**Additional File 4**

**Spatio-temporal structure validation**

The validity of the adopted spatio-temporal structure used in the modelling exercise was tested using steps outlined in the main text. This is significant especially when identifying areas where prevalence lies below (Non-Exceedance Probability-NEP) or above (Exceedance probability-EP) pre-defined thresholds. The results of this exercise are shown in Figure 1 below. Since the empirical semi-variogram (solid line) falls within the 95% tolerance intervals (dashed lines), then the adopted covariance model was compatible with the malaria parasite prevalence data implying that the results of NEPs and EP are valid.

**Figure S3**: Model validation plot, the solid line is the variogram based on the residuals from a non-spatial model (empirical semi variogram). The dashed lines are the 95% confidence intervals generated under the fitted spatio-temporal geostatistical model.

