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Title: Severity scores do not accurately predict microbial aetiology in community-acquired pneumonia

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Body: Background: Severity scores are increasingly being promoted to guide empirical antibiotic prescribing in community-acquired pneumonia (CAP). The aim of this study was to determine the accuracy of existing severity scores for prediction of microbial aetiology in patients hospitalised with CAP. Methods: Prospective observational study of patients hospitalised with CAP from two independent databases. Microbial aetiology was recorded (based on sputum, blood, urinary antigen testing, PCR for respiratory viruses or atypical serology). The area under receiver operator characteristic curve (AUC) was used to determine predictive accuracy of scores for specific groups of pathogens: Atypical bacteria (Atyp), Gram-negative enterobacteriaceae (GNEB) and Staphylococcus aureus (SA). Severity scores assessed were: Pneumonia Severity Index (PSI), CURB65, ATS minor criteria, SMART-COP and severe community acquired pneumonia (SCAP) rule. Results: 2818 patients were included in the study with 48.5% male and median (IQR) age 72 years (58-81 years). Table 1 shows AUC for prediction of specific groups of pathogens for each severity score.

Severity score	Atyp (n=85)	GNEB (n=46)	SA (n=56)
CURB65	0.45 (0.39-0.51)	0.64 (0.56-0.72)	0.69 (0.63-0.75)
PSI	0.46 (0.40-0.51)	0.66 (0.58-0.74)	0.59 (0.52-0.66)
ATS minor criteria	0.50 (0.44-0.56)	0.66 (0.57-0.74)	0.72 (0.65-0.78)
SMART-COP	0.50 (0.43-0.56)	0.64 (0.56-0.72)	0.68 (0.61-0.75)
SCAP	0.48 (0.42-0.54)	0.68 (0.60-0.76)	0.69 (0.62-0.76)

Conclusion: Existing severity scores are poor predictors of microbial aetiology. Other patient related factors may require consideration when making empirical antibiotic decisions for patients hospitalised with CAP.