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In This Issue

Brucella Exposure in Hospital Laboratory Workers

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Introduction

Laboratory workers are at risk for infection from testing specimens containing certain pathogens when appropriate precautions are not implemented. Infections can occur through inhalation, needle sticks, contact with mucous membranes, or ingestion. Viruses, bacteria, fungi, and parasites are all capable of infecting laboratory workers[1]. The most commonly reported laboratory-associated bacterial infection is brucellosis[2].

Background

On October 27, 2009, the Hillsborough County Health Department (CHD) was notified of a death in a patient with a preliminary *Brucella melintensis* result from a local hospital laboratory. Subsequent testing at the Bureau of Laboratories (BOL) in Jacksonville indicated that the organism was *Brucella suis*. An investigation was initiated working with the hospital infection preventionist (IP), the hospital laboratory, the hospital employee health nurse, the BOL in Jacksonville, and a family member.

The patient had an underlying health condition that affected his heart. Because of this condition, he had undergone multiple heart procedures, the last of which was in 1991. The patient was hospitalized in July 2008, January 2009, and most recently in October 2009. Each of these hospitalizations documented fevers of 102° to 103° F. Doctors suspected endovascular infection at the first and third visits, but the causative organism was not identified until the final admission.

Though the patient was an avid wild hog hunter, no mention of hunting was noted in the medical record. The Hillsborough CHD investigation learned that the last time the patient hunted was prior to his second admission in January 2009.

Laboratory Investigation
The hospital laboratory was not notified to treat the blood culture with appropriate precautions, as the doctor did not suspect *Brucella*. Once *Brucella* was identified, the laboratorians worked with the culture under a hood; however, the microbiology laboratory workers had been exposed to the culture prior to the identification.

Employee Health evaluated all exposed persons and identified nine laboratory workers who met the definition of high risk (see next page) and 21 who met the definition of low risk. All nine high-risk people were prophylaxed. Seven people received the standard combination of doxycyline and rifampin for 21 days, and two people received trimethoprim-sulfamethoxazole and rifampin for 21 days. In addition, review of the patient's second hospital admission records indicated that laboratory workers were exposed to a previous culture that was not identified as *Brucella* at the time, and these workers were also recommended for testing.

All exposed lab workers were asked to submit serum shortly after the exposure was identified and then at the recommended intervals (two, four, six, and twenty-four weeks) to identify any potential infections. The serum was sent to the BOL in Tampa for processing and then to the Centers for Disease Control and Prevention (CDC) for agglutination testing. At each of the testing intervals an e-mail was sent out to all affected workers requesting that they submit serum for testing, and notifying them of the time and location of tests. Members of the Employee Health team went to the microbiology laboratory to collect samples twice a day at shift-change for several days at each of the specified intervals in an attempt to obtain the highest compliance possible. In addition, laboratory workers who were unavailable to be tested in the laboratory were offered a testing appointment with Employee Health.

One laboratory worker was identified as having a 1:160 total titer on the baseline test. This specimen was drawn two days prior to her completion of 21 days of post-exposure prophylaxis with doxycycline and rifampin. Employee Health was notified of the high titer by the CDC and the laboratory worker was prescribed another course of doxycycline and rifampin. After taking the first dose of these two drugs, the worker had a severe anaphylactic reaction and discontinued treatment. The worker did not have symptoms that would meet the brucellosis case definition. However, she was referred to a private infectious disease physician who prescribed ciprofloxacin and continued to follow the patient throughout the 24-week testing period.

All 32 of the low- and high-risk exposures submitted initial samples for testing, and 28 submitted samples for the final tests. The results of the final 24-week agglutination tests indicated that no additional laboratory workers acquired brucellosis from this exposure.

***Brucella* Exposure in Laboratory Workers**
The risk for *Brucella* exposure in laboratory workers is present when samples are cultured, because they are easily aerosolized and *Brucella* has a low infectious dose of 10 to 100 bacteria[3]. There is no risk from exposure to blood, tissue, or other fluids prior to culture when standard precautions are used. Unprotected laboratory workers can be exposed through common laboratory practices, as well as inappropriate laboratory technique. Everyday laboratory procedures that can put an individual worker at risk for *Brucella* include working with an unidentified culture on an open bench, or in a class II Biological Safety Cabinet (BSC) without adhering to Biosafety Level 3 (BSL-3) precautions. Other high-risk laboratory behaviors include mouth-pipetting samples, sniffing a culture in order to identify the bacteria, or performing aerosol-generating procedures such as using a vortexer or a shaker tube without a cap, or putting the sample into an automated system. Risk of *Brucella* exposure also extends to other people present in the laboratory who do not work directly with the culture. Risk extends to persons

working in close proximity to the culture on an open bench, and to everyone present when aerosolizing procedures are used anywhere in the laboratory or when a sample breaks within a centrifuge.

In 2009, more than 86 Florida laboratory workers were exposed to *Brucella* and one Florida specimen likely caused brucellosis in a laboratory worker in another state. These exposures resulted from only four initial cases of brucellosis. In addition to the previously discussed laboratory exposures in Hillsborough County, one case in Seminole County exposed 31 workers in two hospital laboratories across two counties and one case in Hernando County exposed seven laboratory workers in three laboratories across three counties.

Brucella Exposure Recommendations for Laboratory Workers

The first line of defense against *Brucella* exposure in laboratory workers is following standard laboratory precautions. When *Brucella* is suspected it is vital for the ordering provider to label the specimen with "rule out *Brucella*." Laboratory workers can then take precautions such as wearing appropriate Personal Protective Equipment (PPE), working with the specimen in a class II BSC, and limiting access to the laboratory to necessary personnel[1]. Unfortunately, *Brucella* is not always suspected when it is present, which puts laboratory workers at risk. The CDC recommends the following procedures to reduce exposure risk when working with unidentified cultures:

- manipulate specimens in ways that minimize splashes or aerosols,
- refrain from sniffing open plates, and
- work with small gram-negative or gram-variable rods within a BSC[1].

When *Brucella* is positively identified in a culture, it is important to assess all laboratory workers for exposure and classify them according to risk as high, low, or no risk. Workers who only manipulated the specimen while in a class II BSC and used BSL-3 precautions are considered to have no risk. High risk is assigned to: individuals who manipulated the specimen on an open bench or in a class II BSC without using BSL-3 precautions; anyone within a five-foot radius of the culture while it was manipulated on an open bench (regardless of aerosol-generating procedures); and everyone in the laboratory if an aerosol generating procedure was performed on an open bench. Prophylaxis is recommended for everyone categorized as high risk. Individuals are considered to be at low risk if they were present in the laboratory while the specimen was being manipulated, but do not fit the high-risk criteria as defined above. Specifically, people meet the definition of low risk if they were: present in the laboratory and did not work directly with the culture; were not within the five-foot radius of the culture on an open bench; and were not present in the laboratory during any aerosol-generating procedure. People at low risk of exposure should be informed about post-exposure prophylaxis and allowed to choose whether or not to take it[4].

The standard recommendation for post-exposure prophylaxis is doxycycline 100 mg orally twice daily and rifampin 600 mg once daily for at least 21 days. For people who can not take doxycycline, trimethoprim-sulfamethoxazole 160mg/800 mg orally twice daily for at least 21 days may be substituted[3]. Pregnant women classified as high or low risk should consult with their obstetrician.

Test high- and low-risk persons for brucellosis and institute an active surveillance system to monitor for symptoms. Draw blood as soon after the exposure as possible and, then, at the CDC recommended intervals of two, four, six and twenty-four weeks[1]. The Florida BOL does not perform the recommended agglutination test, but can help coordinate specimen submission to the CDC laboratory. Drawing blood at the exposed laboratory rather than requiring workers to go to a health office to be tested may increase efficiency and compliance. In addition to testing

laboratory workers, conduct surveillance of symptoms, especially fever, for six months post-exposure to identify any possible infections. Test and treat people with symptoms of brucellosis[1].

Because *Brucella* is a select agent regulated by Federal law, laboratory exposures of *Brucella abortis*, *B.melintensis,* and *B.suis* are must be reported to the CDC. The Report of Theft, Loss, or Release of Select Agents and Toxins Form[5] should be completed and will require detailed information on the exposure event, number of people exposed and follow-up actions. The Biological Defense Coordinators at the BOL branches can assist to ensure the form is completed appropriately.

Discussion

The first step to reducing the number of laboratory exposures to *Brucella* is to increase doctors' awareness of risk factors for *Brucella* including hunting or preparing wild hog and consuming unpastuerized milk products (especially while traveling internationally). Once *Brucella* is suspected, the information needs to be communicated clearly to the laboratory, preferably by phone to ensure that all cultures are handled in a BSCII with BSL3 precautions.

Realistically, doctors will occasionally send specimens to laboratories for culture without recognizing the potential for *Brucella*. Therefore, it is imperative for laboratory workers to use proper laboratory technique for all unknown specimens including: never pipetting by mouth; refraining from sniffing cultures to aid in identification; and minimizing the possibility of sample aerosolization. As soon as laboratory workers culture unidentified gram-negative or gram-variable rods, they should move the culture immediately into a BSCII to prevent subsequent exposure, in case it is ultimately identified as *Brucella*. Once *Brucella* is identified, the laboratory must report the result to the Florida Department of Health and make arrangements to have the sample speciated at a state laboratory.

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Florida Year-to-Date Mosquito-Borne Disease Summary Through June 26, 2010

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During the period from January 1 through June 26, 2010, the following arboviral activity was recorded in Florida:

Eastern Equine Encephalitis Virus (EEEV) Activity
Positive samples were obtained from 17 horses, 41 sentinel chickens, 13 live wild birds, and three mosquito pools in 25 counties.

West Nile Virus (WNV) Activity
Positive samples were obtained from 47 sentinel chickens in five counties.

St. Louis Encephalitis Virus (SLEV) Activity
No activity reported in 2010.

Highlands J Virus (HJV) Activity
Positive samples were obtained from 14 sentinel chickens in seven counties.

California Encephalitis Group Viruses (CEV) Activity
No activity reported in 2010.

Dengue Virus (DENV)
Nine locally-acquired cases of dengue were reported from Key West in Monroe County. Twenty-one imported cases with onset in 2010 in Florida residents were reported from ten counties. Places of origin include Brazil, Columbia (3), Costa Rica, Dominican Republic (3), Haiti (3), Jamaica, Nigeria (4), the Philippines, Puerto Rico (6), and Venezuela. Three cases were reported as confirmed, 17 as probable, and one as suspect.

Malaria
Forty-five imported cases of malaria with onset in 2010 were reported in Florida residents from 14 counties. Places of origin included Angola, Dominican Republic, Ghana, Guyana, Haiti (31), Honduras (3), Nigeria (4), Uganda, West Africa, and an unknown African country. Thirty-seven (82%) were diagnosed with *Plasmodium falciparum,* four (9%) with *Plasmodium vivax,* and four were unidentified. All cases were confirmed.

Dead Bird Reports
The Fish and Wildlife Conservation Commission (FWC) collects reports of dead birds, which can be an indication of arbovirus circulation in an area. Since January 1, 2010, 154 reports representing a total of 449 dead birds (13 crows, 9 jays, 30 raptors, 397 others) have been received from 41 of Florida's 67 counties. Please note that FWC collects reports of birds that have died from a variety of causes, not only arboviruses. Dead birds should be reported to www.myfwc.com/bird/.

See the following web site for more information
http://www.doh.state.fl.us/Environment/medicine/arboviral/index.html.

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Reportable Diseases in Florida

Up-to-date information about the occurrence of reportable diseases in Florida, based on the Merlin surveillance information system, is available at the following site: http://www.floridacharts.com/merlin/freqrpt.asp. Counts can be displayed by disease, diagnosis status, county, age group, gender, or time period.

Monthly Notifiable Disease Data

Table 1. Provisional Cases* of Selected Notifiable Diseases, Florida, May 1-31, 2010

	Month				Cumulative (YTD)	
Disease Category	**2010**	**2009**	**Mean†**	**Median¶**	**2010**	**2009**
A. Vaccine Preventable Diseases						
Diphtheria	0	0	0	0	0	0
Measles	0	4	1.8	5	0	5
Mumps	1	2	1.8	2	10	7
Pertussis	48	61	22.8	14	112	196
Poliomyelitis	0	0	0.0	0	0	0
Rubella	0	0	0.4	2	0	0
Smallpox	0	0	0	0	0	0
Tetanus	1	0	0.2	1	4	0
Varicella	180	172	N/A	N/A	569	781
B. CNS Diseases & Bacteremias						
Creutzfeldt-Jakob Disease	2	1	1.8	2	4	7
H. Influenzae (invasive)	9	20	13.6	6	85	119
in those ≤5	1	2	3.6	3	9	12
Listeriosis	5	2	1.8	2	15	4
Meningitis (bacterial, cryptococcal, mycotic)	15	21	1.4	12	32	27
Meningococcal Disease	5	2	5.0	4	38	31
Staphylococcus aureus (VISA, VRSA)	0	1	0.2	1	0	3
Streptococcal Disease, Group A, Invasive	18	22	23.8	22	38	53
Streptococcus pneumoniae (invasive disease)						
Drug resistant	63	71	60.2	59	479	459
Drug susceptible	49	51	56.0	57	382	388
C. Enteric Infections						
Campylobacteriosis	103	73	81.8	80	409	358
Cholera	0	0	0	0	0	0
Cryptosporidiosis	29	24	23.2	24	149	111
Cyclospora	1	2	60.4	2	11	12
Escherichia coli, Shiga-toxin producing (STEC)**	8	16	3.2	4	64	67
Giardiasis	179	124	94.2	102	740	762
Hemolytic Uremic Syndrome	0	0	0	0	4	1
Salmonellosis	305	309	298.8	298	1,388	1,324
Shigellosis	64	34	116.4	83	254	176
Typhoid Fever	1	1	0.6	1	7	6
D. Viral Hepatitis						
Hepatitis A	12	14	12.0	13	60	94
Hepatitis B, Acute	35	23	33.2	32	135	137
Hepatitis C, Acute	8	10	4.0	4	50	21
Hepatitis +HBsAg in pregnant women	27	48	49.8	53	194	257
Hepatitis D, E, G	0	0	0	0	1	2

* Confirmed and probable cases based on date of report as reported in Merlin
Incidence data for 2010 is provisional, data for 2009 was finalized on April 1, 2010

† Mean of the same month in the previous five years

¶ Median for the same month in the previous five years

** Includes *E. coli* O157:H7; shiga-toxin positive, serogroup non-O157; and shiga-toxin positive, not serogrouped

†† Includes neuroinvasive and non-neuroinvasive

N/A indicates that no historical data is available to caculate mean and median

Table 1. (cont.) Provisional Cases* of Selected Notifiable Diseases, Florida, May 1-31, 2010

	Month				Cumulative (YTD)	
Disease Category	**2010**	**2009**	**Mean†**	**Median¶**	**2010**	**2009**
F. Vector Borne, Zoonoses						
Dengue	8	2	1.8	2	21	14
Eastern Equine Encephalitits††	0	0	0	0	0	0
Ehrlichiosis/Anaplasmosis	0	1	0.8	1	2	3
Leptospirosis	0	0	0	0	0	0
Lyme Disease	8	3	1.6	3	29	19
Malaria	8	5	4.0	5	46	35
Plague	0	0	0	0	0	0
Psittacosis	0	0	0	0	0	0
Q Fever (acute and chronic)	0	0	0	0	0	1
Rabies, Animal	18	12	13.4	13	58	72
Rabies (possible exposure)	160	118	113.8	118	800	614
Rocky Mountain Spotted Fever	7	1	0.8	1	13	2
St. Louis Encephalitis††	0	0	0	0	0	0
Toxoplasmosis	2	0	0.6	1	4	1
Trichinellosis	0	0	0.2	1	0	0
Tularemia	0	0	0	0	0	0
Typhus Fever (epidemic and endemic)	0	0	0	0	0	0
Venezuelan Equine Enchephalitis††	0	0	0	0	0	0
West Nile Virus††	0	0	0	0	0	0
Western Equine Encephalitis††	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0
G. Others						
Anthrax	0	0	0	0	0	0
Botulism-Foodborne	0	0	0.2	1	0	1
Botulism-Infant	0	0	0	0	0	0
Brucellosis	1	0	0.4	1	7	3
Glanders	0	0	0	0	0	0
Hansen's Disease (Leprosy)	0	0	0.6	1	2	1
Hantavirus Infection	0	0	0	0	0	0
Legionella	13	14	9.2	8	64	59
Melioidosis	0	0	0	0	0	0
Vibriosis	14	11	9.2	11	24	25

* Confirmed and probable cases based on date of report as reported in Merlin
Incidence data for 2010 is provisional, data for 2009 was finalized on April 1, 2010

† Mean of the same month in the previous five years

¶ Median for the same month in the previous five years

†† Includes neuroinvasive and non-neuroinvasive

N/A indicates that no historical data is available to caculate mean and median

Note: The 2010 and 2009 case counts are provisional and are subject to change until the database closes. Cases may be deleted, added, or have their case classification changed based on new information and therefore the monthly tables should not be added to obtain a year to date number.

Please refer any questions regarding the data presented in these tables to Kate Goodin at Kate_Goodin@doh.state.fl.us or 850.245.4444 Ext. 2440.

Recent Publications

Doyle TJ, Hopkins RS, *et al*. Low secondary transmission of 2009 pandemic influenza A (H1N1) in households following an outbreak at a summer camp: relationship to timing of exposure. *Epidemiol. Infect.*, 2010

Upcoming Events

Bureau of Epidemiology Monthly Grand Rounds
Date: Last Tuesday of each month
Time: 10 a.m.-11 a.m., E.T.
Location: Building 2585, Room 310A
Dial-In Number: 877.646.8762 (password: Grand Rounds)

July 27, 2010: "Hospital-Acquired Infections Program Overview" presented by A.C. Burke, M.S.

This Month on EpiCom

Christie Luce

EpiCom is located within the Florida Department of Health's Emergency Notification System (FDENS). The Bureau of Epidemiology encourages *Epi Update* readers to register on the EpiCom system by emailing the Florida Department of Health Emergency Notification System Helpdesk at FDENS-help@doh.state.fl.us. Users are invited to contribute appropriate public health observations related to any suspicious or unusual occurrences or circumstances through the system. EpiCom is the primary method of communication between the Bureau of Epidemiology and other state medical and public health agencies during emergency situations. The following are titles from selected recent postings:

- Untreated typhoid fever case, Miami-Dade County
- Rabid horse, Marion and Alachua counties
- Aggressive fox, Clay County
- Ringworm outbreak in a child care facility, Hillsborough County
- Strep and scarlet fever in a childcare facility, Hillsborough County
- Suspect Measles, Duval County
- One case of severe gastrointestinal (GI) illness on a cruise ship, Hillsborough County
- Varicella in second elementary school, Nassau County
- Rabid raccoon, Lake County
- Synthetic marijuana use by teens, Santa Rosa County
- Norovirus outbreak in a long-term care facility (LTCF), Duval County
- Pertussis in the workplace, Santa Rosa County
- Varicella cluster in an elementary school, Lake County
- Follow-up on food handler with typhoid fever, Miami-Dade County
- Vehicle-related carbon monoxide poisoning, Palm Beach County
- Imported ehrlichiosis, Martin County
- Confirmed measles case, Duval County

- Rash illness in nursing home, Escambia County
- Varicella at a daycare, Miami-Dade County
- Possible reptile-associated infant salmonellosis, Hernando County
- Cyanobacteria bloom in St Johns River, St. Johns County
- Rabies PEP in an immuno-suppressed patient, Polk County
- Suspected scombroid outbreak associated with sushi, Hillsborough County
- Dengue virus type 2, Miami-Dade County
- Probable dengue, Monroe County
- Mumps in daycare, Okaloosa County

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For submission guidelines or questions regarding Epi Update, please contact Leesa Gibson at 850.245.4409 or by email at Leesa_Gibson@doh.state.fl.us .