Malaria in Madagascar Benjamin Rice November 29, 2017

Supplementary Figure 2: Map of Madagascar showing the regions sampled and some climatic characteristics

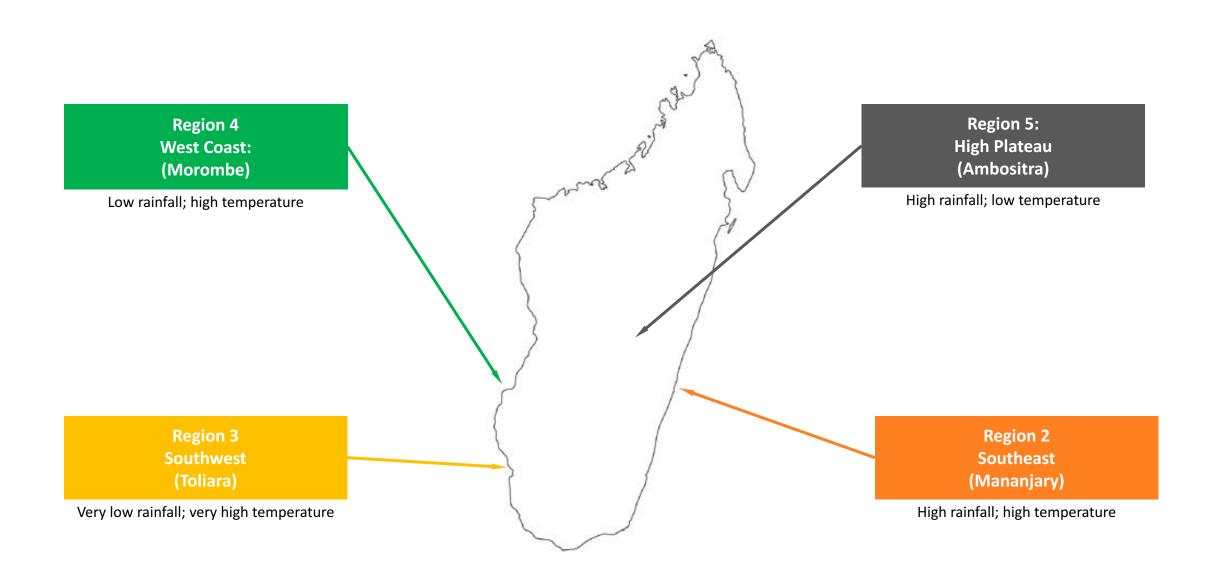
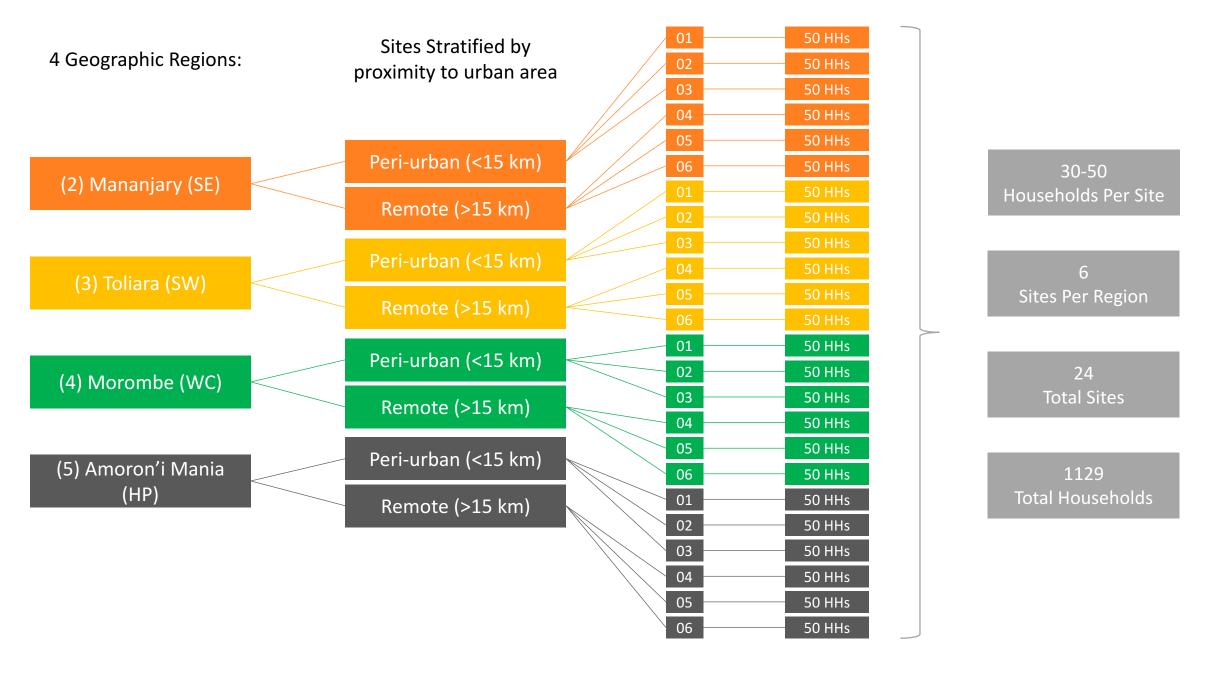


Figure 1: Schematic of nested study design where individuals were sampled within households at 6 sites per region for 4 regions







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	Summary of data set analyzed		1 130
	Regions	4	1 1
	Sites	24	
	Households	1129	1 100
	Individuals	6293	1 1
	Mean household size (number of individuals)	5.57	f (100 f (100
,	Household size range	(2-19)	6 0.00 6 0.00
	Individuals with valid malaria result	5544	
	Percent of individuals with a malaria result (%)	88.1	1 100
1	Number of malaria positive individuals	776	1 1
ì	Malaria prevalence (overall) (%)	13.99	1 1
1	Mean age of individuals (years)	17.34	1 1



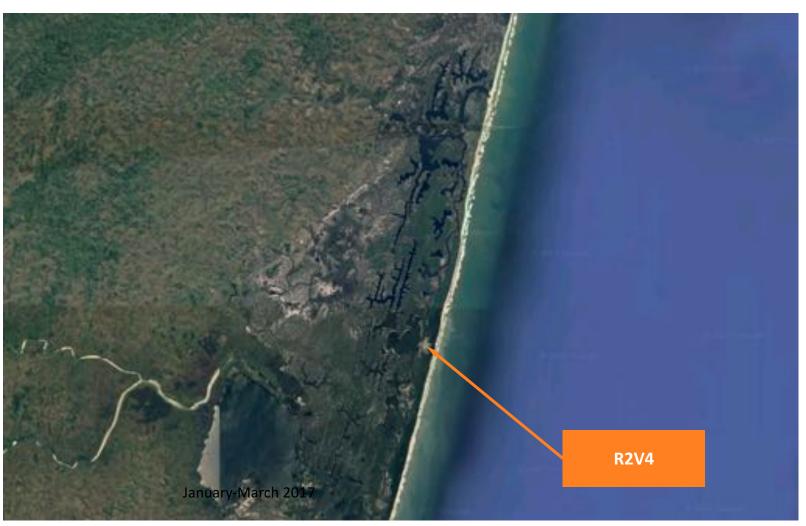










Figure 3: Density plots of age for all individuals, those infected with malaria, and uninfected with malaria (n = 5533)

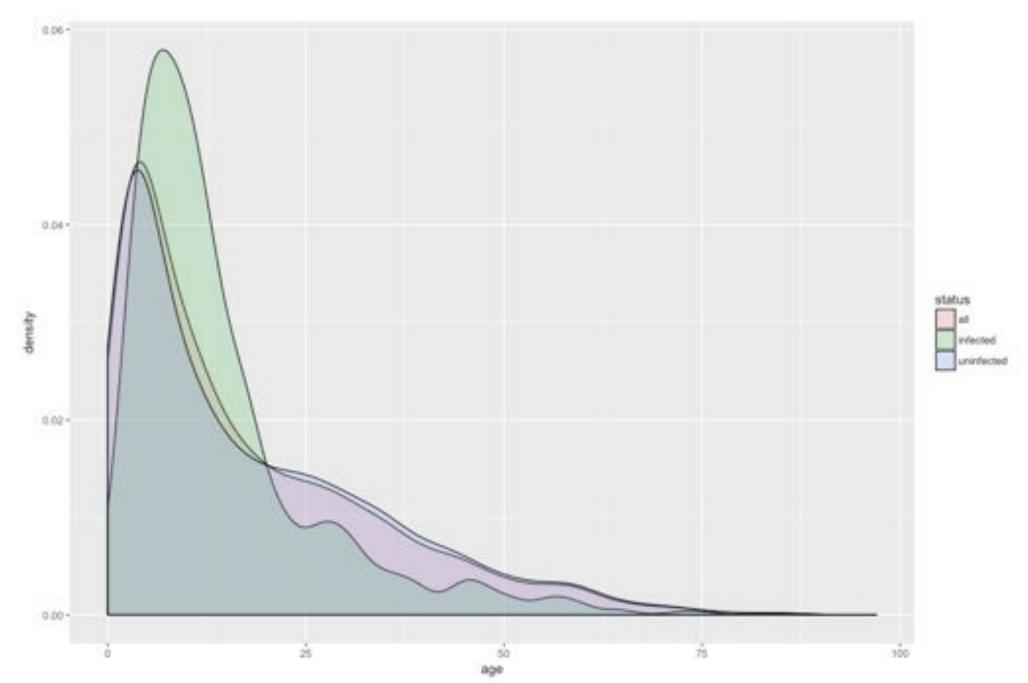


Figure 2: Variation in the percentage of individuals infected (prevalence) between sites within regions and between regions

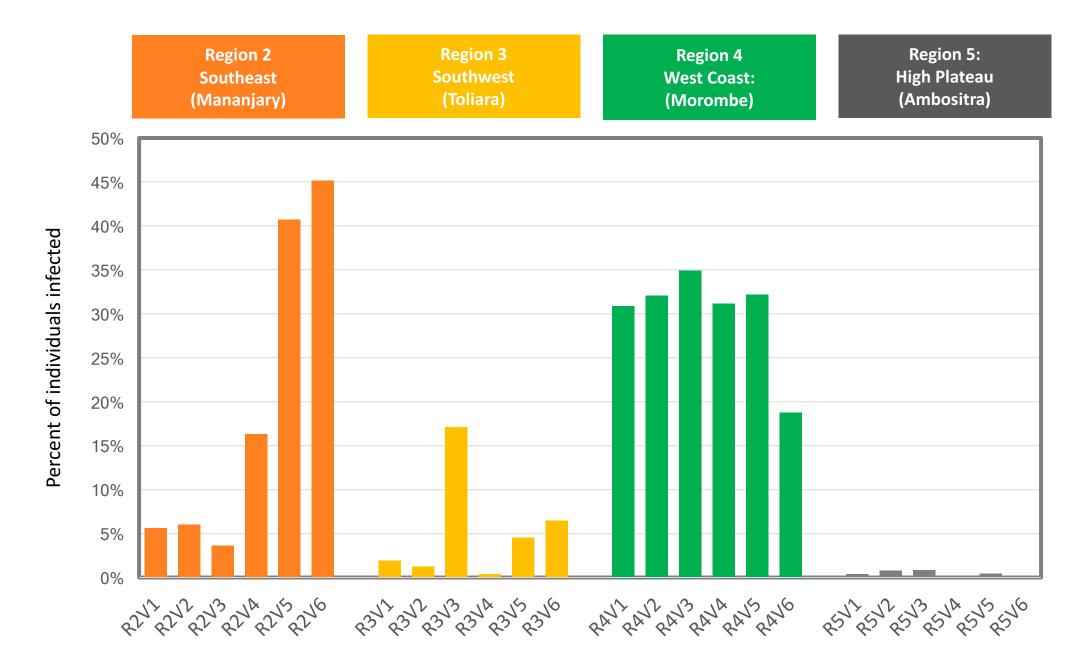


Table 2: Using a simple generalized linear model of four site-specific predictors of malaria prevalence to demonstrate the need for accounting for inter-regional differences

Table 2A: All	regions	combined	n	= 24	sites)	
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Predictor	Coefficient	Confidence interval
Travel time by foot to nearest doctor (hours) (continuous)	-0.73	[-2.31, 0.85]
Road access (binary)	-10.64	[-23.15, 1.87]
Coastal versus inland (binary)	15.56	[2.25, 28.87]
Distance to nearest hospital (km) (integer)	0.31	[-0.099, 0.73]

Table 2B: Excluding Region 5 (n = 18 sites)

Predictor	Coefficient	Confidence interval
Travel time by foot to nearest doctor (hours) (continuous)	-0.93	[-3.0684, 1.2084]
Road access (binary)	-13.73	[-29.2334, 1.7734]
Coastal versus inland (binary)	11.72	[-5.506, 28.946]
Distance to nearest hospital (km) (integer)	0.28	[-0.215, 0.775]

Supplementary Table 2: Parameter values: Empirically derived, chosen simulation inputs or simulation outputs for the intercepts, coefficients, and residual standard deviations show

	Empirical estimate	Simulation (1X)* Inputs	Simulation (1X) Outputs (mean)	Simulation (2X)* Inputs	Simulation (2X) Outputs (mean)
Intercept	14.09	14	5.64	14	18.72
Travel time by foot to nearest doctor (hours)	-0.72	-0.70	-0.71	-1.50	-1.49
Distance to nearest hospital (km)	0.14	0.13	0.13	0.26	0.26
Residual sd	15.61	15	14.84	7.30	7.18

[&]quot;In the "2X" simulation scenario the coefficients (i.e. slopes) were increased approximately by a factor of two and the residual sd was decreased by approximately a fact of two (intercept unchanged). For both simulation scenarios, the proportion of repetitions in which the simulation returned parameter estimates with confidence intervals that covered the inputted parameter values were recorded. For both coefficients in both simulation scenarios, the proportions were above 0.93.

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Table 3: Mean household size a	s a site predictor – not enough sites to	o have sufficient statistical power
Model:	$Pr(infection) = \alpha + \beta^*(mean household size)$	e) + error
Model parameter estimates	All regions included*	Region 5 excluded*
α	38.089 [1.20, 74.97]	7.44 [-76.01, 90.89]
β	-4.301 [-10.749, 2.14]	2.04 [-13.58, 17.66]
Residual sd	15.03	15.65

^{*95%} confidence intervals shown in brackets next to parameter estimates

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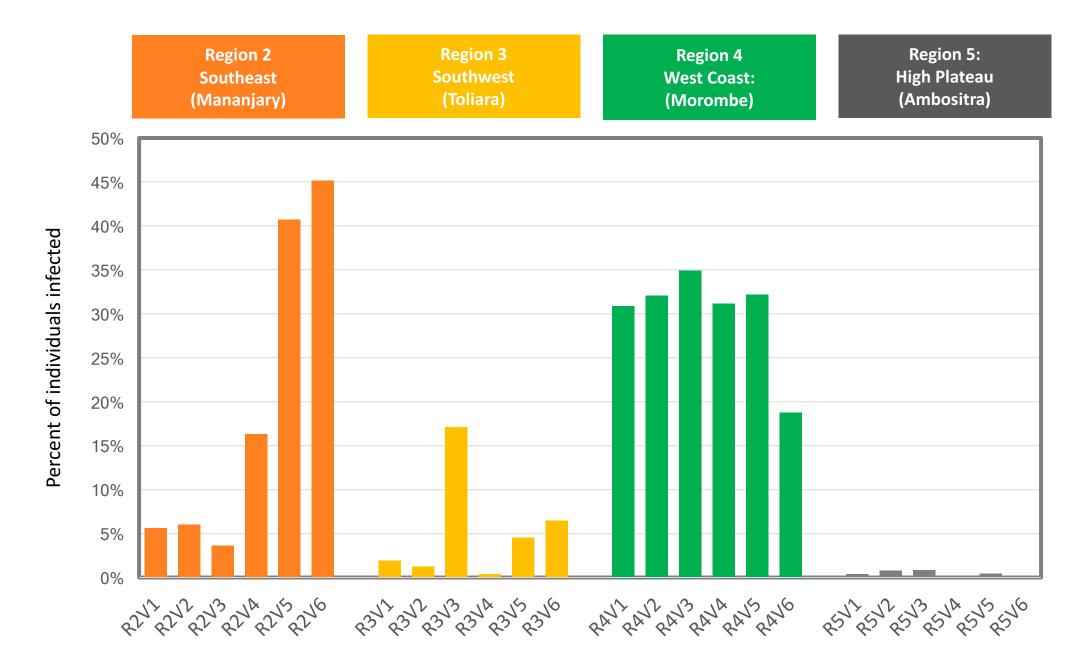


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