

## Journal watch

Journal Watch presents a brief description of articles recently published in other journals and thought to be of relevance or interest to the *Australian Infection Control* readership. Readers are encouraged to refer to the full article for complete information.

### Proposed definitions of community-associated methicillin-resistant *S. aureus* (CA-MRSA)

Community-acquired or community-associated MRSA (CA-MRSA) is emerging as a significant pathogen in some parts of the world, being endemic in the US and increasingly prevalent in Europe. This organism is distinct from healthcare-acquired MRSA (HA-MRSA) in terms of its epidemiology, microbiology and clinical manifestations.

Currently there appears to be a lack of consensus regarding the terminology used to describe CA-MRSA and to differentiate it from HA-MRSA. The Centers for Disease Control and Prevention (CDC) were the first to draft criteria to help differentiate between the two organisms, and these are still in use. However, recently, there has been confusion in the literature with regard to nomenclature of non-HA-MRSA and sub-definitions of CA-MRSA. For example, community-associated rather than community-acquired is proposed as the preferred nomenclature given that transmission of these organisms has been known to occur in healthcare settings. Additionally, within CA-MRSA several distinguishing terms have emerged, including Panton-Valentine Leukocidin (PVL) negative CA-MRSA, CA-MRSA-like and true or de novo CA-MRSA.

The authors of this article wish to promote clear and unambiguous definitions based on consensus views from the literature that are based on clinical, epidemiological and microbiological characteristics. These definitions include the CDC definitions; however, the authors believe that the CDC criteria may not be sufficiently rigorous to definitively identify CA-MRSA when used alone, as they lack microbiological/molecular criteria.

They conclude that healthcare professionals should routinely distinguish between CA-MRSA and that the term 'community-associated' MRSA be adopted for this organism. In addition, it is proposed that there are three categories within CA-MRSA, two delineated by the presence of absence of the PVL gene and, thirdly, nosocomial CA-MRSA which can be positive or negative for the PVL gene but which is a result of healthcare-associated transmission of CA-MRSA. The authors hope that adoption of common terminology will assist with advancing research into the epidemiology of these organisms.

Millar BC, Loughrey A, Elborn JS & Moore JE. Proposed definitions of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA). *J Hosp Infect* 2007; 67:109-113.

### Epidemiology of multidrug-resistant bacteria in patients with long hospital stays

Two objectives of this study were to determine rates of colonisation with multidrug-resistant (MDR) bacteria after

prolonged hospitalisation, and to assess variables associated with colonisation. The study design used was a prospective observational cohort study over 4 months. The setting was a 900 bed teaching hospital in the Paris area that serves as both a primary and tertiary care centre. The hospital has 27 wards and six ICUs with a total of 70 beds. The mean length of stay (LOS) is 7.7 days.

Patients included in the study were consecutive patients admitted during the study period who were hospitalised for 30 complete consecutive days. These patients were screened within 3 days after Day 30 with two perirectal and one nasal swab tested for the presence of methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant Enterococcus (VRE), Extended Spectrum Beta-Lactamase (ESBL) producing Enterobacteriaceae and *Acinetobacter baumannii*.

Patients were interviewed and medical records reviewed to obtain the following information – demographic characteristics, unit, history of previous hospitalisation, known history of carriage of any of the four organisms either before or during their current hospital stay, severity of underlying disease at admission, chronic health score (Knaus), comorbidities (Charlson index), use of invasive devices or procedures and receipt of antibiotics during the first 30 hospital days.

A total of 470 patients were eligible for inclusion, although 31 were excluded for various reasons, including death during Days 31-33. Some of the patients were screened on admission and/or weekly due to existing policies for screening ICU patients and some other classes of patients. One or more MDR bacteria were recovered from 51 patients (11.6%) during the first 30 hospital-days. MRSA was recovered from 35 (8.0%) of 439 patients, including 11 who were colonised and 24 with at least one clinical culture. ESBL producing Enterobacteriaceae were recovered from 16 patients (3.6%), including 10 with a clinical culture. Of the six patients positive for *A. baumannii* (1.4%), five had a clinical culture. No patients were positive for VRE after 30 days.

In total, 30 day screening identified 38 new cases of MDR colonisation in 37 of the 388 patients not known to be colonised by any of the four MDR bacteria before Day 30. Of the 37 patients, seven had at least one clinical culture positive for MDR bacteria. In total, 87 (19.8%) of the 439 patients were colonised or infected with one or more of the four bacteria.

MRSA carriage at 30 days was associated with age older than 69 years, hospitalisation in the rehabilitation unit, rapidly or ultimately fatal disease on admission, high comorbidity score, no surgery during the first 30 days and receipt of fluoroquinolone therapy within the first 30 days of hospitalisation. Conclusions included that colonisation with MDR bacteria was highest in the

rehabilitation unit and the ICUs. Prevalences were higher for MRSA and ESBL producing Enterobacteriaceae than for the other MDR bacteria studied. Co-colonisation was uncommon.

*Buke C, Armand-Lefevre L, Lolom I, Guerinot W, Deblangy C, Ruiomy R, Andremont A & Lucet J-C. Epidemiology of multidrug-resistant bacteria in patients with long hospital stays. Infect Control Hosp Epidemiol 2007; 28(11):1255-60.*

### **A standardised protocol for perioperative antibiotic prophylaxis (PAP)**

This study involved the implementation of a uniform guideline for perioperative antibiotic prophylaxis (PAP) and measurement of the impact on timing and costs of PAP. Choice of antibiotics and timing of administration were compared for a random sample of procedures before and after implementation of the guideline. Prior to the intervention 153 procedures from different specialties were observed and 2 months after the intervention 146 procedures were observed. The study was carried out in a 1370 bed teaching hospital in the Netherlands. The hospital was founded in 2001 as the result of merging three hospitals. Approximately 11,000 surgical procedures are performed annually and there were 40,525 admissions in 2005.

Prior to the intervention there were several different guidelines in place and, in some cases, there were different recommendations for the same procedure, mainly originating from the merged hospitals. The new guideline was developed by the antibiotic policy committee and was approved by all surgeons and anaesthetists.

Administration of antibiotics was observed for a random sample of operations in all three hospital operating theatres before and after the intervention. Theatre staff were unaware of the objective of the measurements. Prior to the intervention, eight different antimicrobial agents were used as compared to three afterwards. There was a significant reduction of late (after incision) administration of PAP from 20% before the intervention to 7% afterwards, and there was a net cost saving which was estimated to be US\$112,000 annually. Most of this cost saving was achieved due to the fact that before the intervention the most commonly used antibiotics were more expensive than cephazolin which was the most commonly used antibiotic following the intervention.

One of the factors thought to contribute to the improvement in timing of antibiotic administration was that, with the existence of a standard protocol, anaesthesia technicians no longer had to wait for the surgeon to decide whether PAP was appropriate and which agent was to be used, and could just get on with administering it. The authors conclude that, in spite of the improvements, to achieve a continuous high adherence to guidelines for PAP a system of intense surveillance that is able to provide monitoring, analysis of variation, feedback and education is required.

*Willemsen I, van den Broek R, Bijsterveldt T, van Hattum P, Winters M, Andriess G & Kluytmans J. A standardized protocol for perioperative antibiotic prophylaxis is associated with*

*improvement of timing and reduction of costs. J Hosp Infect 2007; 67:156-160.*

### **Reducing ventilator-associated pneumonia in a tertiary care centre in Thailand**

A 4-year controlled, quasi-experimental study was carried out in a medical intensive care unit (MICU), a surgical ICU (SICU) and a coronary care unit (CCU) in a 450 bed hospital in Pratumthani, Thailand. The study used a pre-intervention period of 1 year, a post intervention period of 1 year and a follow up period of 2 years. The intervention, centred around an educational programme for staff, was carried out in the MICU, while the SICU and the CCU served as control units.

The intervention involved respiratory therapists and nurses and included a self-study module with pre- and post-intervention assessments, lectures, fact sheets and posters. The intervention had been previously shown to reduce rates of VAP in US hospitals. The main element was a 10 page self-study module with information on epidemiology and scope of the problem, risk factors, aetiology, definitions, methods to decrease risk, procedures for collecting specimens, and clinical and economic outcomes influenced by VAP. Risk factors specifically addressed were aspiration and those associated with bacterial colonisation of the upper airway and stomach. Posters and fact sheets were also placed in the MICU. No intervention occurred in either the SICU or the CCU and other procedures such as those for weaning patients from ventilators were the same in all three ICUs. All patients admitted to all ICUs were observed during the entire study.

Overall there were 5412 patients in the study, 1904 of whom were in the MICU. Thirty two MICU healthcare workers completed the entire education module and 30 completed the module every 6 months after the intervention. The mean percentage of correct answers on the test was 78.5%±10.2% on the pre-intervention test and this increased to 90.8%±7.1% on the post-intervention test.

Prior to the intervention the rate of VAP was 20.6 cases per 1000 patient days in the MICU, 5.4 cases per 1000 patient days in the SICU and 4.4 per 1000 patient days in the CCU. During period 2, the VAP rate decreased by 59% to 8.5 cases per 1000 patient days ( $p=0.001$ ) while the rates of VAP remained stable in the other two ICUs ( $p=0.22$  and  $p=0.48$  for the SICU and the CCU respectively). The intervention also resulted in significant cost reductions, estimated at 45-50% per patient. These reductions were sustained during period 3, the follow up period, suggesting that it was a long-term effect obtained without using expensive technology, therefore making it particularly attractive for developing countries.

*Apisarnthanarak A, Pinitchai U, Thongphubeth K, Yuekyen C, Warren DK, Zack JE, Warachan B & Fraser VJ. Effectiveness of an educational program to reduce ventilator-associated pneumonia in a tertiary care centre in Thailand: a 4-year study. CID 2007; 45(9):1245-7.*