Brucellosis !

Report immediately 24/7 by phone upon initial suspicion or laboratory test order

PROTOCOL CHECKLIST

- ☐ Enter available information into Merlin upon receipt of initial report
- ☐ Review background on disease (page 5), case definition (page 7), and laboratory testing (page 8)
- ☐ Contact provider and sending and ordering laboratory facilities as appropriate to make sure specimens are handled safely
- ☐ Request that isolates be forwarded to appropriate Florida Department of Health, Bureau of Public Health Laboratory (BPHL)
- ☐ Notify BPHL that specimen will be forwarded and provide basic patient information
- ☐ Contact infection control practitioner and request medical records, history and profile for patient if not received with initial report
- ☐ Interview patient using case report form (http://www.doh.state.fl.us/Disease_ctrl/epi/topics/crforms.html)
    - Review disease facts (page 5)
        - Description of illness
        - Modes of transmission
        - Incubation period
        - Symptoms
        - Treatment
- ☐ Ask about potential sources of exposure and relevant risk factors (pages 10)
    - Travel to endemic regions
    - Occupational exposures to animals and *Brucella* vaccines for animals (i.e., taxidermist, veterinary, laboratory, orthopedic surgeon, and slaughter-house workers)
    - Consumption of unpasteurized milk products
    - Hunter, processor, consumer of feral swine
    - Sexual transmission (uncommon)
- ☐ Identify symptomatic contacts (page 12)
- ☐ Determine whether patient or symptomatic contact is in a sensitive situation
    - Recommend testing and treatment or post-exposure prophylaxis for symptomatic contacts
- ☐ Determine if a sensitive situation exists
    - Bioterrorism event
    - Exposed laboratory workers
    - Pregnant woman
    - Breastfeeding woman
    - Exposed orthopedic surgeon
- ☐ Provide education on transmission and prevention
    - Wear protective gloves and avoid wound, mucous membrane, and eye contact with animal tissues and fluids
    - Eat only pasteurized milk products
    - Aerosol precautions for laboratory workers and orthopedic surgeons
    - Needle-stick prevention information for veterinary workers
    - Importance of completing therapy to prevent relapse
- ☐ Address patient's questions or concerns

- ☐ Follow-up on special situations, including exposed laboratory workers, orthopedic surgeon, veterinary workers, mother-to-child transmission, or other sensitive situations
    - o For pregnant or breastfeeding patients, educate about the risk of transmission via breast-feeding and recommend testing for infant.
- ☐ Enter additional data obtained from interview in Merlin and report

Brucellosis

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. To prevent additional *Brucella* exposures.

2. To identify potentially exposed health care and laboratory personnel and to provide counseling.

3. To identify sources of transmission (e.g., an infected animal or contaminated meat or unpasteurized dairy product).

4. To raise the index of suspicion of a possible bioterrorism event when no natural exposure source is identified.

5. To assist in the diagnosis and treatment of patients.

B. Legal reporting requirements

Laboratories and physicians are required to report cases to the county health department (CHD) immediately 24/7 upon initial suspicion or laboratory test order, prior to confirmatory diagnosis. Practitioners are also responsible to supply laboratories with all necessary information for the laboratories to fulfill the specified reporting requirements.

C. County health department investigation responsibilities

1. If bioterrorism is suspected, **immediately** report the case to the Bureau of Epidemiology (BOE): (850) 245-4401 (24 hours a day).

2. CHDs and BPHL personnel are required to **immediately** report any cultures (not serology, i.e., EIA/ELISA or MAT/SAT) positive for *Brucella* to BOE at (850) 245-4401 (24 hours a day).

3. CHDs are required to **immediately** report any suspected, probable or confirmed cases of human brucellosis to BOE at (850) 245-4401 (during regular business hours).

4. Begin investigation and create a case in Merlin within 24 hours of receiving notification via electronic laboratory reporting (ELR), telephone, fax or other forms of notification.

5. Facilitate the transport of specimens to the BPHL for confirmatory testing.

6. While patient serology samples (EIA/ELISA or MAT/SAT) do not pose an aerosol risk during routine sample processing, bacterial culture samples do. This is primarily a concern for laboratorians. **Health care providers who are considering brucellosis as a possible cause of patient illness (for instance, they are concerned enough to order a *Brucella* EIA/ELISA or MAT/SAT) should *always* advise laboratories receiving patient culture samples that it may contain *Brucella*.**

7. Brucellosis patients do not pose an aerosol risk for family members, health care providers, or other contacts with the following exception. Bone and joint infections are common in patients infected with *Brucella*. Orthopedic surgeons using electric drills on brucellosis patients can create potentially infectious aerosols. CDC recommends aerosol precautions be used by those in the same room during such procedures.

8. Contact reporting laboratory and affiliated infection control practitioner (ICP) to identify possible laboratory exposures **(for suspect or confirmed *Brucella* cultures only**; notification is not necessary for laboratories handling serologic samples such as EIA/ELISA or MAT/SAT). There may be multiple laboratories involved as smaller laboratories may work with a culture isolate and then forward to a reference laboratory for assistance with isolate identification, or the patient may have been seen by multiple health care providers. The CHD for the county where one of these laboratories is located is responsible for laboratory exposure follow-up. The CHD for the county of residence of the patient is responsible for patient follow-up as for other reportable diseases.
   a. The Laboratory Exposure Risk Assessment form should be faxed to the ICP, occupational health specialist (OHS), or Laboratory Manager. These individuals should begin an immediate assessment of workers for potential exposure. Delays in providing prophylaxis can increase risk of infection. Best results are obtained if the ICP or OHS works closely with the laboratory manager to determine if any workers have been exposed. BOE can assist with technical questions if needed. The Laboratory Exposure Risk Assessment form is available at: http://myfloridaeh.com/medicine/arboviral/Zoonoses/brucellosis_CHD.html.
      i. Guidance for management for exposed laboratorians (or orthopedic surgeons) is included on the assessment form as well as in the *MMWR*
      ii. Daily fever check for six months is recommended for all high-and low-risk exposed persons.
      iii. Brucella MAT serology at weeks 0, 6, 12, 18 and 24 post-exposure is recommended for persons meeting criteria for exposure. Serology samples should be submitted to BPHL for forwarding to CDC; please contact BPHL before submitting. If multiple persons are being tested, the test requests can be summarized on a single BPHL laboratory form for each batch. Each person will also need an individual CDC Leptospirosis/Brucellosis submittal form for every submission. A particular individual's original CDC form with an updated sample collection date can be resubmitted to reduce paperwork.
      iv. All potentially exposed persons should consult with their health care providers. Antibiotic prophylaxis as described in the Laboratory Exposure Assessment form and the *MMWR* is recommended for all high risk exposures. Prophylaxis is optional for low risk exposures. Pregnant women, those who are immunosuppressed, and those with a prosthesis (heart valve or joint replacement) may be at greater risk for severe illness or complications if infected.
   b. Suspect culture samples should be forwarded to BPHL immediately. BPHL can generally complete polymerase chain reaction (PCR) testing to confirm presence of *Brucella* in a culture isolate within a few hours of sample receipt. Speciation generally takes several days; however, *Brucella* species does not change laboratory exposure assessment criteria or prophylaxis guidance except in the rare case of *Brucella abortus* RB51 animal vaccine exposure or infection.
   c. If high-or low-risk laboratory exposures have occurred, the CHD should notify BOE immediately and provide a final tally of the number of high-and low-risk exposures identified.

d. If laboratory exposures occurred, the Laboratory Manager should be notified that a Select Agent Form 3 will need to be completed and faxed to the CDC Select Agent Program if the isolate species is *Brucella suis*, *B. melitensis*, or *B. abortus*. The completed form must be faxed to the CDC Select Agent Program within one week of the date that culture speciation is determined by BPHL. A copy of the completed Form 3 should also be requested by the CHD to be used to help develop educational information for health care providers and laboratorians. BOE can assist with any technical questions related to completing Form 3. The completed form should be uploaded into Merlin as a case document. The form including the CDC fax number and guidance to complete the form is available at: http://myfloridaeh.com/medicine/arboviral/Zoonoses/brucellosis_CHD.html.
e. The BPHL is responsible for filling out Select Agent Form 4. Any questions about this form should be directed to BPHL personnel involved with the culture confirmation and speciation.

9. Contact the healthcare provider immediately and determine if other laboratories received patient culture samples (not serology samples), and if so, ensure they are aware of the need to use aerosol precautions and have appropriate follow-up to determine if exposures occurred. Patient medical record and other relevant data should also be obtained from the healthcare provider.

10. Interview the case and discuss control and prevention measures.

11. Complete the Brucellosis Case Report Form (CRF) or a print-out of the extended data section (http://www.doh.state.fl.us/Disease_ctrl/epi/topics/crforms.html).

12. Enter relevant data in the Merlin extended data section, upload Form 3 if laboratory exposures occurred and report patient and attach the Brucellosis CRF.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

Brucella bacteria are small, non-motile, gram-negative bacteria in the genus *Brucella.* Brucellosis is a relatively rare, but epidemiologically important zoonotic disease of wild and domestic animals caused by the *Brucella* bacteria. Humans are accidental hosts. *Brucella* species are transmitted to humans by direct contact with tissues, blood, urine, and other bodily fluids. Reproductive tissues, fluids, and aborted fetuses from infected animals may have particularly high levels of *Brucella* present, although high levels can also be present in the blood of pigs infected with *B. suis*. Ingestion of unpasteurized milk or milk products from infected animals is one of the most common routes of exposure in developing countries. Aerosol exposures rarely occur in natural settings, but a limited risk exists particularly in confined areas where many infected animals are present. However, in countries like the U.S. with domestic livestock surveillance and culling policies, aerosol exposures are almost exclusively limited to those working with *Brucella* cultures in laboratories. Amplification of bacteria in culture increases bacteria numbers and also the likelihood of aerosolization. The most common species of *Brucella* isolated from Florida patients is *B. suis*, which is endemic in Florida feral hogs. *Brucella melitensis* (primarily associated with goats) and *B. abortus* (primarily found in cattle) are not found in Florida. However these species may

cause infections in Florida residents who travel to developing countries where these species are still endemic in domestic livestock. Isolated infections with *Brucella canis* can also occur in persons in close contact with infected dogs. Immunosuppressed individuals are at higher risk. *Brucella ceti* has been identified in wild and captive dolphins and porpoises in and around Florida. *Brucella pinnepedalis* has been identified in seals and other marine mammals outside of Florida. Human infections with *Brucella* species associated with marine mammals are rare.

Most brucellosis cases in Florida are identified in pig hunters in close contact with blood, and other fluids and tissues from infected feral swine. Less frequently infections occur in persons at occupational risk due to contact with feral swine, or domestic swine in contact with feral swine. Persons at occupational risk include taxidermists and others working with potentially infected wildlife, farm and livestock workers, veterinarians, slaughterhouse employees, abattoir workers, meat inspectors, laboratory personnel.

Brucella spp. have been identified as potential bioterrorist weapons and are listed as CDC Select Agents. *Brucella melitensis, B. suis* and *B. abortus* are considered select bioterrorism agents, in part because of the low infectious dose required to cause illness (only 10-100 bacteria). For additional information, see http://emergency.cdc.gov/agent/agentlist-category.asp.

B. Description of illness

The symptoms of brucellosis are non-specific and may wax and wane. The most consistent symptom of brucellosis is intermittent or constant fever. Other common symptoms include headaches, chills, arthralgia (joint pain), and weight loss. Chronic infection can lead to localized disease such as osteomyelitis or endocarditis. Subclinical infections, detected by high levels of antibody but no symptoms, can occur.

C. Reservoirs

Sheep, goats, cattle, deer, elk, pigs, dogs and several other animals are reservoirs for various *Brucella* species.

D. Modes of transmission

Humans become infected by coming in contact with animals or animal products such as tissues, blood, urine, aborted fetuses and especially placentas that are contaminated with these bacteria. Infection is transmitted by inoculation through cuts and abrasions in the skin, by inhalation of contaminated aerosols (rare in natural settings except laboratories), by contact with the conjunctival mucosa, by oral ingestion, and sexual transmission (uncommon)

There is no danger from eating cooked meat products because the disease-causing bacteria are not normally found in muscle tissue and they are killed by normal cooking temperatures. The disease may be transmitted to humans when slaughtering infected animals or when processing contaminated organs from freshly killed animals. It can also be transmitted by consuming raw milk and unpasteurized dairy products from infected animals. Most infections occur in immigrants or returning travelers who ingested unpasteurized milk products while visiting areas outside of the United States that have endemic *Brucella*.

While aerosol transmission is less common, it is possible in areas contaminated with high concentrations of *Brucella* such as laboratories, abattoirs, or animal birthing areas. Clinical specimens and laboratory isolates can present a risk to health care or laboratory workers.

Human to human transmission has been rarely documented; however, infection can result from contact with vaginal discharges or semen. Infants can be exposed via ingestion of breast milk from an infected woman.

Brucella can be weaponized to create an infectious aerosol which can be used in a bioterrorism event.

E. Incubation

Highly variable; average onset 2- 4 weeks; range five days to six months. Illness can be chronic and intermittent so patients may not always associate multiple febrile illnesses with a single infection and report onset date of the most recent febrile illness. Relapse in treated patients also occurs; 13% of Florida brucellosis cases identified from 1999-2008 had clinical relapses.

F. Period of communicability

Direct person-to-person spread of brucellosis is uncommon. Breast-feeding women may transmit the infection to their infants. Sexual transmission has also been reported.

G. Treatment

Brucellosis treatment remains complex. Optimal treatment of uncomplicated brucellosis should be based at minimum, on a six week regimen of doxycycline combined with either streptomycin for 2-3 weeks, or rifampicin for six weeks. Gentamicin may be considered an alternative to streptomycin. Other regimens or combinations should be used as second-line therapy. Two-drug therapy is crucial in preventing relapses which are generally associated with premature discontinuation of therapy and monotherapy rather than development of *Brucella* resistance. Refer to the Centers for Disease Control and Prevention (CDC) for the most recent guidance at:
http://www.cdc.gov/nczved/divisions/dfbmd/diseases/brucellosis/#nine.

H. Prophylaxis

Interim PEP recommendations

Doxycycline 100 mg orally twice a day plus rifampin 600 mg orally once a day for 21 days.

Note: PEP recommendations for *B. abortus* RB51 (attenuated vaccine strain) differ from those for fully pathogenic *Brucella* spp. As RB51 was derived by selection in rifampin-enriched media and is resistant to rifampin in vitro, the use of rifampin for PEP or treatment will not be effective for RB51. PEP for those at high risk of exposure should include doxycycline 100 mg orally twice daily for at least 21 days. For those with contraindication to doxycycline, trimethoprim-sulfamethoxazole may be used.

After a potential laboratory exposure, all individuals classified as high-risk should begin PEP. PEP should be discussed with, and offered to, laboratory workers with low-risk exposures.

For women who are pregnant, PEP should be considered in consultation with their obstetricians.

I. Brucellosis in Florida

Brucellosis is an important disease of ruminants, swine and canids. *Brucella suis* is endemic in wild hogs in Florida and *B. canis* occurs sporadically in dogs. The BOE receives an average of ten reports of human brucellosis infections annually due to hunting, and ingestion of raw milk and unpasteurized milk products.

Brucella melitensis and *B. abortus* are not found in FL; however, may cause illness in FL residents who travel to developing countries where these species are still endemic in domestic goats, sheep, and cattle.

3. CASE DEFINITIONS

A. Clinical Case Definition

A pleomorphic illness generally characterized by acute or insidious onset of intermittent or persistent fever. Other symptoms may include night sweats, arthralgia, fatigue, anorexia, weight loss, headache, myalgia, endocarditis, orchitis, epididymitis, hepatomegaly, splenomegaly, abdominal pain, arthritis, meningitis and/or spondylitis. Pain in a single joint may be present in chronic infections; a single tissue abscess, and aneurysm in large blood vessels has also been reported.

B. Laboratory Criteria for Diagnosis:

Confirmed

- Isolation of *Brucella* sp. from a clinical specimen,
  OR
- Fourfold or greater rise in *Brucella* agglutination titer between acute- and convalescent-phase serum specimens obtained >2 weeks apart and studied at the same laboratory.

Probable

- *Brucella* total antibody titer >160 by standard tube agglutination test (SAT) or *Brucella* migroagglutination test (BMAT) in more or more serum specimens obtained after onset of symptoms,
  OR
- Detection of *Brucella* DNA in a clinical specimen by PCR assay.

C. Case Classification (2011)

Confirmed: a clinically compatible illness that is laboratory confirmed.

Probable: a clinically compatible illness that is epidemiologically linked to a confirmed case OR a clinically compatible illness that meets the probably laboratory criteria for diagnosis.

D. Comment

Exposure risk factors include involvement with slaughtering, dressing, or butchering of potentially infected animals such as feral hogs, consumption of unpasteurized dairy products or undercooked meat from infected animals, and laboratory exposure to *Brucella* culture without using aerosol precautions. Follow-up should occur to identify any potential exposures among laboratory staff. **Any available isolates of the organism must be sent to the BPHL for confirmation and speciation. This condition has been identified as a potential bioterrorism agent by the CDC.**

E. Reporting

Immediate; reporting triggers include confirmed or probable laboratory results, healthcare record containing a diagnosis of brucellosis, and death certificate listing brucellosis as cause of death or as a significant condition.

A copy of laboratory test results must accompany the paper case report form.

4. LABORATORY TESTING

A. Laboratory diagnosis

Laboratory diagnosis of brucellosis may be performed by serological methods. Diagnostic reference laboratories may perform *Brucella* ELISA assays; however, the *Brucella* microagglutination test (BMAT) is preferred as the ELISA assays have produced false positive and false negative results in the past. Serological methods typically only detect antibodies to the three most common human pathogens; *B. abortus*, *B. melitensis* and *B. suis*. Culture is required for identification of the rare human pathogen *B. canis* as there is currently no FDA approved human serologic test available.

Brucella is most often isolated from blood and bone marrow, but may be present in a variety of tissues and bodily fluids including spleen, liver, synovial fluid and CSF. *Brucella* may grow slowly in culture and should be incubated for an extended period of at least 21 days.

Laboratory isolates must be confirmed by the BPHL. The organism is highly infectious and presents a risk to laboratory workers. Alert laboratory personnel when specimens are sent from a suspect brucellosis case. Biosafety level 3 practices should be used to avoid exposure within the laboratory by aerosol. The CDC recommendations for safe laboratory practices to avoid exposure to *Brucella* species can be found here: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5702a3.htm.

Due to their potential use as biothreat agents, *B. abortus*, *B. melitensis* and *B. suis* are designated select agents and all laboratories identifying and possessing these agents must conform to 42 CFR Part 73: Possession, Use, and Transfer of Select Agents and Toxins; Final Rule.

B. Services available at BPHL

All four of the BPHL laboratories: Jacksonville, Miami, Pensacola and Tampa, are Laboratory Response Network (LRN) Reference laboratories and have the capability of confirming the identification of *Brucella* species. Additionally, these laboratories are registered with the National Select Agents Registry Program.

The BPHL identifies *Brucella* species from pure isolates as well as cultures of clinical specimens. The BPHL also performs rapid diagnostic testing using nucleic acid amplification methods (real-time polymerase chain reaction) for all suspected cases, whether naturally-acquired or a potential bioterrorism event.

The BPHL does not perform serologic testing; serum samples will be forwarded to CDC for BMAT testing. Consult with BOE for approval before collecting and shipping specimens.

C. Criteria for testing at the BPHL

A completed BPHL Specimen Submittal form must be submitted with each specimen: http://www.doh.state.fl.us/lab/PDF_Files/DOH_Form_DH1847_1009_v12152010.pdf

In accordance with Chapter 64D-3, Florida Administrative Code, *Brucella* is defined as a "Suspect Immediately" notifiable disease and a suspect brucellosis case must be reported immediately by telephone to the CHD. See Laboratory Reporting Guidelines of Notifiable Diseases or Conditions in Florida:
http://www.doh.state.fl.us/disease_ctrl/epi/surv/LaboratoryPacket.pdf

Additionally, before bacterial isolates or clinical specimens are submitted to the BPHL for confirmation testing the Biological Defense Coordinator at the nearest BPHL LRN Reference laboratory should be notified. The on-call Biological Defense Coordinator can be contacted after normal business hours at 1-866-FLA LABS (866-352-5227).

D. Specimen collection and shipping

For serologic testing, paired acute- and convalescent-phase serum specimens obtained at least 14 days apart should be collected. Due to the chronic nature of the disease, many patients seroconvert before symptom onset so may not demonstrate a significant change between acute and convalescent titers. Specimens should be shipped cold at 2-8°C for next day delivery or frozen at ≤-20°C if shipment will be delayed.

Bacterial isolates should be shipped preferably on agar slants at ambient temperature. However, due to the slow growth of *Brucella* species and the need for a rapid turnaround time, especially in a potential bioterrorism event, cultures submitted on agar plates will be accepted providing plates are sealed with Parafilm and placed in a leak-proof primary receptacle and all packaging and shipping regulations are followed to ensure the safety of laboratory personnel receiving the specimen.

Whole blood with EDTA anticoagulant may also be shipped at 2-8°C for detection of *Brucella* species DNA by real-time PCR. However, this does not provide a confirmatory result and isolation of the organism by blood culture should be attempted.
Proper packaging and shipping of infectious substances and diagnostic specimens are defined in the International Air Transport Association (IATA), Department of Transportation

(DOT), and United States Postal Service (USPS) regulations. It is the sender's responsibility to properly classify, identify, package, mark, label, and document shipments for transport. Consult the following websites to ensure compliance with packaging and shipping regulations:

- ☐ International Air Transport Association (IATA):
  - www.iata.org
- ☐ DOT Pipeline and Hazardous Materials Safety Administration:
  - http://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Transporting_Infectious_Substances_brochure.pdf
- ☐ Office of Health and Safety (OHS)
  - http://www.cdc.gov/biosafety/
- ☐ World Health Organization:
  - http://www.who.int/ihr/biosafety/en/

5. CASE INVESTIGATION

Immediately interview the case, proxies and others who might be able to provided pertinent information.

A. Evaluate the diagnosis

Review the clinical presentation and laboratory results. **Any available isolates of the organism must be sent to the BPHL for confirmation and speciation.**

Facilitate submission of laboratory specimens to BPHL for confirmation. Proceed with investigation after preliminary or confirmatory laboratory results are available for sporadic infections. During an outbreak or a suspected bioterrorism event, start investigation before laboratory results are available.

B. Identify potential sources of infection

Investigate possible exposures during the period five to 60 days before illness onset, including:

1. Travel to *Brucella* endemic areas:
   Areas currently listed as high-risk include the Mediterranean Basin (Portugal, Spain, Southern France, Italy, Greece, Turkey, and North Africa), South and Central America, Eastern Europe, Asia, Africa, the Caribbean and the Middle East. Unpasteurized cheeses sometimes called "village cheeses" from these areas may pose a risk to tourists.

2. Consumption of unpasteurized dairy products

3. Contact with potentially infected animals or their tissues, particularly postpartum fluid or tissues

4. Contact with birthing animals

5. Contact with ill household or other pets

6. Occupational exposure such as hunting, camping, slaughterhouse, veterinarian, farmer, taxidermist, butcher, and abattoir workers

7. Parenteral or mucous membrane exposure to *Brucella* vaccine

8. Mother-to-child via breastfeeding

9. Sexual contact with a suspect or confirmed case of brucellosis

10. Work in microbiology laboratory

11. Work with fibers, wool, or animal skin

C. Identify potentially exposed persons

Serial serum specimens should be monitored for all exposed workers. Obtain baseline serum as soon as possible after the exposure has been recognized, and obtain available pre-exposure stored specimens. Arrange for serologic testing (*Brucella* microagglutination testing) at 2, 4, 6, and 24 weeks. These tests will monitor for the development of infection and can be performed at BPHL or CDC. Note: RB51 does not induce a measurable antibody response. Monitoring serum specimens in individuals exposed to RB51 will not provide a useful indicator of infection.

1. Persons who participated with the patient in any of the activities listed above (Section 5B). Inquire about illness status of household member and close social contacts. Inform ill persons or their physician of possible exposure to assist in the course of proper diagnosis and therapy.

2. Laboratory workers who handled specimens or isolates; educate laboratorians on symptoms of illness to facilitate diagnosis.

3. See Section 6 "Management of Exposed Persons" for recommended antibiotic prophylaxis.

D. Environmental evaluation

The DOH Bureau of Epidemiology, Zoonotic and Vectorborne Disease Program (850-245-4401) can assist in notifying other state agencies when an environmental investigation is warranted.

1. If exposure source appears to be from domestic animals, notify the Florida Department of Agriculture and Consumer Service (DOACS) for animal disease investigation or testing.

2. If source of infection appears to be wild animals, notify the Florida Fish and Wildlife Conservation Commission.

6. CONTROLLING FURTHER SPREAD

A. Patient/ household education on prevention recommendations

- Avoid consumption of contaminated and unpasteurized milk products or soft cheeses.
- Avoid direct contact of infected tissues (fetal or aborted tissues, or blood).
- Avoid inhalation of infected materials.
- Use appropriate precautions to prevent inoculation with a vaccination, splashing the vaccine in the eyes, mucous membranes or open wounds.
- Abstain from intercourse or use relevant prophylactic measures if having intercourse with a suspect case.
- Post-exposure-prophylaxis (PEP) is recommended for a breastfeeding infant if the mother is infected to eliminate the risk of infection to the infant.
- Pregnant women should avoid direct contact with *Brucella* agents, animals or animal products known or suspected to be infected with *brucella.*
- Persons exposed via known infected individuals, occupational exposure or brucellosis vaccine should seek medical attention immediately.
- Slaughterhouse workers should wear protective clothing while handling carcasses.
    - Impermeable gloves, protective eye wear, mask, long sleeve pants and sleeves, protective apron or other clothing deemed fit by facility.
    - Wash hands after handling carcasses especially before eating and drinking.
    - Minimize procedures that may generate aerosol.

Information for feral or free-ranging swine and hunters

Practice good sanitation when handling feral swine or raw feral swine meat, swine can carry a number of infectious organisms including bacteria and parasites such as *Brucella*. To protect against these and other agents (including viruses):

- Avoid contact with sick or dead animals.
- Avoid eating, drinking or using tobacco when field-dressing or handling carcasses.
- Use latex or rubber gloves when handling the carcass or raw meat.
- Avoid direct contact with blood, reproductive organs and fecal matter. Wearing long sleeves, eye protection and covering any scratches, open wounds or lesions will help provide protection.
- Clean and disinfect knives, cleaning area, clothing and any other exposed surfaces when finished.
- Wash hands frequently with soap and water.
- Cook meat from these animals to 160º F or until juices run clear.

B. Isolation of cases

- Hospitalized patients should be cared for using standard precautions.
- Contact precautions should be used in case of draining wounds.

C. Management of contacts/ exposed persons:

- *Brucella* is not commonly spread from person-to-person.

- Sexual contact has been documented: If sexual transmission is suspected, seek medical care and abstain and/or use barrier methods to prevent infection.
- *Brucella* can be transmitted via breast milk from an infected mother to an infant. If mother-to-child transmission is suspected, breastfeeding should be discontinued and PEP should be considered for the infant.
- Brucellosis in the third trimester of pregnancy is potentially serious. Pregnant women that have been exposed to *Brucella* should seek medical care immediately.

Brucella is highly infectious and presents a risk to laboratory workers. Communication between physicians ordering testing and laboratory workers are essential to prevent occupational exposure to *Brucella*. Laboratory personnel should be notified when specimens are sent from a person suspected of having a brucellosis infection. Proper precautions should be used to avoid aerosol exposure in the laboratory.

Brucella has been responsible for many laboratory-acquired infections. If *Brucella* is suspected or the gram stain shows a small, gram-negative coccobacillus, avoid aerosols and perform subcultures in a biosafety cabinet. Plates should be taped shut, and all further testing should be performed only in the biosafety cabinet, using Biosafety level III practices. Follow-up should occur to identify any potential exposures among laboratory staff.

All laboratorians handling specimens with confirmed *Brucella* should undergo a risk assessment to determine their need for PEP and follow-up.

Contact the BOE to discuss the need for post-exposure prophylaxis for other exposed persons.

D. Lab testing during outbreaks

Same as for individual infections.

7. MANAGING SPECIAL SITUATIONS

Bioterrorist Event

Brucella **has been identified as a potential "category B" agent for bioterrorism by the CDC**. An intentional release should be suspected if unusual clusters are seen in otherwise healthy individuals or in people in buildings with common ventilation systems**. Contact the BOE immediately at (850) 245-4401 if intentional release of *Brucella* is suspected.**

The CHD should be prepared to enhance surveillance and case investigation for suspected clusters. Internal communication and proper chain of command should be followed.

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J. http://www.doh.state.fl.us/disease_ctrl/epi/surv/PractitionerPacket.pdf

K. http://www.doh.state.fl.us/disease_ctrl/epi/surv/LaboratoryPacket.pdf

L. For information of FLDOH/BPHL site provider for each respective county see http://www.doh.state.fl.us/lab/Locations/locations.htm

M. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5822a3.htm (feral swine hunter *MMWR*). CDC Wild Game Hunting and Food Safety

N. CDC Brochure on Wild Hog Hunting Safety

O. http://www.myfloridaeh.com/medicine/arboviral/Zoonoses/Zoonotic-brucellosis.html

P. Brucellosis information for Public Health Officials and Health Care Providers can be found at http://www.myfloridaeh.com/medicine/arboviral/Zoonoses/brucellosis_CHD.html and includes information on:

a. **Laboratory exposure risk assessment**
b. **APHIS-CDC Form 3**
c. **Tips for completing form 3**
d. **Laboratory acquired *Brucella*--Indiana and Minnesota, 2006 *MMWR***

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