

# Supplementary Material

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	All admissions with severe pneumonia (N=4184)	KHDSS Residents with severe pneumonia (N=2461)	Non-KHDSS Residents with severe pneumonia (N=1723)	Univariate P-value
<b>Demographic characteristics <sup>a</sup></b>				
Age in months: median (IQR)	8.9 (4-19)	9.3 (3.9-20.4)	8.3 (4-17)	<0.001
Female	1846 (44)	1064 (43)	782 (45)	0.17
Reported premature/LBW	166 (4.0)	74 (3.0)	92 (5.3)	<0.001
Hospitalization time (days): median (IQR)	4 (2-6)	3 (2-5)	4 (2-7)	<0.001
Previous hospital admission	109 (2.6)	69 (2.8)	40 (2.3)	0.34
<b>Clinical characteristics at admission</b>				
Hypoxia (SaO <sub>2</sub> <90%)	578 (14)	304 (12)	274 (16)	0.001
Capillary refill >2 seconds	202 (4.8)	89 (3.6)	113 (6.6)	<0.001
Impaired consciousness <sup>b</sup>	329 (7.9)	161 (6.5)	168 (9.8)	<0.001
Wheezing	671 (16)	432 (18)	239 (14)	0.001
Cough for >14 days	185 (4.8)	68 (3.0)	117 (7.6)	<0.001
Jaundice	34 (0.8)	15 (0.6)	19 (1.1)	0.08
Severe anaemia	114 (3.4)	59 (3.0)	55 (4.0)	0.22
Axillary temperature <36°C	112 (2.7)	71 (2.9)	41 (2.4)	
Axillary temperature 36-39°C	3355 (80)	1988 (81)	1367 (79)	0.18
Axillary temperature >39°C	717 (17)	402 (16)	315 (18)	
HIV antibody test positive	267 (6.4)	110 (4.5)	157 (9.1)	
HIV test not preformed	307 (7.3)	180 (7.3)	127 (7.4)	<0.001
RSV test positive	805 (19)	485 (20)	320 (19)	
RSV test not preformed	1109 (27)	723 (29)	386 (22)	0.03
Malaria slide positive	401 (9.6)	240 (9.8)	161 (9.3)	0.66
Bacteraemia	189 (4.5)	113 (4.6)	76 (4.4)	0.78
<b>Nutritional characteristics at admission</b>				
WHZ Mean (sd) <sup>c</sup>	-1.1 (1.8)	-0.9 (1.7)	-1.3 (1.8)	<0.001
HAZ Mean (sd) <sup>d</sup>	-1.6 (1.7)	-1.5 (1.6)	-1.8 (1.8)	<0.001
WAZ Mean (sd) <sup>e</sup>	-1.9 (1.7)	-1.7 (1.6)	-2.2 (1.8)	<0.001
HCAZ Mean (sd) <sup>f</sup>	-0.5 (1.7)	-0.4 (1.6)	-0.6 (1.8)	<0.001
MUAC cm Median (IQR) <sup>g</sup>	13.0 (11.8-14.0)	13.0 (12.0-14.2)	12.5 (11.0-14.0)	<0.001
Kwashiorkor (nutritional oedema)	68 (1.6)	25 (1.0)	43 (2.5)	<0.001
<b>Outcome</b>				
Inpatient death	364 (8.7)	137 (5.6)	227 (13.2)	<0.001

Supplementary Table 1: Patient profile at admission by KHDSS residence.

<sup>a</sup> data given as N (%) unless otherwise indicated, IQR: interquartile range, LBW: low birth weight (<2500grams), <sup>b</sup> conscious level classified as 'prostrate' or 'unconscious', RSV: Respiratory Syncytial Virus, <sup>e</sup> 115 missing, <sup>d</sup> 378 missing, <sup>c</sup> 454 missing, <sup>f</sup> 168 missing, sd: Standard deviation, <sup>g</sup> 161 missing, WHZ: weight for length/height z-score, HAZ: length/height for age z-score, WAZ: weight for-age z-score, HCAZ: head circumference for age z-score, MUAC: Mid-upper arm circumference, and KHDSS: Kilifi Health and Demographic Surveillance System

(CYO=2,163)	N=2279	Crude HR	95% CI	P-value
<b>Demographic characteristics</b>				
>=24 months	401	1.0	Reference	
12-24 months	546	2.38	0.78 to 7.29	0.13
6-12 months	519	3.10	1.04 to 9.27	0.04
<6 months	813	4.64	1.65 to 13.0	0.004
Distance from KCH (KMs)	2117	1.04	1.02 to 1.07	0.002
Reported premature/LBW	64	2.75	1.11 to 6.83	0.03
Hospitalization time (days)	2276	1.07	1.06 to 1.09	<0.001
Previous admission	62	2.24	0.82 to 6.14	0.12
<b>Clinical characteristics at admission</b>				
Hypoxia (SaO <sub>2</sub> <90%)	247	2.73	1.58 to 4.71	<0.001
Capillary refill >2 seconds	48	3.87	1.56 to 9.61	0.004
Impaired consciousness <sup>a</sup>	103	1.29	0.47 to 3.54	0.62
Wheezing	424	0.33	0.13 to 0.81	0.02
Cough for >14 days	55	2.67	0.97 to 7.34	0.06
Jaundice	13	2.53	0.35 to 18.2	0.36
Severe anaemia	48	1.39	0.34 to 5.70	0.65
Axillary temperature <36°C	58	1.06	0.26 to 4.33	0.94
Axillary temperature 36-39°C	1858	1.0	Reference	
Axillary temperature >39°C	363	0.67	0.32 to 1.41	0.29
HIV antibody test negative	2035	1.0	Reference	
HIV antibody test positive	85	6.05	3.30 to 11.1	<0.001
HIV test not performed	159	0.71	0.22 to 2.28	0.57
RSV test negative	1174	1.0	Reference	
RSV test positive	477	0.22	0.07 to 0.71	0.01
RSV test not performed	628	1.88	1.16 to 3.03	0.01
Malaria slide negative	2073	1.0	Reference	
Malaria slide positive	206	0.45	0.14 to 1.42	0.17
No bacteraemia	2187	1.0	Reference	
Bacteraemia	92	1.87	0.75 to 4.64	0.18
<b>Nutritional characteristics at admission</b>				
Weight for-age per Z-score	2248	0.56	0.50 to 0.63	<0.001
Weight-for-Height per Z-score	2115	0.65	0.56 to 0.75	<0.001
Length-for-age per Z-score	2137	0.67	0.59 to 0.75	<0.001
MUAC in cm	2218	0.57	0.52 to 0.64	<0.001
Kwashiorkor (nutritional oedema)	15	2.32	0.32 to 16.7	0.40

Supplementary Table 2: **Univariable analysis of factors associated with post-discharge mortality.**

LBW: low birth weight (<2500grams), <sup>a</sup> conscious level classified as 'prostrate' or 'unconscious', RSV: Respiratory Syncytial Virus, MUAC: Mid-upper arm circumference.

(CYO=2,163)	N	Adjusted HR	95% CI	P-value	Adjusted HR	95% CI	P-value
<b>Demographic characteristics</b>							
>=24months	401	1.0	Reference		1.0	Reference	
12-24months	546	1.17	0.17 to 8.10	0.87	0.98	0.14 to 7.08	0.99
6-12months	519	12.4	2.33 to 66.0	0.003	6.10	1.24 to 30.1	0.03
<6months	813	16.2	2.87 to 91.5	0.002	10.01	2.24 to 44.7	0.003
Female	976	0.65	0.28 to 1.47	0.30	0.59	0.27 to 1.27	0.18
Distance from KCH (KMs)	2117	1.02	0.99 to 1.06	0.18	1.04	0.99 to 1.08	0.06
Reported premature/LBW	64	0.46	0.05 to 4.20	0.50	0.69	0.15 to 3.09	0.63
Hospitalization time (days)	2276	1.09	1.03 to 1.15	0.003	1.07	1.01 to 1.14	0.02
Previous admission	62	0.62	0.17 to 2.22	0.46	0.77	0.25 to 2.38	0.65
<b>Clinical characteristics at admission</b>							
Hypoxia (SaO <sub>2</sub> <90%)	247	1.32	0.37 to 4.70	0.67	1.37	0.46 to 4.12	0.57
Capillary refill >2 seconds	48	1.42	0.19 to 10.4	0.73	1.63	0.32 to 8.30	0.55
Impaired consciousness <sup>a</sup>	103	1.62	0.14 to 18.3	0.70	0.88	0.11 to 6.83	0.90
Wheezing	424	0.45	0.10 to 2.06	0.30	0.43	0.09 to 2.05	0.29
Cough for >14 days	55	0.05	0.01 to 3.75	0.17	0.25	0.01 to 7.91	0.43
Jaundice	13	14.5	2.20 to 94.9	0.005	11.8	1.45 to 96.0	0.02
Severe anaemia (Hb <5g/dl)	48	0.52	0.05 to 4.95	0.57	0.73	0.07 to 7.25	0.79
Axillary temperature <36°C	58	0.38	0.05 to 3.08	0.36	0.50	0.07 to 3.79	0.50
Axillary temperature 36 to 39°C	1858	1.0	Reference		1.0	Reference	
Axillary temperature >39°C	363	0.81	0.27 to 2.34	0.70	1.34	0.53 to 3.35	0.54
HIV antibody test negative	2035	1.0	Reference		1.0	Reference	
HIV antibody test positive	85	6.13	2.33 to 16.2	<0.001	5.14	1.63 to 16.2	0.005
HIV test not performed	159	0.34	0.05 to 2.55	0.30	0.49	0.05 to 4.65	0.53
RSV test negative	1174	1.0	Reference		1.0	Reference	
RSV test positive	477	0.38	0.10 to 1.46	0.16	0.38	0.09 to 1.48	0.16
RSV test not performed	628	2.58	1.10 to 6.05	0.03	2.88	1.23 to 6.77	0.02
Malaria slide negative	2073	1.0	Reference		1.0	Reference	
Malaria slide positive	206	0.57	0.04 to 6.58	0.65	0.53	0.05 to 5.17	0.58
No bacteraemia	2187	1.0	Reference		1.0	Reference	
Bacteraemia	92	0.47	0.12 to 1.77	0.26	1.16	0.26 to 5.14	0.85
Weight-for-height per Z-score	2115	0.81	0.63 to 1.03	0.09			
Length-for-age per Z-score	2137	0.53	0.40 to 0.69	<0.001			
Weight-for-age per Z-score	2248				0.61	0.50 to 0.76	<0.001
<b>Year of admission</b>							
2007	480	1.0	Reference		1.0	Reference	
2008	381	0.87	0.29 to 2.61	0.80	1.04	0.36 to 2.99	0.95
2009	392	0.62	0.15 to 2.53	0.50	0.59	0.16 to 2.15	0.43
2010	392	0.64	0.17 to 2.42	0.52	0.53	0.14 to 1.99	0.35
2011	319	1.66	0.55 to 5.01	0.37	1.30	0.37 to 4.50	0.68
2012	315	1.17	0.11 to 12.0	0.89	1.52	0.13 to 18.1	0.74
<b>Model performance</b>							
AIC		451.5			529.9		
Raw AUC (95% CI)		0.91 (0.88 to 0.95)			0.92 (0.89 to 0.95)		
Bootstrapped AUC (95% CI)		0.92 (0.87 to 0.96)			0.92 (0.89 to 0.95)		

Supplementary Table 3: **Multivariable analysis of factors associated with one year post-discharge mortality.**

CYO: Child years of observation, LBW: Low birth weight (<2500g), <sup>a</sup> conscious level classified as 'prostrate' or 'unconscious'. RSV: Respiratory Syncytial Virus, AIC: Akaike information criterion, AUC: area under the receiver operating characteristic curve

(CYO=2,163)	N	Died	% died	Crude	95% CI	Adjusted	95% CI
<b>Weight for length/height Z-score</b>							
>=-1	1282	26	2.0	1.0	Reference	1.0	Reference
-1 to -2	531	18	3.4	1.68	0.92 to 3.06	2.03	1.11 to 3.73
-2 to -3	282	8	2.8	1.41	0.64 to 3.11	1.61	0.72 to 3.58
<-3	184	18	9.8	4.98	2.73 to 9.09	4.45	2.40 to 8.26
<b>Model performance</b>							
Raw AUC (95% CI)						0.74 (0.68 to 0.80)	
Bootstrapped AUC (95% CI)						0.76 (0.71 to 0.80)	
<b>Length/height for age Z-score</b>							
>=-1	992	15	1.5	1.0	Reference	1.0	Reference
-1 to -2	567	12	2.1	1.40	0.66 to 3.00	1.48	0.69 to 3.17
-2 to -3	447	19	4.3	2.85	1.45 to 5.61	3.26	1.64 to 6.45
<-3	273	24	8.8	6.07	3.18 to 11.6	5.94	3.07 to 11.5
<b>Model performance</b>							
Raw AUC (95% CI)						0.74 (0.69 to 0.81)	
Bootstrapped AUC (95% CI)						0.76 (0.72 to 0.79)	
<b>Weight-for-age Z-score</b>							
≥-1	838	6	0.7	1.0	Reference	1.0	Reference
-1 to -2	643	13	2.0	2.86	1.09 to 7.52	3.18	1.21 to 8.39
-2 to -3	460	13	2.8	3.98	1.51 to 10.5	4.67	1.77 to 12.3
<-3	338	38	11.2	16.8	7.09 to 39.7	16.07	6.70 to 38.5
<b>Model performance</b>							
Raw AUC (95% CI)						0.81 (0.76 to 0.86)	
Bootstrapped AUC (95% CI)						0.82 (0.78 to 0.86)	
<b>MUAC in cm</b>							
>13.5	1089	11	1.0	1.0	Reference	1.0	Reference
12.5-13.5	541	7	1.3	1.28	0.50 to 3.30	1.22	0.47 to 3.17
11.5-12.5	356	11	3.1	3.10	1.35 to 7.16	2.71	1.14 to 6.44
<11.5	293	41	14.0	14.9	7.67 to 29.0	11.8	5.67 to 24.5
<b>Model performance</b>							
Raw AUC (95% CI)						0.81 (0.76 to 0.87)	
Bootstrapped AUC (95% CI)						0.80 (0.77 to 0.84)	

Supplementary Table 4: **Association between nutritional status and post discharge mortality.**

<sup>a</sup> Adjusted for age, gender and HIV, MUAC: Mid-upper arm circumference, AUC: area under the receiver operating characteristic curve.