

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



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BACKGROUND

Updated since submission.

In current guidelines¹, 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.

OBJECTIVE

- Evaluate the diagnostic value of MRSA nasal screens in predicting MRSA pneumonia

METHODS

- Pubmed and EMBASE were searched from inception to March 2017
- English studies evaluating MRSA nasal screening and development of MRSA pneumonia
- References of included articles and abstracts from IDWeek, ICAAC, and ESCMID also reviewed

METHODS CONTINUED

- Used keywords related to MRSA, nasal swab, and pneumonia
- 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 500 studies were identified, of which 129 were duplicates and 302 were excluded upon review of title and abstract
- After full review, 22 studies, comprising of 5,163 patients met inclusion criteria
- Overall pooled PNA prevalence was 10% (95% CI 8-13; I² 89.6%; P < 0.001)
- For all types of PNA the sensitivity, specificity, PPV, and NPV of MRSA nares screen was 70.9%, 90.3%, 44.8%, and 96.5%, respectively
- For CAP/HCAP sensitivity, specificity, PPV, and NPV of MRSA nares screen was higher at 85%, 92.1%, 58.8%, and 98.1%

References: ¹Kalil AC, et al. *Clin Infect Dis.* 2016 Sep 1;63(5):e61-e111.

Figure 1. Flow Diagram

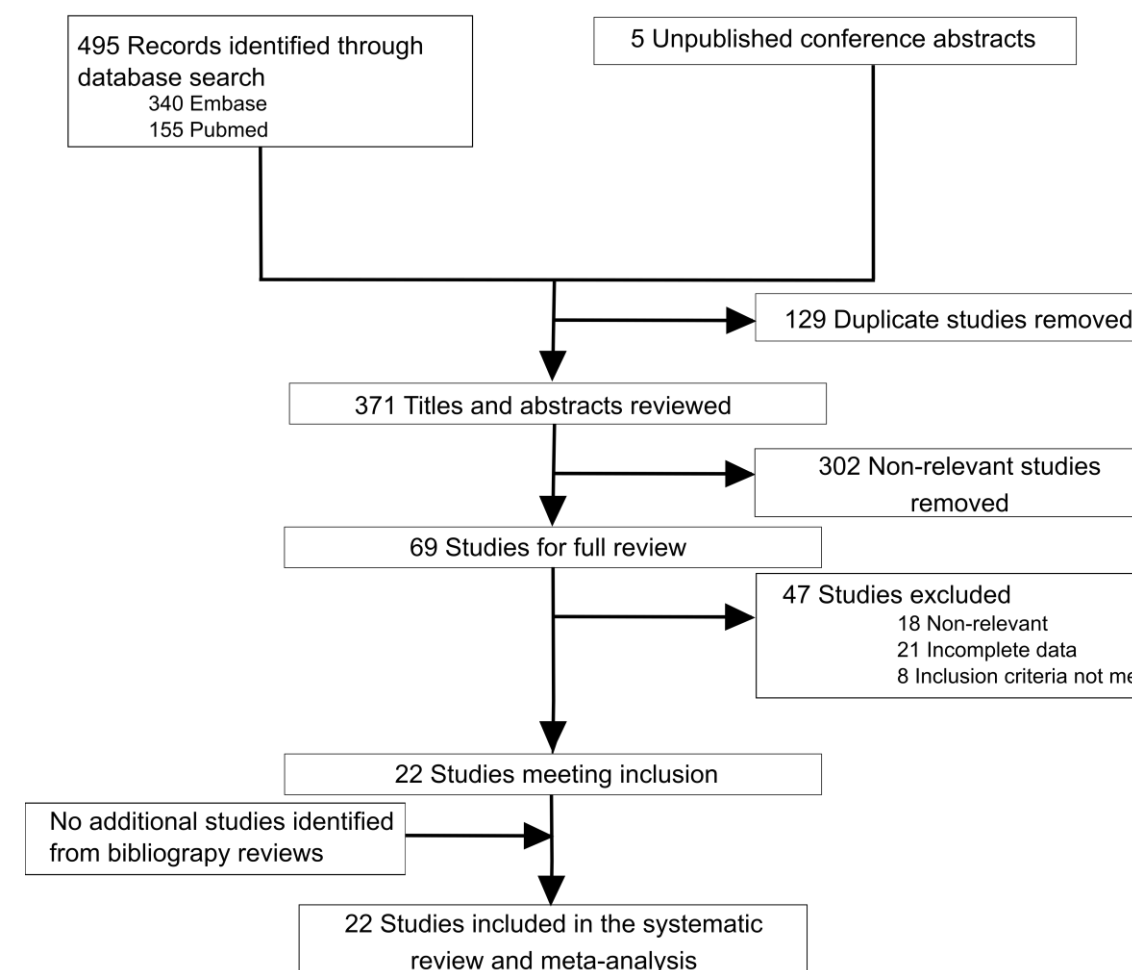


Figure 2. Pooled Prevalence of MRSA Pneumonia

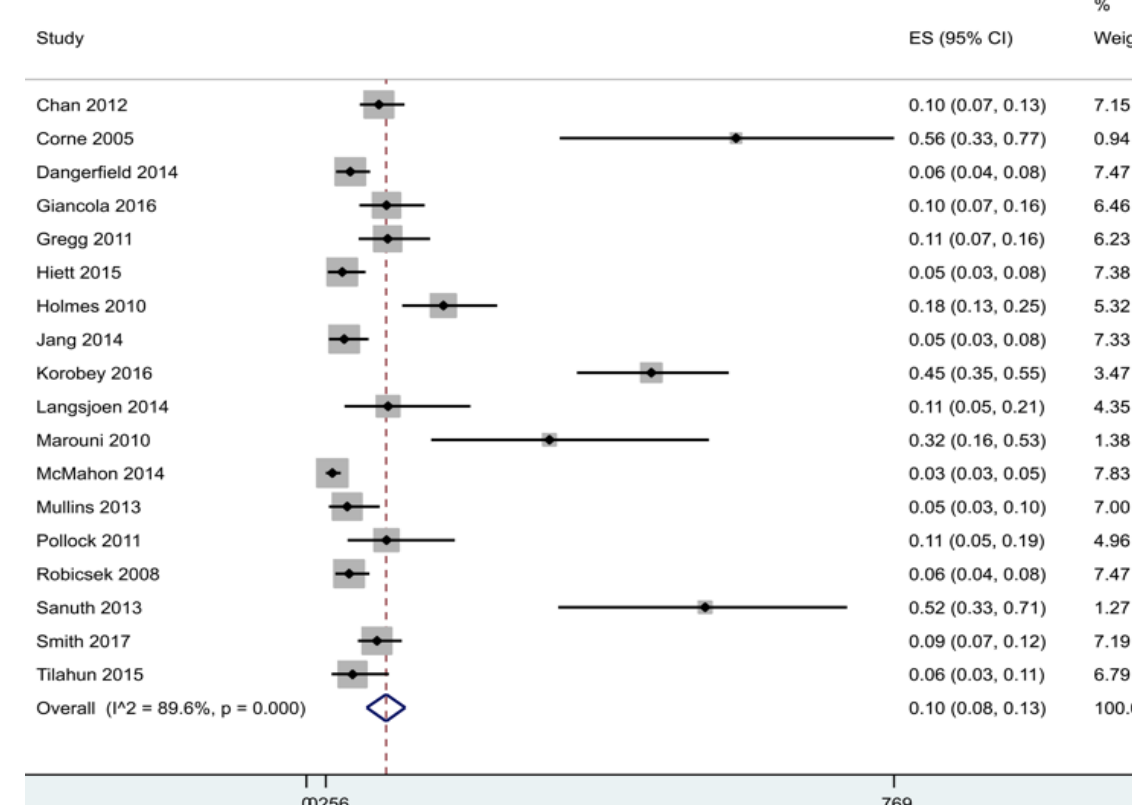


Table 1. Performance Characteristics of MRSA Surveillance Screening by MRSA Pneumonia Type

PNA Type	All	CAP/HCAP	VAP
No. Studies	22	4	5
Sensitivity, % (95% CI)	70.9 (58.8-80.6)	85.0 (59.7-95.6)	40.3 (17.4-68.4)
Specificity, % (95% CI)	90.3 (86.1-93.3)	92.1 (81.5-96.9)	93.7 (77.1-98.4)
PPV, %	44.8	56.8	35.7
NPV, %	96.5	98.1	94.8

PNA, pneumonia; No., number; CI, Confidence Interval; CAP, community acquired pneumonia; HCAP, healthcare-acquired pneumonia; VAP, ventilator associated pneumonia

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 CAP/HCAP who are not colonized with MRSA in the nares
- PPV from MRSA nares screening was of no benefit in ruling in MRSA pneumonia
- The low sensitivity in VAP suggests low utility in ruling out VAP MRSA pneumonia