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PET–CT in lung cancer: data discrepancies

The Danish study of positron emission tomography (PET)–CT versus conventional staging (CS) in non-small cell lung cancer has been reported twice now[1 2] and corrected once.[3]

However, there are discrepancies in numbers between the manuscripts,[1 2] which is surprising given the small number of patients (n=189) and centres (n=3). Was endoscopic ultrasonography done in 42 or 47 of 98 PET–CT patients, and in 30 or 35 of 91 CS patients? Was fine-needle aspiration done in 36 or 40 PET–CT patients, and in 24 or 29 CS patients?[2] Was fine-needle aspiration positive in 16 or 19 PET–CT patients? Was mediastinoscopy positive in 10 or 12 CS patients? Can the authors explain the discrepancies and show how any reconciliation of the numbers affects the findings of each manuscript?

While the total downstaging in both groups was comparable (62% vs 71%, p=0.19), the implied downstaging in the PET–CT arm as a result of modalities other than PET–CT was significantly lower (41% vs 71%; p=0.001). One would have expected the proportion of patients experiencing downstaging based on non-PET–CT investigations to be similar in both groups in a randomised study. It is possible that the apparent superiority of PET–CT is simply the result of inadequacy of non-PET–CT investigations in the CS arm.

Our concern is that the conclusions in both manuscripts have hinged upon small differences in the PET–CT and CS groups, which could simply be due to analytical errors or technical deficiencies of the sort described above. We respectfully suggest that the accuracy of the primary data from this important study be verified independently by the journals.

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Contributors JMP and JM both critically analysed the manuscripts in question and co-wrote the response.

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Authors' response

We thank Drs Paredes and Mehta for their comments on our work on positron emission tomography (PET)–CT in the staging of lung cancer.[1] As correctly pointed out by Drs Paredes and Mehta, there is a discrepancy in the number of patients undergoing endoscopic ultrasonography (EUS) in the two reports from our institution.[2 3] Although both reports concern the staging of patients with non-small cell lung cancer, they address different aspects of the disease. The paper published in the *New England Journal of Medicine*[2] was an intention-to-treat analysis with PET–CT as the only intervention and with the number of futile thoracotomies as the final end point. We have meticulously tried to assemble and report complete and accurate data on all included patients in both papers. Unfortunately, this was done twice, giving rise to a minor discrepancy in the number of patients undergoing PET–CT and EUS reported in the two studies. When performing the analysis previously published in *Thorax*,[3] we focused on information regarding the specific N-stage of each patient. In order to confirm the N-status of each patient, we compared the initial database[2] with (A) the database from a study on EUS performed in parallel with the study on PET–CT (as mentioned in both our previous reports) and (B) the nationwide pathology register. By doing this, we found an additional five patients in each group who had undergone an EUS examination. In four and five patients, respectively, of the additional five patients found in each of the two groups, a fine-needle aspiration (FNA) was done during the same procedure. There was still no significant difference in the frequency of either EUS or EUS–FNA between the two groups and it had no impact on the reported results. Our findings confirm that PET–CT is an important part of preoperative staging of patients with non-small cell lung cancer, but it also underscores, as stated by Drs Paredes and Mehta and in the Discussion section of our paper, the need for a complimentary well-considered use of invasive mediastinal staging. Finally, we would be happy to welcome both Drs Paredes and Mehta to our department for a discussion of our data.

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CORRESPONDENCE

Severity scales in community-acquired pneumonia: what matters apart from death?

Chalmers *et al*[1] and Loke *et al*[2] present excellent meta-analyses of the value of various tools in predicting mortality from community-acquired pneumonia (CAP). There is a continuing fallacious belief, however, that only patients at high risk of death are at high risk of complications. Of the 47 studies identified by Chalmers and Loke, only 16 made any assessment of the value of these scores in predicting the need for critical care. These are presented in

Table 1 Value of scores in predicting non-death outcome measures

Reference	Outcome measure	Predictive value (AUROC) (95% CI)
CURB		
Buising[3]	ICU admission	0.7
Buising[4]	ICU admission	0.64 (0.54 to 0.74)
Ewig[5]	ICU admission	0.732 (0.676 to 0.787)
Kontou[6]	ICU admission	No AUROC
CRB-65		
Buising[4]	IPPV/inotrope	0.64 (0.56 to 0.73)
Chalmers[7]	IPPV/inotrope	0.77 (0.74 to 0.8)
Man[8]	ICU admission	No AUROC
CURB-65		
Ananda-Rajah[9]	ICU admission	0.63
Buising[3]	ICU admission	0.61
Buising[4]	IPPV/inotrope	0.59 (0.48 to 0.71)
Challen[10]	ICU or HDU admission	0.64 (0.546 to 0.734)
Chalmers[7]	IPPV/inotrope	0.78 (0.75 to 0.81)
Chalmers[11]	IPPV/vasopressor	0.77 (0.72 to 0.83)
Charles[12]	ETT/NIV/vasopressor	0.67
Man[8]	ICU admission	No AUROC
Phua[13]	ICU admission	0.68 (0.63 to 0.72)
Yandiola[14]	ICU admission	0.61
PSI		
Ananda-Rajah[9]	ICU admission	0.58
Angus[15]	ICU admission	0.6 (0.56 to 0.65)
Buising[3]	ICU admission	0.65
Buising[4]	IPPV/inotrope	0.64 (0.54 to 0.74)
Chalmers[11]	IPPV/vasopressor	0.73 (0.67 to 0.78)
Charles[12]	ETT/NIV/vasopressor	0.69
Etzion[16]	IPPV	No AUROC
Ewig[5]	ICU admission	0.665 (0.607 to 0.727)
Feagan[17]	ICU admission	No AUROC
Garau[18]	ICU admission	No AUROC
Man[8]	ICU admission	No AUROC
Migliorati[19]	ICU admission	No AUROC
Phua[13]	ICU admission	0.75 (0.71 to 0.79)
Renaud[20]	ICU admission	No AUROC
Restrepo[21]	ICU admission	No AUROC
Roson[22]	ICU admission	No AUROC
Van Der Eerden[23]	ICU admission	No AUROC
Yandiola[14]	ICU admission	0.63

ICU, intensive care unit; IPPV, intermittent positive pressure ventilation; HDU, high dependency unit; ETT, endotracheal tube.

table 1, together with a further five studies previously identified in the field.[3 6 11 14 15]

Forest plots of sensitivity and specificity are shown in figure 1, allowing the calculation of pooled estimates (with 95% CIs): CRB-65 sensitivity 0.467 (0.428 to 0.506) and specificity 0.825 (0.817 to 0.833); CURB sensitivity 0.484 (0.447 to 0.521) and specificity 0.72 (0.708 to 0.732); CURB-65 sensitivity 0.499 (0.479 to 0.519) and specificity 0.734 (0.728 to 0.74); PSI sensitivity 0.755 (0.743 to 0.767) and specificity 0.486 (0.481 to 0.491).

As concluded in Ewig's editorial,[24] none of the existing mortality predictor tools performs adequately in identifying patients who will need high intensity care, and therefore the application of these tools to protocols or guidelines for sites of care should be with caution.

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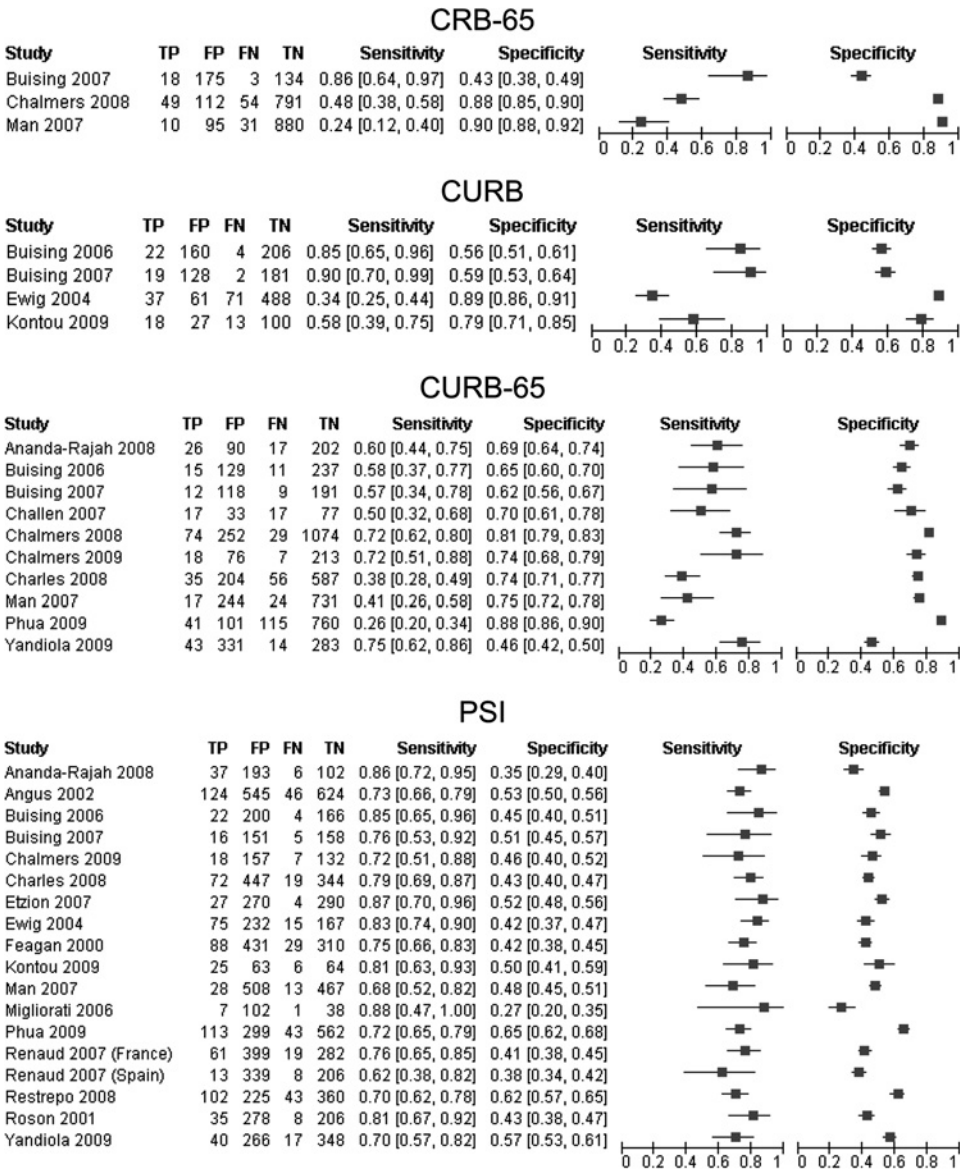
Figure 1 Forest plots of sensitivity and specificity. PSI, pneumonia severity index.



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Authors' response

We thank Dr Challen for her letter regarding our article[1 2] in which she highlights the limitations of CURB65 and PSI for guiding ICU admission. This is an important point which a number of authors including ourselves have made previously.[3] Our meta-analysis demonstrates that CURB65 and PSI predict 30-day mortality, the end-point for which these scores were originally derived. Unfortunately, 30-day mortality risk does not translate directly into management decisions and so it is important to establish whether severity scores can impact positively in clinical practice. This 'impact analysis' is a critical part of the validation of all prognostic tools.[4]

Guidelines based on severity scores significantly increase the proportion of low-risk patients treated in the community without compromising patient safety or satisfaction[5], and we have recently shown that guidance of antibiotic prescribing using CURB65 can safely reduce broad-spectrum antibiotic use.[6] For critical care admission, however, the role of severity scores is not established. The major indications for critical care unit admission are requirement for mechanical ventilation or vasopressor support. As others have said, these patients are generally not difficult to identify[7] and there are established guidelines such as surviving sepsis for the identification and management of these critically ill patients. There is little evidence that simply being managed on an intensive care unit for a patient not requiring mechanical ventilation or vasopressors improves outcome. Use of scoring systems such as CURB65/PSI or other recently proposed scores to admit these patients to critical care lacks evidence of benefit and may be impractical.

Studies suggest that less than 10% of hospitalised patients with CAP are currently admitted to ICU's. Implementing scoring systems would require a massive expansion of scarce ICU resources. Admitting all patients with CURB65 ≥3 (17–42% of patients), PSI class V (average of 20.9% of patients), SMART-COP score ≥3 (43.3% of patients in the derivation study) or all patients with three or more IDSA-ATS criteria (26% of patients based on the study of Phua *et al*)[8] is not going to be possible