Supplemental material

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BMJ Global Health

Pre-referral rectal artesunate and referral completion among children with suspected severe malaria in the Democratic Republic of the Congo, Nigeria and Uganda

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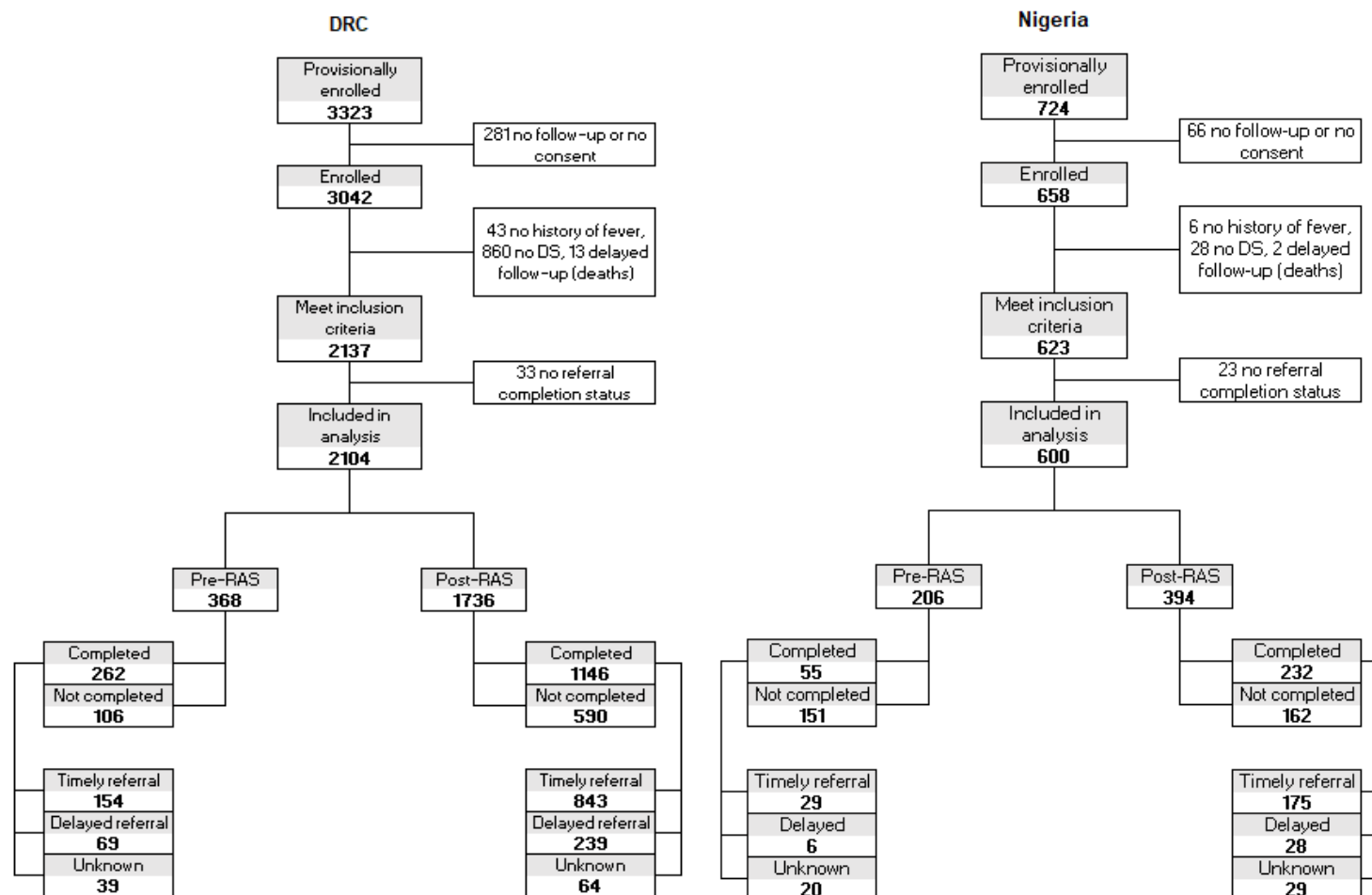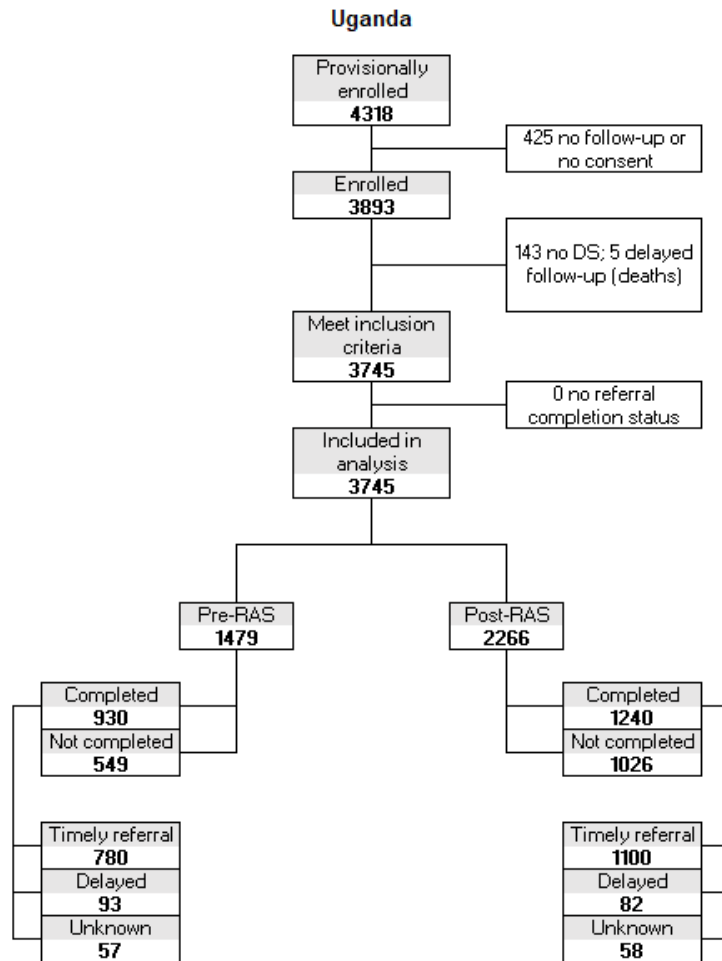[6] Clinton Health Access Initiative, Boston, MA, USA
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Supplementary material

Supplement 1

Inclusion flow-charts

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Uganda

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            ┌──────────────────┐
            │  Provisionally   │
            │     enrolled     │
            │      4318        │
            └────────┬─────────┘
                     │        ┌──────────────────────┐
                     ├────────│ 425 no follow-up or   │
                     │        │    no consent         │
                     │        └──────────────────────┘
            ┌────────┴─────────┐
            │     Enrolled     │
            │      3893        │
            └────────┬─────────┘
                     │        ┌──────────────────────┐
                     ├────────│ 143 no DS; 5 delayed  │
                     │        │  follow-up (deaths)   │
                     │        └──────────────────────┘
            ┌────────┴─────────┐
            │ Meet inclusion   │
            │    criteria      │
            │      3745        │
            └────────┬─────────┘
                     │        ┌──────────────────────┐
                     ├────────│   0 no referral       │
                     │        │ completion status     │
                     │        └──────────────────────┘
            ┌────────┴─────────┐
            │  Included in     │
            │    analysis      │
            │      3745        │
            └────────┬─────────┘
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	Pre-RAS 1479	Post-RAS 2266
Completed	930	1240
Not completed	549	1026
Timely referral	780	1100
Delayed	93	82
Unknown	57	58

Supplemental material

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BMJ Global Health

Supplement 2

Table S2 1. Estimated associations between child characteristics and referral completion, DRC.

	n	N	%	Unadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
						DRC			
All	1,408	2,104	66.9						
Study group									
Pre-RAS	262	368	71.2	Ref.			Ref.		
Post-RAS									
No RAS use	142	188	75.5	0.42	0.23–0.77	0.005	0.34	0.18–0.66	0.001
RAS use	1,004	1,548	64.9	0.54	0.36–0.82	0.004	0.48	0.30–0.77	0.002
Child gender									
Male	735	1,121	65.6	Ref.			Ref.		
Female	673	983	68.5	0.97	0.74–1.28	0.85	1.01	0.75–1.34	0.97
Age									
0	312	416	75.0	Ref.			Ref.		
1	441	624	70.7	0.72	0.48–1.08	0.11	0.78	0.51–1.19	0.25
2	303	467	64.9	0.74	0.49–1.14	0.18	0.77	0.49–1.20	0.24
3	187	308	60.7	0.62	0.39–1.01	0.05	0.69	0.42–1.14	0.15
4	165	289	57.1	0.56	0.34–0.91	0.02	0.53	0.31–0.88	0.02
Caregiver age									
<25	176	243	72.4	Ref.			Ref.		
25–34	530	765	69.3	1.19	0.74–1.93	0.47	1.32	0.79–2.19	0.29
35–44	495	791	62.6	1.39	0.84–2.28	0.20	1.62	0.94–2.78	0.08
>=45	207	305	67.9	1.28	0.73–2.27	0.39	1.38	0.74–2.57	0.31
Missing	0	0	NA	NA			NA		
Caregiver gender									
Male	789	1,265	62.4	Ref.			Ref.		
Female	619	839	73.8	1.10	0.81–1.49	0.54	1.19	0.85–1.67	0.31
Health zone									
Ipamu	562	692	81.2	Ref.			Ref.		
Kenge	488	766	63.7	0.10	0.03–0.30	<0.001	0.16	0.05–0.49	0.001
Kingandu	358	646	55.4	0.51	0.17–1.54	0.23	0.64	0.21–1.98	0.44
CNS involvement*									
No	532	678	78.5	Ref.			Ref.		
Yes	876	1,426	61.4	0.60	0.43–0.83	0.002	0.58	0.41–0.82	0.002
Malaria test									
Negative / Not done	64	100	64.0	Ref.			Ref.		
Positive	1,344	2,004	67.1	1.46	0.77–2.74	0.24	4.02	1.87–8.60	<0.001
Enrolment location									
CHW	42	96	43.8	Ref.			Ref.		
PHC	1,366	2,008	68.0	6.09	1.51–24.57	0.01	4.85	1.22–19.25	0.02

Enrolled during rainy season**									
No	665	959	69.3	Ref.			Ref.		
Yes	743	1,145	64.9	0.97	0.73–1.28	0.82	0.77	0.56–1.07	0.12
Enrolled on a workday									
No	365	527	69.3	Ref.			Ref.		
Yes	1,043	1,577	66.1	0.93	0.67–1.28	0.65	0.91	0.65–1.29	0.60
Enrolled during Covid-19 pandemic									
No	1,092	1,638	66.7	Ref.			Ref.		
Yes	316	466	67.8	1.12	0.80–1.58	0.50	1.15	0.78–1.70	0.48
Delay to enrolling provider									
0–1 days	402	667	60.3	Ref.			Ref.		
> 1 day	915	1,336	68.5	1.33	0.98–1.79	0.06	1.07	0.77–1.49	0.69
Missing	91	101	90.1	7.87	3.08–20.10	<0.001	3.33	0.86–12.83	0.08
Transport to enrolling provider									
By foot / at home	1,065	1,691	63.0	Ref.			Ref.		
Vehicle	251	307	81.8	1.05	0.65–1.70	0.85	1.08	0.66–1.79	0.75
Missing	92	106	86.8	6.90	2.99–15.89	<0.001	4.80	1.37–16.84	0.01
Time to RHF (min)									
0–<15	668	806	82.9	Ref.			Ref.		
15–<30	232	322	72.0	1.01	0.60–1.71	0.98	1.12	0.65–1.95	0.68
30–<60	228	336	67.9	0.85	0.50–1.43	0.54	0.80	0.46–1.40	0.44
≥60	80	228	35.1	0.55	0.29–1.03	0.06	0.46	0.24–0.89	0.02
Missing	200	412	48.5	0.75	0.46–1.23	0.26	0.87	0.52–1.46	0.60
Perceived severity									
Not fatal	979	1,542	63.5	Ref.			Ref.		
Fatal	413	545	75.8	1.57	1.10–2.25	0.01	1.86	1.28–2.71	0.001
Missing	16	17	94.1	33.29	1.39–795.57	0.03	16.14	0.61–429.60	0.10
Home treatment									
No	445	793	56.1	Ref.			Ref.		
Yes	963	1,311	73.5	1.51	1.12–2.03	0.01	1.43	1.03–1.99	0.03
Missing	0	0	NA	NA			NA		

* Danger signs involving the central nervous system (CNS): convulsions, unusually sleepy or unconscious
** October-April

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Table S2 2. Estimated associations between child characteristics and referral completion, Nigeria.

	n	N	%	Unadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
					Nigeria				
All	287	600	47.8						
Study group									
Pre-RAS	55	206	26.7	Ref.			NA		
Post-RAS									
No RAS use	118	183	64.5	5.95	2.54–13.93	<0.001	NA		
RAS use	114	211	54.0	2.17	0.94–5.01	0.07	NA		
Child gender									
Male	177	364	48.6	Ref.			Ref.		
Female	110	236	46.6	0.67	0.37–1.23	0.20	0.58	0.29–1.17	0.13
Age									
0	28	71	39.4	Ref.			Ref.		
1	85	163	52.1	1.51	0.51–4.47	0.46	1.88	0.57–6.29	0.30
2	86	170	50.6	1.07	0.37–3.10	0.90	1.23	0.38–3.92	0.73
3	50	119	42.0	0.63	0.21–1.92	0.42	0.74	0.21–2.59	0.64
4	38	77	49.4	1.57	0.45–5.45	0.47	1.96	0.50–7.64	0.33
Caregiver age									
<25	52	93	55.9	Ref.			Ref.		
25–34	140	300	46.7	0.53	0.21–1.34	0.18	0.55	0.19–1.59	0.27
35–44	68	149	45.6	0.43	0.16–1.18	0.10	0.53	0.16–1.75	0.30
>=45	26	57	45.6	0.39	0.11–1.37	0.14	0.58	0.14–2.50	0.47
Missing	1	1	100.0	NA			NA		
Caregiver gender									
Male	96	201	47.8	Ref.			Ref.		
Female	191	399	47.9	1.88	1.00–3.54	0.05	1.35	0.61–3.00	0.46
LGA									
Mayo-Belwa	160	251	63.7	Ref.					
Fufore	84	245	34.3	0.33	0.07–1.49	0.15	NA		
Song	43	104	41.3	1.00	0.19–5.28	1.00	NA		
CNS involvement									
No	33	99	33.3	Ref.			Ref.		
Yes	254	501	50.7	0.77	0.33–1.83	0.56	0.48	0.17–1.38	0.17
Malaria test									
Negative / Not done	15	32	46.9	Ref.			Ref.		
Positive	272	568	47.9	1.45	0.35–5.94	0.61	4.31	0.69–26.75	0.12
Enrolment location									
CHW	49	315	15.6	Ref.			NA		
PHC	238	285	83.5	85.47	23.16–315.38	<0.001	NA		
Enrolled during rainy season**									
No	78	154	50.6	Ref.			Ref.		
Yes	209	446	46.9	0.64	0.32–1.29	0.21	0.70	0.29–1.67	0.42

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Enrolled on a workday									
No	33	107	30.8	Ref.			Ref.		
Yes	254	493	51.5	1.48	0.67–3.27	0.33	0.74	0.31–1.76	0.50
Enrolled during Covid-19 pandemic									
No	239	483	49.5	Ref.			Ref.		
Yes	48	117	41.0	0.19	0.08–0.42	<0.001	0.09	0.03–0.26	<0.001
Delay to enrolling provider									
0–1 days	90	197	45.7	Ref.			Ref.		
> 1 day	154	327	47.1	1.35	0.71–2.58	0.36	1.64	0.77–3.52	0.20
Missing	43	76	56.6	2.27	0.80–6.44	0.12	3.53	1.03–12.09	0.04
Transport to enrolling provider									
No vehicle / missing	125	371	33.7	Ref.			Ref.		
Vehicle	162	229	70.7	1.28	0.60–2.69	0.52	0.82	0.32–2.10	0.68
Time to RHF (min)									
0–<15	85	104	81.7	Ref.			Ref.		
15–<30	62	87	71.3	0.60	0.17–2.14	0.43	0.48	0.13–1.73	0.26
30–<60	83	149	55.7	0.39	0.13–1.21	0.10	0.23	0.07–0.77	0.02
> 60	48	247	19.4	0.13	0.04–0.43	<0.001	0.06	0.02–0.22	<0.001
Missing	9	13	69.2	0.85	0.10–7.15	0.88	0.13	0.01–1.84	0.13
Perceived severity									
Not fatal	212	434	48.8	Ref.			Ref.		
Fatal	72	161	44.7	0.61	0.32–1.17	0.14	0.63	0.30–1.32	0.23
Missing	3	5	60.0	1.25	0.05–32.21	0.89	1.23	0.01–153.00	0.93
Home treatment									
No / missing	166	379	43.8	Ref.			Ref.		
Yes	121	221	54.8	1.14	0.63–2.06	0.68	1.08	0.54–2.16	0.82
Interactions									
Enrolment location (adjusted for study group)									
CHW	49	315	15.6	Ref.			Ref.		
PHC	238	285	83.5	92.82	18.92–455.42	<0.001	19.79	2.97–131.71	0.002
Study group by enrolment location									
CHW									
Pre-RAS	9	148	6	Ref.			Ref.		
Post-RAS									
No RAS use	16	76	21	3.14	1.03–9.60	0.04	3.97	1.07–14.75	0.04
RAS use	24	91	26	5.33	1.75–16.20	0.003	9.95	2.71–36.58	<0.001
PHC									
Pre-RAS	46	58	79	Ref.			Ref.		
Post-RAS									
No RAS use	102	107	95	13.00	3.11–54.42	<0.001	35.09	6.52–188.75	<0.001
RAS use	90	120	75	1.23	0.43–3.50	0.70	6.45	1.62–25.67	0.01

Enrolment location by LGA								
Mayo-Belwa - CHW	26	95	27.4	Ref.			Ref.		
Mayo-Belwa - PHC	134	156	85.9	16.62	3.50–78.93	<0.001	NA		
Fufore - CHW	5	145	3.4	0.04	0.01–0.25	<0.001	0.07	0.01–0.43	0.004
Fufore - PHC	79	100	79.0	32.81	5.27–204.46	<0.001	1.98	0.33–11.99	0.46
Song - CHW	18	75	24.0	0.62	0.15–2.58	0.51	0.50	0.12–2.07	0.34
Song - PHC	25	29	86.2	39.60	4.61–340.41	<0.001	3.20	0.33–30.93	0.32

* Danger signs involving the central nervous system (CNS): convulsions, unusually sleepy or unconscious
** Mai-October

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Table S2 3. Estimated associations between child characteristics and referral completion, Uganda.

	n	N	%	Unadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
					Uganda				
All	2,170	3,745	57.9						
Study group									
Pre-RAS	930	1,479	62.9	Ref.			Ref.		
Post-RAS									
No RAS use	365	635	57.5	0.79	0.63–1.00	0.05	0.80	0.63–1.01	0.06
RAS use	875	1,631	53.6	0.64	0.53–0.77	<0.001	0.72	0.58–0.88	0.002
Child gender									
Male	1,162	1,993	58.3	Ref.			Ref.		
Female	1,008	1,752	57.5	0.97	0.83–1.12	0.66	0.98	0.84–1.14	0.81
Age									
0	417	675	61.8	Ref.			Ref.		
1	637	1,078	59.1	0.92	0.74–1.15	0.48	0.93	0.74–1.17	0.54
2	500	890	56.2	0.74	0.59–0.93	0.01	0.74	0.58–0.94	0.01
3	401	694	57.8	0.84	0.65–1.07	0.15	0.83	0.65–1.07	0.16
4	215	408	52.7	0.69	0.52–0.92	0.01	0.69	0.51–0.92	0.01
Caregiver age									
<25	831	1,394	59.6	Ref.			Ref.		
25–34	868	1,484	58.5	0.92	0.78–1.09	0.36	0.93	0.78–1.11	0.44
35–44	327	608	53.8	0.82	0.66–1.03	0.08	0.84	0.66–1.06	0.13
>=45	143	258	55.4	0.87	0.64–1.18	0.37	0.91	0.66–1.25	0.55
Missing	1	1	100.0	NA			NA		
Caregiver gender									
Male	359	610	58.9	Ref.			Ref.		
Female	1,811	3,135	57.8	0.96	0.78–1.18	0.70	0.92	0.74–1.14	0.46
Health zone									
Ipamu	1,071	1,749	61.2	Ref.			Ref.		
Kenge	525	991	53.0	0.74	0.44–1.26	0.27	0.88	0.52–1.49	0.64
Kingandu	574	1,005	57.1	1.25	0.70–2.25	0.46	1.46	0.80–2.63	0.21
CNS involvement									
No	267	425	62.8	Ref.			Ref.		
Yes	1,903	3,320	57.3	0.67	0.53–0.86	0.002	0.80	0.61–1.04	0.09
Malaria test									
Negative / Not done	40	59	67.8	Ref.			Ref.		
Positive	2,130	3,686	57.8	0.81	0.43–1.49	0.49	0.90	0.48–1.67	0.74
Enrolment location									
CHW	2,170	3,745	57.9	NA			NA		
PHC	0	0	NA	NA			NA		
Enrolled during rainy season**									
No	772	1,392	55.5	Ref.			Ref.		
Yes	1,398	2,353	59.4	1.15	0.99–1.35	0.07	1.15	0.97–1.38	0.11

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Enrolled on a workday									
No	516	959	53.8	Ref.			Ref.		
Yes	1,654	2,786	59.4	1.20	1.01–1.42	0.04	1.19	1.00–1.41	0.05
Enrolled during Covid-19 pandemic									
No	1,922	3,323	57.8	Ref.			Ref.		
Yes	248	422	58.8	0.87	0.68–1.11	0.25	0.90	0.69–1.19	0.48
Delay to enrolling provider									
0–1 days	1,212	2,134	56.8	Ref.			Ref.		
> 1 day	925	1,565	59.1	1.15	0.99–1.35	0.08	1.14	0.97–1.34	0.12
Missing	33	46	71.7	1.87	0.89–3.94	0.10	1.11	0.43–2.86	0.83
Transport to enrolling provider									
By foot / at home	2,002	3,462	57.8	Ref.			Ref.		
Vehicle	150	260	57.7	1.09	0.81–1.45	0.57	1.06	0.78–1.42	0.72
Missing	18	23	78.3	3.39	1.08–10.66	0.04	3.31	0.78–14.06	0.11
Time to RHF (min)									
0–<15	1,349	1,998	67.5	Ref.			Ref.		
15–<30	692	1,457	47.5	0.69	0.56–0.85	<0.001	0.72	0.58–0.89	0.003
30–<60	115	270	42.6	0.54	0.38–0.77	<0.001	0.55	0.39–0.79	0.001
> 60	0	2	0.0	NA			NA		
Missing	14	18	77.8	2.35	0.68–8.14	0.18	1.88	0.53–6.67	0.33
Perceived severity									
Not fatal	1,180	2,078	56.8	Ref.			Ref.		
Fatal	985	1,657	59.4	1.07	0.91–1.24	0.41	1.11	0.94–1.30	0.21
Missing	5	10	50.0	0.78	0.20–3.15	0.73	0.80	0.20–3.19	0.75
Home treatment									
No	1,876	3,271	57.4	Ref.			Ref.		
Yes	294	474	62.0	1.18	0.94–1.49	0.15	1.10	0.87–1.39	0.41
Missing	0	0	NA	NA			NA		

* Danger signs involving the central nervous system (CNS): convulsions, unusually sleepy or unconscious
** April-October

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Supplement 3

Table S3 1. Estimated associations between child characteristics and referral timeliness, DRC.

	n	N	%	Undadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
						DRC			
All	997	1,305	76.4						
Study group									
Pre-RAS	154	223	69.1	Ref.			Ref.		
Post-RAS									
No RAS use	89	128	69.5	1.01	0.61–1.69	0.96	0.92	0.52–1.62	0.77
RAS use	754	954	79.0	1.49	1.04–2.14	0.03	1.39	0.92–2.12	0.12
Child gender									
Male	513	680	75.4	Ref.			Ref.		
Female	484	625	77.4	1.08	0.82–1.42	0.58	1.11	0.83–1.48	0.47
Age									
0	207	285	72.6	Ref.			Ref.		
1	323	413	78.2	1.46	1.00–2.13	0.05	1.56	1.06–2.31	0.02
2	214	283	75.6	1.29	0.86–1.95	0.21	1.26	0.83–1.92	0.28
3	140	173	80.9	1.71	1.03–2.82	0.04	1.48	0.88–2.49	0.14
4	113	151	74.8	1.09	0.66–1.82	0.73	1.07	0.63–1.81	0.80
Caregiver age									
<25	124	164	75.6	Ref.			Ref.		
25–34	377	500	75.4	0.96	0.62–1.50	0.87	0.85	0.53–1.35	0.49
35–44	357	458	77.9	1.01	0.64–1.61	0.95	0.85	0.52–1.40	0.53
>=45	139	183	76.0	0.83	0.48–1.41	0.48	0.76	0.42–1.34	0.34
Not documented	0	0	NA	NA			NA		
Caregiver gender									
Male	557	716	77.8	Ref.			Ref.		
Female	440	589	74.7	0.86	0.63–1.16	0.31	0.78	0.56–1.09	0.15
Health zone									
Ipamu	418	514	81.3	Ref.			Ref.		
Kenge	345	485	71.1	0.53	0.29–0.97	0.04	0.54	0.29–1.02	0.06
Kingandu	234	306	76.5	0.72	0.38–1.34	0.29	0.75	0.38–1.49	0.41
CNS involvement*									
No	358	493	72.6	Ref.			Ref.		
Yes	639	812	78.7	1.55	1.16–2.07	0.003	1.50	1.10–2.04	0.01
Malaria test									
Negative / Not done	38	47	80.9	Ref.			Ref.		
Positive	959	1,258	76.2	0.71	0.31–1.63	0.41	0.39	0.13–1.21	0.10
Enrolment location									
CHW	31	38	81.6	Ref.			Ref.		
PHC	966	1,267	76.2	0.65	0.22–1.92	0.43	0.63	0.21–1.86	0.40

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Enrolled during rainy season**									
No	501	627	79.9	Ref.			Ref.		
Yes	496	678	73.2	0.71	0.54–0.95	0.02	0.73	0.53–1.01	0.06
Enrolled on a workday									
No	267	341	78.3	Ref.			Ref.		
Yes	730	964	75.7	0.83	0.61–1.15	0.26	0.83	0.59–1.15	0.25
Enrolled during Covid-19 pandemic									
No	764	1,005	76.0	Ref.			Ref.		
Yes	233	300	77.7	1.09	0.77–1.54	0.62	0.83	0.57–1.22	0.35
Delay to enrolling provider									
0–1 days	296	396	74.7	Ref.			Ref.		
> 1 day	671	873	76.9	1.19	0.87–1.61	0.27	1.69	1.20–2.38	0.003
Not documented	30	36	83.3	1.43	0.51–4.01	0.50	2.29	0.35–14.86	0.38
Transport to enrolling provider									
By foot / at home	786	1,024	76.8	Ref.			Ref.		
Vehicle	181	243	74.5	0.82	0.56–1.21	0.33	0.88	0.59–1.31	0.53
Not documented	30	38	78.9	0.93	0.37–2.34	0.88	0.37	0.07–1.97	0.25
Time to RHF (min)									
0–<15	498	636	78.3	Ref.			Ref.		
15–<30	157	213	73.7	0.95	0.59–1.53	0.84	0.98	0.59–1.61	0.92
30–<60	147	202	72.8	0.83	0.51–1.35	0.46	0.82	0.49–1.38	0.46
≥60	44	69	63.8	0.60	0.31–1.16	0.13	0.58	0.28–1.18	0.13
Missing	151	185	81.6	1.32	0.80–2.17	0.28	1.25	0.72–2.15	0.43
Perceived severity									
Not fatal	690	907	76.1	Ref.			Ref.		
Fatal	294	384	76.6	0.91	0.67–1.26	0.59	0.92	0.66–1.28	0.61
Not documented	13	14	92.9	1.63	0.18–14.28	0.66	1.73	0.19–15.97	0.63
Home treatment									
No	339	406	83.5	Ref.			Ref.		
Yes	658	899	73.2	0.53	0.38–0.75	<0.001	0.49	0.33–0.71	<0.001
Not documented	0	0	NA	NA			NA		

* Danger sign involving the central nervous system (CNS): convulsions, unusually sleepy or unconscious
** October-April

Table S3 2. Estimated associations between child characteristics and referral timeliness, Nigeria.

	n	N	%	Undadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
						Nigeria			
All	204	238	85.7						
Study group									
Pre-RAS	29	35	82.9	Ref.			Ref.		
Post-RAS									
No RAS use	84	101	83.2	1.02	0.37–2.84	0.97	1.33	0.36–4.85	0.67
RAS use	91	102	89.2	1.71	0.58–5.04	0.33	1.53	0.36–6.40	0.56
Child gender									
Male	114	140	81.4	Ref.			Ref.		
Female	90	98	91.8	2.57	1.11–5.94	0.03	2.73	1.03–7.28	0.04
Age									
0	21	24	87.5	Ref.			Ref.		
1	58	70	82.9	0.69	0.18–2.69	0.59	0.48	0.09–2.67	0.40
2	64	73	87.7	1.02	0.25–4.11	0.98	0.68	0.13–3.65	0.65
3	35	39	89.7	1.25	0.25–6.14	0.78	0.83	0.12–5.87	0.86
4	26	32	81.3	0.62	0.14–2.78	0.53	0.54	0.08–3.54	0.52
Caregiver age									
<25	42	48	87.5	Ref.			Ref.		
25–34	98	117	83.8	0.74	0.27–1.98	0.54	0.40	0.12–1.35	0.14
35–44	48	54	88.9	1.14	0.34–3.81	0.83	0.49	0.11–2.12	0.34
>=45	16	19	84.2	0.76	0.17–3.42	0.72	0.25	0.04–1.69	0.15
Not documented	0	0	NA	NA			NA		
Caregiver gender									
Male	63	69	91.3	Ref.			Ref.		
Female	141	169	83.4	0.48	0.19–1.22	0.12	0.42	0.12–1.41	0.16
LGA									
Mayo-Belwa	112	135	83.0	Ref.			Ref.		
Fufore	56	65	86.2	1.31	0.48–3.56	0.60	0.84	0.30–2.40	0.75
Song	36	38	94.7	3.78	0.78–18.32	0.10	5.42	1.02–28.68	0.05
CNS involvement									
No	18	26	69.2	Ref.			Ref.		
Yes	186	212	87.7	3.18	1.26–8.05	0.01	4.78	1.28–17.77	0.02
Malaria test									
Negative / Not done	9	10	90.0	Ref.			Ref.		
Positive	195	228	85.5	0.66	0.08–5.35	0.69	1.58	0.15–16.73	0.71
Enrolment location									
CHW	30	39	76.9	Ref.			Ref.		
PHC	174	199	87.4	2.09	0.89–4.91	0.09	1.73	0.45–6.60	0.42
Enrolled during rainy season**									
No	56	66	84.8	Ref.			Ref.		
Yes	148	172	86.0	1.10	0.50–2.45	0.81	0.59	0.20–1.74	0.34

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Enrolled on a workday									
No	24	27	88.9	Ref.			Ref.		
Yes	180	211	85.3	0.73	0.21–2.56	0.62	0.78	0.18–3.41	0.74
Enrolled during Covid-19 pandemic									
No	165	195	84.6	Ref.			Ref.		
Yes	39	43	90.7	1.77	0.59–5.33	0.31	1.90	0.49–7.44	0.35
Delay to enrolling provider									
0–1 days	77	89	86.5	Ref.			Ref.		
> 1 day	122	144	84.7	0.86	0.40–1.85	0.71	0.63	0.25–1.58	0.33
Not documented	5	5	100.0	NA			NA		
Transport to enrolling provider									
No vehicle	70	84	83.3	Ref.			Ref.		
Vehicle	134	154	87.0	1.44	0.69–3.04	0.33	1.14	0.40–3.24	0.81
Not documented	5	5	100.0	NA			NA		
Time to RHF (min)									
0–<15	62	70	88.6	Ref.			Ref.		
15–<30	46	48	95.8	2.97	0.60–14.64	0.18	1.72	0.31–9.69	0.54
30–<60	59	75	78.7	0.48	0.19–1.19	0.11	0.38	0.14–1.06	0.07
> 60	34	41	82.9	0.63	0.21–1.88	0.40	0.75	0.20–2.83	0.67
Missing	3	4	75.0	0.39	0.04–4.18	0.43	0.16	0.01–2.76	0.21
Perceived severity									
Not fatal	155	180	86.1	Ref.			Ref.		
Fatal	49	58	84.5	0.88	0.38–2.01	0.76	0.93	0.34–2.52	0.88
Not documented	0	0	NA	NA			NA		
Home treatment									
No	117	138	84.8	Ref.			Ref.		
Yes	87	100	87.0	1.20	0.57–2.53	0.63	1.02	0.42–2.49	0.96
Not documented	0	0	NA	NA			NA		

* Danger sign involving the central nervous system (CNS): convulsions, unusually sleepy or unconscious
** Mai-October

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Table S3 3. Estimated associations between child characteristics and referral timeliness, Uganda.

	n	N	%	Unadjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
						Uganda			
All	**1,880**	**2,055**	**91.5**						
Study group									
Pre-RAS	780	873	89.3	Ref.			Ref.		
Post-RAS									
No RAS use	321	350	91.7	1.40	0.88–2.20	0.15	1.43	0.89–2.30	0.14
RAS use	779	832	93.6	1.91	1.31–2.79	<0.001	1.81	1.17–2.79	0.01
Child gender									
Male	1,003	1,105	90.8	Ref.			Ref.		
Female	877	950	92.3	1.23	0.89–1.69	0.21	1.23	0.89–1.71	0.21
Age									
0	358	395	90.6	Ref.			Ref.		
1	559	611	91.5	1.15	0.73–1.80	0.55	1.15	0.73–1.83	0.54
2	438	470	93.2	1.44	0.87–2.39	0.15	1.49	0.89–2.49	0.13
3	345	382	90.3	0.97	0.59–1.58	0.89	0.89	0.53–1.47	0.64
4	180	197	91.4	1.14	0.62–2.11	0.68	1.01	0.53–1.90	0.99
Caregiver age									
<25	713	791	90.1	Ref.			Ref.		
25–34	752	818	91.9	1.25	0.88–1.77	0.22	1.33	0.92–1.91	0.13
35–44	289	309	93.5	1.60	0.95–2.69	0.08	1.81	1.04–3.13	0.03
>=45	125	136	91.9	1.22	0.62–2.39	0.56	1.22	0.60–2.49	0.59
Not documented	1	1	100.0	NA			NA		
Caregiver gender									
Male	312	341	91.5	Ref.			Ref.		
Female	1,568	1,714	91.5	1.03	0.67–1.58	0.89	1.21	0.77–1.92	0.41
Health zone									
Ipamu	928	1,017	91.2	Ref.			Ref.		
Kenge	451	507	89.0	0.86	0.55–1.34	0.49	0.65	0.41–1.03	0.07
Kingandu	501	531	94.4	1.74	1.04–2.92	0.03	1.19	0.67–2.12	0.56
CNS involvement									
No	223	246	90.7	Ref.			Ref.		
Yes	1,657	1,809	91.6	1.21	0.74–1.96	0.45	1.13	0.66–1.92	0.65
Malaria test									
Negative / Not done	35	39	89.7	Ref.			Ref.		
Positive	1,845	2,016	91.5	1.18	0.40–3.44	0.77	0.94	0.31–2.81	0.91
Enrolment location									
CHW	1,880	2,055	91.5	NA			NA		
PHC	0	0	NA	NA			NA		
Enrolled during rainy season**									
No	680	738	92.1	Ref.			Ref.		
Yes	1,200	1,317	91.1	0.92	0.65–1.28	0.61	0.97	0.67–1.40	0.87

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Enrolled on a workday									
No	439	480	91.5	Ref.			Ref.		
Yes	1,441	1,575	91.5	0.99	0.68–1.44	0.97	1.06	0.72–1.54	0.78
Enrolled during Covid-19 pandemic									
No	1,659	1,817	91.3	Ref.			Ref.		
Yes	221	238	92.9	1.27	0.74–2.17	0.39	0.97	0.53–1.78	0.93
Delay to enrolling provider									
0–1 days	1,119	1,189	94.1	Ref.			Ref.		
> 1 day	755	860	87.8	0.45	0.33–0.62	<0.001	0.48	0.34–0.68	<0.001
Not documented	6	6	100.0	NA			NA		
Transport to enrolling provider									
By foot / at home	1,745	1,912	91.3	Ref.			Ref.		
Vehicle	135	143	94.4	1.56	0.74–3.26	0.24	1.70	0.80–3.60	0.17
Not documented	0	0	NA	NA			NA		
Time to RHF (min)									
0–<15	1,168	1,277	91.5	Ref.			Ref.		
15–<30	605	657	92.1	1.21	0.82–1.81	0.34	1.10	0.75–1.63	0.61
30–<60	94	107	87.9	0.77	0.39–1.53	0.46	0.61	0.30–1.24	0.17
> 60	0	0	NA	NA			NA		
Missing	13	14	92.9	1.30	0.16–10.55	0.81	1.25	0.14–10.82	0.84
Perceived severity									
Not fatal	1,017	1,109	91.7	Ref.			Ref.		
Fatal	859	942	91.2	0.96	0.70–1.33	0.82	0.94	0.67–1.31	0.70
Not documented	4	4	100.0	NA			NA		
Home treatment									
No	1,635	1,774	92.2	Ref.			Ref.		
Yes	245	281	87.2	0.59	0.40–0.89	0.01	0.69	0.45–1.04	0.08
Not documented	0	0	NA	NA			NA		

* Danger sign involving the central nervous system (CNS): convulsions, unusually sleepy or unconscious
** April-October

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