



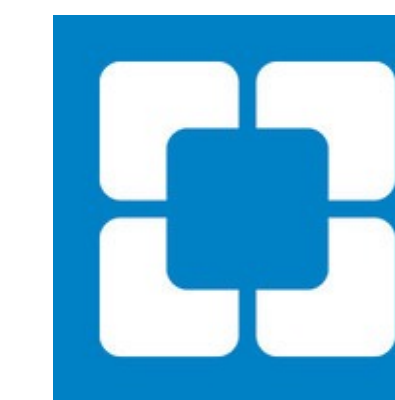
Cleveland Clinic  
Community Care

# Predictors of Pneumococcal Urinary Antigen Test Positivity in Patients with Community-acquired Pneumonia: A Meta-Analysis and Systematic Review

Priscilla Kim BA MS<sup>1</sup>, Oluwapeyibomi Runsewe BS<sup>1</sup>, Mary Schleicher RN BSN MLIS<sup>2</sup>, Abhishek Deshpande MD PhD<sup>3</sup>

<sup>1</sup>Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, <sup>2</sup>Floyd D. Loop Alumni Library, Cleveland Clinic, Cleveland, OH,

<sup>3</sup>Center for Value-Based Care Research, Cleveland Clinic, Cleveland, OH



Cleveland Clinic  
Lerner College  
of Medicine

## BACKGROUND

- The 2019 American Thoracic Society/Infectious Diseases Society of America (ATS/IDSA) guidelines argue against routine pneumococcal urinary antigen testing (pUAT), except in patients with severe community-acquired pneumonia (CAP)
- Recent studies, however, have suggested that these recommendations identify a low-risk population, resulting in wasted resources and missed opportunities for antimicrobial stewardship
- The optimal patient population for pUAT remains unknown

## OBJECTIVE

- To summarize predictors of pUAT positivity among patients hospitalized with CAP, as determined by previous observational studies

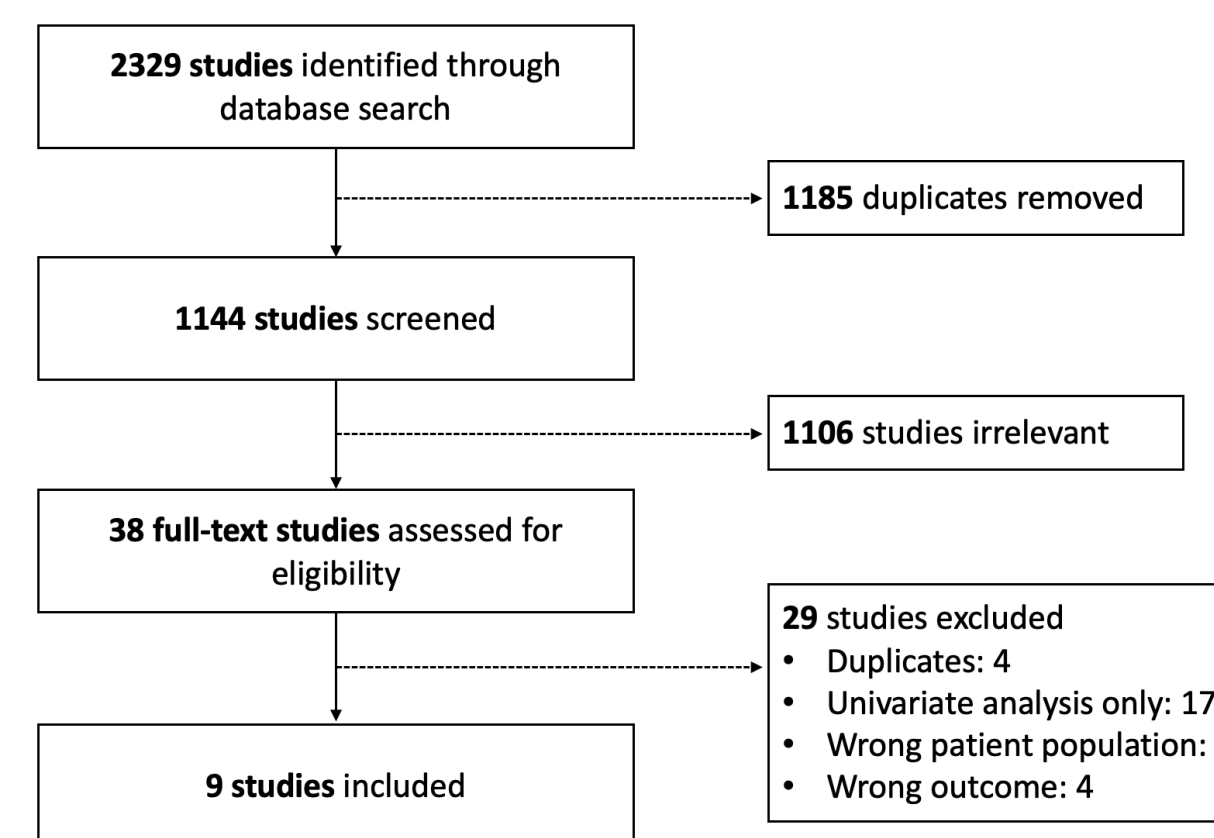
## METHODS

- We systematically searched MEDLINE, Embase, Web of Science, and Scopus for articles related to urinary antigen tests and community-acquired pneumonia
- Studies published until August 26, 2021, were included if risk factors for pUAT positivity in adult patients with community-acquired pneumonia were evaluated with multivariable analyses
- Studies conducted exclusively in children and those without full-text (i.e., abstract only) were excluded
- In order to capture all potentially relevant material, no language filters or limits were applied
- Two investigators (P.K. and O.R.) independently screened studies, extracted, and compiled data

## RESULTS

- The preliminary literature search identified 2329 articles, from which 1185 duplicates were removed (**Figure 1**)
- Of the 1144 studies that were screened, 38 full-text studies were assessed for eligibility
- Ultimately, 9 studies met the inclusion criteria, representing 8,536 patients who underwent pUAT

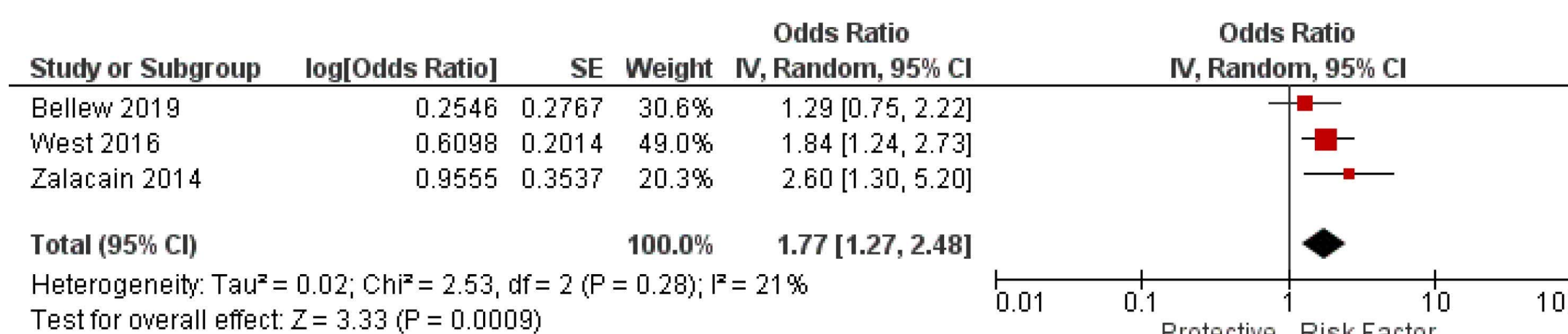
**Figure 1. Flow chart for study inclusion in the systematic review and meta-analysis**



- The most frequent independent risk factors associated with a positive pUAT were ICU admission (OR 1.77, 95% CI 1.27 – 2.48,  $I^2 = 21%$ ) (**Figure 2**) and female sex (OR 1.53, 95% CI 1.19 – 1.97,  $I^2 = 36%$ ) (**Figure 3**)

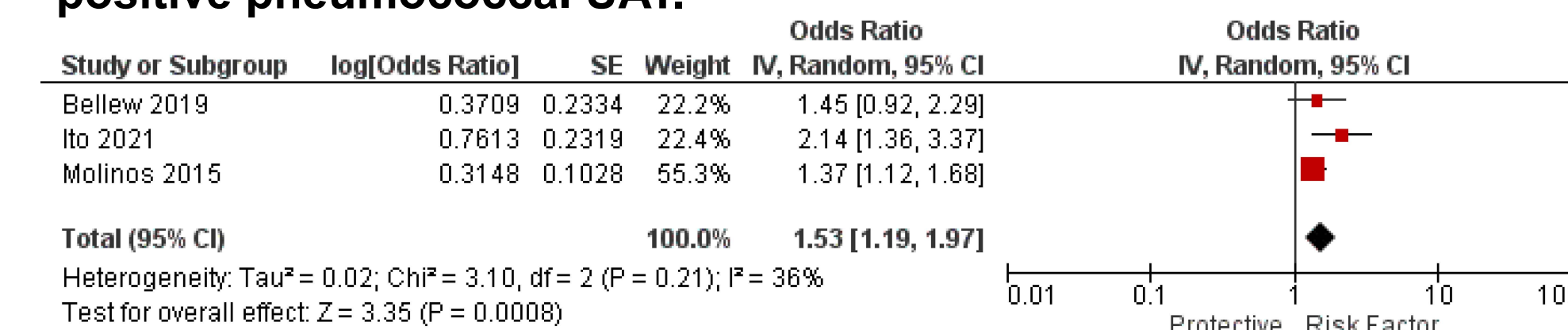
**Figure 2. Forest plot of the association between ICU admission and positive pneumococcal UAT.**

The vertical line corresponds to the no difference point between the two groups. Squares, the size of which indicates the proportion of information given by each study, correspond to ORs. Horizontal lines represent the 95% CIs. The diamond indicates the pooled odds ratios. df = degrees of freedom; IV = inverse variance



## RESULTS

**Figure 3. Forest plot of the association between female sex and positive pneumococcal UAT.**



- Laboratory parameters such as C-reactive protein (OR 0.26, 95% CI 0.02 – 4.49,  $I^2 = 93%$ ) and BUN (OR 1.36, 95% CI 0.84 – 2.19,  $I^2 = 93%$ ) were not significantly associated with pUAT positivity
- Many variables were inconsistently reported and thus could not be combined for analysis, including age  $\geq 65$ , current smoking, history of emphysema, hyponatremia, various clinical findings (pleuritic chest pain, chills, fever, HR $\geq 125$  bpm, SBP $< 90$  mmHg, bacteremia), other markers of severity (CURB-65, PSI risk class, use of mechanical ventilation), and antibiotic history

## CONCLUSIONS

- Consistent with current guidelines, ICU admission, an indication of severe CAP, appears to be an important predictor of pUAT positivity
- Female sex was also significantly associated with pUAT positivity
- Recognition of these risk factors can assist in identifying patient populations most likely to benefit from pUAT and may be considered in future CAP guidelines
- Additional studies are needed to assess the impact of other potential risk factors for pUAT positivity