Go Green Initiatives Prove Successful!

When the opportunity arose to build the new North Carolina State Laboratory of Public Health (NCSLPH) and Office of the Chief Medical Examiner (OCME), we were challenged with the task of incorporating green practices into our new building.

The Bath Building in downtown Raleigh, former home of the laboratory, was built in 1973 when recycling and waste management was never considered. Space constraints and lack of resources limited our recycling efforts. Although we have always taken proper care of our hazardous chemical waste and steam sterilized our biological waste, the run off of non-hazardous waste (chemical and biological) from our laboratory sinks was sent directly to the wastewater treatment plant in Raleigh. Times have changed, and having a green building is now a goal for all new laboratories. Waste management is one of the most important green building practices, second only to energy efficiency. Strategies to “go green” began in the planning and design process of our building project.

Waste Neutralization System

One portion of green building practices in our new facility is a waste neutralization system. The wastewater from our laboratory sinks flows by gravity through a filter bag into the 2,900 gallon ground equalization tank. This fiberglass tank is located behind our loading dock area. Water in this tank is pumped back into the lower floor of the building via transfer pumps into one of two 350 gallon reaction tanks where the process of neutralizing out-of-spec wastewater is performed. The transfer pumps start and stop automatically based on the liquid level in the equalization tank.

Water in the reaction tanks is circulated using mixers, while probes measure the pH of the wastewater in the tanks. The Programmable Logic Controller (PLC)
based control system starts and stops the acid and caustic metering pumps as needed to adjust the measured pH in the tank. When the wastewater is within spec (for our purposes, a pH of approximately 7.0), a pneumatic butterfly discharge valve opens and releases water to the sanitary sewer via gravity feed. Meanwhile, the pH and flow rate are recorded by the PLC control system. The water will remain in the reaction tanks until it has reached the desired pH. The system will automatically add either a caustic or an acid and re-test the wastewater to adjust the pH to 7.0.

In summary, the system takes wastewater from our laboratory sinks and automatically adjusts the pH to neutral before releasing it to the sanitary sewer. This is a great benefit because water that is too acidic or too caustic can cause severe corrosion to plumbing.

The system was installed about nine months before we moved into the facility. After an initial inspection by the N.C. Division of Waste Management, a few safety design changes were suggested:

1. Separate the chemicals used by the neutralization system. To comply, we purchased a stand-alone outside shed for the caustic material and piped it back into the building. If this had been addressed earlier in the design phase, we would not have had to break through the outer wall of the building to insert pipes.

2. The design featured two solid doors opening into the room housing the system. If there were a spill or any type of emergency, we would not be aware until the door was opened, possibly injuring the individual. A window had to be added to the door so that the interior of the room can be viewed before entering. Again, if this had been discussed in the design phase, we would not have had to remove these doors and replace them with a much more expensive type of windowed door.

3. In case of an emergency, the emergency shut off button was originally located inside the room on the front panel of the equipment. We have also placed an emergency shut off button on the wall outside of the room. We plan to enclose this button in a case to protect it from being accidentally hit by passing traffic.

4. It was also suggested that a closet be placed next to the door to house personal protective equipment (PPE) that might be used in case of an emergency. We have a chemical spill room located on the same hallway, and it will be used to house PPE now that the shut-off button has been installed.

The changes and adjustments to the waste neutralization system are only a few of many that were made as we settled into our new building. We are proud to have this new technology and to be part of developing a sustainable waste management strategy for the future of North Carolina.
Recycling Efforts

Moving into a new facility also provided the NCSLPH and OCME opportunity to more fully engage in a recycling initiative. The two agencies are serviced by a convenience contract for recycling that is administered by the Department of Administration’s (DOA) Facilities Management Division. Office paper of all colors, magazines and other glossy print materials, newspaper, certain packing materials, hard cover books, aluminum drink cans, steel cans, plastic and glass beverage bottles, laboratory plastic, and some laboratory glass are collected via this contract. Cardboard is recycled as well under a different contract facilitated by DOA.

Several meetings with recycling vendors helped us to design a program that attempts to minimize the work on the part of staff and maximize efficiency for collection. Containers were selected that fit efficiently in the spaces (dining, office and lab areas) where recycling items are produced. It was required that the containers be easy to move to other areas where the recycling is picked up on a weekly basis.

We developed a “Recycling Guide” that helps staff members understand what is accepted for collection, where to put it, and when to put it there. Regular communication via email is used to alert employees when new items are added to the collection or when weather events and holidays necessitate changes to the pickup schedule.

Within the “Recycling Guide” is a diagram of the building with pickup locations that assists the pickup crew, as well as a location of every container with the type of material collected in each. This is primarily used as reference and to assist the recycling vendor on training new staff who will pick up at our location. The vendors have provided us resources to create custom signage for each recycling container that clearly articulates what goes in the container and how to prepare it before putting it in the container.

We have about 40 collection containers with a combined capacity of 1,300 gallons per week. These containers service approximately 150,000 square feet of occupied space in our building. Staff members move these containers to about 15 different pickup locations each week.

Over a six month period from September 2013 through February 2014, our location has diverted approximately 6.5 tons of paper, one ton of cans and bottles, and one-half ton of polystyrene foam (Styrofoam®) from area landfills. These impressive statistics are due to the hard work of “recycling enthusiasts” from both NCSLPH and OCME. It is very time-intensive to coordinate, facilitate, communicate and execute an efficient recycling program in a government agency, but with an excellent partnership with DOA and our vendors, along with the support of staff members, this “go green” effort is definitely proving to be a success!
Warm Weather Picnics and Food Safety 101

Spring has finally arrived! We can wash the salt off our cars and pack away our winter coats. Colorful spring flowers and sunny warm weather can only mean one thing – ’tis the season for picnics, grilling, and barbeques!

Unfortunately, with warmer weather comes a greater risk for infection from foodborne pathogens such as *Salmonella* and *E. coli.* that can cause symptoms such as stomach cramps, diarrhea, and vomiting – terrible horrors that we would all like to avoid.

Between transporting perishable foods and cooking outside the safety of the kitchen, there are plenty of opportunities for bacteria to grow and multiply in foods. But that doesn’t mean we can’t enjoy the outdoors this season! With a little extra care and planning, you can prevent harmful bacteria from ruining your picnic. Follow these tips to make the sunny weather activities more enjoyable for your friends and family.

**Wash Your Hands**
Growing up, we heard it all the time. Well, now is the time to listen, and don’t hold back! You cannot wash your hands enough when you’re handling raw meats. Always wash with soap and water for 20 seconds before and after handling raw foods, after using the restroom, and before eating. If you are out of the kitchen and away from soap and running water, be sure to pack some disposable disinfecting wipes for cleaning your hands and utensils.

**Thaw Properly**
Safety and planning ahead may not be on your mind when all you can think about are those juicy steaks just begging to be thrown on the grill. Don’t fire up the grill until you’ve safely thawed your frozen meats, which do require special care. There are three safe ways to correctly defrost:

- **Refrigerator**: This is the safest method for defrosting your meats. Always remember to do so overnight in the refrigerator and never on the countertop. Harmful bacteria can easily grow and multiply at room temperature.

- **Cold Water Bath**: This is a faster method compared to refrigerator thawing, but also requires more attention from you. To thaw your foods this way, place in a sealed bag and submerge in cold water. Never...
use hot water, as this may allow
the outer layer of food to heat up
to a temperature which allows
bacteria to grow. Also, the cold
water will need to be changed
every 30 minutes to maintain the
proper cold temperature.

• Microwave: Since most
microwaves now come with a
pre-set defrosting option, this
may appear to be the most
tempting and convenient method.
However, this method may
cause certain areas of the meat
to partially cook, creating an
optimal environment for the
growth of bacteria. This should
only be used when you are
crunched for time and when
the food is going to be cooked
immediately after.

Avoid Cross-Contamination
Preventing cross-contamination
from one food to another is not
only essential in the first steps of
kitchen-prep, but it’s also crucial
when transporting food to an
outdoor activity. Always use a
dedicated cutting board for raw
meats, and another for produce.
Those who prefer a wooden cutting
board should be especially cautious
since bacteria can be trapped in the
grains and porous wood surface and
cannot be disinfected with only soap
and water. After preparing each food
item, wash all associated dishes with
hot soapy water before preparing the
next item. When transporting foods
to an event, securely wrap all raw
meats and keep them in a separate
cooler away from ready-to-eat foods
and beverages. Use plenty of ice or
ice packs to keep it at the appropriate
cold temperature of 40°F or below.

Do Not Wash Raw Poultry
The theory of
washing off bacteria
from poultry before
cooking it has been
passed down
from generation
to generation – it’s
even suggested
by The French Chef,
Julia Child, the
expert herself!
While rinsing
poultry is part
of most people’s
routine, and countless recipes state
something to the effect of: “rinse
chicken and pat dry,” stop doing this,
now! Not only is rinsing raw poultry
ineffective at killing or washing away
germ, it may actually spread them.
That bacteria-saturated water is
running off the meat, splashing all
over your sink, and your counter top
working space, and may lead
to cross-contamination. The only
sure-fire way to kill all of the
bacteria on raw meats is to cook
the meat properly.

Wash Produce
Fresh produce may also be a
vehicle for bacteria and illness due
to animals, soil and water bacteria,
or poor hygiene of the food handlers.
Rinse smooth or waxy skinned foods
thoroughly under running water,
and rub briskly with your hands.
For rough skinned produce like
potatoes and melons, use a vegetable
brush to remove any remaining dirt
before peeling and consuming. A
1:3 ratio of vinegar and water is also
proven to be very effective at killing
bacteria and removing pesticides.

Keep Cold Foods Cold
Picnics and barbecues are not
complete without some sides and
desserts. Bring on the potato salad,
deviled eggs and banana pudding!
However, similar to raw meats, these
foods require storage at the proper
temperature to ensure that they
remain edible, in all of their tasty
glory. All perishable foods, meat,
eggs and dairy should always be
stored at or below 40°F. Once
everyone has finished eating, it’s
time to relax and socialize. The
leftover food clean-up can wait until
later, right? Not quite. While it may
be tricky to remember during the
hustle of a social outdoor event, it is
important to always put leftover
perishable foods back in the coolers
right away. Do not leave food
requiring refrigeration out for more
than two hours. If it is a particularly
hot day, exceeding 90°F, foods
will need to be refrigerated
within one hour.
Warm Weather Picnics cont. from page 5

Keep Hot Foods Hot
Keeping foods hot until served will not only please your guests, but it will also keep them safe from harmful bacteria. After cooking the meats, keep them at 140°F or higher by placing them on the side of the grill rack; this keeps the food away from the direct heat of the coals, reducing the risk of burning it, but maintaining the desired safe temperature.

Cook Thoroughly
Invest in a food thermometer to always ensure safe internal temperatures, making sure food is cooked completely. Thermometers vary in price from $2 for a simple gauge-read thermometer all the way up into the $80 range and more for digital or more high-tech tools. The thermometer should be inserted into the thickest part of the meat, avoiding any bone or gristle. Always remember to wash the thermometer between temperature readings.

The USDA recommends the following meat temperatures:

<table>
<thead>
<tr>
<th>Meat Type</th>
<th>Temperature (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pork roasts, ribs, and chops</td>
<td>145°F</td>
</tr>
<tr>
<td>Beef, lamb, and veal whole cuts</td>
<td>145°F</td>
</tr>
<tr>
<td>Ground meats – beef, lamb, veal,</td>
<td>160°F</td>
</tr>
<tr>
<td>and pork</td>
<td></td>
</tr>
<tr>
<td>All poultry products – chicken,</td>
<td>165°F</td>
</tr>
<tr>
<td>turkey</td>
<td></td>
</tr>
</tbody>
</table>

Remember to Enjoy Your Day!
Even though food safety is definitely important, don’t let it dampen your enthusiasm for attending spring parties and picnics. These events allow us to enjoy the weather, our friends and family, and some great food. These tips will help ease the uncertainty of food safety, and by aiming to be conscientious overall, your friends and family will remember the event for the beautiful day that it was, instead of remembering the get-together when we all got sick!

Submitted by:
Robbie Hall, Molecular Diagnostics and Molecular Epidemiology Unit

Cervical Cancer Detection and Prevention: Then and Now

From 1928 to the present, initial credit for saving the lives of many hundreds of thousands of women from cervical cancer goes to George N. Papanicolaou, M.D., the Father of Exfoliative Cytology and inventor of the Pap smear test. In his career culminating work, *Atlas of Exfoliative Cytology* [1954. Cambridge, MA: Harvard University Press], Dr. “Pap” was able to describe and catalog, with exquisite full color artistic drawings, the cellular changes associated with normal to abnormal and cancerous physiological conditions. This became one of the original training resources used in the then new field of cytopathology.

In the 1940s when the Pap smear test became a more widely used screening test, cervical cancer was the number one killer of women. Over the years, due

![A depiction of diseased cells from Dr. Papanicolaou's *Atlas of Exfoliative Cytology* (1954).](image)
Cervical Cancer Detection and Prevention cont. from page 6

to massive routine Pap smear testing, the death rate for cervical cancer worldwide has been greatly reduced, yet it remains a leading cause of cancer related death for women in developing countries. It remains the fourth most common malignancy in women worldwide. (NIH News in Health Oct. 2013).

In the United States, the underserved and those who lack access to routine cytology screening, the poor and minority groups, continue to be overrepresented in cervical cancer statistics. Because access to Pap and human papillomavirus (HPV) testing among these risk groups remains especially critical, county health departments throughout the state collect and send Pap smear samples to the North Carolina State Laboratory of Public Health (NCSLPH) for cervical cancer screening services. The lab also processes and interprets Pap smears for the North Carolina Breast and Cervical Cancer Control Program (NCBCCCP) that has successfully identified about 27 percent of the state’s cervical cancer cases while serving less than 1 percent of the general population.1

**Improvements in Cervical Cancer Screening: Pap specimen processing, screening and HPV co-testing**

The original or conventional Pap smear was thick, often poorly fixed and difficult for cytologists to interpret. In 1996, the FDA approved ThinPrep®, an automated liquid based cytology specimen process made by Cytyc (now Hologic). This process mechanically applies a representative sample of each Pap specimen onto a glass slide for microscopic examination as a mono-layer of cells rather than dense, multi-layers of cells commonly found on conventional Pap smears. Pap specimens are thereby made easier to interpret, clearer of obscuring material and inflammatory cells that contribute to more accurate testing outputs.

Bringing this closer to home, it is the ThinPrep® process that is used by the cancer cytology section of NCSLPH. Also utilized here is the ThinPrep® Imaging System that provides for Dual Review screening. The first review is made by a mechanical analyzer called the Imager, and the second review is then made by human microscopic review. The Imager scans cells and cell groups, measuring DNA content. Twenty-two fields of view (FOV) are identified by the Imager, including the darkest and largest nuclei. Further human review of these 22 FOVs (plus additional FOVs) are then made by highly trained and experienced cytotechnologists who use both mechanical (ThinPrep® Review Scope) and manual microscopes to determine if abnormalities indeed exist or can otherwise be ruled out. Specimens found to include suspicious cells are then referred in-house to Dr. Les Burke, NCSLPH cytopathologist, for final cytodiagnosis and reporting out to the health departments.

Another advantage of the ThinPrep® process is that it allows for additional testing for the presence of certain high risk genotypes of HPV using the same liquid based sample used for the ThinPrep® Pap test. In the past, HPV testing at NCSLPH has been performed by the Virology/Serology Unit. To maintain a high level of efficiency and improve turnaround time, the Cancer Cytology Unit began providing those services beginning late March 2014.

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*Image: The Cancer Cytology Unit at NCSLPH uses two Imagers as part of the ThinPrep® Imaging System.*
Current guidelines for comprehensive cervical cancer screening still favor having primary Pap smear screening followed generally by HPV testing as either an automatic co-test or a reflex test in cases of certain abnormal Pap results. However, an FDA advisory committee voted unanimously on March 12, 2014 to recommend that a specific new HPV test (cobas® HPV by Roche Molecular Systems) is safe, effective and could be used as a primary screening test before a Pap smear, or possibly even replace the Pap smear entirely.2

<table>
<thead>
<tr>
<th>Before age 21</th>
<th>Do not begin any testing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 21-29</td>
<td>Pap test only every 3 years and no HPV testing.</td>
</tr>
<tr>
<td></td>
<td>(However the cobas® HPV test is FDA approved for women aged 21 and older who have already received an abnormal Pap test.)</td>
</tr>
<tr>
<td>Age 30-65</td>
<td>Co-Test (Pap and HPV tests) every 5 years or cytology (Pap) test only every 3 years.</td>
</tr>
<tr>
<td>After age 65</td>
<td>If consistent and recent negative results, no further screening is necessary.</td>
</tr>
</tbody>
</table>

(Higher risk patients and those with previous atypical screening test results may be screened on a different schedule and/or by additional means.)

**HPV Vaccines**

In 2006, HPV vaccines were approved by the FDA for use for both young females and males. These vaccines provide a strong weapon of protection from certain HPV types that cause various cancers including cervical, vulvar, vaginal, penile, anal and oropharyngeal, as well as protection from genital warts.

Research shows that the vaccines produce higher antibody to fight off HPV infection when given to those who are younger rather than older adults. As recommended by the Center for Disease Control and Prevention (CDC), all girls and boys at ages 11 or 12 should get all three doses over a six month period (well before sexual activity begins as these vaccines only work before a person gets infected with HPV virus). Other recommended vaccine candidates include teen boys and girls not yet vaccinated, young women through age 26, young men through age 21, and gay/bisexual men and persons with weakened immune systems.

**Summary**

Cytology screening with the Pap test has proven a champion for women’s health for more than 70 years. It remains a critically important means of preliminary detection of abnormal cellular changes associated with more serious conditions, including cancer. With the more recent addition of HPV testing, a more thorough and comprehensive cervical cancer screening, as well as improved patient health management, can now be achieved.

*Submitted by:*

**Kate Bena, MBA, CT (ASCP)**

*Cytotechnologist, NCSLPH Cancer Cytology Unit*

**References**


What Does It Take to Bring a BSL-3 Laboratory Online for Testing of Biological Threat Agents?

(Note: This article is a sequel to the article that appeared in the Winter 2013 issue titled, “What Does It Take to Move the Bioterrorism and Emerging Pathogens Unit?”)

So, we’ve managed to successfully move all laboratory supplies and equipment from the Bath Building to the new facility, decontaminate the Biosafety Level 3 (BSL-3) laboratory in the old facility and organize the new office and laboratory spaces in the new building. Now all we have to do is plug in all of the equipment, refrigerators, freezers and incubators and begin testing clinical and environmental samples for the presence of possible biothreat agents such as Bacillus anthracis (anthrax) and Yersinia pestis (plague). Right? WRONG! It’s just not that easy. Several factors go into ensuring that the space that will be used to test for agents of bioterrorism and suspicious substances satisfies not only physical specification requirements, but also complies with federal Clinical Laboratory Improvement Amendments (CLIA) and Federal Select Agent Program regulations. Facility design and construction, quality assurance and staff training all played a significant role in bringing the Bioterrorism and Emerging Pathogens (BTEP) Unit BSL-3 laboratory at the North Carolina State Laboratory of Public Health (NCSLPH) in Raleigh back online for testing.

Even before the ribbon was cut on the site of the new facility, plans for the construction of the BTEP BSL-3 laboratory were being drafted, reviewed and amended. The design and construction of the new facility as it pertains to the BSL-3 laboratory contributes not only to the protection of those working inside of the laboratory, but also to the protection of those outside of the facility from an accidental release of an infectious agent. The BTEP BSL-3 laboratory is inaccessible to the public and even to those who work in other areas of the building. The physical location of the laboratory within the building and the inclusion of special biometric security measures ensure a controlled access zone. A special High-Efficiency Particulate Air (HEPA) treatment system was installed to remove aerosols containing agents from exhaust air. The air from the BSL-3 must be carefully monitored to ensure that there is negative airflow into the laboratory and that the air is exhausted and not recirculated into any other area of the facility. Negative airflow prevents cross-contaminations from room to room by allowing air to flow into the isolation room but not escape from the room. Before the laboratory was deemed operational, it was necessary to adjust the special system that was put into place to provide a visual indicator of negative airflow. All windows were sealed to assist in maintaining the pressure, to prevent leaks and to keep things from getting into the

A smoke test is performed to test window seals in a BSL-3 room at the new facility.
lab, i.e. water, air, bugs, etc. Design and construction still continues to be an integral part of the BSL-3 laboratory operation.

As with any laboratory facility, different plans are written and put into place to ensure the safety and security of personnel, the items within the laboratory, and the community. The facility’s security plan, the incident response plan and the transportation safety plan all required revisions based on the new building’s specifications, as well as requirements from the Federal Select Agent Program. The Federal Select Agent Program oversees the established list of biological agents and toxins that could threaten public health and safety and regulate procedures for the handling of those agents.

The Federal Select Agent Program also dictates training requirements for facilities working with select agents and toxins. Any personnel who had a role or responsibility in any part of BSL-3 functions – including BTEP unit staff, facilities maintenance, mailroom, administration and the State Capitol Police – all were required to undergo training on some of the plan updates. The BTEP staff was required to undergo training for all of the plans as well as a safety, security and Powered Air Purifying Respirator (PAPR) training, an intense training comprised of both online and physical instruction. After consultations with experts in the field of BSL-3 laboratory design and safety and a thorough inspection by the Centers for Disease Control and Prevention/Division of Select Agents and Toxins, the BSL-3 operations manual was completely rewritten. The new manual includes updates in the areas of laboratory physical design, laboratory utilization, engineering controls and equipment, transfer of biohazardous agents, laboratory decontamination, biohazard spill cleanup procedures, and emergencies within the BSL-3 laboratory. New risk assessments were required for all biothreat agents. Several back-and-forth communications between the BTEP Unit and Federal Select Agent Program representatives led to many revisions of the BSL-3 operations manual. Specific details such as where to put on (don) and take off (doff) personal protective equipment and BSL-3 laboratory entry and exit signage were addressed. Safety and security were a major concern with bringing the laboratory back online.

Before any testing of clinical samples or suspicious substances could take place, steps were taken to make sure that the instruments and methods produced expected results. After a move of laboratory equipment, calibrations and method verifications must be performed to ensure that the test results are accurate. For each piece of equipment and each test method, multiple runs were performed and calculations performed to ensure that instrumentation, reagents and other laboratory equipment performed as expected. Accuracy and precision for each result were monitored and reviewed before that test was considered “online” and available for use. This was done for molecular, biochemical and serology based assays. All testing personnel participated in the method verification process.

Bringing a BSL-3 laboratory back online for testing of biothreat agents is not a quick and easy task. Individuals from different areas of the laboratory and regulatory agencies were involved in making sure that the NCSLPH was indeed ready to begin testing. A BSL-3 facility inspection and subsequent certification deemed the facility appropriate for BSL-3 operations. The training and operations manuals and plans revisions helped to meet federal requirements to ensure the safety and proficiency of those working in the facility and the safety of the environment and the public.

Submitted by:
La’Vonda Benbow, BS, MLT(ASCP)cm
From Out of Date to State of the Art: Laboratory Improvement’s New Training Suite

On December 19, 2012, the Laboratory Improvement Unit of the North Carolina State Laboratory of Public Health (NCSLPH) moved into the new building located on District Drive in Raleigh. The new home of NCSLPH and the Office of the Chief Medical Examiner (OCME) brings greater opportunities for training and consultation to be provided through hands-on workshops, seminars and distance learning. Previously, the Bath Building in downtown Raleigh housed the Laboratory Improvement offices and classroom on the first floor and the training labs on the fourth floor. The old training labs were across the hall from each other and when combined, could only handle about 28 students in cramped quarters. Only one of the training labs was equipped with a projector screen. Parking in the downtown area was always an issue for students attending workshops, and free parking was usually not available. When students who have been to the Bath Building location visit the new NCSLPH location they remark, “Love the free parking and the beautiful new building!” When they see the new training suite, we get a lot of “wow’s!”

In contrast, the new facility, conveniently located off Blue Ridge Road near the state fairgrounds, is a beautiful modern facility with plenty of windows and adequate free parking. The Laboratory Improvement Unit has offices and a training suite on the first floor. The training suite includes a small training lab with comfortable seating for 15 people, a large training lab with seating for 28 people, two chemical training rooms, two Biosafety Level 3 (BSL-3) rooms, a prep lab, and an equipment room. There are also two storage rooms for microscopes and supplies, and a cylinder closet for storage of CO2 tanks for incubators. The large and small training labs have lockers for personal belongings, comfortable chairs, and spacious lab tables with cabinets for workshop supplies. Adjacent to the training labs is a small café area with a refrigerator, microwave, ice and water machine, and drink machine for the convenience of the students. Across the hall from the training labs is a large classroom that seats 72 people at tables or 100 people without tables. The room can be divided with a moveable wall in the event there are two different trainings occurring at the same time. The new building has allowed Laboratory Improvement to acquire some updated audiovisual (AV) equipment for use during workshops and other trainings. The AV system consists of projector screens, flat screen monitors mounted in the ceiling of the large training room, cameras positioned throughout the training labs and classroom that can be moved to showcase demos or speakers during trainings, portable microphones for instructors, and a microscope camera in the small training lab that can display images seen under the microscope on the projector screen. The classroom and large training lab have window shades with options of sheer shades to block out glare from the outside on sunny days or blackout shades to make the rooms darker for viewing training videos or teleconferences. The incubators, refrigerators, freezers, CO2 tanks, and equipment room are connected.

The large training lab is pictured during a “Bacteriological Methods for the Analysis of Drinking Water” workshop.
Laboratory Improvement’s New Training Suite cont. from page 11

to a monitoring system that will alert personnel by phone and email when temperatures or CO2 levels are out of range.

Having a modern and spacious training suite has enabled the Laboratory Improvement Unit of NCSLPH to enhance the trainings available to laboratory personnel across the state. Since moving into the new facility in December 2012, the unit has hosted approximately 500 students in workshops and more than 1,100 students in webinars and online studies. For a list of upcoming workshops and other training opportunities, please visit our website at http://slph.ncpublichealth.com.

Submitted by:
Diana Scarborough, AAS, CLA (ASCP)
Lab Improvement Training
Lab Manager

The small training lab is the site of workshops that provide skills in microscopy, wet mount examinations, and gonorrhea detection.

A “Lunch and Learn” presentation is held in the classroom for SLPH and OCME employees.
A Passion for Parasites!

Many people who spend their careers in the fields of science and medicine find their jobs very rewarding and enjoyable. The North Carolina State Laboratory of Public Health (NCSLPH) was very fortunate to have one such employee who not only developed valuable expertise in her area of work, but also immensely enjoyed sharing her knowledge and experience. Kathy Benson, medical laboratory specialist in parasitology, retired on December 31, 2013 after 29.5 years of service at NCSLPH.

Kathy received a liberal arts degree from Wayne State University and then spent almost five years in the United States Navy. Shortly before her discharge, Kathy was encouraged by her brother, an army LPN, to visit a naval hospital and get information on careers in laboratory technology. What she learned sounded interesting to her, and after leaving the navy, Kathy was accepted into the first medical laboratory technician (MLT) program at Wake Technical Community College in Raleigh. To meet the requirements for admission to the MLT program, she taught herself a chemistry class by taking a “program text” course where her only tools were a book and the library. Kathy’s motivation and dedication to her laboratory career were becoming evident! She graduated in 1981 and received her certification from the American Society of Clinical Pathologists (ASCP).

Kathy began her career at Raleigh Community Hospital (now Duke Raleigh Hospital) working second shift and weekends as a generalist. Several years later, she accepted a position at NCSLPH and worked in newborn screening, clinical chemistry, and blood grouping and typing. Kathy joined the microbiology unit in 1998 as a floater and gained experience in testing for Bordetella, Neisseria, enterics, atypical bacteriology and mold identification. She also began assisting in parasitology, and when an opening occurred in that laboratory in 2004, she found a permanent home!

Finding and identifying parasites in clinical samples requires excellent visual skills, and Kathy knew she had developed those skills at an early age. Growing up in the suburbs of Detroit and going on long car rides with her family, Kathy remembers her mother encouraging the kids to be the first to identify the types of cars approaching from the other lane. She attributes this game to helping her develop the visual skills she would later use in her laboratory positions!

Over the years, Kathy saw a wide variety of parasites and was always aware that uncommon findings were a possibility. One of her most memorable and interesting findings was the discovery of Schistosoma mansoni in a number of Asian refugees. The parasite is found in fresh lakes and ponds in South America, Africa and Asia and penetrates directly through the skin of a human host. The parasite is unusual looking because of a prominent spike on its side, and Kathy included this parasite in her own pictorial reference library. Other interesting findings made by Kathy over the years were those of a tapeworm proglottid, a pinworm found in a urine sample, and a foot-long tapeworm in a four year old (with the awareness that they lay hundreds of eggs)!

Along with developing skills in identifying parasites, Kathy also learned to spot trends in world news that would cause an increase in the number of samples she received at the laboratory. Political unrest and similar events occurring in other countries would often result in an influx of immigrants to the United States and a subsequent increase in samples. Watching the news and reading the paper often gave Kathy insight into what she might encounter at work!

Kathy’s employment at NCSLPH has made her an advocate of public health careers. Stated simply, she has...
A Passion for Parasites! cont. from page 13

said the most rewarding factor is “helping other people.” The biggest change that Kathy observed while working at NCSLPH was obviously the recent move to the new facility. Coupled with the changes to the laboratory’s leadership, Kathy sees many positive changes and opportunities for growth over the coming years. Concerning the area of parasitology, Kathy would not be surprised if there is one day a shortage of employees with a good level of knowledge and understanding of this specialty. The move is toward molecular testing for many disorders, but Kathy feels this methodology may not be satisfactory in identifying some parasites and molds. Her experience has demonstrated that laboratory personnel need to know and understand the basics of this specialty so that when newer technology is not appropriate, technologists will understand why and know how to use earlier, more standard methods.

As Kathy settles into retirement, she looks forward to church activities, reading, solving crossword puzzles, and even learning tai chi! Her husband, Mike, has a few more years to work, so she will have some well-deserved time to herself! Kathy will be greatly missed by her friends and co-workers at NCSLPH, not only for her knowledge and experience, but for her warmth, friendliness and willingness to help anyone with anything! We wish her the best, and whenever a pesky parasite shows up at our laboratory………we know who to call!

Submitted by: Patty Atwood
Laboratory Improvement Coordinator

CUSTOMER SERVICE TIP

Always be true to your word!

Never say or promise something that is out of your control. If you aren’t sure about a situation, let the person know that you aren’t comfortable with answering their question or resolving the issue, and that you will find someone that is capable and more experienced with the situation. Take their number and make sure someone responds to that person in a timely manner. Customers will appreciate your honesty and extra effort to ensure they receive accurate information.

The State Laboratory welcomes the following new employees:

Stock Room/Operations – Eddie “Nelson” Betancourt, Louie Allen
Newborn Screening – Alfreda Burnette
Environmental Sciences – Takisha Davis
Operations – Srunokshi Neelakantan
Virology/Serology – Rhonda Pollard, Ashley Thomas
Facility Maintenance – Randall Wells
I am excited to announce we are beginning a new series with “The Safety Corner”! Over the next few Lab-Oratory issues, we are going to discuss frequently asked questions. Therefore, I need your help. Please email any safety questions you have to me, and I will answer them in an upcoming Lab-Oratory. My contact information is below.

What monitors are necessary to check for proper sterilization in our autoclave runs?

We have had several questions arise lately regarding the use of autoclaves. Specifically, the question is, what monitors are necessary to verify all items have been sterilized? Kristy Osterhout, NCSLPH Safety Officer, was a great resource for this question.

OSHA doesn’t have regulations for running an autoclave. The bloodborne pathogen regulation is ‘performance oriented,’ which means we get to decide how to do this based on what we do, the type of material to be processed, and what organisms we have. If labs use steam sterilization, then they should use recommendations made by the CDC or other professional organizations. Sterilizing microbiological waste is very different from sterilizing healthcare equipment that will be used again.

The autoclave uses mechanical, chemical and biological monitors. Chemical indicators are the pouches and autoclave tape that are incorporated into the pack to show the autoclave reached temperature. Biological indicators are the spore tests (Geobacillus stearothermophilus). Mechanical indicators are the printouts of the temperature, the time at temperature and the pressure.

Osterhout references the CDC document, ‘Guidelines for Disinfection and Sterilization in Healthcare Facilities, 2008,’ on page 91 under Monitoring of Sterilizers:

a. Use mechanical, chemical and biological monitors to ensure the effectiveness of the sterilization process.

b. Monitor each load with mechanical (e.g., time, temperature, pressure) and chemical (internal & external) indicators. If the internal chemical indicator is visible, an external indicator is not needed.

c. Use biological indicators to monitor the effectiveness of sterilizers at least weekly with an FDA-cleared commercial preparation of spores (e.g., Geobacillus stearothermophilus for steam) intended specifically for the type and cycle parameters of the sterilizer.

So, what do all of these big words mean? To sum it up, a spore strip should be run at least weekly to ensure your autoclave is working properly. Autoclave tape may also be used on individual pieces to distinguish between items that have been sterilized and those that are just rinsed. For example, sterilized beakers can be differentiated from others. Finally, be sure to document the time, temperature and pressure in an autoclave log book.

If you have any questions regarding safety, please contact Kristy Main at kristy.main@dhhs.nc.gov or (919) 733-7186. Remember, your question may be featured in an upcoming Lab-Oratory!

Submitted by:
Kristy Main, BS
Laboratory Improvement Consultant

References

M. Kristy Osterhout, January 23, 2014
## 2014 WORKSHOP SCHEDULE

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Disclaimer: These Workshops are not intended to replace formal education but to enhance skills and promote use of recommended standard techniques.

For more information, consult our website or contact Lab Improvement at 919-733-7186

http://slph.ncpublichealth.com