Section 8

Public Health Laboratory Status Report

The Bureau of Laboratories (BOL), a network of four laboratories located in Jacksonville, Lantana, Miami, Pensacola and Tampa, provides population-based diagnostic, screening, monitoring, reference, emergency and research laboratory services. BOL also collects epidemiologic and demographic information to support the core public health functions of the Florida Department of Health (FDOH). Technical services, based upon evolving community requirements, include screening and confirmation tests for: biological and chemical threats and disease outbreak investigations; sexually transmitted diseases; tuberculosis; human immunodeficiency virus (HIV); mosquito (arthropod) -borne viruses; animal rabies; and parasitology. Accurate and timely laboratory data are critical to support informed public health decisions. BOL also provides training to healthcare providers and laboratory scientists; tests samples from potable, environmental, and recreational water sources, pollution spills, and suspect contaminated foods; and certifies environmental and water testing laboratories. BOL provides laboratory screening of all newborns in the state for 34 genetic disorders, which, without detection and early treatment, can lead to death or severe physical and mental disabilities.

BOL supports all 67 county health departments, other Department of Health programs, physicians, hospitals, and numerous state and federal agencies, by providing public health diagnostic, screening and reference laboratory services.

Centennial Anniversary of Tampa and Pensacola Branch Laboratories

The Florida Legislature established the State Board of Health in 1889, which was located in Jacksonville. In 1903, the Legislature established the State Public Health Laboratory, also located in Jacksonville. Seven years later, in 1910, the Tampa and the Pensacola Laboratories were established. Like the Jacksonville Laboratory, the Pensacola and Tampa Laboratories were responsible for providing diagnostic testing to the State Board of Health and to private physicians. With three laboratories up and running, the Bureau of Laboratories was able to provide vital services to what were then the most populous areas of Florida. The Miami Laboratory was established in 1914 and the Tallahassee Laboratory in 1915. The latter closed in 1917, was re-opened in 1921, and closed permanently in 1992. The Orlando Laboratory was opened in 1948 and operated until 1992. Lastly, West Palm Beach/Lantana was opened in 1953 in the basement at the A.G. Holley State Tuberculosis Hospital and since 1982, has had its own separate building on the campus. The Lantana Laboratory was closed in September 2011.

On April 8, 2010 approximately 100 people, including current and former employees, former DOH Secretary Robert Brooks, and former Deputy State Health Officer Rick Hunter, gathered to celebrate the 100th anniversary of the Tampa Public Health Laboratory. Dr. Doug Holt, Director of the Hillsborough County Health Department, read a proclamation from Tampa Mayor Pam Iorio.

Public health professionals, legislators, and education leaders from across the Florida Panhandle met on June 17, 2010 at the J. Earle Bowden Building in Historic Pensacola Village to celebrate the 100th anniversary of the establishment of the Public Health Laboratory in Pensacola. Today's laboratory, located at 50 West Maxwell Street, traces its roots back to 1910 when the City of Pensacola presented a request to the State Board of Health that a laboratory be established to provide diagnostic screening to the State Board of Health and to private physicians. The first laboratory was located in City Hall which is now the T. T. Wentworth Museum. In attendance at the celebration were Representative Dave Murzin, Mr. Ray Walker, Aide for Representative Clay Ford, Billy Sasser from Department of Homeland Security, and Dr. John Parker, the Pensacola Laboratory Director from 1989-2006. Speakers at the event were Dr. Kristina Behan of the University of West Florida's Clinical Laboratory Sciences Department and Dr. Susan Turner, Associate Director of the Escambia County Health Department. A congratulatory letter from Governor Crist was read aloud.

***Brucella* species**

Together with the Bureau of Environmental Public Health Medicine and the Bureau of Epidemiology, the BOL-Jacksonville, BOL-Tampa and BOL-Pensacola were involved in analysis for several cases of brucellosis. Historically, there are five to six cases of brucellosis in Florida each year. However, in 2010 there were nine cases in Florida residents. In addition, the BOL also tested specimens from two other cases: one Alabama resident and one visitor from Nicaragua. In total, the BOL identified 14 *Brucella* species from these 11 cases: nine *Brucella suis*, three *B. melitensis*, and two *B. abortus.*

Due in part to more stringent select agent reporting criteria, an actual increase in the number of brucellosis cases, as well as a lack of timely recognition of *Brucella* in the clinical laboratories, there has been a large increase in potential exposures to *Brucella* species in clinical diagnostic laboratory personnel since sometimes these organisms are worked on without adequate precautions. Despite the recent increase in cases, *Brucella* species remain rarely seen pathogens in the clinical laboratory and automated identification systems often misidentify them or report a result with a low degree of confidence. As such, these isolates tend to be forwarded to more sophisticated diagnostic laboratories for identification as an “unknown organism”, potentially exposing a greater number of laboratory workers. An unfortunate example of this occurred in August 2009 when a hospital microbiology laboratory in Hillsborough County sent a culture to a diagnostic reference laboratory in Florida, which then sent the culture to a reference laboratory in North Carolina where it was finally suspected to be a *Brucella* species. The culture was sent to the North Carolina Department of Health and Human Services laboratory, where it was determined to be *Brucella* species by real-time PCR. As the patient was a Florida resident, the isolate was forwarded to BOL-Jacksonville where it was identified as *Brucella suis*. Several personnel at the clinical laboratories were exposed to the organism and unfortunately one microbiologist developed brucellosis resulting in a *B. suis* positive blood culture.

The total number of laboratorians exposed to *Brucella* species from these cases was 85 (75 high risk exposures and 10 low risk). Exposed personnel underwent extensive medical evaluation involving a minimum of 21 days prophylaxis and serological monitoring up to 24 weeks post-exposure.

Dengue Update

The Bureau of Laboratories Virology sections in Tampa and Jacksonville have performed serological assays for the detection of antibodies to dengue virus for many years. Few specimens are tested annually for this rare disease. Nevertheless, this virus causes significant problems worldwide. Because of a study performed in the Tampa laboratory by Dr. Julia Gill in 1996-1997, demonstrating higher rates of imported dengue than previously suspected, molecular assays for detection of dengue virus RNA were developed at the BOL. During 2009, the BOL began development and validation of a real-time RT-PCR molecular assay for dengue. This assay is faster and capable of analyzing more specimens than the traditional gel-based assay. The BOL also has the capability to perform genetic sequencing to assess relationships of various specimens.

When dengue virus appeared in Key West in 2009, BOL-Tampa was able to detect the virus in local mosquitoes and show that it was the same strain detected in locally acquired human cases. During 2010, over 610 serological assays on 332 clinical sera were performed at the BOL Virology units in Tampa and Jacksonville for dengue confirmation, compared to 127 assays on 70 sera in 2009 and 13 assays on eight sera in 2008. IgM antibody indicating a recent infection was detected in 98 sera in 2010, 23 in 2009 and four in 2008. BOL-Tampa Virology has performed PCR assays on all acute (less than five days post onset of symptoms) specimens submitted for dengue testing, in addition to IgM and IgG serological assays; 182 acute sera from 17 Florida counties have been tested by PCR to date. Dengue virus RNA was detected in 53 patient sera. However, 19 of these cases had not yet developed IgM antibody to dengue and would have been considered negative had molecular assays not been performed. Virus types detected included 36 dengue type 1, 12 Dengue type 2, three dengue type 3 and three dengue type 4. Genetic sequencing confirmed

virus strains detected from all Key West cases are the same, indicating continued indigenous transmission. This heightened surveillance effort has detected two other instances of locally acquired transmission in two additional counties: dengue 3 in Broward and dengue 2 in Miami-Dade. Genetic sequencing analysis of the detected additional strains aids in determining whether the virus continues to be transmitted, and to date, additional cases related to the Broward and Miami-Dade cases have not been detected.

Biological Defense Program

The 2010 Laboratory Response Network (LRN) National Meeting Planning Committee selected the FDOH BOL to be the recipient of the "Excellence in Partnership" award for building strong working relationships with the Department of Agriculture and Consumer Services, the University of South Florida Center for Biological Defense, and hundreds of sentinel (hospital/commercial) laboratories. BOL established the Advanced Capacity Hospital Laboratory Network for Florida, trained of first responders, and authored the State of Florida Comprehensive Laboratory Response Plan, which has been used as a model for similar plans around the nation.

BOL-Jacksonville and BOL-Pensacola were two of ten laboratories nationwide that participated in a Centers for Disease Contol and Prevention (CDC) Division of Preparedness and Emerging Infections study entitled "Determination of Clinical Specificity of Laboratory Response Network Real-Time PCR Assays Using Leftover Unlinked Human Specimens". The objective of the study was to determine the clinical specificity for selected LRN real-time PCR assays and demonstrate that routine human specimens will not generate false positive results, thereby increasing the confidence in positive results generated during an actual or suspect bioterrorism event. Almost 3,000 real-time PCR reactions were performed for *Bacillus anthracis, Francisella tularensis, Burkholderia mallei* and *B. pseudomallei* on 100 throat or nasopharyngeal swabs and 30 pleural fluids submitted from local hospital laboratory partners. No false positive results were obtained.

BOL-Jacksonville and BOL-Tampa were invited and participated in the development of a Department of Homeland Security BioWatch Quality Assurance Program Plan (QAPP). The purpose of the QAPP is to increase confidence in all aspects of laboratory procedures in the BioWatch program and provide public health laboratory directors nationwide with sound data necessary for decision-making in the event of a BioWatch Actionable Result.

LabWare Enhancements

In March 2010 BOL upgraded the LabWare Laboratory Information Management System (LIMS) to include functionality that enables the BOL to create and send electronic orders and to receive electronic results from outside laboratories. This functionality can be used to send samples to other public health laboratories for laboratory surge capacity testing. By adding this capability, BOL can help ensure that laboratory testing services for Floridians can be sustained during large outbreaks or in the aftermath of natural disasters.

Newborn Screening Dried Blood Spot Retention Policy

The 6-month retention policy for Newborn Screening dried blood spots was approved and signed by the State Surgeon General on December 13, 2010. Previously there had been no official retention policy and dried blood spots were retained on space available basis.

Severe Combined Immunodeficiency Disease (SCID)

Severe Combined Immunideficiency Disease (SCID), also known as Bubble Boy Disease, is a treatable illness in which an infant fails to develop a normal immune system. After successful treatment, infants with SCID can lead a normal life. The Genetic Testing and Newborn Screening Advisory Council endorsed the SCID as the next marker to be implemented.

2009 Newborn Screening Morbidity Data

The Bureau of Laboratories, in collaboration with FDOH Children Medical Services, manages the newborn screening program for Florida and screens for all disorders recommended by the Secretary's Advisory Committee on Heritable Disorders in Newborns and Children (SACHDNC) with additional tests including cystic fibrosis, totaling 35 diseases and conditions (hearing included). Data included below in Table 1 indicates the disorders screened for as well as their frequency of detection for the year of 2009, the most recent year that data is available.

Table 1. Newborn Screening Morbidity Counts, Florida 2009 (Final)

Conditions	Count
Live Births	221,632
Confirmed Diagnosis by Florida Referral Centers	
Biotinidase Deficiency	0
Partial	6
Congenital Adrenal Hyperplasia	5
Congenital Hypothyroidism	68
Cystic Fibrosis	
2 mutations	25
1 mutation	10
Ultra-High IRT/No mutations	1
Galactosemia (G/G)	1
Variant	1
Sickle Cell	
Sickle Cell Anemia (SS)	140
Hemoglobin SC Disease (SC)	82
Sickle Beta Thalassemia (SA)	9
Disorders detected by Tandem Mass Spectronomy	32
Hearing Loss recognized through NBS Follow-Up Program	249