

# Use of CURB-65 scoring in Community Acquired Pneumonia

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The World Journal of Medical Education and Research (WJMER) is the online publication of the Doctors Academy Group of Educational Establishments. Published on a quarterly basis, it's aim is to promote academia and research amongst all members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from all parts of the world. The principal objective of this journal is to encourage the aforementioned from developing countries in particular to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings all over the world. We envisage an incessant stream of information will flow along the channels that WJMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our subsequent editions. We are honoured to welcome you to WJMER.



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## Use of CURB-65 scoring in Community Acquired Pneumonia

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**Introduction**

Over the past two decades, clinical guidelines have become increasingly widespread and have influenced many aspects of everyday practice. Potential benefits conferred by clinical guidelines include increased consistency and quality of care, increased quality of clinical decision, medico-legal protection for healthcare professionals, gaps in public policies being identified and delivery of improved and cost effective healthcare.<sup>1</sup> To further understand the management of community acquired pneumonia, an audit of the clinical pathway used in the Accident and Emergency (A&E) department of Princess of Wales Hospital, Bridgend, UK, was performed.

**Methodology**

The Princess of Wales Hospital radiological database was searched using the query “consolidation” between September 2008 and February 2009. Three hundred and thirteen potential cases were found, and of those one hundred were identified to have pneumonia on the electronic database. Hospital acquired pneumonia, paediatric and pregnant cases were excluded. These one hundred cases were audited based on the appropriateness of investigations, severity and prognostic features of each case as well as the overall medical management.

**Results**

The initial investigations for community acquired pneumonia (CAP) listed in the guidelines include full blood count (FBC), urea, creatinine and electrolytes (U&Es), arterial blood gases (ABG), atypical viral titres, blood cultures if the noted body temperature is greater than or equal to 38°C, chest radiographs (CXR), electrocardiogram (ECG) and sputum for culture and sensitivity (see appendix). It was observed that very few patients had atypical viral titres measured, hence this parameter was excluded from the audit. As seen in Figure 1, the vast majority of patients had FBC, U&E, ECG and CXR done. 16% of patients did not have their U&E recorded as their blood samples had haemolysed

requiring a further sample. Only 17% of patients had ABGs performed and 40% had sputum cultures collected. Figure 2 shows that blood cultures were taken from 29 patients. However out of those, only eight had a temperature greater than or equal to 38°C. On the other hand, it was observed from the cohort study that blood cultures were not done for nine patients despite having a temperature of 38°C or higher.

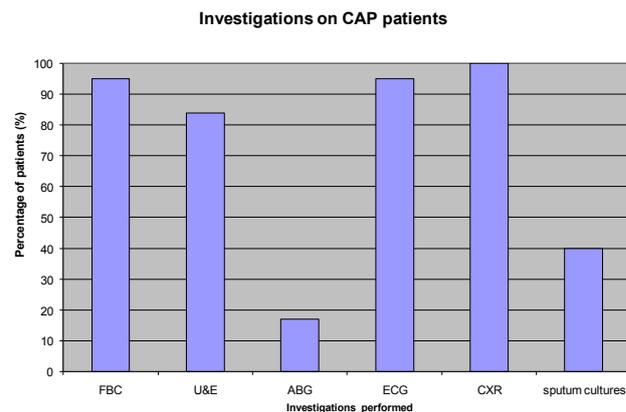


Figure 1: Percentage of patients with community acquired pneumonia who undergone initial investigations.

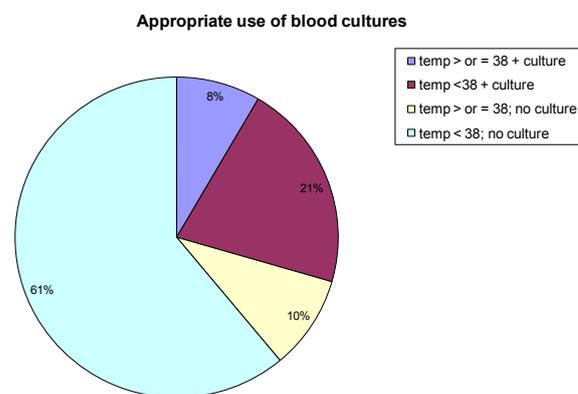


Figure 2: Percentage of blood cultures performed based on body temperature.

Initial assessment of CAP severity was performed using the CURB-65 scoring system whereby a point is scored for each of the following: new mental confusion (abbreviated mental test score less than 8), urea >7mmol/L, respiratory rate of over 30/min, low blood pressure (systolic blood pressure <90mmHg, and/or diastolic blood pressure <60mmHg) and age over 65.<sup>2</sup> The overall picture of CAP severity presenting to A&E over the period of September 2008 and February 2009 is illustrated in Figure 3, with 13% presenting with a CURB-65 score of 0, 29% scoring 1/5, 26% scoring 2/5, 20% scoring 3/5, 10% scoring 4/5 and none scoring 5/5.

Apart from CURB-65 score, poor prognostic features such as co-existing disease (ischaemic heart disease, cancer, chronic lung disease, diabetes mellitus, CVA), WCC <4 or >20, hypoxia (sats <92%, or pO<sub>2</sub> ≤60mmHg), multilobar involvement and albumin <35g/L also influence the severity of CAP. A positive blood culture result is also a marker of poor prognosis which is listed on the clinical pathway. However, as cultures do take several days to grow, this parameter was not included in the assessment of CAP severity.

Severity of CAP presenting to A&E (using CURB-65)

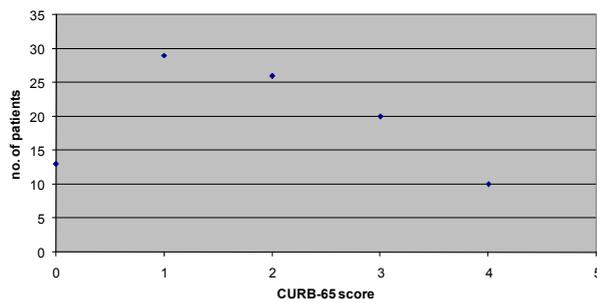


Figure 3: Overall picture of severity of pneumonia patients presenting to A&E.

CAP Severity (CURB-65 and prognostic features)

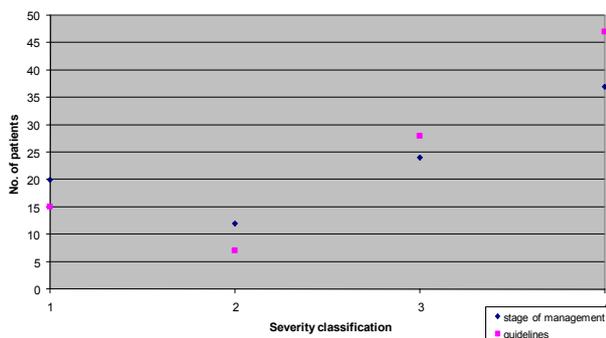


Figure 4: CAP severity classed according to CURB-65 and prognostic features. Class 1 : CURB-65 score 0-1, no poor prognostic features; Class 2: CURB-65 score 2, no poor prognostic features; Class 3: CURB-65 score <3, 1 poor prognostic feature; Class 4: CURB-65 score 3 or greater or 2 or more poor prognostic features.

Patients were stratified into 4 different classes in accordance to the severity as per the local guidelines

illustrated in appendix. Patients with no poor prognostic factors were classified into either class 1 or 2 dependent on their CURB score and age. Patients with one poor prognostic feature were automatically placed into class 3 or above and those with two or more poor prognostic features, or have a CURB-65 score greater than 3 were treated as severe CAP (class 4). Figure 4 illustrates that the majority of patients attending A&E were classified to have moderate to severe CAP when the prognostic features are taken into account.

Discussion

In general, all patients with CAP received a CXR in this cohort study as the initial selection of patients was achieved by using the radiographic database. Only 17% of patients had ABGs performed in view of it being an invasive test and may not be appropriate for patients with high oxygen saturations on air. Request for sputum sample was documented for only 40% of patients. The low percentage for sputum sample request may be partly attributed to the fact that not every patient with CAP was able to expectorate, however, these figures can definitely be improved upon.

Severity assessment of CAP (using CURB-65)

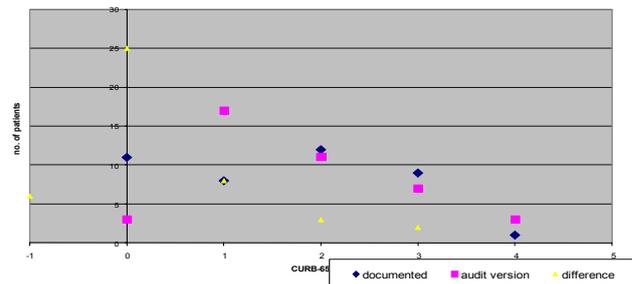
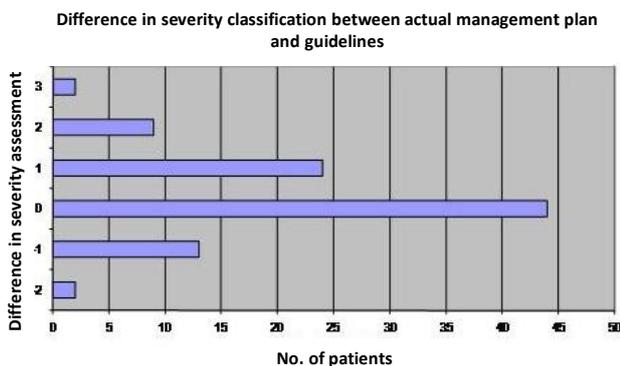


Figure 5: Severity assessment of CAP patients using CURB-65 in 40 patients who were scored in notes. Blue represent the amount of patients with the corresponding CURB-65 score documented in the notes. Pink shows the reassessed CURB-65 score using data from the notes from the same cohort of patients. Yellow records the difference in the CURB-65 score between the documented and audit version (calculated by audit score – documented score).

Although the CURB-65 is a straight-forward simple scoring system, there are discrepancies between the documented score and the score marked independently during the audit using the data from A&E admission card, as illustrated in Figure 5. The blue indicator marks the CURB-65 score documented in the notes, the pink indicator marks the score marked independently and the yellow indicator represents the difference between the independent score marked in the audit process and the documented score (i.e., audit score – documented score). As seen below, 25 patients had identical scores, but there were differences in scores for 19 patients, with 2 patients having a difference of 3 points. Possible reasons for the dissimilarities include scoring systems using patient vital

signs at different points in time (i.e., systolic blood pressure of 89 on admission, which improved to 92 when patient was seen), or different cut-off points used, for example several patients were documented as scoring 1 point for respiratory rate, when the documented as 28 breaths per minute.

In terms of management compatibility with the trust guidelines, Figure 6 illustrates the differences in CAP severity classification between the management plan for patients (according to whether they were admitted and type of antibiotics given) and that which is suggested by clinical guidelines (according to CURB-scoring and presence or absence of poor prognostic features).



**Figure 6:** Differences in CAP severity classification between management plan for patients (according to whether they were admitted and type of antibiotics given) and that which is suggested by clinical guidelines (according to CURB-scoring and prognostic features). This is calculated by clinical guideline class - actual management plan class i.e., a score of -2 means guidelines underestimated management plans by 2 classes, and a score of +2 means that according to the guidelines, the management plan should have been stepped up by 2 classes.

For example patients required admission if they were in

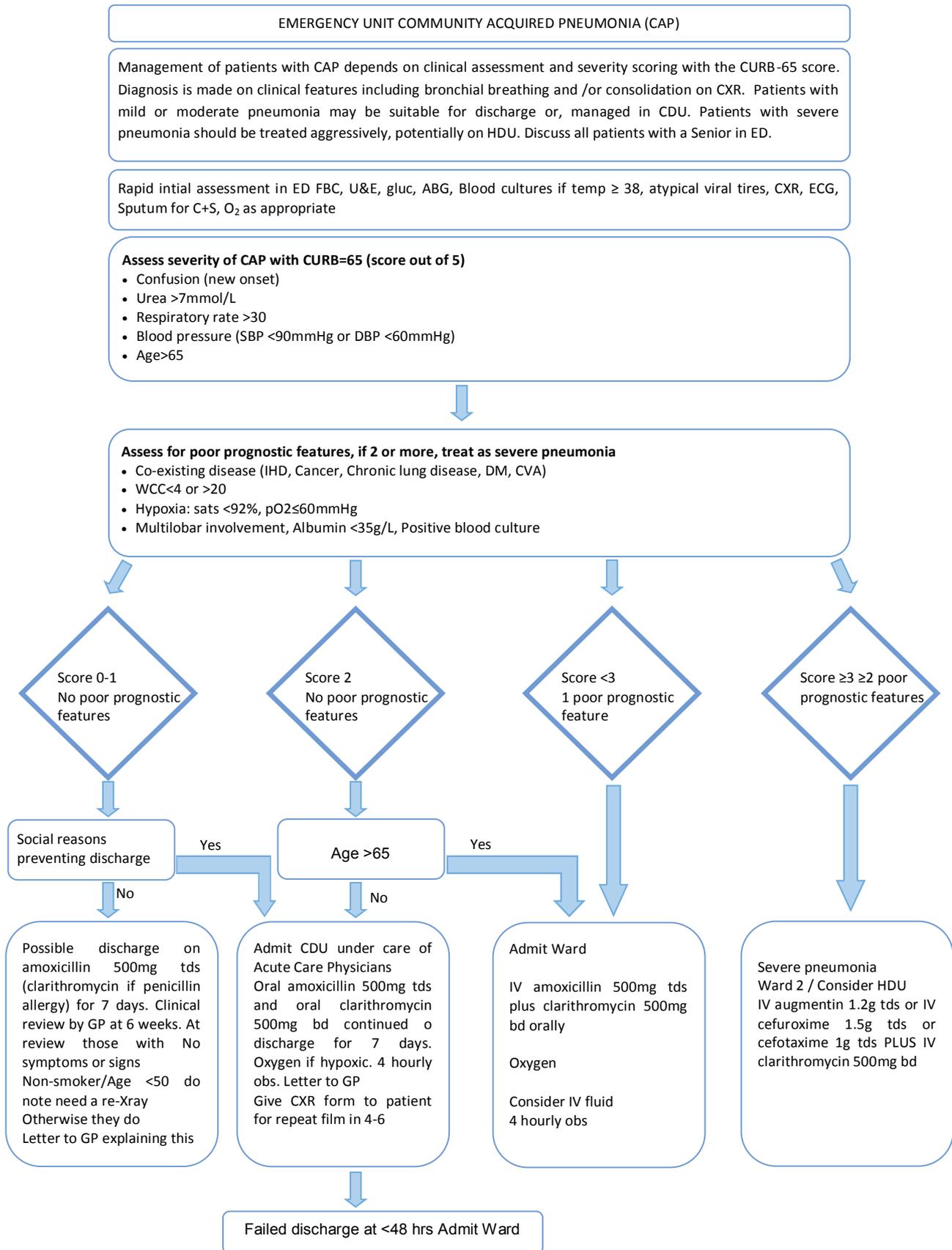
class 2 or above, and only required intravenous antibiotics if they were in class 3 of the severity stratification. A score of -2 means guidelines underestimated management plans by 2 classes, and a score of +2 means that according to the guidelines, the management plan should have been stepped up by 2 classes. After comparison of the actual management plan with the recommended guidelines, it was found that only 44% of cases were identical to that suggested by the guidelines. The remaining patients were more often managed as having a lower severity compared to the scoring system. Possible reasons include the artificial cut-off points in the guidelines, for example patients with a white cell count of 19.9 are not considered to have a poor prognostic feature, but if they had a slightly higher white cell count of 20.1, they are automatically placed into a class 3 CAP or above, even if they have a CURB-65 score of 0.

### Conclusion

Clinical guidelines provide us with guidance in management of diseases, and are particularly useful in conditions such as CAP, which is widespread and is immensely varied in terms of severity. However, this audit demonstrates that clinical management does not always follow the pathway, particularly with judicious use of blood cultures, sputum sample requesting, accuracy of CURB-65 scoring and management of patients in accordance to risk stratification. This lack of adherence to the published guidelines is consistent with findings in literature<sup>3</sup> should be addressed by dissemination of the above article to junior doctors in Princess of Wales Hospital. However, one must remember that these guidelines are only a protocol and when faced with difficult or unusual CAP cases, deviance from these guidelines is acceptable, provided sound clinical judgment is applied.

Appendix

Princess of Wales Hospital, Bridgend, UK, Emergency Department Community Acquired Pneumonia (CAP) Guidelines



*References:*

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