## Assessment

New Zealand Crash Data

Problem:

In 2011 there were 1409 serious or minor crashes where alcohol or drugs were recorded as a factor. A random sample was taken from these drivers and they were interviewed in person by researchers. A sample of 317 drivers was taken to analyse. The variables that I will be using are different risk groups and the blood alcohol level. The Two risk groups are a high risk group which is an age group between 15-24 and a low risk group which is between the ages of 50-59.

What is the difference between the median blood alcohol levels for drivers aged 50-59 and drivers aged 15-24 in New Zealand during 2011? ①

Data:

A random sample was taken from these drivers and they were interviewed in person by researchers. A sample of 317 drivers was taken to analyse.
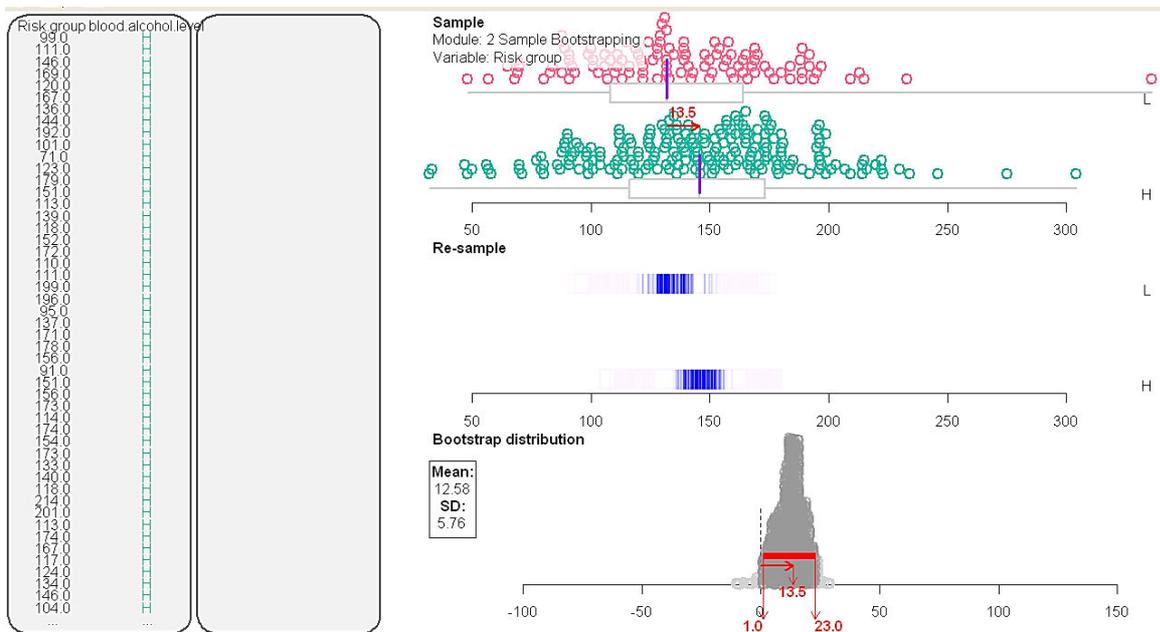
Analysis:

Overall Visual Comparisons:

My initial impression of this sample is that people aged 15-24 (high risk group) have their blood alcohol levels more spread out than people aged 50-59 (low risk group). Also there are more people in the high risk group than there are in the low risk group. You can see this clearly in the sample. ③

Centres:

The sample median blood alcohol level for people aged 50-59 (low risk group) is 13.5 milligrams of alcohol per 100 millilitres of blood lower than people aged 15-24 (high risk group). ③

I was surprised how many high risk drivers there were involved in serious and minor crashes in 2011. Out of the 317 people involved in this sample, 206 were high risk drivers and only 111 were low risk drivers.

Shape:

The distributions of both high and low risk groups are slightly right skewed, with most of the data between 0 milligrams of alcohol per 100 millilitres of blood and 150 milligrams of alcohol per 100 millilitres of blood.

Unusual:

In the sample the person who has the highest blood alcohol level is 336 milligrams of alcohol per 100 millilitres of blood yet they are in the low risk group. There must have been some extreme circumstances which is why they are an outlier.

Shift/Overlap:

There is large overlap between the middle 50% of the blood alcohol level for both risk groups with the median not too far away from each other. Still, this overlap is not extreme and with the medians being different I can make a clear call on what risk group has the higher blood alcohol level.

I will calculate a bootstrapping confidence interval anyway to confirm this.

Statistical Inference:

From the bootstrapping confidence interval you can see that the median blood alcohol level for high risk drivers in New Zealand in 2011 is somewhere between 1 milligram of alcohol per 100 millilitres of blood and 23 milligrams of alcohol per 100 millilitres of blood higher than the blood alcohol level for those in the low risk group.

Conclusion:

From these samples, I can make the call that there is a difference in the blood alcohol levels for people in the low risk group (people aged 50-59) and the people in the high risk group (people aged 15-24). That is, I can make the call that people in the high risk group in New Zealand have a higher blood alcohol level.

I am pretty sure that the median blood alcohol level for high risk drivers is somewhere between 1 milligram of alcohol per 100 millilitres of blood and 23 milligrams of alcohol per 100 millilitres of blood more than the median blood alcohol level for low risk drivers. I can make the call from these samples that there is a difference in the blood alcohol level for low and high risk drivers involved in crashes in New Zealand.

My sample did highlight that the middle section of the high risk group had more drivers involved to that of driver in the low risk group.

I am fairly confident that, if I took another sample even though the sample might be different and the initial graphs and statistics might be different, I would still make the same call as I think the difference between the medians is quite high and positive.