

## BIOQUELL Literature Review Highlights 2006

### 1. CA-MRSA reaches epidemic proportions in the USA

Community-associated meticillin-resistant *Staphylococcus aureus* (CA-MRSA) has featured heavily in the medical literature over the past few years as an emerging pathogen. The magnitude of the problem caused by CA-MRSA, especially in the USA, was highlighted by a study published in the *New England Journal of Medicine*. All Skin and Soft Tissue Infections (SSTIs), which were mainly abscesses, were cultured in 11 Emergency Departments across the USA for the month of August in 2005. MRSA was responsible for the **majority** of the SSTIs. Furthermore, the rate of meticillin resistance in the *S. aureus* causing SSTIs was 78%. This figure is shockingly high - higher in fact than in hospitals in the UK and USA.

### 2. CA-MRSA emerges as a common cause of nosocomial infection

Several reports published in 2006 have paradoxically described nosocomial or healthcare-associated infection caused by CA-MRSA (CDC 2006; Sax et al. 2006). A short review paper, also published in 2006, discusses the rather frightening potential implications of the widespread emergence of CA-MRSA as a cause of cross-transmission in hospitals (Otter and French 2006).

### 3. MRSA – the missing link

Indirect evidence that MRSA can be acquired from contaminated environmental surfaces has been discussed for many years. However, conclusive evidence has been lacking. A seminal paper published this year provides conclusive evidence based on molecular typing that MRSA environmental contamination is responsible for patient acquisition of MRSA (Hardy et al. 2006). There was strong evidence that at least 3 of the 26 MRSA acquisitions on an intensive care unit were from the contaminated environment. The role of healthcare worker (HCW) hands was not investigated, but a further proportion of MRSA acquisition could have occurred through indirect transmission through the contamination of HCW hands from an environmental reservoir.

### 4. *C. difficile* 027 reaches Europe

*Clostridium difficile* 027 (or NAP1) has emerged in recent years as an important cause of antibiotic-associated diarrhoea in North America. 2006 has seen the widespread emergence of *C. difficile* in European countries, including the UK, prompting urgent questions about the microbiology and effective infection control methods for this organism (Kuijper et al. 2006).

### 5. *Acinetobacter* – increasing prevalence of resistant strains

*Acinetobacter* resistance trends, particular for carbapenem-resistance, are on the increase (Richet and Fournier 2006). *A. baumannii* has proven problematic in military settings, particularly following importation of soldiers from Iraq (Jones et al. 2006). In a study from London, three outbreak strains, one major and two minor, were identified by a molecular study comparing clinical *Acinetobacter* isolates from soldiers in the USA and in the UK (Turton et al. 2006).

## 6. Bacterial contamination in hospitals

Many 2006 studies have reported on nosocomial pathogen contamination of various hospital objects, including computer keyboards (Fellowes et al. 2006; Rutala et al. 2006), blood-pressure cuffs and tourniquets (de Gialluly C. et al. 2006; Leitch et al. 2006; Ormerod et al. 2006; Walker et al. 2006) and other equipment that is touched frequently by HCW and may contact patients directly (Beer et al. 2006; Brady et al. 2006; Ditchburn 2006; Hill et al. 2006). Although it is difficult to **prove** that contamination of these objects results in the acquisition of nosocomial pathogens, it is difficult to see how, for example, a contaminated blood-pressure cuff is **not** a risk for the acquisition of a nosocomial pathogen in a susceptible host.

## 7. Prospective study of MRSA environmental contamination

Studies investigating levels of MRSA contamination in hospitals have reported levels ranging from approximately 0-75% of sites contaminated. Variation can be explained by differences in patients and settings. In a 2006 study, twenty-five MRSA isolation rooms were prospectively evaluated for MRSA contamination over a four week period. MRSA was cultured from 269/502 (53.6%) surface samples, 70/250 (28%) air samples and 102/251 (40.6%) settle plates. On the fourth week of sampling, the levels of contamination were particularly high with 34/42 (81%) surfaces contaminated. The high levels of MRSA contamination identified suggest that environmental contamination may be an underestimated reservoir.

## 8. Prior room occupancy with an MRSA or VRE is a risk factor for acquisition

If environmental contamination is responsible for a portion of nosocomial cross-infection, then it would follow that a colonised or infection prior room occupant would contaminate their room, and that this would be a risk for the next patient. A recent study tested this hypothesis on an intensive care unit and found that patients assigned to a room previously occupied by an MRSA or VRE carrier had a significantly higher risk of acquisition by multivariate analysis. However, the increased risk amongst patients VRE accounted for less than 10% of all ICU acquisition, suggesting that other routes of transmission (which may involve contaminated surfaces indirectly) account for the majority of nosocomial cross-infection.

## 9. "Source control" – a novel infection control strategy

Colonised or infected individuals represent the largest source of nosocomial pathogens for cross-transmission. "Source control" is the reduction of the bio-burden of a micro-organism colonising the skin to reduce the risk of environmental contamination and contamination of HCW hands. A study published this year showed that chlorhexidine impregnated cloths provide an effective alternative to soap and water for reducing environmental contamination, HCW hand contamination and ultimately patient acquisition of VRE (Vernon et al. 2006). This has infection control implications for other skin colonisers such as MRSA.

## 10. And finally...

2006 has seen a number of somewhat quirky articles including green tea to cure MRSA (Yamada et al. 2006), quizzing people in the street about their knowledge of nosocomial infection (Mattner et al. 2006), the "Furry Friend Foundation" (DiSalvo et

al. 2006), **really** scary Jack O'Lanterns (Nagano et al. 2006) and how to define a "nose picker" (Wertheim et al. 2006)!

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