

ST440/540 – Assignment 8 – Due 4/2

In this assignment you will perform random slopes logistic regression in JAGS using the Gambia data described in

<http://www4.stat.ncsu.edu/~reich/ABA/code/GLM>

Let Y_i be the binary response for individual i , $v_i \in \{1, \dots, 65\}$ denote the village of individual i , and $X_i = 1$ if individual i regularly sleeps under a bed-net and $X_i = 0$ otherwise. Fit the model

$$\text{logit}[\text{Prob}(Y_i = 1)] = \alpha_{v_i} + X_i \beta_{v_i}$$

where α_j and β_j are the intercept and slope for village j . The priors (independent over village and with each other) are $\alpha_j \sim \text{Normal}(\mu_a, \sigma_a^2)$ and $\beta_j \sim \text{Normal}(\mu_b, \sigma_b^2)$. Choose uninformative priors for the hyperparameters μ_a , μ_b , σ_a^2 , and σ_b^2 .

In your report address the follow questions:

- (1) Scientifically, why might the effect of bed-net vary by village?
- (2) Did the MCMC algorithm converge?
- (3) Do you see evidence that the slopes and/or intercepts vary by village?
- (4) Which village has the largest intercept? Slope? Does this agree with the data in these villages?

You should turn in your responses to these questions in 3-4 pages (i.e., two pieces of paper with text on both sides). You should also turn in a separate file with carefully commented code. Only output in the 3-4 page document will be graded. Please staple both documents together!