Supplementary Table 1. Published studies on the incidence rate ratio of uncomplicated febrile malaria in children with sickle cell trait, α-thalassemia, and G6PD polymorphisms in Africa

Study	Country	Sample size	Age	IRR (95% CI)
Sickle cell trait				
Parikh *et al* 2004[1]	Uganda	307	6 months - 5 years	0.72 (0.50, 1.10)
Williams *et al* 2005[2]	Kenya	323	<8 years	0.55 (0.37, 0.81)
Clark *et al* 2008[3]	Uganda	558	1 - 10 years	0.68 (0.52, 0.90)
Crompton *et al* 2008[4]	Mali	176	2 - 10 years	0.46 (0.27, 0.79)
Kreuels *et al* 2010[5]	Ghana	852	3 months - 2 years	0.78 (0.66, 0.92)
Lopera-Mesa *et al* 2015[6]	Mali	1543	6 months - 17 years	0.66 (0.59, 0.75)
Lwanira *et al* 2015[7]*	Uganda	413	3 - 9 years	0.78 (0.76, 1.43)
Travassos *et al* 2015[8]	Mali	300	0 - 6 years	0.95 (0.51, 1.76)
Croke *et al* 2017[9]	Tanzania	767	0 - 19 years	0.71 (0.53, 0.96)
Kakande *et al* 2020[10]	Uganda	1010	6 - 10 years	0.78 (0.66, 0.92)
α-thalassemia het				
Williams *et al* 2005[11]	Kenya	370	<11 years	0.93 (0.82, 1.04)
Crompton *et al* 2008[4]	Mali	176	2-10 years	1.14 (0.90, 1.46)
Veenemans *et al* 2011[12]	Tanzania	610	6 months - 5 years	0.86 (0.71, 1.04)
Lopera-Mesa *et al* 2015[6]	Mali	1543	6 months - 17 years	1.05 (0.97, 1.14)
Kakande *et al* 2020[10]	Uganda	1010	6 - 10 years	1.04 (0.91, 1.20)
α-thalassemia hom				
Williams *et al* 2005[11]	Kenya	370	<11 years	0.83 (0.70, 0.97)
Crompton *et al* 2008[4]	Mali	176	2-10 years	1.60 (0.51, 3.81)
Veenemans *et al* 2011[12]	Tanzania	610	6 months - 5 years	1.12 (0.81, 1.52)
Lopera-Mesa *et al* 2015[6]	Mali	1543	6 months - 17 years	1.19 (0.93, 1.53)
Kakande *et al* 2020[10]	Uganda	1010	6 - 10 years	1.19 (0.87, 1.62)
G6PD het females				
Uyoga *et al* 2015[13]	Kenya	752	<10 years	1.09 (0.86, 1.38)
Lopera-Mesa *et al* 2015[6]	Mali	1543	6 months - 17 years	1.12 (0.99, 1.28)
Lwanira *et al* 2017[14]	Uganda	423	<9 years	0.98 (0.67, 1.43)
Kakande *et al* 2020[10]	Uganda	1010	6 - 10 years	0.80 (0.63, 1.10)
G6PD hom females†				
Lopera-Mesa *et al* 2015[6]	Mali	1543	6 months - 17 years	0.51 (0.29, 0.90)
Lwanira *et al* 2017[14]	Uganda	423	<9 years	1.38 (0.31, 6.03)
Kakande *et al* 2020[10]	Uganda	1010	6 - 10 years	0.89 (0.51, 1.57)

*This study was excluded from meta-analysis because the confidence intervals appeared unreliable.
†Studies included only few G6PD homozygous females (n = 13 in Lopera-Mesa *et al* 2015, 4 in Lwanira *et al* 2017, and 12 in Kakande *et al* 2020).
Het, heterozygous; hom, homozygous

Supplementary Table 2. Effect of sickle cell trait (HbAS) on iron deficiency before and after adjusting for α-thalassemia.

Study	HbAS		HbAS adjusted for α-thalassemia	
	n	OR (95% CI)	n	OR (95% CI)
Malawi	1035	0.75 (0.45, 1.25)	1030	0.76 (0.45, 1.26)
Ghana	1123	0.45 (0.26, 0.77)	1045	0.46 (0.26, 0.80)
Western, Kenya	411	0.73 (0.39, 1.39)	409	0.73 (0.38, 1.38)
Sud Kivu and Kongo Central, DRC	678	0.91 (0.46, 1.79)	381	0.66 (0.22, 1.98)
Kilifi, Kenya	996	0.68 (0.47, 0.98)	991	0.68 (0.47, 0.98)
Muheza, Tanzania	652	0.96 (0.58, 1.59)	616	0.99 (0.59, 1.70)
Yaoundé and Douala, Cameroon	292	0.99 (0.39, 2.53)	270	0.99 (0.32, 3.08)
Overall (fixed-effects meta-analysis)	4046	0.76 (0.58, 0.93)	3697	0.74 (0.56, 0.92)

Summary results of the effect of HbAS on ID by study site in overall fixed-effects meta-analysis of children in malaria-endemic areas, and the effect of HbAS on ID after adjusting for α-thalassemia. The interaction term between HbAS and α-thalassemia in predicting iron deficiency was 0.82 (95% CI 0.61, 1.11); $P = 0.20$

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