17-ID-02

Committee: Infectious Disease

Title: Revision for the Standardized Case Definition, Case Classification, and National Surveillance for Anthrax

I. Statement of the Problem
Since the position statement 09-ID-10 was approved in January 2010, updates and refinements have been identified to improve the anthrax case definition and its application to national surveillance. Herein, we describe the updates and applicable edits, and we make additional refinements to improve the readability and usability of the case definition.

II. Background and Justification
Anthrax has been a notifiable condition since 1944[1] and has historically been caused by the organism *B. anthracis*. Although *B. anthracis* is a select agent and thus falls under the reporting requirements of both the National Select Agent Program[2] and the Laboratory Response Network (LRN), CDC also conducts case surveillance. Surveillance is an important aspect of case detection, and disease-specific information informs what and how additional case finding should occur.

Since 2010, a number of updates have been identified to improve the anthrax case definition:

- Update laboratory diagnostics to accommodate changes in availability and classification.
    - Remove a test that is no longer available;
    - Updating wording to be more inclusive of positive results on a test with established performance in a CLIA-accredited laboratory;
    - Upgrade the lethal factor assay (LFA) to a confirmatory test.
- Add infections with *Bacillus cereus* strains that express anthrax toxin genes (pXO1 and/or pXO2 plasmids), including *B. cereus* biovar *anthracis.*
    - While rare, these *B. cereus* strains have been identified in human infections that resemble anthrax [3-7].
    - The *B. cereus* biovar *anthracis* strain has recently emerged as a cause of an anthrax-like disease in animals. It has not been isolated from humans,[8] yet there is no reason to believe it would not cause an infection that resembles anthrax in humans and has thus recently been designated a select agent[9].
        - These infections have been described as causing a disease that could meet the anthrax case definition.
        - Even though these infections are rare, infections should be treated like anthrax and not a typical *B. cereus* infection.
        - *B. anthracis, B. cereus* biovar *anthracis, B. cereus* expressing anthrax toxins, and other *B. cereus* isolates can be distinguished by microbiological and molecular methods (Appendix 1)[8].
- Improve consistency in the terms used for the types of anthrax
    - Change all terms to convey the route of entry of the organism; rather than the affected organ system. This will help to reduce confusion about the symptoms that may be experienced in each disease type.
    - Add Injection anthrax as a separate disease type[10].
- Based on a systematic review of anthrax cases,[11] we are refining the symptoms and signs to improve sensitivity and specificity of the case descriptions for each disease type.

III. Statement of the desired action(s) to be taken

1. Utilize standard sources (e.g. reporting*) for case ascertainment for anthrax. Surveillance for anthrax should use the following recommended sources of data to the extent of coverage presented in Table III.

Table III. Recommended sources of data and extent of coverage for ascertainment of cases of anthrax.

Source of data for case ascertainment	Coverage	
	Population-wide	Sentinel sites
Clinician reporting	x	
Laboratory reporting	x	
Reporting by other entities (e.g., hospitals, veterinarians, pharmacies, poison centers)	x	
Death certificates	x	
Hospital discharge or outpatient records	x	
Extracts from electronic medical records		
Telephone survey		
School-based survey		
Other reports from other federal agencies	x	

2. Utilize standardized criteria for case identification and classification (Sections VI and VII) for anthrax and add anthrax to the *Nationally Notifiable Condition List.*

2a. **Immediately notifiable, extremely urgent** (within 4 hours)—If the source of the infection is not recognized or is recognized as one of BT or potential mass exposure, or if the case or cases involve serious illness of naturally-occurring anthrax, such as with systemic involvement where medical countermeasures available through CDC may be requested for therapy.

2b. **Immediately notifiable, urgent** (within 24 hours)—If the source of infection can be attributed to a naturally-occurring or occupational exposure and the case or cases are responding to current medical management, CDC requests **immediate (urgent)** notification for confirmed and probable cases.

CSTE recommends that all States and Territories enact laws (statue or rule/regulation as appropriate) to make this disease or condition reportable in their jurisdiction. Jurisdictions (e.g. States and Territories) conducting surveillance (according to these methods) should submit case notifications** to CDC.

Due to the rarity of anthrax, it is currently not prioritized for development of a Message Mapping Guide; outside of an anthrax mass casualty event, case notification will place a minimal burden on reporting jurisdictions.

3. CDC should publish data on anthrax as appropriate in *MMWR* and other venues (see Section IX).

CSTE recommends that all jurisdictions (e.g. States or Territories) with legal authority to conduct public health surveillance follow the recommended methods as outlined above.

4. CSTE recommends that all jurisdictions, states and territories send isolates from incident infections to CDC for whole genome sequencing and other advanced molecular diagnostics, which assists with the epidemiologic investigation. In cases associated with a natural or intentional outbreak or cluster, CDC will work with state and local health officials to determine the number of isolates needed for characterization.

Terminology:
* Reporting: process of a healthcare provider or other entity submitting a report (case information) of a condition under public health surveillance TO local or state public health.
**Notification: process of a local or state public health authority submitting a report (case information) of a condition on the Nationally Notifiable Condition List TO CDC.

IV. Goals of Surveillance

- To provide information on the temporal, geographic, and demographic occurrence of anthrax to facilitate its prevention and control.
- To identify anthrax cases epidemiologically linked to confirmed or probable anthrax cases that may not be reported through LRN or Select Agent processes.
- To enable early detection of outbreaks and a timely and informed public health response.
- To determine the epidemiology of *B. cereus* biovar *anthracis* and *B. cereus* strains expressing anthrax toxin genes.

V. Methods for Surveillance: Surveillance for anthrax should use the recommended sources of data and the extent of coverage listed in Table III.
Surveillance for anthrax should use the sources of data and the extent of coverage listed in Table III.

VI. Criteria for case identification

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

Report any illness or laboratory findings to public health authorities that meets any of the following criteria:

- Any person with an illness comprising symptoms and signs for cutaneous, ingestion, inhalation, or injection anthrax; systemic involvement; or anthrax meningitis, AND an anthrax test is ordered OR there is epidemiologic evidence relating it to anthrax.
- Any death of unknown cause AND organ involvement consistent with anthrax[12].
- Any person in whom anthrax is suspected.
- Any person with any of the following laboratory evidence of *Bacillus anthracis* or *Bacillus cereus* expressing anthrax toxins (including *B. cereus* biovar *anthracis*):
    - Culture and identification of *B. anthracis* or *B. cereus* expressing anthrax toxins from clinical specimens[13,14] (Appendix 1)
    - Demonstration of *B. anthracis* antigens in tissues by immunohistochemical staining using both *B. anthracis* cell wall and capsule monoclonal antibodies
    - Evidence of a four-fold rise in antibodies to protective antigen between acute and convalescent sera or a fourfold change in antibodies to protective antigen in paired convalescent sera using quantitative anti-PA IgG ELISA testing in an unvaccinated person
    - Detection of *B. anthracis* or anthrax toxin genes by polymerase chain reaction and/or sequencing in clinical specimens collected from a normally sterile site (such as blood or CSF) or lesion of other affected tissue (skin, pulmonary, reticuloendothelial, or gastrointestinal)
    - Detection of lethal factor (LF) in clinical serum specimens by LF mass spectrometry
    - Positive result on a test with established performance in a CLIA-accredited laboratory

- A person whose healthcare record contains a diagnosis of anthrax.
- A person whose death certificate lists anthrax as a cause of death or a significant condition contributing to death.

Other recommended surveillance procedures:

- All cases of anthrax should be reported.
- Reporting should be ongoing and routine.
- Reporting should be immediate—either extremely urgent or urgent.

B. Table of criteria to determine whether a case should be reported to public health authorities

Table VI-B. Table of criteria to determine whether a case should be reported to public health authorities.

Criterion	Anthrax Reporting Scenarios			
Clinical Evidence				
Non-specific Clinical Evidence				
Abdominal pain	*O*			
Abnormal lung sounds	*O*			
Altered mental status	*O*			
Ascites	*O*			
Cough	*O*			
Dyspnea	*O*			
Fever	*O*			
Headache	*O*			
Hypotension	*O*			
Localized edema	*O*			
Meningeal signs	*O*			
Nausea /vomiting (may be bloody)	*O*			
Sore throat	*O*			
Tachycardia	*O*			
Specific Clinical Evidence				
Painless or pruritic papular or vesicular lesion or eschar, may be surrounded by erythema		*O*		
Blood in the CSF		*O*		
Evidence of pleural effusion		*O*		
Evidence of mediastinal widening on imaging		*O*		
Additional Clinical Evidence				
Death of unknown cause			*N*	
Organ involvement consistent with anthrax			*N*	
Anthrax suspected				*S*
Healthcare record contains a diagnosis of anthrax				*S*
Death certificate lists anthrax as a cause of death or a significant condition contributing to death.				*S*
Laboratory Evidence				
Culture and identification of *B. anthracis* or *Bacillus cereus* expressing anthrax toxins from clinical specimens				*S*
Demonstration of *B. anthracis* antigens in tissues by immunohistochemical staining using both *B. anthracis* cell wall and capsule monoclonal antibodies				*S*

Evidence of a four-fold rise in antibodies to protective antigen between acute and convalescent sera or a fourfold change in antibodies to protective antigen in paired convalescent sera using quantitative anti-PA IgG ELISA testing in an unvaccinated person				*S*
Detection of *B. anthracis* or anthrax toxin genes by LRN PCR and/or sequencing in clinical specimens collected from a normally sterile site (such as blood or CSF) or lesion of other affected tissue (skin, pulmonary, reticuloendothelial, or gastrointestinal)				*S*
Detection of lethal factor (LF) in clinical serum specimens by LF mass spectrometry				*S*
Positive result on a test with established performance in a CLIA-accredited laboratory				*S*
Laboratory testing ordered for anthrax	*O*			
Epidemiologic Evidence				
Exposure to the same environment, food, animal, materials, or objects as persons who have laboratory-confirmed anthrax	*O*			
Consumption of the same food as persons who have laboratory-confirmed anthrax	*O*			
Exposure to environment, food, animal, materials, or objects that is suspect or confirmed to be contaminated with *B. anthracis*	*O*			

Notes: S = This criterion alone is Sufficient to report a case.
N = All "N" criteria in the same column are Necessary to report a case.
O = At least one of these "O" (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to report a case.
** A requisition or order for any of the "S" laboratory tests is sufficient to meet the reporting criteria.*

C. Disease-specific data elements
The following clinical information data elements are to be included in the initial report. Laboratory and epidemiological information data elements can be reported as they become available.

Clinical Information:
Description of clinical symptoms and signs of illness
Date of onset
Timing of antimicrobial therapy and collection of specimens
Anthrax vaccine history

Laboratory Information:
Date of specimen collection
Laboratory processing the specimen
Specimens collected:
- Specimen type
- Specimen collection date
- Laboratory test performed
- Results

Epidemiological Information:
Risk factors
Epidemiological linkage to a documented anthrax environmental exposure
Contact with livestock, wild animals, animal body fluids, or animal products (e.g., hides, hair, wool)
- Animal species (e.g., livestock, wildlife species)
- Exposure type
- Animal disposition
- Current location of animal or product
- Exposure date(s)

Handled suspicious mail or worked as a mail handler
Exposed to suspicious powder
Gardened or worked with soil
Contact with or consumption of raw/undercooked meat

Travel in the month prior to symptom onset
- Date of travel
- Location of travel

Contact with illicit drugs
Received an injection
Worked in a clinical or microbiological laboratory processing samples that could potentially cause anthrax
Attended a large gathering or a place where people congregate during incubation period
- Place name and address
- Dates of attendance

VII. Case Definition for Case Classification

A. Narrative: Description of criteria to determine how a case should be classified.

Clinical description
An illness or post-mortem examination characterized into several distinct clinical types, including:

Cutaneous anthrax: It usually begins as a small, painless, pruritic papule on an exposed surface, which progresses through a vesicular stage into a depressed black eschar; the eschar is often surrounded by edema or erythema and may be accompanied by lymphadenopathy. Fever is also common.
Ingestion anthrax: presents as two sub-types:

Oropharyngeal: When anthrax spores germinate in the oropharynx, a mucosal lesion may be observed in the oral cavity or oropharynx. Symptoms include sore throat, difficulty swallowing, and swelling of the neck. Less specific symptoms include fever, fatigue, shortness of breath, abdominal pain, and nausea/vomiting; the symptoms may resemble a viral respiratory illness. Cervical lymphadenopathy, ascites, and altered mental status may be observed.

Gastrointestinal: When anthrax spores germinate in the lower gastrointestinal tract, symptoms include abdominal pain, nausea, vomiting or diarrhea (either of which may contain blood), and abdominal swelling. Less specific symptoms such as fever, fatigue, and headache are also common. Altered mental status and ascites may be observed.

Inhalation anthrax: Often described as a biphasic illness. Early nonspecific symptoms of inhalation anthrax include fever and fatigue. Localized thoracic symptoms such as cough, chest pain, and shortness of breath follow, as may non-thoracic symptoms such as nausea, vomiting, abdominal pain, headache, diaphoresis, and altered mental status. Lung sounds are often abnormal and imaging often shows pleural effusion or mediastinal widening.

Injection anthrax: Usually presents as a severe soft tissue infection manifested as significant edema or bruising after an injection. No eschar is apparent, and pain is often not described. Nonspecific symptoms such as fever, shortness of breath, or nausea are sometimes the first indication of illness. Occasionally patients present with meningeal or abdominal involvement. A coagulopathy is not unusual.

Additional considerations:
1) Signs of systemic involvement from the dissemination of either the bacteria and / or its toxins can occur with all types of anthrax and include fever or hypothermia, tachycardia, tachypnea, hypotension, and leukocytosis. One or more of these signs are usually present in patients with ingestion anthrax, inhalation anthrax, and injection anthrax and may be present in up to a third of patients with cutaneous anthrax.

2) Anthrax meningitis: may complicate any form of anthrax, and may also be a primary manifestation. Primary symptoms include fever, headache (which is often described as severe), nausea, vomiting, and fatigue. Meningeal signs (e.g., meningismus), altered mental status, and other neurological signs such as seizures or focal signs are usually present. Most patients with anthrax meningitis have CSF abnormalities consistent with bacterial meningitis, and the CSF is often described as hemorrhagic.

Classification criteria

Clinical Criteria

- For surveillance purposes, an illness with at least one specific OR two non-specific symptoms and signs that are compatible with cutaneous, ingestion, inhalation, or injection anthrax; systemic involvement; or anthrax meningitis; OR
- A death of unknown cause AND organ involvement consistent with anthrax[12].

Laboratory Criteria

Presumptive laboratory criteria for *Bacillus anthracis* or *Bacillus cereus* expressing anthrax toxins:

- Gram stain demonstrating Gram-positive rods, square-ended, in pairs or short chains;
- Positive result on a test with established performance in a CLIA-accredited laboratory[1];

Confirmatory laboratory criteria for *Bacillus anthracis* or *Bacillus cereus* expressing anthrax toxins:

- Culture and identification from clinical specimens by Laboratory Response Network (LRN)[13,14];
- Demonstration of *B. anthracis* antigens in tissues by immunohistochemical staining using both *B. anthracis* cell wall and capsule monoclonal antibodies;
- Evidence of a four-fold rise in antibodies to protective antigen between acute and convalescent sera or a fourfold change in antibodies to protective antigen in paired convalescent sera using Centers for Disease Control and Prevention (CDC) quantitative anti-PA IgG ELISA testing in an unvaccinated person;
- Detection of *B. anthracis* or anthrax toxin genes by the LRN-validated polymerase chain reaction and/ or sequencing in clinical specimens collected from a normally sterile site (such as blood or CSF) or lesion of other affected tissue (skin, pulmonary, reticuloendothelial, or gastrointestinal);
- Detection of lethal factor (LF) in clinical serum specimens by LF mass spectrometry.

Epidemiologic Linkage

- Exposure to environment, food, animal, materials, or objects that is suspect or confirmed to be contaminated with *B. anthracis*;
- Exposure to the same environment, food, animal, materials, or objects as another person who has laboratory-confirmed anthrax;
- Consumption of the same food as another person who has laboratory-confirmed anthrax.

Case classification

Suspect:

- A case that meets the clinical criteria AND for whom an anthrax test was ordered, but with no epidemiologic evidence relating it to anthrax.

Probable:

- A case that meets the clinical criteria AND has presumptive laboratory test results, OR

[1] For example, the RedLine Alert test, http://tetracore.com/bacillus-anthracis-detection/Tetracore_RedLine_Alert_Test.pdf.

- A case that meets the clinical criteria AND has an epidemiologic evidence relating it to anthrax

Confirmed:

- A case that meets the clinical criteria AND has confirmatory laboratory test results;

Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance

- Case not previously reported to public health authorities.

B. Classification Tables

Table VII-B. Criteria for defining a case of anthrax.

Criterion	Cutaneous Anthrax								Inhalation Anthrax								Gastrointestinal Anthrax				Oropharyngeal Anthrax				Injection Anthrax				Meningitis Anthrax								All			
	Suspect	Suspect	Probable	Probable	Probable	Probable	Confirmed	Confirmed	Suspect	Suspect	Probable	Probable	Probable	Probable	Confirmed	Confirmed	Suspect	Probable	Probable	Confirmed	Suspect	Probable	Probable	Confirmed	Suspect	Probable	Probable	Confirmed	Suspect	Suspect	Probable	Probable	Probable	Probable	Confirmed	Confirmed	Suspect	Probable	Probable	Confirmed
Clinical Evidence																																								
Non-specific Clinical Evidence (at least 2)																																								
Abdominal pain									O		O		O		O		O	O	O	O	O	O	O	O	O	O	O	O												
Abnormal lung sounds									O		O		O		O																									
Altered mental status									O		O		O		O		O	O	O	O	O	O	O	O					O		O		O		O					
Ascites																	O	O	O	O	O	O	O	O																
Cough									O		O		O		O																									
Dyspnea									O		O		O		O						O	O	O	O																
Fever	O		O		O		O		O		O		O		O		O	O	O	O	O	O	O	O	O	O	O	O	O		O		O		O					
Headache									O		O		O		O														O		O		O		O					
Hypotension																	O	O	O	O	O	O	O	O	O	O	O	O												
Localized edema	O		O		O		O														O	O	O	O	O	O	O	O												
Meningeal signs																													O		O		O		O					
Nausea /vomiting (may be bloody)									O		O		O		O		O	O	O	O					O	O	O	O	O		O		O		O					
Sore throat																					O	O	O	O																
Tachycardia									O		O		O		O		O	O	O	O	O	O	O	O	O	O	O	O	O		O		O		O					
Specific Clinical Evidence (at least 1)																																								
Evidence of pleural effusion										O		O		O		O																								
Evidence of mediastinal widening on imaging										O		O		O		O																								

Blood in the CSF																														O		O		O		O				
Painless or pruritic papular or vesicular lesion or eschar, may be surrounded by erythema		O		O		O		O																																
Additional Clinical Evidence																																								
Death of unknown cause																																					N	N	N	N
Organ involvement consistent with anthrax[12]																																					N	N	N	N
Laboratory Evidence																																								
Laboratory testing ordered for anthrax	N	N							N	N							N				N				N				N	N						N			
Culture and identification of *B. anthracis* or *Bacillus cereus* expressing anthrax toxins from clinical specimens by the LRN							O	O							O	O				O				O									O	O				O
Detection of lethal factor (LF) in clinical serum specimens by LF mass spectrometry							O	O							O	O				O				O									O	O				O
Demonstration of *B. anthracis* antigens in tissues by immunohistochemical staining using both B. anthracis cell wall and capsule monoclonal antibodies							O	O							O	O				O				O									O	O				O
Evidence of a four-fold rise in antibodies to protective antigen between acute and convalescent sera or a fourfold change in antibodies to protective antigen in paired convalescent sera using quantitative anti-PA IgG ELISA testing in an unvaccinated person							O	O							O	O				O				O									O	O				O
Detection of *B. anthracis* or anthrax toxin genes by LRN PCR and/or sequencing in clinical specimens collected							O	O							O	O				O				O									O	O				O

from a normally sterile site or lesion of other affected tissue																																								
Positive result on a test with established performance in a CLIA-accredited laboratory			O	O							O	O						O				O				O					O	O						O		
Gram stain demonstrating Gram-positive rods, square-ended, in pairs or short chains			O	O							O	O						O				O				O					O	O						O		
Epidemiologic Evidence																																								
No identified epidemiologic association as another case of anthrax	N	N							N	N							N				N				N				N	N							N			
Exposure to the same environment, food, animal, materials, or objects as persons who have laboratory-confirmed anthrax					O	O							O	O					O				O				O						O	O					O	
Consumption of the same food as persons who have laboratory-confirmed anthrax					O	O							O	O					O				O				O						O	O					O	
Exposure to environment, food, animal, materials, or objects that is suspect or confirmed to be contaminated with *B. anthracis*					O	O							O	O					O				O				O						O	O					O	

Notes:
S = This criterion alone is Sufficient to classify a case.
N = All "N" criteria in the same column are Necessary to classify a case. A number following an "N" indicates that this criterion is only required for a specific disease/condition subtype (see below). If the absence of a criterion (i.e., criterion NOT present) is required for the case to meet the classification criteria, list the Absence of criterion as a Necessary component.
O = At least one of these "O" (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to classify a case. (These "O" criteria are alternatives, which means that a single column will have either no O criteria or multiple O criteria; no column should have only one O.) A number following an "O" indicates that this criterion is only required for a specific disease/condition subtype.

VIII. Period of Surveillance

- Ongoing and routine surveillance.

IX. Data sharing/release and print criteria

- Notification to CDC of all probable and confirmed cases of anthrax is recommended.
- Anthrax, caused by *Bacillus anthracis* (*B. anthracis*), is a naturally occurring disease in the United States and in many parts of the world, and is also one of the most likely biological agents to be used as a bioterrorism weapon. Anthrax caused by *Bacillus cereus* biovar *anthracis* is an emerging zoonotic disease. Case notification to the national level provides CDC, the lead agency for the national public health response to biological terrorism, the ability to conduct national real-time surveillance for a potential bioterrorism release or outbreak of *B. anthracis* or *B. cereus* biovar *anthracis*. Such an event would require immediate and coordinated public health, medical, and law enforcement response at the local, state and national levels, as well as rapid deployment of federal response personnel and resources.
- Additionally, infections due to *B. cereus* expressing anthrax toxins have caused severe illness and high mortality in a small number of cases. These infections may require a public health response.
- Cumulative and aggregate case data as they are reported to CDC will be monitored to allow for detection of changing trends in cases by CDC subject matter experts.
- Annual case data on anthrax is summarized in the yearly Summary of Notifiable Diseases. In the event of an increased number of cases of either natural or bioterrorism-related origin the CDC will relay information to the states and territories on an increased, situation-dependent frequency.
- State-specific compiled data is published in the annual MMWR Surveillance Summaries. All cases are verified by CDC epidemiologists or with the state(s) reporting before publication. Due to the very low frequency of occurrence of cases of anthrax in the United States, additional case information will usually be published in the form of individual case or investigation summaries in the MMWR or manuscripts in peer-reviewed journals. The frequency of release of additional publication of this data will be dependent on any change in status from the current epidemiologic situation in the US.
- Summary de-identified case data is reported nationally in the annual MMWR Surveillance Summary report for all confirmed cases. In the event of a suspected bioterrorism event, or an event where cases may appear in multiple states, CDC will coordinate the sharing of necessary data between the affected or potentially affected state and territorial health departments. In circumstances where there is a potential for an international health impact, data from these notifications may be sent to the Pan American Health Organization (PAHO), the World Organization of Animal Health (OIE), or the World Health Organization (WHO) via the International Health Regulations (IHR) mechanism.

X. Revision History

Position Statement ID	Section of Document	Revision Description
09-ID-10	Statement of the problem	DELETED the previous statement; ADDED the current purpose for revising the case definition
09-ID-10	Background and Justification	DELETED the previous background and justification; ADDED content specific to the purpose for revising the case definition
09-ID-10	Statement of the desired action(s) to be taken	ADDED an additional data source (reports from other federal agencies); aligned the section with the current template, including text on MMG and OMB PRA approval; information on data transmission for single, rare cases and in case of an anthrax event; and requested isolates be sent to CDC

09-ID-10	Goals of Surveillance	ADDED four bullets regarding the purpose of anthrax surveillance beyond the information available through the Select Agent Program
09-ID-10	Criteria for Reporting	ADDED death of unknown cause with consistent organ involvement to clinical presentation; *B. cereus*, a positive result on a test with established performance in a CLIA-accredited laboratory, and Gram stain to laboratory criteria; extremely urgent or urgent to recommend surveillance procedures
09-ID-10	Criteria for Reporting	EDITED the clinical presentation to be standalone text; Specified LRN protocol for both culture and PCR.
09-ID-10	Criteria for Reporting	DELETED the Quick ELISA Anthrax-PA kit (not available).
09-ID-10	Criteria for Reporting	EDITED the anti-PA IgG ELISA testing description
09-ID-10	Table VI-B	ADDED death of unknown cause with consistent organ involvement to clinical criteria.
09-ID-10	Table VI-B	EDITED clinical symptoms and laboratory criteria to match changes specified in Criteria for Reporting.
09-ID-10	Table VI-B	DELETED the Quick ELISA Anthrax-PA kit (not available).
09-ID-10	Disease Specific Data Elements	ADDED clinical information (date onset, timing of treatment, anthrax vaccine history), laboratory information (date of collection, laboratory processing, specimen information and results).
09-ID-10	Disease Specific Data Elements	EDITED epidemiological information: explained animal products, gardened, contact with illicit drugs, attended a gathering.
09-ID-10	Case Definition for Case Classification narrative	ADDED clinical, laboratory, and epi criteria sections; within clinical, added death of unknown cause to both clinical criteria and case classification for both probable and confirmed.
09-ID-10	Case Definition for Case Classification narrative	EDITED the clinical description to include more sign and symptom information based on systematic literature review; updated lab criteria to include *B. cereus* expressing anthrax toxins, Gram stain, reduced specificity of the RedLine Alert test to a positive result on a test with established performance in a CLIA-accredited laboratory; specified LRN protocol for both culture and PCR; simplified the probable and confirmed sections; Upgraded the anti-PA IgG ELISA testing description; Upgraded lethal factor test to a confirmatory test.
09-ID-10	Case Definition for Case Classification narrative	DELETED the Quick ELISA Anthrax-PA kit (not available).
09-ID-10	Table VII-B	EDITED the clinical description to include more sign and symptom information based on systematic literature review.
09-ID-10	Table VII-B	ADDED Laboratory criteria: Gram stain as a probable test, included a positive result on a test with established performance in a CLIA-accredited laboratory; ADDED Clinical criteria death of unknown cause and organ involvement consistent with anthrax; Added injection anthrax to the categories of “optional” criteria (O6)
09-ID-10	Table VII-B - Confirmed	EDITED lethal factor test to a confirmatory test, specified LRN protocol for both culture and PCR
09-ID-10	Table VII-B - Probable	EDITED specificity of the RedLine Alert test a positive result on a test with established performance in a CLIA-accredited laboratory
09-ID-10	Table VII-B - Probable	DELETED the Quick ELISA Anthrax-PA kit (not available).
09-ID-10	Period of Surveillance	EDITED statement to include ‘routine’.
09-ID-10	Data sharing/release and print criteria:	EDITED to remove mention of branch and division names, which have changed; included *B. cereus*.
09-ID-10	References	EDITED the references.

09-ID-10	Appendix 1	ADDED a table as an Appendix with the phenotypic characteristics of *B. anthracis*, *B. cereus*, and *B. cereus* biovar *anthracis* included.
17-ID-02	Table VIIB	CSTE National Office reorganized Table VIIB during technical review after Council approved statement.

XI. References

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Appendix 1: Microbiological methods to distinguish the following *Bacillus* species

This table describes the characteristics of *B. anthracis*, *B. cereus*, and *B. cereus* biovar *anthracis*. Additional information on methods and findings for each organism are available in the respective references[8,15,16]. The Association of Public Health Laboratories has developed interim guidance related to *B. cereus* biovar *anthracis* that may provide additional context and information[17].

Characteristic	*B. anthracis*[15]	*B. cereus*[16]	*B. cereus* biovar *anthracis* (Côte d'Ivoire strain)[8]	*B. cereus* biovar *anthracis* (Cameroon strain)[8]
Hemolysis at 24 hours	-	+	-	-
Hemolysis at 48 hours	-	+	+	+
Motility	-	+	+	+
Gamma phage susceptibility	+	-	-	-
Penicillin G	S	R	S	R
Capsule	+	Absent in vitro	+	+

S=susceptible, R=resistant