

# Suicide Rates of Schizophrenics

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# Introduction

- Our question:

→ How do gender, race, age, and time (year) trend with schizophrenic death by suicide? When and what kind of people were / are more susceptible to schizophrenia related suicide?

- Our hypotheses:

- There are more white individuals who have died from schizophrenia related suicide than compared to other races.
- Schizophrenia related suicide has become more common in recent years.
- More death by suicide by those who identify as male
- Most deaths will be from those of 45-54 and/or the 55-64 years age group
  - Studies have also shown that middle aged men are the population that make up a large chunk of suicide commits

- Our dataset:

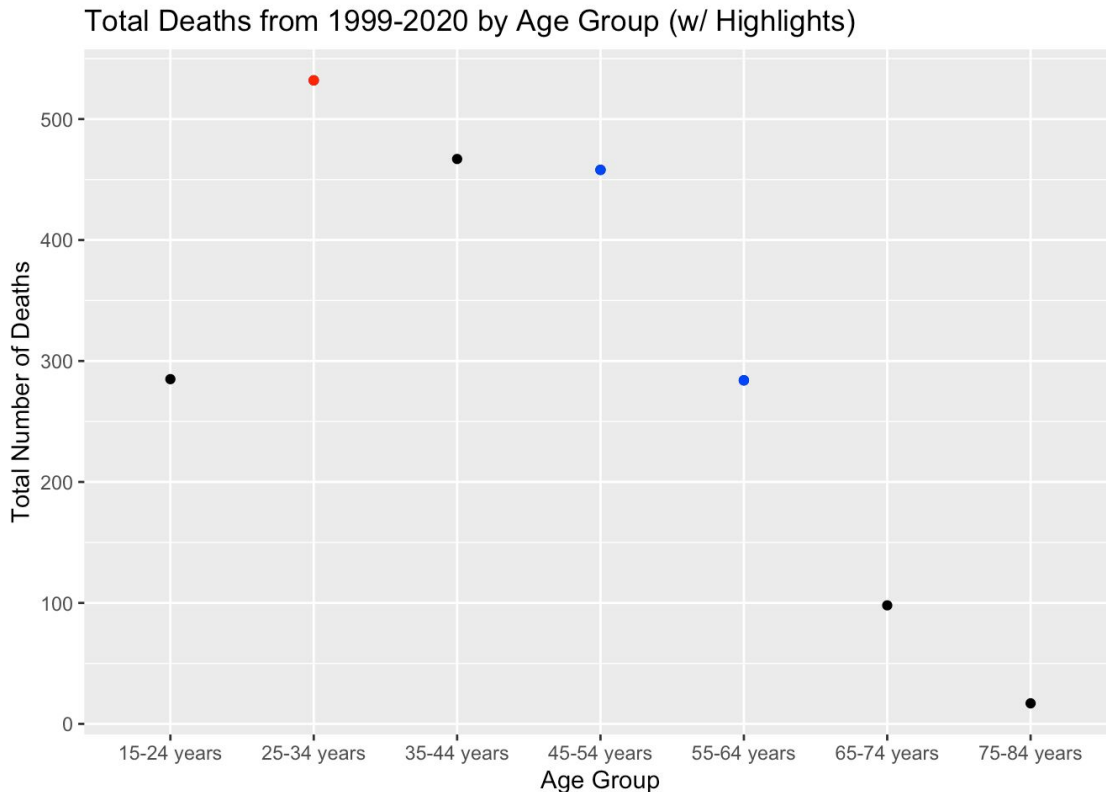
- After cleaning, our data came out to 14784 observations.
- We chose to remove the observations with age groups of ages 0-14 years, > 85 years, or "Not Stated" (amount of deaths small enough to be considered non-factor)
- Removed all key code columns corresponding to the actual variable columns as well as the "Crude Rate" (not necessary for our analysis)
- Population column we were provided contained only unusable values, and thus also had to be removed
  - Had the population column actually worked, could calculate a percentage for demographic variables to account for certain groups making for a larger portion of the overall U.S. population
  - Compensated for this by creating a column for Total Deaths, a cumulative sum of suicides across different demographic values

# Summary of Variables

- Response: death by suicide of schizophrenics
- Covariates used for data exploration:
  - Age
    - Categorical
    - Ten Year Age Groups (15-24 yrs, 25-34 yrs, ... 75-84 yrs)
  - Gender
    - Categorical
    - Male or Female
  - Race
    - Categorical
    - White, Black or African American, Asian or Pacific Islander, American Indian or Alaskan Native
  - Year
    - Time-based
    - 1999-2020

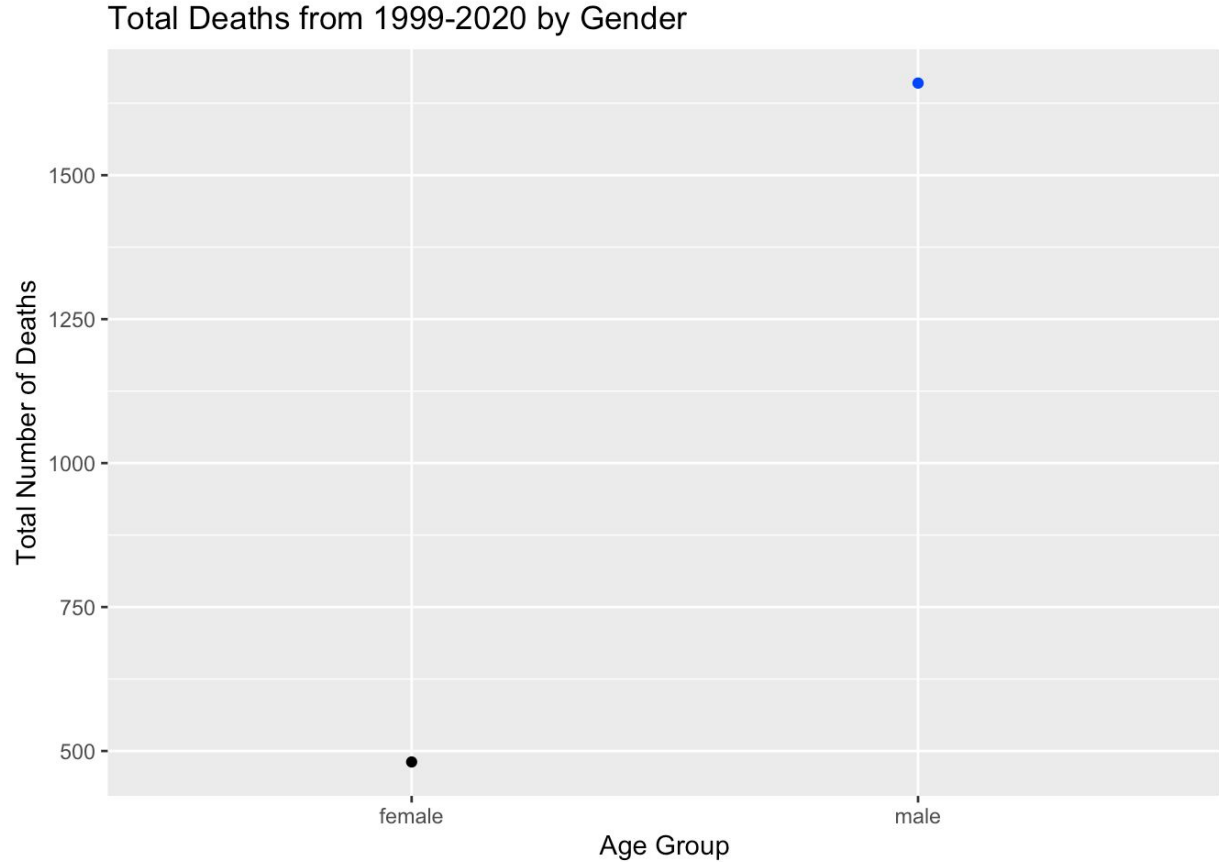
# Age

- 25-34 year-olds most deaths in total and also in general over each year
  - Indicated in red
- Predicted 45-54 and or 55-64 year-olds would have the most total deaths
  - Indicated in blue



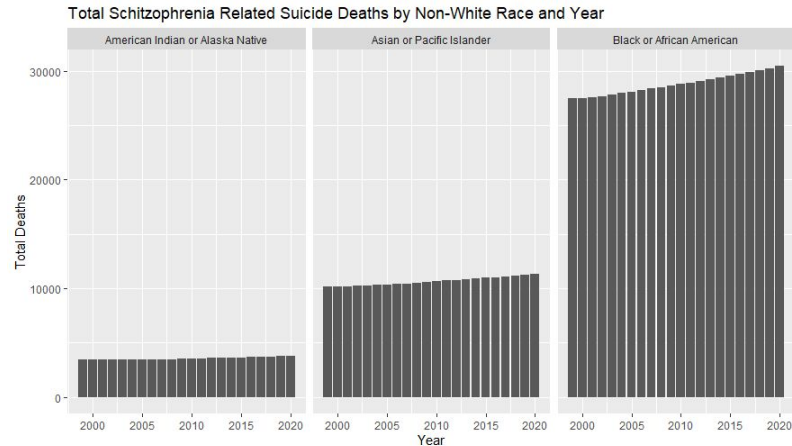
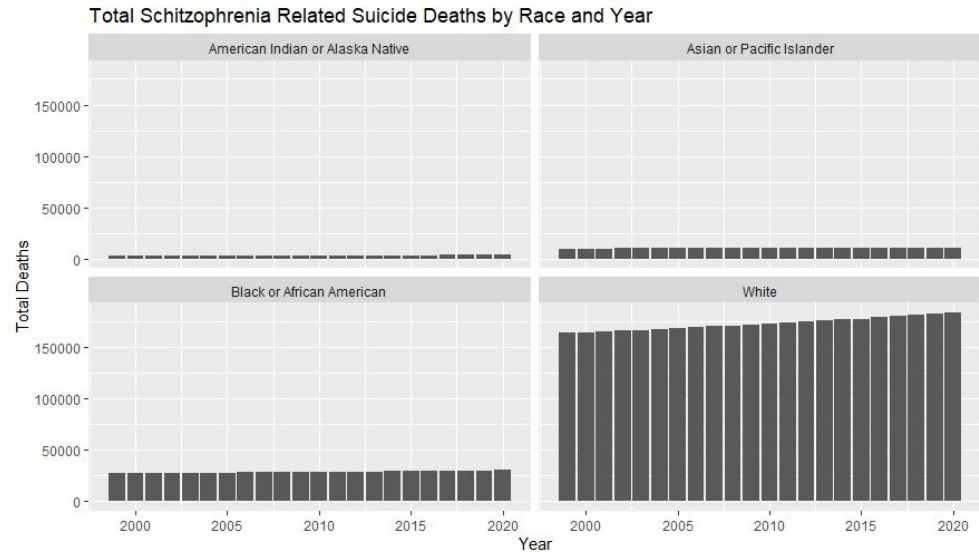
# Gender

- Male deaths appear more common
  - Around 4 times more than female deaths over the span of all years in dataset



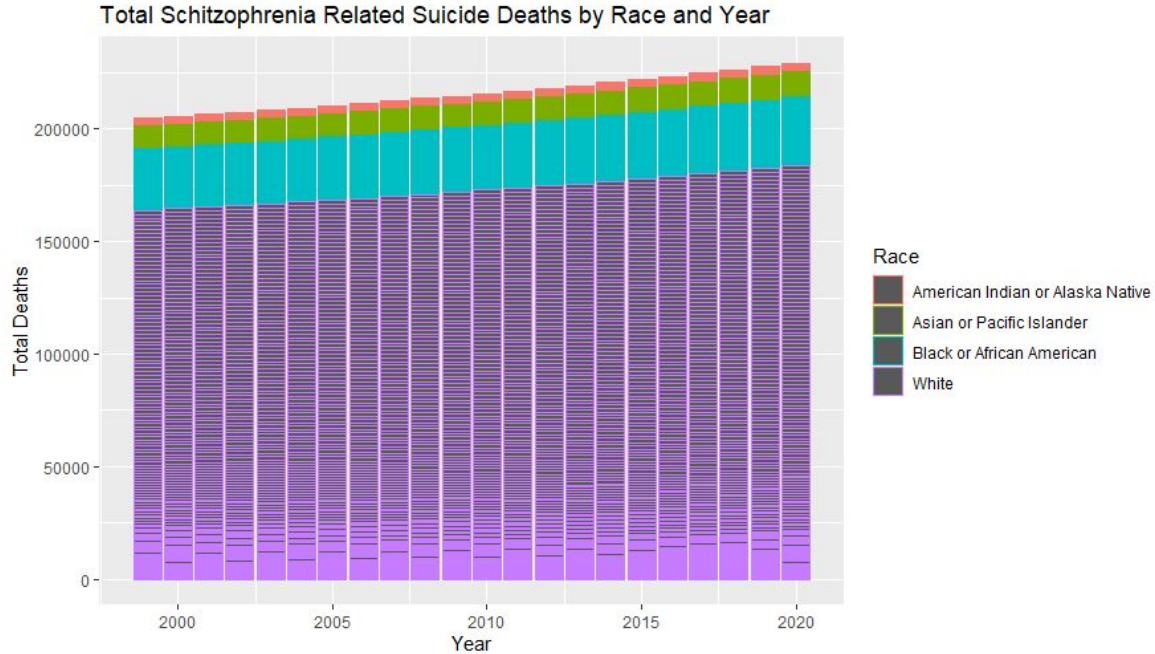
# Race

- Total Deaths by Race
- By far, most schizophrenia-related suicides come from white individuals.
- When you remove observations with white race, the rise and trends in suicides among the other races become much more apparent.



# Year

- Total deaths by Race
- Schizophrenia related suicides have increased pretty consistently over time. Increase rate has been fairly consistent.
- We picked 2019 as an extra constant value for the year variable for regression because COVID-19 data in 2020 may be skewed.



# Regression

```
linear_model <- lm(Deaths ~ Gender + Race, data = df*)
```

\*df has age group set to 25-34 and year to 2019 or 2020

**2019**

Deaths			
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	-0.21	-0.48 – 0.07	0.133
Gender [Male]	0.42	0.17 – 0.66	<b>0.001</b>
Race [Asian or Pacific Islander]	0.04	-0.30 – 0.39	0.811
Race [Black or African American]	0.17	-0.18 – 0.51	0.341
Race [White]	1.04	0.70 – 1.39	<b>&lt;0.001</b>
Observations	96		
R <sup>2</sup> / R <sup>2</sup> adjusted	0.394 / 0.368		

**2020**

Deaths			
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	-0.21	-0.50 – 0.08	0.154
Gender [Male]	0.42	0.16 – 0.67	<b>0.002</b>
Race [Asian or Pacific Islander]	0.12	-0.24 – 0.49	0.497
Race [Black or African American]	0.17	-0.20 – 0.53	0.366
Race [White]	0.96	0.59 – 1.32	<b>&lt;0.001</b>
Observations	96		
R <sup>2</sup> / R <sup>2</sup> adjusted	0.327 / 0.298		



# More on Regression

- Initial plan for regression: fix year to 2020
  - Chose to include a model for 2019 in order to account for any extraneous impact COVID-19 may have had
- 2019 model interpretation
  - Gender = Male
    - positive estimate
    - entire confidence interval being a range of positive values.
    - P-value = 0.001 ( $< 0.05$ ).
    - significant positive correlation between being a Male schizophrenic and committing suicide, supporting our gender hypothesis.
  - Race = White
    - estimate more positive than the estimates for the other races
    - only race that has a completely positive confidence interval.
    - only race with a P-value  $< 0.05$ .
    - significant positive correlation between being a White schizophrenic and committing suicide more so than for other races, supporting our race hypothesis.
- 2020 model interpretation
  - Both race (White) and gender (male) are statistically significant
  - Using alpha = 0.05 level test, we would reject the null that the coefficients on White race and male gender is 0, suggesting that there evidence that these coefficients are non-zero

# Conclusion

- Hypothesis about race
  - AFFIRMED
  - Someone who died from schizophrenia-related suicide is more likely to be white than another race group
- Hypothesis about gender
  - AFFIRMED
  - Our dataset had nearly 4 times as many male deaths vs. female deaths.
- Hypothesis about age
  - CONTRADICTED
  - More deaths come from the 25-34 age range rather than predicted 45-54/55-64 ranges
- Hypothesis on year:
  - CONTRADICTED
  - Visualizations suggest that the rate of suicide has not significantly increased, and instead has stayed consistent over time
- Takeaways to prevent more deaths by suicide in schizophrenic community
  - Consider monitoring/targeting white males in 25-34 age range