

Carriage of *Staphylococcus aureus* and methicillin-resistant *S. aureus* by medical students

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Sir,

Methicillin-resistant *Staphylococcus aureus* (MRSA) is increasingly recognized in the community, especially among children and young adults.^{1,2} Due to their younger age and exposure to the healthcare environment, medical students comprise a unique population at risk of carriage of both community-associated (CA) and healthcare-associated (HA) MRSA. There are few published reports on this issue.^{3,4} Here, we assessed the carriage of MRSA among year 1 medical students in the University of Hong Kong. In the first year of their studies, exposure to patients and hospitals were limited. The studies were conducted on consecutive cohorts of year 1 students from 2006-2013 with the exception of 2008 because of administrative reasons. In the clinical skill sessions, students were taught to obtain clinical specimens. After demonstrations, students collected specimens among themselves under supervision of the tutors. At the end of each session, the throat and nasopharyngeal swabs were transferred in Amies transport to the microbiology laboratory for *S. aureus* culture. The swabs from each subject were inoculated into a mannitol-salt broth. After aerobic incubation at 35 °C for 24 h, turbid broths were subculture onto mannitol salt agars (plain and supplemented with oxacillin 6 mg/L).² Bacterial identification and antimicrobial susceptibility were carried out as previously described.^{2,5} No data about the students was collected. The MRSA isolates were further characterized by *spa* and *SCCmec* typing.^{1,2} PCR was used to detect presence of PVL genes.^{1,2} Linear regression analyses were used to assess trend changes in the measurements (*S. aureus* carriage, MRSA carriage, antimicrobial resistance rates) over time. A *P* value of 0.05 was considered to indicate statistical significance. The data were analyzed using SPSS version 17.0 (SPSS, Hong Kong). The study is approved by the Institutional Review Board at the Hong Kong West Cluster/University of Hong Kong.

A total of 1149 students were recruited into this study. The annual number of subjects varied from 126 to 213 due to changes in the number of student intake. Overall, *S. aureus* was identified in 532 students, including methicillin-sensitive *S. aureus* (MSSA) in 526 students and MRSA in 6 students (one in 2009, two in 2011, two in 2012 and one in 2013). The annual (\pm standard deviation) rates of MSSA and MRSA carriage were $45.8 \pm 12.3\%$ and $0.5 \pm 0.6\%$, respectively. Resistance rates were low ($<1\%$ to 3% for chloramphenicol, cotrimoxazole, fusidic acid, gentamicin and rifampicin) except for erythromycin and tetracycline. Overall, 135 (25.4%) isolates including 131 MSSA and four MRSA were erythromycin-resistant. Tetracycline resistance rates among MRSA and MSSA isolates were 50% (3/6) and 12.7% (67/526), respectively.

There were no significant trend changes in the carriage rates of *S. aureus* ($R^2 = 0.139$, $P = 0.4$) and MRSA ($R^2 = 0.328$, $P = 0.2$) over time. Temporal rates of erythromycin ($R^2 = 0.05$, $P = 609$) and tetracycline ($R^2 = 0.02$, $P = 0.773$) resistance also remained stable. The *spa*/*SCCmec* types of the six MRSA were as follows: t437/*SCCmec* IV or V (n=3, one each in 2009, 2011 and 2012), t11642/*SCCmec* IV (n=1, in 2011), t1081/*SCCmec* IV (n=1, in 2013) and t267/*SCCmec* IV (n=1, in 2012). One of the t437 strains was PVL positive while the other five strains were PVL negative. In Hong Kong, MRSA *spa* t437 and the related *spa* t11642 types represent CA-MRSA of the ST59 clone while MRSA *spa* t1081 and t267 are HA-MRSA of the ST45 and ST97 clones, respectively.^{1,2}

This study showed that whereas carriage of MSSA by medical students was widespread, the prevalence of either CA-MRSA or HA-MRSA is low. To our knowledge this is the first study to report on trends in carriage over a period of several years. MRSA carriage among healthcare personnel has been implicated in outbreaks, but whether they should be screened routinely remains debatable.⁴ Our data indicated that there is no need to screen medical students routinely for MRSA in our region.

Conflict of Interest statement

None

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