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## **Validity of pneumonia severity assessment scores in low- and middle-income countries: a systematic review and meta-analysis**

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### **Abstract**

**Background** Community-acquired pneumonia (CAP) treatment decisions are often guided by severity assessment scores, such as pneumonia severity index (PSI) and CURB-65. Although widely used, their validity in low- and middle-income countries (LMICs) is not well-defined. We aimed to investigate the available evidence around the validity and performance of the existing scores in adults with CAP in LMICs.

**Methods** Medline, Embase, Cochrane Central Register of Controlled Trials, Scopus, and Web of Science were searched to May 21, 2020. Studies of any design evaluating a pneumonia severity score/tool among adults in LMICs were included. Bivariate random-effects meta-analysis was performed to examine the scores' performance in predicting mortality when at least four studies were identified. Studies' quality was assessed with Quality in Prognosis Studies criteria.

**Results** Of 9,898 records, 11 studies were eligible covering 12 tools. Of these, only CURB-65 and CRB-65 were included in the meta-analysis. Both scores were effective in predicting mortality risk. Performance characteristics (with 95% Confidence intervals) at high (CURB-65  $\geq 3$ , CRB-65  $\geq 3$ ) and intermediate-risk (CURB-65  $\geq 2$ , CRB-65  $\geq 1$ ) cut-offs, respectively, were as follows: for CURB-65, pooled sensitivity, 0.70 (0.25-0.94) and 0.96 (0.49-1.00), and for CRB-65, 0.09 (0.01-0.48) and 0.93 (0.50-0.99); pooled specificity, for CURB-65, 0.90 (0.73-0.96) and 0.64 (0.45-0.79), and for CRB-65, 0.99 (0.95-1.00) and 0.43 (0.24-0.64).

**Conclusion** CURB-65 and CRB-65 appear to be valid scores for predicting mortality in LMICs. Whilst CURB-65 exhibited better performance in most aspects, CRB-65 may be employed where urea levels are unavailable. Lack of robust evidence regarding other scores, including PSI.

### **Categories**

Disease Epidemiology/Clinical Course