Human Exposures to Marine *Brucella* Isolated from a Harbor Porpoise — Maine, 2012

On February 10, 2012, the Maine Center for Disease Control and Prevention (Maine CDC) was notified of a positive *Brucella* culture from a harbor porpoise (*Phocoena phocoena*) found on the coast of southern Maine. Maine CDC, in consultation with CDC, initiated an investigation of potential occupational exposures of staff members at university A and at diagnostic laboratories known to have handled samples from the porpoise. This report describes the results of that investigation. In humans, brucellosis can cause fever, sweats, headaches, back pains, physical weakness, and sometimes severe infections of the brain, bone, heart, liver, or spleen. Because staff members at university A did not use respiratory protection while handling the porpoise or its specimens, the four exposed staff members were advised to begin immediately a 3-week regimen of rifampicin and doxycycline for antimicrobial prophylaxis, conduct daily fever checks, be monitored for symptoms of acute febrile illness weekly, and have their serum tested for *Brucella* antibodies immediately and at regular intervals for 24 weeks after the last known exposure. As of June 26, none of the four persons had seroconverted or become ill. The potential for human infection and illness as well as the intensity, duration, and expense of the follow-up recommended for *Brucella* exposure highlights the need for facilities to develop standard protocols for preventing exposures during the handling of marine mammals, particularly during aerosol-generating procedures.

On January 28, 2012, a porpoise carcass was recovered by a rescue team affiliated with a marine mammal facility at university A. On January 29, a necropsy of the porpoise was performed in a small room at university A by a faculty member, two students, and a community volunteer. All wore gloves and gowns but worked without respiratory protection. The necropsy included removal of necrotic tissue from the uterine horn and the use of an electric saw with an oscillating blade to cut the skull to evaluate the brain. The same four persons who performed the necropsy also cleaned the room after the procedure. The necropsy room did not have a separate air supply, but the air was exhausted directly outdoors; therefore, persons in rooms adjacent to the necropsy room were considered to have minimal to no risk for exposure to *Brucella*. A swab of the uterine horn tissue was sent to laboratory A, which specializes in veterinary diagnostics. The sample was sent as an unknown diagnostic sample to laboratory A and successfully cultured. The cultured organism had morphologic and microscopic characteristics of *Brucella*, and the isolate was forwarded to laboratory B for identification. Once a high suspicion that the isolate might be a *Brucella* species was noted, standard biosafety level 3 (BSL-3) laboratory precautions were taken at both laboratories, including use of a biosafety cabinet for specimen manipulation. On February 15, samples from laboratory B were received at CDC for confirmatory testing. The isolate was identified by multilocus sequence typing as sequence type 23, a known sequence type associated with harbor porpoises. DNA tests for further differentiating the marine species (*Brucella pinnepedialis* and *Brucella ceti*) are limited. Based on the fact that the isolate originated from a cetacean, it likely was *B. ceti*.

On February 10, 2012, Maine CDC was notified by laboratory B of the positive *Brucella* culture. Maine CDC initiated an investigation to determine the potential for occupational exposure among persons who had handled the porpoise or the specimens. Because of the potential for aerosolization of *Brucella* organisms during the necropsy and the lack of respiratory precautions taken, the four persons who performed the necropsy were assessed to be at high risk for *Brucella* exposure. Laboratories A and B reported using proper procedures in handling unknown samples, and no potential laboratory exposures were identified. Maine CDC consulted with CDC, and recommendations for the four exposed persons included 1) an immediate 3-week course of antimicrobial prophylaxis with rifampicin and doxycycline, 2) *Brucella* serologic monitoring performed by CDC laboratories, 3) self-administered daily fever checks, and 4) weekly monitoring for symptoms of acute febrile illness for 24 weeks (*1*).

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Editorial Note

Brucellosis is a zoonotic infection uncommon in the United States but endemic in many parts of the world, where it most commonly affects cattle, swine, goats, and sheep. During 2000–2009, an average of 113 human cases was reported to

CDC annually (*2*). Human cases in the United States commonly are associated with consuming unpasteurized milk, hunting feral swine, and inadvertent exposure among laboratory workers who handle *Brucella* species. Brucellosis can have an incubation period ranging from days to months. Brucellosis can cause fever, sweats, headache, back pain, physical weakness, and sometimes severe infections of the brain, bone, heart, liver, or spleen. Moreover, human cases of brucellosis have been associated with marine mammals. Four human cases of brucellosis caused by marine mammal *Brucella* species have been reported since 2001. Three cases were attributed to environmental exposures (*3,4*); two of the patients reported symptoms consistent with neurobrucellosis, and the third was diagnosed with spinal osteomyelitis. The single laboratory-acquired infection caused a mild form of brucellosis (*5*).

Antimicrobial postexposure prophylaxis recommendations are based on risk assessment for the exposed person. A 3-week course of doxycycline and rifampicin is recommended for persons at high risk (*1*). For persons at high risk who cannot tolerate doxycycline, a 3-week course of trimethoprim-sulfamethoxazole and rifampicin is recommended. Persons who are at low risk for exposure should discuss the need for antimicrobial therapy with their health-care provider, and antimicrobial therapy should be based on individual health factors. Symptom surveillance includes regular (e.g., weekly) symptom watch and self-administered daily fever checks for 24 weeks after last known exposure for persons at low and high risk. Serologic testing is recommended for persons at high risk immediately and at regular intervals for 24 weeks after the last known exposure (*1*).

An increase in strandings and deaths of marine mammals along U.S. coastlines during 2010–2012 has increased the likelihood of human/animal interactions, which increase the risk for exposure to *Brucella* species and other pathogenic organisms (*6*). Persons who handle stranded marine mammals or carcasses should be made aware of any potential health risks associated with these activities and use appropriate personal protective equipment (*7*).

The potential for human infection and illness, as well as the intensity, duration, and expense of the follow-up recommended for *Brucella* exposures, highlights the need for standard protocols for preventing exposures during the handling of marine mammals, particularly during aerosol-generating procedures. When developing protocols for the rescue, care, treatment of marine mammals, or the performance of laboratory procedures or necropsies on these animals, precautions should be focused widely to protect workers from a broad range of infectious organisms.

What is already known on this topic?

Brucellosis is a zoonosis caused by bacteria of the genus *Brucella*. Various *Brucella* species affect sheep, goats, cattle, deer, elk, pigs, dogs, and marine mammals. In humans, brucellosis can cause fever, sweats, headaches, back pains, physical weakness, and sometimes severe infections of the brain, bone, heart, liver, or spleen.

What is added by this report?

Four persons participated in the necropsy of a harbor porpoise that was found subsequently to be infected with a *Brucella* species. They were a university faculty member, two students, and a community volunteer. Because they did not wear respiratory protection, they were advised to take antimicrobial prophylaxis and be monitored for brucellosis for 24 weeks. As of June 26, 2012, none of the four persons had become ill, and none had seroconverted.

What are the implications for public health practice?

Persons who handle marine mammals should be educated on the potential for infection associated with their activities and the precautions necessary to avoid being exposed to infectious agents. Failure to use primary protection to avoid exposure necessitates using more costly and time-consuming secondary strategies, such as prophylactic antimicrobials and clinical and laboratory monitoring.

Given the extensive involvement of students and volunteers in the rescue and handling of stranded marine mammals, facilities should provide the same level of training and protection for this population as they do for employees. If this is not feasible for administrative reasons, facilities should restrict the participation of nonemployees in procedures deemed to be of higher risk based on the facility's risk assessment, such as aerosol-generating procedures or cleaning of facilities and equipment after necropsy. The recently published *Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories* (*8*) provides a comprehensive approach to safe work practices in various human and animal diagnostic laboratory settings, including animal necropsy facilities. The guidelines emphasize prevention of occupational injury and illness in laboratory settings through the use of engineering tools, administrative policies, and personal protective equipment.

Acknowledgments

Patricia Bosse, MPH, Maine Center for Disease Control and Prevention, Maine Dept of Health and Human Svcs. Meredith Morrow, MSPH, Div of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, CDC.

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