Online Resource 1

Article: Climatic variability and routine childhood vaccine uptake in high-risk urban settlements of Karachi, Pakistan: a longitudinal fixed-effects panel analysis

Journal: Journal of Urban Health

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Fixed-effects model of total doses summed across the six vaccines. Provided for reference only; the vaccine-specific models in the main text are the primary analysis.

The outcome is the total number of doses administered per facility-month, summed across BCG, Penta-1, Penta-2, Penta-3, IPV-1 and MR-1. Because these vaccines target different age cohorts and delivery contacts, and one child can contribute several doses in a month, the total is best read as a measure of overall facility immunization workload rather than coverage. Specification as in the main text: one-way fixed effects, facility-clustered standard errors, N = 266 facility-months, 14 facilities; coefficients are within-facility standardized betas.

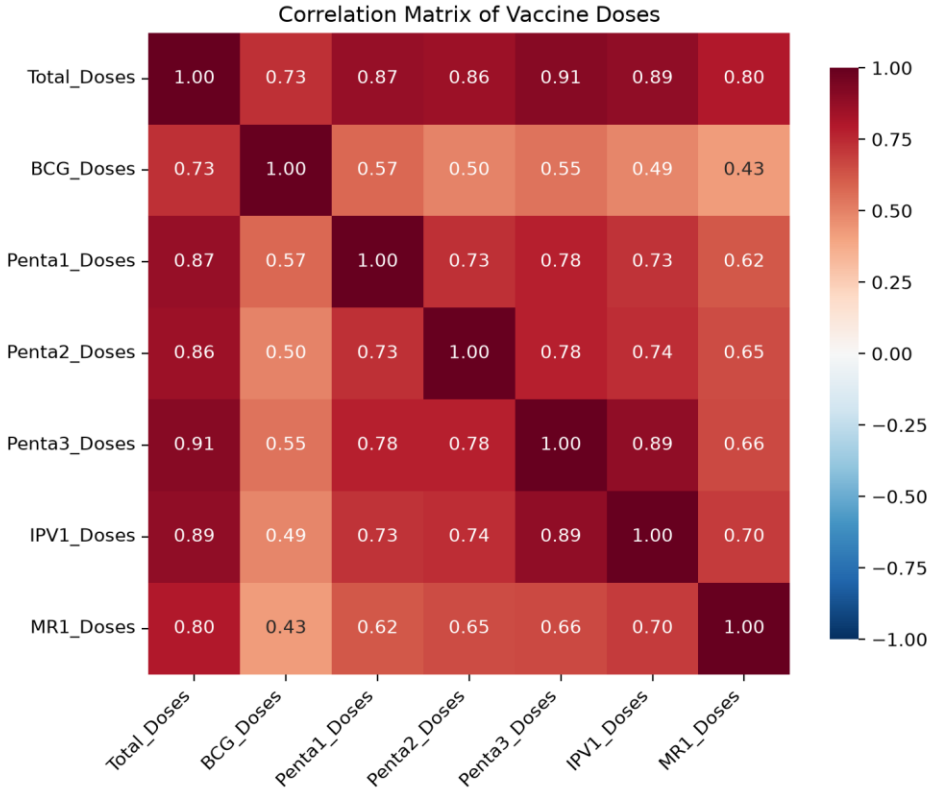
Table S1 Fixed-effects estimates for total doses (sum of six vaccines)

Predictor	β	95% CI	p
Rainfall	0.003	[−0.081, 0.088]	0.938
Maximum temperature	−0.276***	[−0.376, −0.176]	< 0.001
Wind speed	−0.423***	[−0.563, −0.284]	< 0.001
Relative humidity	0.412***	[0.265, 0.559]	< 0.001
Population	0.223**	[0.052, 0.395]	0.011
NTL index	0.210***	[0.053, 0.367]	0.009

Within $R^2 = 0.324$; robust model $F = 25.71$, $p < 0.001$; poolability $F = 17.96$, $p < 0.001$; Mundlak $\chi^2 = 70.64$ (df = 6, $p < 0.001$). *p < 0.10, **p < 0.05, ***p < 0.01. NTL night-time light.

Rainfall showed no association with total doses (β = 0.003, p = 0.94), reflecting the offsetting of a negative association for BCG and positive associations for Penta-2 and MR-1 in the vaccine-specific models (main text, Table 2).

Fig. S1 Pearson correlation matrix of monthly doses of the six vaccines and of total doses (N = 266 facility-months)


Correlation Matrix of Vaccine Doses
Total_Doses
BCG_Doses
Penta1_Doses
Penta2_Doses
Penta3_Doses
IPV1_Doses
MR1_Doses
1.00 0.73 0.87 0.86 0.91 0.89 0.80
0.73 1.00 0.57 0.50 0.55 0.49 0.43
0.87 0.57 1.00 0.73 0.78 0.73 0.62
0.86 0.50 0.73 1.00 0.78 0.74 0.65
0.91 0.55 0.78 0.78 1.00 0.89 0.66
0.89 0.49 0.73 0.74 0.89 1.00 0.70
0.80 0.43 0.62 0.65 0.66 0.70 1.00
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00