be used to aid in the diagnosis of active TB. However, it should **not** be used for patients currently receiving treatment for active or latent TB.

**Special note! Specimen Collection is VERY important!**

Correct collection of blood specimens is absolutely critical in the Quantiferon In-tube test. This test differs from most other lab tests drawn off-site, in that the testing process begins IMMEDIATELY upon the correct volume of blood entering the tube. Therefore the blood collection personnel become an official part of the technical testing team. Three tubes are collected for each patient, providing a positive and negative control tube along with the actual test tube on each patient. The 3 tube set must be shaken VIGOROUSLY for 5 seconds until visible frothing is seen to coat the sides of the tubes. The reason for this mixing process is to ensure even distribution of stimulating antigen, allowing optimal contact with T-cells leading to production of the target interferon. After blood collection, the 3 tube sets may be kept at room temperature for up to 12 hours, then MUST be incubated at 37 degrees C for 16-24 hours. In Delaware TB clinics, these specimens will be racked upon collection during Monday - Thursday clinic hours, left at room temperature until the end of the work day, then incubated overnight until the following morning's regular scheduled courier pick up. When received at Delaware Public Health Laboratory (DPHL), the tubes will be centrifuged upon receipt, and then refrigerated until the ELISA testing is completed. Initially, this test will be run weekly, but probably more often once the initial trial/validation period is completed. Currently this test is not yet available to the general public, but if your clinic or

*Continued, page 4*

*Quantiferon Testing, continued*

hospital is interested in sending specimens to the DPHL for Quantiferon testing, please contact Diane Hindman or Debbie Rutledge at DPHL, 302-223-1520, or Jeannie Rodman, TB Nurse Consultant, 302-744-1050, in order to help us assess the needs of our Delaware community.

**References:**

1. CDC. Guidelines for Using QuantiFERON-TB Gold Test for Detecting *Mycobacterium tuberculosis* Infection, United States. MMWR 2005;54 -RR-15:49-55.
2. CDC Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health Care Settings, 2005. MMWR 2005;54 RR-17:1-141.
3. Riccheldi L. An update on the diagnosis of tuberculosis infection Am J Respir Crit Care Med. 2006;174:736-42.
4. Cellestia, Ltd., Carnegie, Australia. [www.cellestia.com](http://www.cellestia.com)
5. NYC, Bureau of TB Control, QFT-G Provider Fact Sheet February 2007.

## BLOOD LEAD TESTING UPDATE

*Tara Lydick, B.S., Chemical Preparedness Coordinator*

*Frederick Franze, Quality Assurance Manager*

The 1995 Childhood Lead Poisoning Prevention Act mandates blood lead screening for all children 12 months and older prior to admission to any childcare, learning, or school environment. The Delaware Public Health Laboratory (DPHL) has participated in blood lead testing for over 2 decades, testing over 100,000 children and providing screening to all uninsured, Medicaid, or disadvantaged children. Blood lead analysis through DPHL has undergone sweeping changes in the past two years to provide a more accessible and stronger screening tool for Delawareans.

In 2006, the implementation of DPHL's LIMS (Laboratory Information Management System) resulted in changes in sample submission and reporting. LIMS generated barcodes for sample tracking and the LIMS test requisition form replaced the older triplicate form and labels. LIMS has been implemented at the state service centers and state clinics and will be rolled out to hospitals, private clinics and health care providers in the future. It requires an internet-ready computer, a barcode printer, state provided software, and a LIMS specific state account to implement. Training for the LIMS is provided through DPHL. Once submitting sites are online with LIMS, clinicians order the test, enter patient information, barcode the specimen and form, and are able to look up specimen status, as well as view and print patient and specimen reports in their own facility.

For facilities without LIMS access, specimens are submitted using the new LIMS barcodes and the LIMS test requisition form. 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". Results are entered directly into LIMS by DPHL staff and blood lead reports are generated directly through LIMS. The Childhood Lead Poisoning Prevention Program (CLPPP) reviews the report, suggests any recommendations and then mails it to clinicians and providers. Facilities which need additional LIMS test requisition forms or barcodes should contact CLPPP at 995-8693.

In 2007, DPHL retired its 19-year-old graphite furnace atomic adsorption spectrometer (GFAA) and transferred blood lead analysis to inductively coupled plasma mass spectroscopy (ICP/MS). This required a change in the capillary collection container and volume for screening samples. Confirmatory specimens are still collected via venous draw. ICP/MS methodology offers the simultaneous



**Lead Care® II Analyzer**

monitoring of multiple analytes including cadmium and mercury in blood. The ICP/MS also provides a 10-100 fold decrease in limits of detection, monitoring in the sub ppb and ppt levels.

In 2008, DPH implemented use of the LeadCare® II blood lead analyzer at five of the state service centers and Claymont Family Health site. The LeadCare® II delivers quantitative blood-lead results equivalent to those reported by reference laboratories, with only two drops of blood in just three minutes. It requires only a finger-stick sample and can be combined with other routine blood tests that are performed during the child's visit to the clinic. If the blood lead result is elevated, a sample for confirmation testing can be obtained and sent to the DPHL. A.I. DuPont Nemours Pediatric clinics have also implemented the use of Lead Care II analyzers at their sites throughout the state.

The implementation of the LeadCare® II has significantly reduced the number of screening samples received at DPHL from over 350 per month to less than 10 per month. The reduction of samples also has reduced the number of blood lead test runs from twice per week to as needed basis. DPHL continues to perform confirmatory blood lead testing using ICPMS. These changes provide better access to rapid blood lead screening, electronic tracking of results, and rapid electronic report generation.



**LPAC page**

**More Laboratory Section Reports**

**Revised Test Requisition Form**

**Specimen Collection Procedures**

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



*DELAWARE HEALTH AND SOCIAL SERVICES*  
*Division of Public Health*  
*Laboratory*

*Dr. Jaime Rivera, MD, FAAP and the Delaware Public Health Laboratory  
cordially invite you to a Laboratory System Assessment  
December 10, 2008 from 8:30 to 4 p.m.  
at the Smyrna Opera House  
7 West South Street, Smyrna*

*This assessment is part of a national initiative  
sponsored by the Centers for Disease Control and Prevention  
and The Association of Public Health Laboratories  
To coordinate laboratory activities in Delaware and the nation.  
Breakfast, Lunch and free parking are included.*

*Kindly RSVP by December 5th*

To ensure that Delaware's vast and complex laboratory system is effective, seamless and comprehensive while meeting quality standards, the DPH Laboratory is holding a Laboratory System Assessment on Dec. 10, 2008. The Assessment will measure how Delaware's system meets the Public Health Laboratory Systems Performance Standards developed by the Association of Public Health Laboratories and the Centers for Disease Control and Prevention. Participants will discuss if laboratories performing public health related testing are adequately serving the needs of the public. We will use an assessment tool based on the 10 Essential Public Health Services and the 11 Core Functions of State Public health Laboratories.

We invite epidemiologists, first responders, health care providers, clinicians, educators, environmental professionals in water, food and air surveillance activities, clinical, agricultural, environmental and veterinary laboratories and other lab partners to register. If you are interested in participating, please contact Liz Moore at (302) 223-1259 or [Liz.moore@state.de.us](mailto:Liz.moore@state.de.us).

We will appreciate hearing your thoughts, past experiences and visions for improvement. By including laboratory partners in our reflection of Delaware's public health laboratory system, we will collectively strengthen and improve laboratory science services and ultimately, health outcomes for Delawareans.

## DELAWARE HEALTH ADVISORY

### SECOND CONFIRMED INFLUENZA CASE FOR 2008-2009

#### *Delaware Health Alert Network #163*

The Delaware Division of Public Health (DPH) is reporting the state's second laboratory confirmed case of influenza. The case is Type A influenza and was confirmed at the DPH laboratory by PCR (polymerase chain reaction) on November 3.

#### **Testing**

The Delaware Public Health Laboratory (DPHL) performs a Real Time Reverse Transcriptase Polymerase Chain Reaction (Real Time RT-PCR) method for detection of influenza virus nucleic acids. The date generated by Real Time RT-PCR will help determine what influenza viral types are circulating in Delaware, and the most appropriate treatment to provide to patients. Results are available within 48-72 hours depending on the number of specimens received. RT-PCR has the ability to detect non-viable viral particles and provides optimal sensitivity and specificity for identification of influenza. Furthermore, PCR can distinguish the common human strains of influenza virus (H1, H3) from uncommon strains (H5 and H7).

DPH strongly encourages health care providers to submit influenza specimens to the DPH Laboratory for PCR testing and subtyping (throat/NP/nasal wash) to assist with surveillance. Influenza testing by the DPH Laboratory is done free of charge and results are sent back to the requesting physician or hospital as soon as test results are available. To submit a specimen contact the DPH laboratory (302-223-1520) to request influenza virus detection kits and obtain information about specimen transport to the laboratory.

#### **For more information**

DPH Laboratory: (302) 223-1520  
 DPH Immunization Hotline: 1-800-282-8672  
 DPH Epidemiology: 1-888-295-5156  
 CDC Influenza website: <http://www.cdc.gov/flu/about/disease.htm>

#### 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 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



### DELAWARE HEALTH AND SOCIAL SERVICES

#### Division of Public Health

#### Laboratory

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

Christina Pleasanton, MS  
 Deputy Director, Delaware Public Health Laboratory

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

*Fall 2008 LabOrator*

Jane P. Getchell, DrPH 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.

*Document Control #35-05-20/08-04-75*