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. Detailed methodology has been reported previously. 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 severity, 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.

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 (189 vs 214), larger studies are needed to test the validity of these modified criteria.

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

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURB-65 estimate (95% CI)</td>
<td>81.5% (61.9 to 93.7)</td>
<td>64.2% (56.3 to 71.6)</td>
<td>27.5% (18.1 to 38.6)</td>
<td>95.4% (89.6 to 98.5)</td>
</tr>
<tr>
<td>CURB-age estimate (95% CI)</td>
<td>81.5% (61.9 to 93.7)</td>
<td>74.1% (66.6 to 80.6)</td>
<td>34.4% (22.9 to 47.3)</td>
<td>96.0% (90.9 to 98.7)</td>
</tr>
</tbody>
</table>

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

### References


### Birth weight and adult lung function

In a recent paper published in *Thorax* Canoy and co-workers 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 respiratory symptoms in a large cohort study. This may have improved the assessment of severity in community-acquired pneumonia.

**Author’s reply**

We agree with Myint and colleagues that severe CAP should be treated with biotics, especially in older adults, and their use may impair growth? Only two measurements of birth weight and adult lung function or respiratory outcomes give contradictory results as methods used in different studies vary. Although Canoy et al. 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...
Impairment of the swallowing reflex in exacerbations of COPD

An exacerbation of chronic obstructive pulmonary disease (COPD) has a serious impact on disease progression and is associated with high medical costs, but the cause of about one-third of exacerbations cannot be identified. Adequate protective reflexes in the airways play an important role in the prevention of aspiration of bacteria-containing oropharyngeal or gastric secretions. Impairment of these reflexes against aspiration could be useful to highlight a novel risk factor for exacerbations of COPD.

Fifty clinically stable patients with COPD were enrolled from the outpatient clinic of Ishinomaki Red Cross Hospital, Ishinomaki, Japan. Patients who were current smokers and those with oral corticosteroid use, oral and pharyngeal cancer, previous head and neck surgery, neuromuscular disease and oesophageal disease were excluded. Twenty-five patients (22 men and 3 women) had at least one exacerbation during the previous year, while the other 25 patients (21 men and 4 women) were stable. In the exacerbation group the patients had 2.4 (range 1–10) exacerbations per year, and 20 patients (80%) required hospital admission. There was no significant difference between the stable group and the exacerbation group in age (mean (SE) 75.0 (1.3) years vs 77.2 (1.0) years), forced expiratory volume in 1 s (FEV1) (mean (SE) 1.11 (0.11) l vs 1.07 (0.09) l), percentage predicted value of FEV1, (mean (SE) 47.1 (3.7%) vs 50.1 (3.7%)) and the rate of home oxygen therapy (4% vs 20%). All patients were eating an entirely oral diet without complaining of dysphagia prior to enrolment.

We evaluated the swallowing reflex on the basis of the latency of response to the onset of the swallowing action timed from the injection of 1 ml distilled water into the pharynx through a nasopharyngeal catheter. The mean (SE) latent time of the swallowing reflex was significantly longer in the exacerbation group than in the stable group (8.6 (1.3) s vs 2.6 (0.3) s, p<0.001; fig 1). We classified a response as normal or impaired according to whether the swallowing reflex was induced within 3 s of the injection. In the exacerbation group 22 of 25 patients (88%) exhibited an impaired response compared with 8 of 25 patients (32%) in the stable group (p<0.001). Impairment of the swallowing reflex was significantly associated with an exacerbation of COPD (relative risk 2.8, 95% confidence interval 1.5 to 5.0).

These results indicate that there is a high incidence of impairment of the swallowing reflex in patients with COPD and this is a risk factor for an exacerbation of COPD. To date, there are few published reports available on swallowing dysfunction in patients with COPD. The impact of impairment of the swallowing reflex in COPD exacerbations has not been clarified. The findings of our study highlight a novel risk factor for exacerbations of COPD and raise the possibility that precautions against aspiration could be useful to prevent these exacerbations.