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# The clinical utility of methicillin-resistant Staphylococcus aureus (MRSA) nasal screening for predicting MRSA pneumonia: a diagnostic meta-analysis

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**Background:** In current guidelines, empiric MRSA therapy is recommended based on risk factors in a significant proportion of patients, yet MRSA pneumonia has a low prevalence. Recent literature has highlighted MRSA nasal screening as a possible antimicrobial stewardship tool for avoiding unnecessary empiric MRSA therapy**.** Specifically, some data suggest while a positive MRSA nares culture is not diagnostic of MRSA pneumonia, a negative nares culture effectively rules out MRSA pneumonia. The objective of this meta-analysis was to evaluate the diagnostic value of MRSA nasal screens in predicting MRSA pneumonia.

**Material/methods:** Pubmed and EMBASE were searched from inception to November 2016 for English studies evaluating MRSA nasal screening and development of MRSA pneumonia. References of included articles and abstracts from IDWeek, ICAAC, and ESCMID were also reviewed. Keywords related to MRSA, nasal swab, and pneumonia were used. Data analyses were performed using a bivariate random-effects model to estimate pooled sensitivity, specificity, and positive (PPV) and negative (NPV) predictive values.

**Results:** A total of 357 studies were identified, of which 93 were duplicates and 202 were excluded upon review of title and abstract. After full review, twenty studies, comprising of 4,670 patients met inclusion criteria. Pooled sensitivity and specificity of MRSA nares screen for all MRSA pneumonia types was 69.7% and 90.1%, respectively. With a 10% prevalence of MRSA pneumonia, the calculated PPV was 46.9% while the NPV was higher at 96.4%. The pooled sensitivity and specificity for MRSA community-acquired pneumonia (CAP) and healthcare-associated pneumonia (HCAP) were higher at 85% and 92.1%, respectively. For CAP and HCAP both the PPV and NPV increased to

54.5% and 98.2%, respectively.  In comparison, MRSA ventilated-associated pneumonia (VAP) had a sensitivity, specificity, PPV, NPV of 40.3%, 93.7%, 41.4%, and 93.4%, respectively.

**Conclusions:** Nares screening for MRSA had a high specificity and NPV while sensitivity and PPV were low to moderate. Based on the NPV, utilization of MRSA nares screening may be a valuable tool for antimicrobial stewardship to streamline empiric antibiotic therapy in patients with pneumonia who are not colonized with MRSA in the nares, particularly in cases of CAP/HCAP. In contrast, PPV from MRSA nares screening was of no benefit in ruling in MRSA pneumonia. Moreover, the low sensitivity in VAP suggests low utility in ruling out VAP MRSA pneumonia.