Idaho Bureau of Laboratories

Clinical Forum

Volume 6, Issue 2 Summer 2013

State of Idaho

Bureau of Laboratories

2220 Old Penitentiary Rd

Boise, ID 83712-8249

Phone: 208-334-2235

Fax: 208-334-4067

E-mail: statelab@dhw.idaho.gov

IDAHO DEPARTMENT OF HEALTH & WELFARE

Inside this issue:

Cryptosporidiosis in Idaho

The Bureau of Communicable Disease Prevention

Cryptosporidiosis is a diarrheal disease caused by intestinal infection with *Cryptosporidium*, a unicellular, obligate, intracellular parasite of humans and other animals. Infected hosts shed resistant oocysts in the stool into the environment, where oocysts can survive adverse conditions for up to a year.

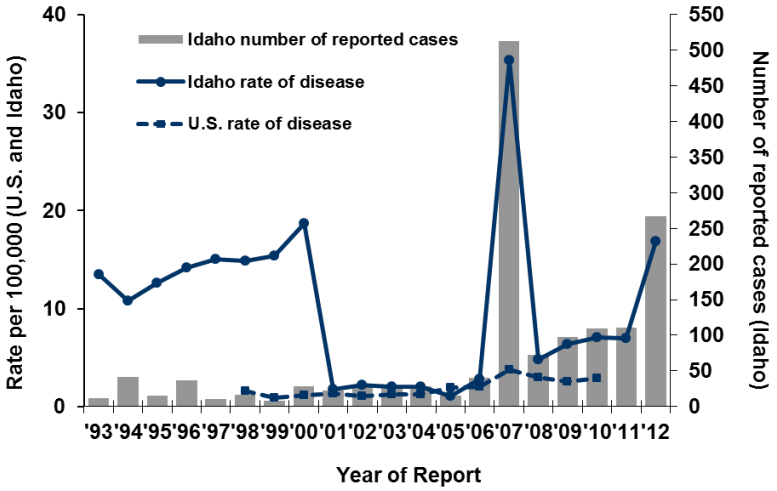

Figure 1: Number and rate of reported cases of cryptosporidiosis*, Idaho and U.S. 1993–2012

*Cryptosporidiosis was not tracked in Idaho until 1993. It was not tracked nationally until 1998.

Until the mid-1990s, *Cryptosporidium parvum* was identified as the primary species infecting humans and a broad range of other animals; most human cases of cryptosporidiosis were attributed to animal contact. Taxonomic studies using molecular techniques have clarified the understanding of the pathogen/host relationship and several new *Cryptosporidium* species have been described. The new species designations depict their host-specific origin, for example, *C. hominis* (human host), *C. canis* (dog host), and *C. felis* (cat host), while *C. parvum* is retained for the cattle host where it was originally described. *C. hominis* and *C. parvum* are the two species most frequently isolated from human cases and the only species that have been implicated in waterborne outbreaks.

Since the nadir in 2005, annual incidence of reported cryptosporidiosis in Idaho (Figure 1) has

(continued on page 3)

Increased Testing Capabilities at IBL

Idaho Bureau of Laboratories (IBL) has the capability to test for two emerging viruses of global concern: MERS-CoV, causing Middle East Respiratory Syndrome (MERS), and avian influenza A (H7N9) virus.

Samples suspected of either of these viruses may be referred to IBL. For more information, call 208-334-2235.

Idaho Full Scale Exercise

Michael Stevenson, PhD

On April 29, 2013, the Idaho Department of Health and Welfare (IDHW) began its *Statewide Medical Countermeasure Full-Scale Exercise* (MCM FSE). This was an operations-based exercise that lasted three days, involved 35 players and encompassed multiple exercise venues in each of the seven Public Health Districts and IDHW. The exercise included the activation and operations of eight separate Emergency Operations Centers (EOCs), six separate District Distribution Centers (DDCs), seven Point of Dispensing (POD) Clinics, and one State Receive, Stage, and Store (RSS) Warehouse.

The purpose of the MCM FSE was to conduct an exercise for distributing and dispensing Strategic National Stockpile (SNS) medical countermeasures, using National Incident Management System (NIMS) principles and operating under the Incident Command System (ICS). The scenario of this exercise involved credible intelligence reports warning of possible bioterrorism attacks and a statewide release of anthrax in which emergency rooms and doctor offices filled up with patients reporting flu-like symptoms and fevers.

One of the initial steps of the exercise was notification and assembly of the IDHW Operations Center (IDHWOC). The team consisted of an EOC Manager, a Public Information Officer, a Safety Director, and several Section Chiefs covering Logistics, Planning, Operations, and Finance. Players for these positions involved the Bureau Chiefs of the IDHW Division of Health, the Division Administrator, and the State Public Health Medical Director.

The IDHWOC followed the NIMS guideline for initial response and assessment during the three days of the exercise. This involved an incident briefing, development of objectives, tactics and planning meetings, execution of plans, and continuation in this cycle with new objectives.

(continued on page 5)

Sentinel Laboratory Preparedness Survey

Wendy Loumeau and Robert Voermans

Idaho Bureau of Laboratories (IBL) provides a free service to Idaho's sentinel laboratories performing microbiological analysis. Two lyophilized swabs are sent to participating laboratories three times a year. Labs are instructed to process the specimens according to their facility's procedures.

This challenge is intended to test the sentinel lab's ability to thoroughly follow the protocols outlined for the rule-out or refer component of select agent identification. Results are submitted via an online survey. The results packet includes an individual results summary, an overall results summary, and a discussion narrative.

The most recent survey was sent in May 2013, of which 28 Idaho sentinel laboratories participated. The organisms sent were *Yersinia pestis*, A1122 strain (organism #2a-2013) and *Pseudomonas luteola* (organism #2b-2013). Results of the survey are shown in Figures 2 and 3.

The gram stain of *Y. pestis* reveals plump gram-negative rods. At 24 hours, *Y. pestis* produces hazy growth or pinpoint colonies. At 48

(continued on page 4)

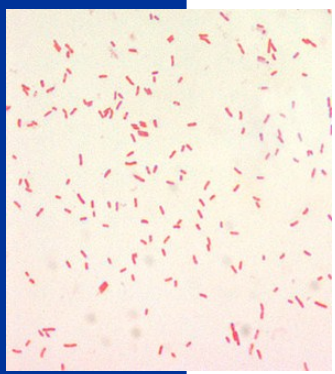

Figure 1: *Yersinia pestis* gram stain reveals plump, gram-negative rods.

Cryptosporidiosis in Idaho

continued from page 1

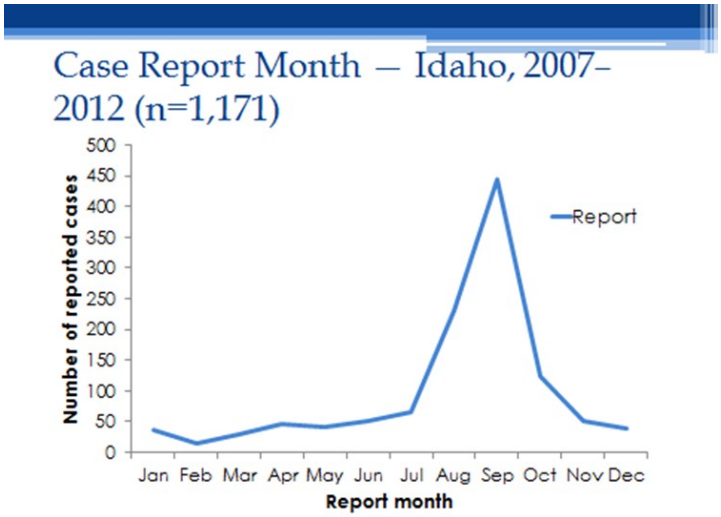

Figure 2: Number of cases of cryptosporidiosis reported in Idaho by month for the period of 2007 through 2012.

been steadily increasing. The extension of Food and Drug Administration (FDA)-approved specific treatment for cryptosporidiosis in 2005 may be responsible for the increased testing and case detection; however, the large peak of Idaho cases seen in 2007 is attributed to outbreaks associated with recreational water venues. In 2012, an outbreak associated with swimming pools and a community-wide outbreak of undetermined and likely multiple sources contributed to the large number of reported cases.

During the five year period from 2007–2012, the incidence of reported cases was highest in male children aged five years and younger (4 per 100,000), followed by female adults aged 20–39 years (1.9 per 100,000). Cryptosporidiosis has a very seasonal distribution, as the number of reported cases in September is nearly 30 times greater than in February (Figure 2). Nearly half (44%) of reported cases during this time period were associated with an outbreak (Figure 3).

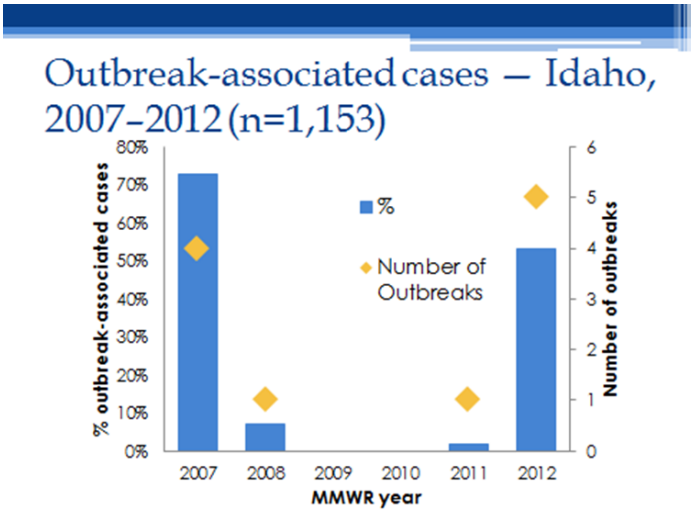

Figure 3: Number of cases of cryptosporidiosis in Idaho associated with outbreaks and number of outbreaks per year for the period of 2007 through 2012.

Molecular studies at the Centers for Disease Control and Prevention (CDC) on isolates from clinical and environmental samples identified *C. hominis* IaA28R4 as the etiologic agent in a splash-park associated outbreak in 2007[1]. Because all forms of *Cryptosporidium* are morphologically indistinguishable by traditional clinical laboratory tests, speciation and genotyping of *Cryptosporidium* isolates is needed to help elucidate the transmission ecology of *Cryptosporidium* in Idaho and the U.S. The Idaho Division of Public Health encourages clinical laboratories to work with Public Health Districts on submission of *Cryptosporidium* isolates to Idaho Bureau of Laboratories (IBL) for molecular characterization, which requires Public Health Districts to complete and submit special forms with epidemiologic information on each sample.

We thank all the providers, laboratories, and Public Health Districts for their assistance with sample collection, sample submission, case reporting, and data collection for this effort.

References

[1]CDC. Outbreak of cryptosporidiosis associated with a splash park — Idaho, 2007. MMWR 2009; 58(22). http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5822a2.htm

Sentinel Laboratory Preparedness Survey

continued from page 2

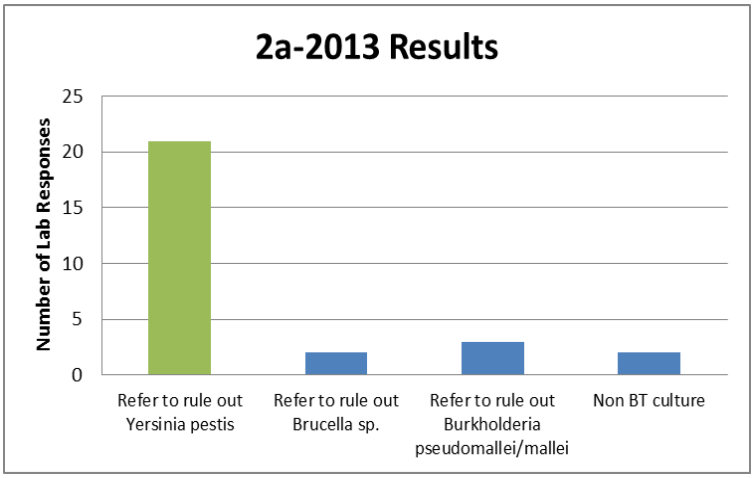

Figure 2: 75% of participating labs were able to correctly rule out *Y. pestis* for organism #2a-2013.

hours, colonies are grey-white to slightly yellow and opaque except on MAC where colonies are clear and have a raised, irregular "fried egg" appearance which develops as the culture ages. The slow growth rate of *Y. pestis* distinguishes it from other Enterobacteriacae found in clinical samples. Biochemically, *Y. pestis* is oxidase negative, catalase positive, urea and indole negative. Automated identification systems may misidentify *Y. pestis* as *Acinetobacter, Shigella,* or H_2S-negative *Salmonella.*[1]

Plague can be transmitted to humans by bites of infected rodent fleas (the most common route), by handling an infected animal, or through inhalation when in close contact with an infected animal or human. Wild rodents, such as ground squirrels, are common natural reservoirs. Other less frequent sources of infection include wild rabbits, and carnivores that pick up their infections from wild rodent outbreaks. Domestic cats and dogs are readily infected by fleas or from eating infected wild rodents.[2]

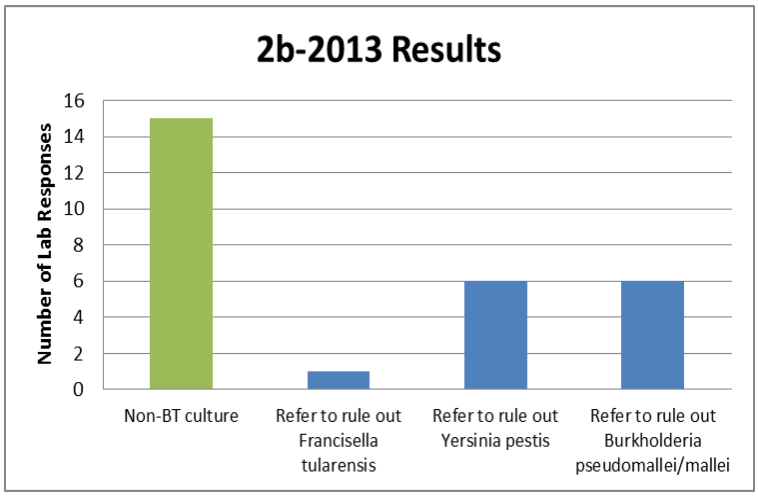

Figure 3: 54% of participating labs correctly identified organism #2b-2013 as a non-BT culture.

Pseudomonas luteola is an aerobic non-spore-forming gram-negative rod. It is catalase positive, oxidase, indole, and urease negative, motile, nitrate negative, and arginine positive. It grows well on SBA, CHOC, and MAC as a lactose non-fermenter. Initial growth is good at 18-24 hours, and colonies are smooth changing to rough, wrinkled, adherent colonies with extended incubation. Colonies are distinctive in their production of an intracellular, non-diffusible yellow pigment. *P. luteola* most resembles the bio-threat agents *Burkholderia mallei/pseudomallei*. *P. luteola* can be differentiated from *B. pseudomallei* by its production of yellow pigment, negative nitrate and oxidase result. *P. luteola* differs from *B. mallei* by growth on MAC, yellow pigmentation, motility, and positive arginine results.

Did the laboratory correctly follow ASM guidelines and contact IBL when unable to rule out a select agent?

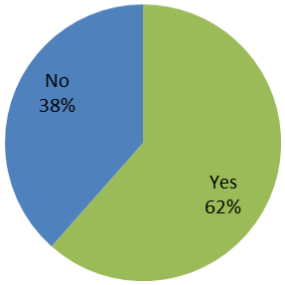

Figure 4: 62% of participating labs correctly followed the ASM guidelines and contacted IBL when they were unable to rule out a select agent on one or both samples.

An essential step referring select agents for both real and proficiency situations is contacting IBL prior to sending the suspected agent. The preparedness surveys test and document this component. For this exercise, 62% of laboratories correctly followed this procedure (Figure 4); this reinforces the need for continued communication with sentinel laboratories.

We thank the sentinel laboratories for their participation in the Idaho Sentinel Laboratory Network (ISLN). For questions or to sign up for the Idaho Sentinel Laboratory Preparedness Surveys, contact Wendy Loumeau at loumeauw@dhw.idaho.gov.

(continued on page 6)

Idaho Full Scale Exercise

continued from page 2

The exercise played out as follows: On Day 1, the Governor requested release of the SNS anthrax prophylaxis from CDC to have it delivered to the Boise RSS. On Day 2, the meds arrived in town and were organized for distribution and delivery to the DDCs. On Day 3, the PODs were set up and the meds were distributed to individuals (people actually participated in going through the PODs).

Overall, the statewide MCM FSE was a success. The objectives defined for the exercise were all met. Although areas for improvement were expected and were identified, the FSE indicates Idaho has advanced in many areas since a similar exercise was held in 2006.

Word Scramble: Summer Diseases

answers on page 6

1. ARCYABPMECTOL _ _ _ _ _ _ _ _ _ _ _ _ _
2. ACEHRLO _ _ _ _ _ _ _
3. OCPTSURIRIDOMYP _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
4. SRCYCOLPAO _ _ _ _ _ _ _ _ _ _
5. EGDNEU _ _ _ _ _ _
6. E. ILCO _. _ _ _ _
7. ENREIGITSOSTRTA _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
8. RIIDAGA _ _ _ _ _ _ _
9. AVHURNAIST _ _ _ _ _ _ _ _ _
10. RSOLPYE _ _ _ _ _ _ _
11. EYML SSEEAID _ _ _ _ _ _ _ _ _ _ _ _
12. ALMIAAR _ _ _ _ _ _ _
13. SASMEEL _ _ _ _ _ _ _
14. ALPEUG _ _ _ _ _ _
15. RAEBIS _ _ _ _ _ _
16. LNMLAOLSAE _ _ _ _ _ _ _ _ _ _
17. GISHLAEL _ _ _ _ _ _ _ _
18. SWET LEIN USVIR _ _ _ _ _ _ _ _ _ _ _ _ _

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

statelab@dhw.idaho.gov

Solution to Word Scramble

1. CAMPYLOBACTER
2. CHOLERA
3. CRYPTOSPORIDIUM
4. CYCLOSPORA
5. DENGUE
6. E. COLI
7. GASTROENTERITIS
8. GIARDIA
9. HANTAVIRUS
10. LEPROSY
11. LYME DISEASE
12. MALARIA
13. MEASLES
14. PLAGUE
15. RABIES
16. SALMONELLA
17. SHIGELLA
18. WEST NILE VIRUS

Upcoming Teleconferences

September 17, 2013; 11:00 am Mountain Time

"Laboratory-Acquired Infections"

September 24, 2013; 11:00 am Mountain Time

"Risk Assessment in the Clinical Microbiology Laboratory"

October 1, 2013; 11:00 am Mountain Time

"2013 Influenza Update"

Archived programs are available upon request. Contact Wendy Loumeau at loumeauw@dhw.idaho.gov for more information.

Sentinel Laboratory Preparedness Survey

continued from page 4

References

[1]Sentinel Laboratory Guidelines for Suspected Agents of Bioterrorism, *Yersinia pestis*, CDC, ASM, APHL, 11 February 2008, found at: http://www.asm.org/images/pdf/Clinical/Protocols/ypestis06-11-10.pdf

[2]Centers for Disease Control and Prevention, General Information on Plague, found at: http://www.cdc.gov/ncidod/dvbid/plague/info.htm