

<https://classroom.github.com/a/nQ-VPQcj>

The dataset `hospital` is a sample of 113 hospitals from four anonymized regions of the United States. You can find the CSV of the dataset at the following link:

<https://raw.githubusercontent.com/roualdes/data/master/hospital.csv>

You can find the help file for this dataset at the following link:

<https://github.com/roualdes/data/blob/master/hospital.txt>

1. Read in the dataset using the function `read.csv`.
2. Using `ggplot2`, make a scatter plot of the variables `stay` and `infection_risk` with points colored by `region`.
3. Use the likelihood method together with `optim` to predict `infection_risk` using a multiple linear regression model with one slope across `stay` and unique intercepts by `region`.
4. Write 1 complete English sentence describing the estimated intercept for `region 3`.
5. Write 1 complete English sentence describing the estimated slope for all `regions`.
6. Use the bootstrap method to calculate  $R = 999$  bootstrapped estimated coefficients from your model.
7. Write 1 complete English sentence describing a 89% confidence interval for the intercept for `region 3`.
8. Write 1 complete English sentence describing a 89% confidence interval for the slope for all `regions`.
9. Write 1 complete English sentence describing a 89% confidence interval for the predicted `infection_risk` when `stay` is equal to its average.