

Optimising The Diagnosis And Prognosis Of Sepsis In The Pregnant Population  
Evaluation Of The Performance Of Current Clinical Tools

Miss Andrea Ize-Iyamu<sup>1</sup>, Ms Suzannah Twiss<sup>2</sup>, Ms Cristina De La Iglesia<sup>2</sup>, Ms Elena Otero Romero<sup>2</sup>, Ms Robyn Murray<sup>2</sup>, Dr Natalie East<sup>2</sup>, Ms Catherine Evans<sup>2</sup>, Dr Katarzyna Gajewska-Knapik<sup>2</sup>, Miss Gabriela Tavares Bisinoto<sup>3</sup>, Prof Mark Johnson<sup>1,4</sup>, Dr Nishel Shah<sup>1,4</sup>, Dr Orene Greer<sup>1</sup>

<sup>1</sup>Imperial College London, London, United Kingdom. <sup>2</sup>Cambridge University Hospitals NHS Foundation Trust, Cambridge, United Kingdom. <sup>3</sup>University of Cambridge, Cambridge, United Kingdom. <sup>4</sup>Chelsea and Westminster Hospital, London, United Kingdom

Background

Maternal sepsis is a syndrome characterised by organ dysfunction in the presence of infection occurring during pregnancy and in the puerperium

- Estimated global prevalence: 4.4%
- Mortality rate: 7% - severe sepsis; 60% - septic shock | Morbidity/mortality ratio: 50:1

Current sepsis prognostic tools for use in the obstetric population include: obstetrically modified SOFA (**omSOFA**) | obstetrically modified qSOFA (**omqSOFA**) | qSOFA in pregnancy (**qSOFA-P**) | Modified Early Obstetric Warning Score (**MEOWS**)

- Studies assessing the validity of these tools are limited

Aims:

- Evaluation of the **performance of current diagnostic and prognostic sepsis algorithms** to predict severe clinical outcomes in the pregnant population
- Determine whether a **modified sepsis screening tool** could successfully identify patients **most at risk**

Methods

Retrospective cohort study - 181 pregnant and postpartum (up to 6 weeks postnatally) women with suspected sepsis

Primary Outcome: Morbidity

**Low:** parameter(s) indicative of organ dysfunction or infection (but not both)

**High:** ≥1 organ dysfunction parameter + ≥1 infection parameter

statistically significant parameters

Sepsis scoring tools studied for their predictability of morbidity: **SOFA**, **omSOFA**, **qSOFA**, **omqSOFA**, **qSOFA-P**, **MEOWS** and the proposed tool, **SSPT**

Statistical analysis:

- Associations determined using Welch’s t-test and Mann-Whitney U test
- ROC curves created at 0, 24, 48, 72hrs post-admission (suspected sepsis) for sepsis scoring tools with optimal thresholds determined for the proposed tool

| Suspected Sepsis In Pregnancy Tool (SSPT) |       |                       |
|-------------------------------------------|-------|-----------------------|
| Parameter                                 | Score |                       |
| Demographic                               |       |                       |
| Age >30 years                             | 1     |                       |
| Observations                              |       |                       |
| SBP ≤110 mmHg                             | 1     | Optimal Threshold: ≥2 |
| RR >15 breaths/min                        | 1     |                       |
| Invasive                                  |       |                       |
| Bilirubin >8 µmol/L                       | 1     |                       |
| Lactate >2 mmol/L                         | 2     |                       |
| Platelets ≤198 x10 <sup>9</sup> /L        | 1     |                       |

Results

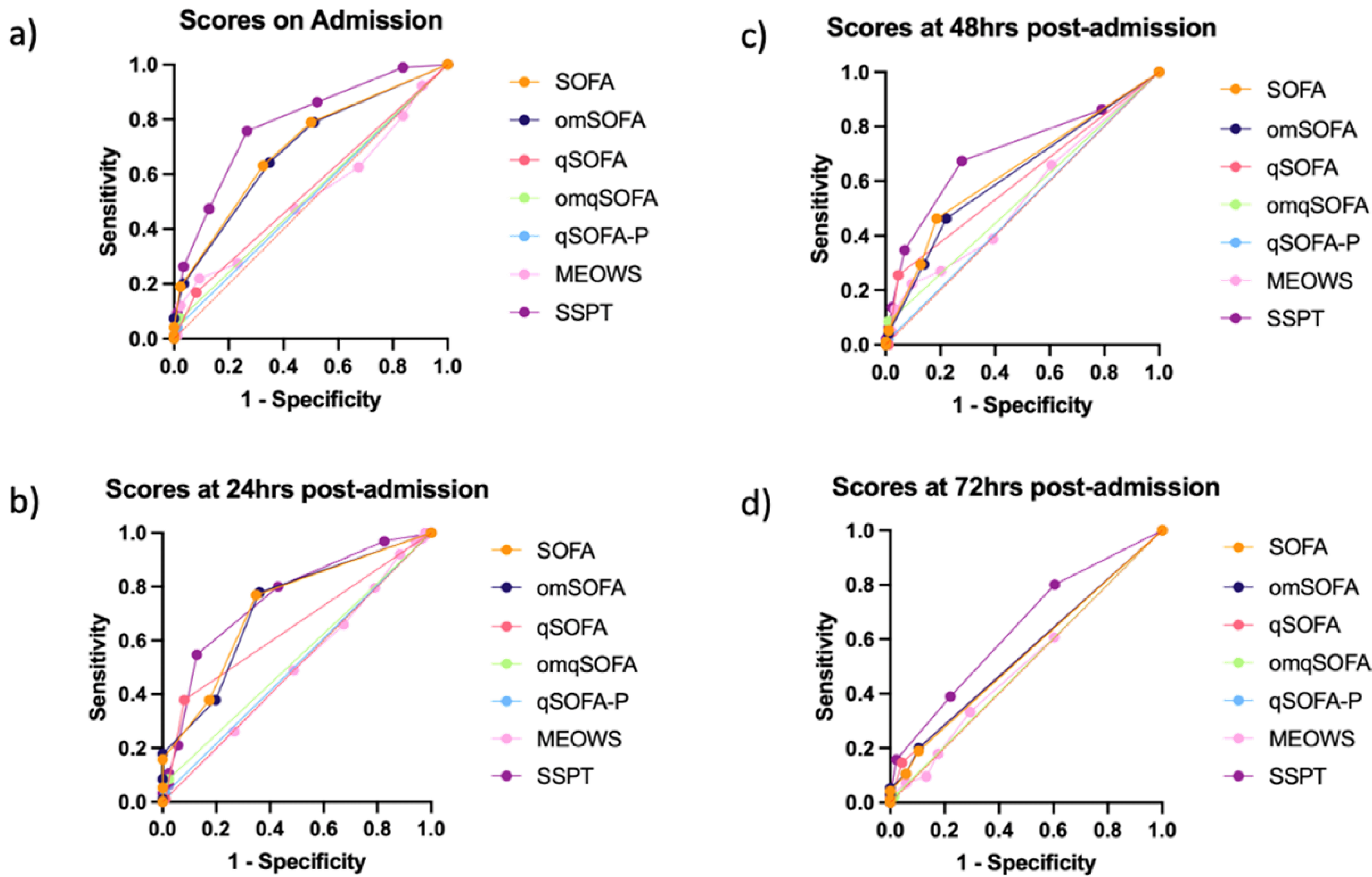


Figure 1 (a-d). Receiver Operating Characteristic (ROC) curves comparing existing sepsis screening tools against the new proposed tool, Suspected Sepsis in Pregnancy Tool (SSPT), at 0hrs, 24hrs, 48hrs and 72hrs post-admission.

Significance level for AUROC is set at p<0.05.

Proposed Tool – Suspected Sepsis In Pregnancy Tool (SSPT)

| Time from Admission (hrs) | AUROC (95% CI)      | p-value | Sensitivity (%) | Specificity (%) |
|---------------------------|---------------------|---------|-----------------|-----------------|
| SSPT                      |                     |         |                 |                 |
| 0                         | 0.785 (0.719-0.852) | <0.0001 | 86.3            | 47.7            |
| 24                        | 0.758 (0.688-0.828) | <0.0001 | 80.0            | 57.0            |
| 48                        | 0.708 (0.632-0.784) | <0.0001 | 67.4            | 72.1            |
| 72                        | 0.640 (0.560-0.720) | 0.001   | 39.0            | 77.9            |

Discussion

- Best performing tool of existing tools at admission: **SOFA score**
  - AUROC at admission: 0.698
  - AUROC at 24hrs: 0.723
- SOFA and qSOFA score outperformed their modified counterparts with peak performance elicited at **24 hours post-admission**
- **SSPT** outperformed all existing tools at all timepoints
  - AUROC at admission: 0.785
  - AUROC at 24hrs: 0.758

Factors to consider:

Study Participants

Cohort: 0% mortality rate

Higher SOFA thresholds correlate with higher predictive value  
**Low applicability** in less severe clinical outcomes

Suspected Sepsis In Pregnancy Tool (SSPT)

Thresholds for each parameter determined at different time points post-admission  
**Sensitivity of tool decreases** as time from admission increases

Clinical Relevance

- **Clinical applicability:** Potential for use of SSPT in **triage** and on the **ward**
- **Future directions:** creation of an **obstetric sepsis management pathway** using various tools dependent on setting (A&E, ICU)

Scan For References

