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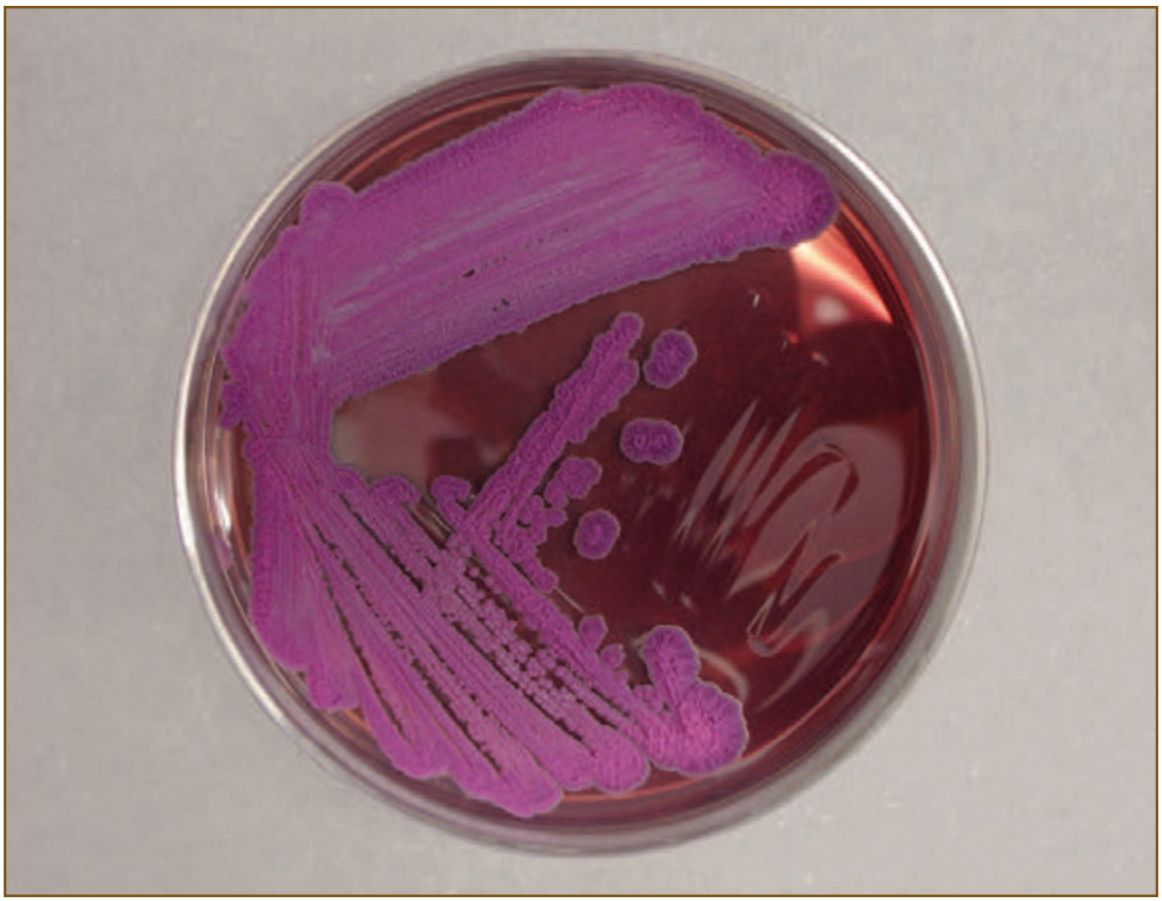
Melioidosis Cases and Selected Reports of Occupational Exposures to *Burkholderia pseudomallei* — United States, 2008–2013



U.S. Department of Health and Human Services
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Front cover photo: Typical colony morphology of *Burkholderia pseudomallei* on Ashdown's selective agar after incubation at 37°C for four days.

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Melioidosis Cases and Selected Reports of Occupational Exposures to *Burkholderia pseudomallei* — United States, 2008–2013

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Abstract

Problem/Condition: Melioidosis is an infection caused by the Gram-negative bacillus *Burkholderia pseudomallei*, which is naturally found in water and soil in areas endemic for melioidosis. Infection can be severe and sometimes fatal. The federal select agent program designates *B. pseudomallei* as a Tier 1 overlap select agent, which can affect both humans and animals. Identification of *B. pseudomallei* and all occupational exposures must be reported to the Federal Select Agent Program immediately (i.e., within 24 hours), whereas states are not required to notify CDC's Bacterial Special Pathogens Branch (BSPB) of human infections.

Period Covered: 2008–2013.

Description of System: The passive surveillance system includes reports of suspected (human and animal) melioidosis cases and reports of incidents of possible occupational exposures. Reporting of suspected cases to BSPB is voluntary. BSPB receives reports of occupational exposure in the context of a request for technical consultation (so that the system does not include the full complement of the mandatory and confidential reporting to the Federal Select Agent Program). Reporting sources include state health departments, medical facilities, microbiologic laboratories, or research facilities. Melioidosis cases are classified using the standard case definition adopted by the Council of State and Territorial Epidemiologists in 2011. In follow up to reports of occupational exposures, CDC often provides technical assistance to state health departments to identify all persons with possible exposures, define level of risk, and provide recommendations for postexposure prophylaxis and health monitoring of exposed persons.

Results: During 2008–2013, BSPB provided technical assistance to 20 U.S. states and Puerto Rico involving 37 confirmed cases of melioidosis (34 human cases and three animal cases). Among those with documented travel history, the majority of reported cases (64%) occurred among persons with a documented travel history to areas endemic for melioidosis. Two persons did not report any travel outside of the United States. Separately, six incidents of possible occupational exposure involving research activities also were reported to BSPB, for which two incidents involved occupational exposures and no human infections occurred. Technical assistance was not required for these incidents because of risk-level (low or none) and appropriate onsite occupational safety response. Of the 261 persons at risk for occupational exposure to *B. pseudomallei* while performing laboratory diagnostics, 43 (16%) persons had high-risk exposures, 130 (50%) persons had low-risk exposures, and 88 (34%) persons were classified as having undetermined or unknown risk.

Interpretation: A small number of U.S. cases of melioidosis have been reported among persons with no travel history outside of the United States, whereas the majority of cases have occurred in persons with a travel history to areas endemic for melioidosis. If the number of travelers continues to increase in countries where the disease is endemic, the likelihood of identifying imported melioidosis cases in the United States might also increase.

Public Health Actions: Reporting of melioidosis cases can improve the ability to monitor the incidence and prevalence of the disease in the United States. To improve prevention and control of melioidosis, CDC recommends that 1) physicians consider melioidosis in the differential diagnosis of patients with acute febrile illnesses, risk factors for melioidosis, and compatible travel or exposure history; 2) personnel at risk for occupational exposure (e.g. laboratory workers or researchers) follow proper safety practices, which includes using appropriate personal protective equipment when working with unknown pathogens; and 3) all possible occupational exposures to *B. pseudomallei* be reported voluntarily to BSPB.

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Introduction

Melioidosis is a bacterial infection caused by *Burkholderia pseudomallei* (formerly known as *Pseudomonas pseudomallei* or Whitmore's bacillus), which is found in many tropical regions of the world (*1*). *B. pseudomallei* has been designated as a Tier 1 overlap select agent, which can affect both humans and animals. Select agents have the potential to pose a severe threat to public, animal, or plant health or to animal or plant products (*2*). Identification of the pathogen *B. pseudomallei* must be reported to the Federal Select Agent Program immediately (i.e., within 24 hours). However, melioidosis is not considered a nationally notifiable condition (i.e., reportable condition in all jurisdictions), and reporting of human infections and exposures associated with animal infections to BSPB is voluntary.

Infection with *B. pseudomallei* usually occurs through direct contact with an environmental source (soil or water) by ingestion, percutaneous inoculation, or inhalation of the bacterium. No vaccine is available to prevent melioidosis. The best ways to prevent infection are by 1) avoiding contact with contaminated soil or water by wearing appropriate footwear and gloves, especially in areas where the disease is endemic (*3*), 2) using purified or clean water for drinking, hand washing, and food preparation (*4*), and 3) in the laboratory setting, working with isolates in a biosafety cabinet and wearing personal protective equipment (PPE) (e.g., gloves and an appropriate mask or respirator) (*5*).

Both humans and animals can become infected with *B. pseudomallei*. Infections have been identified in domestic animals (e.g., sheep, goats, swine, cattle, horses, dogs, and cats) and certain wildlife species, including primates (*6*–*12*). Although human-to-human transmission is rare, at least one case has been reported involving sexual transmission (*13*), one case involving breastfeeding (*14*), and seven neonatal cases (*15*–*17*). Incidents involving occupational exposure (e.g., laboratory testing of human and animal isolates) also have occurred (*18*,*19*); however, these exposures did not result in infection. These incidents often involved persons working with insufficient PPE or with high concentrations of bacteria in a laboratory setting outside of a biosafety cabinet. High-risk exposures included needle stick injuries, bites or scratches by infected experimental animals, splash events involving the mouth or eyes, or activities that generated aerosols outside of a biosafety cabinet. In a 2005 incident, several persons were exposed after an isolate was handled outside of a biosafety cabinet (*19*). Occupational exposures involved more than one facility because isolates were tested in several facilities before identification of *B. pseudomallei* was confirmed by a Laboratory Response Network (LRN) member or CDC.

The incubation period for melioidosis generally ranges from 1 to 21 days, with a median of 9 days; however, latent infections can occur, with disease manifesting decades after exposure (*3*). In one documented case, a patient was diagnosed with reactivated disease 62 years after initial exposure (*20*). Although some infections are asymptomatic, the disease can manifest as localized, pulmonary, or bacteremia/disseminated infections. Pneumonia is the most common clinical presentation (*3*). Clinical presentation can be acute or chronic. Signs and symptoms of melioidosis often mimic other diseases (e.g., other community-acquired pneumonias or tuberculosis), resulting in possible misdiagnosis of the condition. For these reasons, melioidosis is often referred to as the "Great Mimicker" (*21*). Other clinical presentations include ulcers or other skin lesions, gastrointestinal ulceration, sepsis, or infections and abscesses involving internal organs (e.g., the spleen, prostate, kidney, or liver). In addition, persons with certain underlying medical conditions are at greater risk for manifesting disease symptoms; therefore, melioidosis is considered an opportunistic infection. Medical conditions that predispose persons for melioidosis include diabetes mellitus, alcoholism, chronic lung disease, chronic renal disease, liver disease, hematologic malignancy, thalassemia, cancer, long-term steroid use, and other non-HIV-related immune suppressed conditions (*22*).

Confirmation of melioidosis is achieved with isolation of *B. pseudomallei* from clinical specimens (e.g., blood, urine, sputum, throat swabs, or pus from abscesses or wounds). Early diagnosis and treatment is critical in reducing the mortality rate from this disease, which can be up to 90% in septic patients with delayed diagnosis and treatment (*3*).

Treatment of melioidosis consists of two phases: an intensive phase, followed by an eradication phase. The intensive phase involves intravenous antimicrobial therapy for a minimum of 10 days with ceftazidime, meropenem, or imipenem. The eradication phase consists of oral therapy with trimethoprim-sulfamethoxazole (TMP/SMX) for 3–6 months (*22*). Occasionally, in minor localized skin infections, treatment with oral TMP/SMX alone can be used (*23*).

This is the first CDC report that summarizes data on confirmed melioidosis cases and occupational exposures to *B. pseudomallei* that occurred during 2008–2013. The findings in this report can be used by providers and public health officials to assess the importance of making melioidosis a nationally notifiable condition. Furthermore, the purpose of this report also is to raise awareness of the disease among clinicians as well as persons traveling abroad.

Methods

Data Sources

BSPB at CDC receives voluntary reports of human and animal melioidosis cases, and sporadically receives reports of occupational exposures from state health departments, medical facilities, microbiologic laboratories, and research facilities by e-mail or phone call. Occupational exposure reports are usually received in the context of a request for technical consultation (so that the system does not include the full complement of the mandatory and confidential reporting to the Federal Select Agent Program). Therefore, it is possible that BSPB might have received duplicate reports of exposures already reported to the Federal Select Agent Program.

Since 2010, BSPB has used a secure Access database, requiring a unique username and password, to collect and store data on voluntarily reported suspected or confirmed melioidosis cases and occupational exposures. Occupational exposures are incidents that occur during laboratory procedures or research activities. Such exposures are usually identified during investigations of reported cases. Investigation of occupational exposures often includes working with state health departments to trace back the origin of the specimen to determine facilities that have handled or processed the specimen. State health department investigators will then contact each facility to determine any exposures that might have occurred during diagnostic testing. In the United States, clinical laboratory staff working on isolates from patients with melioidosis commonly have potential exposure to *B. pseudomallei* because melioidosis is rarely part of the differential diagnosis and they typically perform work with less than recommended biosafety precautions for this select agent. Research exposures are those exposures that occurred as a result of manipulating *B. pseudomallei* for research purposes. The select agent program mandates that facilities handling *B. pseudomallei* must be registered, inspected, cleared, and approved for such research activities (*2*). In follow up to reports of occupational exposures, BSPB often provides technical assistance to state health departments to identify all persons with possible exposures, define level of risk, and provide recommendations for postexposure prophylaxis and health monitoring of exposed persons.

Each reported melioidosis case is assigned a unique identification number and data are deduplicated. Data collected for suspected melioidosis cases include the patient's demographic information, signs and symptoms, diagnosis, travel history, country of birth, and risk factors, and data from occupational exposures resulting from testing the patient isolate. Data for research exposures include activities resulting in exposure, the number of exposed persons, exposure risk level (high versus low) of exposed persons, disease risk factors of exposed persons, and information related to postexposure prophylaxis recommendations and compliance. Data for laboratory exposures include the number of laboratories involved in testing or processing the patient specimen and the number of laboratories that were determined to have known, no, or unknown exposures. For each laboratory facility with exposures, the following data are collected: activities resulting in exposure, number of exposed persons, exposure risk level (high versus low) of exposed persons (*24*), disease risk factors of exposed persons, and information related to postexposure prophylaxis recommendations and compliance.

Surveillance Case Definitions and Classification

All suspected cases, whether reported to states or to CDC, are classified as probable or confirmed on the basis of the 2011 standardized Council of State and Territorial Epidemiologists case definition (*25*,*26*), which considers clinical, laboratory, and epidemiologic evidence. For the purpose of surveillance reporting and classification, clinical evidence includes signs and symptoms consistent with melioidosis or documentation of laboratory diagnosis in a patient's record or death certificate. Signs and symptoms consistent with melioidosis can vary on a case-by-case basis and include one or more of the following symptoms: fever >38°C (>100.4°F); headache; myalgia, anorexia; chest pain; skin abscess; ulcer; nodule; respiratory distress; abdominal discomfort; joint pain; abscess in the liver, spleen, or prostate; disorientation; weight loss; or seizure.

Melioidosis is confirmed on the basis of isolation of the bacteria from any clinical specimen and characterization by the LRN algorithm (*27*). Isolation of *B. pseudomallei* is considered confirmatory regardless of clinical presentation because these bacteria are not considered commensal. Probable cases are those that meet the clinical case definition and also one or more of the following laboratory results: detection of *B. pseudomallei* by the LRN real-time polymerase chain reaction for *Burkholderia* spp., a fourfold increase in antibody titer by the Indirect Hemagglutination Assay (IHA) or titer >1:40 using IHA (*25*,*26*).

Analysis

This report summarizes data collected during 2008–2013. Findings are presented by three domains. First, the total number of suspected and confirmed melioidosis cases reported to BSPB is presented. Excel was used to perform univariate analysis to describe selected characteristics of confirmed melioidosis cases.

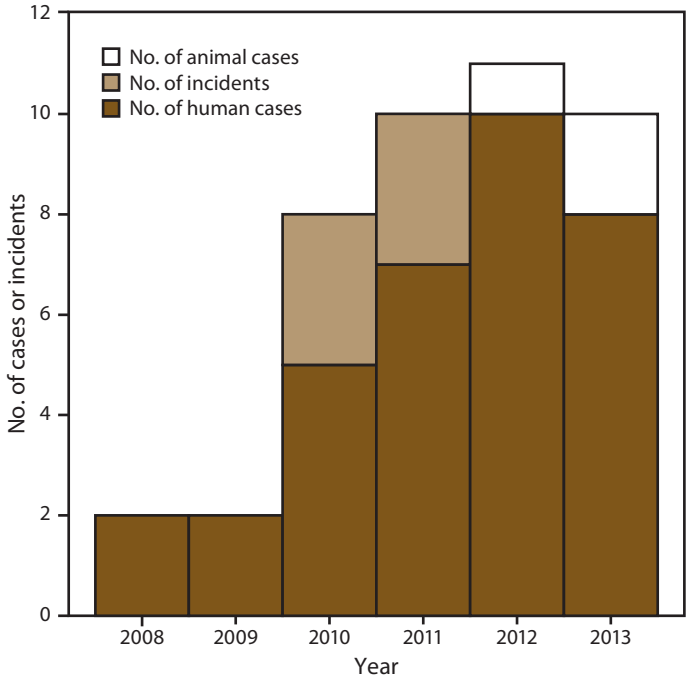
Variables analyzed for confirmed cases include the year that the case was reported to BSPB, the patient's demographics (age, sex, and state or territory), travel history, country of origin, medical conditions, risk factors, possible risk of exposure (if known), and clinical outcome (whether the patient survived or died). Second, the number of reported incidents with possible occupational exposure involving research activities reported to BPSB was counted and findings are presented by state, year, and clinical outcome. Third, the number of persons at risk for occupational exposure to *B. pseudomallei* while performing laboratory diagnostics is presented by risk level (high, low, or none) and specimen category (i.e., specimen related to medlioidosis case [human or animal infection] or reported incidents with possible occupational exposure involving research activities). Risk level was determined according to criteria in the guidance for "Management of accidental laboratory exposure to *Burkholderia pseudomallei* and *B. mallei*" (*24*). These at-risk persons were identified by working with state health departments to review each facility that handled the pathogen.

Results

During 2008–2013, a total of 47 suspected melioidosis cases were reported to BSPB, and 37 confirmed cases are described in this report. The 10 cases excluded from this analysis included four human cases in non-U.S. residents who never traveled to the United States (isolates for all the cases were forwarded to U.S. laboratories for test confirmation only and no associated laboratory exposures occurred in the United States); four cases were excluded because test results for *B. pseudomallei* were negative; one case whose clinical isolate was never submitted for confirmatory testing; and another case for which information on the index case or associated occupational exposures was not provided.

Of the 37 suspected melioidosis cases, all were confirmed by laboratory testing; 34 were human infections and three were animal infections. (Figure, Table 1). Six incidents of possible occupational exposure involving research activities were also reported (Figure, Table 2), but only two incidents involved occupational exposures (Table 3) and no infections occurred from those incidents. BSPB received reports of suspected cases and exposures from 20 states and Puerto Rico. At least one form of technical expertise (epidemiology assistance or laboratory confirmation) was provided by BSPB to each of these jurisdictions involving human or animal cases. None of the human cases were considered to have acquired the disease as a result of occupational exposure or intentional release. Epidemiologic investigations indicated that two of 34 patients did not have any travel history outside of the United States (*28*,*29*). Although a third patient

FIGURE. Number* of reported melioidosis cases and number of incidents with possible occupational exposure involving research activities, by year — United States, 2008–2013



* N = 43 (34 human cases, three animal cases, and six incidents with possible occupational exposure involving research activities).

TABLE 1. Number* of melioidosis cases in humans and animals — United States and Puerto Rico, 2008–2013

States	2008	2009	2010	2011	2012	2013	Total
AZ	1	0	1	0	0	0	**2**
CA	0	0	2	2	4	3†	**11**
CO	0	0	1	1	0	0	**2**
FL	0	1	0	0	1	0	**2**
GA	0	0	0	0	2§	0	**2**
IL	0	0	0	0	1	0	**1**
MA	0	0	0	1	0	0	**1**
MD	0	0	0	0	0	1	**1**
MI	0	0	0	0	0	1¶	**1**
NC	0	0	0	1	0	0	**1**
NH	0	0	0	0	1	0	**1**
NJ	0	0	0	0	0	1	**1**
NV	0	0	0	1	0	0	**1**
NY	1	0	1	0	0	0	**2**
OH	0	0	0	0	0	1	**1**
PA	0	0	0	0	1	0	**1**
PR	0	0	0	0	1	0	**1**
RI	0	1	0	0	0	1	**2**
TX	0	0	0	0	0	0	**0**
VA	0	0	0	0	0	1	**1**
WA	0	0	0	1	0	1	**2**
Total	**2**	**2**	**5**	**7**	**11**	**10**	**37**

* Humans (N = 34), animals (N = 3).
† One animal (iguana) case.
§ One animal (macaque) case.
¶ One animal (macaque) case.

had a history of international travel, the patient did not travel to any countries where melioidosis is known to be endemic (Table 4); however, the patient might have been exposed to *B. pseudomallei* while working in a reptile wholesale warehouse located in the United States. Three confirmed animal cases involving one iguana and two macaques were reported from two states (*30*,*31*).

Among the 261 persons identified by state health departments to be at risk for occupational exposure to *B. pseudomallei* while performing laboratory diagnostics, 43 (16%) had high-risk exposures, 130 (50%) had low-risk exposures, and 88 (34%) had exposures that were classified as undetermined or of unknown risk (Table 3).

TABLE 2. Number of reported incidents of possible occupational exposure to *Burkholderia pseudomallei* involving research activities — United States and Puerto Rico, 2008–2013

States	2008	2009	2010	2011	2012	2013	Total
AZ	0	0	0	0	0	0	**0**
CA	0	0	0	1	0	0	**1**
CO	0	0	2	0	0	0	**2**
FL	0	0	0	0	0	0	**0**
GA	0	0	0	0	0	0	**0**
IL	0	0	0	0	0	0	**0**
MA	0	0	0	0	0	0	**0**
MD	0	0	0	1	0	0	**1**
MI	0	0	0	0	0	0	**0**
NC	0	0	0	0	0	0	**0**
NH	0	0	0	0	0	0	**0**
NJ	0	0	0	0	0	0	**0**
NV	0	0	0	0	0	0	**0**
NY	0	0	0	0	0	0	**0**
OH	0	0	0	0	0	0	**0**
PA	0	0	0	0	0	0	**0**
PR	0	0	0	0	0	0	**0**
RI	0	0	0	0	0	0	**0**
TX	0	0	0	1	0	0	**1**
VA	0	0	0	0	0	0	**0**
WA	0	0	1	0	0	0	**1**
Total	**0**	**0**	**3**	**3**	**0**	**0**	**6**

Discussion

The small number of melioidosis cases reported in the United States has been increasing slightly each year since 2008. This might reflect an increase in travel to locations endemic for melioidosis with patients developing disease after their return to the United States or could represent unidentified foci of locally acquired *B. pseudomallei* infections in the United States.

Melioidosis occurs in tropical and subtropical areas (e.g., Australia and Southeast Asia), with highest endemicity in northeast Thailand, northern Australia, Singapore, and parts of Malaysia. Southeast China, Taiwan, the Philippines, and much of the Indian subcontinent also are considered endemic areas. Sporadic cases are found in southwest Asia, Papua New Guinea, and several locations in Africa and the Pacific regions (*32*). Within the Americas, *B. pseudomallei* has been isolated from environmental samples in Peru (*33*), Brazil (*33*,*34*), Haiti (*33*), and Puerto Rico (*36*). Human cases have been reported from

TABLE 3. Number of persons at risk for occupational exposures to *B. pseudomallei* while performing laboratory diagnostics, by specimen category, number of states involved, facility characteristics, and risk level — United States, 2008–2013

				Facilities* by exposure type				Classification of risk level† of exposed persons		
Specimen§ category	No. occupational exposure	No. of different states involved	No. facilities involved in processing specimens	No. facilities with known exposures	No. facilities with no exposures	No. facilities with unknown exposures	No. persons exposed	No. persons at high risk	No. persons at low risk	No. persons with undetermined or unknown risk
Melioidosis case (human infection)	27	19	69	27	37	5	242	43	116	83
Melioidosis case (animal infection)	3	4	7	4	3	0	17	0	12	5
Reported incident of possible occupational exposure during research activities	2	5	6	2	4	0	2	0	2	0
Total	**32**	—	—	—	—	—	**261**	**43**	**130**	**88**

* In some cases, specimens were processed in more than one facility before submission to state public health laboratories or CDC's laboratory for confirmation (n = 50).
† Classification of risk level was determined on the basis of the guidance in Peacock SJ, Schweizer HP, Dance DA, et al. Management of accidental laboratory exposure to *Burkholderia pseudomallei* and *B. mallei*. Emerg Infect Dis 2008;14:e2.
§ Human infection = 34; animal infection = 3; possible occupational exposure = 6.

the United States, Mexico, El Salvador, and the Caribbean (*35*). In the United States, reported cases have primarily occurred among persons immigrating or visiting from areas where the disease is endemic. For example, a previous report documented melioidosis in a person who had travel history to Honduras and in another person who was a resident of Honduras visiting the United States at the time of diagnosis (*19*). Although the majority of melioidosis cases in the United States have occurred among persons with documented travel history (Table 5), in two instances, the infected persons did not have any travel outside of the United States; infections occurred in 2008 and 2013 (*28*,*29*). The source of infection in a reported case in 2010 was unknown but was suspected to be from occupational exposure to imported reptiles. The patient did not report travel to any areas where melioidosis is endemic. However, the patient worked in a reptile importation and distribution center, which might have resulted in exposure to the bacterium (Unpublished data, CDC, 2010). Melioidosis infections in two iguanas,

TABLE 4. Melioidosis cases with infection acquired presumptively in the United States, 2008–2013

Yr. of diagnosis	Patient	Risk factors or possible risk of exposure	Travel history	Outcome
2008	32 year-old male	Diabetes	No travel history outside of the United States	Patient survived
2010	27 year-old female	Contact with imported reptiles in the United States	Travel history to England, Italy, and Greece	Patient survived
2013	44 year-old male	Diabetes	No travel history outside of the United States	Patient died

TABLE 5. Summary of melioidosis cases among U.S. residents reported to CDC—United States, 2008–2013

Yr. of diagnosis	Patient	Travel history or country of origin	Medical conditions, risk factors, and possible risk for exposure	Outcome
2008	32 year-old male	No travel history outside of the United States.	Risk factor: diabetes. Possible exposure: while working as a mechanic	Patient survived
	Unknown	Unknown	Unknown	Unknown
2009	7 year-old female	Travel history to Puerto Rico, Northern Portugal, and Aruba	Medical condition: cystic fibrosis	Patient survived
	88 year-old male	Travel history to Puerto Rico, Korea, and Panama. Served in WWII in Korea and Panama	Possible exposure: in Puerto Rico or Panama	Patient survived
2010	Male (Unknown age)	Travel history to Vietnam	Possible exposure: in Vietnam	Patient survived
	27 year-old female	Travel history to England, Italy, Greece	Possible exposure: contact with reptiles while working at a zoological warehouse	Patient survived
	42 year-old female	Travel history to Costa Rica and Mexico	Possible exposure: contact with soil and water while vacationing in Costa Rica.	Patient survived
	67 year-old female	Country of origin: Cambodia. Patient had been in the United States for 3 years before diagnosis. Travel history to Laos.	Risk factor: diabetes. Possible exposure: in Cambodia or Laos	Patient survived
	46 year-old female	Country of origin: United Kingdom but had been a U.S. resident since 1972. Travel history to several Caribbean locations with most recent to Aruba in October 2010	Possible exposure: in the Caribbean	Patient survived
2011	82 year-old male	Travel history to the Philippines (August–October 2010)	Possible exposure: in the Philippines	Patient survived
	58 year-old male	Country of origin: Cambodia	Possible exposure: in Cambodia	Patient survived
	Unknown	Travel history to Malaysia	Possible exposure: contact with soil/ fertilizer in Malaysia	Patient survived
	10 year-old female	Travel history to Mexico	Unknown	Patient survived
	22 year-old male	Travel history to Mexico	Risk factor: alcoholism, acute pancreatitis	Patient survived
	Male (unknown age)	Country of origin: Cambodia. Recent travel history to SE Asia	Risk factor: diabetes, Chronic Obstructive Pulmonary Disease, chronic kidney disease	Patient survived
	75 year-old male	Lived in the Philippines for approximately 5 years	Risk factor: alcoholism, renal disease	Patient died

including one within the reporting period for this manuscript, were recently reported in California (*30*).

The movement of pathogens from one geographic area to another is often influenced by the frequency of global human movement (*37*). Diseases not normally diagnosed in some geographic areas can easily be imported by tourists, immigrants, and workers (*38*). In 2012, the number of international tourist arrivals to the United States increased by approximately 6% (*39*) from 62.8 million visitors in 2011 to 66.7 million visitors in 2012 (*40*). A 6% increase in flight departures (from 5,107 departures in 2011 to 5,415 departures in 2012) was documented among U.S. residents traveling to Asia, which included melioidosis-endemic countries (e.g., Malaysia, Singapore, Thailand, and the Philippines). Thailand, Singapore, and the Philippines were among the top destinations of U.S. residents traveling abroad (*41*).

Because of the slight increase in the number of cases since 2009, melioidosis might be considered an emerging infection in the United States, and standardized reporting could enable a better understanding of the incidence and prevalence of the

TABLE 5. (*Continued*) Summary of melioidosis cases among U.S. residents reported to CDC—United States, 2008–2013

Yr. of diagnosis	Patient	Travel history or country of origin	Medical conditions, risk factors, and possible risk for exposure	Outcome
2012	71 year-old male	Country of origin: Guatemala. Patient immigrated to the United States 8 months before diagnosis	Risk factor: diabetes	Patient survived
	61 year-old male	Country of origin: China. Moved to Burma at age 2 and immigrated to United States at age 30. Last visit to Burma was in 2010	Risk factor: diabetes and nonalcoholic cirrhosis	Patient survived
	37 year-old male	Country of origin: Vietnam. Immigrated to the United States at age 24, and traveled back to Vietnam before diagnosis	Possible exposure: in Vietnam	Patient survived
	50 year-old male	Country of origin: Bangladesh. Travel history to Saudi Arabia and Bangladesh before diagnosis	Risk factor: diabetes. Possible exposure: soil in Bangladesh during rainy season	Patient survived
	10 year-old male	Country of origin: Vietnam with recent travel history to Vietnam	Possible exposure: in Vietnam	Patient survived
	56 year-old male	Country of origin: Scotland. Living in the United States for 20 years; travel history to Thailand a few months before diagnosis	Risk factor: diabetes. Possible exposure: contact with soil, animals, and water on rice farm in Thailand as a Product Engineer	Patient survived
	56 year-old female	Travel history to India	Risk factor: diabetes. Risk of exposure: contact with soil in India	Patient survived
	47 year-old male	Travel history to Vietnam (multiple times)	Possible exposure: in Vietnam	Patient survived
	58 year-old male	Country of origin: Trinidad. Travel history to Trinidad before diagnosis	Risk factor: Pancreatic cancer	Patient died
	68 year-old male	Country of origin: Puerto Rico	Possible exposure: in Puerto Rico as a banana farmer	Patient survived
2013	66 year-old male	Country of origin: Mexico. Served in Vietnam war	Risk factor: diabetes	Patient survived
	46 year-old male	Country of origin: Russia. Travel history to Shanghai, Malaysia, and Dubai	Possible exposure: in Malaysia	Patient survived
	44 year-old male	No travel history outside of the United States	Risk factor: diabetes	Patient died
	81 year-old male	Travel history to India	None identified	Patient survived
	22 year-old female	Travel history to Guatemala	Possible exposure: in Guatemala (use of thermal hot sulfur spring 2 years before diagnosis).	Patient survived
	70 year-old male	Country of origin: Laos. Immigrated to the United States in December 1994 through a refugee camp from Thailand	Possible exposure: in Thailand or Laos	Patient survived
	65 year-old male	Travel history to Thailand	Possible exposure: contact with soil in Thailand	Patient survived
	70 year-old male	Travel history to Korea, Ghana, Senegal, Nigeria, Benin, and Egypt	Risk factor: diabetes	Patient survived

disease in the United States. Physicians are encouraged to consider melioidosis in their differential diagnosis of acute febrile illnesses among persons with a history of international travel to areas where the disease is endemic or with specific risk factors for melioidosis (e.g., diabetes or immunodeficiency). Of note, three cases of melioidosis occurred in U.S. residents with no travel history either outside of the United States or to regions where melioidosis is endemic, possibly indicating unrecognized sources of exposure in the United States. Therefore, being aware that this infection can be seen in persons without an obvious history of travel to locations where *B. pseudomallei* is endemic is important.

Burkholderia spp. are relatively easy to aerosolize when manipulated in the laboratory. Thus, working with these organisms put laboratory workers at risk for laboratory-acquired infections. Laboratory work involving known or suspected *Burkholderia* spp. isolates requires use of a biosafety cabinet and appropriate PPE (*5*).

Conclusion

Melioidosis is the only overlap select agent that is not a nationally notifiable disease, and reporting of cases to CDC is voluntary. Given the slight increase in the number of melioidosis cases reported since 2009, melioidosis might be considered an emerging disease in the United States, and standardized reporting could enable a better understanding of the incidence and prevalence of the disease in the United States.

Physicians and other health-care personnel should be aware of the increase of cases reported in the United States, especially given the identification of infected persons without travel histories to endemic areas or known risk factors. Laboratory and research personnel are encouraged to follow proper safety practices and use appropriate PPE when working with select agents such as *B. pseudomallei* or unknown pathogens.

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