Idaho Bureau of Laboratories

Clinical Forum

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State of Idaho

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Enhanced *Cryptosporidium* Surveillance in Idaho

Bureau of Communicable Disease Prevention

Cryptosporidiosis is widespread throughout the United States and is increasing in Idaho with a rise from 29 reported cases in 2002 to 147 reported cases in 2013. Since the 1990s, discoveries on the taxonomy of *Cryptosporidium* have shown that this parasite can be transmitted to people from other people and from several animal species. Each species of *Cryptosporidium* is most commonly found in a specific animal host but can be transmitted between species. For instance, *C. hominis* is commonly transmitted from person to person, but people can also get infected with *C. parvum*, often found in ruminants, as well as *Cryptosporidium* species found in other hosts, such as cats, dogs, rodents, and poultry. Transmission occurs by ingestion of fecal particles containing *Cryptosporidium* oocysts from human or animal hosts. *Cryptosporidium* oocysts are very hardy and resistant to chlorine disinfection, making *Cryptosporidium* an effective waterborne pathogen, even in properly maintained swimming pools.

Molecular methods are the only way to distinguish between the many species and genotypes of *Cryptosporidium*, which determines the most likely host source of exposure. In addition, molecular evidence can help confirm or exclude epidemiologically-linked exposures by comparing *Cryptosporidium* species and genotypes among clinical samples and between clinical and environmental samples. Since only a few species

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IBL Website Updates

Wendy Loumeau

Idaho Bureau of Laboratories (IBL) has made a few changes to our website (www.statelab.idaho.gov) to improve functionality for clients (see Figure 1).

The first is the new and improved *Sampling and Submission Guide*. This guide now contains a listing of tests performed at IBL and is organized by agent. Prior to submitting a sample to IBL, the client will select the agent for which testing will be requested and determine whether or not specimen requirements are met and sampling materials are appropriate. Shipping instructions and a link to the corresponding test request form are included in each agent's sampling and submission guide. The guide also provides an approximate turnaround time and details reporting requirements.

This listing is still in progress, and guides are being added as needed. IBL hopes to add

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IDAHO DEPARTMENT OF HEALTH & WELFARE

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Cryptosporidium Surveillance

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cause human infection, molecular methods are necessary to identify possible sources of transmission.

Use of *Cryptosporidium* genotyping has helped resolve several outbreaks as well as improve epidemiologic knowledge of the illness. For instance, in 2009 in North Carolina, public health officials identified zoonotic transmission of *C. parvum* that had occurred from pre-weaned calves to camp attendees and staff, an epidemiologic link that traditional laboratory methods failed to identify. Additionally, in 2007, Colorado, Idaho, New Mexico, and Iowa identified a previously rare *C. hominis* subtype in 40 of 57 (70%) sporadic cases from all four states.

To help Idaho enhance *Cryptosporidium* surveillance and outbreak investigation by implementing speciation and genotyping of *Cryptosporidium*, please submit *Cryptosporidium*-positive (by EIA or direct examination) stool samples to the Idaho Bureau of Laboratories (IBL) for molecular analysis. Molecular findings will be contributed to CryptoNet, the Centers for Disease Control and Prevention's *Cryptosporidium* molecular surveillance network, to improve national surveillance and outbreak detection, as well as reported back to the submitter. Ideally, samples should not be stored in formalin-based or mercury-based fixatives – fresh stools or samples stabilized in EcoFix® are acceptable for molecular testing. Samples can be stored at 4°C if fresh or at room temperature in EcoFix® and should be received at IBL within 7 days of collection. If you would like more information about sample submission for *Cryptosporidium* speciation and genotyping, please contact Amanda Bruesch, Principal Microbiologist, at 208-334-2235 x 267.

Preparedness Survey #1-2014 Summary

Wendy Loumeau and Robert Voermans

Idaho Bureau of Laboratories (IBL) provides preparedness surveys to laboratories within the Idaho Sentinel Laboratory Network (ISLN) that conduct microbiological testing. The surveys are designed to assess the ability of sentinel laboratories to recognize and perform testing related to potential biological threat (BT) agents and emerging microbial pathogens.

Survey #1-2014 included two lyophilized swabs and was sent in February of this year. Twenty-six laboratories participated. This article contains a summary of the identifications of agents sent for this survey. Figures 1 and 2 show identification results for both organisms.

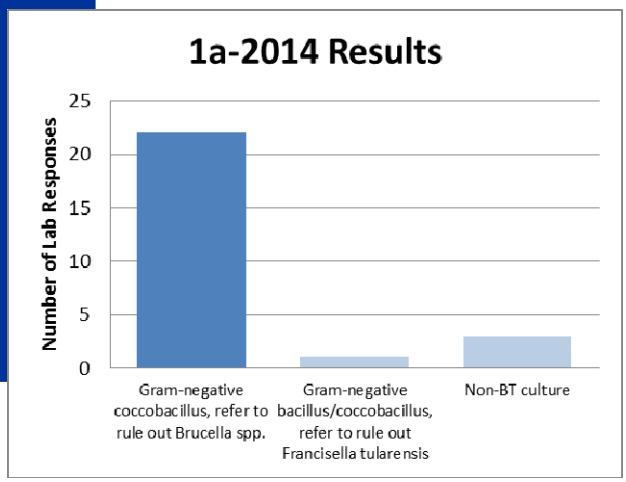

Figure 1. 85% of participating labs were unable to rule out *Brucella* spp. for organism #1a-2014. This was the intended result.

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IBL Website Updates

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Sampling and Submission Guides for environmental testing by the end of 2014. Call IBL at 208-334-2235 to inquire about tests not listed and to provide additional feedback.

The second update to the website is the addition of the *Amended Information for Submitted Samples form*. This form is designed to be used if a client needs to make changes to patient data, request additional tests, or amend any other information pertaining to previously submitted samples to IBL. Data sent on this form will be encrypted and meet HIPAA guidelines and standards. The information submitted will be used solely by IBL and only in relation to testing and resulting of samples submitted for analysis. Phone calls to add tests or correct information will no longer be accepted, and requestors will be asked to submit these requests via this form.

IBL hopes these changes improve the usability of the website and provide clients with tools to aid in the submission and sample information amendment processes at IBL. We welcome your feedback as we continue website updates. Please contact us with additional recommendations.

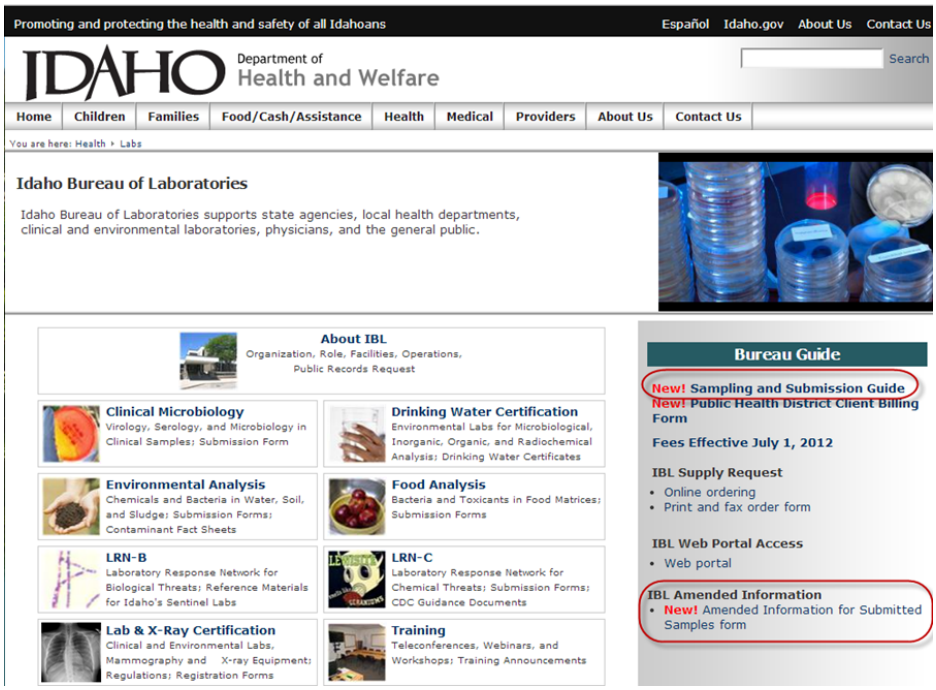

Figure 1. The *Sampling and Submission Guide* and *Amended Information for Submitted Samples form* can be accessed on the State Lab Home Page (www.statelab.idaho.gov).

Preparedness Survey Summary

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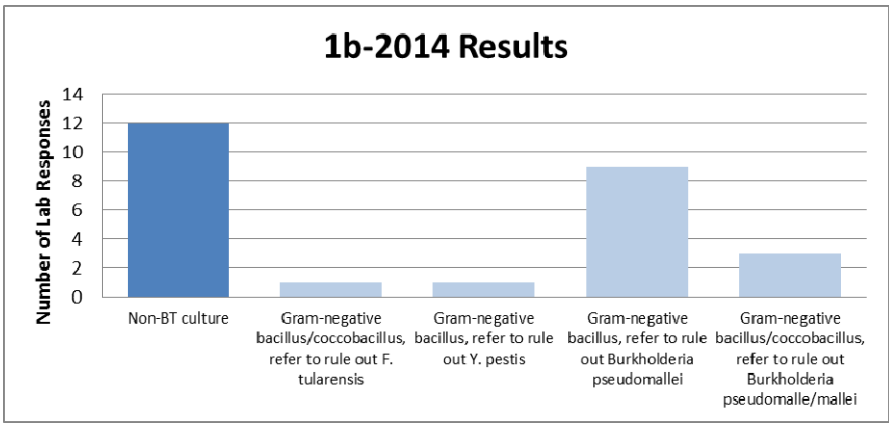

Figure 2. 46% of labs identified organism #1b-2014 as a non-BT culture. This was the intended result.

Organism 1a-2014 was the Select Agent exempt strain *Brucella abortus*, RB51. RB51 was selected because it is presumed to be less likely to cause severe disease in humans. *Brucella* is a fastidious, aerobic, small, gram-negative coccobacillus that grows slowly and is difficult to isolate (Figures 3 and 4). *Brucella* is one of the smallest gram-negative organisms likely to be seen in the clinical laboratory. Early

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Preparedness Survey Summary

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recognition that an isolate may be a *Brucella* species is important for reasons of public health and laboratory safety as well as the patient's diagnosis. Fortunately, *Brucella* species have some easily determined key features than can lead to an early suspicion of the organism's identity: slow growth on blood agar plates (BAP) and chocolate (CHOC) agar , no growth on MacConkey (MAC) agar , catalase, oxidase, and urease positive, and non-motile.

Organism 1b-2014 was *Bordetella bronchiseptica*. This is a small, gram negative coccobacillus that is indole negative, oxidase, urease, and catalase positive and motile. *B. bronchiseptica* grows well on BAP, CHOC, and MAC agars within 24 hours. Additionally, *B. bronchiseptica* is susceptible to the antibiotics colistin and polymyxin B and is also negative for arginine decarboxylase. Clinical labs should have been able to rule out *Francisella tularensis, Burkholderia mallei* and *Brucella* spp., as these organisms do not grow on MAC agar. The positive motility and urease test would have ruled out *Yersinia pestis* as a possibility. *Burkholderia mallei/pseudomallei* are resistant to colistin and polymyxin B and positive for arginine decarboxylation; either of these tests would have ruled out organism 1b-2014 (*Bordetella bronchiseptica*) as one of these organisms.

Automated identification systems are ubiquitous in the clinical laboratory; however, it is not recommended that these systems be used to identify suspected *Brucella* species due the risk of laboratory-acquired infection. Care should be taken with this type of organism to avoid work on the open bench and production of aerosols as would occur when using automated ID systems. Additionally, few evaluations of performance of such systems have been made for *Brucella* identification, but all suggest that the performance of automated systems has generally been poor. For example, 100% (4) of labs using automated systems to aid in the identification of specimen 1a-2014 misidentified the sample. The misidentifications included *Bergeyella zoohelcum*, *Roseomonas gilardii*, and *Kocuria* spp.

Per the American Society for Microbiology (ASM) guidelines, exercise participants were required to contact IBL if they were unable to rule out an agent of bioterrorism. IBL should have received notification that 1a-2014 could not be ruled out as a select agent. If a sentinel lab is unable to rule out a select agent on real samples, IBL must be notified prior to sending the sample (Figure 5).

IBL thanks ISLN laboratories for their participation in these surveys. The data acquired provides valuable information and guidance for future BT trainings and areas of focus for future communications.

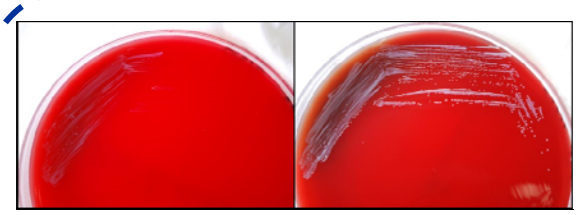

Figure 3. *Brucella abortus* on BAP at 24 and 48 hours at 37° C.
Image provided by CDC Public Health Image Library (PHIL) at www.phil.cdc.gov.

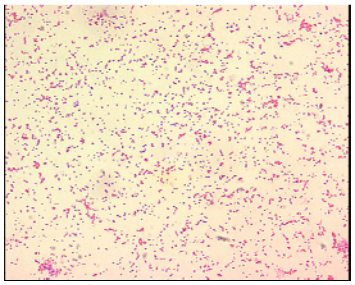

Figure 4. *Brucella* spp. are small, gram-negative organisms that are faintly staining.
Image provided by CDC Public Health Image Library (PHIL) at www.phil.cdc.gov.

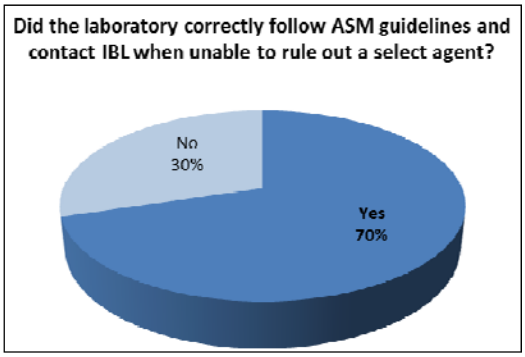

Figure 5. 70% of labs correctly followed ASM guidelines and contacted IBL when they were unable to rule out a select agent on one or both samples.

Dave Passes the Torch

Dave Eisentrager recently retired as Idaho Bureau of Laboratories (IBL) Laboratory Improvement Section Manager after 23 years with IBL. In 1971, Dave was employed as a Certified Medical Technologist after attending the St. Alphonsus School of Medical Technology. He then spent 17 years in the St. Alphonsus hospital laboratory system. Dave began his career with IBL as the Clinical Laboratory Inspector in 1990 and inherited the Laboratory Improvement Section manager position within 2 years.

Dave's goal has always been to bring the laboratories and x-ray facilities into compliance with State and Federal regulations in a compassionate but firm way, using a relational approach as opposed to one of contention. Dave has also been an asset in responding to requests and resolving complex issues within the CLIA and X-ray programs.

Highlights of his tenure at IBL include teaching at ISU's campus in Meridian, interacting with other regulators as a consultant, and working with the other clinical laboratory scientists in their annual meetings.

Dave plans to keep busy during retirement with hopes to get the bass boat in the water more often than it has been, resurrect his golf game, and tackle the "honey do" list around the house. He also has an Alaskan cruise lined up for this summer.

Thanks Dave for your dedication and vision at IBL these past 23 years. You will be missed!

Word Scramble

answers on page 6

1. UESEAR _____

2. IOTYLMTI _____

3. TOEYPNEG _____

4. YTROMSIODPPCRIU _____

5. NNELITSE TYRALBOROA _____ _____

6. ANROWTBERE ESHNTGOAP _____ _____

7. ABEDTLLREO HOERSCBIACTPIN _____ _____

8. ISSIODAFUT _____

9. OACLIULOCBCCS _____

10. AUBECLRL ORSAUTB _____ _____

To be added or removed from the Clinical Forum email list:

statelab@dhw.idaho.gov

Solution to Word Scramble

1. UREASE
2. MOTILITY
3. GENOTYPE
4. CRYPTOSPORIDIUM
5. SENTINEL LABORATORY
6. WATERBORNE PATHOGENS
7. BORDETELLA BRONCHISEPTICA
8. FASTIDIOUS
9. COCCOBACILLUS
10. BRUCELLA ABORTUS

Lindsey Catlin, Microbiologist Senior

Lindsey Catlin joined IBL on June 23, 2014 as a Microbiologist, Senior. She was born and raised in Nevada and came to Boise to attend Boise State University. She completed her Bachelor's degree in Human Biology while working on multiple research projects. She worked under Dr. Troy Rohn doing research on Alzheimer's and Parkinson's diseases. She also worked under Dr. Julie Oxford on the role of radiation and microgravity in the progression of osteoarthritis. Lindsey was a member of the NASA Microgravity University program initially as the biology team lead and then as a biology faculty mentor. This project focused on the effects of microgravity on calcium signaling in bone cells.

In her free time Lindsey enjoys travelling, knitting, and the outdoors. She also enjoys gardening and cooking.

Katey Anderson, Lab Improvement Manager

Born and raised in Cascade, Katey Anderson obtained a B.S. in Biology with a minor in English from Boise State University before continuing on to finish her M.S. in Biology from the same institution. She came to work for Idaho Department of Health and Welfare in 2008 – starting as a Research Analyst, Senior in the Bureau of Vital Records and Health Statistics. In 2010, Katey accepted the Quality Assurance Manager position at IBL, helping to establish a bureau-wide quality assurance program that has successfully assisted the bureau through federal audits without significant deficiencies. In March of 2014, Katey accepted a promotion to Laboratory Improvement Manager following the retirement of long-time leader, Dave Eisentrager.

Last fall, Katey and her husband welcomed a son, Cole, into the world. Avid outdoorsmen, Katey and her husband enjoy spending time hiking and boating in McCall.

Upcoming Webinars

October 7, 2014; 11:00 am Mountain Time

"2014 Influenza Update"

November 4, 2014; 11:00 am Mountain Time

"Metrics in Microbiology: Monitoring Processes and Taking Action"

Contact Wendy Loumeau at loumeauw@dhw.idaho.gov to access archived programs.