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Micro News

Spring 2009

1. MRSA everywhere: toilets, stethoscopes, uniforms, air, pagers, ambulances and elephants!

Many articles have been published this spring identifying MRSA in all sorts of places including:

- 32% of 50 stethoscopes from emergency personnel in an emergency department in New Jersey, USA (Merlin et al. 2009); but none of 44 stethoscopes from physiotherapists in four Irish hospitals (Fenelon et al. 2009)
- 27-80% of healthcare workers uniforms following contact with MRSA patients in a in a long-term care facility when disposable gowns were not worn, and 18-60% of uniform pockets when pocket use was not controlled (Gaspard et al. 2009) similarly, 18% of 149 doctors' coats were contaminated following rounds in a US hospital (Treakle et al. 2009);
- air samples from 88% of the rooms of patients colonized or infected with MRSA at respiratory sites (Gehanno et al. 2009);
- 0-14% of mobile communication devices (Brady et al. 2009);
- 3.3% of toilet seats in a childrens' hospital (Giannini et al. 2009);
- a baby elephant, which was the source of a small outbreak in a US zoo!, (CDC, 2009) ; and
- a sample of emergency vehicles in Serbia failed to identify MRSA, but 30% of samples were positive for methicillin-resistant coagulase negative staphylococci (Stepanovic et al. 2008).

2. What's lurking on the keyboard?

C. difficile spores are excreted and result in widespread contamination during episodes of *C. difficile* infection (CDI). However, a recent study in the Cleveland VA, USA, investigated *C. difficile* contamination outside of the rooms of patients with CDI (Dumford, III et al. 2009). 16% of 105 non-isolation rooms and 23% of 87 surfaces in communal areas including portable medical equipment were contaminated, providing evidence that *C. difficile* contamination may be more widespread than expected in the hospital environment.

3. VRE: at the seaside, improved cleaning and diarrhoea

The discovery of VRE around infected or colonised patients in hospital would be no surprise. However, 7% of 227 *Enterococcus* spp. isolates from beach water and sand were resistant to vancomycin in a recent US study (Roberts et al. 2009). The study raises uneasy questions about how widely the vancomycin resistance genes have spread in the natural *Enterococcus* spp. population.

There have been several studies this spring investigating VRE contamination in hospitals. A study from Chicago, Illinois, suggests that improved cleaning

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can reduce the frequency of VRE contamination, although 8% of sites remained contaminated after cleaning (Hota et al. 2009)

A study from the Cleveland VA shows that up to 38% of the sites in the rooms of patients with VRE are contaminated, and that the frequency of contamination is greater during episodes of diarrhoea (Sethi et al. 2009).

4. A problem to get your teeth into

Several studies have investigated the relationship between *C. difficile* and MRSA in animals and animal products. An Austrian study identified *C. difficile* in 4% of 187 samples from animals in abattoirs, but none from retail meat (Indra et al. 2009). Perhaps more worryingly, a study from California identified MRSA in 5% of 120 retail meat samples (Pu et al. 2009) Are you watching what you eat?

5. New drugs: lantibiotics and flower power

With the Pharmaceutical antibiotic discovery pipeline continuing to slow, novel antimicrobial approaches are necessary to keep up with drug resistance in hospital pathogens. A recent review on lantibiotics, peptide bacteriocins produced by certain Gram-positive bacteria, has highlighted the antibiotic potential of these substances. Certain lantibiotics are already used as food preservatives, so may be useful to treat human disease (Piper et al. 2009).

Most antibiotics originate from microbes, but plants have antimicrobial properties too. A study of several plants used in Thai medicine has identified one plant, *Garcinia mangostana*, with impressive antimicrobial activity against MRSA (Chomnawang et al. 2009). However, it's a long way from *in vitro* antimicrobial properties to a safe, effective drug!

6. MRSA, the media and the public: an uneasy relationship

No matter where you live, MRSA will have been in the media lately – but does this have any effect on the treatment of MRSA patients? A recent American study shows that media coverage of MRSA in New York increased 10-fold in October 2007, coinciding with a 6-8 fold increase in MRSA related internet search terms from the public and a 79% increase in patients' concern over MRSA expressed to providers, although these correlations were not noted in areas of low socioeconomic status (Hahn et al. 2009). Furthermore, there was a two-fold increase in the number of skin and soft tissue infections cultured, suggesting physician behaviour has also been modified, which has implications for the case ascertainment of community MRSA.

A Scottish study has investigated knowledge of MRSA among patients, visitors and members of the general public (Easton et al. 2009). Encouragingly, almost 90% of the 1000 respondents had heard of MRSA, 59% knew that it was a bacterium and 47% understood the concept of colonization. However, 7% thought that MRSA was untreatable and most estimates of MRSA prevalence were much higher than actual prevalence!

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7. Modelling CA-MRSA as a cause of hospital infection

Community strains of MRSA have emerged as a common cause of hospital infection in the USA, in certain parts of Europe and as a cause of outbreaks in the UK (Boyce 2008). A model developed by Harvard scientists predicts that CA-MRSA, in particular USA300, will replace traditional healthcare-associated strains of MRSA in hospitals as a result of the expanding community reservoir (D'Agata et al. 2009). However, the model also predicted that hand hygiene, screening and isolation are effective control strategies for CA-MRSA in hospitals.

8. Where is USA300 CA-MRSA in the UK?

USA300 dominates the CA-MRSA landscape in the USA and has begun to supplant traditional healthcare associated strains. However, a recent study presents a picture of clonal diversity among CA-MRSA in London (Otter et al. 2009) CA-MRSA presenting at hospitals in the US and in the UK was compared and CA-MRSA was more common in the US hospital, US isolates tended to affect younger patients, who were more frequently black or Hispanic and were more likely to be USA300 strains cultured from abscesses. The reasons for these differences are not clear, but may have important control implications.

9. A PVL vaccine?

The role of the Panton-Valentine leukocidin (PVL) in CA-MRSA disease has been the subject of intense debate of late. A recent study from an American / French research group demonstrates that PVL contributes to necrotising pneumonia and skin infection in mice, and found that vaccination with PVL was protective against disease in the models used (Brown et al. 2009). This raises the interesting possibility of a PVL vaccine, which may reduce the chances of the most severe CA-MRSA disease.

10. A one-size-fits-all diagnostic and typing method?

Sequence-based typing methods such as *spa* typing and MLST have provided useful insight into the population biology of various nosocomial pathogens. However, these methods are not rapid enough for routine diagnostics and typing. A new method using Raman spectroscopy, an optical fingerprinting method, could be a one-size-fits-all diagnostic and typing platform. A recent Dutch study demonstrates that Ramen spectroscopy has equal discriminatory power compared with pulsed-field gel electrophorsis (PFGE) for MRSA and could become a standard real-time typing system (Willemse-Erix et al. 2009).

And finally…Outbreak? Google it!…

'To google' has as become a common verb. It seems that Google could also be a useful way to rapidly identify outbreaks of Influenza, according to a study by Google employees and the CDC published in Nature (Ginsberg et al. 2009). The study compared the ability of the number of Influenza-like Google hits (e.g. "flu", "cold/flu remedy") with the standard CDC rapid reporting method and found that the Google method was a more rapid estimation of Influenza activity!

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