



Spring 2015

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Beyond the SCPE

A publication of the Missouri State Public Health Laboratory



Our Vision

By: Bill Whitmar, Laboratory Director

All buildings great and small start with a plan, a blueprint from which the structure is conceived. From that blueprint, materials, human resources and time frames are determined to fill the needs, and ultimately meet the end goal of a habitable structure.

Successful businesses around the globe utilize blueprints to leverage all of their assets to meet their end goal as well. Those blueprints are called Strategic Plans. The MSPHL is a business too, make no mistake about that. We have inputs like businesses- funding, raw materials such as supplies and testing reagents. We have superior human capital that operates within a magnificent "factory" otherwise known as the Laboratory. And we have outputs, or products, in the form of quality laboratory reports, data, interpretation and consultation.

The question becomes, "How does the Laboratory maintain and become better at its role?" The answer is by planning strategically. The strategic planning process boils down to looking at what we as a laboratory want to be doing and where we want be positioned in a 5 year time period from the present.

The Strategic Plan is a road map that guides us in an organized fashion by the use of goals, objectives, strategies and action steps. Without a plan to achieve these goals, most entities fail to have an organized path to realize long-term improvement and growth which results in failure to adapt in the rapidly changing environment in which they operate.

Over the past 5 years the MSPHL has developed, utilized and refined its Strategic Plan. It has been used to develop funding and acquire equipment. We have developed a robust Quality Systems program, ensured more training for staff, reduced costs in laboratory services and improved customer services. The staff have also been involved in internal change as a result of the plan. Inter-unit communication has increased and employee satisfaction is extremely high.

Strategic planning is far from a business catch phrase. It is a valuable tool if used correctly and taken seriously as I believe the Missouri State Public Health Laboratory has proven.

Bill



Bill Whitmar, MSPHL Laboratory Director

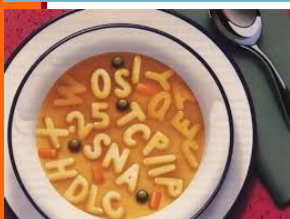
Annual Team Meeting

The MSPHL held its 4th Annual Team Meeting on December 3rd, 2014. Staff were there to hear the results of the Laboratory's 2014 quality improvement activities and to receive a summary of the 2014 Customer Satisfaction and Workforce Satisfaction surveys. There were also segments that included safety reminders, fiscal updates, and employees were recognized for years of service. The Annual Team Meeting also had the theme "Hollywood Game Night" where staff had a little fun playing games such as *Link the Chain*, *Timeline* and *Block of Fame*.



Acronyms

AFB - Acid Fast Bacillus	MSDS—Material Safety Data Sheets
APHL – Association of Public Health Laboratories	MSPHL – Missouri State Public Health Laboratory
CDC – Center for Disease Control and Prevention	OSHA—Occupational Safety and Health Administration
CSF—Cerebral Spinal Fluid	PART – Post analytical reporting team
CLIA – Clinical Laboratory Improvement Amendments	PCR – Polymerase Chain Reaction
COOP – Continuity of Operations Program	PHEP – Public Health Emergency Preparedness
DHSS – Department of Health and Senior Services	PPE—Personal Protection Equipment
DNR – Department of Natural Resources	QI—Quality Improvement
DPS – Department of Public Safety	rRT-PCR – Real time, reverse transcription polymerase chain reaction
EB – Environmental Bacteriology Unit	SARS—Severe Acute Respiratory Syndrome
EiMF – Excellence in Missouri Foundation	SDS—Safety Data Sheet
EMAC—Emergency Management Assistance Compact	S.C.O.P.E. – Systematically Collaborating for Overall Performance Excellence
FBI—Federal Bureau of Investigation	SEMA—State Emergency Management Agency
ITSD—Information Technology Services Division	SPHL – State Public Health Laboratory
LIS—Laboratory Information System	TRF—Time Resolved Fluorescence
LPEs – Laboratory Preparedness, Education and Safety	USPS – United States Postal Service
LRN – Laboratory Response Network	WHO – World Health Organization
MGIT—Mycobacteria Growth Indicator Tube	
MOLRN—Missouri Laboratory Response Network	



The Emergence of Chikungunya Virus

By: Ralph Horne, Virology Unit Chief

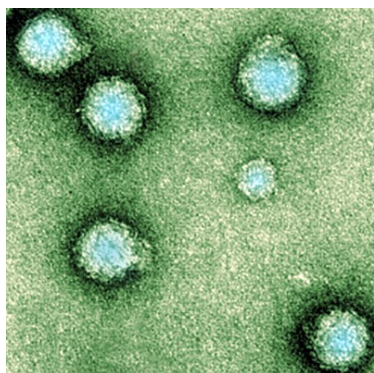
The term Vector-borne disease refers to illnesses transmitted to humans by blood-sucking arthropods (insects or arachnids), most commonly by mosquitoes, ticks and fleas. Some of these diseases have long been present in Missouri, while others have recently emerged and may increase the risk to human health as they become more common.



One important vector-borne disease that has recently affected Missourians is Chikungunya (pronunciation: \chik-en-gun-ye) virus. Chikungunya was primarily found in Africa/Asia/Europe/Indian and Pacific Oceans prior to 2013.

In late 2013 the Chikungunya virus was found on Caribbean islands, and poses the risk that the virus will be imported to new areas by infected travelers. There is no vaccination to prevent Chikungunya virus infections, nor is there any specific treatment for the disease. Travelers are advised to protect themselves from mosquito bites when traveling to Chikungunya-affected areas with the use of insect repellent, long sleeves and pants, and to stay in places that use air conditioning or have screened doors and windows. Primary vectors are the *Aedes aegypti* and *Aedes albopictus* mosquitoes, both of which are aggressive daytime biters. Rarely, transmission occurs from mother to child when the virus is transmitted to the newborn around the time of birth. At present no infants have been found to be infected with Chikungunya virus through breastfeeding. There are reports of virus transmission among laboratory personnel and health care workers through infected blood.

Chikungunya virus disease is now classified as a nationally notifiable condition and cases are reported to CDC by health departments using standard case definitions. There were 93 cases reported in 2015 (as of 4/21/15) in the United States, all cases being found in travelers to infected areas. A total of 20 cases of Chikungunya virus infection have been identified in Missouri residents, beginning in the summer months of 2014. Florida is the only U.S. state that has reported local Chikungunya virus transmission.



chikungunya virus photo by [AJCL](#)

The symptoms of Chikungunya virus infection typically begin 3-7 days after being bitten by mosquitoes, and most commonly include fever and joint pain. Chikungunya disease is rarely fatal but can be disabling, affecting newborns, older adults (e.g., > 65 years), and people with certain medical conditions most severely. While there is no specific treatment for the virus infection, rest, hydration, and non-steroidal anti-inflammatory drugs (NSAIDs) may be used to lessen fever and pain. Patients usually feel better within a week, but some people may have joint pain that persists for months. People infected with Chikungunya should be protected from further mosquito exposure during the first week of illness to reduce the risk of local transmission.

Chikungunya virus infection is a consideration in patients with compatible symptoms (fever, polyarthralgia) with recent travel history from areas with known virus transmission. Diagnostic testing is performed by testing serum (or plasma) to detect the virus/nucleic acid, or virus-specific IgM neutralizing antibodies. Viral RNA can often be detected in serum during the first 8 days of symptoms, while virus-specific IgM antibodies develop towards the end of the first week of illness. If acute-phase samples test negative, a convalescent sample may be requested to definitively rule out the diagnosis.

Beginning this year the MSPHL will be offering IgM-specific serology and RT-PCR testing in-house, using protocols provided by the CDC. The Chikungunya serology assay is a modification of the currently-performed Arbovirus ELISA testing procedure, while the RT-PCR assay is a newly developed procedure. Blood specimens are to be collected in a plain (no additive) red-top or serum separator tube. Acute samples should be collected between days 3 and 10 of symptom onset, with convalescent serum collected 10-14 days after acute specimen collection. Samples should be collected and shipped to the laboratory at 2°-8°C (refrigerated) as soon as possible. At present both assays are in the process of validation and review.

2014 Customer Survey Results

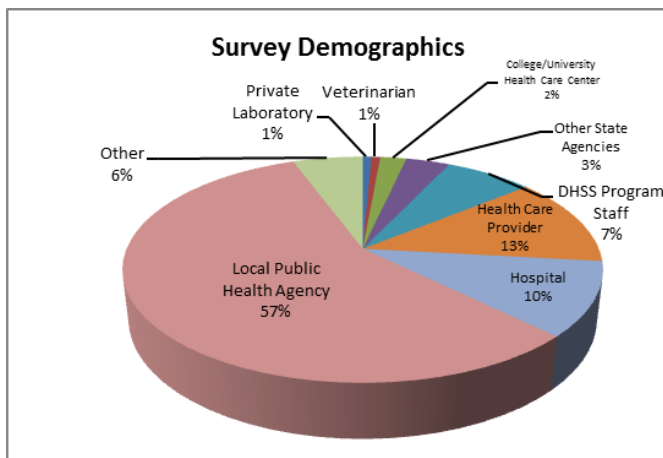
By: Laura Naught, CLIA Director

In order to improve customer service the MSPHL conducted its second biennial customer satisfaction survey during the month of October, 2014. Slips of paper were added to mailing kits and result reports directing customers to the website to take the 2014 survey. Approximately 7,500 slips of paper were included in result report mailers for the month of October. Customers were also notified of the survey through email, fax and the Department of Health and Senior Services' "Friday Facts" newsletter. The MSPHL is happy to report that the Laboratory received 142 responses. That is the same number of respondents that took the survey in 2012.

A wide range of customer groups took the survey (see the Customer Group Demographics chart) which helped give the MSPHL a comprehensive look at its services. This survey covered several topics such as communication, ease of ordering test kits and result reports. Some highlights from the survey include a 99% satisfaction rate

"The staff is great; so polite, helpful & professional!"

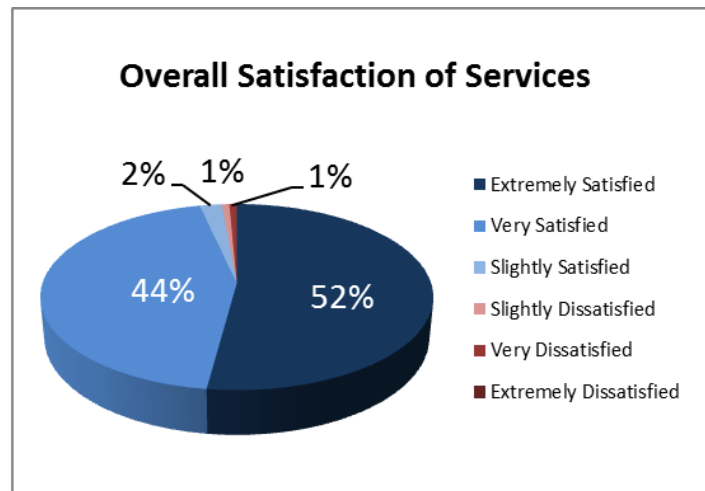
-2014 Survey Comment



(includes slightly, very or extremely satisfied) with the Laboratory's courier service (n=119). 100% of respondents were at least slightly satisfied with the courteous and professionalism of staff both for technical and administrative/support staff. Satisfaction for the overall services provided at the MSPHL was 98%. From the survey it appears that MSPHL customers want an alternative to receiving result reports by mail. In 2012 the majority of respondents still wanted to receive results by mail but in 2014 email was the majority at 34%. There were also several comments in the free text field that mentioned easier access to result

reports and wanting results emailed. The MSPHL is currently working on several projects to improve the accessibility of result reports that will be faster than traditional mail. The MSPHL will provide updates on the progress as those projects develop.

The MSPHL would like to thank everyone who took our survey. We value your opinion and have learned a lot about laboratory services from your responses. As the MSPHL improves, additional surveys to measure laboratory performance may be necessary. The MSPHL appreciates your participation in advance. If you ever have a question or concern please feel free to contact the Laboratory directly through email (LabWeb1@health.mo.gov) or call 573-751-3334 and we will be happy to help in any way we can.

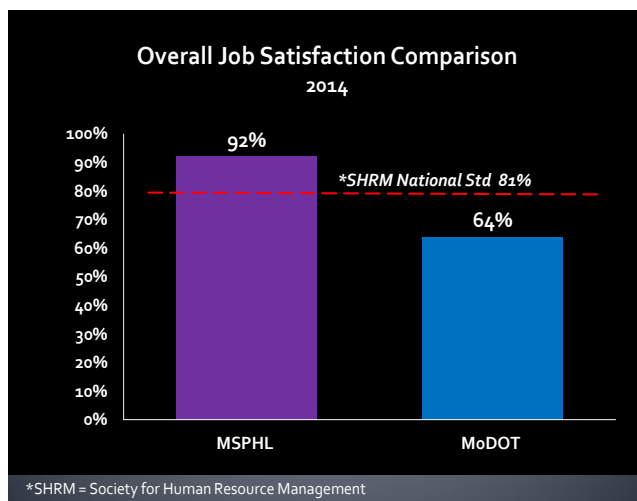
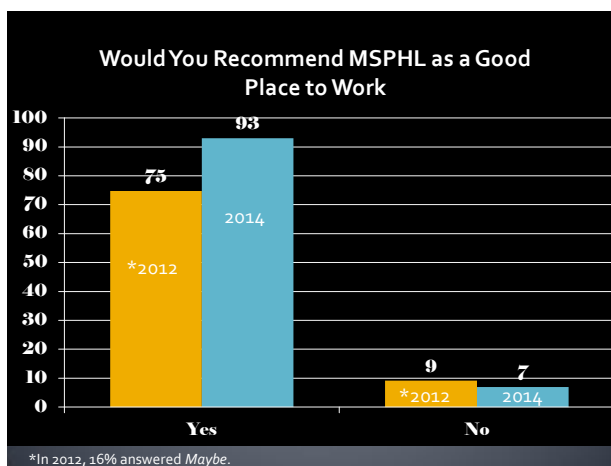


2014 Workforce Survey Results

By: Roy Tu'ua, TB Unit Chief



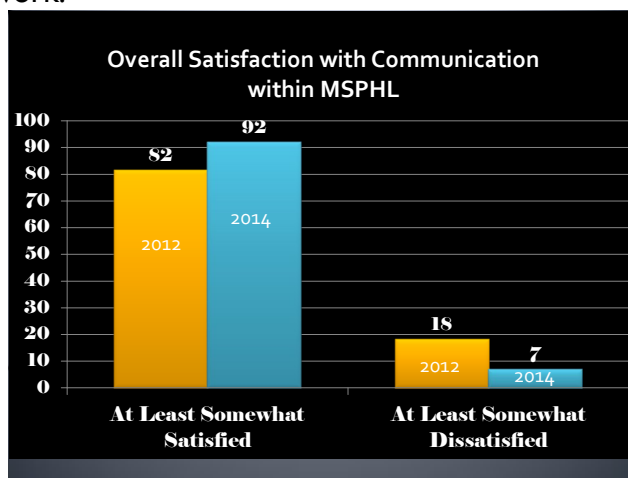
Have you ever tried to put together a comprehensive workforce survey for your fellow colleagues? Let me tell you, it wasn't as easy as we thought it would be. The Workforce Survey was developed with assistance from APHL using questions asked of Fortune 500 companies from global performance management consulting firms. In the months prior to the survey launch the questions were pared down and, along with the responses, were modified to fit the Laboratory and ensure unbiased results. The purpose of the Workforce Survey was to provide a comprehensive snapshot of the attitudes, concerns and thoughts of Laboratory personnel through an anonymous approach. This allowed staff to express their concerns candidly with no inhibitions, filters or risk of ridicule.



Since the development of the survey the Laboratory has assessed its workforce twice which provided two data points for comparison. The response rates for the 2012 and 2014 surveys were 95% and 99% respectively. Based on the 2014 Workforce Survey results the Laboratory is progressing in the right direction with job satisfaction increasing by 6% to 92%. The Laboratory job satisfaction rate is 11% higher than the national standard set by the Society for Human Resource Management (SHRM). Corroborating this result is the fact that

93% would recommend MSPHL as a good place to work.

Another noteworthy improvement is the increased satisfaction with overall communication within the Laboratory. There has been a 10% increase of Laboratory staff who are at least "somewhat satisfied" with communication within the Laboratory. We've made some great strides, but within every great institution there will always be opportunities for improvement. The Workforce Survey provides one of many avenues within the Laboratory for employees to take part in helping the MSPHL strive for greatness.



MSPHL's Ebola Response

By: Russ Drury, LPES Director

On March 25, 2014, the World Health Organization (WHO) released its first announcement of a developing outbreak of Ebola hemorrhagic fever in Guinea, western Africa. Cases were also being reported in the neighboring countries of Liberia and Sierra Leone. This initial release reported 86 suspected cases with 59 deaths, resulting in an alarmingly high mortality rate of 68.5%. Over the next weeks, the numbers grew. Months later, cases were still increasing. Now, a year later, the number of suspected cases, as of March 2nd, was 23,948. Laboratory confirmed cases totaled 14,347 with 9,729 deaths. The result is the largest recorded outbreak of Ebola hemorrhagic fever in history. An outbreak that presented multiple challenges on multiple levels, and the numbers are still climbing. The response to this outbreak has been widespread in western Africa, the United States and within Missouri.



The Ebola Virus, courtesy of www.cnn.com.

The world has become a global society. This is an asset in countless ways, but in the arena of communicable disease, it only creates more challenges. A non-symptomatic person can board a plane in Africa today, begin feeling ill during the flight and arrive in the U.S. within a matter of hours. Potentially exposing people on the flight, and when they reach their destination. The gentleman that showed up at the Texas Health Presbyterian Hospital in Dallas showed how easily this can happen, and the ramifications of not being truly prepared.

The guidelines as defined in CDC's fact sheet, *Screening and Monitoring Travelers to Prevent the Spread of Ebola*, state any passenger leaving an Ebola afflicted country and travelling to the United States must have their temperature taken, answer questions about their health and Ebola exposure history and be checked for fever and other Ebola symptoms. Travelers from these countries are only permitted to fly into five airport destinations within the United States. Once passengers from those countries arrive, they are interviewed by Department of Homeland Security staff and provided with an Ebola Check and Report Kit. They are put in contact with health departments at their final destination and actively monitored for 21 days. If they are symptomatic, or do have a fever, they are further evaluated and decisions are made based on their risk level. Active monitoring and surveillance has effectively prevented the spread of the disease within the U.S.

Initially, the threat of Ebola to the United States was very real. The potential for exposure was very high due to the level of American aid workers assisting in Africa. Eventually they would return, and with them was a potential for disease. The CDC recognized the need for assistance with surge testing well in advance of any large scale outbreak. Through the Laboratory Response Network (LRN) the CDC began to identify key laboratories across the country that could become certified Ebola testing laboratories. These laboratories were selected on multiple criteria such as biosafety level functionality, testing capabilities, testing equipment and much more. The MSPHL was selected as one of the laboratories to gain certification for Ebola testing.

Laboratory staff conducted an Ebola testing risk assessment of practices in the existing biosafety level 3 laboratory based on guidance from CDC and the Association of Public Health Laboratories (APHL). Procedures were adjusted for the new testing format to address any identified gaps. Plans were improved to better protect laboratory staff. Concepts such as working in a buddy system when

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donning and doffing PPE were added. This involves one person being a “trained observer” watching closely, coaching, and even assisting as needed, especially in the doffing process. A program for monthly PPE training was developed for testing staff to reinforce the proper techniques for donning and doffing PPE to avoid self contamination. All staff performing manipulations on suspect Ebola specimens are required to shower out before leaving the laboratory space. And all clothing worn during the testing process has to be properly decontaminated and washed before being worn again. A medical surveillance plan was added for any staff that participate in the testing of a positive specimen. They would be required to undergo a 21 day fever watch in which their temperature is taken twice daily and recorded.

The molecular unit was very heavily involved in the certification process. They communicated with the CDC on a regular basis to receive the proper testing procedure and reagent kits. Staff were trained on these procedures and passed the proficiency tests, thus confirming the MSPHL as a certified Ebola testing laboratory. Governor Jay Nixon announced this designation to the public at a press conference hosted at the MSPHL on Friday, October 17, 2014. Weeks later, the MSPHL performed LRN Ebola testing for an epidemiological investigation. The MSPHL continues to maintain laboratory capacity for Ebola testing for when it is determined to be necessary.

The MSPHL also worked with external partners such as regional epidemiologists and the State Emergency Management Agency (SEMA). Plans were developed to preposition collection kits at all regional epidemiology offices. Any hospitals with suspect cases are required to contact regional offices and coordinate with them, the CDC and the MSPHL to decide if the case should be tested. This system was put into place to prevent a surge in testing of specimens that did not meet specific criteria. Ebola testing supplies and reagents are very limited. It is necessary to assure that only specimens of credible risk are tested.

This system has worked very well with previous outbreaks and has been invaluable in conserving limited MSPHL time and resources. The MSPHL also participated on an advisory panel with SEMA to develop PPE trainings for healthcare workers at Missouri hospitals. While the MSPHL has not delivered the training themselves, they did provide guidance and assistance with course development based on CDC guidelines.

The Ebola outbreak is one that has clearly had a global impact. Actions taken by the CDC, Homeland Security and state health departments significantly decreased the chances of Ebola spreading within the United States. Actions taken by MSPHL staff to quickly develop the ability to safely receive and test suspect Ebola specimens provides greatly reduced turnaround time for testing of a specimen collected inside the state of Missouri. The lessons learned from the Ebola response will be applied to preparation for large scale outbreaks such as pandemic influenza in the future and will result in a better response plan for most hospitals in the state of Missouri and the MSPHL.



Governor Jay Nixon announcing the MSPHL as a designated Ebola Laboratory during an October 17, 2014 press conference at the MSPHL.

A Personal History with Tuberculosis

By: Linda Eisinger, Laura Naught, CLIA Director and Roy Tu'ua, TB Unit Chief

On my very first Mother's Day as a new mom my Mother (Linda) gave me the most amazing present, her autobiography. This was a project she and her sister Pennie had decided to do several years ago to document the family history. While I thought I knew a lot about my family history my mother provided me with some amazing stories about both her and my father's family that I will proudly share with my son. Growing up I always remembered my mother talking about how her Father, Elbert, had Tuberculosis (TB) and was in the hospital for a long time. But I never really grasped what that meant or how that affected my Mother, Aunt and Grandmother. Elbert passed away when I was three and the only memory I have is sitting on his lap. I do, however, possess and display a knitted wool bag that hangs in our spare bedroom that he made while in the hospital that acts as a lasting memory. Reading about my Grandfather's life and experiences with TB and connecting his experiences to my work in the public health laboratory really hit a cord. With my Mother's permission below is an excerpt from her autobiography describing her, her fathers' and their family's experience with TB in the 1950's.



Elbert Bennett when he was positioned in the South Pacific during World War II.

In the fall of 1954 Elbert began to feel ill. He was tired constantly and had been to see doc Hickerson several times. He also had developed a bad cough. Each time he visited the doctor he was told it was the flu. One afternoon in late January he was taking a nap and woke up coughing. He felt some liquid on the front of his shirt, looked down and saw blood. Obviously something was very wrong. Elbert was 37 years old.

Elbert went to a doctor on February 11th, 1955 to get his diagnosis. He had gone on the previous day to be X-rayed. The doctor told him he had Tuberculosis. In 1955 that was basically a death sentence. Treatments were primitive at the time, patients were isolated into TB hospitals, many never seeing their loved ones ever again. It was considered to be highly contagious so people shunned you and cut you off completely.



My grandfather with me before his death at the age of 61

There is one related story my father told us all of his life. He had been a smoker. Smoking was considered the leading cause of TB. Upon delivering the TB diagnosis the doctor asked Elbert if he was a smoker and he said "not anymore". The doctor asked, "when did you quit?" my father answered, "just now." I am sure the doctor thought, "right." But, my father went from several packs of cigarettes a day to nothing. He never smoked another day in his life.

Several veterans who served on the Pacific Islands during the war returned to the states and later contracted TB. My father's illness also proved to be war related so he was allowed to go to the Veterans Hospital in Kansas City for treatment. He entered the hospital on February 16, 1955 at 9am. You have to realize that to enter a TB ward in 1955 was the same as knowing you would most likely never return to your home or life. There was an entire floor in the Veterans Hospital full of TB patients. Treatment up until this time was "good" air treatments which consisted of pumping air into the chest cavity so the lung could relax and the TB lesions could heal..

Elbert and Maxine (Elbert's Wife), who were very careful people, went against type, and chose a doctor that had some very unconventional ideas about treating TB. His doctor's personal appearance was disheveled and he was known to curse constantly. Mother said that other doctors and family members were always telling them they would regret choosing that "quack" but they had faith in him and they were proven right. Out of the entire floor of TB patients at the Veterans Hospital, my father was the only one to recover from the disease and return to his family and former life.

In reading the journal my father kept it is disheartening to read about his days. At first the hospital denied

patients any visitors. Elbert filled his long days with reading books and newspapers, but mostly he read the Bible. There was no television, no visitors, nothing to break up the boring and endless days. Elbert was told on March 2 by his physician that he was going to break the odds and survive, but that he would be in the hospital for at least a year.

My father could not see Mother until March 16th and he had to wear a mask and covering on all of his body. Throughout his entire hospital stay, the only ones who visited my father were my mother, Pennie and me, Elsie and Al Barrow, and Ida Ann. Elbert's days at the hospital started with "air" support treatments. The pressure of the air was increased weekly and these were painful and exhausting. Streptomycin has been discovered in 1946. Dr. Dunn began to use this powerful antibiotic in my father's treatment on February 28th. This was something some progressive doctors were doing in the United States, but no one was doing this in the Midwest. Dr. Dunn then approached Elbert and Maxine with what was his most startling idea so far. He wanted to operate and remove the diseased part of the lung. This had not been done to any other patient at the Veterans Hospital. My parents felt God had given them this doctor and they agreed to let him do this surgery. He had surgery on September 14, 1955.

In the beginning of Elbert's hospital stay Maxine had to rely on her friends' husbands or Elsie to take her over for visits in the evenings. When this proved to be too confining, Mother did what was the only alternative. Elsie taught her how to drive. I remember Mother saying how driving just opened up her life. She had never known such freedom. She began going to the hospital daily as soon as the doctors allowed my father visitors. In late spring of 1955, Pennie and I were allowed to see my father. Mother took us into this huge hospital. My father had to go to a special room and was covered with a mask and garments so we couldn't touch him. It was really unnecessary though because my father would never touch us. His fear of Pennie or I getting sick was so great, he never kissed us for the rest of our lives. Even eventually when he returned home, his plate, utensils, and glass was always kept on a special shelf well out of our reach.

TB patients were given sputum tests well into their treatments. Something unique began to happen with my father's sputum tests though. They began to come back negative, something unheard of. On December 16th, 1955 he was moved to another floor of the hospital, off the contagious TB ward. Christmas Day, 1955, Elbert received something no other TB patient had ever received at the Veterans Hospital, a 24 hour pass to go home.

My father was discharged from the hospital on March 16, 1956 after a thirteen month stay, cured of the once incurable disease Tuberculosis. My parents were people of faith. They felt blessed to have found Dr. Dunn. I personally know that my Mother and Father thanked God for this doctor, and prayed for his continued health every day of their lives.

Continued on page 11...

...Strategic Planning continued from page 5

Each unit will have its own specific map. Every employee will see exactly what piece they and the rest of their unit play and how it relates back to the overall Laboratory objectives.

Tracking the progress of the action steps is also greatly improved. An Excel file gives specific due dates for implementation, a breakdown of the steps to implementation, a percentage toward completion and a specific person or unit who is the "owner" of that metric. This will increase accountability for realizing those goals. The hope is that great ideas will not fall by the wayside because a goal was forgotten, buried in unread text.

The Strategic Map is a new chapter in the strategic goals of the MSPHL. Gone are the days when employees are not engaged in the Laboratory's future. Now, everyone has, at a glance, the tools they need to see how the MSPHL is working towards not only its mission of "promoting, protecting and partnering for health by delivering quality public health laboratory services" but also the Department of Health and Senior Services' goal to "Maximize Our Impact on the Health and Safety of Missourians".



The Strategic Planning Action Team, (F) Russ Drury, Laura Naught and Amy Pierce. (B) Shondra Johnson, Pat Olson and Patrick Hopkins. Not pictured; Fran Thompson

The History of TB Drug Treatments

Mycobacterium tuberculosis, the organism responsible for TB, is primarily transmitted through airborne aerosols and affects the lungs, but it can be isolated from other regions of the body. The lineage of TB can be traced as far back to the mummified bodies of ancient Egyptians. There have been a wide range of TB treatments from drilling a hole in the patient's skull to release the bad spirits, to removing the lung. But, it is only within the last century mankind has made some tremendous therapeutic discoveries that greatly impacted the management of TB disease.

1900's

1907—Missouri State Sanatorium (Now known as the Missouri rehabilitation Center which houses the VA Clinic) opened in Mt. Vernon.



1920's

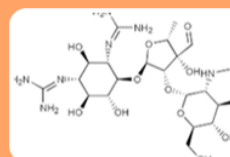
1921—BCG vaccine for *Mycobacterium tuberculosis* (MTB) was developed by Albert Calmette & Camille Guerin. The BCG vaccine was not approved to be used in the United State by the FDA.



1940's

1944 – Streptomycin (STR) approved to treat MTB patients – 1st compound that effectively killed MTB bacteria.

1946 – p-aminosalicylic acid (PAS) approved to treat TB patient due to developments of STR-resistant strains of MTB. PAS drug trials (1948-1950) showed it significantly reduced the risk of STR-resistant strains.



1950's

1952 – Isoniazid (INH) approved to treat MTB patients

1955 – Cycloserine approved to treat MTB patients. The compound was effective, but severe toxicity has limited its use. Triple Therapy developed. Daily intake of a three drug cocktail STR, INH & PAS over a two year period.

1959 – Rifampicin (RIF) approved to treat MTB patients. Daily intake of a two drug cocktail RIF & INH over a 9-month period proved as effective as the triple therapy regimen over two years.



1960's

1961 – Ethambutol (ETH) approved to treat MTB patients.

1962 – Pyrazinamide (PZA) approved to treat MTB patients. PZA had been previously tested in the 1950's but was abandoned because of its toxic side effects. A lower does and over a shorter time period was safe than originally tested.



1990's

1992 – Rifabutin (RFB) approved to treat MTB patients. This is a modified version of RIF.

1994 – Rifater approved to treat MTB patients. It combines three drugs (RIF, INH & PZA) into one pill for increased compliance.



2002 and Beyond

2012 – Bedaquiline (TMC207) approved to treat multidrug resistant TB (MDR-TB) patients

Coming Soon

Delamanid (OPC-67683)

PaMZ (Pretomanid, Moxifloxacin, PZA)

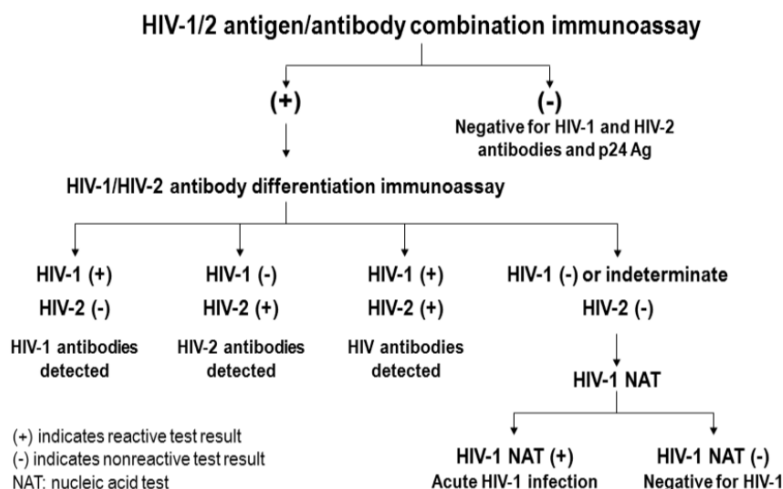


New HIV Testing Algorithm

By: Dana Strobe, Immunology Unit Chief

In June 2014, the CDC updated its recommendations for laboratory testing for diagnosis of HIV infection. Below is the recommended HIV Testing algorithm for serum and plasma specimens.

Due to these recommendations, the MSPHL added the Multispot, an HIV-1/HIV-2 antibody differentiation immunoassay to its platform. This test replaced the HIV-1 Western Blot. Blood specimens that come into the MSPHL for HIV testing undergo a screening test (the CMIA) that is performed on the Abbott Architect i1000. This test can detect HIV-1 antigen, HIV-1 antibodies, or HIV-2 antibodies but cannot differentiate. If the sample is initially reactive it is repeated in duplicate and if two out of three are reactive, a Multispot test is performed. The Multispot test can differentiate between HIV-1 and HIV-2 antibodies. If the Multispot test is Non-reactive or HIV-1 Indeterminate, an aliquot of the sample is sent to Wadsworth New York State Department of Health for an HIV-1 NAT test. This can only be done if enough serum is available and the time frame is within acceptable limits. If a sample is sent to Wadsworth, a separate report is sent with those results.



There is no change in the submission process for sending samples for HIV or syphilis testing. One tube of blood can still be used to perform both tests. The full recommendation from the CDC can be accessed at <http://www.cdc.gov/hiv/pdf/HIVtestingAlgorithmRecommendation-Final.pdf>.

Special Projects Highlighted by the Chemistry Unit

By: Alan Schaffer, Chemistry Unit Chief

West Fork Lead Mine

In June of 2014 flooding at Doe Run's West Fork mine near Bunker, Missouri caused concern for residents in Reynolds County. Workers were in the process of closing the lead, zinc and copper mine when a crack in the roof developed, causing water from Black River to enter the mine. Residents worried water from the mine could contaminate their wells.

The Chemistry Unit at the MSPHL was contacted by the Missouri Department of Health and Senior Services', Section for Environmental Public Health to provide support for their response to the flooding. Results from samples in Reynolds County tested during the previous three years were provided to determine a baseline for the area. The Reynolds County Health Department submitted samples from twenty private wells near the mine in June of 2014. The Chemistry Unit reported results on thirty analytes for each well. These results indicated that the aquifer had not been contaminated by the flooding. The twenty wells were retested in July of 2014 and results again indicated that contamination had not occurred.



Picture of a water well. <http://imgkid.com/old-water-well.shtml>

...Special Project continued from page 12

Small Mammal Study

The Missouri Department of Natural Resources (DNR), Natural Resource Damage and Assessment Unit (NRDA) is conducting an investigation of possible injury to small mammals from lead contaminated soils in the Southeast Missouri Lead Mining District (SEMOLMD). Levels of lead exceeding 1,000 mg/kg have been measured in surface soil at various facilities and locations within the SEMOLMD. These levels far exceed most ecological screening benchmarks for lead in soils which are in the range of 120-400 mg/kg. There is concern that lead released from the tailing impoundments, haul roads, and through wind transfer have resulted in injuries to terrestrial natural resources (small mammals) in the SEMOLMD area. DNR has chosen to look specifically at mice (*Peromyscus* species) and shrews (*Sorex*, *Blarina* and *Cryptotis* species) due to the nature of their habitat and eating habits.



Picture of a shrew www.planet-mammiferes.org

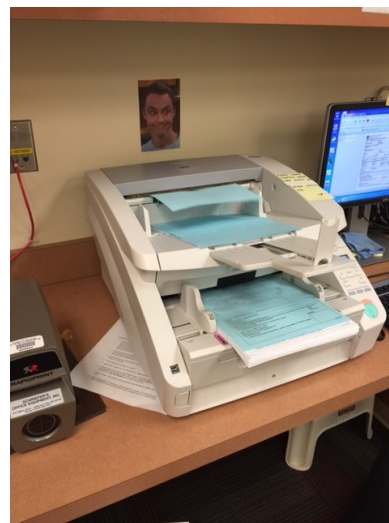
DNR contracted with the MSPHL Chemistry Unit to run the analyses to assist in determining injury to small mammals from lead contaminated soils. To do this the MSPHL analyzed mammal blood for lead and mammal tissues (kidney, liver and femur) for lead and cadmium. The tissues were digested by the University of Missouri Veterinary School prior to analysis. The MSPHL analyzed 75 blood samples and 208 mammal tissue samples. The results are currently being evaluated by DNR.

Scanning into the Future

By: Mary Menges, Assistant Laboratory Director

In the winter of 2014 a new electronic document scanning system was introduced to the Laboratory. The Kofax scanning system enables the Post Analytical Reporting Team (PART) staff to scan all OpenELIS and Newborn submitter forms and files them on a server. Testing unit staff and PART staff can then easily retrieve the electronic copy of a form without ever leaving their desks. Gone are the days of going back into the file room, pulling out stacks of forms, thumbing through them to pull the correct copy, making a photocopy and then going back into the stacks to re-file the paperwork.

This is how the process works. Before submitter forms are entered into OpenELIS, submitter forms are placed in bundles of twenty-five and fed into an IBM scanner, affectionately known as Dr. Sheldon Cooper. Newborn Screening submitter forms are not scanned until after entry into Neometrics Laboratory Information Management System and are placed in bundles of fifty. Utilizing the Kofax scanning technology, each bundle is then manually validated to assure a clear and “good” scan of the document. Once the validation has occurred, the forms are saved on a server using the Content Manager Enterprise Program. The Content Manager is the tool used by all the Laboratory staff who have requested a license to retrieve the submitter form electronically. Hard copies are kept for 30 days after they are scanned.



“Dr. Sheldon Cooper” hard at work scanning test request forms.

The advantages of this new scanning system are many. No more filing of forms, which frees up space and staff hours. Submitter forms are easily retrievable. Anyone who has the Content Manager license can pull up the scanned forms. Additionally, no archiving is necessary saving space and money. Now what to do with all that space?

Employee Spotlight: James Christian, Environmental Bacteriology

By: Pat Shannon, EB Unit Chief

James grew up in Bloomfield, Missouri; a small town in the southeast section of the State. He attended Central Methodist University in Fayette where he received a BA in Biology. After college James worked for Engineering Surveys and Services in Columbia as a chemist performing wet lab materials and metals analyses.

James started his career with the MSPHL in April of 2002 as a Public Health Laboratory Scientist at the Southeast Branch Laboratory in Poplar Bluff. There he was responsible for drinking water testing, media production, quality control and sample kit production and shipping. James transferred to the Jefferson City MSPHL on November 1, 2014, following the closure of the Southeast Branch Laboratory. With the Environmental Bacteriology Unit, he is responsible for drinking water, recreational water testing, quality control and is in training for various food testing methods.

In his spare time James enjoys fishing, traveling, watching movies and spending time with friends and family back in Southeast Missouri. And if you have ever watched the Discovery Channel show “Storage Wars”, James has some experience with storage unit auctions, as well as State/Federal surplus auctions. Need a flashlight? He has a “few” for sale.



James Christian, Environmental Bacteriology



MSPHL Employees showing their support of women's heart issues during Go Red Day for the American Heart Association on February 6th, 2015.



A Fond Farewell

Carlene Campbell Retiring after Twenty Eight Years of Service

By: Patrick Hopkins, Newborn Screening Unit Chief



Carlene Campbell (L) with her Husband Mike (R) and son Ben when he was stationed in Germany.

On April 1, 2015, Carlene Campbell of the Newborn Screening Unit retired after serving the MSPHL for over 28 years. Carlene started in the Environmental Bacteriology Unit in 1986. She transferred to the Newborn Screening Unit in March of 1992 becoming proficient in many testing areas of the unit and has worked in this unit ever since. For the last six years, Carlene has served as a Manager for half of the NBS laboratory overseeing the hemoglobinopathy, tandem mass spectrometry and lysosomal storage disorder testing sections. She has worked in all three of these screening areas since their beginnings and has certainly become a national expert with screening for these disorders.

Carlene grew up on a dairy farm in northeast Missouri and obtained a B.S. in Biology in 1986 from Northeast Missouri State University (now known as Truman University).

She and her husband, Michael, have been married for 26 years and live in the Brazito area. Michael is a retired Lt. Colonel with the Missouri Army National Guard and is also

a retired computer programmer with the Missouri Senate. Carlene has two adult sons, Danny and Ben. Danny is a Captain in the Missouri Army National Guard. Danny and his wife live in the mid-MO area and have blessed Carlene with four beautiful grandchildren. Her youngest son, Ben, joined the Army full time and is currently stationed at Fort Polk, LA.

Carlene enjoys spending time with family, reading, bird watching, gardening and farm activities like feeding cows, putting up hay and raising chickens. With so many hobbies, Carlene will certainly stay busy and greatly enjoy her retirement for years to come... which is apparent by the unmistakable smile that has been on her face for the last several months.

Carlene will be greatly missed, but we sincerely thank her for her many years of dedicated service to the MSPHL and the Newborn Screening Unit. We wish her all the happiness in her retirement which she has greatly earned.



Carlene began her career at the MSPHL in 1986.

All the best, Carlene! Enjoy!



Staff happenings in the Laboratory

Environmental Bacteriology received a letter of thanks from the FDA regional office Director thanking them for the work over Christmas on an outbreak.

Lab Blab

New Employees

Monica Beddo—Molecular, **Jocelyn Bernard**—PART, **Keith Bock**—Newborn Screening, **Josetta Forck**—PART, **Judy Morrison**—PART, **Ashley Steeby**—Microbiology, **Melissa Williams**—Molecular

Promotions

Erica Gaw—PART, SOSA, **Tracy Klug**—Newborn Screening, Laboratory Manager BI, **Brian Lutmer**—Breath Alcohol, Laboratory Manager BI, **Jessica Meller**—Molecular, Senior Public Health Laboratory Scientist, **Clayton Toebben**—PART, Senior Office Support Assistant, **Lacey Vermette**—Newborn Screening, Senior Public Health Scientist

Conferences & Trainings

Stephen Gladbach, Microbiology, attended the Joint North Central/Midwest Regional PulseNet and OutbreakNet meeting in Chicago, IL.

Nicole Ayres, Immunology, attended the Baldrige 101 Training and Examiner Preparation course in preparation for her second year as an MQA examiner.

Melissa Williams, Molecular, attended the PulseNet Regional Meeting in Chicago.

Jessica Meller, Molecular, attended a course about Whole Genome Sequencing in Cold Springs Harbor, NY.

Connor Mahon, PART, attended Basic Supervision, Structured Interviews: Hire right the first time, and Coaching and Difficult Conversations

Pat Shannon, Environmental Bacteriology, attended the Missouri Food Safety Task Force Quarterly meeting in Jefferson City, MO as well as the FDA Governmental Food and Feed Laboratories Accreditation Meeting in San Diego, CA with **Jeremy Wilson**, Environmental Bacteriology.

Lindsay Boyd, Environmental Bacteriology, attended a FERN Food PCR Methods Course in Phoenix, AZ.

Patrick Hopkins, Newborn Screening, attended a tandem mass spectrometry conference in Atlanta in February

Several MSPHL staff including, **Brian Inman**, **Steve Gladbach**, **Pat Shannon**, **Ralph Horne**, **Sandy Jones** and **Roy Tu'ua** presented at the LPHA training in Springfield.

Other News

Sabrina Ivy, Microbiology, and her husband Cale had their first child, a baby boy, Avery, December 17,

MSPHL Staff showing their inner Irish on St. Patrick's Day.



Introducing Lab Employee of the Quarters

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

Jesse Meller, Molecular Unit, Quarter I

Jessica Meller was selected for her relentless service within the Molecular Unit to ensure quality results with regards to Bioterrorism testing.

As the Murphy's Law adage would say, "Anything that can go wrong will go wrong". Jessica was challenged during an event where samples from the FBI were expected in the Laboratory for Ricin toxin testing. However, vital equipment used to perform the LRN protocol to test samples for Ricin toxin was discovered to be inoperable. Jessica worked diligently to get this equipment up and running with no success.

With quick and innovative thinking and consulting with fellow colleagues Jessica reprogrammed a previously used instrument to align with the LRN protocol parameters and was able to perform Ricin toxin testing. Jessica's persistence and dedication allowed the MSPHL to continue to accept and provide rapid laboratory testing of evidence for the FBI.

Jessica ended up receiving and testing 10 additional samples for the FBI in the same month. Like all Laboratory employees, Jessica performed the tasks asked of her with no complaint or objection. She has always been willing to help anyone in

any way possible.

Jessica has been described as a dedicated and hard working employee who jumps in and assists with anything that is needed. She has grown personally and professionally over the last few years and has proven to be an asset to the Laboratory. Jessica can be depended on, but is not afraid to ask for help when needed. With typical modesty Jessica would say that she could not have done this alone and would insist on sharing the credit with her fellow colleagues within the Molecular and Microbiology Units.

Adam Perkins and Sarah Sharr, Microbiology, Quarter II

Adam Perkins and Sarah Sharr were selected for their assistance with the Iowa State Hygienic Laboratory (ISHL) in testing 315 clinical specimens for ova and parasite (O&P) during a multi-state outbreak of a sporulating coccidian protozoan called *Cyclospora*.

The outbreak began in Eastern Nebraska and Western Iowa with Iowa impacted the hardest with the highest number of cases. The main concern of the outbreak was testing for *Cyclospora*. The SHL focused primarily on this particular testing which lead to a severe back-log of clinical samples for O&P testing. With an increase of clinical samples the SHL requested assistance from

their friendly southern state neighbor.

The request involved a dramatic change within the Unit since the specimens tested during the outbreak were approximately 25% of the annual volume tested. The influx of testing spanned over two months which both individuals performed 40% of their annual volume within this short timeframe. The request also involved approval of MSPHL testing protocols, the Laboratory Executive Management Team, and CLIA. This also involved coordinating receipt and return of all clinical samples to Iowa through the central services mailroom.

The collaborative effort put forth by both individuals speaks

extraordinarily about their added service to their Unit, MSPHL and to our neighboring states that know they can be depended on in times of need. Their quality of work is second to none and is confirmed yearly through proficiency testing. Their integrity during this event never wavered and their ability to work efficiently together made the increased workload seem effortless. The accountability was never in question and the growth and knowledge gained through this experience will serve them well as future leaders in the laboratory.



Jesse Meller, QI Employee of the Quarter. Congratulations!



Adam Perkins and Sarah Sharr,, QII Employees of the Quarter. Congratulations!

2015 MSPHL Training Calendar

The MSPHL provides a number of training opportunities for our stakeholders. If you are interested in a Packaging and Shipping course, Biosafety and Biosecurity course or numerous other offerings please click on the **2015 Training Calendar** for courses and dates. The laboratory looks forward to assisting you with your training needs.



Around Jefferson City, MO

St. Marys Hospital

St. Mary's hospital began its long tenure in Jefferson City when the first cornerstone was laid in 1904. The \$60,000 St. Marys Hospital was completed and dedicated in October, 1905 by Archbishop John J. Glennon of St. Louis.

This was the first hospital in Jefferson City and had 38 patient rooms, a pharmacy, operating rooms and x-ray. While St. Marys may have grown and had several additions throughout the years, its original façade sits proudly on a bluff welcoming everyone who arrives into Jefferson City by way of the Missouri River Bridge.

After more than a century of providing exceptional health care St. Marys Hospital has gone through another transformation. This includes a name change in October 2014 and a relocation to a new state-of-the-art facility in November 2014. Today, SSM Health St. Marys Hospital - Jefferson City is a faith-based, world-class, full-service hospital with 167 beds, extensive cardiology and open-heart surgery, a maternal and child care center, an oncology center, and a network of primary care clinics.

See more at: <http://www.ssmhealthmidmo.com/about/who-is-ssm-health/History-of-St-Marys-Hospital-Jefferson-City#sthash.TrVa8zMs.dpuf>



The original St. Marys Hospital that is still standing today.



The new state-of-the-art SSM Health St. Marys Hospital—Jefferson City opened in November of 2014.

Editorial Board for *Beyond The Scope*

Russ Drury, Shondra Johnson, Sandy Jones, Mike Massman, Mary Menges,
Laura Naught, Amy Pierce, Bill Whitmar

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