

Bayesian Analysis of Heart Attack Data

Due: Friday, April 26, 2002

We will revisit a study that was conducted to examine what happened to the blood cholesterol level in patients after a heart attack. The data¹ was collected on 28 patients 2, 4, and 14 days post heart attack and on 30 control patients. The researchers are interested in addressing two questions:

- A. Is the cholesterol levels the same in the two groups of patients?
 - B. How does the blood cholesterol level change after a patient has a heart attack.
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1. Describe a model which includes priors for the fixed effects and variance components. The model for cholesterol level given the fixed and random effects should be a split plot in time. The priors for the variance components should be an inverse gamma with κ and $1/\theta$ close to zero. The prior for the fixed effects should be a normal with $1/\sigma_\beta^2$ also close to zero.
2. Estimate the posterior means, standard deviations, and 95% credible intervals for the variance components.
3. Estimate the posterior means, standard errors, and 95% credible intervals for the differences in cholesterol levels for patients 2, 4, and 14 days post heart attack.
4. Compare and contrast these results with the split plot in time REML analysis.

¹Electronic version: OzDASL - Australasian Data and Story Library
<http://www.statsci.org/data/general/cholest.html>