ST495/590 – Assignment 8 – Due 4/11

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, $v_i \in \{1, ..., 65\}$ 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?

(5) Are the results sensitive to the priors for the hyperparameters?

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!