



Beyond the SCPE

A publication of the Missouri State Public Health Laboratory



VOLUME I, ISSUE I

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Welcome to the MSPHL Newsletter

Welcome to the inaugural issue of the Missouri State Public Health Laboratory newsletter. This publication sets out to inform you of events in and around the laboratory whether that is related to the people who work here, the work that goes on within the confines of the building or the relationships that exist between the laboratory and the stakeholders beyond the walls of this facility.

This newsletter is about this laboratory, the staff and work that goes on within. But I wish it to be more than that. We desire to reach out to those stakeholders that utilize our services, or interact with us in other ways. With each issue it is our hope that we can relate more of us to you, and that you can reach back to us and to your fellow laboratorians. Please consider this newsletter as a vehicle to share newsworthy items about your facility and staff with our Missouri laboratory community. With a modest effort on all our parts, this will be an entertaining and enlightening project for years to come.



Bill Whitmar, Laboratory Director

The thought of a laboratory newsletter has been in the back of my mind for many years, but only recently have we had the human capital to bring it to realization. I wish to extend my gratitude to the editorial staff of Laura Naught, Shondra Johnson, Sandy Jones, Steve Hynes, Amy Pierce, Mary Menges and Mike Massman. Without these individuals this newsletter would still be just an idea. Please enjoy the newsletter my friends.

Bill

The Missouri State Public Health Laboratory: A Brief History

By: Steve Hynes, EROT Director and Michael Massman, Deputy Director

The Bureau of Laboratories of the Missouri Division of Health was organized in April, 1906, under the direction of the State Board of Health. According to the State Board of Health minutes of January 9, 1906, Dr. Guthrie McConnell was elected the first state bacteriologist with a salary of \$125 a month. The following work was required of the Bacteriologist, "A monthly analysis of the waters used for drinking purposes throughout the state where State Institutions are located,



First State laboratory in 1906

MSPHL History cont.



Congratulations

to Miranda Farnsworth for winning the MSPHL newsletter naming contest.

The newsletter editorial board would like to thank all staff for their entries. Miranda's original submission of 'Under the Scope' was the submission that seemed to encompass the entire laboratory. With a slight modification, the MSPHL newsletter has now become 'Beyond the Scope.'

The editorial board would also like to thank Jackie Pfenenger and Ray Tucker for submitting 'The LabBlab'. Their submission has become the title of our staff notes section.

once a month beginning in May, June, August, September, and October free of cost, parties sending the water must pay the expense of carriage and two cent stamp for answers; and also such other analyses as may be determined by the Board in cases of epidemics of any kind; we further require the analyses of tubercular sputum, diphtheria exudates, malarial plasmodium, and when sent in by any Doctor in the State, free of charge to him except postage both ways."

The first state laboratory, located in St. Louis at 410 N. Jefferson, was located in a small laboratory inside a private hospital. In 1910 the laboratory was transferred to the Jefferson City Capitol building. In 1911 a fire destroyed the State Capitol Building and the laboratory. The laboratory moved several times between the years of 1911-1915 but found its way back to the Capitol Building after being rebuilt in 1917. Due to inadequate funds, the State laboratory was transferred to the University of Missouri Medical School, Columbia, in 1919, operating there until 1924 when it was returned to the Capitol in Jefferson City. In 1939 the laboratory relocated on the top floor of the Broadway State Office Building. Due to an increase in staff and expanded operations, the laboratory moved to a new, dedicated laboratory at 307 West McCarty Street in Jefferson City in 1978. The enhanced laboratory was complete with isolation rooms for animal studies, cold rooms, and facilities for workshops that could accommodate up to 20 students.

Today, the laboratory resides at 101 North Chestnut Street in Jefferson City in a new, state of the art facility that was dedicated in September 2007— just over 100 years after the laboratory was



State Bacteriology Laboratory in 1906

originally created. Approximately 100 scientific and support staff provide testing services in diverse laboratory areas of microbiology, tuberculosis, virology, immunology, newborn screening, chemistry, environmental bacteriology, and breath alcohol. The laboratory annually receives approximately 375,000 samples and performs more than five million analyses in support of local, state, and federal public health programs. The laboratory operates one branch laboratory in Poplar Bluff, Missouri.

Through the years, the Missouri State Public Health Laboratory has continued to be dedicated to protecting the public health of Missourians by maintaining quality scientific measurement through the utilization of advanced technologies and a qualified and well-trained staff.



MSPHL located in the Capitol Building circa 1924

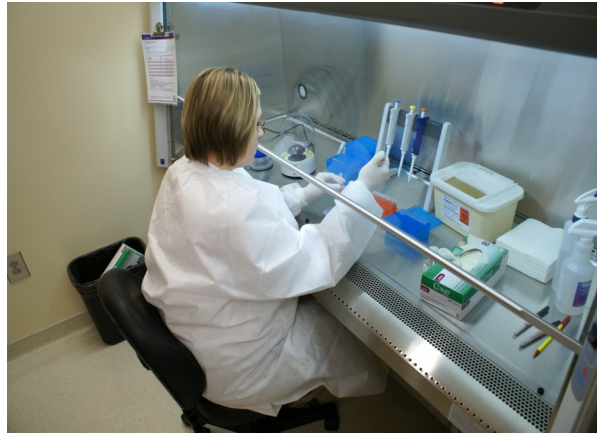
Norovirus Testing

By: Ralph Horne, Virology Unit Chief

Infection with human caliciviruses (which includes noroviruses and sapoviruses) cause the majority of acute gastroenteritis (GI) outbreaks in the United States. Norovirus molecular testing has been implemented in state public health and some local health laboratories in all 50 states. An increasing number of these laboratories now have the capability to sequence their state's norovirus strains. Currently 17 states are participating in CaliciNet (the National Norovirus Outbreak Electronic Surveillance System) and are certified for the sharing of sequence information and genotyping of noroviruses. Five laboratories have been designated as regional CaliciNet outbreak support centers (CN-OSC) for nationwide coverage. The CaliciNet system provides standardization and the capability to rapidly compare strains for swift detection of potential multistate outbreaks, faster response time and improved prevention of additional foodborne illness.

Norovirus testing at the MSPHL is provided only for cases of identified GI outbreaks. Testing is done by real-time RT-PCR, and can classify the virus into two distinct genotypes, GI and GII. The laboratory instructions request that 3-10 raw (no preservative) specimens be collected during the acute phase of the illness. Both stool and vomitus specimens may be collected, preferably within 72

hours after the onset of symptoms. Specimens should be refrigerated at 4°C (not frozen) during storage and transport. It is important to test multiple specimens to increase the likelihood of being able to submit at least two positives for sequencing. It is possible to find sporadic cases of norovirus infection, so comparing the sequences of the positives is necessary to tie those cases to the outbreak. Positive samples are submitted to the Calicinet Outbreak Support Laboratory at the Wisconsin State Laboratory of Hygiene for sequence analysis and inclusion into the CaliciNet system.



Senior Public Health Laboratory Scientist Jessie Bauer pipetting samples for Norovirus testing.

In 2010 the Virology unit tested 84 samples from 19 named outbreaks. Out of those stool and vomitus specimens, 13 were found positive for genotype GI, 39 for genotype GII, and one specimen was indeterminate. Positives were found in 16 of the 19 outbreaks, 7 identified as GI and 9 identified as GII. These samples were received from a homeless shelter, retirement homes, restaurants, schools, and a mayor's appreciation breakfast.

In most cases same-day results were provided to the submitters and the investigating epidemiologist. Our laboratory has also assisted other states' outbreak investigations by testing samples from Missouri residents that were linked to an outbreak in that state.

CDC Norovirus Internet page: <http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus.htm>

Wisconsin State Laboratory of Hygiene: <http://www.slh.wisc.edu/comdis/norovirus.dot>

Flu Facts: Four questions answered by our experts

When is flu season?

October – May

Do you test everyone for the flu?

No, Influenza testing at the MSPHL is primarily for the surveillance of circulating viral strains and the identification of influenza outbreaks. Specimens are submitted throughout the transmission season by a group of sentinel medical providers, located throughout the state.

Are you seeing positive samples?

Influenza A (2009 H1N1)pdm; 47, Influenza A H3; 24, Influenza B; 24

Where can I go for more information regarding the Flu?

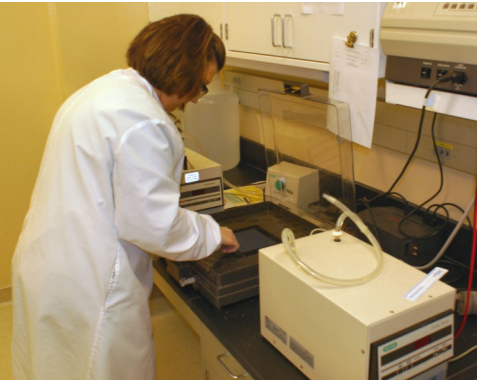
<http://health.mo.gov/living/healthcondiseases/communicable/influenza/index.php>

<http://www.cdc.gov/flu/weekly/fluactivitysurv.htm>

Food Surveillance? In the Microbiology unit? Not exactly.

By: The Microbiology Unit

The Microbiology unit of the MSPHL is a reference microbiology laboratory that focuses on testing human samples. So how does this unit help in food surveillance?



Public Health Laboratory Scientist, Jessica Meller performing PFGE

This unit is one of the few places in the state where many foodborne pathogens can be classified more thoroughly in order to link possible

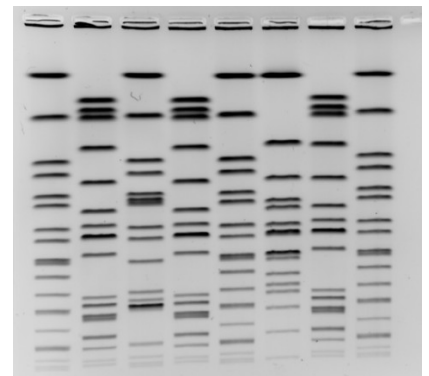
cases and identify problems. This classification includes serotyping of *Salmonella*, *Shigella*, and Shiga toxin-producing *Escherichia coli* such as *E. coli* O157:H7. It also includes molecular classification in the form of Pulsed Field Gel Electrophoresis (PFGE).

PFGE is a process by which we can give bacterial isolates a DNA fingerprint to further classify these bacteria. This allows us to more definitively link bacteria found in a person with bacteria identified in food. This, in turn, helps the epidemiologists to determine the problem (cause, size, duration of any outbreak). We also use PFGE to DNA fingerprint bacteria that the Environmental Bacteriology Unit of the MSPHL has isolated from suspect food vehicles from a potential outbreak. We can compare, genetically, the bacteria found in the food with the bacteria found in a

human specimen. If the bacterium isolated from the food has the same PFGE DNA fingerprint as the bacterium isolated from the human specimen, there is a good chance either the food caused the problem in the human or the human may have contaminated the food.

The unit also participates in PulseNet. This is a national database of DNA fingerprints. All of our DNA fingerprints get uploaded to this national database which allows our information to be compared to information from other states. This comparison helps identify foodborne outbreaks. It also helps to identify cases that belong to already known outbreaks. Missouri has played a role in nearly all of the foodborne outbreaks in the recent past that have been covered nationally by the media. Some of the more notorious are *Salmonella* in peanut butter, *E. coli* in green onions in a national fast food chain, and again in lettuce, and many more.

When a problem has been detected, but the source has not yet been identified we play a very active role in food surveillance. Our lab receives raw specimens from sick people as part of the beginning of an investigation in order to determine the etiology of the outbreak. We test these raw specimens for the common enteric pathogens (*Salmonella*, *Shigella*, *E. coli*) as well as many others including *Campylobacter*, *Cyclospora*, *Cryptosporidium*, etc.



Example of a PFGE Gel

2010 Adopt-A-Family Donations

In 2010 the MSPHL and the Missouri Department of Agriculture Animal Health Laboratory participated in several fundraisers to help raise money for two Adopt-A-Families. The Laboratory Holiday Committee set up fundraisers that included a cinnamon roll breakfast, raffle baskets, chili lunches and bake sales, just to name a few. The picture on the right shows Robyn Carrender, Belinda Luadzers, Rose Lamberson and Theresa Driver showing off all the wonderful presents and food that were purchased or donated from the Laboratory to two very appreciative families.



MSPHL Receives FERN Grant

By: Alan Schaffer, Chemistry Unit Chief and Patrick Shannon, Environmental Bacteriology Unit Chief



Ashley Mehmert, Senior Public Health Laboratory Scientist prepping food samples for testing

The Food Emergency Response Network (FERN) is a consortium of state and federal food safety laboratories committed to providing emergency testing services in the event of national disease outbreaks and possible terrorist

activities related to the nation's food supply. A joint project of the U.S. Food and Drug Administration (FDA) and the U.S. Department of Agriculture's Food Safety Inspection Service (FSIS), FERN provides member laboratories with mutual support during testing emergencies, and provides a forum for the development of standardized food testing methods in the disciplines of food microbiology, chemistry and radiochemistry.

In 2010, the MSPHL Chemistry Unit and Environmental Bacteriology Unit's joint proposal was selected as one of 25 laboratories funded by the FSIS/FERN Cooperative Agreement Program (CAP). The MSPHL was given an award of \$196,503 for a joint chemistry/microbiology surveillance project and a separate microbiology project.

For the surveillance project, the DHSS Bureau of Environmental Health Services (BEHS) staff collects samples of produce from vendors at Farmers' Markets throughout Missouri, from Community Supported Agriculture (CSA) entities, and from wholesale distributors of produce for the purpose of analyzing them for the presence of pathogens and chemical contaminants. In the produce off-season, food samples consist of deli meats and homemade jerky-type items.

Environmental health specialists collect 15 samples twice per month for submission to the State Public Health Laboratory for analysis. The MSPHL's Environmental Bacteriological Unit tests the samples for the bacterial pathogens *Listeria monocytogenes*, *Salmonella* species, *Escherichia coli* O157:H7, and *Campylobacter jejuni* where appropriate. Samples are screened for these pathogens using the Applied Biosystems Inc. (ABI) 7500 FAST real-time polymerase chain reaction (PCR) platform, and standard probe/primer test kits available from ABI. PCR

positive samples are confirmed using standard FERN or FDA Bacterial Analytical Manual (BAM) culture methods for organism isolation and identification.

Splits from the food samples are also analyzed by the MSPHL's Chemistry Unit for pesticide residues and chemical contamination using AOAC Official Method 2007.01 by acetonitrile extraction and partitioning with magnesium sulfate. Instruments used for the analyses include an Agilent 7890A gas chromatograph and 5975C mass spectrometer.

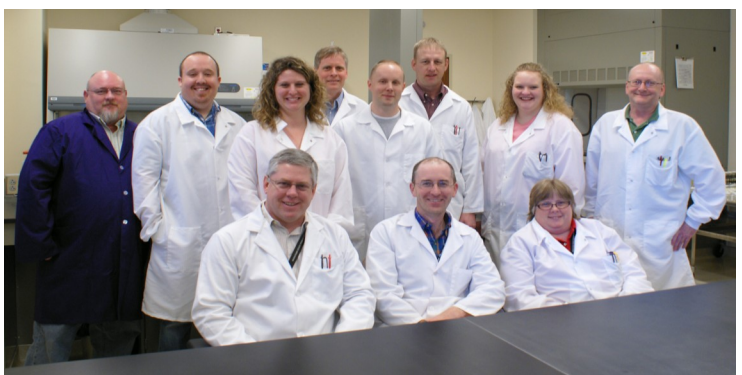
The MSPHL's Environmental Bacteriological Unit is also one of 15 state and federal labs participating in a FERN/FSIS multi-lab validation study (MLV) using the ABI 7500 FAST PCR system to detect *Listeria monocytogenes* in various food types. Each lab will receive 4 sets of 20 samples (including cheese, lettuce, fish and milk) during the study's February through April timeframe. Each lab will use the same PCR reagents and testing platform to test the unknown samples, which include blank samples and samples spiked with high or low levels of bacteria. FERN/FSIS will analyze the data produced by the labs to determine if the new test method is valid across multiple testing sites and for various food types.

By the end of the CAP surveillance project in the fall of 2011, the MSPHL plans to have analyzed more than 300 food samples for bacterial pathogens and chemical contaminants. This project will give DHSS food safety experts a snapshot of the quality of food available in Missouri, and provide field staff the opportunity to develop better sampling techniques and

train additional staff in the proper methods of field sampling.

The funding provided by the CAP grant will allow MSPHL staff to maintain PCR and pesticide testing capabilities, and train additional staff in food pathogen and chemical contaminant testing methods. In addition, a new testing method for *Listeria* will be available for labs to use nationwide in the continued fight to keep our nation's food supply safe.

Feature Story:

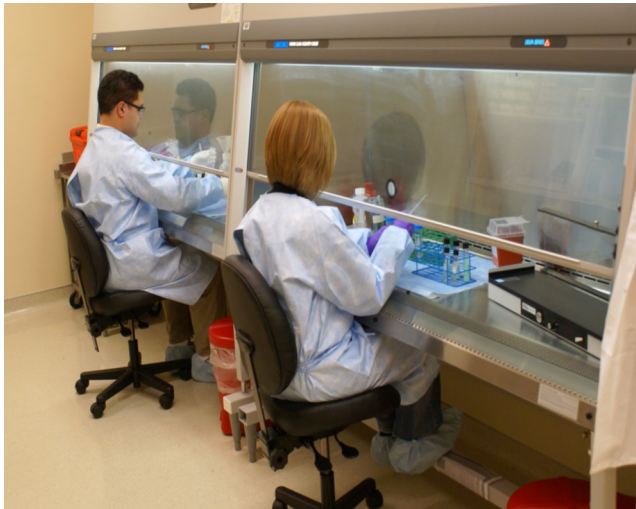


Chemistry and Environmental Bacteriology FERN staff, back row: Dean Robinson, Jeremy Wilson, Ashley Mehmert, Dave McGovney, Brad Morgan, Leon Luebbering, Mindy Rustemeyer and Stan Carrender. Front row: Pat Shannon, Alan Schaffer and Julie Buckley.

One Year of TB Laboratory Operations

By: Bill Walden, TB Unit Chief

On February 28, 2011, the Tuberculosis (TB) Laboratory at the MSPHL celebrated the completion of one year of laboratory operation at a new location in the main laboratory facility in Jefferson City. Previously, the TB laboratory had operated for over fifty years at the



Roy Tuua and Ashley Lincoln, Public Health Laboratory Scientist preparing samples for TB analysis

Missouri Rehabilitation Hospital in Mount Vernon, Missouri. The Mount Vernon laboratory was consolidated with the main facility due to the opening of the new public health laboratory in Jefferson City in 2007. The new facility provides access to the state of the art Biosafety Level 3 laboratories for the safe processing of TB specimens, as well as offering other efficiencies gained by centralizing the TB laboratory with other laboratory operations.

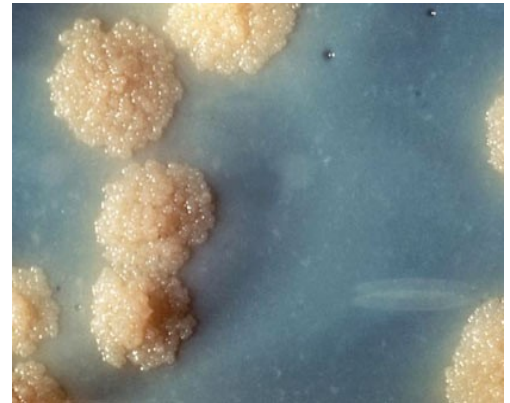
The past year has brought many changes, challenges, and accomplishments for members of the TB Unit and for TB testing in Missouri. A remarkable amount of planning, coordination, and cooperation have occurred to ensure this successful transition of laboratory services. In order to ensure that TB testing was continued for the state of Missouri, substantial effort by numerous Mount Vernon and Jefferson City laboratory staff was exhibited. This transition consisted of closing the Mount Vernon laboratory facility, moving testing operations to Jefferson City, employing and training new staff members--all while managing client outreach and sample logistics. During several months of the transition, TB testing services were

temporarily contracted to the Oklahoma State Public Health Laboratory to provide continuous TB testing for Missouri.

With the move to the Jefferson City facility, many enhancements have been made to public health laboratory TB testing in Missouri. Laboratory methodology and instrumentation have been updated and reorganized, as well as, the successful implementation and utilization of the MSPHL electronic laboratory information system within this testing area.

The TB Unit's mission continues to emphasize the core public health principle of providing laboratory services in support of the state TB control program, public health agencies, and Missouri healthcare providers. Comprehensive laboratory services target *Mycobacterium tuberculosis* complex (MTBC) and include accurate and timely detection of MTBC, identification, drug susceptibility testing, and genotyping.

The TB Unit realizes the completion of the first year of operation is only the start. The TB Unit values continuous improvement and good customer service by maintaining cutting-edge technology and methods that are supported by good laboratory science and practice.



Mycobacterium tuberculosis culture
Picture from www.CDC.gov

TB Facts

One year in operation

2473	Total clinical specimens received
387	Total reference culture received
75	# of patients with MTBC isolated
2	# Multiple Drug Resistant (MDR) cases

Improving Document Control

By: Laura Naught, Quality Systems Officer

The MSPHL has recently purchased a web-based software program that will help improve the laboratory's quality management system. iPassport made by Genial Genetics is designed specifically for laboratories. It allows for global access to all controlled documentation at any location where access to the internet is available. This streamlines procedure distribution, sign-off and employee training while increasing access to important health and safety information¹. iPassport also has many additional capabilities such as reagent and supply inventory, instrument tracking, aiding in conducting internal audits and the ability to link documents to regulations for proof of compliance.

While this software has numerous functions, our initial focus at the MSPHL will be document control. We currently have an excellent document control system in place; however, iPassport will allow us to streamline this process and make it more efficient. Document control is one of the most important aspects of the MSPHL's quality management system. The MSPHL has hundreds of documents that are used to convey new ideas, provide direction, give instructions, describe processes, define specifications, and a host of other purposes. Individually, documents are pieces, or snippets, of an organization's

intellectual capital. They each contain information that represents a small part of what the organization knows. Taken together over time, documents become a significant part of the intelligence of the organization². Effective document management requires an underlying philosophy and strategy. It should be tailored to the needs of the organization that must use it. Document control provides the means of managing the development, approval, issue, change, distribution, maintenance, use, storage, security, and disposal of the documents².

With the importance of document control and the amount of documentation the laboratory must control, iPassport is going to help eliminate the need for staff to manually administrate and distribute documents by providing the means to streamline document retrieval, reviewing, editing, distribution (for peer review) and authorization. It reduces time, effort and expense by automating the document control process. Document control is very important to the laboratory, not only as a good practice, but is required by several of our regulatory agencies. The MSPHL will be gradually implementing each unit into the new iPassport system. Once this process is completed we will begin expanding the use of iPassport to further strengthen our quality management system.

1. www.genialgenetics.com

2. www.davebaldwinconsulting.com/article_principles_documents_control.html

The MSPHL Institutes a New Information Management System

By: Shondra Johnson, LIMS Administrator

Several sections of the MSPHL have gone to an electronic laboratory information management system (LIMS) called OpenELIS. OpenELIS was developed with open source tools by Minnesota in collaboration with Iowa and the Associations of Public Health Laboratories (APHL). Having an open source system is beneficial because it allows us to enhance OpenELIS without having to work through a vendor.

The test sections that have moved to this new system are Immunology (CT/GC, HIV, Syphilis); Microbiology (*Bordetella*, Enterics, Parasitology, Special Bacteriology); Tuberculosis; and Virology (Influenza, West Nile, Rabies, Norovirus, etc.). Blood lead testing in Chemistry has not yet been added to this new system, but it is next for implementation. After the blood lead implementation, we will work to develop additional functionality that allows environmental samples to be logged in and reported out of OpenELIS.

Many changes have occurred with implementation of this system, both internal and external. Some of the internal changes include dual entry of patient/sample information, electronic storage/retrieval of data, electronic transfer of results from testing equipment for HIV and Gonorrhea/Chlamydia, and electronically

generated result reports.

External changes include the way laboratory tests are requested. The laboratory is no longer using the half sheet triplicate carbon test request /result report forms nor are the forms being sent with the testing kits. The test request forms are now available on the State Public Laboratory Website at <http://health.mo.gov/lab/index.php>. Selecting 'Click here' allows submitters to complete the Test Request Form. After completing the form, submitters must then print and mail the form in with the sample.

The result report that submitters receive for the laboratory tests have changed as well. The result report is now generated from OpenELIS and is a standard full sheet with some of the demographic information from the test request form and the result of the laboratory test(s) performed.

Implementation of OpenELIS has allowed other sections of Department of Health and Senior Services electronic access to the result report as well as all of the demographic information. As a result the reports that the Local Public Health Agencies receive from other sections outside the State Lab may have a new look to them as well. Having a LIMS allows the laboratory to participate in projects such as electronically receiving test orders and sending laboratory results to a facility's electronic health record system via an HL7 message. We also expect that this implementation will allow future enhancements to disease tracking and reporting.

Employee Spotlight: Raymond Tucker

By: Jackie Pfeneger, Central Services Unit Chief

Raymond Tucker has been with the Central Services Unit since February 18, 1997. He works in the sterilization room (informally referred to as the “kitchen”). Ray is primarily responsible for the proper handling, sterilization, and disposal of biohazard waste generated in the testing units. He is also responsible for the collection and proper handling of dirty glassware and utensils, minor maintenance of the equipment, data collection through quality control tests and assisting in the mailroom.

Ray enjoys working at the MSPHL because he believes we do important work by testing and monitoring our fellow citizens’ health and the environment. He said he has always enjoyed working with and supporting the people here at the State Lab.

Ray lives in Jefferson City with his wife Debra. He has two children Raymond Tucker II and Misty Harper. Ray enjoys spending time with his three grandchildren, Airel, Gavin, and Ray III. In his spare time Ray enjoys reading, writing literature, watching movies, and listening to music. His words to live by are “It’s a good life if it ain’t hard”.



Lab Blab

Staff happenings in the laboratory

New Employees

Megan Eisterhold, Immunology
 Amy Crump, Newborn Screening
 Lindsey Brandl, Central Services
 Alan Jarrell, Tuberculosis
 Erin Hart, Administration
 Sara Loganbill, Fiscal
 Connor Mahon, PART



Promotions

Candice Hubbard, Central Services
 Miranda Farnsworth, Newborn Screening
 Tina Nutter, PART
 Nicole Ayres, Immunology
 Alan, Schaffer, Chemistry Unit Chief
 Sandy Jones, EROT
 Steve Hynes, EROT Unit Chief
 Adam Perkins, Microbiology

Conferences and Trainings

Dave McGovney, A Basic Course in the Fundamentals of Analytical Radiochemistry at EPA NAREL, Montgomery, AL
 Stan Carrender attended the FERN Gamma Spectrometry Interpretation of Radionuclides in Food Matrices
 Training Course, Shoreline, WA

Ashley Mehmert attended the FERN/FSIS Food Microbiology and Rapid Methods course in Phoenix, AZ

Keith Bock attended an MS/MS instrument training course at Mayo Clinic

Patrick Hopkins attended a Severe Combined Immunodeficiency Disease (SCID) conference at CDC in Atlanta, GA

Jason Herstein assisted in planning and attended the 14th annual PulseNet update meeting in Chicago, IL

Shondra Johnson attended and was certified in the State of Missouri Project Management program in Jefferson City, MO

Brian Lutmar attended and presented at the American Academy of Forensic Sciences in Chicago, IL

Training Schedule

By: Amy Pierce, Training Coordinator and Sandy Jones, Health Program Representative

MSPHL New Employee Orientation:

June 30– MSPHL, Jefferson City

September 22– MSPHL, Jefferson City

December 14– MSPHL, Jefferson City

Packaging and Shipping of Division 6.2 Infectious Substances:

April 20– MSPHL, Jefferson City

May 11– St. Francis Medical Center, Cape Girardeau

May 25– Springfield area, Location to be announced

June 16– St. Louis area, Location to be announced

July 14– MSPHL, Jefferson City

August 25– St. Luke's Northland Hospital, Kansas City

September 14– MSPHL, Jefferson City

Biosafety and Biosecurity: Minimizing Risk in the Laboratory:

June 23– St. Charles Department of Community Health and Environment, St. Charles

Educational Challenge Program: Sentinel Laboratory Preparedness

Challenge scenario sets twice yearly by mail.



For more information or to register for a training please contact:

Amy Pierce or Sandy Jones

Emergency Response, Outreach and Training Unit

Phone: 573-522-1444

Email: labweb1@health.mo.gov

Or at our website:

<http://health.mo.gov/lab/erot/>

Editorial Board for *Beyond The Scope*

Steve Hynes, Shondra Johnson, Laura Naught, Mike Massman,

Mary Menges, Amy Pierce and Bill Whitmar



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