

VIGILAIR® White Paper: *Acinetobacter*



source: DOD SFC JOHANCHARLES VAN BOERS

Fallujah, Iraq-US Army Soldiers evacuate a wounded comrade from the battlefield.

Doctors battle ‘super bugs’ brought home by troops returning from Iraq

Some coalition soldiers injured in Iraq are finding themselves engaged in another battle as they recover in hospitals back home. The troops are fighting a drug resistant bacterium that is potentially lethal to the injured troops as well as other patients who share the same hospital.

The so-called ‘super bug’ is *Acinetobacter baumannii*¹, a bacterium commonly found in soil and water. To date more than 300 US soldiers^{2,3} have tested positive for the bacteria, although some patients’ rights activists say the number is much higher⁴.

Acinetobacter is carried in the wounds of injured soldiers. Once the soldiers are back home receiving treatment, the bacteria they carry spreads to other patients who are in the same hospital. Injured service people tend to be young and strong and can

overcome the *Acinetobacter* infection. This is not the case for other patients in the hospital whose immune systems are already compromised by illness and/or old age.

The US is not alone in dealing with this issue. Reports from the UK⁵ claim the problem there is more acute with their vets returning from Iraq:

“Injured soldiers flown back (from Iraq) to be treated on the NHS have been infected with a rare strain of *Acinetobacter baumannii*, a superbug resistant to antibiotics. At one hospital in Birmingham in 2003, the bacteria went on to infect 93 people, 91 of whom were civilians. Thirty-five died, although the hospital has not been able to establish whether the superbug was a contributory factor.”

The Airborne Connection

Acinetobacter is hard to eradicate for many reasons, mainly because its ability to remain viable in dry conditions. One [study](#)⁶ found that the mean survival time for some strains of *Acinetobacter baumannii* is 27 days. Several peer reviewed papers have indicated that *Acinetobacter* becomes airborne and is transmitted via the air. One [study](#)⁷ of a 1984-1985 UK outbreak of the bacteria

concluded:
“This is the first outbreak of infection with *Acinetobacter*, of which we are aware, where airborne spread has been observed.”

A 1998 [study](#)⁸ published in The American Journal of Infection Control documented an *Acinetobacter* outbreak in two Dutch hospitals. The article’s authors recognized airborne transmission of the bacteria and recommended changes in infection control measures:

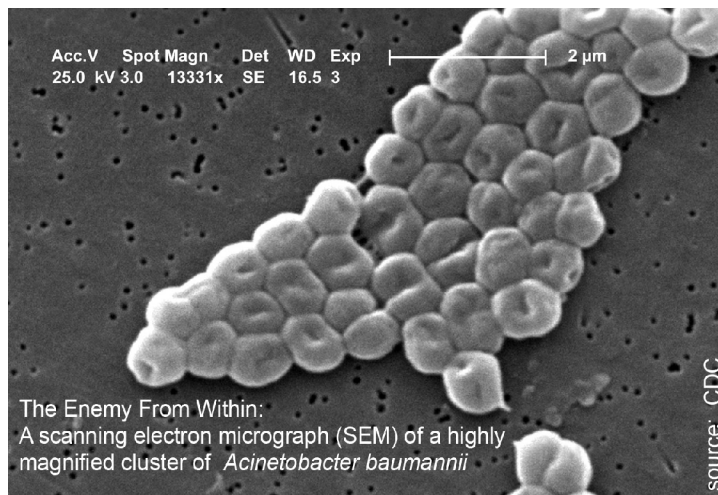
“Precautions recommended for multiresistant gram-negative organisms are insufficient for the prevention of nosocomial spread of multiresistant *Acinetobacter*. **The airborne mode of spread of *Acinetobacter* should be taken into account, and guidelines should be revised accordingly.**”

Two other studies^{9,10}, draw similar conclusions, that standard precautions are ineffective against the spread of *Acinetobacter*. While evidence mounts to support the airborne transmission of *Acinetobacter*, at least one conclusion is clear. There is no silver bullet for infection control.

A hospital’s environment of care is dynamic. Micro-environments co-exist and interact with each other. Our research leads us to believe that the heating, ventilation and air conditioning system (HVAC) provides an excellent reservoir for microorganism growth. It is the HVAC system that connects a hospital’s micro-environments and this connection frequently is a perfect mechanism for spreading infection.

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commonly culture *Acinetobacter* from surfaces within the HVAC of hospitals. One example showed *Acinetobacter* that was found in the tracheas of NICU patients was also cultured from sinks, work stations and ceiling air diffusers in the NICU as well as the HVAC air handler that served



the NICU.

Using [Ultraviolet Germicidal Irradiation \(UVGI\)](#) and [high efficiency filtration](#) to disinfect the air supplied to critical care areas can remove one link in the chain of nosocomial disease transmission. UVGI technology should not be viewed as an alternative to other infection control measures, but rather as a compliment to them. Eradicating *Acinetobacter* requires an environmental approach that considers surfaces, air and materials found in healthcare settings.

VIGILAIR Systems, Inc. provides Indoor Air Quality solutions for Healthcare, Industrial Production and Biodefense clients in the US, Canada, Mexico and Asia. More information on VIGILAIR® Systems is available [here](#).

1. Division of Healthcare Quality Promotion. Overview of Drug Resistant *Acinetobacter* Infections in Healthcare Settings. Accessed October 31, 2006; Available from http://www.cdc.gov/ncidod/dhqp/ar_acinetobacter.html
2. Gawande A: Casualties of War — Military Care for the Wounded from Iraq and Afghanistan. NEJM December 9, 2004 Volume 351:2471-2475
3. Herper M: The Iraqi Infection. Forbes Magazine on line. Accessed October 31, 2006: Available from http://www.forbes.com/home/sciencesandmedicine/2005/08/02/iraq-war-infection-bacteria-cx_mh_0802iraqinfect.html
4. Clark M: The Battle over multiple drug resistant microbes: MRSA, *Acinetobacter*, *E. Difficile*, etc. "Irresponsible medicine". Accessed October 31, 2006; Available from <http://www.acinetobacter.org/>
5. Swinford S: Troops 'spread superbug' The Sunday Times (UK) on line. Accessed October 31, 2006: Available from <http://www.timesonline.co.uk/article/0,,2087-2393815,00.html>
6. Jawad A, Seifert H, Snelling AM, Heritage J, Hawkey PM: Survival of *Acinetobacter baumannii* on dry surfaces. Journal of Microbiology July 1998 Vol. 36, No. 7
7. Allen KD, Green HT: Hospital outbreak of multi-resistant *Acinetobacter anitratus*: an airborne mode of spread? J Hosp Infect 1987;9:110–119.
8. Bernards AT, Frenay HME, Lim BT, Hendricks WDH, Dijkshoorn L, van Boven CPA: Methicillin-resistant *Staphylococcus aureus* and *Acinetobacter baumannii*: an unexpected difference in epidemiologic behaviour. Am J Infect Control 1998;26:544–551.
9. Rello J: *Acinetobacter baumannii* infections in the ICU – Customization is the key. Chest 1999;115:1226–1228.
10. Mulin B, Rouget C, Clement C, Bailly P, Julliot MC, Viel JF, Thouverez M, Vieille I, Barale F, Talon D: Association of private isolation rooms with ventilator-associated *Acinetobacter baumannii* pneumonia in a surgical intensive-care unit. Infect Control Hosp Epidemiol 1997;18:499–503.