

The Laboratorian

The Laboratory Green Team was awarded the Zero Landfill Commitment award, presented by the Texas Facilities Commission (TFC). In photo: (back row) Arran Walker, Robyn Seiferth, Jill Alexander, Michelle Harborth, Dawn Dutelle, Bi Ho, (front row) Joanne Day, Winnann Ewing, Erin Swaney. Not pictured: Vanessa Cantu, Eric Casey, Natalie Choo, Leslie Covarrubias, Mary D'Anton, Michelle Hobson, Ruth James, Bonny Mayes, Myra Williams, Darlene Ollinger, Riley Ryan, Alicia Schneider, Thomas Shook, and Steven Uecker.



Laboratory Green Team Embodies Recycling Success

In the spring of 2008, the Green Team was established to implement a Laboratory-wide recycling program. Paper and cardboard were already recycled, and some plastics were being transported to Ecology Action; however, the team wanted to coordinate and centralize recycling efforts. Thomas Shook, the recycling coordinator for Texas Facilities Commission (TFC), helped the team set up bins around the Laboratory and distribute information about the new program. Our efforts paid off as the Laboratory saw a 30 percent reduction in waste in the first month.

By the end of fiscal year (FY) 2008, the Laboratory had accomplished a 60 percent waste reduction. The cost savings for the Laboratory were significant. Our main trash container had previously been emptied three times a week at a cost of \$635 per month. It is now picked

up once a week at a cost of \$215 per month—saving the Laboratory \$420 per month.

Of the 30 buildings that TFC handles, the Laboratory is number one in paper recycling at 1.22 pounds per person per day. Our recycling efforts were rewarded in November when TFC awarded the Laboratory a Zero Landfill Commitment award at its Recycling Heroes celebration.

Currently, we are recycling paper, cardboard, aluminum, glass, tin and steel cans, scrap metal, Styrofoam, Styrofoam peanuts, plastic bags, and number 1-7 plastic containers. We are not able to recycle tempered glass (such as test tubes) or items the Safety Officer designates as too hazardous for the landfill or recycling. While recycling is not mandatory, it is strongly encouraged.

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THE LABORATORIAN

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Editorial

The DSHS Laboratory Services Section is pleased to present our new laboratory newsletter, *The Laboratorian*. In each issue, we look forward to sharing information from throughout the laboratory.

In this time of rapid change, we are dealing not only with a slowing economy and dynamic political and global climates, but also with significant work force shortages and constantly shifting and increasingly complex technology. Our inaugural issue touches on a number of these topics. Our Green Team has been recognized by the Texas Facilities Commission for their outstanding success in reducing laboratory waste. Our Newborn Screening staff work continuously to improve our Newborn Screening testing, as described in the article on galactosemia.

Of course, there is also the issue of pandemic influenza. When the state received the PanFlu grant, as described in the newsletter, pandemic influenza still seemed like something for which we needed to prepare but hoped not to see in our lifetimes. The month of May 2009 has definitely changed that perspective with the outbreak of the novel H1N1 Influenza A virus. Fortunately, this virus still does not appear to be any more severe than the seasonal strains of influenza we see every year; therefore, this outbreak has provided both a good test of our plans and timely experience for use in implementing the PanFlu grant.

We anticipate that this newsletter will provide you with current information on our laboratory—sharing updates, guidelines, and our experiences in the laboratory. We also want to make this useful to all who read it. Please email (laboratorian@dshs.state.tx.us) your ideas and suggestions for future topics. We look forward to hearing from you.

by Susan U. Neill, PhD

Director, Laboratory Services Section

Laboratory Green Team, continued... (cover story)

In February 2009, TFC went to single streaming its paper, cardboard, plastic and aluminum collections in a single blue bin found on each floor. TFC is now partnering with Texas Task to handle and sort the paper, cardboard, and plastics. This means that a wider variety and more of our materials can be directed to TFC for recycling. Please be sure that items are clean and relatively dry (especially food containers). Flatten cardboard boxes. Place small boxes in the blue bins; large boxes can go to the freight elevator vestibule. Remove Styrofoam peanuts from boxes and put them in a plastic bag. Styrofoam can be placed in the freight elevator vestibule or taken down to the gray bin on the loading dock. Aluminum cans, foil, and plastic containers (number 1-7) can be placed together in the large, gray bins. Items such as glass, plastic bags, tin or steel cans, and scrap metal will still need to be taken to Ecology Action (Austin's recycling center).

Bins are set up on each floor for collecting number 1-7 plastics, bags, metal, glass, and Styrofoam. Floor representatives then sort, bag, and deliver items to either the large blue bins or the loading dock. Plastic bags—including wrapping, grocery bags, shrink wrap, and FedEx



Recycling bins; at center is large bin for single stream recycling—aluminum cans, foil, and plastic containers (number 1-7).

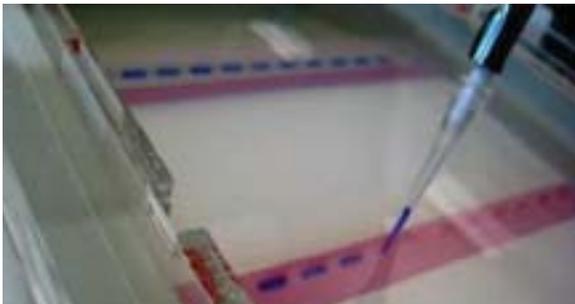
and UPS shipping bags—go into a separate bin, as do tin or steel cans and scrap metal.

Recycling makes waste management more efficient and cheaper, and it is easy to accomplish. With potential savings of over \$5,000 per year for the Laboratory, it just makes sense.

by Robyn Seiferth

The Best Defense is a Good Offense: DNA Analysis for Galactosemia

Separation of DNA using Gel Electrophoresis highlights any mutations and their severity.



Imagine leaving the hospital with an apparently happy, healthy newborn, only to return several days later with a critically ill infant. Your once-healthy baby is now lethargic, having difficulty feeding, and failing to thrive. These symptoms

can be associated with a variety of illnesses, but for one infant out of 45,000 born in Texas these symptoms indicate a genetic disorder called Classical Galactosemia.

Galactosemia is an autosomal recessive disorder that affects the body's ability to metabolize galactose. Galactose—a simple sugar and the primary component of lactose—is found in breast milk, non-soy based formulas, and a variety of other foods. In healthy individuals, galactose is broken down by the enzyme galactose-1-phosphate uridylyl transferase (GALT) into the sugar called glucose.

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Galactosemia, continued...

Because galactose can not be broken down efficiently in infants with galactosemia, initial milk feedings build up in the blood and lead to a variety of symptoms including: vomiting, diarrhea, jaundice (yellowing) of both the skin and whites of the eyes, and liver damage. Untreated, the disorder may result in death, which is most frequently associated with *E. coli* septicemia. If the infant survives these symptoms without the appropriate dietary interventions, galactosemia can lead to growth failure, developmental retardation, cataracts, Fanconi's syndrome, premature ovarian failure, and an enlarged liver. However, if a lactose-galactose restricted diet is established in the first 10 days of life, these symptoms can possibly be resolved and many of the complications prevented.

Due to the life-altering impact of early dietary intervention, establishing a diagnosis of galactosemia is critical to a symptomatic infant's health. For this reason, testing for galactosemia is included in the Newborn Screening programs of all 50 states. Here at the Texas Department of State Health Services (DSHS), galactosemia is initially screened by fluorometric analysis on specimens collected soon after birth; this is done for every baby born in Texas. Fluorometric analysis provides information on the production and activity of the GALT enzyme through evaluation of particular analytes. Classical Galactosemia (genetic alleles GG) is the predominant and most severe form of the disorder and occurs in 1 out of 45,000 live births in Texas. Individuals with Classical Galactosemia have little or no GALT enzyme activity. Besides Classical Galactosemia, other variant forms of galactosemia exist, differing in overall enzyme activity. One variant form, Duarte-2 Galactosemia, occurs in 1 out of 17,000 live births in Texas. Individuals with the Duarte-2 variant display a 25 percent reduction in activity of the GALT enzyme.

To compliment the information provided through fluorometric assay and unlock the genetic components of galactosemia, confirmatory DNA analysis was established as part of

routine testing for galactosemia at DSHS in May of 2007. DNA analysis for galactosemia utilizes Tetra-Primer ARMS PCR (amplification refractory mutation system, polymerase chain reaction) to identify the mutations present in those infants with abnormal or borderline results from the fluorometric assay. The amplification produced in the PCR reaction is evaluated through gel electrophoresis to highlight the exact mutations present and provides Case Management and physicians with additional valuable insight into the disorder's severity.

Genetically, infants with classical galactosemia inherit a gene encoding for Classical Galactosemia from each parent. Currently, there are more than 200 mutations on the gene that encodes the GALT enzyme. Out of those mutations, the DNA Analysis Laboratory tests for the three most prevalent Classical Galactosemia mutations: Q188R, S135L, and K285N. The Table below provides information about the prevalence of these mutations, their association with cases of Classical Galactosemia, and their ethnic distribution.

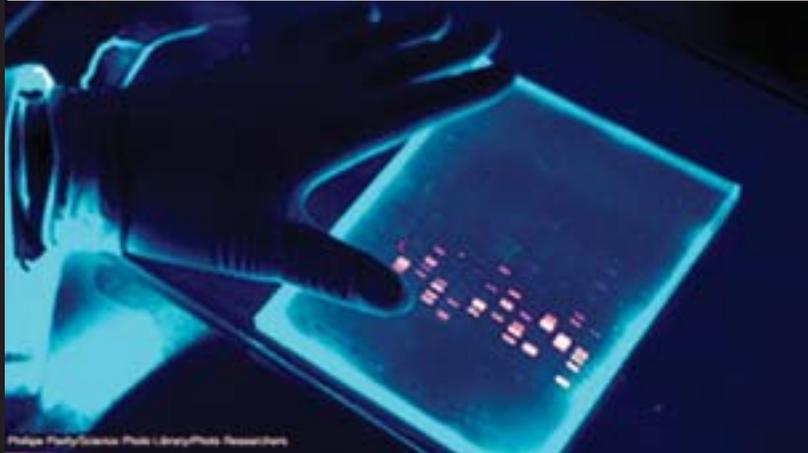
Table 1: DSHS evaluated Classical Galactosemia Mutations

Mutation	Prevalence of GG+DG alleles in Texas	Percent of Classical Galactosemia Alleles	Ethnic Distribution related to Classical Galactosemia Diagnoses
Q188R	37 %	54-70 %	60% of alleles in Caucasians 15% of alleles in African-Americans
S135L	3 %	8.4 %	50% of alleles in African Americans 1-2 % Caucasians
K285N	4 %	4.8 %	8 % of alleles in Caucasians of European descent

The less severe form of galactosemia, Duarte Galactosemia, results from the infant inheriting a gene for galactosemia from one parent and a Duarte variant gene from the other parent. Infants with this genetic makeup typically have a very good prognosis and do not experience all of the serious symptoms and side effects associated with Classical Galactosemia. The Duarte variant is caused by the presence of the N314D mutation on the GALT gene. The N314D mutation is the fourth mutation tested for in the DNA Analysis Laboratory. The N314D mutation is prevalent in both Caucasian and Hispanic populations.

Galactosemia, continued...

Individuals who inherit a Duarte-2 variant allele from each parent are considered to be homozygous for the N314D mutation and reveal



The amplification produced in the PCR reaction is evaluated through gel electrophoresis to highlight the exact mutations present.

a 50 percent reduction in overall GALT enzyme activity. However, these individuals usually do not need dietary restriction of galactose.

By identifying these specific mutations, DNA analysis facilitates the differentiation of patients with severe Galactosemia from those with potentially less severe forms of the disorder. Newborn screening coupled with DNA analysis provides rapid insight into the cellular and molecular life of the infant. The invaluable insight provided by fluorometric and mutational analyses offers medical professionals the earliest chance to prepare a good defense to the potentially hazardous symptoms of genetic disorders like Galactosemia.

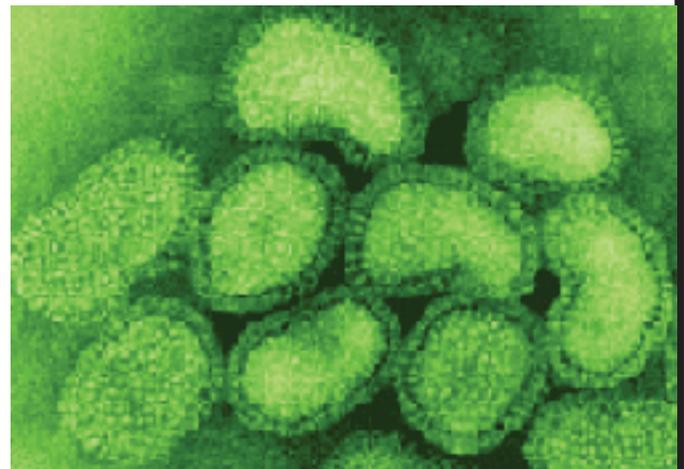
For further information, please refer to the Gene Review information on Galactosemia: <http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=gene&part=galactosemia>.

by E. Nicole Kroutter

Pandemic Influenza Grant

Although most people view influenza as the “common cold,” a malady from which they will easily recover, influenza can cause serious illness and even death. Each year, approximately 226,000 people in the U.S. are hospitalized and, on average, 36,000 die from the disease and its complications. Responding quickly and appropriately to an influenza outbreak is crucial. By providing reliable results in a timely manner, the Texas Department of State Health Services (DSHS) Laboratory ensures that doctors and health care providers can respond quickly to this public health threat. The CDC PanFlu (Pandemic Influenza) grant and partnership with Florida will facilitate the DSHS emergency preparedness and response initiative by expanding the influenza surveillance capabilities in Texas.

An important aspect of the DSHS and the all-hazards emergency preparedness and response initiative, is the continued efforts to expand influenza surveillance capabilities in Texas. The current surveillance system is cumbersome and lacks a standard information technology (IT) platform, which all of our



Electron micrograph of influenza A virus

surveillance partners (for example, federal, state, and local) may use to share information. In the future, this system could be a hindrance for coordinated and efficient responses to influenza outbreaks. Accordingly, to ensure the appropriate efforts are implemented for effective influenza strain identification, patient treatment, etc., establishment of improved real-time interoperability and data sharing capabilities is crucial. The overall goal of the Texas Department of State Health Services and Florida Department of Health Influenza

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PanFlu Grant, continued...

Electronic Data Exchange Interoperability Partnership is to increase the ability to communicate and exchange flu test orders and reports between our states.

Since the goals of this project are (1) to achieve greater real-time influenza data sharing and (2) to improve laboratory testing surge capacity, both IT and Laboratory personnel must work together in completing these goals. The DSHS Laboratory has established an alliance with the Florida Department of Health Bureau of Laboratories (FDOHBOL), which has helped to develop the common data standards and standardized vocabulary needed to accomplish efficient electronic messaging and results reporting for influenza through their active participation in the Public Health Laboratory Interoperability Project (PHLIP). Consequently, FDOHBOL is in a position to partner with Texas as a model of a cooperative effort and share its advanced electronic data exchange infrastructure in an effort to advance influenza planning, surveillance, response, and mitigation efforts across state and national borders.

This relationship will allow both states to use the same electronic messaging capability (i.e., Health Level 7) between their LabWare® Laboratory Information Management Systems (LIMS) and to share the cost of system modifications for electronic test ordering. All Public Health Information Network (PHIN) modifications will be shared between the two entities for a cost-effective solution. Therefore, this partnership will generate a standardized vocabulary and messaging guidelines that will foster a more universal electronic data exchange of laboratory orders and results among our public health partners. DSHS and FDOHBOL hope this project will serve as a model for other states to foster and enhance greater communication nationally.

by Laura Radney

Abbreviation Key	
DSHS	Texas Department of State Health Services
FDOHBOL	Florida Department of Health Bureau of Laboratories
PHLIP	Public Health Laboratory Interoperability Project
IT	Information Technology
LIMS	Laboratory Information Management Systems
PHIN	Public Health Information Network

Laboratory H1N1 Influenza A Response



A laboratorian processes suspected H1N1 samples.

Since the late-April outbreak of H1N1 flu in Texas, the DSHS Laboratory has been flooded with a volume of flu-related specimens that is 24 times higher than the normal rate. In just

three weeks, the lab received 9,000 specimens to test for the flu virus. "During a normal influenza season, the laboratory usually receives fewer than 3,000 specimens over a 24-week period," says Susan Neill, director of the DSHS Laboratory Services Section.

"We've increased our throughput from an average of fewer than 20 specimens per day to check for flu to more than 250 per day," she says. "Two employees are routinely involved in this testing, but we now have 25 trained in it and continue to train additional staff. With all of our work providing supplies, receiving and sorting packages, and setting up the tests, we had several days in the past few weeks in which 60 to 80 employees were involved in the flu response in this laboratory alone."

by Shelly Ogle
Editor, DSHS Staff News