Domestic Homicides in NY 2016-2019

Presented by: Team R-rated

Glimpse of Our Dataset:

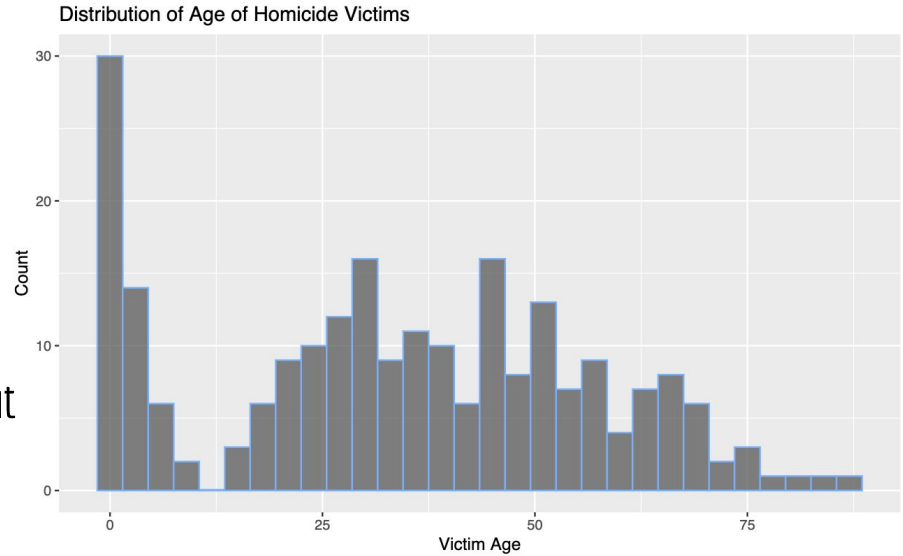
```
Observations: 1,241
Variables: 26
$ `SHOOTING HOMICIDE INCIDENT ID-ANONY` <dbl> 25126, 31093, 31236, 31245, 3...
$ DATE                                  <chr> "Apr 27, 2019", "Jul 3, 2019"...
$ MONTH                                 <dbl> 4, 7, 2, 1, 1, 1, 1, 1, 1, 1,...
$ PRECINCT                              <chr> "041", "047", "075", "075", "...
$ `PATROL BOROUGH`                      <chr> "PBBX", "PBBX", "PBBN", "PBBN...
$ BOROUGH                               <chr> "BRONX", "BRONX", "BROOKLYN",...
$ `VICTIM AGE`                          <dbl> 20, 25, 34, 29, 50, 44, 29, 3...
$ `VICTIM<1`                            <chr> NA, NA, NA, NA, NA, NA, NA, N...
$ `VICTIM SEX`                          <chr> "M", "M", "M", "M", "F", "M",...
$ `VICTIM RACE`                         <chr> "WHITE HISPANIC", "BLACK", "B...
$ `VICTIM ETHNIC`                       <chr> "HISPANIC", NA, NA, NA, "HISP...
$ `PERP STATUS DESCRIPTION`             <chr> NA, "ARRESTED", NA, NA, "DOA"...
$ `PERP AGE`                            <dbl> NA, 34, NA, NA, 46, NA, 28, 3...
$ `PERP SEX`                            <chr> NA, "M", NA, NA, "M", NA, "M"...
$ `PERP RACE`                           <chr> NA, "BLACK", NA, NA, "WHITE H...
$ `PERP ETHNIC`                         <chr> NA, NA, NA, NA, "HISPANIC", N...
$ `VICTIM PERP RELATIONSHIP`            <chr> NA, NA, NA, NA, "INTIMATE PAR...
$ `WEAPON USE`                          <chr> "HANDGUN", "HANDGUN", "HANDGU...
$ CIRCUMSTANCE                          <chr> "UNKNOWN", "OTHER ARGUMENT", ...
$ `OTHER CIRCUMSTANCE`                  <chr> NA, NA, NA, NA, "DOMESTIC", N...
$ `IN/OUT`                              <chr> "O", "O", "O", "I", "I", "I",...
$ `CASE NUMBER`                         <dbl> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
$ `RECORD NUMBER`                       <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,...
$ `VICTIM NUMBER`                       <dbl> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
$ `DOMESTIC INCIDENT`                   <chr> NA, NA, NA, NA, "YES", NA, NA...
$ YEAR                                  <dbl> 2019, 2019, 2019, 2019, 2019,...
```

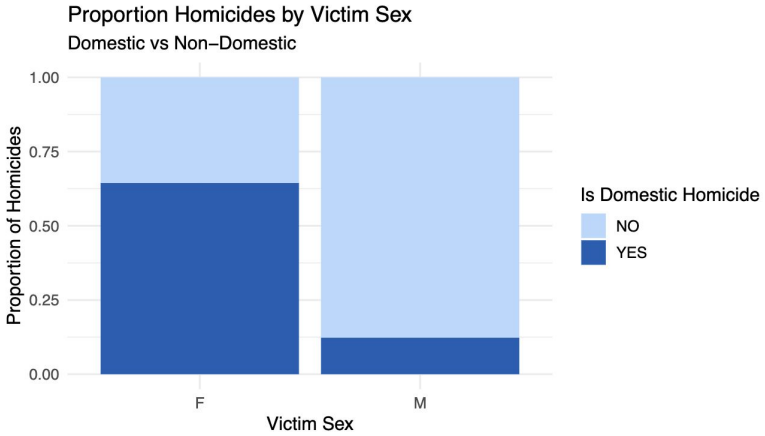
Our Question: Which factors make a homicide more likely to be domestic/are associated with domestic homicides?

Our dataset is provided by the New York Police department and consists of recorded homicides in New York City. For our project, we chose to merge the years 2016 through 2019, creating one large dataset with 26 variables and more than 1200 observations.

Our Analysis

We began working our dataset by visualizing the relationships between variables and performing further analysis on observations we found interesting. The main variables of interest were age and sex, as pictured here, but also race, borough, and the weapons used.





For our project, we ran bootstrap simulations as well as hypothesis tests for independence. Furthermore we ran logistic regressions using AIC to determine the best combination of these factors culminating in successful (78% accuracy) classification of test data. The overall analysis illustrated the importance of each of the factors to help answer the research question.

Conclusions

From our analysis these are the conclusions we gathered:

- The hypothesis testing suggested possible connections of domestic homicides with age (young children) and sex (females), but not race.
- Logistic regression also supports victim age and sex being influential factors, since the best model found incorporated these factors with decent (78%) success.
- Logistic regression also suggests that borough and weapon used may be good predictors of whether a homicide is domestic.
- Furthermore, logistic regression incorporating victim race increased its AIC score, which was in agreement with results from the hypothesis test suggesting race to be a lesser factor in determining likelihood of homicide being domestic.

Together the analysis shows that the circumstances and demographics revolving around domestic homicides significantly differs from those of regular homicides in NYC and that victim sex, victim age, weapon-used, and borough are good predictors of whether a homicide is domestic.