

# **ANTHRAX Guidelines**

**Possible exposures or threats**

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**Generic guidelines  
for the Pacific islands**

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**A collaboration among:**

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Secretariat of the Pacific Community  
World Health Organization**

# **Anthrax guidelines**

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## General information

### FACTS ABOUT ANTHRAX

#### WHAT IS ANTHRAX?

Anthrax is a bacterial disease caused by the bacterium *Bacillus anthracis*. Anthrax is most commonly found among animals such as cows, horses, sheep and goats. The bacterium can survive for years in the form of spores. However in the Pacific islands, anthrax has not been reported in any form except in PNG where it is endemic. Anthrax does not occur naturally in powders. Powdered anthrax, with anthrax spores, is man-made.

Anthrax infection in humans is of three types reflecting the route by which the disease was acquired:

- Cutaneous anthrax - anthrax infection of the skin
- Gastro-intestinal tract anthrax - anthrax infection of the gut/intestines
- Pulmonary or inhalation anthrax - anthrax of the lung

#### HOW IS IT SPREAD?

When humans become infected with anthrax, the source is usually infected animals or from exposure to the spores. The transmission of anthrax is as follows:

1. Cutaneous (skin) anthrax occurs when the bacterium enters a cut or a bruise on the skin, such as when handling contaminated skins, wool, flesh or other parts of the infected animal, or by contact with contaminated soil.
2. Intestinal anthrax follows the ingestion of contaminated food, mainly undercooked meat from an infected animal.
3. Pulmonary or inhalation anthrax results from breathing in airborne spores of the bacteria. Anthrax spores in powders can enter the body via inhalation.

Person-to-person spread of anthrax is extremely unlikely, if it occurs at all.

#### WHAT ARE THE SIGNS AND SYMPTOMS?

Symptoms of disease vary depending on how the disease was contracted, but usually occur within seven (7) days after exposure. Of the three types of anthrax, inhalation anthrax is the most likely to be fatal even if treated properly.

1. Cutaneous (skin) anthrax starts as a small itchy bump that grows and develops a blackened centre. It is usually painless.
2. The initial signs of intestinal anthrax are nausea, loss of appetite, vomiting, and fever. These are usually followed by abdominal pain, vomiting of blood, and severe diarrhoea.
3. The early symptoms of inhalation anthrax infection are similar to the common cold. After several days, the symptoms progress to severe breathing problems and shock.

#### HOW IS ANTHRAX TREATED OR PREVENTED?

Anthrax disease can be prevented after exposure with prompt antibiotic treatment.

Vaccination against anthrax is not recommended for the general public.

Prompt antibiotic treatment is also important in a case of symptomatic anthrax disease.

## **The anthrax threat in the world**

Amongst the numerous germs that may be used as weapons of bioterrorism, only a limited number could cause disease and deaths in sufficient quantities to seriously affect a population. Anthrax is one of the most serious of these diseases. To be efficient, and cause the more severe form of the disease, i.e. pulmonary anthrax, it has to be aerosolised into very small particles. This requires technical skills and special equipment. After an attack with aerosolised anthrax, inhalation anthrax, ie. the pulmonary form of the disease, is expected to account for most of the mortality.

Since October 2001 (as to the end of November 2001), cases of anthrax were reported in US from media houses and postal facilities or were consistent with exposure to letters known to be contaminated with anthrax. Although the presence of anthrax was also suspected in US Embassies in a few countries, most of the anthrax alerts around the world in countries others than US are due to hoaxes.

The targets for anthrax or other bioterrorist threats are generally expected to be in (main) towns or cities, rather than in rural areas.

## **The anthrax threat in the Pacific Islands**

In general, the risk of real anthrax exposure is negligible in the Pacific Islands at this point. A suspicious powder discovered in a package or letter is even more unlikely with anthrax if it was directly sent from a Pacific Island country or territory.

But the risk of exposure to an anthrax hoax is real (there have been many episodes in the Pacific already).

Because the two situations cannot be differentiated immediately, we must be prepared to respond appropriately (and at the same time to avoid over-reaction).

### **WHAT MUST BE DONE IN RESPONSE TO AN ANTHRAX THREAT?**

The main points of the response to an anthrax threat are:

- Avoid any kind of contact with the content of any suspicious letter or package.
- Determine if this content includes anthrax spores.  
*This step requires access to appropriate laboratory services. Countries and territories, or islands without such an access will need to have an alternative way to deal with the threat until such access is provided.*
- In all cases in which the exposure to anthrax is confirmed or cannot be ruled out:
  - Give an appropriate preventive treatment to the persons having been in contact with the powder.
  - Decontaminate the premises where the exposure happened.
- Investigate the threat, i.e. try to determine who did it.

## **Who must be involved in response to an ANTHRAX threat?**

The police, the fire brigade or a public body equipped with biohazard-type protection, and the health services.

### ***Police***

As any anthrax threat is a criminal act to individuals and the population, the police (or a similar body) should lead the response. They should seal off the involved area, make sure the appropriate measures are taken, and do the investigations.

### ***Fire brigade (or a public body equipped with biohazard-type protection)***

They might be the ones sealing off the possibly infected area before the arrival of the police for instance. They should be responsible for handling the suspected materials, and dispatching them to the relevant laboratory. They should also be the ones responsible of decontaminating the possibly infected area whenever the need arises.

### ***Health services***

They should be the ones responsible for prophylaxis (preventive treatment) of exposed cases, laboratory testing of suspected powder (if possible), and diagnosis and treatment of any case suspected of anthrax.

## **Government Policies**

They must reflect all the above.

They must strongly discourage anthrax hoaxes.

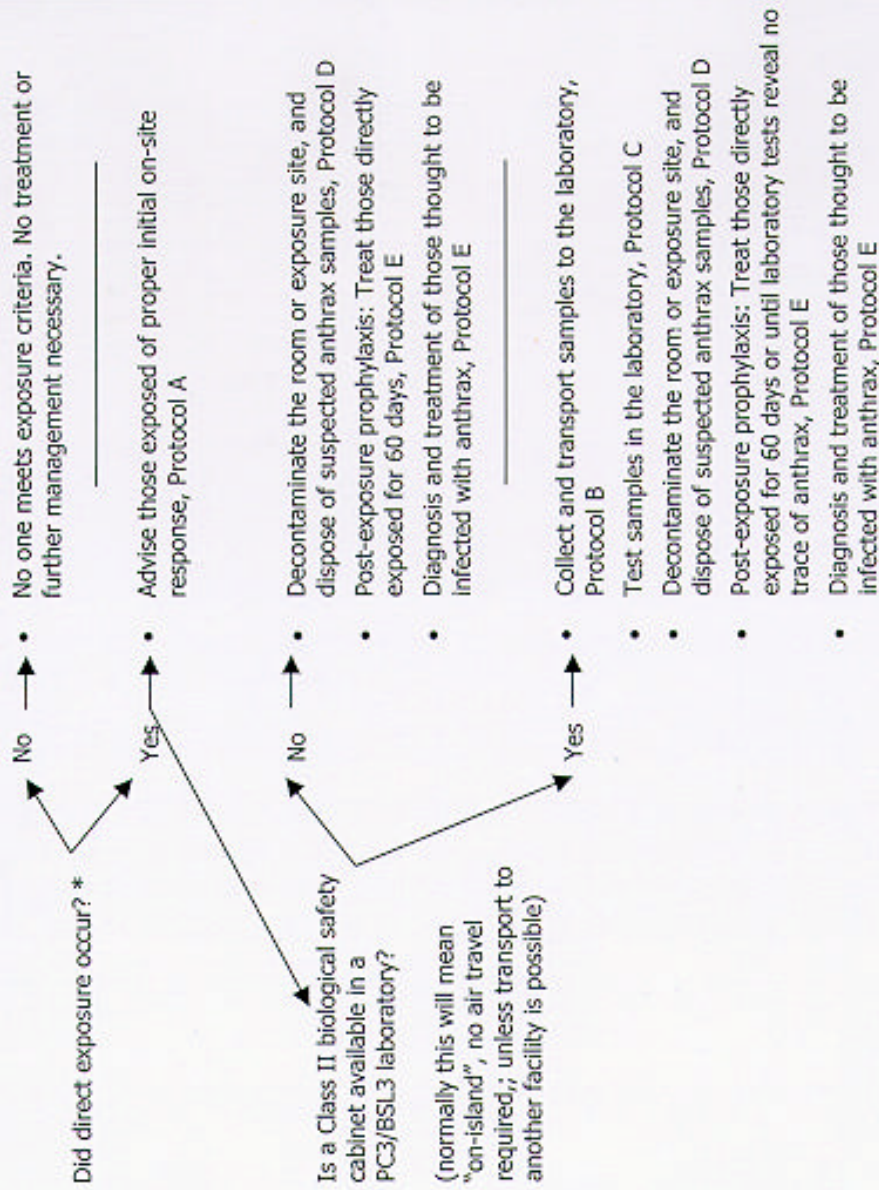
They should encourage international collaboration, especially for the investigation of suspected anthrax threats. In particular, they should facilitate international collaboration for laboratory testing of suspected samples, i.e. between countries or territories with adequate laboratory facilities and those without.

## **Person to contact/number to call**

In each country or territory, people looking for more information or with a suspect letter or package should be able at any time to contact/call a person in charge to deal with the anthrax bioterrorism issue.

## Decision tree for those responding to possible anthrax exposure

**Starting point:** Report of a possible exposure to anthrax spores



\* If a true anthrax bioterrorism incident seems to have occurred, even some people NOT known to be directly exposed could be at risk. In this situation, further expert advice should be sought immediately.

Comments and definitions
<p>Direct exposure = a person who touched what could be anthrax spores, or was in the room when anthrax spores may have been aerosolized.</p> <p>The presence of anthrax spores may be suspected in situations described in Annex A.</p>
<p>Collection and disposal of samples, and decontamination of the exposure site, should take place using high-level protective equipment if possible:</p> <ul style="list-style-type: none"> <li>• Respirator (e.g. HEPA*) which filters &gt;90% of particles ranging from 0.5 um to 1.0 um;</li> <li>• or self-contained breathing apparatus</li> <li>• Safety glasses or eye shield</li> <li>• Impermeable suit or laboratory coat</li> <li>• Gloves</li> </ul> <p>If high-level protective equipment is unavailable:</p> <ul style="list-style-type: none"> <li>• Filtration mask if available</li> <li>• Safety glasses, protective coat, gloves</li> <li>• Take extra care in post-contact clean-up</li> <li>• Seek medical advice about need for treatment</li> </ul> <p>* HEPA = high-efficiency particle air filter</p>

## **Annex**

### **When to suspect the presence of anthrax spores**

#### **HOW TO IDENTIFY HIGHLY SUSPICIOUS PACKAGES AND LETTERS**

Highly suspicious packages and letters may include the following...

- Suspicious messages on the outside
- Powdery substance outside
- Oily stains, discolorations or odour
- Lopsided or uneven envelope
- Protruding wires or aluminium foil
- Ticking sound

Any opened package or letter with a powdery substance inside should be considered as suspicious.

#### **SHOULD PACKAGES AND LETTERS FROM ANY ORIGIN BE SIMILARLY SUSPICIOUS?**

Although for 100%-security reasons we should say "Yes", suspicious packages and letters sent from a Pacific Island country or territory are very unlikely with anthrax (even if a suspicious powder is discovered.)

#### **SHOULD PACKAGES AND LETTERS TO ANY ADDRESSEE BE SIMILARLY SUSPICIOUS?**

For 100%-security reasons we should say "Yes", but:

- The targets for anthrax or other bioterrorist threats are generally in (main) towns or cities, rather than in rural areas.
- Known persons (e.g. politicians) or people working with them or with known organisations (e.g. government, new agency) have been the usual targets for anthrax attacks.

#### **IF A CASE OF ANTHRAX IS SUSPECTED OR DIAGNOSED**

It demonstrates the presence of anthrax spores somewhere (and the case must be properly investigated).

## Protocol A

### Immediate action following suspected exposure

#### **INFORMATION SHEET FOR THE PUBLIC: HOW TO HANDLE ANTHRAX THREATS**

#### **FIRST YOU MUST KNOW THAT:**

1. Anthrax organisms can enter the body by being rubbed into broken skin, swallowed, or inhaled as a fine, aerosolised mist. Disease can be prevented after exposure to the anthrax spores by early treatment with the appropriate antibiotics. Person-to-person spread of anthrax is extremely unlikely, if it occurs at all.
2. For anthrax to cause pulmonary illness, it must be aerosolised into very small particles. This is difficult to do, and requires a great deal of technical skill and special equipment. If a huge number of these small particles are inhaled, life-threatening lung infection can occur, but prompt recognition and treatment are effective and available.

**So, don't panic!**

**WHEN TO SUSPECT THE PRESENCE OF ANTHRAX SPORES** - See Annex

#### **WHAT YOU SHOULD DO WITH A HIGHLY SUSPICIOUS UNOPENED LETTER OR PACKAGE**

1. Do not shake or empty the contents of any suspicious envelope or package.
2. Avoid further handling. If possible, gently cover the letter or package with anything (e.g., clothing, towel, paper, dust bin, container, etc.).
3. Wash your hands with soap and water.
4. Then.....

If you are at WORK report to your supervisor, who will call the designated phone number of your country's or territory's:

.....

and notify your building/compound security official (if there is one).

If you are at HOME call the designated phone number of your country's or territory's:

.....

**WHAT YOU SHOULD DO WITH AN OPENED ENVELOPE OR PACKAGE WITH POWDER**

- 1. Do not shake or empty the contents of any suspicious envelope or package.
- 2. If any powder has spilled do not try to clean it up. Gently cover the envelope or package and the spilled contents immediately with anything (e.g., clothing, towel, paper, dust bin, container, etc.) and do not remove this cover.
- 3. Turn off fans and air conditioning or ventilation units, close all the windows, do not sweep, vacuum, pour liquid or use anything that would get the powder airborne.
- 4. Leave the room and close the door, and keep others away to prevent them others from entering.
- 5. Wash your hands with soap and water.
- 6. Then.....

If you are at WORK report to your supervisor, who will call the designated phone number of your country's or territory's:

.....

and notify your building/compound security official (if there is one).

If you are at HOME call the designated phone number of your country's or territory's:

.....

- 7. Remove all contaminated clothing as soon as possible and place in a plastic bag, or some other container that can be sealed. Give this bag of clothing to the emergency responders for proper handling.
- 8. Shower with soap and water as soon as possible. **Do not use bleach or other disinfectant on your skin.** These tend to irritate the skin and may result in increased absorption of infectious material.
- 9. If possible, list all people who were in the room or area, especially those who had actual contact with the powder. Give this list to the local public health authorities so that proper instructions can be given for medical follow-up.

## Protocol B

### Instructions for first responders (Fire brigade or police, or other proper authority)

#### Including collection and transport of samples to the laboratory.

Handling of a suspicious letter or package containing powder must be done only by the police or the fire brigade or other proper authority (the “first responders”).

If the proper procedure has been followed as described in Protocol A, they should find the envelope left in the room, doors and windows closed and fans, air conditioning or ventilation units turned off.

1. The first responder seals off the involved area.
2. The first responder puts on biohazard protection (or as much similar protection as possible) and enters the area.
3. They must use a triple packaging system for the specimen:
  - ✓ Primary receptacle. To prevent leakage, the specimen must be placed in a leak-proof primary receptacle, like a plastic bag sealed with tape or closed with a zip lock.
  - ✓ Secondary receptacle. This encloses and protects the primary receptacle. It should be a solid box like Tupperware sealed with tape. If liquid material is present in the primary receptacle, an absorbent material can be introduced between the primary and secondary receptacle.
  - ✓ External packaging. The secondary receptacle must be placed into an external package that protects it from physical damage like an isothermal box or a biohazard plastic bag (or similar other robust plastic bag).
4. The first responder exits the area with the triple-packaged specimen.
5. The first responder should then be hosed off with water.

Then:

➤ ***If a microbiology laboratory with proper equipment is accessible:***

5. The premises remain sealed off until lab results rule out anthrax (2-3 days).
6. If there is a high index of suspicion<sup>1</sup>, all individuals who have had direct contact with the suspicious material should be considered for appropriate antibiotic prophylaxis until the lab tests have ruled out anthrax: see protocol F.
7. After arrangements have been made with the microbiology laboratory to allow for preparation, the police or the fire-brigade (or other proper body) brings or sends with a reliable carrier the isothermal box or the biohazard plastic bag with the suspicious letter or package to the microbiology laboratory, where it will be opened and processed.

Although most of most of the carriers may refuse, if transport by air is feasible, the isothermal box or the biohazard plastic bag must be shipped as an “Infectious substance

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➤

affecting humans” and packaged in accordance with the International Air Transportation Association (IATA).

➤ ***If a microbiology laboratory with proper equipment is not accessible:***

5. The premises remain sealed off until decontamination: see protocol E.
6. All individuals who have had direct contact with the suspicious material should be considered for appropriate antibiotic prophylaxis: see protocol F.
7. The police or fire brigade (or other proper body) properly disposes of the plastic bags with the suspicious letter or package: see protocol D.

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<sup>1</sup> A high index of suspicion means both:

- likely target for a bioterrorist attack, eg. Embassy (especially US) or government high level person, or person handling the package or letter (post office/rapid courier service employee). AND
- package or letter with suspicious powder sent from outside the Pacific Islands.

# Protocol C

## Laboratory testing of anthrax samples

### I. General

The procedures described below function to rule out or presumptively identify *Bacillus anthracis* from powder or clinical specimens. These procedures should be performed in microbiology laboratories that use Biological Safety Level-2 (BSL-2) practices.

**II. Precautions**      Refer to Procedure for Laboratory Safety and Decontamination.

### III. Specimen collection/ preparation, according to source of specimen

#### 1. Suspicious powder

- Under controlled conditions, the suspicious material is removed carefully from the transport containers, and the containers are re-sealed.

#### 2. Cutaneous anthrax

- Vesicular stage: Aseptically collect vesicular fluid on sterile swabs from previously unopened vesicles. Note: The anthrax bacilli are most likely to be seen by Gram stain in the vesicular stage.
- Eschar stage: Collect eschar material by carefully lifting the eschar's outer edge; insert a sterile swab, then slowly rotate for 2-3 sec beneath the edge of the eschar without removing it.

#### 3. Gastrointestinal anthrax

- Blood cultures: Collect appropriate blood volume and number of sets per usual laboratory protocol. In later stages of disease (2-8 days post-exposure) blood cultures may yield the organism, especially if obtained before antibiotic treatment.
- Stool: Transfer ≈5 g of stool directly into a clean, dry, sterile, wide-mouth, leak-proof container.
- Rectal swab: For patients unable to pass a specimen, obtain a rectal swab by carefully inserting a swab 1 inch beyond the anal sphincter.

#### 4. Inhalational anthrax

- Blood cultures: Collect appropriate blood volume and number of sets per laboratory protocol.
- Sputum: Collect >1 ml of a lower respiratory specimen into a sterile container. Inhalational anthrax usually does not result in sputum formation.

## IV. Materials required

### Reagents

1. Gram stain reagents
2. Catalase reagent (3% hydrogen peroxide)
3. Motility media (or slide, coverslips, saline for wet mount)
4. India ink (an optional test)
5. Sterile saline

### Media

1. 5% sheep blood agar (SBA) or equivalent
2. Chocolate agar (CA)
3. MacConkey agar (MAC)
4. Phenyl ethyl alcohol agar (PEA)
5. Blood culture bottles
6. Tubed motility media
7. Tryptic soy broth (TSB), or equivalent
8. Thioglycolate broth or equivalent

### Equipment/miscellaneous

1. Blood culture instrument (optional)
2. Light microscope with 10X, 40X and 100X objectives and 10X eyepiece
3. Microscope slides and coverslips
4. Disposable bacteriologic inoculating loops
5. Incubator, 35-37 °C, ambient preferred (CO<sub>2</sub> enriched is acceptable)

## V. Procedure

### A. Stains and smears

1. Gram stain

Procedure: Perform Gram stain procedure/QC per standard laboratory protocol.

White powder: Suspend a small amount in 1 ml of sterile water, vortex and a part of the diluted specimen is put on a slide for Gram staining.

### b. Interpretation

(1) *B. anthracis* is a large gram-positive rod (1-1.5 X 3-5 µm).

(2) Blood and impression smears: Vegetative cells seen on Gram stain of blood and impression smears are in short chains of 2-4 cells that are encapsulated, which may be seen on the Gram stain as clear zones around the bacilli. Spores are not present in clinical samples unless exposed to low CO<sub>2</sub> levels, such as those found in the atmosphere; higher CO<sub>2</sub> levels within the body inhibit sporulation. The presence of large encapsulated gram-positive rods in the blood is strongly presumptive for *B. anthracis* identification.

(3) Growth on SBA or equivalent medium: *B. anthracis* forms oval, central-to-subterminal spores (1 X 1.5 µm) on SBA that do not cause significant swelling of the cell; frequently occur as long chains of bacilli. However, cells from growth on SBA regardless of the incubation conditions (ambient atmosphere or CO<sub>2</sub> enriched) are not encapsulated.

## B. Cultures

1. Inoculation and plating procedure: Inoculate and streak the following media for isolation of the respective specimen types. Note: Standard media should be used according to normal laboratory procedures.

a. Powder: Suspend a small amount in 1 ml of sterile water, vortex and streak one drop on SBA, Chocolate and Mac Conkey. Subculture enrichment broth to SBA, CA, MAC. Incubate at 35°C-37°C for 18 – 24 hrs.

[Some reference laboratories are not using enrichment broth, however we recommend using an enrichment culture until we find evidence- based information showing this is not useful.]

Inoculate the remaining suspension in 9 ml of enrichment broth (trypticase soy broth or thioglycolate)

b. Blood cultures: Process following routine laboratory protocol.

c. Cutaneous swab specimens: Plate directly on media used routinely for surface wounds such as SBA, MAC, and broth enrichment, and prepare smears for staining. Note: *B. anthracis* does not grow on MAC.

d. Stool: Plate directly on appropriate media, such as PEA, SBA, and MAC.

e. Sputum specimens: Plate directly on media used routinely, such as SBA, MAC, and CA, and prepare smears for staining.

## 2. Incubation

a. Temperature: 35-37 °C

b. Atmosphere: Ambient preferred

c. Length of incubation: Hold primary plates for at least 3 days; read daily. Examine plates within 18-24 h of incubation. Growth of *B. anthracis* may be observed as early as 8 h after incubation.

## 3. Colony characteristics of *B. anthracis*

a. After incubation of SBA plates for 15-24 h at 35-37°C, well isolated colonies of *B. anthracis* are 2-5 mm in diameter. The flat or slightly convex colonies are irregularly round, with edges that are slightly undulate (irregular, wavy border), and have a ground-glass appearance. There may be often comma-shaped projections from the colony edge, producing the "Medusa-head" colony.

b. *B. anthracis* colonies on SBA usually have a tenacious consistency. When teased with a loop, the growth will stand up like beaten egg white. In contrast to colonies of *B. cereus* and *B. thuringiensis*, colonies of *B. anthracis* are not α-hemolytic. However, weak hemolysis may

be observed under areas of confluent growth in aging cultures and should not be confused with  $\alpha$ -hemolysis.

c. When examining primary growth media, it is important to compare the extent of growth on SBA plates with that on MAC. *B. anthracis* grows well on SBA but does not grow on MAC.

d. *B. anthracis* grows rapidly; heavily inoculated areas may show growth within 6-8 h and individual colonies may be detected within 12-15 h. This trait can be used to isolate *B. anthracis* from mixed cultures containing slower-growing organisms.

4. Extent of identification: Except in reference laboratories, identification is limited to 'presumptive' only.

### **C. Motility test: Wet mount or motility medium**

1. Purpose: Used to determine motility of suspected isolates; *B. anthracis* is nonmotile. Two methods are given, the wet mount and the motility medium test.

#### 2. Wet mount procedure

a. Deliver 2 drops (approximately 0.1 ml) of TSB, or equivalent, into a sterile glass tube. Using an inoculating loop, transfer a portion of the suspect colony from a 12-20 h culture and suspend the growth in the broth medium.

b. Alternatively, a loopful of medium from a fresh broth culture can be used.

c. Transfer 10  $\mu$ l of the suspension to a microscope slide and overlay with a coverslip.

d. Examine slide under a microscope using the 40X objective (total magnification 400X; may also be viewed at 1000X with oil objective).

e. Discard slide(s) following standard laboratory procedures, such as into 0.5% hypochlorite solution.

#### 3. Motility medium test procedure

a. Using a sterile inoculating needle, remove a portion of growth from an isolated, suspect colony after 18-24 h incubation.

b. Inoculate the motility medium by carefully stabbing the needle 3-4 cm into the medium and then drawing the needle directly back out so that a single line of inoculum can be observed.

c. Incubate the tube at 35-37 °C in ambient atmosphere for 18-24 h.

4. Interpretation of motility results: Lack of motility is unusual among *Bacillus* species and is therefore useful in the preliminary identification of *B. anthracis* isolates.

a. Wet mount

(1) Positive result: Motile organisms will be observed moving throughout the suspension. Observe that the movement may be sluggish/slower than that of the positive controls .

(2) Negative result: Nonmotile organisms either do not move or move with Brownian motion.

b. Motility test

(1) Positive result: Motile organisms will form a diffuse growth zone around the inoculum stab.

(2) Negative result: Nonmotile organisms, such as *B. anthracis*, will form a single line of growth that does not deviate from the original inoculum stab.

## VI. Interpretation and reporting

A. Presumptive identification criteria: refer Table 1

1. Direct smears from white powder or clinical samples, such as blood, CSF, or skin lesion (eschar) material : Encapsulated gram-positive rods

2. From growth on SBA or equivalent media: Large gram-positive rods (may stain gram-variable after 72 h of culture). Spores may be found in culture, under non-CO<sub>2</sub> atmosphere (but not on direct examination). Spores are nonswelling and oval-shaped.

3. Rapid, aerobic growth, and tenacious colonies on sheep blood agar.

4. Catalase positive

5. Nonmotile: In addition to *B. anthracis*, *B. cereus* var. *mycoides* is nonmotile.

6. Nonhemolytic on SBA, ground-glass appearance of colonies

**Table 1 : Presumptive *Bacillus anthracis* identification and similar organisms**

TEST	<i>B. anthracis</i>	<i>B. cereus</i>	<i>B. mycoides</i>	<i>B.thuringiensis</i>	<i>B. megaterium</i>	<i>B. subtilis</i>
β-hemolysis	-	+	-	+	-	V
Motility	-	+	V	+	V	V
Capsule	+	-	-	-	-	-
Urea hydrolysis	-	V	V	+	-	V
Nitrate reduction	+	V	V	+	-	V

B. Rule out: While hemolysis, gram stain morphology, or motility can be used for rule out when the result provides clear evidence that the isolate is not *B. anthracis* (e.g., a clearly visible zone of beta hemolysis), a combination of two Level A tests is recommended for rule out.

## **Protocol D**

### **Decontamination of a room or exposure site, and disposal of waste**

#### **Entry to an exposed area**

If the room has been sealed or otherwise placed off-limits because of possible aerosolization of anthrax spores (see Protocol A), wait at least 24 hours before beginning decontamination. If a heavy exposure, seek further expert advice before entering the room.

#### **Personal protection during clean-up**

- Gloves
- Safety glasses
- Protective overgarments, or laboratory coat or gown
- Respiratory protection (ideally HEPA filter mask) if aerosolization is suspected

#### **Spills containing the organism** (for example, powder on a desktop)

- Traces of powder must be cleaned with a disposable damp cloth impregnated in commercially-available household bleach containing 5.25% hypochlorite, diluted 1:10.

#### **Surfaces and equipment**

- Surfaces or equipment which have been directly exposed to the suspected substance should be flooded with the above solution and soaked for at least one hour. If the solution does not remain on the surface for that time period, the surface should be flooded again.

#### **Disposal of waste**

- Infectious waste (e.g. leftover powder, cleaning materials) must be placed in autoclavable bags for decontamination and must be incinerated, or autoclaved and incinerated before disposal (ensuring safe transport to autoclave/ incineration sites).

#### **Personal protection after clean-up of a contaminated site**

- Wash self thoroughly with soap and copious amounts of water (do not use bleach or other disinfectants on the skin).
- Protective overgarments must be placed in separate containers and autoclaved before being washed, and should not be taken home for washing.
- Other clothing should be placed in plastic bags (clearly labeled), and washed thoroughly with soap and water (autoclaved first, depending on exposure).

# Protocol E

## Post-exposure prophylaxis, and diagnosis and treatment of suspected anthrax infections

### 1. Post-exposure prophylaxis (PEP)

**Who should be treated?** All those directly-exposed<sup>1</sup>

**For how long?** 60 days, or until testing of samples proves negative, or until a hoax has been established.

Table Post-exposure prophylaxis (PEP) for anthrax associated with bioterrorism

	<b>PEP for exposure to unknown or antibiotic-resistant strains<sup>2</sup></b>	<b>Optimal PEP, if strain is susceptible<sup>2</sup> (or if Ciprofloxacin is not available)</b>	<b>Duration</b>
Adults	Ciprofloxacin 500 mg twice a day orally	Amoxicillin 500 mg every 8 hours orally <b>OR</b> Doxycycline 100 mg twice a day orally	Total: 60 days
Children <sup>3</sup>	Ciprofloxacin 10-15 mg/kg (up to 500 mg) twice a day orally	<b>Weight &lt; 20 kg:</b> Amoxicillin 15 mg/kg every 8 hours orally  <b>Weight ≥ 20 kg:</b> Amoxicillin 500 mg every 8 hours orally	Total: 60 days
Pregnant women <sup>3</sup>	Ciprofloxacin 500 mg twice a day orally	Amoxicillin 500 mg every 8 hours orally	Total: 60 days

<sup>1</sup> Direct exposure = a person who touched what could be anthrax spores, or was in the room when anthrax spores may have been aerosolized.

<sup>2</sup> The same regimen applies for those who are immunosuppressed.

<sup>3</sup> Ciprofloxacin is not routinely recommended for use in prepubertal children or pregnant women (Category B3). Toxicological studies in immature animals have shown that some fluoroquinolones can produce erosion in the cartilage of weight-bearing joints and other signs of arthropathy. Although such adverse events have not been demonstrated in children, the risks must be weighed carefully against that of developing life-threatening disease.

### 2. Diagnosis and treatment of suspected anthrax infections

*i.e. patients with laboratory confirmation or clinical signs of an anthrax infection.*

Such clinical infections as a result of anthrax bioterrorism are still exceedingly rare (as opposed to anthrax hoaxes, or anthrax exposures which do not result in clinical signs of infection). As at 25 November 2001 there had been only 17 such infections in the U.S., and none elsewhere.

Complete diagnostic and treatment guidelines for clinical anthrax (cutaneous, inhalational, and gastrointestinal) are available.

If such an infection is suspected, early treatment is essential. Dosage may differ from the PEP protocols above, and intravenous routes may be recommended. Management guidelines may be requested urgently from SPC, WHO, or other sources (see **Further Resources**).

**References:** Australia Interim Guidelines, 31 October 2001