Comparing Ranks through Simulation

Want to make posterior inference on the relative ordering of the quality of care of the VA hospitals in 1992.

Observed data give one ranking, but no indication of uncertainty

- see the 6th ranked hospital
- many are very similar

Simulation with Transformations

- (Jointly) Ranks are a function of the proportions
  - Observed ranks are a function of observed proportions
  - Posterior for ranks is a function of the posterior for proportions
- A simulation from the posterior for proportions produces a simulation from the posterior for ranks
- Evaluate posterior for ranks via Monte Carlo

- Simulate a vector of proportions from the posterior

$$f_i|Y \sim Beta\,(y_i + 1, n_i - y_i + 1)$$

  $f_i|Y$'s conditionally independent

- Generate k samples from the posterior for proportions
- Transform each sample into a sample of posterior ranks