

# Positioning the role of qSOFA for screening and prognostication in critically ill medical and surgical patients with suspected sepsis

The global magnitude of sepsis coupled with the unacceptably high attendant mortality continues to fuel universal efforts to improve its early detection and the assessment of severity of disease in the pursuit of improving clinical outcomes.<sup>[1,2]</sup> The quick Sequential Organ Failure Assessment (qSOFA) score was introduced in conjunction with the Sepsis-3 definition – the intention being that a positive qSOFA score would serve as a screening tool for sepsis and for predicting poor outcomes in such patients.<sup>[3,4]</sup> The qSOFA score is based on three variables: a Glasgow Coma Score <15, a respiratory rate  $\geq 22$  breaths per minute, and a systolic blood pressure  $\leq 100$  mmHg. The simultaneous presence of two of these variables indicates a positive qSOFA. There is no directive on how to gauge change in mentation at baseline for patients with altered mental status. The appeal of qSOFA score is related to it being immediately calculated without additional investigations and the ease of its derivation.

qSOFA was initially validated for predicting poor outcomes in sepsis outside of the intensive care unit (ICU).<sup>[4]</sup> As a sepsis screening tool, it has not been demonstrated to be consistently reliable in the emergency department (ED) or ICUs, even when compared with the now out-of-vogue systemic inflammatory response syndrome (SIRS) criteria.<sup>[5-8]</sup> The 2021 updated sepsis guidelines caution against the sole reliance on qSOFA for the early detection of sepsis.<sup>[9]</sup> In terms of predicting mortality in patients with suspected or confirmed sepsis, most of the evidence emanates from the ED, where the value of the qSOFA to predict poor outcomes is variable or even inferior to other models such as SIRS, the national early warning score (NEWS) and the modified early warning score (MEWS).<sup>[10-16]</sup> Studies conducted in the ICU setting are scarce but have also not been promising.<sup>[17]</sup> Clinicians practising in resource-limited regions could argue that qSOFA may fare differently in their patients taking into account the differences in patient profile, pathophysiology and microbiology that occur with economic disparities. In poorly resourced environments, the ability to predict poor outcomes would be immensely valuable to optimising the efficient use of scarce ICU resources.

In this issue of the *AJTCCM*, Bishop *et al.*<sup>[18]</sup> retrospectively evaluated the role of a positive qSOFA score in predicting mortality in medical and surgical patients with suspected infection from the database of a regional hospital's critical care unit comprising of high care (HC) and ICU patients. The predictive ability of qSOFA for all patients in their database, including those without infections, has been previously reported.<sup>[18,19]</sup> This cohort of 1 162 patients consists predominantly of surgical patients (60%) who were mechanically ventilated. This is a useful study, and the authors ought to be congratulated for their efforts, considering the paucity of qSOFA data in ICU settings, the need for data from poorly resourced regions and the global lack of qSOFA data for surgical cohorts in particular. Their observation of a positive qSOFA score being highly associated with but poorly discriminant for in-ICU mortality among medical and surgical patients highlights that while a positive qSOFA score should raise alarm bells for medical and surgical patients upon

admission to a critical care unit, we still need to explore how we can add on to the score or find alternative readily available practical tools to identify patients with a high risk for ICU mortality, with greater and more acceptable levels of certainty. Addition of age, sex and HIV status only marginally improved the discriminatory power for medical and surgical patients.

Interestingly, the recent ACCCOS study which evaluated COVID-19 outcomes in 3 154 patients admitted to HC units or ICUs in Africa, reported a very high mortality in patients with a qSOFA score of 3.<sup>[20]</sup> Data from developing countries suggest that a positive qSOFA score is associated with a higher risk of mortality in patients with infections.<sup>[21,22]</sup> The discriminatory power of qSOFA is, however, variable and sometimes inferior to other available scores.<sup>[22]</sup>

The overall accuracy or discriminatory power of a predictive tool is extremely important. In the context of making meaningful management decisions with the use of a qSOFA score, the ED physician would prefer a highly sensitive tool to avoid missing an infection, while an intensivist would favour a tool with higher specificity to be able to exclude an infection with certainty.

It should be highlighted that using predictive scoring systems for individual patient triage purposes is complex, as they are typically designed to predict outcomes in a cohort of patients. Lead-time bias is a reality and as our management practices evolve over time, models need to be amended to retain or enhance their discriminatory power. As such, no predictive tool will ever be singularly fully accurate to predict mortality for an individual patient, and at best, it will serve as an adjunctive tool to inform decision making.

It would thus be prudent to consider the use of a combination of tools or layering with add-on processes to improve efficiencies for resource allocation purposes. In the context of ICU mortality, prediction of sepsis for triage purposes, the role of qSOFA with NEWS, MEWS, or universal vital assessment (UVA) as well as machine learning warrant further exploration. Additionally, the role of multiple score assessments (evaluating score change over time) would probably add more value if used for triage purposes. Where available, the role of biochemical markers such as lactate and inflammatory markers should also not be disregarded.

As the clinical outcomes for sepsis improve, the endpoint of mortality for prediction tools may well need to be reconsidered to ensure meaningful comparisons. Finally, despite the lack of robust supportive evidence for qSOFA as a screening tool for infections, it is still important that a positive qSOFA score be regarded as a 'red flag alert', that the possibility of sepsis ought to be considered, and the patient be accordingly evaluated for an infection. A positive qSOFA score in a patient with suspected or confirmed sepsis also flags the patient in view of the observed associations with mortality.

**F Paruk**, MB ChB, FCOG (SA), Cert Crit Care (SA), PhD

Department of Critical Care, Faculty of Health Sciences, University of Pretoria and Steve Biko Academic Hospital, Pretoria, South Africa  
Fathima.Paruk@up.ac.za

*Afr J Thoracic Crit Care Med* 2021;27(4):132-133. <https://doi.org/10.7196/AJTCCM.2021.v27i4.195>

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