

# Predicting Mortality in Hypoxemic Adults in Sub-Saharan Africa: Investigating the Prognostic Performance and Utility of Three Severity of Illness Scores.

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## Introduction

Mortality prediction is difficult in resource-constrained settings. Severity of illness scores have not been tested in hypoxemic adults in Sub-Saharan Africa.<sup>1,2</sup>

## Objective

**Research Question**  
How well do three severity of illness scores (MEWS, qSOFA, UVA), and ability to walk, predict mortality in hypoxemic hospitalized adults in Sub-Saharan Africa?

## Methods

We prospectively enrolled all adults with hypoxemia on admission in five hospitals in Kenya, Malawi, and Rwanda between November 2022 and April 2023. Participants were inpatient adults (18 years or older) with hypoxemia on admission, defined as SpO<sub>2</sub> < 90% on ambient air or receiving oxygen at the time of screening. No exclusion criteria were applied. The primary outcome was hospital mortality. MEWS, qSOFA, and UVA were calculated for all participants. We evaluated the capability of MEWS, qSOFA, UVA, and ability to walk to predict hospital mortality. In exploratory analyses, we compared differences in disease severity and mortality between sites.

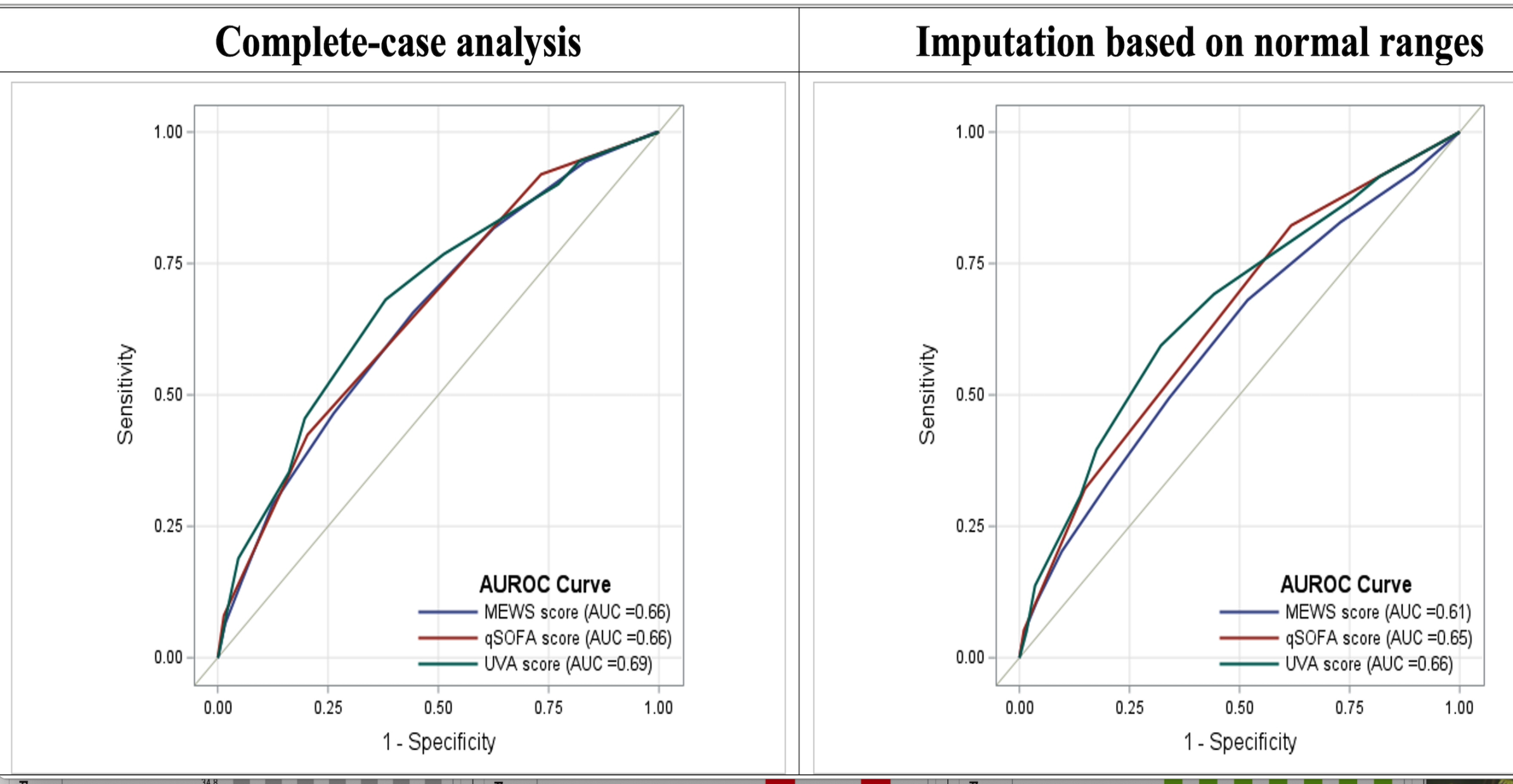
During the four-month enrollment periods across the 5 hospitals, 24,724 adults were admitted; 1,739 were hypoxemic on admission and 1,732 were included in analyses, after excluding 7 with missing outcomes data.

**Table 5.** A comparison of the performance of the three illness scores (MEWS, qSOFA, and UVA) as continuous variables

	Complete-case analysis		Imputation	
	Patients n	AUROC (95% CI)	Patients n	AUROC (95% CI)
Unadjusted				
MEWS score	996	0.66 (0.62; 0.69)	1,724	0.61 (0.58; 0.64)
qSOFA score	1,135	0.66 (0.63; 0.69)	1,715	0.65 (0.62; 0.67)
UVA score	967	0.69 (0.65; 0.72)	1,732	0.66 (0.64; 0.69)

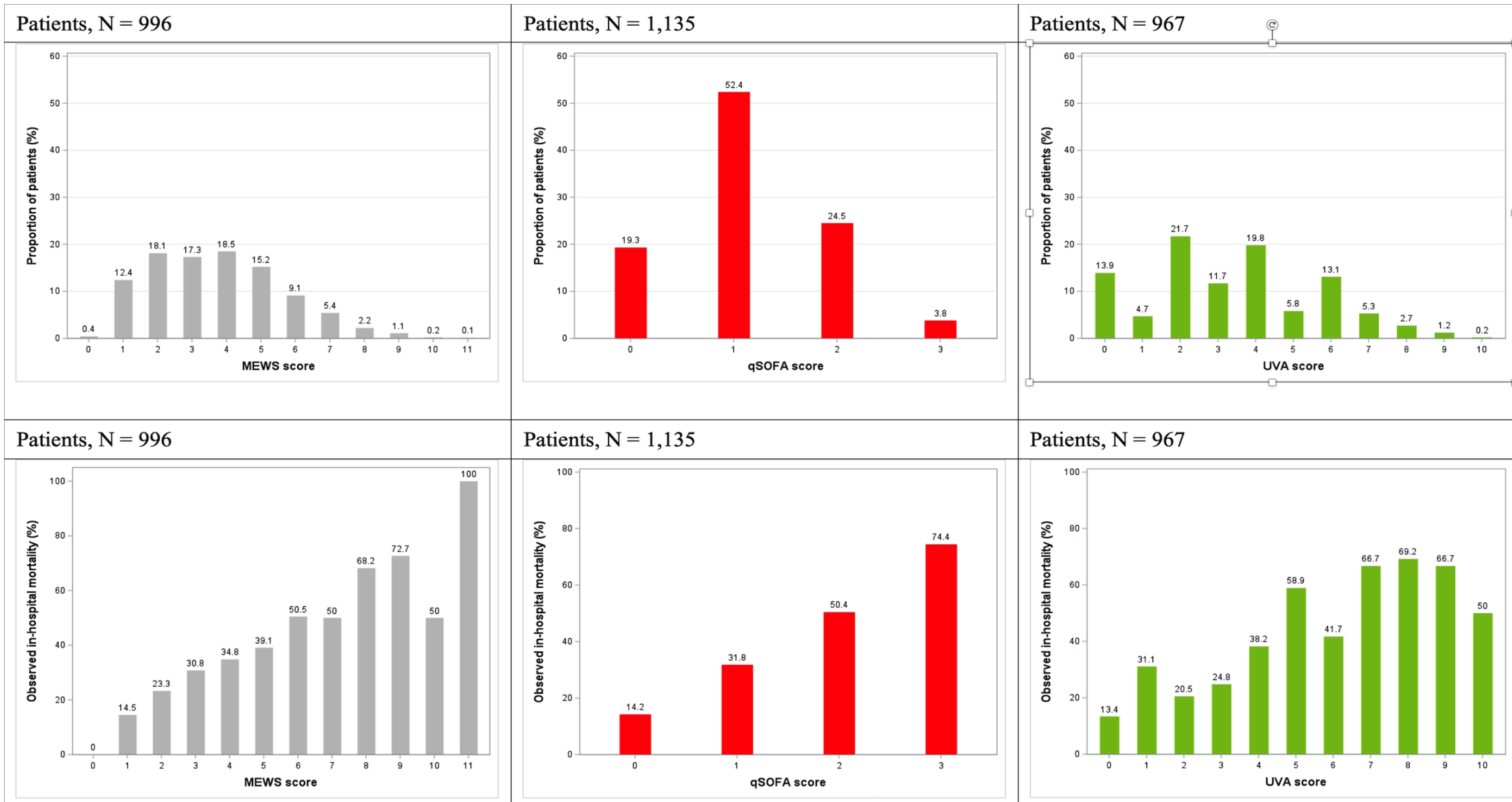
Abbreviations: AUROC = area under the receiver operating curve, 95% CI = 95% confidence interval. Note: for imputation any missing value was assumed to be in a normal range for that value (score of 0). We did not impute a score for patients with *all* missing component variables for a given score.

**Figure 3.** Receiver operator characteristic curves (AUROC) to compare the performance of the three illness scores (MEWS, qSOFA, and UVA) as continuous variables



## Results

**Figure 2.** Distribution of patients and mortality by modified early warning score (MEWS), quick sequential (Sepsis-Related) Organ Failure Assessment (qSOFA) score and Universal Vital Assessment (UVA) among enrolled hypoxemic adult patients



## Conclusions

In the largest prospective cohort of hypoxemic adults in sub-Saharan Africa to date, MEWS, qSOFA, UVA, and walking had moderate capability to predict hospital death. Missing data was common. Imputation of missing variables only slightly altered performance, thus it is possible scores could be simplified. UVA had the best predictive performance; it can be thoughtfully used to aid clinical decision-making, quality improvement, research comparisons, and risk-adjustment.

## References

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