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Protecting Investigators from Exposure to *Bacillus anthracis* Using Personal Protective Equipment

NIOSH personnel and other investigators at risk for exposure to *Bacillus anthracis*, the organism causing anthrax, should wear protective personal equipment (PPE), including respiratory devices, protective clothing, and gloves. The items described below are similar to those used by emergency personnel responding to incidents involving letters or packages. Responders need to use greater levels of protection in responding to incidents involving unknown conditions or those involving aerosol-generating devices.

Powered Air-Purifying Respirator with Full Facepiece and High-Energy Particulate

Air (HEPA) Filters

- The constant flow of clean air into the facepieces is an important feature of this respirator because contaminated air cannot enter gaps in the face to facepiece seal. These respirators also give wearers needed mobility and field of vision.
- Use respirators in accordance with a respiratory-protection program that complies with the OSHA respiratory-protection standard (29 CFR 1910.134).
- Respiratory facepieces for NIOSH investigators will be assigned on the basis of results of quantitative fit testing.
- Wearing a properly functioning, powered, air-purifying respirator with a full facepiece that is assigned to the wearer on the basis of quantitative fit testing will reduce inhalation exposures to 2 % or less of what they would be without wearing this type of respirator.

Disposable Protective Clothing with Integral Hood and Booties

- Wearing protective clothing not only protects the skin but can eliminate the likelihood of transferring contaminated dust to places away from the work site.
- Wear disposable rubber shoe coverings with ridged soles made of slip-resistant material over the booties of the disposable suit to reduce likelihood of slipping on wet or dusty surfaces.
- Decontaminate all PPE immediately after leaving a potentially contaminated area.
- Remove and discard protective clothing before removing the respirator.

Disposable Gloves

- Disposable gloves made of lightweight nitrile or vinyl protect hands from contact with potentially contaminated dusts with compromising needed dexterity.
- A thin cotton glove can be worn inside a disposable glove to protect against dermatitis, which can occur from prolonged exposure of the skin to moisture in gloves caused by perspiration.

Conclusions

- The current *B. anthracis* strains associated with the intentional exposures are susceptible to ciprofloxacin and doxycycline, the two drugs approved for post-exposure prophylaxis to *B. anthracis* and recommended as part of initial therapy of inhalational or cutaneous anthrax.
- The current strains also are susceptible to chloramphenicol, clindamycin, rifampin, vancomycin, and clarithromycin, but limited or no data exists regarding the use of these agents in the treatment or prophylaxis of *B. anthracis* infections.
- Cephalosporins should not be used for post-exposure prophylaxis or treatment of *B. anthracis* infections.
- The likelihood of a beta-lactamase induction event that would increase penicillin MICs is significantly higher in infections where high concentrations of organisms are present. Thus, treatment of known *B. anthracis* infections with a penicillin type drug alone (i.e., penicillin G, ampicillin, etc.) in the setting where high concentrations of organisms are present is a concern.
- The likelihood of a beta-lactamase induction event that would increase penicillin MICs is lower when only small numbers of vegetative cells are present, such as during post exposure prophylaxis. Thus, amoxicillin or penicillin VK may be an option for post-exposure prophylaxis where ciprofloxacin or doxycycline are contraindicated.
- Additional studies are in progress to assess the susceptibility of the penicillinase activity observed in these strains to beta-lactamase inhibitors.
- Clinical experience is limited, but combination therapy with two or more antimicrobials may be appropriate in patients with severe infection.

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DEPARTMENT OF HEALTH AND HUMAN SERVICES