Reviewer's report

Title: Predicting mortality in sick African children: the FEAST Paediatric Emergency Triage (PET) score.

Version: 2  Date: 16 June 2015

Reviewer: Jeeva Sankar

Reviewer's report:

Risk scores in African Children
Major revisions
Original comment

The final model includes ‘lung crepitations’ as one of the predictor variable. There are at least three pitfalls in including this variable. First, it requires training to correctly identify lung crepitations. Interobserver variability is likely to be high even among trained pediatricians. It is not clear how other health providers can accurately pick up this sign in the emergency room. Second, having both respiratory distress and lung crepitations in the final model does not seem to be a good idea. There must be some collinearity between these two variables. It would be interesting to omit ‘lung crepitations’ from the model and examine how the discriminatory ability changes. Third, the variable could have emerged significant because of inclusion of participants from the intervention (bolus) arm. The predictor variables were measured at or within 1 hour of randomization. It is possible to have lung crepitations because of fast fluid boluses in the intervention arm.

Response

We firstly apologise that it was not clear that all measures at baseline were made prior to trial intervention (even if they were measured after randomisation). This is now clarified in the methods section on page 9, first paragraph of the statistical analysis section. Although there is some overlap between the variables we find that 75% (1934/2604) of children with respiratory distress do not also have lung crepitations present, although we acknowledge that children with lung crepitations very frequently have respiratory distress as well (670/695 (96%)). Practically therefore the two variables correspond to a three level variable: respiratory distress plus lung crepitations, respiratory distress alone, or neither. The model building process shows that both of these variables remain independently predictive even in the presence of the other suggesting they are describing different clinical presentations (respiratory distress could be indicating acidosis whereas lung crepitations is a sign that a diagnosis of pneumonia should be considered). The aetiology of respiratory distress in critically ill children is multifactorial; whilst considered as a highly sensitive sign for very severe pneumonia it has low specificity. That we were able to demonstrate in a multicentre study that crepitations had good specificity at identifying high risk
patients is a valuable addition to published literature. This is particularly valuable since WHO are promoting measurement of oxygen saturations to identify hypoxia – which has similar limitations as respiratory distress i.e the limited predictive ability versus another sign which is likely to identify children with true pneumonia syndrome compared to non-specific signs of the critically ill child. WHO Handbook recommends crepitations on auscultation as an additional sign which supports the diagnosis of pneumonia in children with severe breathing difficulties. Furthermore, high intra-observer variability in the measurement of lung crepitations should lead to dilution bias as the recorded factor would not then be accurately describing the child’s lung state. Any intra-observer bias should therefore make the observed factor less predictive, rather than more so. We have now also given a definition of lung crepitations in the manuscript (added breath sounds heard on inspiration in one or both lung fields: any one of crackles, clicks or rattling (rales)).

Final comment
The authors have tried to address some of the concerns but I am still not very comfortable in including this variable in the final model. The inter-observer variability (not intra-observer variability!) might lead to dilution bias in the study. But what is more important is the inter-observer variability observed while one uses the score for triage in real-life. The variable is too ‘subjective’, the measurement of which at the hands of unskilled health providers cannot be relied upon. It would be better to have sensitivity analysis without this variable and examine how it affects the discriminatory ability.

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests: None