Bootstrapping Diabetes Data to Illuminate Factors Final Paper

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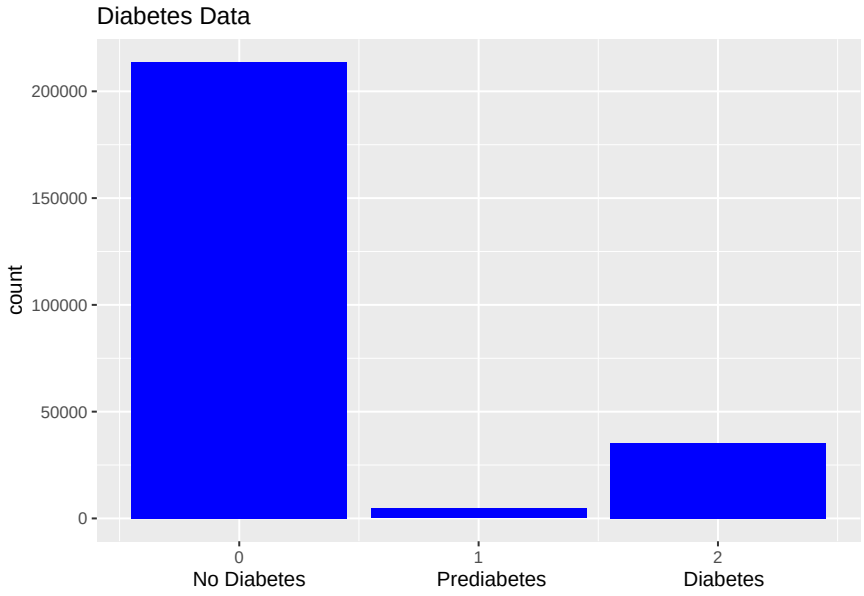
Dataset

We got our dataset from kaggle:

The dataset consisted of health indicators for people with no diabetes, prediabetes, and diabetes.We chose to focus on the variables HighBP, HighChol, BMI, AnyHealthcare, GenHlth, and Income out of the 21 factors in the dataset

- High BP, HighChol, and AnyHealthcare are binary
- GenHlth has 5 levels
- BMI and Income are continuous



Methods

We decided to bootstrap our data because there was a massive difference in sample sizes for the 3 classifications of patients. We utilized all 5 types of bootsrapping.

Table 1: No Diabetes - Prediabetes

	mean	low percentile	high percentile	low basic	high basic
HighBP	-0.258	-0.272	-0.244	-0.272	-0.243
HighChol	-0.241	-0.255	-0.227	-0.257	-0.228
BMI	-2.984	-3.173	-2.783	-3.181	-2.791
AnyHealthcare	0.005	-0.002	0.011	-0.002	0.011
GenHlth	-0.603	-0.632	-0.572	-0.635	-0.575
Income	0.857	0.790	0.920	0.795	0.925

Table 2: Prediabetes - Diabetes

	mean	low percentile	high percentile	low basic	high basic
HighBP	-0.124	-0.272	-0.109	-0.272	-0.243
HighChol	-0.050	-0.064	-0.033	-0.065	-0.035
BMI	-1.210	-1.430	-0.981	-1.459	-1.009
AnyHealthcare	-0.015	-0.021	-0.008	-0.022	0.011
GenHlth	-0.316	-0.632	-0.285	-0.345	-0.281
Income	0.141	0.073	0.209	0.073	0.209

Percentile and Basic

For the percentile and basic bootstrapping, I decided to focus on the difference in means and seeing if there was any difference between the two types of bootstrapping to check my assumptions bout biasness. If there was a large difference between my methods, that would have meant there was bias in the sample. My calculations showed no bias so I wanted to make sure that my bootstrapping methods matched this finding. I used R=1000 for each bootstrap and found the difference in means for each variable for the 3 combinations of no diabetes, prediabetes, and diabetes.

Normal and Studentized

BCa

Results

In my results, I found that there was a significant difference in means for most of my combinations. The only variable that didn't have consistent significant difference in means was the AnyHealthcare variable. I also found that the percentile and basic bootstraps were very similar which matched both my assumption and my findings for low SE

The following are tables showing the mean difference among the combinations of no diabetes, prediabetes, and diabetes for all the varibles and for both kinds of bootstrapping:

Table 3: Diabetes - No Diabetes

	mean	low percentile	high percentile	low basic	high basic
HighBP	0.381	0.377	0.386	0.377	0.386
HighChol	0.291	0.286	0.296	0.286	0.296
BMI	4.201	4.120	4.281	4.122	4.283
AnyHealthcare	0.010	0.008	0.012	0.008	0.012
GenHlth	0.919	0.907	0.930	0.907	0.930
Income	-0.998	-1.021	0.920	-1.024	-0.976

Percentile and Basic

Normal and Studentized

BCa

Overall Results