Extracts from the Lab

A New Hampshire Public Health Laboratories Publication

Winter 2013 Volume 7, Issue 1

Not Your Normal State Government Freeze!

Dr. Christine Bean, NH PHL Director

On January 16, 2012, laboratory staff notified the New Hampshire Public Health Laboratory (NH PHL) Director that the facility was below freezing temperature and there appeared to be an emergency situation in the building at 29 Hazen Drive, Concord, NH. The NH PHL Director, Dr. Christine Bean, contacted the NH Division of Public Health Services (DPHS) Director, Dr. José Montero, to inform him of the situation. Both Dr. Montero and Dr. Bean responded to the call and reported to the laboratory. They were assisted by members of the Concord Fire Department, DPHS, NH DHHS Emergency Services Unit (ESU), and several other DPHS employees who were working in the building on the Martin Luther King holiday. Additional laboratory staff members were called in to gain entry to the Rabies Laboratory and to the biosafety level-3 (BSL-3) laboratories to assess facility damage. Some of the damage included saturated wallboard, burst pipes and sprinkler heads, and flooding throughout the labs. Based upon the assessment, the Continuity of Operations Plan (COOP) was executed immediately and was in effect for the next 10-15 days.

Water damage in the Specimen Receiving Unit

Because the damage in the laboratory wing of 29 Hazen Drive required that the sprinkler and fire alarm systems be disengaged for the entire building, the Fire Marshall requested that all employees who work in the building not report to work until such time that these systems were brought back on-line. The building evacuation order was put into place as a precautionary safety measure. Employees were informed not to report to work using communication systems including media, call trees, and e-mail messaging. A minimal number of laboratory staff were required to be present to monitor construction workers in the BSL-3 laboratories. These employees were instructed to report to the main lobby of the building to sign in and out and were supplied a hand-held radio for communication. Other staff were allowed controlled, short-term access to gather the materials necessary to conduct business off-site.

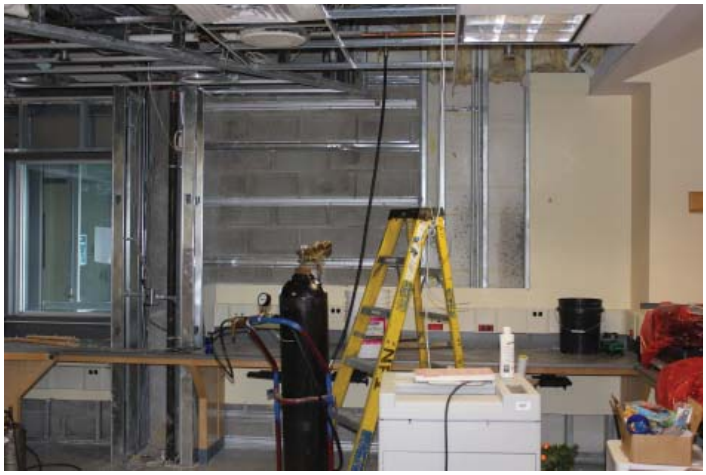
TABLE OF CONTENTS

All laboratory operations were out of service due to the severe damage to the laboratory wing. The COOP included outsourcing laboratory testing to the State Laboratory Institute in Massachusetts (Massachusetts) for most of the testing. The Maine Health and Environmental Testing Laboratory (Maine) assisted with norovirus and *Bordetella pertussis* polymerase chain reaction testing. The NH PHL continued to receive specimens via courier and mail and then used the Laboratory Information Management System (LIMS) to enter specimens into the database and track to which laboratory they were referred. Specimens were delivered to Massachusetts using emergency couriers and shipped overnight to Maine using FedEx.

On Monday, January 23, 2012, one week after the event, all laboratory staff were allowed back in the facility. There was concern and uncertainty about what effect the prolonged exposure to freezing temperatures would have on instruments, therefore instrument function was assessed. Manufacturers were contacted and service maintenance agreements were evaluated to determine whether coverage was included for such an event. Several instruments required emergency repairs, and one refrigerator was damaged beyond repair. Fortunately, electricity was not lost during this event and so no specimens were compromised.

Polymerase chain reaction instruments were protected from water damage using plastic biohazard bags.

This very real event tested the COOP's of different State departments within the building. It was a good test of State communication plans, protocols, the NH PHL emergency response team, building alarm system functioning, and disaster recovery measures. Lessons learned included the challenges of joint-agency



The water damage to the Specimen Receiving Unit was so extensive that large portions of the drywall had to be replaced.

The temperature inside the NH PHL was so low that water began freezing on the ground and hallways became ice skating rinks.

Members of the DHHS ESU, the NH PHL, and the DPHS gathered to formulate a plan of action.

continuity of operations planning, communicating during an emergency event, and inventory and execution of laboratory safety and security measures. An after-

action report/improvement plan has been written and lists corrective action steps to be completed. An outcome of the improvement plan has been the establishment of a NH PHL Health Alert Network (HAN) group, which will allow for timely communication with employees in an emergency. The NH PHL HAN was successfully drilled in April 2012.

This unique event spotlighted the importance of having a COOP and a strong partnership with neighboring public health labs. Teamwork, planning, and patience mitigated the potentially disastrous effects of this situation.

A Broad Abroad

NH PHL Supports Scientist with a Global Health Mission

Rebecca Adams, Microbiologist, Clinical Microbiology Unit

Melissa Levesque is a laboratory scientist at the NH PHL in the Virology and Molecular Diagnostics Program. She graduated from the University of New Hampshire (UNH) with a Bachelor of Science degree in microbiology in 2011 and is currently working on her Master of Public Health (MPH) degree from UNH Manchester. Not only is Melissa concerned about the health of New Hampshire residents, but she is also particularly concerned about public health in developing countries. This past January, Melissa participated in a medical brigade to Honduras with thirty-four other volunteers including UNH faculty and students, physicians, and translators. Global Brigades, a worldwide, student-organized, non-profit organization, helped coordinate this first medical aid trip to Monjiman, Honduras. For several months, Melissa and her fellow brigade members spent their time fundraising and gathering both medical supplies and basic necessities (i.e., baby formula, multivitamins, shampoo, toothpaste, etc.) for a small community in Honduras that lacked medical care.

The medical brigade left on January 7, 2012 and returned on January 13, 2012. The group spent a total of 24 hours traveling from New Hampshire to the small city of Tela, Honduras, where they would stay. The first day after their arrival, the group prepped for the brigade that would happen over the next four days. They counted, organized, and labeled medication in Spanish and assembled hygiene packs with pamphlets.

The first Global Brigade group to travel to Monjiman, Honduras.

The group also set up the database in which patient information would be entered. The remainder of the first day was spent sightseeing. They ventured into the city of Tela, where the group saw local stands selling everything from English DVDs and fruit to homemade jewelry and decorations. They even spent time at some of the nicest beaches in Central America, where they became aquainted with the Hondurian Brigades staff.

The Brigaders counting and dispensing multi-vitamins.

Over the next four days Melissa and the group were up by 6 a.m., ate a quick breakfast, and were out the door by 7 a.m. They boarded a bus for a two-hour ride to the brigade location in Monjiman, where their patients warmly greeted them each day.

The group then helped set up several stations through which that the patients would navigate. The first station was Intake. Hondurian community volunteers wrote basic patient demographic information on a form and then directed patients on to the next station.

Brigaders setting up the database.

A dentist was available if patients required extraction, where they received two shots of novocaine prior to tooth removal.

In Triage, the second station, students and translators recorded patient medical history and symptoms. The blood pressure of the adults and the weight and temperature of children under the age of twelve were also recorded. Patients were then directed to the physicians or nurse practitioners. There patients were given drug prescriptions or treated immediately. Patients were seen for many ailments, such as asthma, fungal infections, heart disease, and parasitic infection. Many were also seen for chronic pain due to their lifestyle (i.e., cutting grass with a machete or washing laundry using a washboard or rock).

All adults were required to attend a class with an adult charla, a Hondurian volunteer who taught them about basic hygiene such as hand washing and proper lavoratory practices. The charla distributed the hygiene packs that contained items such as toothpaste, shampoo, soap, and feminine hygiene products. The children met with a separate charla, where they also learned about hygiene and received a toothbrush and toothpaste. The children then learned about brushing and flossing their teeth from the brigade students.

The last station the patients visited was the Pharmacy where all prescribed medications were dispensed.

Over the four-day period, the brigade members saw more than 1,300 patients and pulled 280 teeth. Most patients and their families traveled up to four hours and spent the majority of the day waiting in lines. The following is a short interview with Melissa about her trip.

Inteviewer: If you could do a medical brigade again, would you?
Melissa: Absolutely! I would love to do another brigade. It was a life-changing experience.
Interviewer: What was the best experience that you had in Honduras?
Melissa: The gratitude of the community members. They always had a smile on their face no matter the heat, humidity, or wait time. Everything was always followed with a 'Thank You.'
Interviewer: What was the most exciting thing you did in Honduras?
Melissa: The most exciting thing was crossing the country in a bus. There was so much to see!
Interviewer: What is the one thing you would like people to know about your experience?
Melissa: I would want people to know how eye opening it is to travel to a country that is so different from your own. It really allows you to see the world differently.

Children learning about personal hygiene with the charla.

Melissa (far right) with fellow UNH Brigaders.

Would You Like a Little Arsenic with That?

Laboratory Offers Arsenic Speciation Testing

Rachel Boisvert, Laboratory Scientist, Water Analysis Unit

Arsenic (As) is an element that is frequently in the news because of its link to cancer and other negative health impacts. It is a common, naturally occurring contaminant in New Hampshire's bedrock wells mostly due to their geologic origin and partly due to land use in some areas. Studies have shown that health risks increase with repeated exposure to high levels of arsenic.[1-3] Because it is a colorless, odorless, and tasteless contaminant, arsenic in drinking water is usually detected by water quality testing.

Arsenic causes many negative health problems including hyperkeratosis (shown here), skin, bladder, and lung cancer, and cardiovascular and neurological problems.

The Environmental Protection Agency has set the maximum contaminant level of arsenic in water for public water systems at 10 ug/L (ppb) or 0.01 mg/L. If arsenic levels in drinking water are greater than 10 ug/L, it is strongly recommended that the water used for drinking and cooking be treated to reduce exposure to this contaminant.

The NH PHL Water Analysis Lab tests water samples for total arsenic concentration and also offers testing for As-III and As-V species, since this information is very important in the selection of water treatment technology. As-V is generally much easier to remove from water than As-III. If As-III is present, a pre-oxidation step should be added to convert As-III to As-V to improve treatment effectiveness.

The NH PHL provides an arsenic speciation kit that includes two bottles, a syringe, and an alumina packed filter. The first bottle from the kit is filled with raw water directly from the tap. The second bottle is filled with tap water that has been filtered through the alumina packed filter. The As-V is retained on the filter while the As-III passes through without being retained. Both water samples are analyzed on an inductively coupled plasma/mass spectrometer instrument.

The As-V result is obtained by subtracting the filtered water result (equivalent to arsenic-III) from the total arsenic result. This information can then be used to select the appropriate treatment system for reducing the total arsenic levels to below the standard in the most cost-effective way.

Public water systems that serve 25 or more people and that are found to have unsafe levels of arsenic are required to sample every three months. There is no State requirement for homeowners with private wells to have their water tested, but the New Hampshire Department of Environmental Services, Drinking Water Groundwater Bureau (DWGB) recommends water quality testing for this population. If arsenic is found to be above safe levels, well water can be treated using commercially available water treatment systems. The DWGB is available to advise homeowners about water treatment devices, but does not regulate their use or installation.

NH PHL water collection kit for arsenic speciation.

References

1. Crebelli, R. & Leopardi, P. (2012). Long-term risks of metal contaminants in drinking water: A critical appraisal of guideline values for arsenic and vanadium. Ann 1st Super Sanita, 48(4), 354-361.

2. Kunrath, J., Gurzau, E., Gurzau, A., et al. (2012). Blood pressure hyperreactivity: An early cardiovascular risk in normotensive men exposed to low-to-moderate inorganic arsenic in drinking water. J Hypertens, 2012 Nov. 29.

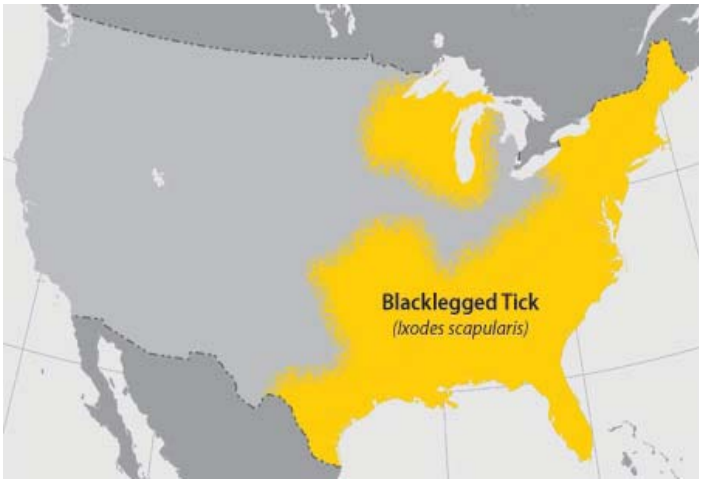
3. Buchhamer, E. E., Blanes, P.S., Osicka, R.M., & Gimenez, M.C. (2012). Environmental risk assessment of arsenic and fluoride in the Chaco Province, Argentina: Research advances. J Toxicol Environ Health A, 75(22-23), 1437-1450.

Additional information about arsenic testing, treatment options, and water treatment companies can be obtained at http://des.nh.gov/organization/divisions/water/dwgb/capacity/arsenic.htm. Please contact the NH PHL Water Analysis Unit at (603) 271-3445 with any questions you may have about As testing or other water quality testing in New Hampshire. For questions regarding water treatment, please contact the DWGB at dwgbinfo@des.nh.gov or call (603) 271-2513.

Tick Talk

Denise Bolton, Supervisor, Emergency Response and Arbovirus Unit

The **deer tick,** *Ixodes scapularis*, which normally feeds on the white-footed mouse, white-tailed deer, other mammals, and birds, is responsible for transmitting the Lyme disease bacteria (*Borellia burgdorferi*) to humans in the northeastern and north-central United States.



The geographic spread of the Lyme disease-causing blacklegged deer tick in the United States.

Ixodes ticks are much smaller than common dog and cattle ticks. In their larval and nymphal stages, they are no bigger than a pinhead (see picture below). Adult ticks are slightly larger.

Most humans are infected through the bite of

*The deer tick (*Ixodes scapularis*) adult female, adult male, nymph, and larva (from left to right) on a centimeter scale.*[1]

immature ticks called nymphs which are tiny (less than 2 mm) and difficult to see. Nymphs feed during the spring and summer months, while adults feed most often during cooler months.[2] Adult ticks can also transmit Lyme disease bacteria, but they are much larger and are more likely to be discovered and removed before they have had time to transmit the bacteria.

Ticks can attach to any part of the human body, but are often found in hard-to-see areas such as the groin, armpits, and scalp. In most cases, the tick must be attached for 36 hours or more before the Lyme disease bacterium can be transmitted. Ticks feed on blood by inserting their mouth-parts (not their whole bodies) into the skin of a host animal. They are slow feeders; a complete blood meal can take several days. As they feed, their bodies slowly enlarge (see below).

Adult Ixodes scapularis *ticks, before and after feeding.*

Typical symptoms of Lyme disease include fever, headache, fatigue, and a characteristic skin rash called erythema migrans (a bull's-eye rash), which is seen in about 70-80% of cases.[3] If left untreated, infection

can spread to joints, the heart, and the nervous system. Lyme disease is diagnosed based on symptoms, physical findings (e.g., rash), the possibility of exposure to infected ticks, and laboratory testing. Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics.

Confirmed human Lyme cases in New Hampshire have increased dramatically. From 1998–2007 the number of cases has increased over 1,000% and during the past five years, cases have increased over 300%. The incidence of Lyme disease in New Hampshire during this period was one of the highest in the nation. During 2010, 826 confirmed (and 509 probable) cases per 100,000 population were reported.

The risk of human infection depends on the abundance of ticks and their rate of infection. The NH PHL has been involved with two tick surveillance projects in recent years—one within the NH Department of Health and Human Services and the other with the University of New Hampshire. Both projects sought to determine the prevalence of *B. burgdorferi* infection in the *I. scapularis* tick population in New Hampshire.

The NH PHL has tested the ticks by polymerase chain reaction (PCR) for *B. burgdorferi* DNA. Both projects have found that between 50–60% of the ticks tested were carrying the Lyme disease bacterium, so the risk of contracting Lyme disease from a tick bite in New Hampshire is significant.

The NH PHL hopes to expand on these projects to test the remaining DNA samples for the presence of other tick-borne diseases such as babesiosis and anaplasmosis, which are also transmitted by the deer tick.

The NH PHL no longer offers serological Lyme disease testing as many contract labs and hospitals in the state offer the test. Neither does the lab accept tick specimens for testing from the public, however the lab is happy to answer any questions you may have about Lyme disease or testing. Please call Denise Bolton, Emergency Preparedness and Arbovirus Unit Supervisor at (603) 271-3684 or email her at dbolton@dhhs.state.nh.us with any questions.

References

1. Washingtown Township Health Department. Lyme disease. (17 May 2012). Retrieved from http://www.washtwpmorris.org/health/disease.php.

2. Centers for Disease Control and Prevention. Lyme disease transmission. (17 May 2012). Retrieved from http://www.cdc.gov/lyme/transmission/index.html.

3. Centers for Disease Control and Prevention. Signs and symptoms of Lyme disease. (17 May 2012). Retrieved from http://www.cdc.gov/lyme/signs_symptoms/index.html.

Jumble

Unscramble the words below (you can find these words throughout our newsletter). Use the red/underlined letters to create a new word (also found in our newsletter). A clue can be found in the picture and caption.

E R Z E F E

E C S A I R N

U N S O R D H A

R O B O N F E D O

M S H Y P N

What does the NH PHL look to as an aid in test reporting – and predicting outbreaks?

Answer on page 11.

NH PHL + LRN + CST ALS = Hot Wheels

Bryan Gray, Science Officer, U.S. Army, 12th Civil Support Team

During a potential terrorism event or other public health emergency, the National Guard Bureau of Weapons of Mass Destruction Civil Support Teams (CSTs) may be called upon to provide onsite analytical testing of potentially hazardous environmental and clinical samples. The CSTs are equipped with mobile laboratories, each of which is referred to as Analytical Laboratory System (ALS). This is a standardized mobile laboratory system accessible in every state and territory of the United States. New Hampshire's CST is located just around the corner from the NH PHL in Concord. The ALS is designed to apply standardized analyses for screening potentially hazardous samples and preparing them for safe transport. The appropriate law enforcement entity will then transfer the samples to the Laboratory Response Network (LRN) reference lab where confirmatory testing and definitive analysis will occur. In New Hampshire, the NH PHL is the partnering LRN lab for the NH CST. When onsite, the CST mobile laboratory links the nation's LRN directly to the incident site, establishing a conduit from the incident site to local, State, and federal tiers of the laboratory response through the local incident commander.

The 12th Civil Support Team's mobile lab, the Analytical Laboratory System.

Being the Science Officer for the NH CST has given me the opportunity to work with the NH PHL and the LRN on numerous occasions. One of those times was in December of 2009 with the anthrax incident in Durham, New Hampshire. The CST received the call at 8:45 am Christmas morning and spent the next five days working with the first responder community, the NH PHL, and the Centers for Disease Control and Prevention. This was the first real world incident the CST and NH PHL worked on together and much was learned. Since that time our relationship has grown; the CST now attends LRN meetings at the NH PHL and sometimes helps out in the chemical terrorism lab.

NH PHL Took the Leap to Close the Loop

The LIMS, A Year Later

Trevor Lester, Laboratory Scientist and LIMS Database Administrator, Emergency Response and Arbovirus Unit

It has been nearly a year since the NH PHL went live with their new HORIZON Laboratory Information Management System (LIMS) and the lab is pleased to report that the transition occurred with minimal disruption of services to their clients. Since going live, the lab has focused on customizing and enhancing the system to further meet the varied needs of the NH PHL staff.

As laboratory users have become more familiar with the capabilities of LIMS, each workflow step, from receiving specimens, testing, and reporting results, to data analysis for quality assurance, has been streamlined. The algorithms within the system, automatically add required confirmatory tests as well as repeat testing and comments when necessary. Instrument interfaces, which import results directly into the LIMS, increase efficiency and reduce transcription errors. Once all work is completed, reports are automatically generated and printed for mail delivery and/or faxed directly to customers.

The new system also streamlines internal data management. For example, custom reports have been developed that generate data on the tests performed, quality control values, and sample turn-around times. These reports allow staff to monitor every aspect of specimen handling to ensure the lab provides the most accurate and timely results possible.

As the capabilities of the new LIMS are being fully utilized, the lab has extended some benefits of the new system to their partners. For example, the NH PHL

has worked with the Infertility Prevention Program (IPP) to format a report that exports test results along with relevant epidemiological data. This report can be directly imported to the IPP's system for improved monitoring of chlamydia and gonorrhea prevalence in New Hampshire. The LIMS team is also working with the Centers for Disease Control and Prevention to implement automated electronic reporting of results for both influenza and potential terrorism agents. These efforts are part of both the nationwide influenza surveillance that is critical for vaccine formulation and early detection of outbreaks of new flu variants and the Laboratory Response Network designed to facilitate early detection of a bioterrorism attack and coordination of a robust, nationwide response.

The LIMS team has also begun working with their customers to fully realize the potential of the system. The last remaining major component to be implemented is the web portal that will enable outside clients to access our system. This will allow for immediate electronic report delivery as well as online submission of specimen testing requests and orders of reagent kits. Our partners at the New Hampshire Bureau of Disease Control are already making use of the web portal, gaining access to up to the minute

results of tests performed and real-time monitoring of disease outbreaks throughout New Hampshire. The LIMS team hopes to expand access to the web portal to other partners in the coming months.

It has been a time-consuming, but fruitful period of transition for the NH PHL. The new LIMS has facilitated great strides in both testing efficiency and quality assurance. The LIMS Team has made a huge effort to take advantage of everything the new LIMS has to offer and they look forward to exploring its many capabilities.

Staff Spotlight—Jayne Finnigan

Margaret Sweeney, Microbiologist, Tuberculosis Unit Supervisor

Jayne is a true New Hampshirite—born and raised in our own Granite State. She earned her Bachelor of Science degree in biology from Rivier College and joined the NH PHL on May 17, 1982. Yes, you read that right. Jayne has worked for the laboratory for thirty years!

When Jayne first began working here, the NH PHL was called the NH Diagnostic Laboratories, and the Sexually Transmitted Disease Unit in which she started was called the Venereal Disease Unit. Over the years she tested specimens for gonorrhea, syphilis, herpes, and human immunodeficiency virus. A supervisory position in the Environmental Microbiology Unit (which is responsible for food and rabies testing) opened up so she applied and was hired. Years later Jayne accepted a new position in the Food Safety Laboratory, the unit's current name, where she became responsible for validating new testing methods and performing Food and Drug Administration (FDA) regulatory testing. She remains in this unit today, where she conducts rabies testing on Saturdays, is very active in foodborne pathogen testing, and is a member of the NH PHL Bioterrorism Team.

Interviewer: Why did you choose to work in public health?

Jayne: Prior to working at the NH PHL, I always volunteered my time in various endeavors serving others. I have always gravitated

toward positions in the NH PHL that are in flux, that may have a little research built in, that are exciting and dynamic at the time, and that have a lot of work built into them to prevent human illness.

Interviewer: What part of the job fascinates you the most?

Jayne: Currently food testing is a very dynamic field: new technologies every couple of months, dealing with viable-not-culturable organisms, different chromagenic agars, and immunomagnetic separation methods as well as improving molecular techniques.

Interviewer: What is the biggest change you have seen at NH PHL in your 30 years?

Jayne: I remember when I first started, we were subbing with wooden applicator sticks. Although we are still subbing with sticks, technology has really stepped up to the plate in finding disease causes, and our lab has been fortunate enough to obtain really good instruments as well as the personnel training and the talent to search for these causes.

Staff Updates

Rebecca Adams, Microbiologist, Clinical Microbiology Unit
Kimberly Beers, Laboratory Scientist, Water Analysis Unit
Amanda Cosser, Microbiologist, Virology and Special Testing Unit
Sandra White, Administrative Secretary

Congratulations to **Dr. Fengxiang Gao**, manager of the Virology and Molecular Diagnostic Program, who earned his Master of Public Health (MPH) degree from the University of New Hampshire last spring! When

asked what he plans on doing with all of his free time, he replied, "Actually, I have a big on-going project which started many years ago. One objective of the project is to identify an effective approach to manage Kevin, my lovely son. He is eleven and half and I feel like I have to make good progress in the next one and half years. This most likely will be more challenging than completing a MPH degree. Wish me good luck." Congratulations on your achievement, Dr. Gao, and good luck with your next project!

The NH PHL is pleased to welcome **Katie Zink** to the Water Analysis Unit as a Microbiologist I. Katie grew up in Franklin, NH, and received her Bachelor of Science degree in biogeography from Plymouth State University in Plymouth, NH.

After graduating, Katie interned for the New Hampshire Department of Environmental Services Volunteer River Assessment Program and for the Volunteer Biomonitoring Assessment Program. Upon completion of her internship, Katie moved to Massachusetts to work for the Massachusetts Department of Environmental Protection Agency where she helped locate and clean up sources of pollution in waterways of the northeast region.

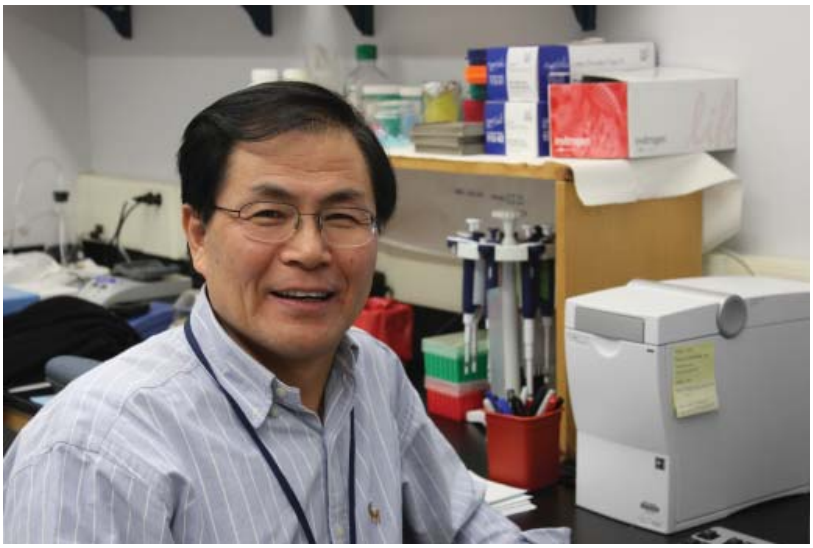
Katie is currently trying to reach her goal of hiking all 48 of the 4,000-foot mountains in New Hampshire. In addition to hiking she enjoys sailing, skiing, swimming, and biking. We're glad to have Katie aboard!

The NH PHL welcomes new employee **Xinglu Zhang** to our molecular diagnostics program. Xinglu started his employment at NHPHL on August 1, 2012, as a Microbiologist I in the Virology Unit. He

comes to us from the University of Pittsburgh in Pennsylvania where he worked as a research associate for cancer research. When he was a postdoctoral associate at Magee-Women's Research Institute, Xinglu's research projects included determining the relationship between human parvovirus B19 infection and pre-eclampsia. Other past research projects included conducting sequencing analysis of hepatitis A and C outbreak investigations.

Xinglu is originally from the People's Republic of China where he studied medicine, public health, and epidemiology. He received his Bachelor's Degree in Medicine and a Master's Degree in Science at the Harbin Medical University in Harbin, China.

Xinglu enjoys reading history and life sciences during his free time at his home in Concord. Some interesting remote places he visited while living in China were Tibet and Yunnan. Xinglu misses celebrating traditional holidays such as the Chinese New Year and the Moon Festival with his family and friends in his native country. We are very happy to have Xinglu join our team!



Coming Up Next Time...

The NH PHL has had an 'interesting' year dealing with several critical public health events which have occupied our attention for many months (hence the delay in this newsletter). One of these is the hepatitis C drug diversion incident, which is implicated in the infection of over 30 people in New Hampshire and involves other states as well. The investigation for this event is ongoing at this time. The next newsletter will update this story and discuss how the laboratory has interacted with many other agencies in the administration of this testing through the course of the year.

We are sure you have also been hearing the news and keeping up to date on the multi-state fungal outbreak investigation. Stay tuned to the next edition of the New Hampshire Public Health Laboratories "Extracts from the Lab" for an article about our part in the outbreak and how it tied into several of the Ten Essential Public Health Services associated with core public health functions. Join us early in 2013 for the scoop!

New Hampshire Department of Health and Human Services

Nicholas Toumpas, Commissioner

José Montero, MD, Director
Division of Public Health Services

Christine Bean, PhD, Director
Public Health Laboratories

To join communities and families in providing opportunities for citizens to achieve health and independence.

New Hampshire Department of Health and Human Services
Division of Public Health Services
Bureau of Laboratory Services
Public Health Laboratories
29 Hazen Drive, Concord, NH 03301-6527
(800) 852-3345 TTY 711
www.dhhs.nh.gov

Please call (603) 271-4661 to reach the lab directly or email Jill Power at jill.j.power@ dhhs.state.nh.us with any newsletter-related questions.

Jumble Answer Key

FREEZE
ARSENIC
HONDURAS
FOODBORNE
NYMPHS

Solution: HORIZON