

Wyoming's Lab Loop

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WYOMING PUBLIC HEALTH LABORATORY (WPHL) TUBERCULOSIS (TB) PROGRAM

WPHL provides mycobacteriological services to health care facilities in Wyoming. Services include smears and cultures for clinical specimens, isolation and identification of reference isolates, nucleic acid amplification for detection of *M. tuberculosis* in clinical specimens that are smear positive, and drug susceptibility testing for first isolates from a TB confirmed patient.

Jody Fleming is the primary mycobacteriologist. Some of you may remember, Jody worked in the TB lab for several years and then took a position with a lab in Colorado. She eventually returned to work for WPHL in the BT lab, and with the retirement of Vivian Stille last year, Jody moved back into the TB lab. The following is an interview with Jody about the TB lab.

Lab Loop: Describe the work area for TB.

Jody: The TB lab is housed in a BSL-3 suite. I have a general work area with a large autoclave, and a separate isolation room. On processing days, I use the typical PPE (Personal Protective Equipment) and a PAPR (Powered Air Purifying Respirator) whenever working with potentially positive organisms. So, if you phone me and I don't take your call, you know what I'm doing!!

Lab Loop: How does a submitter send a specimen to WPHL for TB testing?

Jody: Specimens are received at WPHL from 8 am-5pm Monday through Friday through UPS, Fedex, or USPS.

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Jody Fleming—mycobacteriologist

PARTNERSHIPS FOR TB ELIMINATION

WORLD TB DAY | MARCH 24



World TB Day Partnerships for TB Elimination

World TB Day falls on March 24. This annual event commemorates the date in 1882 when Dr. Robert Koch announced his discovery of *M. tuberculosis*, the bacteria that causes TB. During this time, TB killed one out of seven people living in the United States and Europe.

A century later, the first World TB Day was sponsored by the World Health Organization and the International Union Against Tuberculosis and Lung Disease. World TB Day provides an opportunity to communicate TB-related problems and solutions and to support worldwide TB-control efforts. CDC and their partners are committed to eliminating TB in the United States.

In the U.S., the theme for World TB Day 2009 was "Partnerships for TB Elimination".

Spring Intermediate Microbiology Wet Workshop: Rescheduled for October 2009

Once again, the road to the wet workshop was paved with good intentions. The Intermediate Level Microbiology Workshop, "Exploring Best Practices in the Laboratory", was postponed due to the influx of influenza testing that affected WPHL staff in April. Everyone who had been planning for the workshop was suddenly very busy running flu tests. In order to guarantee a quality learning experience, it was decided to postpone this training event.

The good news is, we have new dates for the training! The workshop will be held twice in October on the 15th and 16th of the month. The workshop will still be conducted at the University of Wyoming in Laramie, but the lecture has been moved to the Coe Library. The hands-on wet workshop will be in the Agriculture Building, Room 5027.

As stated in the brochure, this workshop is designed to generate discussion about microbiology practices used in our hospital laboratories. Biosafety and risk assessment will be covered in the morning lecture, along with a short discussion of Wyoming's Reportable Disease Program and the CLSI M100. In the afternoon, a hands-on workshop stages "collection site based" stations to reinforce the morning's lecture. The design of this training is directly dependent on attendee participation. In other words, it is going to be what the attendees make it. There are no right or wrong answers, just different approaches and it is the purpose of this training to bring the laboratorians together to discuss and improve existing practices.

Please mark your calendars and plan to attend one of these two days! Don't miss this important opportunity to network with your peers and put your WPHL station facilitators through their paces! You may register for one of the two days by logging on to:

<https://wy.train.org/DesktopShell.aspx>

Space is limited to 20 attendees per day, so don't delay! **Sign up today!**

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We also have a courier service, and I strongly encourage shipping specimens through this service. Specimens should be received at WPHL within 1-3 days of collection. We also provide appropriate shipping containers. Both the containers and courier service are free to the submitter.

Lab Loop: Please describe the workflow through the TB lab.

Jody: Processing of the specimens occurs on Tuesdays and Fridays. We are not a "stat" lab and try to avoid situations where we must process more than twice a week. Sterile specimens are inoculated directly into broth and solid media, sputa and other non-sterile specimens are first digested using the N-acetyl L-cysteine procedure. Auramine-Rhodamine fluorescent smears are done on each specimen.

Lab Loop: What type of equipment do you use?

Jody: We use the MB BacT Alert 3D System for incubating the specimens. It will automatically read the broth cultures hourly for 6 weeks. The 7H10 plates are read weekly. We use DNA probes that are specific for *M. tuberculosis complex* and *M. avium complex*, on any culture that appears

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TUBERCULOSIS (TB) PROGRAM

“suspect positive”. The Bacteriology lab has an Avant 3100 DNA sequencer that we use for any mycobacteria isolated that is negative for *M. tuberculosis complex* and *M. avium complex*.

Lab Loop: Do you do nucleic acid amplification?

Jody: Positive smears are sent to National Jewish Hospital (NJH) in Denver. They can often detect the presence of *M. tuberculosis* weeks before WPHL can observe it in the liquid broth or on the solid media. All genotyped results are recorded on a spreadsheet and compared against existing specimens to determine if identical patterns exist. So far, no matches have been identified in any of the genotyping results we have entered to date.

Lab Loop: Do you do any drug susceptibility testing?

Jody: Drug susceptibilities are also done at NJH. We ship within one working day of an isolate being identified as *M. tuberculosis*. NJH tests for Isoniazid, Rifampin, Ethambutol, and Pyrazinamide, as well as several second line drugs.

Lab Loop: Has Wyoming seen an MDR (multi drug resistant) or XDR (extremely drug resistant) infections?

Jody: Wyoming has not seen any drug resistant strains of *M. tuberculosis* that I am aware of. Wyoming is very fortunate to have a small number of treatable positives each year.

Lab Loop: What is your reporting procedure?

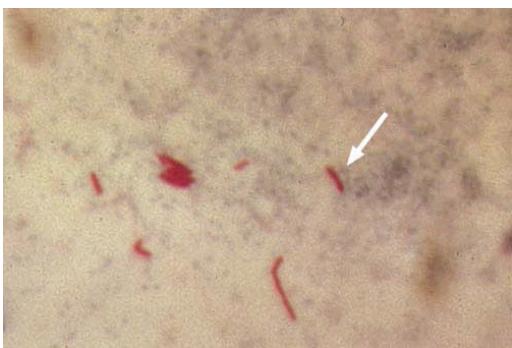
Jody: All smear results, DNA probe results, and culture results are reported via phone or fax to the submitting physician or laboratory the same day they are determined. The TB Program Manager is also notified. Results for nucleic acid amplified testing and drug susceptibility from NJH are faxed to WPHL and then quickly disseminated to the provider and the TB Program Manager.

Lab Loop: How is the TB program funded?

Jody: Currently, this program is funded through a grant from CDC, which is disbursed to the Wyoming TB Prevention and Control Program. The TB program then funds the testing program at WPHL.

Lab Loop: What final thoughts would you like to leave the submitting agencies with?

Jody: Please submit the very best sample you can obtain. I might add that we do not accept blood or swabs.



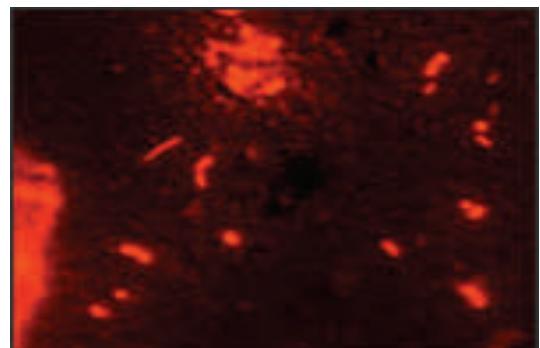
Mycobacterium tuberculosis. Acid-fast stain. Image provided by CDC.

DID YOU KNOW?

One third of the world's population is infected with TB.

In the U.S., 13,299 TB cases (a rate of 4.4 cases per 100,000 persons) were reported in the United States in 2007.

From www.CDC.gov/TB



M. tuberculosis in a sputum smear stained with auramine. Image provided by CDC.

Wyoming Public Health Laboratory Plans to Implement a Laboratory System Improvement Program

The Association of Public Health Laboratories (APHL) has developed the Laboratory System Improvement Program (L-SIP), which is a tool designed to improve the quality of public health practice and the performance of public health systems. The L-SIP targets improvement of the public health laboratory system through the collaborative work of partners to:

- Assess system performance
- Plan for system improvements
- Implement improvement strategies
- Periodically evaluate and re-assess

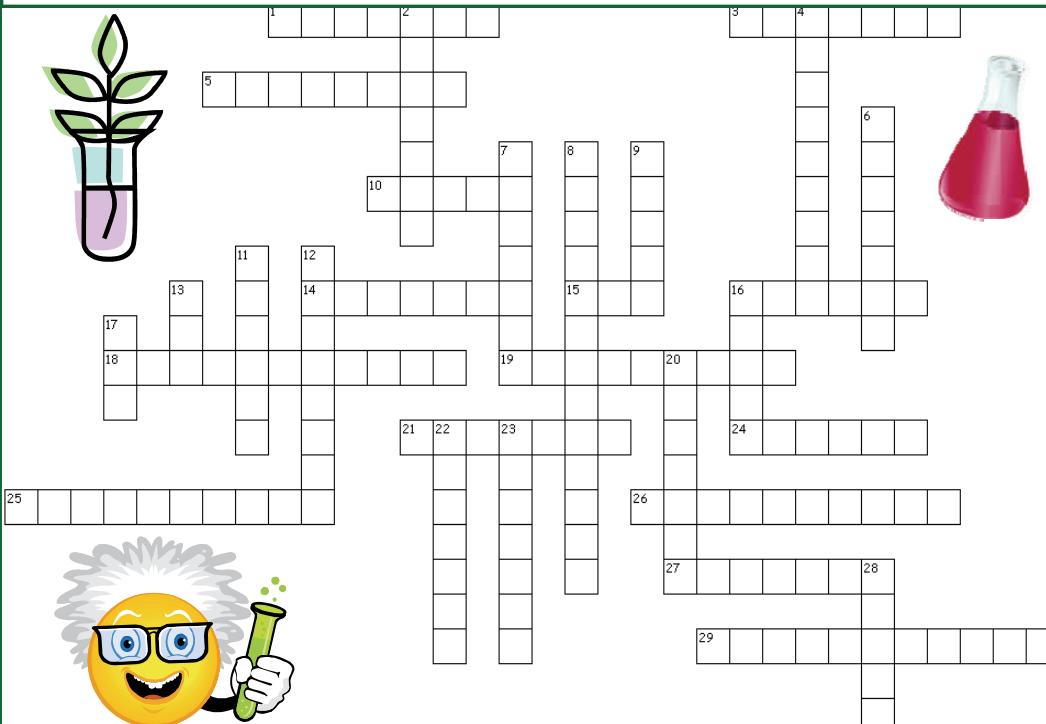
It is WPHL's plan to bring together a panel of key partners to assess Wyoming's Public Health Laboratory System based on essential public health services and core functions of the Public Health Lab here in Cheyenne.

Our partners are defined as representatives from hospitals, clinical laboratories, media, nursing homes, policy makers, academia, law enforcement, corrections, mental health, fire, transportation, local public health partners, etc.

Over the next few months we will be soliciting input to help plan this project. Once representative partners are identified, WPHL plans to host a one-day event and invite our partners throughout the state to join together to constructively evaluate our public health laboratory system. This event has been scheduled for October 28th in Casper.

The goal of this project is to gain a broader understanding of our partners' perceptions of WPHL and to glean helpful information from this project to better serve the laboratory needs in our state.

BREATHE DEEP CROSSWORD PUZZLE



Across

1. at high risk of infection when coming in close _____ with infected person
3. requiring oxygen
5. natural or acquired resistance
10. undue rise in temperature in a body
14. a dispersed spray
15. acid fast bacilli
16. inactive state of TB exhibiting no symptoms
18. having little or no affinity for water
19. management of disease state through medications
21. membranous sac or covering
24. expectorated from the lungs
25. the act of hindering or to stop from happening
26. tending to spread from person to person
27. native to a specific people or place
29. measures taken in advance

Down

2. foreign substance that stimulates production of antibodies against it
4. able to withstand antibiotic treatment
6. preventive inoculation that confers immunity
7. a little drop

8. within a cell or cells
9. multidrug-resistant tuberculosis
11. nasal secretions
12. disease producing agent
13. purified protein derivative
16. organic breathing apparatus

17. World Health Organization

19. TB skin test
20. microscopic organism
22. an air cell of the lungs
23. void of contaminants
28. expel air from lungs with a harsh noise

Winter Findings in the Wyoming Public Health Bacteriology Laboratory

John Harrison, our resident microbiologist, continues to sequence “weird bugs” in the Bacteriology Lab. We thought you might like an update on what he has seen since the last Lab Loop.

Cardiobacterium hominis

Source: Blood

Cardiobacterium hominis is a member of the HACEK group (*Haemophilus aphrophilus*, *Actinobacillus actinomycetemcomitans*, *C. hominis*, *Eikenella corrodens*, *Kingella kingae*), which are fastidious, gram-negative, aerobic bacilli that normally reside in the respiratory tract. They have been associated with local infections of the mouth and, collectively, cause 5-10% of cases of native valve endocarditis.

C. hominis is a non motile organism that requires 5-10% carbon dioxide for growth. It does not grow on selective media such as MacConkey agar. Nearly all infections reported in humans have been in the form of bacteremia or endocarditis.

Lactobacillus rhamnosus

Source: Cervix

Lactobacillus rhamnosus is a probiotic bacterium that was originally thought to be a subspecies of *L. casei*, but genetic research found it to be a species of its own. *L. rhamnosus* inhibits the growth of most harmful bacteria in the intestine. It is used as a natural preservative in yogurt and other dairy products to extend the shelf life. While frequently considered to be a beneficial organism, *L. rhamnosus* has been discovered to be pathogenic in certain circumstances.

Escherichia vulneris

Source: Wound

The name *Escherichia vulneris* is proposed for a group of isolates from the United States and Canada, 74% of which were from human wounds. *E. vulneris* is a gram-negative, oxidase-negative, fermentative, motile bacillus with the characteristics of the family *Enterobacteriaceae*. It is indole negative, two-thirds of strains produce a yellow pigment, and most strains give negative or delayed positive reactions for lactose.

Exiguobacterium acetyllicum

Source: Wound

Exiguobacterium acetyllicum is a rhizospheric, gram-positive bacillus, yellow pigmented bacterium found in soil.

Roseburia hominis

Source: Feces

Roseburia hominis is a gram-positive bacillus found in human feces.

Bergeyella zoohelcum

Source: Cat Bite

Bergeyella zoohelcum is a gram-negative bacillus, aerobic, non-motile, non-saccharolytic bacterium. It is frequently isolated from the upper respiratory tracts of dogs, cats, and other mammals. It has been known to cause cellulitis, abscess, tenosynovitis, septicemia, pneumonia, and meningitis, and is associated with animal bites.

Update on Casper College's Medical Laboratory Technician Program

Hybrid Anyone?

The Casper College Medical Laboratory Technician (MLT) Program is a hybrid internet distance education curriculum. Hybrid internet courses are a combination of internet learning and scheduled laboratory experiences that must be done in person. In the Casper College MLT Program, general education and clinical laboratory science content and laboratory theory is delivered through an internet web-based system and laboratory experiences are available at affiliated clinical laboratories or on-campus at Casper College. Once students have successfully completed the curriculum they are eligible to sit for national certification examination as a Medical Laboratory Technician/ Clinical Laboratory Technician through the American Society of Clinical Pathology or National Credentialing Agency.

This hybrid delivery format has increased the Casper College enrollment and allows for the workforce development of MLT's for the State of Wyoming. The hybrid delivery format has allowed students to enroll in the only MLT program in the State and continue to live and work in their hometowns. We now have students from as far away as Afton, Wheatland, Gillette and Powell. By going to the hybrid delivery format we have promising enrollment for fall 2009 and the potential to alleviate the shortage of clinical laboratory scientists in the State of Wyoming. We have 18, yes 18, students enrolled in our first year Hematology course. We have 16 students who are taking the second year courses. That means we will have approximately 16 graduates during the spring and summer of 2010!

The Casper College Program relies on quality students and strong clinical affiliate relationships. As new students emerge from outlying areas we gain vitality for our program and hope for meeting our clinical laboratory professional shortages. We encourage and prepare our students to continue their education by offering a program that is based in basic science and general education that is transferable to other institutions.

Once students have completed our program they can easily transfer into four year medical technology programs to complete their Bachelor of Science degrees and eligibility for Medical Technologist certification.

The Casper College MLT Program is a great way for working professionals to advance their careers. They can complete college courses while they work and live in their hometowns. If you are interested in becoming a clinical affiliate or promoting a valuable employee, please contact Dr. Audrey Hentzen at ahentzen@caspercollege.edu for more information.



Students working in the bloodbank lab at Casper College.

DID YOU KNOW?

In 1999, investigators found *M. bovis* in bone tissue removed from a 17,000 year old bison that had fallen to its death in the Natural Trap Cave in Wyoming (NE of Lovell), providing clear evidence TB was present in prehistoric America, waiting for new human hosts.

From "Twelve Diseases That Changed Our World".



Students working in the UA lab at Casper College.

CONSTRUCTION BEGINS ON LABORATORY FACILITY IN CHEYENNE

Despite the ups and downs of Wyoming's energy based economy, the groundbreaking ceremony for the new laboratory facility in Cheyenne was on May 20. Governor Freudenthal addressed the crowd about the need for a facility to house the unique requirements of the Wyoming Public Health Laboratory, the DEQ Water Quality Laboratory, and the DCI Crime Laboratory and their associated investigators. A combined facility is a new concept for State of Wyoming buildings, and the logistics of addressing the needs of the four work groups have been challenging at times. Representatives from WPHL, Department of Health, DEQ, DCI, GH Phipps (general contractor), HDR (architect), and other local dignitaries were present.

The building sits on nine acres north of Laramie County Community College on the east side of Cheyenne. Currently, it is the largest structure under construction on the Front Range at 120,000 square feet. It will be a T-shaped building, with WPHL and the DEQ water quality laboratory sharing a wing.

In the weeks since the groundbreaking, the site work has been completed, and construction has started on the underground utilities. This phase is expected to be completed in August and then construction will begin on the shell of the building. Projected move in date is August 4, 2010.

Among other things, this facility will have a large training area available for wet workshops. We hope to begin holding training conferences in our own facility in the near future!! In the meantime, we will continue to work on the design of the laboratory workspace and the logistics of moving across town while maintaining continuity of service to our customers.

The Wyoming State Veterinary Laboratory also received funding to expand their facility. The groundbreaking event for their facility is in late July.



Governor Freudenthal and representatives from WPHL, Department of Health, GH Phipps, and HDR at the groundbreaking on May 20.

DID YOU KNOW?

Evidence of TB is found in bony remains that pre-date human writing. Pott's disease (extrapulmonary TB that affects the spine) has been described from Egyptian mummies dating from 3700 to 1000 BC.

From "Twelve Diseases That Changed Our World".

ANSWERS FOR THE CROSSWORD PUZZLE

Across:

- 1 - CONTACT
- 3 - AEROBIC
- 5 - IMMUNITY
- 10. - FEVER
- 14 - AEROSOL
- 15 - AFB
- 16 - LATENT
- 18 - HYDROPHILIC
- 19 - TREATMENT
- 21 - CAPSULE
- 24 - SPUTUM
- 25 - PREVENTION
- 26 - CONTAGIOUS
- 27 - ENDEMIC
- 29 - PRECAUTIONS



Down:

- 2 - ANTIGEN
- 4 - RESISTANT
- 6 - VACCINE
- 7 - DROPLET
- 8 - INTRACELLULAR
- 9 - MDRTB
- 11 - MUCOUS
- 12 - PATHOGEN
- 13 - PPD
- 16 - LUNGS
- 17 - WHO
- 20 - MICROBE
- 22 - ALVEOLI
- 23 - STERILE
- 28 - COUGH

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- *Wet Workshop Rescheduled*
- *Laboratory System Improvement Program To Be Initiated by WPHL*
- *Weird Bugs from the Winter*
- *Update on MLT Program at CC*
- *New Laboratory Facility in Cheyenne*



What's Coming Up?

Event	Location	Date
Shipping of Infectious Substances	Laramie, WY	August 18-19
Intermountain States Seminar	Jackson, WY	September 16-19
Exploring Best Practices in the Laboratory	Laramie, WY	October 15 or 16
State Public Health Laboratory Systems Performance Meeting	Casper, WY	October 28

Check out the BT Resources page at:

<http://www.health.wyo.gov/phsd/lab/btintro.html>

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