Assignment 2

**Reported Family Incidents Before and During the COVID 19 Pandemic**

3. Introduction [Plain text]: QUESTION 3 Assignment

The article in the ABC news dated the 21 March 2021, discusses increases in the number family violence incidents in Victoria during the 2020 COVID 19 pandemic. After seeing the article, we were motivated to do our own investigation and conduct some statistical analysis of our own, to see if what was reported in the article had statistical merit. Here is the URL link to the article:

<https://www.abc.net.au/news/2021-03-18/victorian-crime-statistics-coronavirus-pandemic-family-violence/100016152>

Statistical analysis is very important in this area, as more government funding and private fundraising can be used to educate and support families and victims of family crime if the data highlights a change during the pandemic.

4. Data [Plain text]: QUESTION 4 Assignment

There have been unprecedented Government mandated lockdowns between April 2020 and October 2020 in Victoria, which has pushed families to live in closer proximity than ever before and with very limited outside freedom. Has the number of incidents changed during the COVID 19 pandemic 2020 because of these mandated lockdowns?

(Support for this)

<https://www.abc.net.au/news/2020-03-16/victoria-coronavirus-state-of-emergency-powers-explained/12059194>

In our statistical analysis, we will use the paired t-test for 2 independent variables. The rationale for the paired-samples t-test is that we are comparing the variance between the 2 years in the same demographic locations to ascertain if there is a change in the mean for the state of Victoria. We will conduct some summary statistics on the variance between the 2 years using the mutate function in R. To ascertain if the data is normally distributed and understand the outliers, we will perform a qqPlot function to visualise the normality of differences. There are 79 observations, greater than the 30 observations required if the data is not normally distributed.

5. Data [Plain text]: QUESTION 5 Assignment

To conduct our analysis, we used the Family Incidents dataset. The data was in the crime statistics agency data tables, in the VIC.GOV.AU | DATA website. The URL link is:

<https://discover.data.vic.gov.au/dataset/data-tables-family-incidentss>

The open dataset used for this analysis contains 5 years of recorded family related offences between 2016 and 2020. The temporal coverage for each year of the dataset starts on 1st of January and ends on the 31st of December.

There are 79 observations in each year, one in each local government area, overarched by the applicable police region. We are only interested in 2019 and 2020, the year before and during the COVID 19 pandemic. We used the numerical ratio of ‘rate per 100,000 population’ as this was the most appropriate and considers population movements year on year. Our data prepossessing activities consisted of filtering out all categorical variables except for year, filtering out numeric totals by the Police Region variable and filtering out the number of incidents. The data was then converted into a data frame, consisting of only the year and rate per 100,000 population.

**Hypothesis**

H0 : μΔ=0

The COVID 19 pandemic and the number of reported family incidents per 100,000 population are both independent, therefore the number of reported family incidents per 100,000 population remains the same in 2019 and 2020.

HA : μΔ≠0

The COVID 19 pandemic and the number of reported family incidents are not independent, therefore the number of reported family incidents has changed between 2019 and 2020 because of the COVID 19 pandemic.

**Supporting evidence of the first case in Victoria**

Paired 2 sample \_t-test write up

The paired samples t-test was used in our investigation on whether there was a significant difference in the mean values of reported family incidents during COVID 19 in 2019 and during COVID 19 in 2020. We used the ggPlot visual to understand the outliers and found that the data was not normally distributed as there were a significant number outliers, however we had 79 observations, more than the required 30 in this case.