2017

Program Exit Assessment

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# Task 1

## Introduction

The data given to us is pulled from Stats Canada and the FBI website about homicides in Canada and the Unites stated. The data is from 2005 to 2014 and includes the method used to commit the commit, breaking it down primarily into total homicides, firearm homicides and then more specifically, handgun homicides. This data was collected when the method of death was confirmed by police officials and once it had been confirmed that the death was a homicide related incident. This data was taken so that the Canadian and US governments know where these crimes are happening in their countries so that they can make an effort into putting money where it’ll make a bigger difference. By providing more funding to police departments where more homicides typically happen, they can try and reduce the amount if fatal crime in different regions.

## Comparing the normalized data from Canada and the US.

Figure : Normalized homicide data in Canada and the US

Figure : Normalized handgun homicide data in Canada and the US

Figure : Normalized firearm homicide data in Canada and the US

Figure : Normalized total Canadian homicide data and firearm homicides

Figure : Normalized total American homicides and firearm homicides

These 5 bar charts represent the normalized data of total homicides, firearm related homicides, and specifically handgun homicides in Canada and the United States. We can see very clearly in the fire bar chart the United States has over twice as many homicides per million people than Canada every year. While the United States maxed out ~50 homicides per 1 million people, Canada only hit ~21. In the next two charts, we start looking at firearm and specifically handgun homicides. We can note two things from this normalized data. The first of which, is that if the number of guns owned, the types of guns owned, and the law controlling the guns were the same in Canada and the United States, we would see this data look very similar to the first bar chart, with Canada having overall less murders, but around the same proportion compared to the United States in each of these three graphs. However, what we see instead is a significant drop in the proportion of homicides in Canada that are being committed with a firearm. This indicates that Canada’s gun control laws and the number of guns that are owned by people in the country has a significant impact on the proportion of homicides that are carried out with firearms. This is then confirmed in the last two bar charts.

In the 4th one, we look at the total number of homicides in Canada in proportion to the total number of firearm homicides in Canada and we can see that only ~30% of homicides are done with firearms. In the Unites States however, that proportion is significantly different. In the US, the percentage of homicides using firearms is closer to ~68%. That means that if you are murdered in America, you are more than twice as likely to have been killed with a firearm, than if you got murdered in Canada.

Each of these bar charts have similar shapes to them. They’re almost all relatively uniform, but slightly skewed to the right. There’s a definite decrease in the homicide rates over the course of the years that these number were recorded. None of these charts have any significant enough difference in deaths to really consider any of it being a mode, so it’s relatively uniform and skewed to the right.

In Science vs., there’s a lot of discussion about how firearms are managed by the governments in different countries. In the US, buying a firearm from a registered gun dealer means filling out a simple form that can be returned within days, where the buyer is background checked by poorly maintained data. On top of that, anyone can go out and legally sell a gun privately. In Canada however, there’s no such thing as private purchases like that. All firearms must be purchased through a registered dealer, all owners must carry a license to own that type of gun, and the pool of types of weapons you can purchase is significantly smaller. In Canada, you aren’t likely to find much that isn’t used for hunting purposes or for sport. From this information, we can draw the conclusion that the regulation of guns in Canada and the types of guns you can purchase, decreases the number of firearm related homicides in the country.

## Summarizing the raw data from Canada and the US

The following summaries represent the homicide data that was recorded in Canada and the United States. The data is broken down into six different summaries, 3 for each country, showing the total homicides, the firearm homicides, and the handgun specific homicides in each country. These summaries show us what the least amount of homicides we saw in a single year was, what the maximum amount we saw was, the average across the years, and the first and third quartiles of the data, so we can see where 68% of the data lies.

These summaries tie in to what Science vs. had to say about the proportion of homicides that were committed using firearms in the US. They said that over 50% of homicides in the US are caused by firearms, which holds up in the data that we see here. According to this data set, firearms accounted for on average 68% of all homicides in the US. This is compared to Canada where firearms only accounted for approximately 31% of all homicides from 2005 to 2014. This is a significant different when Canada is one of the leading countries in the world in terms of number of guns per capita.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Minimum | 1st quartile | Mean | 3rd quartile | Maximum |
| Canadian Handgun Homicides | 2.56 | 2.96 | 3.274 | 3.8 | 4.07 |
| Canadian Firearm Homicides | 3.85 | 4.61 | 5.292 | 5.87 | 6.96 |
| Total Canadian Homicides | 14.54 | 15.74 | 17.262 | 18.4 | 20.62 |
| American Handgun Homicides | 17.44 | 19.77 | 21.563 | 24.53 | 26.24 |
| American Firearm Homicides | 25.47 | 27.76 | 30.024 | 33.59 | 34.35 |
| Total American Homicides | 37.51 | 41.03 | 44.26 | 49.46 | 50.6 |

## Comparing population groups

The following box plot represents the normalized data of the firearm homicides in Canada and in the US. We can see here that even though we’re looking at the normalized data, Canada’s maximum number of firearm homicides in a single year never comes close to hitting the minimum firearm homicides observed in the US in one year. The mean number of firearm homicides in the US is 30/1000000 people, while in Canada it’s only down at 5/1000000 people. If we were to make histograms of these datasets, we would expect to see both Canada and the US having a slight skew to the right indicating a decreasing amount of homicides.

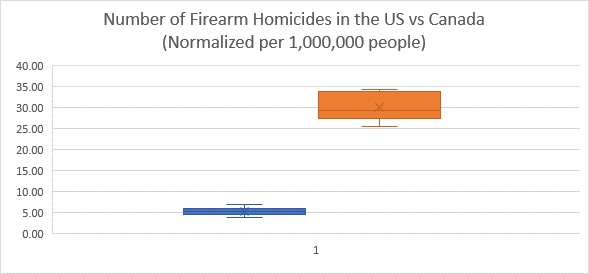


Figure : Normalized data comparing firearm homicide number in Canada and the US

In the next boxplot, we observe the mean number of total homicides in Canada and the US. The US averages around 43 homicides per 1000000 people, while Canada is at ~18/1000000. This means that Canada, although it has significantly less firearm homicides than the US, it has a little less than half as many total homicides. This ties in to something that was mentioned in the Science vs. podcast. While we don’t see crime rates appear in these data sets at all, we can say that increased homicide rate might be because of the fact that a gun is far more likely to be between two people during potentially dangerous encounter, whether it’s a burglary, an assault, or any other type of crime. Having the gun between the two people automatically increases the odds of that crime turning fatal, and in Canada you can’t open carry a weapon, and at home it must be under lock and key. So, while Canada can have plenty of other weapons between an attacker and a victim, a firearm is far less likely, potentially leading to lower homicide rates.

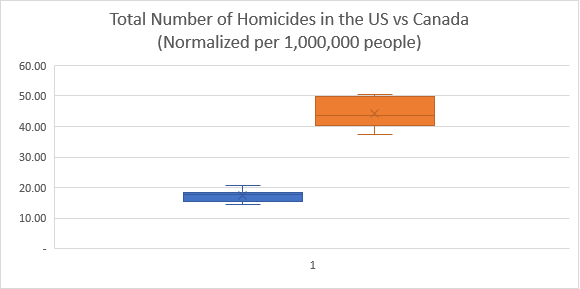


Figure : Normalized data comparing total number of homicides in Canada and the US.

# Task 2

Figure : Normalized Canadian data for homicides with firearms vs total homicides

The scatterplot above represents the total number of homicides compared to the number of firearm homicides with each year from 2005 to 2014 as a data point. The correlation between the total number of homicides and the number of homicides is quite strong. The correlation is positive and linear, so as the number of total homicides go up, we also see the number of firearms homicides go up with the proportion of total to firearm homicides staying relatively similar. The data does meet the correlation conditions for this scatter plot. The data points are both quantitative, the plot does meet the straight enough, and there are no outliers here. The data point for 2011 is the one data point here that could potentially be an outlier, but I don’t believe that the data is far enough away from the trend line to be able to be considered one. The correlation coefficient for this scatter plot is .9181, which means that there is a very strong correlation between the number of homicides and the number of firearm homicides every year.

Figure : Normalized American data for homicides with firearms vs total homicides

This scatterplot represents the total number of homicides compared to the number of firearm homicides in the US with each year from 2005 to 2014 as a data point. The correlation between the total number of homicides and the number of homicides is very strong. The correlation is positive and linear, so as the number of total homicides go up, we also see the number of firearms homicides go up with the proportion of total to firearm homicides staying relatively similar. The data does meet the correlation conditions for this scatter plot. The data points are both quantitative, the plot does meet the straight enough, and there are no outliers here. The correlation coefficient for this scatter plot is .9964, which means that there is a very strong correlation between the number of homicides and the number of firearm homicides every year.

# Task 3