

Review of the CURB-65 Score for Pneumonia Severity

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Abstract

The CURB-65 Score for Pneumonia Severity is a clinical decision support tool designed to predict the 30-day mortality risk of community-acquired pneumonia (CAP) utilizing patient age, mental status, vital signs, and renal function. It assists healthcare providers during the initial evaluation and triage of patients presenting with acute respiratory infections. By calculating a stratified risk score, the tool supports safe disposition practices and helps prevent adverse outcomes by identifying whether patients are suitable for outpatient care, require hospital admission, or need intensive care management. In addition, this tool outlines the predicted mortality rate for each risk bracket and provides evidence-based recommendations to guide providers in safely allocating medical resources. Since its inception, the tool has been validated for use with CAP, but has seen emerging evidence in predicting mortality in influenza and COVID-19 pneumonia.

I. HOW TO USE

When to Use

Use the CURB-65 score during the initial clinical evaluation of adult patients presenting with suspected or confirmed community-acquired pneumonia (CAP). The tool is designed to be used in emergency departments, urgent care centers, and primary care settings to stratify a patient's 30-day mortality risk and help guide site-of-care decisions (e.g., safe outpatient management, standard inpatient admission, or intensive care unit escalation).

Pearls / Pitfalls

The CURB-65 score is widely favored for its simplicity and ability to be rapidly calculated at the bedside from basic clinical data. In community or pre-hospital settings where point-of-care blood testing for blood urea nitrogen (BUN) is unavailable, the modified CRB-65 score can be utilized to make rapid triage decisions. While originally derived for standard bacterial CAP, extensive evidence demonstrates that CURB-65 maintains strong prognostic accuracy for assessing short-term (30-day) mortality across both bacterial and viral etiologies, including influenza, COVID-19, and adenovirus.

However, there are several important limitations to the CURB-65 score. Compared to more comprehensive tools like the Pneumonia Severity Index (PSI), it is less sensitive and can underestimate disease severity, particularly in younger patients (<65 years) with significant

chronic comorbidities, severe immunosuppression, or aggressive viral infections. Furthermore, CURB-65 does not directly account for oxygenation, work of breathing, or hypoxemia; patients with a low calculated score who present with respiratory distress or hypoxemia still warrant hospital admission or intensive monitoring. The score also fails to capture critical clinical and non-clinical determinants of disposition, such as multilobar infiltrates on imaging and poor social support. Finally, while well-validated for acute 30-day mortality, CURB-65 has poor predictive capacity for identifying patients requiring intensive care interventions or for predicting long-term (6- to 12-month) mortality and functional decline in patients recovering from acute CAP.

Why Use

In clinical situations where the appropriate disposition may not be immediately clear, calculating the CURB-65 score for patients with CAP can serve as a valuable objective measure to help support clinician judgment when determining the optimal site of care.

II. NEXT STEPS

Advice

CURB-65 is a supplementary tool and is not a replacement for clinician judgment in determining disposition for patients with CAP. It has not been validated for and is not meant to guide specific therapeutic or pharmaco-

logical decisions. Furthermore, while CURB-65 has been robustly validated in CAP and shows promise in viral pneumonias like influenza and COVID-19, evidence supporting its use for healthcare-associated pneumonia or ventilator-associated pneumonia is lacking.

Management

According to the ATS/IDSA 2019 guidelines, outpatient management is recommended for patients with a low CURB-65 score (0–1). For healthy adults without comorbidities or risk factors for antibiotic-resistant pathogens, empiric antibiotic therapy includes amoxicillin (1 g three times daily), doxycycline, or a macrolide (only in areas where pneumococcal resistance to macrolides is <25%). Clinicians should routinely consult their local institutional or regional antibiograms to guide therapy, as many practice settings exhibit high baseline rates of macrolide resistance. For outpatients with comorbidities (such as chronic heart, lung, liver, or renal disease, diabetes, alcoholism, malignancy, or asplenia), the recommended treatment is either combination therapy (amoxicillin/clavulanate or a cephalosporin plus a macrolide or doxycycline) or monotherapy with a respiratory fluoroquinolone.

For inpatient management of patients with a moderate to high CURB-65 score (≥ 2), routine diagnostic testing (such as blood cultures, sputum cultures, and pneumococcal urine antigen tests) is not recommended for non-severe cases unless specific risk factors for *Methicillin-resistant Staphylococcus aureus* (MRSA) or *Pseudomonas aeruginosa* are present. Patients classified as having severe CAP should undergo expanded diagnostic testing, including blood cultures, sputum cultures (or molecular diagnostics), urinary antigen tests for *Legionella* and *Streptococcus pneumoniae*, and viral testing for influenza or COVID-19 if circulating in the community.

Empiric antibiotic regimens for non-severe inpatients include combination therapy with a beta-lactam plus atypical coverage (macrolide or doxycycline), or monotherapy with a respiratory fluoroquinolone. Severe inpatient cases require combination therapy, such as a beta-lactam plus atypical coverage (macrolide or doxycycline) or a beta-lactam plus a respiratory fluoroquinolone, along with targeted coverage if MRSA or *P. aeruginosa* risk factors exist. Antibiotic therapy should continue for no less than 5 days and until the patient achieves clinical stability. Patients are considered clinically stable when they maintain a temperature $\leq 38^{\circ}\text{C}$, heart rate ≤ 100 beats/min, respiratory rate ≤ 24 breaths/min, systolic blood pressure ≥ 90 mmHg, arterial oxygen saturation $\geq 90\%$ on room air, and a return to baseline mental status.

Critical Actions

It is critical to remember that the CURB-65 score is a decision-support aid and is not a replacement for independent clinician judgment in determining the disposition for patients with CAP. Clinicians should maintain a low threshold to override low calculated scores in the presence of hypoxemia, significant respiratory distress, multilobar radiographic involvement, or lack of reliable outpatient social support. Furthermore, particularly for patients scoring in the moderate-to-high risk tiers (scores ≥ 2), clinicians should actively evaluate for the presence of Systemic Inflammatory Response Syndrome (SIRS) criteria and early organ dysfunction, promptly initiating a formal sepsis workup and evidence-based resuscitation bundle (including serum lactate, blood cultures, and timely intravenous antimicrobials) when clinically indicated.

III. EVIDENCE

Evidence Appraisal

The original study by Lim et al. (2003) was a retrospective cohort analysis of 1,068 adult patients admitted with CAP that served as the international derivation and validation study for the CURB-65 score. The study identified five main independent risk factors for 30-day mortality: confusion, urea >7 mmol/L (BUN >19 mg/dL), respiratory rate ≥ 30 breaths/min, systolic blood pressure <90 mmHg or diastolic BP ≤ 60 mmHg, and age ≥ 65 years. By synthesizing these factors, the authors successfully stratified patients into low-, intermediate-, and high-risk mortality groups. Strengths of the original study include its large multicenter cohort and broad generalizability to public healthcare systems in the UK, New Zealand, and the Netherlands. However, the study faced criticism because all data were collected retrospectively and treatment protocols varied across the national cohorts.

In subsequent prospective validation studies, CURB-65 has been frequently benchmarked against competing clinical decision rules, highlighting distinct trade-offs between simplicity, sensitivity, and clinical endpoints:

CURB-65 vs. Pneumonia Severity Index (PSI): Large prospective comparisons (such as Aujesky et al., 2005) and systematic reviews demonstrate that PSI has higher discriminatory power (AUC ~ 0.81 – 0.84) and sensitivity, misclassifying fewer high-risk patients and identifying a larger proportion of low-risk patients who can safely be treated at home. Conversely, CURB-65 offers higher specificity and bedside efficiency. PSI is preferable when evaluating borderline or mildly ill patients with multiple chronic medical comorbidities where the clinical objective is to safely rule out admission and avoid unnecessary hospitalization. CURB-65 is ideal in fast-paced emer-

gency department and urgent care triage where rapid disposition decisions must be made without waiting for the 20 distinct demographic, laboratory, and radiographic parameters required by the PSI.

CURB-65 vs. ICU Triage Scores (SMART-COP / IDSA-ATS Criteria): A recognized limitation of CURB-65 across the literature is its poor predictive accuracy for intensive care unit (ICU) admission, mechanical ventilation, or vasopressor support (sensitivities often <60%). In patients presenting with acute respiratory distress, younger patients (<65 years) with aggressive viral pneumonias (such as influenza or COVID-19), or those with extensive disease, tools like SMART-COP or the IDSA/ATS minor criteria are preferred. Because these tools directly incorporate markers of hypoxemia ($\text{PaO}_2/\text{FiO}_2$ ratio or SpO_2), arterial pH, and multilobar infiltrates, they substantially outperform CURB-65 in predicting rapid physiological collapse. CURB-65 may under-stratify severity in younger populations who lack the age criterion but present with severe viral hypoxemia, as well as in frail nursing home residents where baseline cognitive impairment and elevated urea reduce the score's discriminatory specificity.

Despite these limitations, extensive systematic reviews and nationwide cohort analyses confirm that CURB-65 remains a robust, highly specific, and exceptionally practical bedside tool for predicting short-term 30-day mortality.

Formula

Give one point for each category if present:

- Confusion (defined as UK or NZ mental test score of 8 or less, or disorientation to person, place, or time)
- Urea > 7 mmol/L, or BUN >19 mg/dL
- Respiratory Rate ≥ 30
- Systolic BP <90 or diastolic BP ≤ 60 mmHg
- Age ≥ 65

Fact & Figures

Based on the derivation study by Lim et al., the CURB-65 score effectively stratifies patients into three distinct 30-day mortality categories. A score of 0 or 1 yields an estimated 30-day mortality of 1.5% and represents a low-risk category, meaning the patient is likely suitable for home treatment. A score of 2 indicates an intermediate risk with a 9.2% estimated mortality, prompting clinicians to consider hospital-supervised treatment. Finally, a score of 3 or more indicates a high risk with an estimated 22% mortality, meaning the patient should be managed in the hospital for severe pneumonia with consideration of ICU admission.

CURB-65 score	Estimated 30 day mortality	Mortality category/ Recommendation
0 or 1	1.5%	Low/Likely suitable for home treatment
2	9.2%	Intermediate/Consider hospital supervised treatment
3 or more	22%	Manage in hospital as severe pneumonia

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