

Supplementary material

Table 1: Sensitivity, specificity, positive likelihood ratio (LR+) and negative likelihood ratio (LR-) of clinical characteristics in predicting death among children presenting to the study hospitals with pneumonia

Clinical Characteristics	AUC (95% CI)	Sensitivity	Specificity	LR+	LR-
Sex: male	0.50 (0.42 - 0.58)	0.52	0.44	0.92	1.11
Age: >9	0.58 (0.53 - 0.63)	0.35	0.81	1.89	0.80
RR: >30	0.55 (0.49 - 0.61)	0.85	0.26	1.14	0.59
RR: >40	0.57 (0.52 - 0.63)	0.62	0.53	1.32	0.71
RR: >50	0.58 (0.52 - 0.64)	0.41	0.76	1.70	0.78
Central cyanosis: present	0.51 (0.47 - 0.54)	0.04	0.99	3.12	0.97
Grunting: present	0.56 (0.52 - 0.61)	0.27	0.85	1.84	0.86
Reduced consciousness: present	0.62 (0.55 - 0.68)	0.28	0.94	5.04	0.76
Inability to eat and drink: present	0.62 (0.55 - 0.68)	0.39	0.84	2.47	0.72
Wheeze: absent	0.53 (0.51 - 0.56)	0.94	0.13	1.08	0.46
Crackles: present	0.56 (0.49 - 0.62)	0.46	0.65	1.32	0.83
Any pallor: present	0.69 (0.64 - 0.74)	0.55	0.84	3.37	0.54
Severe pallor: present	0.60 (0.56 - 0.64)	0.25	0.95	5.16	0.79
Indrawing: present	0.54 (0.50 - 0.59)	0.49	0.60	1.23	0.85
HIV: positive	0.57 (0.53 - 0.61)	0.23	0.91	2.58	0.85
Malaria: positive	0.50 (0.45 - 0.56)	0.33	0.71	1.13	0.95
Severe malnutrition: present	0.56 (0.52 - 0.60)	0.21	0.91	2.36	0.87
Severe pneumonia: present	0.62 (0.57 - 0.68)	0.56	0.68	1.75	0.65
Any one of: Any pallor: present, reduced consciousness: present	0.73 (0.69 - 0.78)	0.68	0.79	3.29	0.40
Any one of: Any pallor: present, reduced consciousness: present, central cyanosis: present	0.74 (0.69 - 0.79)	0.71	0.78	3.24	0.37
Any one of: Any pallor: present, reduced consciousness: present, central cyanosis: present, age: >9	0.72 (0.68 - 0.77)	0.81	0.63	2.21	0.29

Table 2: Multivariate models for risk factors for mortality for all pneumonia cases (complete case analysis)

Variable	Model 1			Model 2		
	Odds ratio	95% Confidence interval	<i>p</i> value	Odds ratio	95% Confidence interval	<i>p</i> value
Sex: male	1.04	0.64 - 1.69	0.872	1	0.61 - 1.64	0.988
Age: >9	2.7	1.58 - 4.61	<0.001	2.32	1.34 - 4.04	0.003
RR: >30	2.29	1.16 - 4.5	0.016	2.26	1.12 - 4.55	0.023
Cyanosis: true	4.81	1.18 - 19.7	0.029	5.18	1.15 - 23.35	0.032
Grunting: true	0.95	0.5 - 1.81	0.873	1.12	0.57 - 2.18	0.742
Reduced consciousness: true	4.61	2.35 - 9.05	<0.001	5.78	2.85 - 11.72	<0.001
Cannot drink: true	1.92	1.08 - 3.42	0.027	1.96	1.08 - 3.54	0.026
Wheeze: true	0.18	0.04 - 0.75	0.019	0.19	0.04 - 0.83	0.028
Crackles: true	1.57	0.94 - 2.62	0.082	1.37	0.81 - 2.31	0.241
Pallor: severe	9	4.7 - 17.25	<0.001	7.61	3.83 - 15.09	<0.001
Pallor: mild/mod	3.24	1.81 - 5.78	<0.001	2.55	1.39 - 4.69	0.003
Indrawing: true	1.41	0.83 - 2.4	0.2	1.22	0.70 - 2.11	0.482
HIV +	-	-	-	2.76	1.49 - 5.09	0.001
Malaria +	-	-	-	0.81	0.43 - 1.52	0.507
Severe malnutrition: present	-	-	-	2.63	1.41 - 4.93	0.003

Model 3: Subgroup multivariate model for risk factors for mortality for children age 5-10 years (n= 1585) using weight for age Z (WAZ) score in place of severe malnutrition

Variable	Model 3		
	Odds ratio	95% Confidence interval	<i>p value</i>
Sex: male	0.86	0.48 – 1.54	0.615
Age: >9	-	-	-
RR: >30	1.89	0.85 – 4.23	0.12
Cyanosis: true	6.35	1.33 – 30.25	0.02
Grunting: true	0.98	0.46 – 2.07	0.96
Reduced consciousness: true	6.27	2.8 – 14.08	<0.001
Cannot drink: true	1.39	0.68 – 2.84	0.367
Wheeze: true	0.13	0.02 – 1.02	0.053
Crackles: true	1.19	0.65 – 2.18	0.582
Pallor: severe	9.89	4.68 – 20.93	<0.001
Pallor: mild/mod	2.85	1.35 – 6	0.006
Indrawing: true	1.21	0.65 – 2.27	0.551
HIV +	2.49	1.18 – 5.28	0.017
Malaria +	0.9	0.44 – 1.82	0.769
WAZ ≤-3SD	2.99	1.61 – 5.55	<0.001

Model 4: Subgroup multivariate model for risk factors for mortality for children presenting to study hospitals in regions of low malaria transmission

Variable	Model 4		
	Odds ratio	95% Confidence interval	<i>p value</i>
Sex: male	1.08	0.54 – 2.16	0.828
Age: >9	3.84	1.78 – 8.26	<0.001
RR: >30	2.53	0.86 – 7.45	0.093
Cyanosis: true	5.22	0.87 – 31.5	0.072
Grunting: true	1.26	0.51 – 3.12	0.612
Reduced consciousness	3.74	1.26 – 11.05	0.017
Cannot drink: true	1.98	0.92 – 4.24	0.079
Wheeze: true	0.17	0.22 – 1.3	0.088
Crackles: true	1.12	0.53 – 2.37	0.77
Pallor: severe	12.12	4.12 – 35.67	<0.001
Pallor: mild/mod	2.65	1.09 – 6.43	0.031
Indrawing: true	1.33	0.62 – 2.87	0.47

Table 3: Admission antibiotic prescriptions for all children admitted to the study hospitals

Antibiotic	Antibiotic class	Number of prescriptions
Penicillin (IV)	Beta-lactamase sensitive penicillins	1291
Penicillin V (PO)	Beta-lactamase sensitive penicillins	4
Gentamicin	Aminoglycoside	848
Amikacin	Aminoglycoside	58
Ceftriaxone	Third-generation cephalosporin	423
Ceftazidime	Third-generation cephalosporin	7
Cefuroxime	Second-generation cephalosporin	1
Amoxicillin	Penicillins with extended spectrum	247
Co-trimoxazole	Combinations of sulphonamides and trimethoprim	116
Metronidazole	Imidazole derivatives	74
Erythromycin	Macrolides	34
Azithromycin	Macrolides	10
Clarithromycin	Macrolides	3
Flucloxacillin	Beta-lactamase resistant penicillins	22
Co-amoxiclav	Combination of penicillins	13
Ciprofloxacin	Fluoroquinolones	9
Tetracycline	Tetracyclines	4
Vancomycin	Glycopeptides	3
Meropenem	Carbapenems	2
Chloramphenicol	Amphenicols	1
Clindamycin	Lincosamides	1
Nitrofurantoin	Nitrofurantoin derivatives	1