

# Homework 2

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## Homework 2

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1. How many hospitals filed more than one report in the same year? Show your answer as a line graph of the number of hospitals over time.

Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.  
i Please use `linewidth` instead.

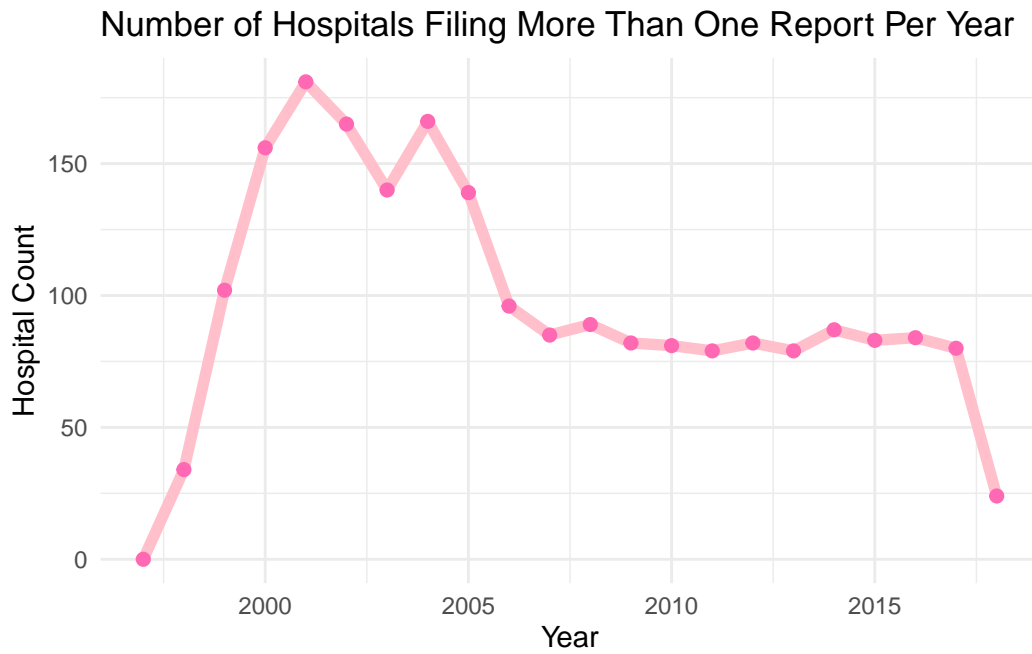


Figure 1

2. After removing/combining multiple reports, how many unique hospital IDs (Medicare provider numbers) exist in the data?

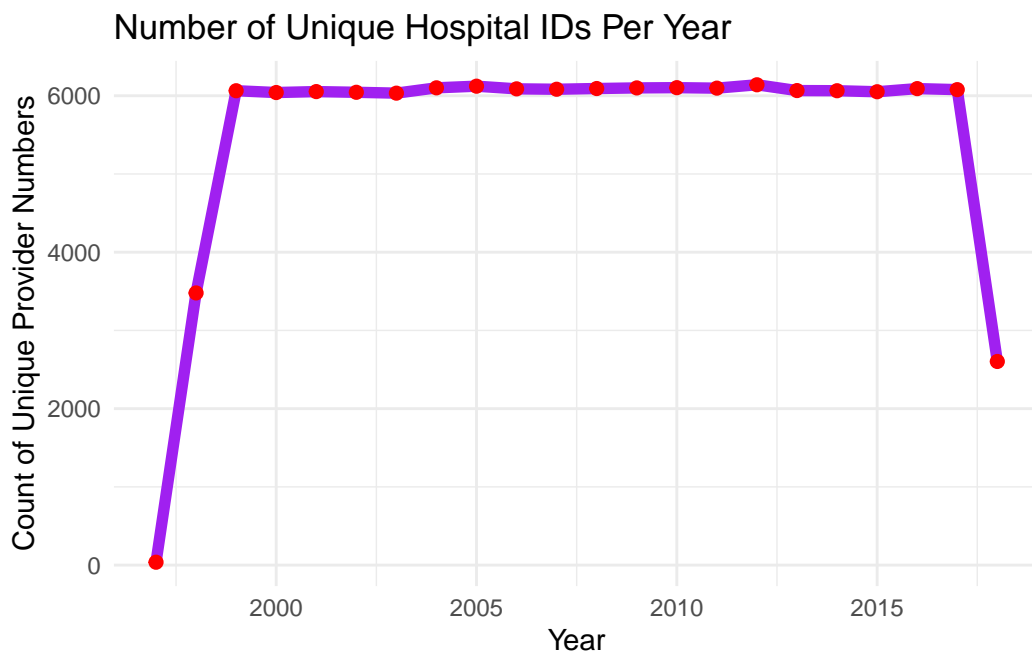


Figure 2

3. What is the distribution of total charges (tot\_charges in the data) in each year?

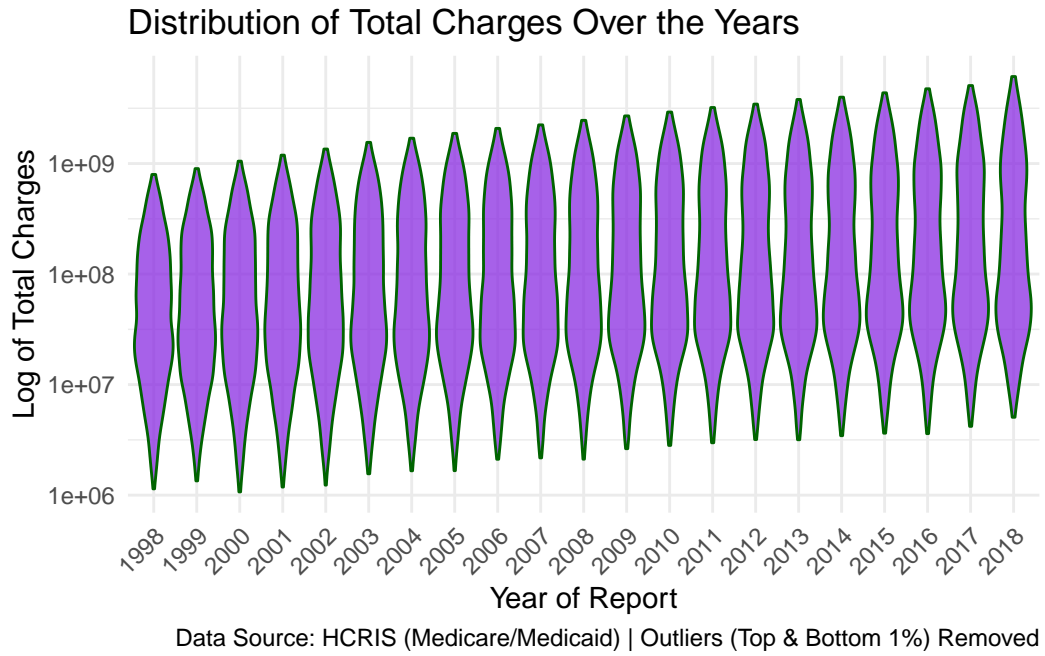


Figure 3

4. What is the distribution of estimated prices in each year?

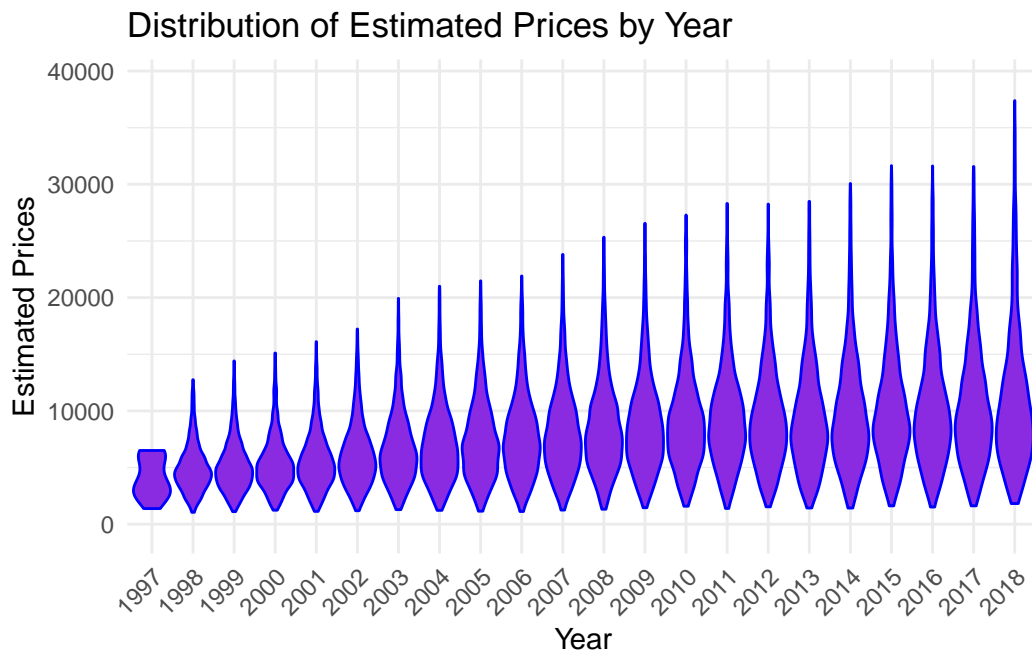


Figure 4

5. Calculate the average price among penalized versus non-penalized hospitals.

The mean price for penalized hospitals is 9896.31, and the mean price for non-penalized hospitals is 9560.41.

6. Calculate the average price among penalized versus non-penalized hospitals.

Table 1: Summary of Prices for Penalized and Non-Penalized Hospitals

Bed Quartile	No Penalty	Penalty
Q1	7696.470	8286.338
Q2	8525.607	8721.033
Q3	9848.404	10132.315
Q4	12367.332	12068.479

7. Find the average treatment effect using each of the following estimators, and present your results in a single table: `:: {cell} :: {cell-output-display}`

Table 2: ATE Estimates from Different Methods

Method	ATE Estimate
Nearest Matching (Inverse Variance)	193.8313
Nearest Matching (Mahalanobis Distance)	193.8313
Inverse Propensity Weighting (IPW)	193.8313
Linear Regression	193.8313

`:: ::`

8. Are the results similar, identical, or very different?

The treatment effect estimators produced very similar results, with each estimator yielding identical average treatment effect (ATE) coefficients.

9. Do you think you've estimated a causal effect of the penalty? Why or why not?

No, because the analysis only controlled for bed size, but many other factors could influence hospital prices. Variables such as patient characteristics, which can vary across hospitals, were not considered, making it unlikely that we've isolated the true causal effect of the penalty.

10. Briefly describe your experience working with these data. Tell me one thing you learned and one thing that really aggravated or surprised you.

Working with these data was challenging, as hospital price data is rarely represented as a single figure. I struggled with knowing whether I was approaching the right or wrong answer when running the code. One key takeaway was learning about the complexities of hospital pricing, but it was frustrating not knowing how accurate my results were, given the data's intricacies.