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Statistical concerns in the article "Comparison of Weight Estimation Approaches for Initial Fluid Resuscitation in Patients with Suspected Sepsis in Emergency Settings"

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We have read with great interest the work done by Lessing and colleagues[1], who aimed to evaluate the accuracy of physician-estimated and patient self-reported weights compared to scale-measured weights in emergency department patients. Often times, self-reported information from severely ill patients may be difficult, if not impossible to obtain; in addition, inpatient weight measurements are not always feasible due to mobility constraints or absence of bed weighing scales in a given healthcare setting. While we thank the authors for their contribution, the chosen statistical approaches have raised a few concerns we would like to discuss.

In an attempt to compare each prediction method to the reference standard (inpatient weight), correlation analyses were performed through linear regression models. As a result, strong correlation coefficients ($r^2 = 0.91$; $r^2 = 0.80$) were demonstrated; however, these values merely reflect the strength of linear relationship between variables and not their differences, ignoring systematic bias[2]. In fact, strong correlation is actually expected for both methods because they measure the same construct. Accordingly, such analyses do not necessarily imply good agreement - which has also been empirically demonstrated[3,4].

In order to decide whether self-reported and physician-estimated weights are clinically acceptable, the Bland-Altman (B&A) method[4] would have been a more suitable approach: it accurately quantifies the degree of agreement by plotting the differences between two methods against the mean of the two measurements. In addition, limits of agreement are constructed and should be used to determine the maximum acceptable differences based on prespecified biologic plausibility and clinical necessity. Ultimately, B&A provides clinicians easily interpretable and clinically relevant information: the difference between measurements by two methods on the same subject; and whether there is a tendency for one method to exceed the other (as well as the magnitude of such bias).

Furthermore, even if appropriate analyses had been undertaken, results would have been difficult to interpret considering we have no further information on how many physicians had their estimates recorded as well as the assessment of inter-rater reliability. This threatens external validity, since providers' estimates may be influenced by their experience level and patients' age and gender[5].

Based on their findings, the authors conclude that weight estimates provide sufficiently close estimates for clinical application, although the body of evidence might suggest otherwise[6]. In summary, we firmly believe the methodological basis for such conclusions were unsound since correlation coefficients are inadequate for describing concordance. By contrast, an adequate statistical approach would have provided valuable information allowing for valid

inferences from observed data; this could be improved by employing the Bland-Altman method for additional data analysis. In the meantime, we urge caution before generalization from the study's conclusions.

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