Reviewer's report

Title: Exhaled Breath Profiling For Diagnosing Acute Respiratory Distress Syndrome

Version: 3 Date: 9 February 2014

Reviewer: Stephen Fowler

Reviewer's report:

- Major Compulsory Revisions
  None

- Minor Essential Revisions
  1. Abstract line 12-13 – “the enose was learned…” suggest change to “trained”
  2. Line 14 – change “evaluation” to “evaluated”
  3. Line 22 – undefined abbreviation: CPE
  4. Abstract conclusion 1st sentence: this is phrased incorrectly – breath analysis was not used to diagnose ARDS in this study; that implies prospective use in the clinical pathway (i.e. the future aim). The authors showed only that the breath profile was somewhat different between those with and without ARDS. This phrasing is repeated in the conclusions of the manuscript body and needs to be corrected
  5. P10 line 19 “temportal”
  6. P11 Competing diagnoses para – the last two sentences are duplicating information aren’t they? Suggest one is removed

- Discretionary Revisions
  1. Results and fig 2 – please explain how the 274 were “not eligible” if they didn’t fulfil the exclusion criteria.
  2. Discussion 1st sentence. This should be toned down. I am sure ICU staff would not accept a test with the performance characteristics shown here as a potential diagnostic aid (at least when used alone) for ARDS.
  3. Please comment of the high prevalence of ARDS in this cohort; approx. 1 in 3 of the ICU patients had ARDS whereas the more typically reported prevalence is 5-15%
  4. The raw data had to be transformed to account for sensor drift. How could this be overcome in a “real world” cross sectional application of the enose for diagnosis?
  5. I presume the models generated from the two enoses were different. Again, how would this be addressed if applied to other centres using other enoses?
  6. P11 first sentence. I'm not sure I understand this sentence correctly. Does this
mean that mod/severe ARDS was correctly predicted in 45% of cases and mild ARDS in 36%? Likewise the second para.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

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