FIEBRE

Febrile Illness Evaluation in a Broad Range of Endemicities

Predicting mortality in febrile adult patients: a prospective validation of the UVA, MEWS and qSOFA scores in four health-care settings in Africa and South-East Asia

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Introduction

- Febrile illness is very common, and may lead to severe or non-severe outcome
- Clinical tools to predict patients' severity of illness can help health workers making triage and care decisions
- Bedside risk assessment scores have been developed for use in resource-limited settings:
  - UVA: Universal Vital Assessment
  - MEWS: Modified Early Warning Score
  - qSOFA: Quick Sequential Organ Failure Assessment

Objectives

This study evaluated the three scores for patients seen in four sites participating in the FIEBRE study (Febrile Illness Evaluation in a Broad Range of Endemicities) to:

1) Determine the performance of the MEWS, qSOFA, and UVA scores for predicting mortality within 28 days in adult patients presenting with fever

AND

2) Compare performance of the three scores in mortality prediction in adult group

Study method

Open access Protocol

BMJ Open

Febrile Illness Evaluation in a Broad Range of Endemicities (FIEBRE): protocol for a multisite prospective observational study of the causes of fever in Africa and Asia

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- Prospective observational study
- Patient recruitment 2018 – 2020
- 4 study sites: Laos, Malawi, Mozambique and Zimbabwe
  - Patient presenting with fever
  - In- and outpatients; adult group aged 15 years and above
  - Patient follow-up at day 28
- This analysis uses clinical data on admission and at day 28
- Severity scores use some or all of 7 clinical parameters, measured at presentation:

1) Body temperature, 2)Heart rate, 3) Respiratory rate,
4) Systolic blood pressure, 5) Oxygen saturation,
6) Level of consciousness and 7) HIV status

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Severity scores	4	2	1	0	1	2	3
UVA							
Temp(c)		<36		≥ 36			
HR (bpm)				< 120	≥ 120		
RR (bpm)				< 30	≥ 30		
Systolic BP(mmHg)			< 90	≥ 90			
SaO2(%)		< 92		≥ 92			
GCS	< 15			15			
HIV		Pos		Neg			
MEWS							
Temp(c)		< 35		35 - 38.4		≥ 38.5	
HR (bpm)		< 40	41 - 50	51 - 100	101 - 110	111 - 129	≥ 130
RR (bpm)		< 9		9 - 14	15 - 20	21 - 29	≥ 30
AVPU score				A	V	P	U
qSOFA							
RR (bpm)				< 22	≥ 22		
Systolic BP(mmHg)			≤ 100	> 100			
GCS			< 15	15			

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Study method (cont.)

UVA, risk category[1]	Range of sum	MEWS, risk category[2]	Range of sum*	qSOFA, risk category[3]	Range of sum
Low	0 – 1	7.9% chance of ICU admission or death within 60 days	1 – 2	Not high risk	0 – 1
Medium	2 – 4	12.7% chance of ICU admission or death within 60 days	3 – 4	High risk**	2 – 3
High	> 4	30% chance of ICU admission or death within 60 days	5 – 6		
		consider higher level of care	> 7		

* for any single physiological parameter with assigned score of 3, consider higher level of care for patient

** 14-fold increase in-hospital mortality

[1] *Moore CC, et al., BMJ Glob Health. 2017 Jul 28;2(2):e000344. doi: 10.1136/bmjgh-2017-000344*

[2] *Gardner-Thorpe J, et al., Ann R Coll Surg Engl. 2006 Oct;88(6):571-5. doi: 10.1308/003588406X130615*

[3] *Rudd KE, et al., JAMA, 2018 Jun 5;319(21):2202-2211. doi: 10.1001/jama.2018.6229*

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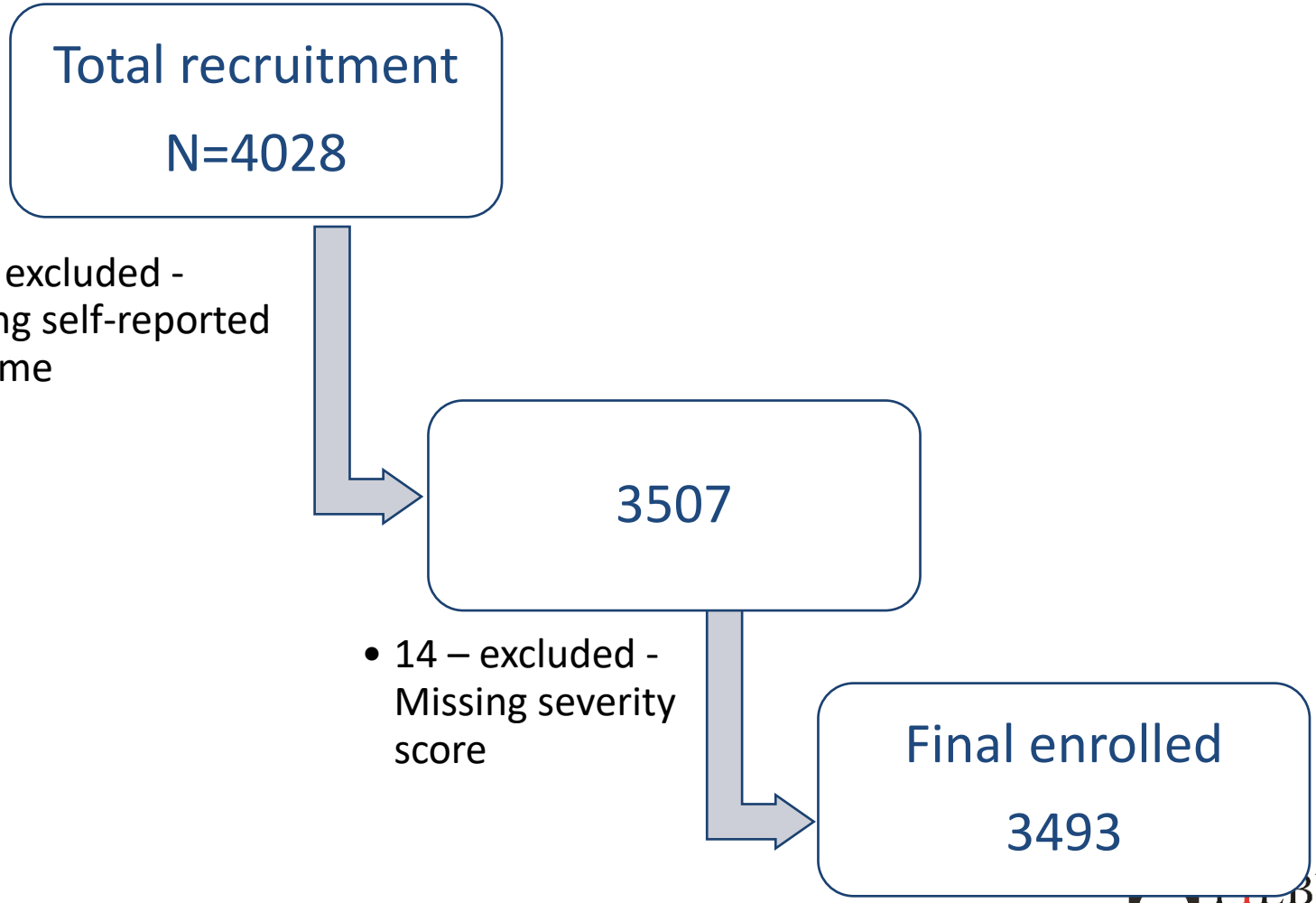
Study method (cont.)

Statistical method:

- The distributions of each of the physiological signs were tabulated and compared between those alive or dead by day 28 follow-up
- To evaluate the scores, we plotted receiver operating characteristic (ROC) curve for each score and
- Calculated each score's area under the curve (AUC)

Results

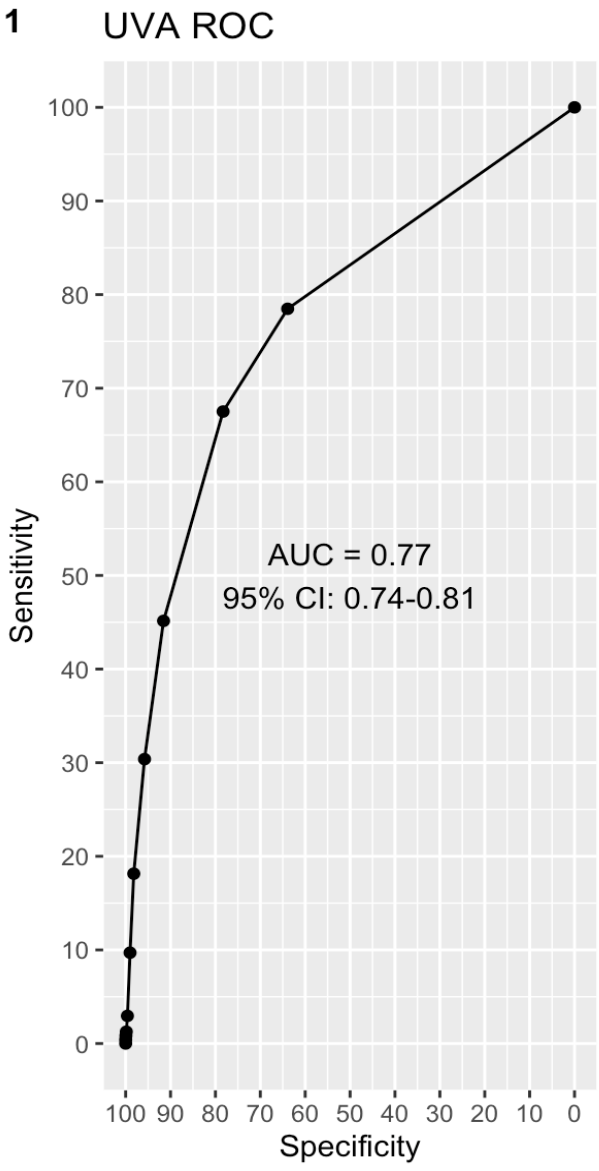

Total recruitment
N=4028
• 521 – excluded - Missing self-reported outcome
3507
• 14 – excluded - Missing severity score
Final enrolled
3493

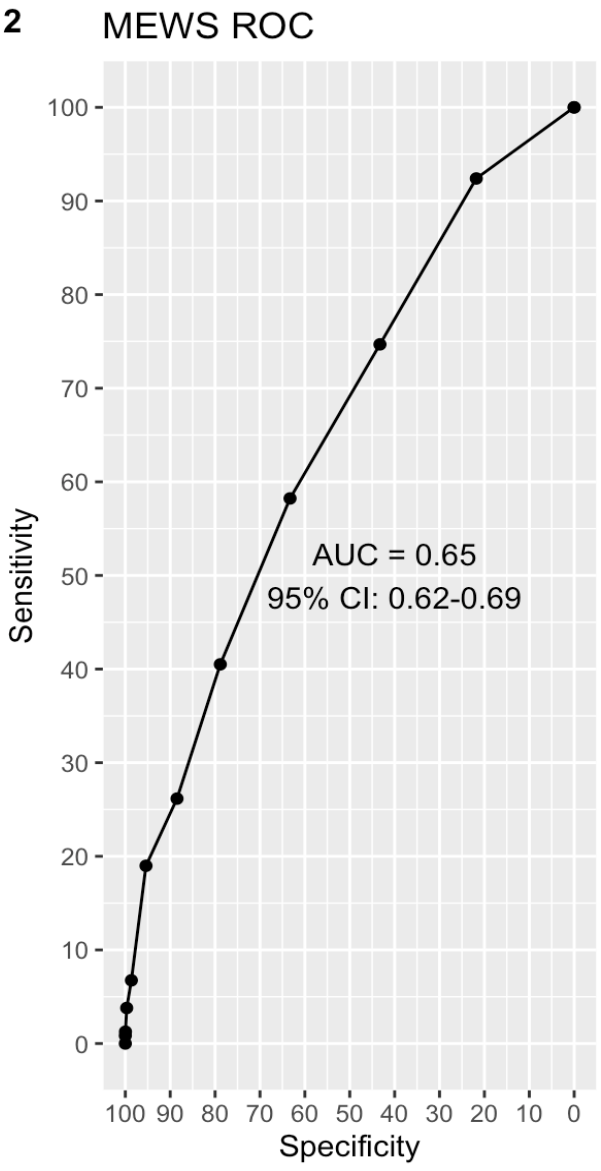
Results (cont.)

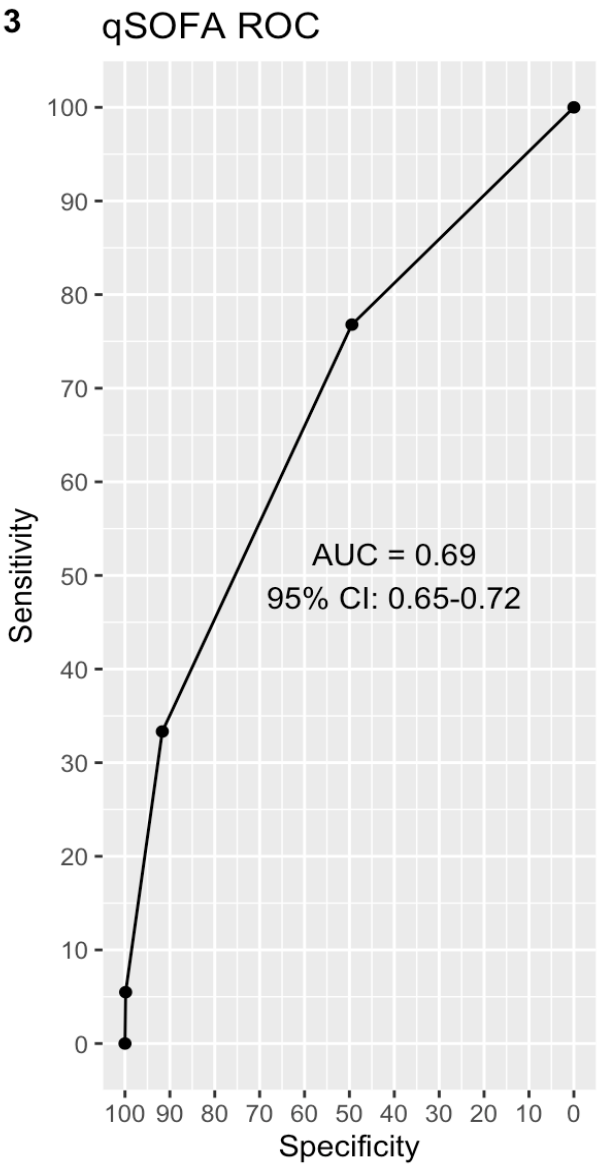
Variable	Overall, N = 3,493	Alive, N = 3,256	Dead, N = 237
Age (years)			
Median (IQR)	33 (24, 45)	32 (24, 44)	45 (34, 6)
Range	16, 96	16, 96	18, 96
Gender, n (%)			
Female	2,037	1,935 (95%)	102 (5%)
Male	1,456	1,321 (91%)	135 (9%)
HIV status, n (%)			
Positive	639	540 (85%)	99 (15%)
Negative	2,107	2,026 (96%)	81 (4%)
Indeterminate	7	6 (86%)	1 (14%)
Unknown	740	684 (92%)	56 (8%)

Results (cont.)

Variable	Overall, N = 3,493	Alive, N = 3,256	Dead, N = 237
Modified early warning score (MEWS)			
Median (IQR)	3 (2, 4)	3 (2, 4)	4 (2, 6)
Range	0, 11	0, 10	1, 11
qSOFA, n (%)			
0	1,665	1,610 (97%)	55 (3%)
1	1,478	1,375 (93%)	103 (7%)
2	332	266 (80%)	66 (20%)
3	18	5 (28%)	13 (72%)
UVA			
Median (IQR)	0 (0, 1)	0 (0, 1)	2 (1, 4)
Range	0, 10	0, 9	0, 10







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Summary and conclusion

- UVA score performed better than MEWs and qSOFA in predicting mortality among febrile adult patients in our study populations in Laos, Malawi, Mozambique, and Zimbabwe
- Using the UVA score may support health workers' triage and care decisions
- Next steps could include further evaluation in other settings, and efforts to improve the scores' predictive power by combining with point-of-care tests for host biomarkers that indicate illness severity

Thank you for your interest and attention

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