

Table 1 Sensitivity, specificity, PPV and NPV for CURB-65 and CURB-age criteria in 189 patients with CAP

	CURB-65 estimate (95% CI)	CURB-age estimate (95% CI)
Sensitivity	81.5% (61.9 to 93.7)	81.5% (61.9 to 93.7)
Specificity	64.2% (56.3 to 71.6)	74.1% (66.6 to 80.6)
PPV	27.5% (18.1 to 38.6)	34.4% (22.9 to 47.3)
NPV	95.4% (89.6 to 98.5)	96.0% (90.9 to 98.7)

PPV, positive predictive value; NPV, negative positive value; CAP, community acquired pneumonia.

improve the assessment of severity in community acquired pneumonia (CAP).

We therefore modified CURB-65 and formulated a new rule (CURB-age) where:

- the presence of new confusion scores 1;
- urea >7 mmol/l but ≤11 mmol/l scores 1;
- urea >11 mmol/l scores 2;
- respiratory rate ≥30/min scores 1;
- either diastolic blood pressure ≤60 mm Hg or systolic blood pressure <90 mm Hg scores 1;
- age ≥65 and <85 scores 1;
- age ≥85 scores 2.

Since the maximum possible score becomes 7, we defined severe pneumonia as a score ≥4 for the CURB-age criteria compared with ≥3 for CURB-65.

The subjects were 189 patients (median age 75 years, range 17–96, 56.1% men) who were included in two prospective observational studies of CAP.³ Detailed methodology has been reported previously.^{3–5} Using CURB-65 there were 109 non-severe cases (57.7%) and 80 severe cases (42.3%) and by CURB-age criteria there were 125 non-severe cases (66.1%) and 64 severe cases (33.9%). There were 5 deaths in each of the non-severe groups and 22 deaths in each of the severe groups. We examined the sensitivity, specificity, positive predictive values (PPV) and negative predictive values (NPV) of 6 week mortality and their corresponding 95% Pearson-Clopper exact confidence intervals for both CURB-65 and CURB-age criteria (table 1). The CURB-age criteria showed a significantly higher specificity (p = 0.0001, McNemar test).

A simple modification improves the specificity and PPV without losing the sensitivity of CURB-65 criteria and without requiring any additional information. It is as simple as CURB-65 and provides higher accuracy in identifying those who died over SOAR and CURB-65 criteria with significantly higher specificity. We combined the data from two cohorts of patients with CAP from two time periods, with the second cohort being elderly patients only (≥65 years). It is reassuring that the CURB-age criteria better identified severe pneumonia in this older cohort. In the study in which the CURB-65 criteria were developed and validated, the median age of patients was 64 years.²

Our findings have important clinical implications. The current BTS guidelines recommend that severe CAP should be treated with intravenous antibiotics. These are more likely to produce untoward side effects such as antibiotic-associated diarrhoea than oral antibiotics, especially in older adults, and their use should be limited to truly severe CAP in older patients. Although the number of patients in our study is comparable to the original validation cohort reported by Lim *et al*² (189 vs 214),

larger studies are needed to test the validity of these modified criteria.

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Author's reply

We agree with Myint and colleagues that CURB-65 will not perform equally in all cohorts of patients. We have previously shown, however, that knowledge among junior and middle grade medical staff about how to perform and apply severity assessment criteria in patients with community acquired pneumonia (CAP) is poor.^{1 2} This may have improved since the inclusion of CURB-65 in the British Thoracic Society (BTS) guidelines in 2004, but it is our anecdotal experience that severity assessment remains suboptimal. When

implementing guidelines, there is a widely accepted paradigm that increasing complexity results in decreased adherence. While the modification proposed by Myint and colleagues may be a statistical improvement, the key question is: Will the improved performance characteristics outweigh the inevitable increased confusion and decreased use as a result of the increased complexity and yet another change to the recommended prognostic criteria for CAP?

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Birth weight and adult lung function

In a recent paper published in *Thorax* Canoy and co-workers¹ concluded that babies with lower birth weight and poor infant growth may be at a higher risk of developing impaired adult pulmonary function. In contradiction to these findings, no association was found between birth weight and adult lung function or between birth weight and asthma symptoms in a Nordic-Baltic population studied by Laerum *et al*.² Studies of birth characteristics and respiratory outcomes give contradictory results as methods used in different studies vary. Although Canoy *et al*¹ showed some interesting findings in a large cohort study, it raises some methodological questions and thereby interpretation of the findings.

The authors state that data on potential confounders and mediating factors operating throughout the life course were prospectively collected. Many of the known early life variables and adult variables were taken into consideration in logistic regression analyses. Canoy *et al* have focused on the nutritional status of the mother and birth weight. However, I wonder whether some relevant factors known to influence weight during the first year of life were missing. For example, it is a known fact that children of diabetic mothers often have heavier babies (large for gestational age) at birth compared with other term babies. This has not been discussed in the paper. Furthermore, have the authors taken into account factors that could influence the development of weight during the first year? What about the nutritional status of the children or conditions that may lead to nutritional disorders during the first year? Did the authors consider other chronic childhood disorders that may impair growth? Only two measurements of weight (at birth and around 12 months of age) during the first year will hardly reflect the natural growth of the child over time.

The authors mention that weight gain during the first year was positively associated with lung function later in life, which remained significant after adjustments for