Supplemental material

Determinants and impact of *Giardia* infection in the first two years of life in the MAL-ED birth cohort

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Figure S1. Heat maps showing *Giardia* positivity in surveillance stools over the first 2 years of life among children in the MAL-ED cohort with more than one *Giardia*-positive stool in Bangladesh, India, Nepal and Pakistan (n=444 of 1016 total children in the South Asian sites; A) and in Brazil, Peru, Tanzania, and South Africa (n=394 of 1072 total children in the southern hemisphere sites; B). Each row represents positivity in the stools of one child; children are ordered by detection frequency.

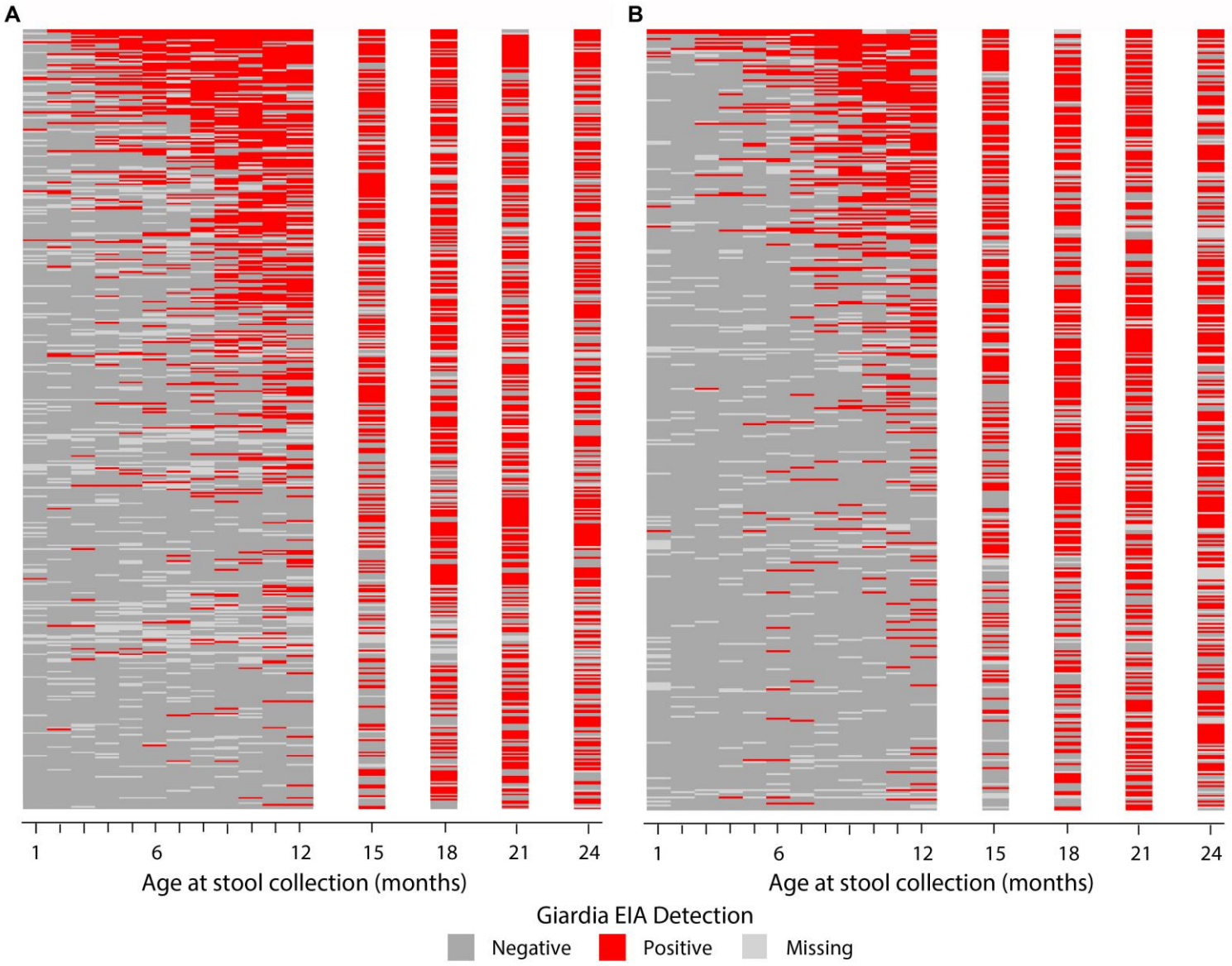
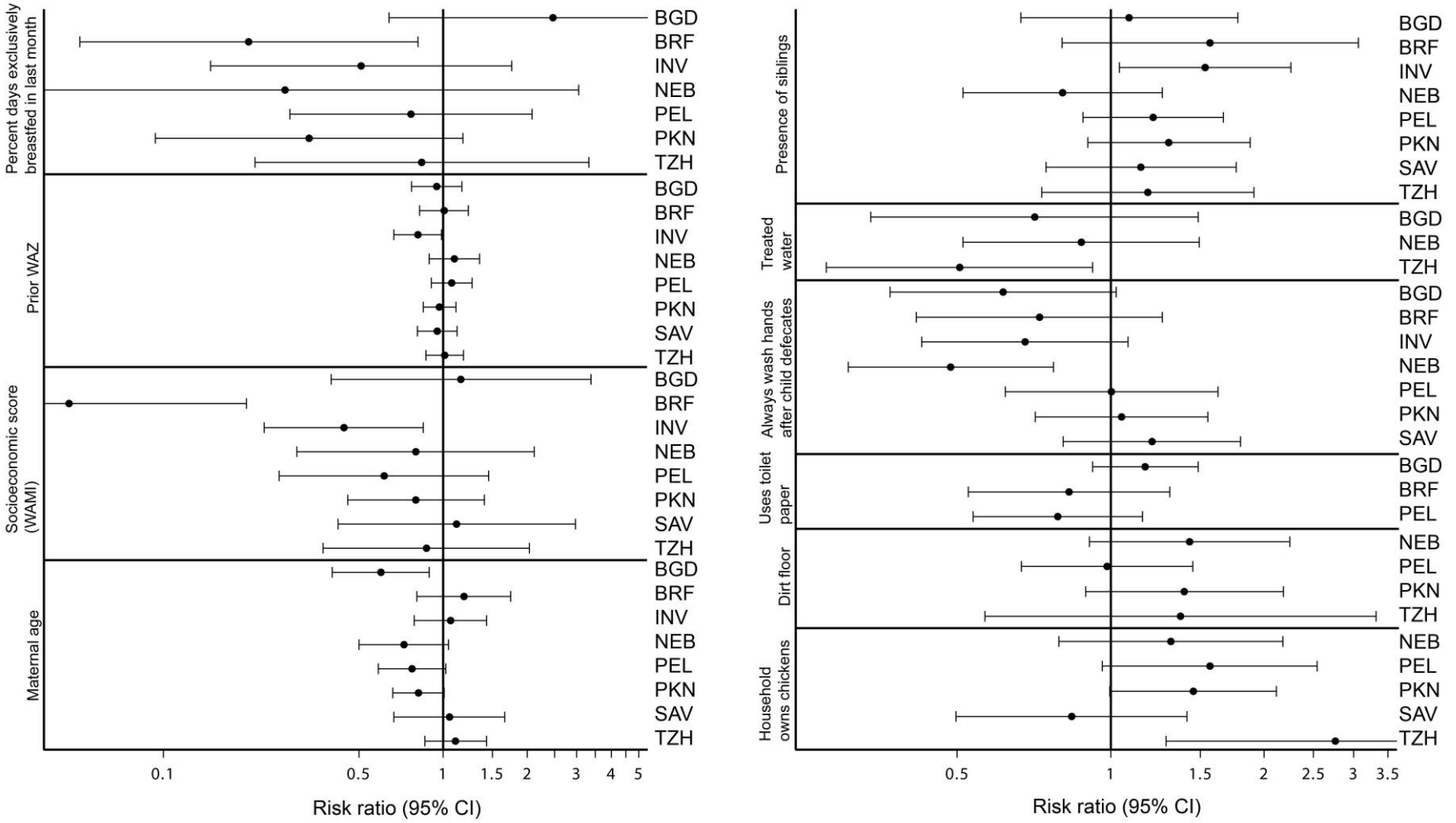


Figure S2. Site-specific estimates of key risk factors for first *Giardia* detection in monthly surveillance stools among 2,088 children in the MAL-ED cohort with at least one surveillance stool.



BGD – Dhaka, Bangladesh; BRF – Fortaleza, Brazil; INV – Vellore, India; NEB – Bhaktapur, Nepal; PEL – Loreto, Peru; PKN – Naushahro Feroze, Pakistan; SAV – Venda, South Africa; TZH – Haydom, Tanzania

Figure S3. Incidence of first *Giardia* detection in surveillance stools among 2,088 children in the MAL-ED cohort over months of the year for the **A**: South Asian sites (Bangladesh, India, Nepal, and Pakistan); and **B**: southern hemisphere sites (Brazil, Peru, Tanzania, and South Africa).

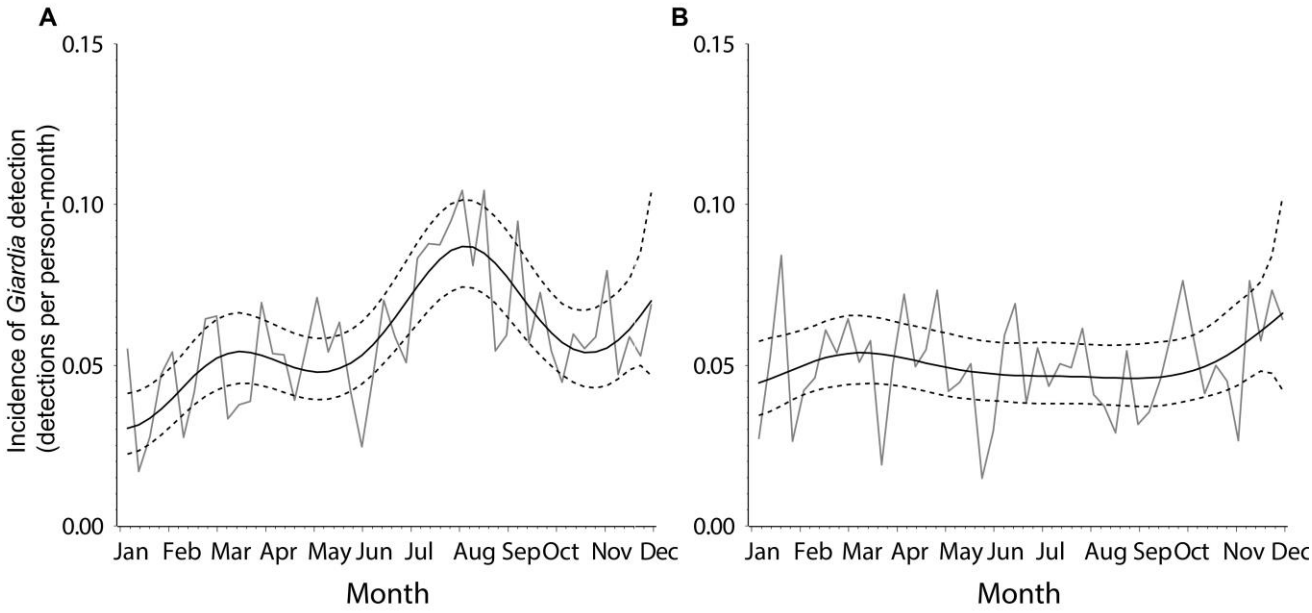


Table S1. Associations between micronutrient status and *Giardia* detection in surveillance stools among 1,521 children in the MAL-ED cohort with an assessment of plasma zinc and retinol concentration at 7 months of age.

Micronutrient	Detection rate ratio* (95% CI)
Zinc concentration (per 50 mcg/dL†)	0.81 (0.67, 0.97)
Retinol concentration (per 10 mcg/dL†)	0.89 (0.79, 1.01)
Both higher zinc (50 mcg/dL) and retinol (10 mcg/dL) concentrations	0.78 (0.63, 0.98)

*Rate ratio of *Giardia* detections in surveillance stools from 8 to 24 months of age, adjusted for site, *Giardia* detection prior to blood draw, enrollment weight, sex, WAMI, mother's age, presence of siblings, water treatment, routine handwashing after child defecation, use of toilet paper, dirt floor, ownership of chickens and proportion of days exclusively breastfed in month before blood draw. Analysis excludes the South African site.
†Approximately the standard deviation of the micronutrient in the study population.

Table S2. Effect of early *Giardia* presence and persistence on subsequent all-cause diarrheal rates in Naushahro Feroze, Pakistan and all other sites among 1,967 children in the MAL-ED cohort who remained in the study for at least 6 months.

	Naushahro Feroze, Pakistan (n=265)			All other sites (n=1702)		
Giardia exposure	No. exposed	aIRR* (95% CI)	*p*-value	No. exposed	aIRR* (95% CI)	*p*-value
Persistence in first 6 months	46	0.72 (0.59, 0.89)	0.002	27	1.13 (0.78, 1.64)	0.5
Any detection in first 6 months	106	0.79 (0.66, 0.95)	0.01	88	1.19 (1.00, 1.41)	0.06
Persistence in first year	122	0.81 (0.64, 1.03)	0.09	188	1.12 (0.96, 1.29)	0.1
Any detection in first year	194	1.06 (0.81, 1.38)	0.7	388	1.10 (0.98, 1.23)	0.1
Persistence in second year	132	0.75 (0.55, 1.01)	0.06	436	1.00 (0.86, 1.18)	0.9
Any detection in second year	210	0.84 (0.60, 1.18)	0.3	806	1.09 (0.94, 1.26)	0.3

*****Incidence rate ratio for diarrhea following exposure period (after 6 months, 12 months, or 18 months), adjusted for site, age, sex, socioeconomic score (WAMI), mother's age, presence of siblings, water treatment, routine handwashing after child defecation, use of toilet paper, dirt floor, ownership of chickens, and days with diarrhea, acute lower respiratory infection, fever, and vomiting in exposure period