



# Beyond the SCPE

A publication of the Missouri State Public Health Laboratory



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## The Ever Changing Public Health Laboratory

By: Bill Whitmar, Laboratory Director

The good old days. The days are long past where a younger public health laboratory scientist spent his days on the bench performing test after test, calculation after calculation, testing hypotheses...you may know the routine. These days that same individual now spends his time examining spreadsheets that denote spending authority versus available cash for oh so many different funding sources, projected personnel funding sheets and budget year meetings. Depending on your position you may know this routine as well. Sometimes if I stare at the spreadsheet on my monitor long enough, and don't move my mouse, my screensaver will pop up and show me my ocean beach scene and take me away for a few moments....aaaah that's it.



Bill Whitmar, MSPHL Laboratory Director

Yes, those were the days. You worked on the bench. You reported to your supervisor. He or she let you know what the ol' man wanted you to know. Simple. In those days the laboratory, and in many laboratories I suspect, funding was in better shape. Rules were fewer. Concerns were less. Now we work in an environment that is more regulated than ever. "Do more with less" is a mantra that is told to us each and every year. But how we do this is more challenging each year. The breaking point is probably closer than many realize. So how do we get by these next levels of challenges? By working together more than ever before. Working together as an entire laboratory-wide team.

In conventional systems, systems such as our laboratory was structured previously, information flowed bi-directionally. Bottom-up and top-down. Think of this as a food chain metaphor. Little fish get eaten by bigger fish, that one gets eaten by a bigger fish, and so on and so on. If I as an Associate Public Health Laboratory Scientist in 1990 had an idea that would benefit our program, or the laboratory as a whole, it was expected that I report that to my supervisor. If he deemed it worthy, that idea was carried up the chain to the director. Conversely, if the director had a message for the staff it was communicated via the unit chiefs down the chain to their staff.

I believe we utilize a less conventional system. Think of us as a "food web" model or a spider web. Information has begun to flow in a multitude of directions. Yes, still bottom-up and top-down as discussed in the previous paragraph, but also back and forth and diagonally between staff and between units. What is truly interesting is the interaction between hierarchal staff levels (Broad Band Managers, Office Support Assistants and Scientists) and between Units at the same time. Need an example? Look no further than the S.C.O.P.E. teams. This "food web" model of interaction, while perhaps not unique, provides the institution many advantages, including:

- Free and open exchange between staff at many levels
- More ideas provided
- More solutions gained from those ideas
- Less "silo effect" within the institution
- Stronger bond between staff and the institution

From the Director continues on page 3....

Happy Holidays!



## Your Credit is Good Here...

### 2013 MSPHL Accreditation Successes

*By: Mike Massman, Deputy Directory*

- **MSPHL Environmental Lead Program has been reaccredited by AIHA through 2015**

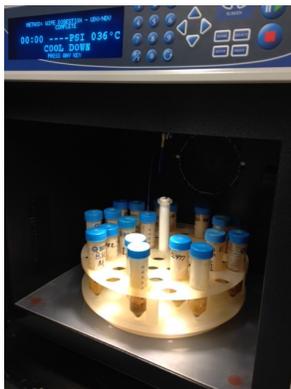
- **MSPHL Select Agent Program has been reaccredited through 2016**

Laboratory accreditations provide valuable assurances and recognition that programs are operating within defined and accepted quality standards. The MSPHL maintains laboratory accreditations through several renowned accrediting/certifying bodies in specific laboratory testing areas. These include: CLIA for clinical testing areas, EPA for drinking water, FDA for food testing, CDC Select Agent Program for reference/LRN testing and the American Industrial Hygiene Association (AIHA) for environmental lead testing. These entities ensure that the MSPHL is adhering to stringent quality assurance policies set forth by these bodies and, in some cases, international organizations. During the summer of 2013, the MSPHL successfully completed reaccreditations by the AIHA and the CDC Select Agent Program.

The MSPHL Chemistry Unit has been accredited by the AIHA since 1999 for the environmental lead testing area. Through this program, all methodology, quality control, organization, documentation and practices meet ELPAT requirements and are compliant to, ISO/IEC 17025:2005 standards. The Chemistry Unit models all testing areas in compliance with ISO/IEC 17025:2005 requirements to ensure high quality testing programs throughout the unit. An AIHA auditor thoroughly reviewed all aspects of the environmental lead testing program over a two day period in July. The audit was successful in that only minor deficiencies were identified and reaccreditation was granted in September after these were addressed. The MSPHL will again be audited for this program in two years. Preparations have already begun and are ongoing.

The MSPHL Select Agent Program was reaccredited by CDC in September 2013. The MSPHL possesses and uses biological agents that are regulated by the CDC Select Agent Program and these activities must be highly regulated in order to ensure security and safety. The MSPHL has specific protocols and plans in place to meet the security and safety standards of this program. Every two years the Select Agent Program evaluates the adherence to these policies and determines if the MSPHL can continue select agent activities. On June 25-26 two inspectors from CDC evaluated MSPHL select agent training protocols/ records, emergency/security/safety plans, inventory records, building maintenance/control and personnel records. As was similar to the AIHA audit, the MSPHL was reaccredited after providing some additional follow up information. The MSPHL is now accredited to possess and use various select agents for three more years.

These successful accreditations are evidence of the entire MSPHL staffs' firm adherence to quality control, analytical accuracy and precision and the realization of the importance of these programs. This culture ensures that these comprehensive and necessary accreditations can be attained and can continue to be maintained at the MSPHL.



*Environmental Samples after being digested for analysis.*

## New Name, Same Purpose

*By: Amy Pierce LPES Unit*

The MSPHL would like to inform you of a name change within one of its units. As of July 1, 2013 The Emergency Response, Outreach and Training (EROT) unit is now the **Laboratory Preparedness, Education and Safety (LPES) Unit**. Though the EROT Unit name has served well for many years we believe that LPES more accurately reflects the mission, goals and purpose in serving both internal and external partners throughout the state. Our commitment to our partners remains the same and we will continue to strive to be a useful resource.

Please update your contacts with the new email address [SPHL.LPES@health.mo.gov](mailto:SPHL.LPES@health.mo.gov) in order to continue receiving Health Alerts, training announcements and other important correspondence.

If you have any questions about the change feel free to contact Russ Drury, Amy Pierce or Sandy Jones at the email above or at 573-522-1444.

**L**aboratory  
**P**reparedness  
**E**ducation  
**S**afety

....From the Director continued from page 1

The outcomes include:

- Better customer service
- Better staff satisfaction
- Higher quality work product
- Higher quality work environment

In the coming months I will be engaging the staff at the Missouri State Public Health Laboratory in more ways than ever before. Up to this point the Executive Management Team and the Unit Chiefs have been tasked with coming up with solutions to ever decreasing fiscal resources and we have been very successful. The budgets will still be a challenge both on the state and federal level. However, with the advent and success of the S.C.O.P.E. teams, and because we possess the fabulous resources that are the MSPHL staff members and our customers, I would like to encourage all of you to think of ways that we, as an institution and system, can achieve more cost savings or become leaner in our operations. No idea or solution is beyond the realm of possibility; we are reaching out to you in search of the best possible ideas.

*Bill*

## New and Emerging Viruses

By: *Stephanie Schildknecht, Molecular Unit Chief*

Avian Influenza A (H7N9) virus is one of a subgroup of influenza viruses that normally circulate among birds. Until recently this virus had not been seen in people. However, human infections have now been detected and the resulting disease is concerning because most of the cases have been severe.

An outbreak of human infections with the H7N9 virus was first reported in China by the World Health Organization (WHO) in May 2013. Many of the people infected with H7N9 reported contact with poultry. The working assumption is that human infections occurred after exposure to infected poultry or contaminated environments. Close contacts of confirmed H7N9 patients were followed to determine whether any human-to-human spread of H7N9 was occurring. No evidence of sustained person-to-person spread of the H7N9 virus was found. No cases of H7N9 outside of China have been reported and the new H7N9 virus has not been detected in people or birds in the United States.

Middle East Respiratory Syndrome Coronavirus (MERS-CoV), formerly called "novel coronavirus (nCoV)" was identified in 2012 in Saudi Arabia. Most people infected with MERS-CoV developed severe acute respiratory illness with symptoms of fever, cough, and shortness of breath. About half of them died. A small number of the reported cases had a mild respiratory illness. Investigators are trying to figure out the source of MERS-CoV and how it spreads. There are no reported cases in the United States.

To help prepare for the possibility of a pandemic outbreak, the Centers for Disease Control and Prevention (CDC) has developed PCR tests for public health laboratories to specifically detect the H7N9 virus and MERS-CoV. The Food and Drug Administration (FDA) issued Emergency Use Authorizations (EUA) to allow the use of the CDC rRT-PCR test to detect H7N9 in clinical respiratory specimens and the rRT-PCR test to detect MERS-CoV in clinical respiratory, blood and stool specimens. These EUAs are necessary because no commercially available FDA-approved tests that identify H7N9 or MERS-CoV in clinical specimens are available at this time. The MSPHL has validated these methods and is prepared to perform these tests as needed. Guidelines have also been published in order to submit samples for testing. At this time a confirmatory test for both H7N9 and MERS-CoV will still be performed at CDC.

As we approach the upcoming influenza season the CDC and WHO will continue to monitor the detection of variant and avian influenza viruses. They will also continue to monitor all influenza viruses that circulate globally and watch for any antigenic, phenotypic and genetic changes in influenza viruses.

**"So how do we get by these next levels of challenges? By working together more than ever before. Working together as an entire laboratory-wide team."**

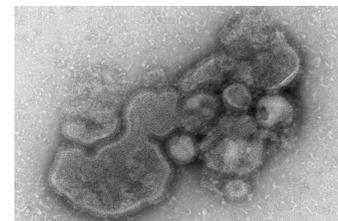
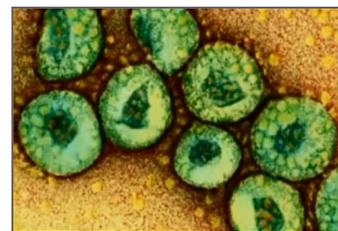


Image of the H7N9 virus courtesy of Cynthia S. Goldsmith and Thomas Rowe, www.CDC.gov



Picture of the MERS-CoV virus courtesy of <http://abclocal.go.com/kabc/story?section=news/health&id=9120526>

## MSPHL's Silent Heroes

By: *Mary T. Menges, Assistant Laboratory Director*



*Jonathan Johnson (L) and Ray Tucker (R), Central Services, pull laboratory waste from the autoclave.*

*'As described by one laboratory manager, these units are the "heart" of the Laboratory and yet work in relative obscurity.'*

The MSPHL is known for its superb analytical laboratory work. Cornerstone to the foundation of this analytical laboratory work is the pre and post analytical support services provided by the Central Services and Post Analytical Reporting Team (PART) units. The men and women of these units provide the behind-the-scenes assistance to each testing unit in order for the Laboratory to assist in the identification and control of diseases and environmental health risks. As described by one laboratory manager, these units are the "heart" of the Laboratory and yet work in relative obscurity.

**Pre Analytical Support**  
 – The Central Services unit starts the Laboratory's day off right by receiving hundreds of samples each morning from the courier and sorting them to the testing units. Amid the mounded carts stacked with samples, Charlie Jameson and Clayton Toebben sort the incoming packages for dissemination. Hospitals, local health departments and the public call the Central Services unit hourly requesting specimen test kits which Thomas Boyd is more than happy to ship out the same day. Under the dedicated and watchful eye of Brian Inman the mailroom functions are performed with the precision of a Swiss clock.



Glassware and utensils cleaning, sterilization and disposal of biological waste are all taken care of by this unit. Ray Tucker and Johnathan Johnson make their daily rounds collecting carts full of dirty glassware and promptly assuring clean and sterile replacements are ready for the scientists' use. Need some minor repairs, room set up or supplies? The unit's store clerks, Don Daniels and Jessica Connell, are happy to assist and assure that all the proper supplies needed are on hand and ready to use. Courier service is also a part of this unit's responsibility. Lindsey Brandl monitors this service daily and assists the MSPHL's partners in getting samples to the Laboratory.

Comfort and safety are a priority for the Central Services unit. As the unit's manager, Jackie Pfenenger fields all sorts of requests and works with Office of

Administration partners to keep the facility in tip top shape. Temperature or air handling concerns are all coordinated with OA maintenance partners. Chris Stevens, Johnny Wyatt and Tim Lempert are always on the lookout for any building issues that may impact the running of the Laboratory.



*Clayton Toebben, Central Services, sorts specimens received by the state wide courier.*



*...Heroes continued on Page 5*

*Heroes continued from page 4...*

Post Analytical Support – Awash with an infinite amount of specimen demographic information, PART captures, records, enters, retrieves and archives the demographics and results of each sample that is submitted for testing. Working with the testing unit managers, Robyn Carrender facilitates the smooth flow of results reporting to assure accuracy and timeliness. First order of business is collecting and mailing out newborn screening results which have been generated overnight. Nicole Farnsworth assures that these results are immediately distributed with the help of Sarah Goben and Holly Willing. As this is going on Lindsay Boeckman handles the main newborn line assisting a physician or clinic in tracking down a result or answering questions. The Laboratory Information Management System assists the PART unit in assuring timely recording and dissemination of



results. Denissa Winder and Victoria Wray make certain the OpenELIS forms are inputted properly. Access data bases are still in use and Connor Mahon diligently works with the Environmental unit to report results to DNR. Need to find an old sample form for a sunshine request? Just ask one of the PART members and they will dig through the archives and produce the information in no

time. Updating protocols is just one on the many tasks that Natasha Voss oversees as well as training new employees. At times there are phone pages for units or individuals. This unit assists Theresa Driver and Erin Corum in fielding all incoming calls to the Laboratory’s main lines as well as providing front desk coverage for the Laboratory.

There is not enough article space to detail all the tasks, roles and responsibilities these units perform quietly for the Laboratory. But rest assured the laboratory would come to a screeching halt if these duties were not performed!

### **MPSHL Assists Neighboring State with Outbreak**

*By: Steve Gladbach, Microbiology Unit Chief*

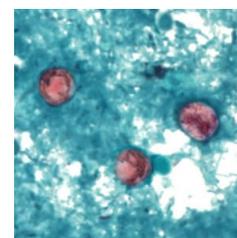
This summer one of the big stories in public health has been the Cyclospora outbreak attributed to bagged salad mix in certain states. The outbreak began in eastern Nebraska and western Iowa. By far the states with the most cases were Iowa, Texas and Nebraska. The Iowa State Hygienic Laboratory (SHL) Parasitology section was overrun with specimens all summer and as a result requested the assistance of several other SPHLs, including the MSPHL. Mary DeMartino of the Iowa SHL began with a search on the Association of Public Health Laboratories (APHL) website resource center. In an APHL survey of capabilities the MSPHL had indicated a substantial resource to perform parasitology testing. She then contacted the MSPHL and requested assistance. Over the course of the following eight weeks (the first on Friday, July 19th) the MSPHL received eight shipments. The most recent was received on Tuesday, September 10th. Adam Perkins, Sarah Sharr and Sabrina Ivy performed Ova and Parasite testing on trichrome slides and concentrates for 315 sample pairs in addition to routine testing. This is equal to approximately 25% of the annual volume in the Parasitology testing section of the Microbiology Unit. David Byrd has been the contact person between the MSPHL and the Iowa SHL. He was also in charge of verifying and reporting the MSPHL’s results to the Iowa SHL.



Johnny Wyatt and Tim Lempert, OA maintenance staff, perform routine building maintenance.



Nicole Farnsworth, PART, talks to a Newborn Screening customer while she prepares to use the NBS LIMS to answer the customer’s question.



Cyclospora Image from [www.dpd.cdc.gov](http://www.dpd.cdc.gov)



**S.C.O.P.E.**  
**Systematically**  
**Collaborating**  
**for**  
**Overall**  
**Performance**  
**Excellence**

## S.C.O.P.E. Initiative Team Members Honored

By: Mike Massman, Deputy Director and Laura Naught, Quality Systems Officer

### **Congratulations to the Missouri State Public Health Laboratory Show Me Challenge Self Assessment Team/SCOPE Initiative Action Teams!**

They were the recipients of the Director's Award for Team Quality Improvement for the 1st Quarter of 2013.

Team Participants: Nicole Ayres, Julie Buckley, Robyn Carrender, Jessica Connell, Erin Corum, Heather Davenport, Theresa Driver, Russell Drury, Nicole Farnsworth, Stephen Gladbach, Patrick Hopkins, Brian Inman, Sabrina Ivy, Shondra Johnson, Sandra Jones, Ashley Mehmert, Laura Naught, Pat Olson, Adam Perkins, Amy Pierce, Michelle Rodemeyer, Mindy Rustemeyer, Brandy Schafer, Dana Strobe, Frances Thompson, Clayton Toeppen, Roy Tu'ua, Erica Vaughan and Dianne Veasman.

In 2011, the MSPHL embarked on a mission to improve the overall quality of the laboratory for staff and customers. The MSPHL decided to begin this effort by conducting the "Show Me Challenge" which is a self assessment tool through the Excellence in Missouri Foundation (EiMF). This system utilizes the Baldrige Criteria for performance excellence and evaluates six categories of; Leadership, Strategic Planning, Customer Focus, Information and Analysis, Workforce Focus and Process Management. The end result from the EiMF was a comprehensive report that outlined laboratory strengths and opportunities for improvements.

To address the report findings the MSPHL conceived and introduced the "Systematically Collaborating for Overall Performance Excellence" (SCOPE) Initiative with the mission to: *Maximize overall performance excellence by utilizing staff collaboration to set and achieve goals in order to better serve the MSPHL employees and the public.* As a part of the SCOPE Initiative six Action Teams were created utilizing laboratory volunteers from all areas of the MSPHL.

The highly motivated volunteer action teams addressing the findings of the Show Me Challenge and improving the quality of the laboratory are:

- The **Workforce Focus Team** which surveyed all laboratory staff to assess employee satisfaction and communication needs. The survey results have lead to improvements in laboratory safety, training, communication and employee recognition.
- The **Strategic Planning Team** which worked to develop new areas of the MSPHL Strategic Plan and provide new Action Steps to sustain the plan. The Team developed creative programs to improve staff awareness and understanding of the MSPHL Strategic Plan. This included a strategic plan scavenger hunt conducted last spring.
- The **Customer Focus Group** which completed a customer satisfaction survey available through the laboratory newsletter and the MSPHL website. The Team is also working closely with individual laboratory units to assist in surveying select customer bases and to improve communication with customers.

.....S.C.O.P.E. continued on page 7

*S.C.O.P.E. continued from page 6...*

- The **Process Management Team** which organized laboratory tours and, unit focus weeks for internal staff, developed job shadowing programs for all staff to learn more about all laboratory processes, created a pictorial organization chart that is displayed in the break room and organizes Laboratory Professionals Week. All of these efforts break the barriers that have led to the silo effects within the laboratory.
- The **Leadership Team** which developed systems to better communicate important information between management and all staff. The team is continually looking for new ways to improve communication with all staff levels. The Team is also developing a comprehensive ethics program for the laboratory.
- The **Measures Team** which is working to identify outside data that can be used as benchmarks for critical laboratory indicators. The team will compile that data, along with internal statistics, into understandable graphs and visuals so that staff can see exactly what the MSPHL is measuring and the trends of that data over time. Dashboards have been distributed and are now visible throughout the laboratory.

These Action Teams will continue to work on developing implementation plans to help improve the MSPHL and push it towards the ultimate goal of achieving performance excellence. Projects for 2013 are already proceeding with the intent to apply for the Missouri Quality Award in 2015.

The goal of attaining performance excellence and the impact of quality improvement at the MSPHL is already being realized through the efforts of these individuals. Improved communication between laboratory management and staff and between different testing units has already occurred. An increased feeling of camaraderie between laboratorians is developing because of new events such as the annual laboratory meeting. Customer service is becoming a key facet in the everyday delivery of our service. A culture that all employees have a voice in the direction of the laboratory and that what they do every day is an essential component in the overall success of the laboratory is now developing. This is already leading to an environment where workers are proud of what they contribute and an institution that is well on the way to achieving performance excellence. If it had not been through the extensive extracurricular efforts by MSPHL SCOPE Initiative Team members these successes and the new culture that is emerging at the MSPHL would not be possible.

The SCOPE Initiative Team was honored during a reception at the MSPHL on April 30<sup>th</sup>, 2013 by the Department of Health and Senior Services Acting Director Gail Vasterling.



*“A culture that all employees have a voice in the direction of the laboratory and that what they do every day is an essential component in the overall success of the laboratory is now developing.”*



“Decrease Silo Effect by Promoting an Organizational Focus”

### S.C.O.P.E. Action Team Feature: Process Management

**Team Goal:** Decrease Silo Effect by Promoting an Organizational Focus

**Team Members:** Sandy Jones, *LPES*; Steve Gladbach, *Microbiology*; Dianne Veasman, *Immunology*; Sabrina Ivy, *Microbiology*; Jessica Connell, *Central Services* and Brandy Schafer, *Chemistry*

**Activities:**

Unit Spotlight

Weeks-Each unit within the laboratory offered fun facts, staff bios and tours of the unit for one week.

Pictorial Employee Directory

was created and made into magnets that are displayed in the employee break room.



New Employee Picture E-mails are sent the first day a new employee starts working to introduce them to the Laboratory.

Coordinate Lab Week Activities for Clinical and Environmental Laboratory Professionals Week.

Job Shadowing allows staff from all units to learn more about a different unit with a half or full day observation experience.

### Laboratory Professional Week Activities, April 22-26th, 2013



## Employee Spotlight: Laura Naught, Quality Systems Officer

By: Mike Massman, Deputy Director

Laura Naught is the MSPHL Quality Systems Officer. Laura has recently accomplished a major achievement in her life and her career in public health at the MSPHL. She has earned a Doctorate of Philosophy in Veterinary Pathobiology from the University of Missouri and shall hence be known as Dr. Laura Naught. Laura Naught is a native of Jefferson City. She attended Jefferson City High School and Drury University in Springfield, MO, where she holds degrees in Biology and Chemistry. After receiving her bachelor degrees, she worked for the University of Missouri as a Research Specialist while she attained a Master's Degree in Biochemistry.

Laura started her career at the MSPHL in the Chemistry Unit in 2004, conducting analysis of drinking water, food and human biological samples for the presence of various chemical contaminants. As an analyst she was instrumental in helping implement the chemical terrorism response program at the MSPHL. In 2009, Laura accepted a position as the first Quality Systems Officer at the MSPHL.

While working in this capacity Laura became a part of the Primary Care Resource Initiative for Missouri Program (PRIMO) and worked for three years to earn a Doctorate of Philosophy in Veterinary Pathobiology from the University of Missouri in August of 2013. Laura conducted her research for her dissertation on: *Arsenic Speciation in Swine Urine for Possible Use in Human Exposure Assessments*. Her research included feeding swine known doses of non-toxic levels of arsenic to determine the bioavailability of exposure that was then used for human health risk assessments. These efforts involved a substantial commitment from Laura to provide care and apply scientific research to the population of swine used in her studies. Laura then applied her MSPHL laboratory knowledge to her research by developing a laboratory method to speciate arsenic in urine by High Performance Liquid Chromatography/Inductively Coupled Plasma/Mass Spectrometry. She utilized instrumentation that was only readily available at the MSPHL to conduct some of the laboratory testing for her research. Laura is currently working to become Board Certified in Clinical Toxicology from the National Registry of Clinical Chemistry.

Laura continues her work as the MSPHL Quality System Officer. During her tenure in this capacity Laura has lead and accomplished numerous improvements for the MSPHL. She has organized several successful laboratory compliancy audits, authored and standardized many new laboratory-wide operating procedures and manuals, implemented a laboratory document control system and periodic MSPHL newsletters, is an Assistant Responsible Official for the MSPHL Select Agent Program, and serves on numerous DHSS and Association of Public Health Laboratories (APHL) committees. One of her most recognized efforts is that of quality improvement at the MSPHL. Laura envisioned, implemented, and organizes the MSPHL performance improvement activities in pursuit of the Baldrige-based Missouri Quality Award. This began with the Show Me Challenge and continues through her brainchild, the SCOPE Initiative. This sustained improvement program has truly impacted the way the MSPHL conducts business and created a new culture of staff involvement to pursue performance excellence at the MSPHL.

Laura makes her home in Jefferson City and has been married to Bill Naught for 13 years. In her spare time Laura enjoys mountain biking, trail running, competing in triathlons and traveling. She is also devoted to many local charitable and civic causes, including the American Cancer Society and the American Heart Association. Laura has also recently announced that she and her husband Bill are expecting their first child, a boy, in the spring of 2014.



Laura Naught, Quality System Officer

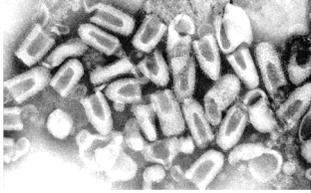
“Dr. Naught conducted her research for her dissertation on: *Arsenic Speciation in Swine Urine for Possible Use in Human Exposure Assessments*.”



Laura and her husband Bill at one of their favorite places, Walt Disney World.

## Evolution of Rabies Testing at MSPHL

*By: Ralph Horne, Virology Unit Chief*



Negatively stained Rhabdovirus as seen through an electron microscope. Courtesy of [www.stanford.edu/group/virus/rhabdo/2004bischoffchang/Rabies%20Profile.htm](http://www.stanford.edu/group/virus/rhabdo/2004bischoffchang/Rabies%20Profile.htm)

**“The rabies laboratory at the MSPHL is the sole rabies diagnostic laboratory in the state of Missouri”**



Josh Featherston, Virology, performing rabies testing. Specimen slides must be read in a dark room.

Rabies is a low incidence, high risk zoonotic disease that causes acute encephalitis in mammals. The disease may be transmitted from animals to humans, most often by a bite or scratch. Although rabies infections are almost uniformly lethal if left untreated, rapid laboratory diagnosis and post exposure prophylaxis (PEP) have proven nearly 100% successful in preventing human infections.

The rabies laboratory at the MSPHL is the sole rabies diagnostic laboratory in the state of Missouri. Rabies testing of animals is listed by APHL as a core function of Public Health laboratories. Approximately 2000 animal samples are processed per year, with about a 2% positive rate. While bats are the animal most commonly found with rabies infection, skunks, cats, dogs, horses, cows, and even a goat have tested positive in recent years. Only animals of public health significance are tested. No epidemiology or ‘curiosity’ testing is performed. Caged rodents and baby bats are excluded from testing because of lack of disease potential. The MSPHL works closely with the state public health veterinarian, Dr. Howard Pue, to ensure that laboratory policy is in accordance with CDC guidelines, and to provide rabies risk assessment to individuals seeking guidance.

Diagnostic testing for rabies has been performed at the MSPHL since the 1940s. Early procedures relied on histologic staining (Seller’s stain) to identify rabies by light microscopy. This technique had poor specificity and low sensitivity so a mouse inoculation test was also performed. Mouse inoculation assays required the maintenance of a mouse colony which were housed in a large climate controlled space with a full-time worker dedicated to care. If the specimen was positive for rabies the mice would usually show signs of illness six to fifteen days after inoculation. Records from 1960-1987 indicated that out of 40,794 total specimens there were 161 positives by mouse inoculation, or an average 5.9 positives per year for 27 years. There were no positive mouse inoculations after June 1983.

In the early 1960s specific fluorescent staining techniques were introduced. Fluorescent Rabies Antibody (FRA) provided greater specificity and sensitivity in detecting the presence of rabies virus. FRA testing was performed alongside traditional tests well into the 1970s, when FRA was proven superior to Seller’s staining. By the early 1980s, monoclonal rabies conjugate had become available improving the sensitivity and specificity of fluorescent antibody testing rendering mouse inoculations unnecessary. The mouse colony was finally eliminated in 1987.

With the increasing regulation of the transport of hazardous materials in the early 2000s the MSPHL undertook a project to secure a suitable shipping container that would be compliant with the new packaging and labeling requirements. The lengthy process of working with a contractor to design and certify a shipping container was completed in 2004 and produced the containers currently in use. The container includes a sealed, screw-top 3.5 gallon bucket, adequate for virtually all animal heads, plus labeling and other requirements for a Biological Substance, Category B container. A separate large animal protocol is available for specimens that cannot fit into the normal container to ensure locally-acquired components meet transportation guidelines.

Animal testing is conducted only for public health or medical purposes so PEP is not given unnecessarily. PEP can be extremely costly and utilizes human vaccine that has often been in limited supply. The current cost of rabies PEP is \$6,000 to \$7,000 per person. The estimated public health cost associated with rabies detection, prevention and control now exceeds \$300 million annually.

Laboratories performed a variety of testing procedures prior to the introduction of the standardized “Protocol for Postmortem Diagnosis of Rabies in Animals by Direct Fluorescent Antibody Testing” developed by the CDC and a number of state laboratories (notably Texas, Wisconsin, New York, and California) and finalized in 2004. The main additions of this protocol were:

- Testing each sample with two different conjugates to reduce the possibility of non-recognition of variant virus
- The requirement that two microscopists read slides from each animal
- Strengthened sampling requirements to include full cross-sections of the brain stem.

*Rabies continued on page 11...*

...Rabies Testing continued from page 11

These refinements virtually eliminate the possibility of missed positives and increase the diagnostic value of negative results.

Rabies testing activities are an important source of information that goes beyond the immediate public health response. These projects include:

- Samples of rabies positive brains are submitted to Kansas State University for variant typing by sequence analysis. This information is compiled into a yearly report of the geographic distribution of rabies variants in Missouri to track trends and distribution of infected species.
- Bat carcasses are retained for the surveillance of bat-associated rabies at the species level. Research wildlife biologist Sybill Amelon of the USDA Forest Service examines MSPHL bat specimens on a regular basis. This greatly increases the useful information obtained from the specimens, as they are examined for age, sex and other conditions such as the occurrence of white-nose syndrome.
- The MSPHL cooperates with USDA's Animal and Plant Health Inspection Service (APHIS) to conduct Bovine spongiform encephalopathy (BSE) surveillance of cow specimens. Specimens that are negative for rabies and contain an intact obex (brain stem) are forwarded to the National Veterinary Services Laboratory in Ames, Iowa.
- The head of any rabid skunk is frozen and forwarded to the CDC rabies laboratory in Atlanta, GA for an ongoing research project.

Missouri reported its last human rabies death in 2008, following an almost 50-year absence of the disease. A total of five persons received PEP as a result of the case, one of which was a health care worker. See the November 6<sup>th</sup>, 2009 volume 58(43); 1207-1209 or <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5843a3.htm>

Great strides in the elimination of rabies transmission have been taken since the Public Health Service established its national rabies control program in the newly-formed Communicable Disease Center (now Centers for Disease Control and Prevention) in 1946. Public health education, vaccination and laboratory testing have reduced human rabies infections to a rare occurrence in the United States.

**“Diagnostic testing for rabies has been performed at the MSPHL since at least the 1940s. Early procedures relied on histologic staining to identify rabies inclusions by light microscopy.”**

## Acronyms

AIHA – American Industrial Hygiene Association  
 APHL – Association of Public Health Laboratories  
 CDC – Center for Disease Control and Prevention  
 CLIA – Clinical Laboratory Improvement Amendments  
 COOP – Continuity of Operations Program  
 CST – Civil Support Team  
 DFA – Direct Fluorescent Antibody  
 DHSS – Department of Health and Senior Services  
 DNR – Department of Natural Resources  
 DOT – Department of Transportation  
 EB – Environmental Bacteriology Unit  
 EiMF – Excellence in Missouri Foundation  
 ELC-ACA – Epidemiology and Laboratory Capacity-Affordable Care Act  
 EUA – Emergency Use Authorizations  
 EPA – Environmental Protection Agency  
 EROT – Emergency Response, Outreach and Training  
 FA – Fluorescent Antibody  
 FDA – Food and Drug Administration  
 FERN – Food Emergency Response Network  
 H7N9 – Avian Influenza A (H7N9)  
 IATA – International Air Transport Association  
 IEC – International Electrotechnical Commission  
 ISO – International Organization for Standardization  
 LIMS-Laboratory Information Management System

LPES – Laboratory Preparedness, Education and Safety  
 LPHA – Local Public Health Agency  
 LRN – Laboratory Response Network  
 MERS-CoV – Middle East Respiratory Syndrome Coronavirus  
 MOU – Memorandum of Understanding  
 MRCE- Midwest Regional Center for Excellence for Biodefense and Emerging Infection Diseases Research  
 MSPHL – Missouri State Public Health Laboratory  
 NBS – Newborn Screening  
 OA – Office of Administration  
 PART – Post analytical reporting team  
 PCR – Polymerase Chain Reaction  
 PEP – Post exposure prophylaxis  
 PRIMO – Primary Care Resource Initiative for Missouri Program  
 rRT-PCR – Real time, reverse transcription polymerase chain reaction  
 S.C.O.P.E. – Systematically Collaborating for Overall Performance Excellence  
 SHL—State Hygienic Laboratory  
 SPHL – State Public Health Laboratory  
 TB – Tuberculosis  
 USPS – United States Postal Service  
 WHO – World Health Organization



## Lab Blab

### New Employees

**Tom Boyd**, Central Services **Amber Robinson**, Chemistry and **Victoria Wray**, PART

### Conferences & Trainings

**David Byrd**, Microbiology, attended the 2013 SWACM Annual Meeting in Dallas, TX.

**Steve Gladbach**, **Patrick Hopkins**, **Leon Luebbering** and **Laura Naught** attended the APHL Annual Meeting in Raleigh, NC. **Patrick** was a presenter at the APHL Annual Meeting. **Steve** also attended the 2013 ELC Grant Meeting and **Leon** and **Laura** attended a FDA ISO 17025 Accreditation grant meeting in Raleigh, NC.

**Dana Strope**, Immunology, attended and presented at the St. Louis Regional Prevention Advisory Group in St. Louis, MO.

**Brian Flores**, Immunology, attended Panther instrument training in San Diego, CA.

**Laura Naught**, Quality Systems Officer attended ISO 17025 Lead Assessor Training in Milwaukee, WI.

**Alan Schaffer**, Chemistry, Attended the LRN-C Level I Surge Meeting in Boston, MA

**Russ Drury**, LPES, and **Alan Schaffer**, Chemistry, attended Radiation Safety Officer Training in Las Vegas, NV.

**Russ Drury**, LPES, Presented a biosafety seminar at the CLIA Consortia in Branson, MO.

**Amy Pierce**, LPES, attended the Biosafety Education for the Research Scientist program presented MRCE in St. Louis, MO.

**Julie Buckley**, Chemistry, participated in a multi-module online EPA training on radioactivity.

**Mindy Rustemeyer**, Chemistry, attended the Principles of epidemiology Course in Jefferson City, MO.

**Pat Olson**, TB, attended the Diagnostic Mycobacteriology Workshop in Atlanta, GA

**Roy Tu'ua**, TB, attended the 2013 National TB Conference in San Diego, CA where he presented a poster.

**Ashley Mehmert**, EB, attended the EPA Laboratory Certification Officer Training, Edison, NJ, the International Association for Food Protection Annual Educational Conference in Charlotte, NC and the FF201 FERN Food Microbiology and Rapid Methods training in Shoreline, WA.

**Leon Luebbering** and **Ashley Mehmert**, EB, attended the Incident Command System 300 & 400 Course and Table Top Exercise in Iowa.

The Environmental Bacteriology Unit staff of **Leon Luebbering**, **Ashley Mehmert**, **Jeremy Wilson**, **Melissa Reynolds** and **Lindsay Boyd**, all attended an in-house two day training on ISO/IEC 17025:2005 standards.

**Pat Shannon**, EB, attended an Assessment of Laboratory Competence to ISO 17025 course sponsored by the FDA in Lenexa, KS, and the Missouri Milk, Food and Environmental Health Association Annual Education Conference in Columbia, MO with **Leon Luebbering** and **Ashley Mehmert**.

**Melissa Reynolds**, EB, attended the FF201 FERN Food Microbiology and Rapid Methods training in Shoreline, WA.

**Patrick Hopkins** and **Darla Eiken**, Newborn Screening, attended the Newborn Screening and Genetic Testing Symposium in Atlanta, GA. **Patrick** also attended Hunter's Hope Annual Krabbe Workshop in Buffalo, NY.



**Staff  
happenings  
in the  
Laboratory**



## Introducing Lab Employee of the Quarters

By: Roy Tu'ua, TB Unit Chief and S.C.O.P.E. Workforce Team Leader

### Connor Mahon, PART, Quarter II Recipient

Connor began his career as an Office Support Assistant at the Missouri State Public Health Laboratory in September 2010. During his tenure he has revealed great potential by exhibiting abilities of a natural leader and always bringing out the best in those around him. Connor has since been promoted to Senior Office Support Assistant.

On many occasions Connor has displayed many valued characteristics of innovation, resourcefulness, independence, self-motivation and continuous improvement to effectively

perform his duties. Connor handles his duties and responsibilities with little to no supervision and is always willing to contribute to the greater good of the team by assisting fellow team members wherever and whenever his help is needed. A superb example is during the snow storm of February 2013 when Connor offered the day before the snow storms arrival to pick up fellow employees. True to his word Connor picked up a team member stranded by the snow and committed to remain at the laboratory to the

end. Connor lives by his old Marine motto of being one of the first ones in and one of the last to leave by arriving to work 15 minutes early and leaving with everyone at the close of business.

Although there are many spotlights shining his way he is humbled by acknowledging that he has more to learn or as Robyn Carrender states, "he is not afraid to admit when he makes a mistake, quick to remedy the concern and eager to learn how it could be prevented in the future".



Connor Mahon, PART, 2013 Quarter II Employee of the Quarter.  
Congratulations **Connor!!**

### Sandy Jones, LPES, 2013, Quarter III Recipient

Sandy Jones stands out among the many for her selfless service not only in her obligatory duties in the LPES Unit but in her extra duties requested by the different units because of her institutional knowledge. Sandy is often requested for assistance with a project small and large but has always put the welfare of the requestor before her own and jumps right in with both feet running and returns to complete her project ahead of schedule.

Her outstanding work and

dependability is noted in her leadership skills as the team leader for the S.C.O.P.E. Initiative Process Management group in coordinating the events for Lab Week and assistance in developing the MSPHL picture organizational chart. Although she was a little reluctant to accept she has embraced her role and excelled as the team leader.

Sandy exhibits her commitment to excellence through her actions and interest in personal growth and development. This allowed

Sandy to consistently go above and beyond the scope of her profession in delivering superb service with a positive attitude and courtesy. Sandy's recent act of assisting Amy Pierce with setting up the "Rule out/Refer" class by taking the initiative of learning how to perform plate streaking of the organisms necessary for the class that resulted in a new valuable skill set well beyond expectations or job description which illustrates her team player attitude.



Sandy Jones, LPES Unit, 2013 Quarter III Employee of the Quarter.  
Congratulations **Sandy !!**

### Josh Featherston, Virology, 2013 Quarter IV Recipient

Josh isn't new to laboratory work, but is new to the State Public Health Laboratory beginning his service one year ago on September 1, 2012. Although Josh is new to the Virology Unit, Josh exceeded expectations of quickly grasping the many different testing algorithms of the Virology Unit within a six month period. Josh was nominated for his motivation and initiative of assisting in any way he could. In one instance, the Virology Unit was notified

on a Friday morning there was a rabies sample arriving the next day that required testing due to human exposure. No one was available to come in, or able to quickly adjust their plans, on a Saturday to conduct Rabies testing due to prior obligations, however, Josh volunteered to come in on a Saturday to perform rabies testing. It was very important that the testing was completed on Saturday because there was a positive domesticated animal (dog) the week before with

other animal and human exposures. Rabies in most cases is fatal, so it was important that the testing was done in a timely manner to initiate rabies immunizations. For his efforts, the Virology Unit and Autumn Grim, Senior Epidemiologist in the Southeast Region, recognized and expressed gratitude on behalf of themselves and the County Health Department for his efforts to test the sample on Saturday.



Josh Featherston, Virology, Unit 2013 Quarter IV Employee of the Quarter.  
Congratulations **Josh !!**

## On the Road – MSPHL Workshop Expanding Its Reach

By: Amy Pierce, LPES Training Coordinator



**“The workshop really opens up the lines of communication between the LPHAs and the state epidemiologists and laboratorians”**

In 2008 the first “Laboratory Services for Regional Epidemiologists” training was born. It was a workshop that brought disease investigators from local health departments around the state to the MSPHL for a day of presentations and discussion. Forty-eight participants learned about the services the MSPHL offers, how to properly collect an acceptable sample for laboratory testing and the correct way to transport specimens to the MSPHL. The day wrapped up with State Epidemiologists delivering case study presentations highlighting successful disease investigation partnerships with the MSPHL. Participant comments on the workshop evaluation were very positive.

Fast forward to 2011. The training was reborn as the “Laboratory Services Workshop for LPHA Disease Investigators”. Again, nearly 100 participants came to Jefferson City to learn the ins and outs of Bordetella pertussis, scabies, rabies, food and water, tuberculosis and enteric bacteriology testing. They received fact sheets about each of the MSPHL testing units, and resources for requesting test kits and using the laboratory courier. The workshop was offered again in 2012. Each time the trainings were a great success with overwhelmingly positive comments from attendees.

The training was obviously valuable and appreciated by the participants. But one large hurdle stood in the way of reaching all the people across Missouri who could benefit from a better understanding of what the MSPHL could do to serve them; travel was difficult. Often local health departments are undermanned and can’t afford to have their staff gone for an entire day. Many have budgetary concerns making it difficult to meet the travel expenses required to spend the day (and sometimes night before) in Jefferson City. The answer was obvious: the MSPHL needed to take the training on the road.

2013 saw two workshops on very different ends of the state. The first, pilot laboratory services workshop occurred in St. Joseph. Unit chiefs and managers from Microbiology, Chemistry, Virology, Tuberculosis, Molecular Biology, Environmental Bacteriology and Central Services units at the MSPHL along with several Senior Epidemiology Specialists from different regions around the state all traveled to St. Joseph. The hope was that for those local health departments that were unable to travel, this would be an opportunity to attend the training without the added expense of distant travel. A few months later, the training was brought to West Plains with the same expectation in mind.

The evaluations at the end of the trainings spoke to the workshops’ success. One participant wrote, “Very helpful – several of us that have been in Public Health at the local level have never been given this information over the years. Thanks for travelling to our area so we could attend.” Another stated, “It was very good to actually see or meet [laboratory staff] in person. In our small county being the CD nurse can feel like a lonely job. Now I know who else is on my team!”

The presenters appreciated being able to conduct the outreach as well. Autumn Grimm, Senior Epidemiology Specialist for the Southeast District stated, “I think taking this on the road is very useful since budgets are limited now and overnight stays have to be justified with LPHA boards. Having a training in specific areas allows those that might not otherwise get to attend the training the ability to come and learn very valuable lab processes and procedures.”

Stephen Gladbach, the Microbiology Unit Chief said, “For me it is great to meet with the people we serve and go over issues for them and for us. It definitely goes both ways. I am sure that we provide information that allows them to do their job as a result of the workshops. And the Laboratory has also made modifications to the way we do things to make them better. As long as the LPHAs want or need the interaction about laboratory services I hope that we will be able to continue to provide it. The workshop really opens up the lines of communication between the LPHAs and the state epidemiologists and laboratorians.”



Pat Shannon, Environmental Bacteriology Unit Chief, presenting at a LPHA training.

*On the Road continues on page 15...*

....*On the Road continued from page 14*

"I could not agree more," said Drew Pratt, Senior Epidemiology Specialist for the Central District, "I've received a lot of positive feedback from LPHAs every time this training was held at the MSPHL. In addition to serving the LPHAs well, the training also allows for continued close collaboration between MSPHL and BCDCP (Bureau of Communicable Disease Control and Prevention) staff. I feel that we already have a great working relationship with the MSPHL, and trainings like these help maintain it."

Planning for the next laboratory services workshop will soon be underway. Requests for the training from other districts in the state have already been submitted. It is yet to be decided if the training will again be held at the MSPHL in Jefferson City or if it will once again be on the road. But it is certain that there will be more travelling workshops in the future.



*Jackie Pfenenger, Central Services Unit Chief, presents at a LPHA training.*

## **A partner in the CST**

**By: Amy Pierce, LPES Training Coordinator**

An often unnoticed, yet critically important function of the MSPHL is to maintain laboratory readiness for public health emergency situations. Fostering professional relationships with outside partners is key. One such valuable collaboration has been a back-and-forth flow of information between the MSPHL and the National Guard's 7th Civil Support Team (CST).

The Jefferson City based 7th CST is a 22 person full time state level resource who stands ready to deploy within 90 minutes of notification 24/7 365 days a year. The team has strong communications and analytical capabilities, and a survey section to enter into a hot zone. They deploy to any hazards where firefighters within the state may need assistance.

Since early 2009, the MSPHL and 7th CST have often communicated about the Team's capabilities and willingness to assist the MSPHL in any way possible. One very impressive asset is their mobile laboratory. Operated by First Lieutenant Jason Davenport, Air Force Captain Nathaniel Looper and Sergeant First Class Jason Allabaugh, this state-of-the-art truck has the capability for on scene chemical and molecular testing to detect dangerous chemical and biological agents. The 7th CST has made very apparent their willingness to make any possible testing a useful tool for the MSPHL should a bio- or chemical weapons attack occur.

Together, the MSPHL and 7th CST have participated in hands-on trainings, drills and other collaborative efforts to strengthen the partnership. "Having a strong working relationship with our State Health Laboratory is a crucial part of being successful in our mission as a CST. We do our best to maintain this relationship through training events and staying in contact using the communication lines we would use in a real emergency", says Lt. Davenport, "I feel very confident that if I need to support of the Health Lab I can get the right person to talk to at any time; day or night."

The collaboration between the MSPHL and the 7<sup>th</sup> CST is in no danger of ending. In fact, the parties maintain an MOU officially establishing the partnership to provide assistance to one another through analytical capabilities, technical training and available resources. Both parties are always looking for future opportunities to strengthen and expand this valuable relationship.

***"Together, the MSPHL and 7<sup>th</sup> CST have participated in hands-on trainings, drills and other collaborative efforts to strengthen the partnership"***



*A view inside the CST mobile laboratory.*

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Happy  
Holidays!



## MSPHL Employee Wins Photography Contest



Ralph Horne, Virology Unit Chief, won the Orscheln Farm & Wildlife photo contest for 2013. His picture depicting birds feeding during a mid-Missouri snow storm earlier this year will be featured in Orscheln's 2014 calendar.

**Congratulations Ralph!**

## Around Jefferson City, MO

Lincoln University was founded by black enlisted men of the 62nd and 65th United States Colored Infantries and their white officers, who fought for the cause of the Union during the Civil War. The black soldiers of these two regiments were the victims of an 1847 Missouri law that prohibited blacks from learning to read and write. Amidst the horror of war, they were given the opportunity to rise above the obstacle when their white officers established informal classes for them. As the war came to a close, the men dreamed of sharing the gift of education with other blacks in Missouri. They resolved to establish a school in their home state dedicated to teaching freed blacks. Lincoln Institute opened September 17, 1866 which became Lincoln University in 1921. Its current enrollment is a little over 3,000 students. [www.lincolnu.edu](http://www.lincolnu.edu).



*The Soldiers' Memorial, Lincoln University, Jefferson City, MO*