



# NAVY AND MARINE CORPS PUBLIC HEALTH CENTER

## ACINETOBACTER IN THE DISASTER ENVIRONMENT

### Summary of Key Messages:

- *Acinetobacter* infections are common in the disaster setting. Published rates of infection from four earthquakes range from 14% to 31% of culture positive specimens.
- A higher degree of drug resistance is often seen in disaster/combat setting compared to peace time settings.
- Aggressive control measures are essential in controlling spread within the hospital.

### What is *Acinetobacter*?

*Acinetobacter* (ACB) species are a group of bacteria commonly found in the soil of tropical climate areas. They are able to develop multiple resistance mechanisms, leading to clinical infections that are difficult to treat. Victims of natural disasters are at increased risk of infections due to: (a) increased contamination of wounds with dirt and other foreign materials, (b) lack of access to immediate medical care, (c) crowded and sub-standard medical facilities and (d) decreased immune response because of psychological and other effects related to the trauma of the events. During peace time, infections with ACB species among hospitalized inpatients occur infrequently and are predominantly hospital-associated events. However, high rates of infections with ACB species, including multi-drug resistant (MDR) or pan-resistant strains are documented in victims of natural disasters in both temporary and established ICU settings.

Additional information and fact sheets on ACB infections for clinicians and patients/families can be found in the deployment health library

<http://deploymenthealthlibrary.fhpr.osd.mil/>.

### What can we expect with Haiti medical support operations?

Literature shows that trauma and injuries resulting from combat or disaster situations often present with MDR organism infections. ACB species were identified among the top most frequently isolated organisms from victims of natural disasters with wound or other clinical infections. High rates of multi-drug resistant and pan-resistant clinical isolates of ACB were also reported. During the 1999 earthquake in Marmara Turkey, 15 of 48 culture positive specimens (31%) from patients admitted to one Turkish hospital were positive for ACB, including 2 strains resistant to all antibiotics including

carbapenems. During the SE Asia tsunami relief efforts in 2004, MDR *Acinetobacter baumannii* isolates from wound, blood and respiratory samples of victims showed intermediate susceptibility to ampicillin and sulbactam only with resistance to all other drugs tested. In the 2005 earthquake in Pakistan, 16% of all wound infections in one hospital were associated with ACB species and 92% of these isolates were multiply drug resistant. Finally, during the 2008 earthquake in Wenchuan, China, 14% of all clinical isolates in one hospital were *Acinetobacter baumannii*. Overall, these isolates were found to be highly resistant to all drugs tested with the exception of imipenem showing 40% resistance.

OIF patients aboard the USNS COMFORT also experienced ACB infections. In 2003, 48 out of 211 (23%) wounded in action patients received by COMFORT were infected or colonized with ACB. Data suggest that the majority of those infected were not infected through hospital-associated spread. Rather, many of these patients were infected from a source outside of the hospital. Finally, majority of the isolates seen were multi-drug resistant, sensitive only to imipenem and amikacin.

Within the Military Health System, ACB isolates are seen. A recent study showed more than 2,400 ACB isolates cultured among DOD active duty service members from 2005 to 2008. In 2008, blood specimen isolates showed 36% susceptibility to amikacin and 57% to imipenem, 7% susceptibility to meropenem, and 33% susceptibility to colistin. Wound specimen isolates in 2008 showed higher levels of susceptibility (60-80%) to those drugs. However, infections related to deployment showed higher degree of resistance as compared to infections not related to deployment.

### **What can be done to control the spread of *Acinetobacter* infections?**

ACB is very hard to eliminate from an environment once introduced. Infection control and infectious disease experts should be consulted. Aggressive implementation and regular enforcement of infection control measures is essential. Infection control measures should take into account the entire patient movement process, from the beginning of an air evacuation to the receiving on COMFORT to the placing of the patient in a bed.

Separating infected patients from non-infected patients and high level cleaning of units or wards (along with temporary shut downs of bays) have also shown to be effective in curtailing hospital-associated spread of ACB.