

NYPD Shooting Incident Data Report

Xiao

2023-01-23

Description of the data - NYPD Shooting Incident Data (Historic):

The name of the dataset is called NYPD Shooting Incident Data(Historic). The source of the dataset: <https://catalog.data.gov/dataset/nypd-shooting-incident-data-historic> This dataset is a record of every shooting incident that occurred in NYC from 2006 to 2022 and provided by City of New York.

Questions of interest

This project will analyze NYPD shooting incidence data to assess the safety of New York City. The NYPD shooting incidence dataset that we use is accessible on data.gov. This dataset is a breakdown of every shooting incident that occurred in NYC from 2006 to 2022. My research questions are: Are all areas of Brooklyn equally dangerous? Is Manhattan a safer area overall? And what time of day should one avoid going out in New York City?

Step 1. Start an Rmd Document

a. loading package

```
library(tidyverse)

## -- Attaching packages ----- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr   1.0.1
## v tibble  3.1.8      v dplyr  1.0.10
## v tidyr   1.2.1      v stringr 1.5.0
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

b. reading the data

```
url_in <- "https://data.cityofnewyork.us/api/views/833y-fsy8/rows.csv?accessType=DOWNLOAD"
NYPD <- read.csv(url_in)
```

Step 2. Tidy and Transform Data

a. check for missing value

```
sapply(NYPD,function(x) table(as.character(x) == "")["TRUE"])
```

```
##          INCIDENT_KEY.NA          OCCUR_DATE.NA
##                NA                NA
##          OCCUR_TIME.NA          BORO.NA
##                NA                NA
##          PRECINCT.NA    JURISDICTION_CODE.NA
##                NA                NA
##    LOCATION_DESC.TRUE STATISTICAL_MURDER_FLAG.NA
##                14977                NA
##    PERP_AGE_GROUP.TRUE          PERP_SEX.TRUE
##                9344                9310
##          PERP_RACE.TRUE          VIC_AGE_GROUP.NA
##                9310                NA
##          VIC_SEX.NA          VIC_RACE.NA
##                NA                NA
##          X_COORD_CD.NA          Y_COORD_CD.NA
##                NA                NA
##          Latitude.NA          Longitude.NA
##                NA                NA
##          Lon_Lat.NA
##                NA
```

b.tidy dataset

Due to an excessive amount of missing values, the columns perp age group, perp sex, perp race, and location desc will not be used. I will be using the columns vic_age_group, vic_sex, vic_race, boro, and precinct columns. As they have high quality data. Columns jurisdiction code and the columns from x_coord_cd to lon_lat will not be used in my analysis.

```
NYPD <- subset(NYPD, select = -c(JURISDICTION_CODE,LOCATION_DESC,
PERP_AGE_GROUP:PERP_RACE,X_COORD_CD:Lon_Lat))
```

c. summary of the dataset

```
summary(NYPD)
```

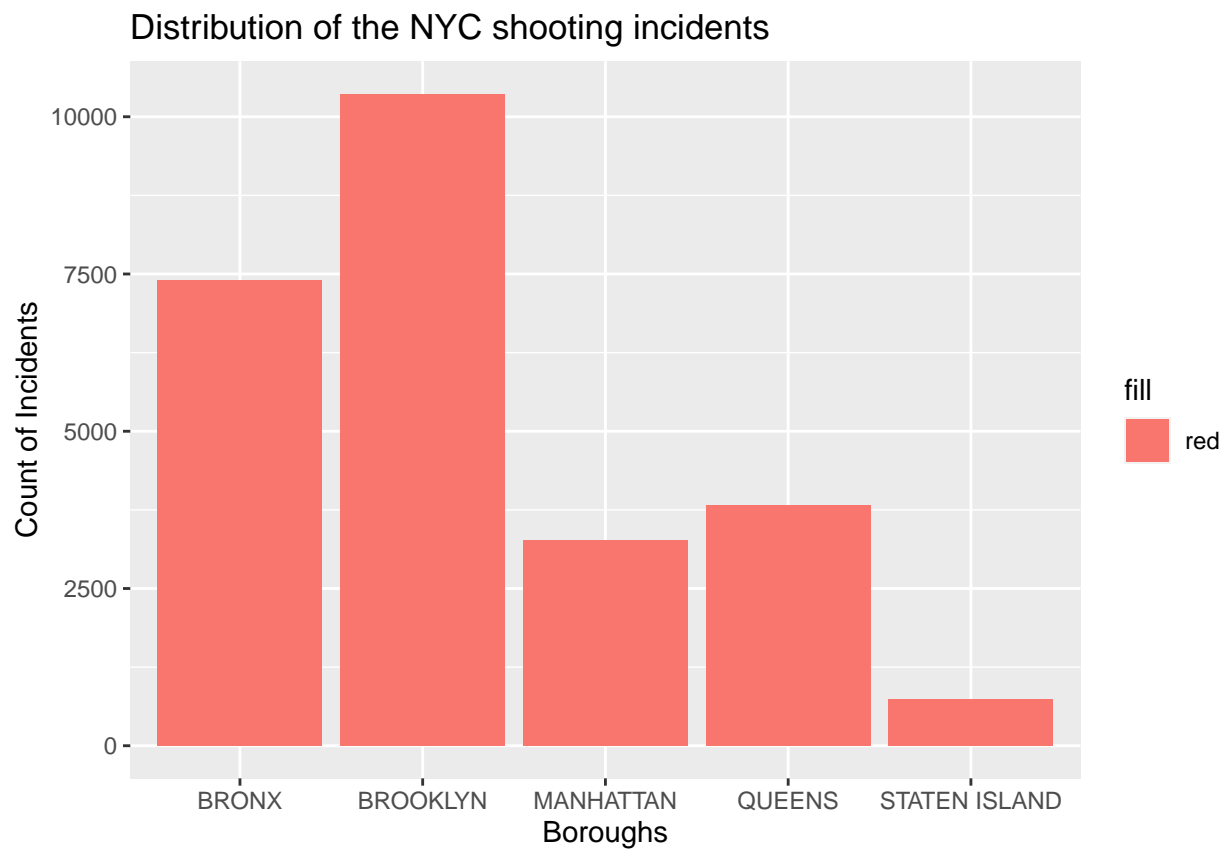
```
##    INCIDENT_KEY    OCCUR_DATE    OCCUR_TIME    BORO
## Min.   : 9953245 Length:25596 Length:25596 Length:25596
## 1st Qu.: 61593633 Class :character Class :character Class :character
## Median : 86437258 Mode  :character Mode  :character Mode  :character
## Mean   :112382648
## 3rd Qu.:166660833
## Max.   :238490103
```

```
##      PRECINCT      STATISTICAL_MURDER_FLAG VIC_AGE_GROUP      VIC_SEX
## Min.   : 1.00    Length:25596                Length:25596      Length:25596
## 1st Qu.: 44.00    Class :character                Class :character  Class :character
## Median : 69.00    Mode  :character                Mode  :character  Mode  :character
## Mean   : 65.87
## 3rd Qu.: 81.00
## Max.   :123.00
##      VIC_RACE
## Length:25596
## Class :character
## Mode  :character
##
##
##
```

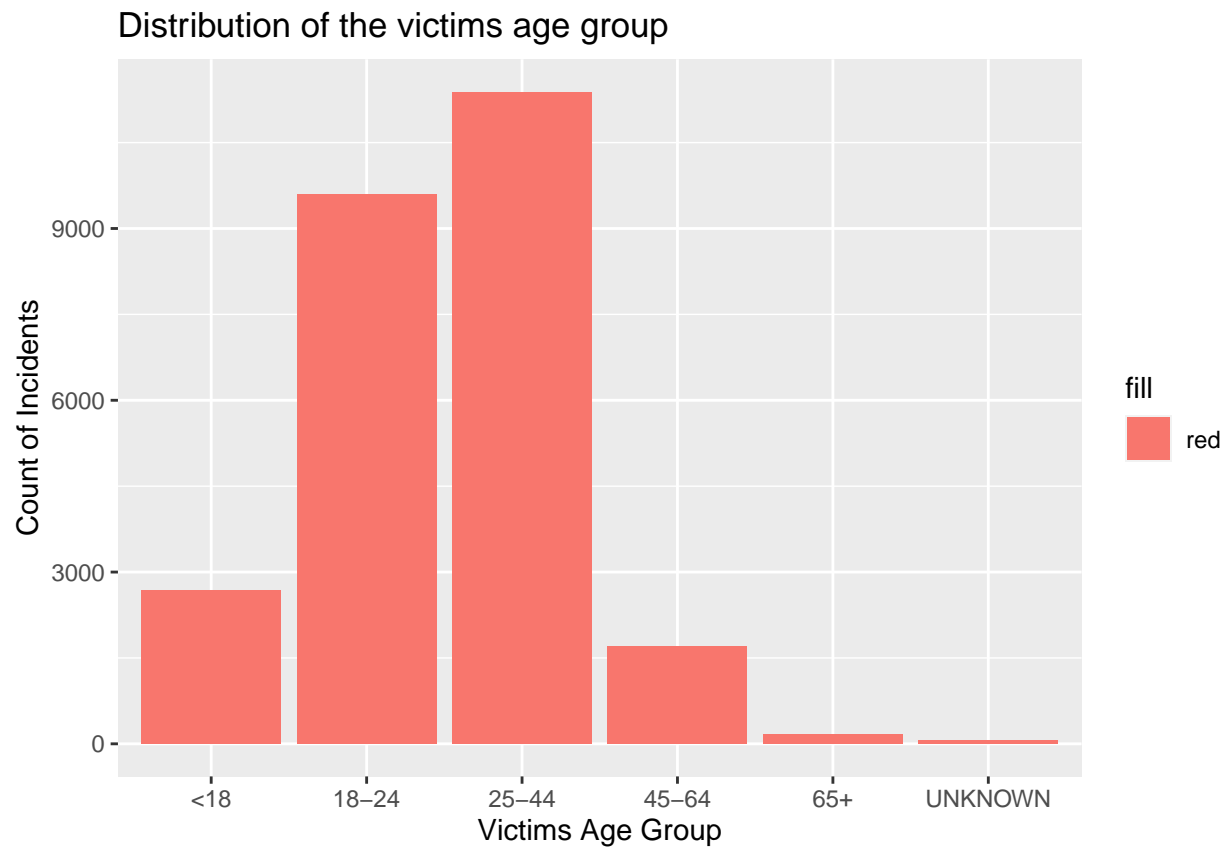
Step 3. Visualization and Analysis

a. visualizing Data

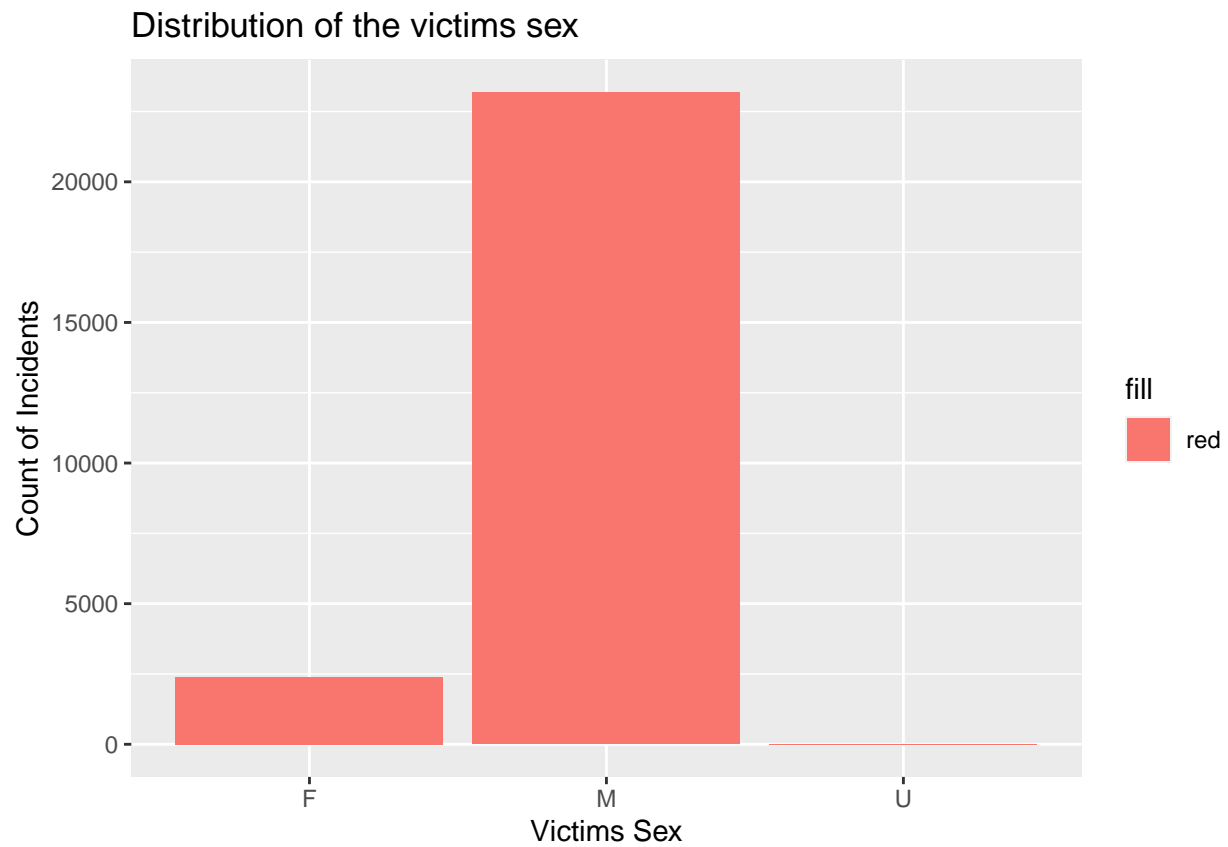
```
ggplot(NYPD, aes(x=BORO,fill="red")) + geom_bar() +
  labs(title = "Distribution of the NYC shooting incidents",
       x="Boroughs", y="Count of Incidents")
```



```
ggplot(NYPD, aes(x=VIC_AGE_GROUP,fill="red")) + geom_bar() +
  labs(title = "Distribution of the victims age group",
        x="Victims Age Group",y="Count of Incidents")
```

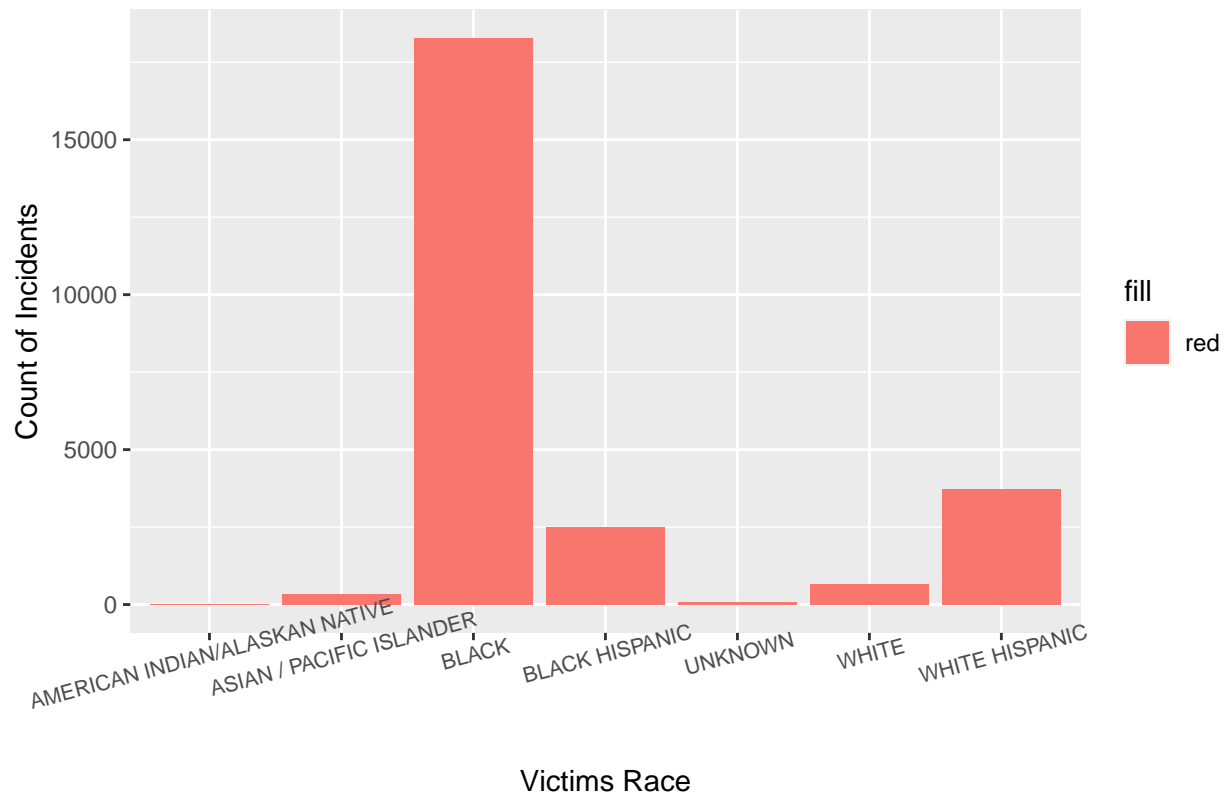


```
ggplot(NYPD, aes(x=VIC_SEX,fill="red")) + geom_bar() +
  labs(title = "Distribution of the victims sex",
        x="Victims Sex", y="Count of Incidents")
```

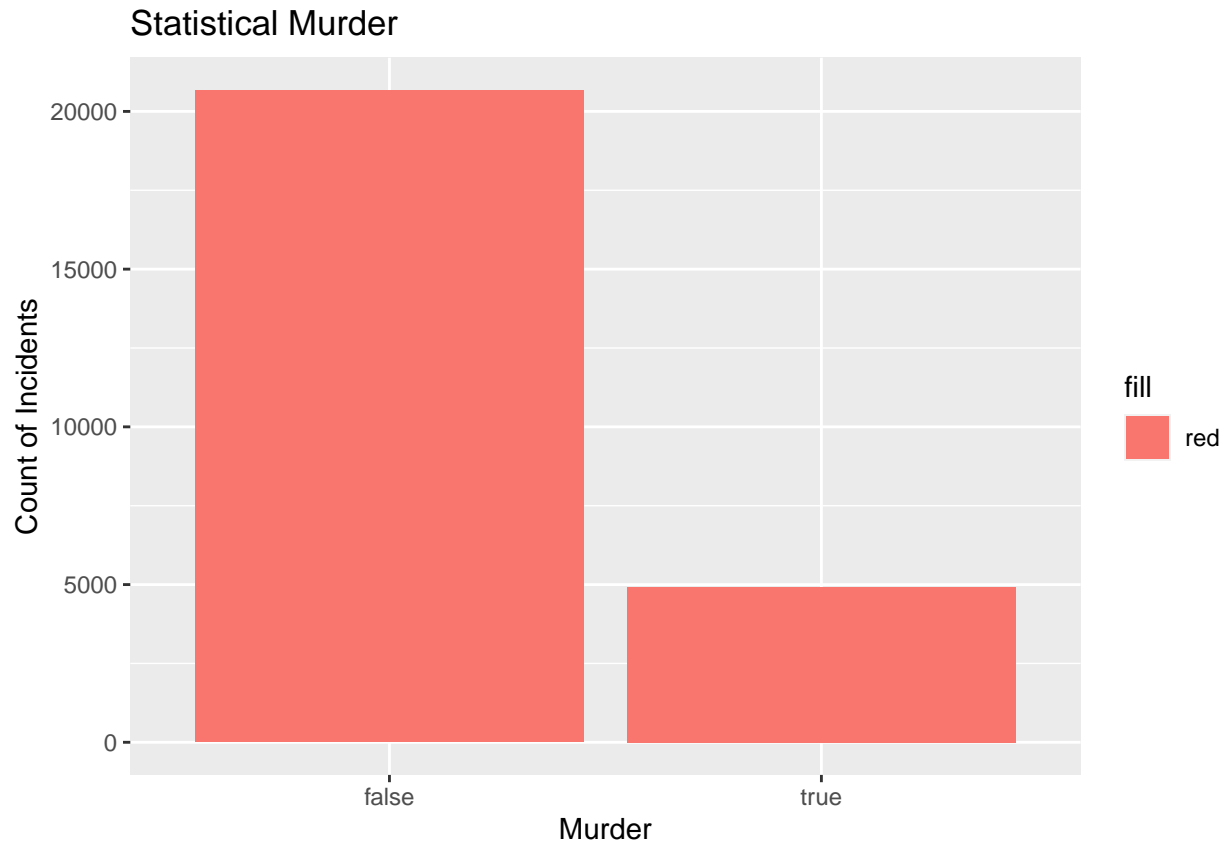


```
ggplot(NYPD, aes(x=VIC_RACE,fill="red")) + geom_bar() +  
  labs(title = "Distribution of the victims race",  
        x="Victims Race", y="Count of Incidents") +  
  theme(axis.text.x= element_text(size=8, angle=15))
```

Distribution of the victims race



```
ggplot(NYPD, aes(x=STATISTICAL_MURDER_FLAG, fill="red")) + geom_bar() +  
  labs(title = "Statistical Murder", x="Murder", y="Count of Incidents")
```



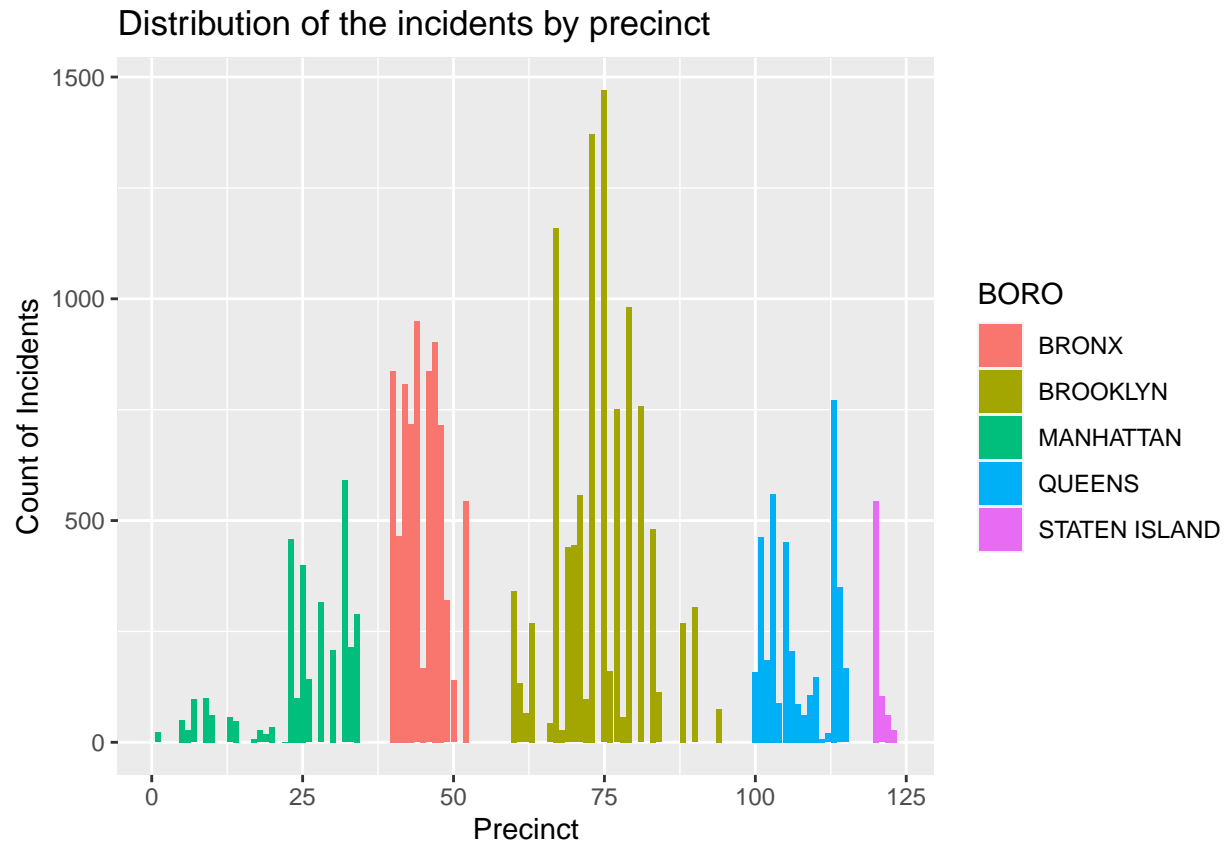
According to the above bar charts, Brooklyn has the most shooting incidents. The majority of the victims are male, between the ages of 18 and 44, and are of the black race. 80% of the incidents are not murder. In light of this, I now have a research question. Are all areas of Brooklyn dangerous? Is Manhattan a safer area? What time should you not be out in New York City?

b. analysis and research questions

Analysis for research question for 1 and 2

1st to 34th precinct represented in Manhattan. 40th to 52nd precinct represented in Bronx. 60th to 94th precinct represented in Brooklyn. 100th to 115th precinct represented in Queens. 120th to 123rd represented in Staten Island.

```
ggplot(NYPD, aes(x=PRECINCT,fill=BORO)) + geom_bar() +
  labs(title = "Distribution of the incidents by precinct",
        x="Precinct", y="Count of Incidents")
```



The first column of the table is the number of precincts.

```
table(NYPD$PRECINCT,NYPD$BORO)
```

```
##
##      BRONX  BROOKLYN  MANHATTAN  QUEENS  STATEN  ISLAND
##  1         0         0         22      0         0
##  5         0         0         50      0         0
##  6         0         0         28      0         0
##  7         0         0         96      0         0
##  9         0         0        100      0         0
## 10         0         0         61      0         0
## 13         0         0         56      0         0
## 14         0         0         48      0         0
## 17         0         0          7      0         0
## 18         0         0         27      0         0
## 19         0         0         18      0         0
## 20         0         0         35      0         0
## 22         0         0          1      0         0
## 23         0         0        458      0         0
## 24         0         0        100      0         0
## 25         0         0         400      0         0
## 26         0         0        142      0         0
```


##	28	0	0	315	0	0
##	30	0	0	208	0	0
##	32	0	0	590	0	0
##	33	0	0	214	0	0
##	34	0	0	289	0	0
##	40	837	0	0	0	0
##	41	465	0	0	0	0
##	42	808	0	0	0	0
##	43	718	0	0	0	0
##	44	949	0	0	0	0
##	45	168	0	0	0	0
##	46	836	0	0	0	0
##	47	903	0	0	0	0
##	48	715	0	0	0	0
##	49	320	0	0	0	0
##	50	139	0	0	0	0
##	52	544	0	0	0	0
##	60	0	341	0	0	0
##	61	0	133	0	0	0
##	62	0	65	0	0	0
##	63	0	269	0	0	0
##	66	0	42	0	0	0
##	67	0	1160	0	0	0
##	68	0	28	0	0	0
##	69	0	439	0	0	0
##	70	0	444	0	0	0
##	71	0	556	0	0	0
##	72	0	98	0	0	0
##	73	0	1372	0	0	0
##	75	0	1470	0	0	0
##	76	0	161	0	0	0
##	77	0	750	0	0	0
##	78	0	57	0	0	0
##	79	0	982	0	0	0
##	81	0	757	0	0	0
##	83	0	481	0	0	0
##	84	0	112	0	0	0
##	88	0	269	0	0	0
##	90	0	304	0	0	0
##	94	0	75	0	0	0
##	100	0	0	0	159	0
##	101	0	0	0	463	0
##	102	0	0	0	185	0
##	103	0	0	0	560	0
##	104	0	0	0	88	0
##	105	0	0	0	451	0
##	106	0	0	0	206	0
##	107	0	0	0	86	0
##	108	0	0	0	61	0
##	109	0	0	0	107	0
##	110	0	0	0	147	0
##	111	0	0	0	8	0
##	112	0	0	0	20	0
##	113	0	0	0	772	0

##	114	0	0	0	349	0
##	115	0	0	0	166	0
##	120	0	0	0	0	544
##	121	0	0	0	0	103
##	122	0	0	0	0	61
##	123	0	0	0	0	28

research question 1. Are all areas of Brooklyn equally dangerous?

We can see from the bar chart and table that there are three precincts in Brooklyn—the 73rd, 75th, and 67th—where there have been more than 1000 shooting events. However, some regions, like the 62nd, 66th, 68th, 72nd, 78th and 94th precincts, have fewer than 100 shooting incidents.

research question 2. Is Manhattan a safer area overall?

The table shows that the 1st through the 22nd and 24th precincts are fairly safe, with the number of gunshot incidents being equal to or below 100. The average number of shooting incidents in the 23rd, 25th to 34th precincts is similar to the other boroughs.

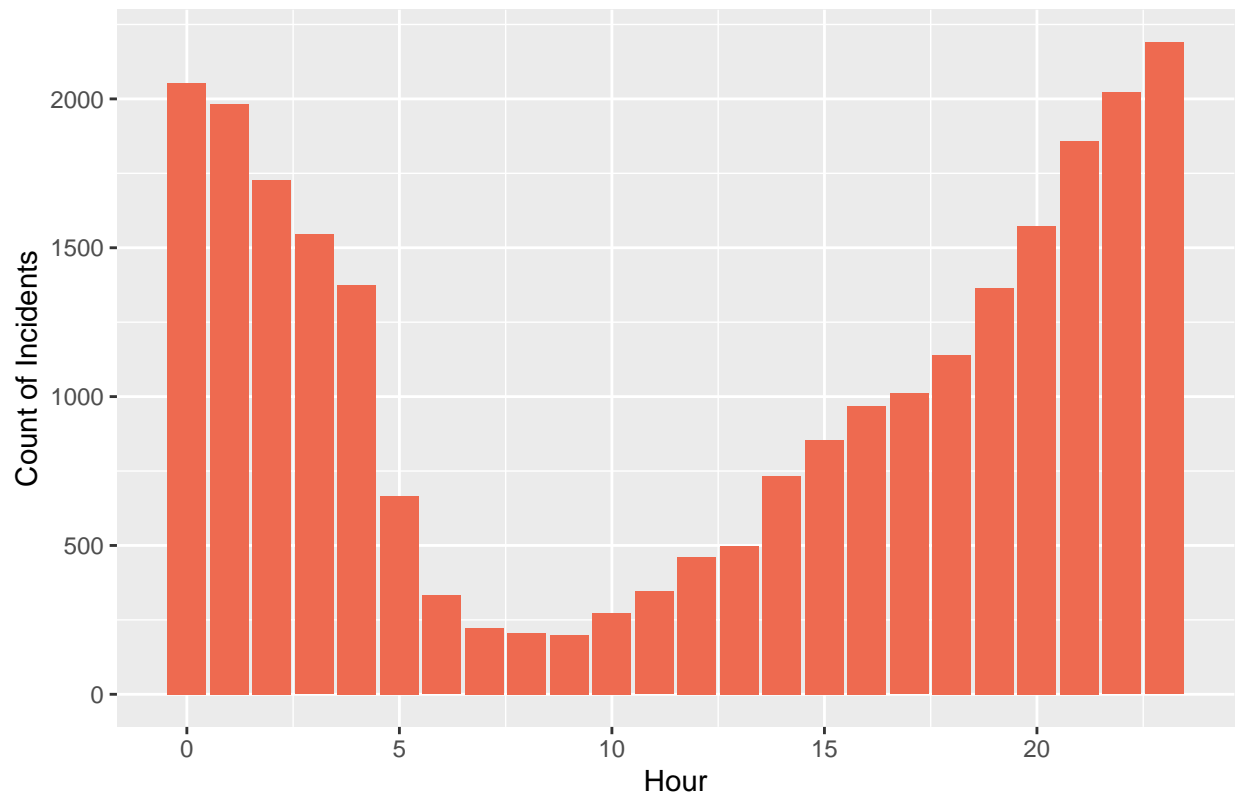
Analysis for research question 3

```
hour <- as.integer(substr(NYPD$OCCUR_TIME,1,2))

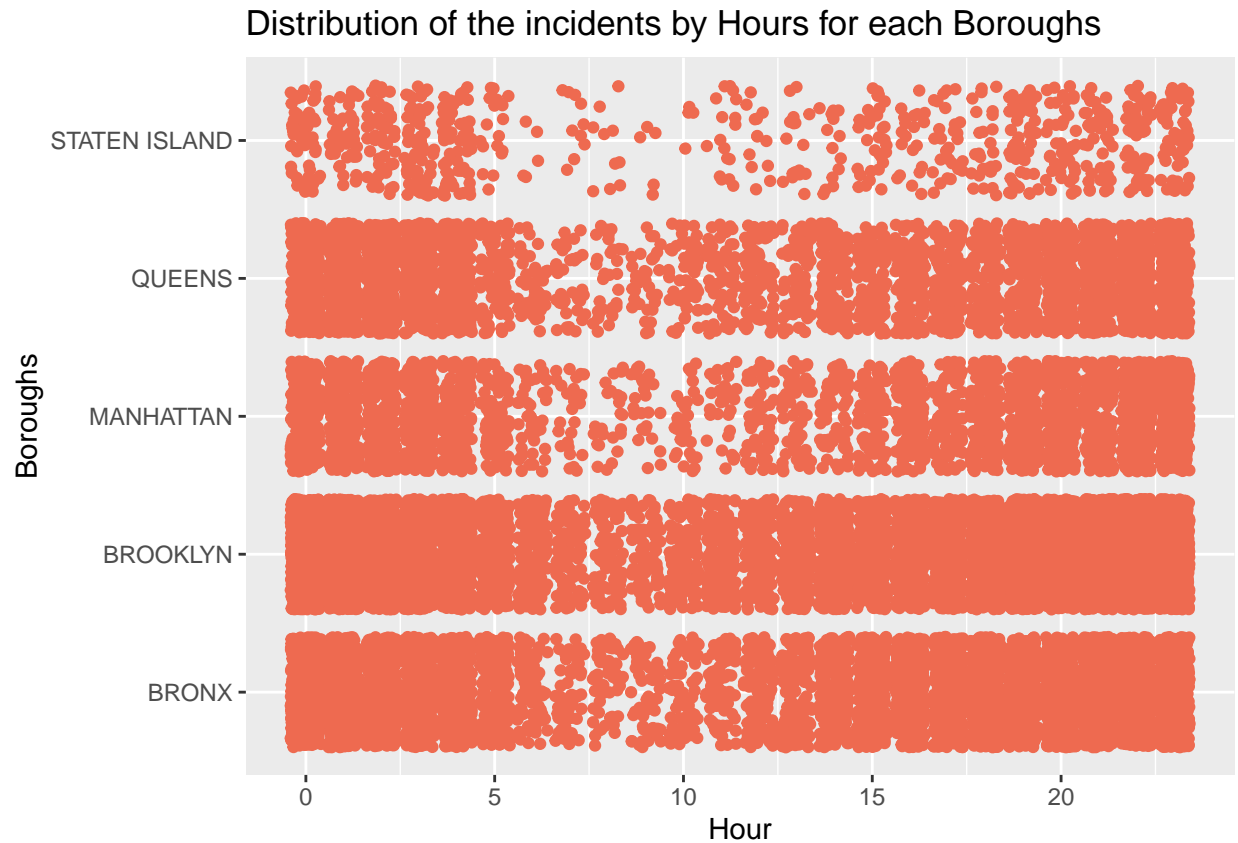
NYPD <- data.frame(INCIDENT_KEY=NYPD$INCIDENT_KEY, OCCUR_DATE=NYPD$OCCUR_DATE, OCCUR_TIME=NYPD$OCCUR_TIME,
  STATISTICAL_MURDER_FLAG=NYPD$STATISTICAL_MURDER_FLAG,
  VIC_AGE_GROUP=NYPD$VIC_AGE_GROUP, VIC_SEX=NYPD$VIC_SEX,
  VIC_RACE =NYPD$VIC_RACE)

ggplot(NYPD, aes(x=hour)) + geom_bar(fill="coral2") +
  labs(title = "Distribution of the incidents by Hours",
    x="Hour", y="Count of Incidents")
```

Distribution of the incidents by Hours



```
ggplot(NYPD, aes(x=hour,y=BORO)) + geom_jitter(color="coral2") +  
  labs(title = "Distribution of the incidents by Hours for each Boroughs",  
        x="Hour", y="Boroughs")
```



research question 3. And what time of day should one avoid going out in New York City?

We can observe from the bar chart and jitter graph that the safest time is from 5:30 am to 12:30 pm. The dangerous period is from 9:30 pm to 2:30 am. Midnight is the most dangerous time to go out.

Step 4: Conclusion and Bias Identification

Conclusion:

Even though Brooklyn has the most shootings, certain areas are relatively safe with fewer than 100 shootings from the year of 2006 to 2022. Lower Manhattan, midtown, upper east side and upper west side are relatively safe, where there have been less than 100 shootings from the year of 2006 to 2022. Midnight is a dangerous time go out.

Bias:

My bias for this project is overusing bar charts for analysis and visualization. I mitigated that by using table and jitter graph for visualization and analysis rather than more bar chart.