California State University Monterey Bay

CST383 Data Science

Final project

Hispanic Suicide Trends

&

Research For Suicide Prevention

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1 Introduction

This project was initiated to explore the pressing issue of suicide rates within the United States, focusing particularly on the Hispanic community (Figure 4). By utilizing historical data, our objective was to uncover patterns and trends in suicide rates across various demographics including sex, race, origin, and age. The central research question sought to determine if specific Hispanic age groups demonstrate increasing trends in suicide rates over time, potentially identifying high-risk populations. This investigation is crucial for designing targeted interventions and providing support to those most vulnerable.

2 Selection of Data

Our dataset originates from the [1] United States government's public data catalog, offering detailed records on suicide death rates categorized by sex, race, Hispanic origin, and age across different years. Data preparation involved filtering to concentrate on the Hispanic demographic and converting the 'YEAR' attribute to a numeric format for subsequent analysis. We engineered polynomial features from the 'YEAR' variable to better model non-linear trends in suicide rates over time.

3 Methods

We utilized Pandas for data manipulation, Sklearn for applying machine learning models, and Matplotlib/Seaborn for generating visualizations. Key tools in-

cluded PolynomialFeatures for feature engineering and both LinearRegression and DecisionTreeRegressor for predictive modeling. Our analysis primarily utilized 'YEAR', 'STUB_NAME', and 'AGE' features to forecast suicide rates and discern trends within Hispanic age groups.

4   Results

The Polynomial Linear Regression model provided insights into future suicide rates based on historical trends (Figure 3). Our analysis identified that certain Hispanic age groups are experiencing upward trends in suicide rates indicating heightened risk levels (Figure 1). Suicide rates as a whole for the Hispanic population are increasing each year, starting from year 2000. We noticed a particular time in which the graph spiked - roughly somewhere between 2012-2014. Further research could be performed to explore the exact reason why suicide rates spiked here, but this was not possible with our current data set. Through our visualizations we pinpointed the age groups that are most susceptible to rising trends. We found that the most susceptible age groups are individuals aged 15-24, and 65 and older, as shown in our historical and predictive graph (Figure 1), and our year-over-year change for ages 15-24 (Figure 2). This was further explored with a distribution graph, (Figure 5) which backs up our original claims.

5   Discussion

Our research highlights the importance of suicide prevention for certain age groups within the Hispanic community. As gathered from the results earlier, certain age groups have an upward trend in suicide rates, making them at a greater risk to be influenced. Other researchers have also noticed an upward trend in suicide among the Hispanic population, noting a nearly 39% increase in suicide rates from 2011 to 2021 [2]. Future research could help direct public health efforts, this research could start with looking into the socioeconomic status within the Hispanic communities. Another area of interest could be access to health care and family relationships, as these areas could be a contributing factor to the individuals aged 65 and older.

6 Conclusions

Through our research, we were able to identify certain Hispanic age groups with increasing suicide rates over time, marking them as particularly vulnerable. Most alarmingly, the two age groups that were identified are teenagers to young adults, and older adults aged 65 and older. This conclusion, drawn from applying Polynomial Linear Regression and Decision Tree models on historical data highlights the immediate need for interventions and support within these age groups.

7 References

[1] U.S. Department of Health & Human Services, 'Death rates for suicide, by sex, race, hispanic origin, and age: United states,' 2022. [Online]. Available: https://catalog.data.gov/dataset/death-rates-for-suicide-by-sex-race-hispanic-origin-and-age-united-states-020c1.

[2] H. Saunders and N. Panchal, 'A look at the latest suicide data and change over the last decade,' 2023. [Online]. Available: https://www.kff.org/mental-health/issue-brief/a-look-at-the-latest-suicide-data-and-change-over-the-last-decade/.
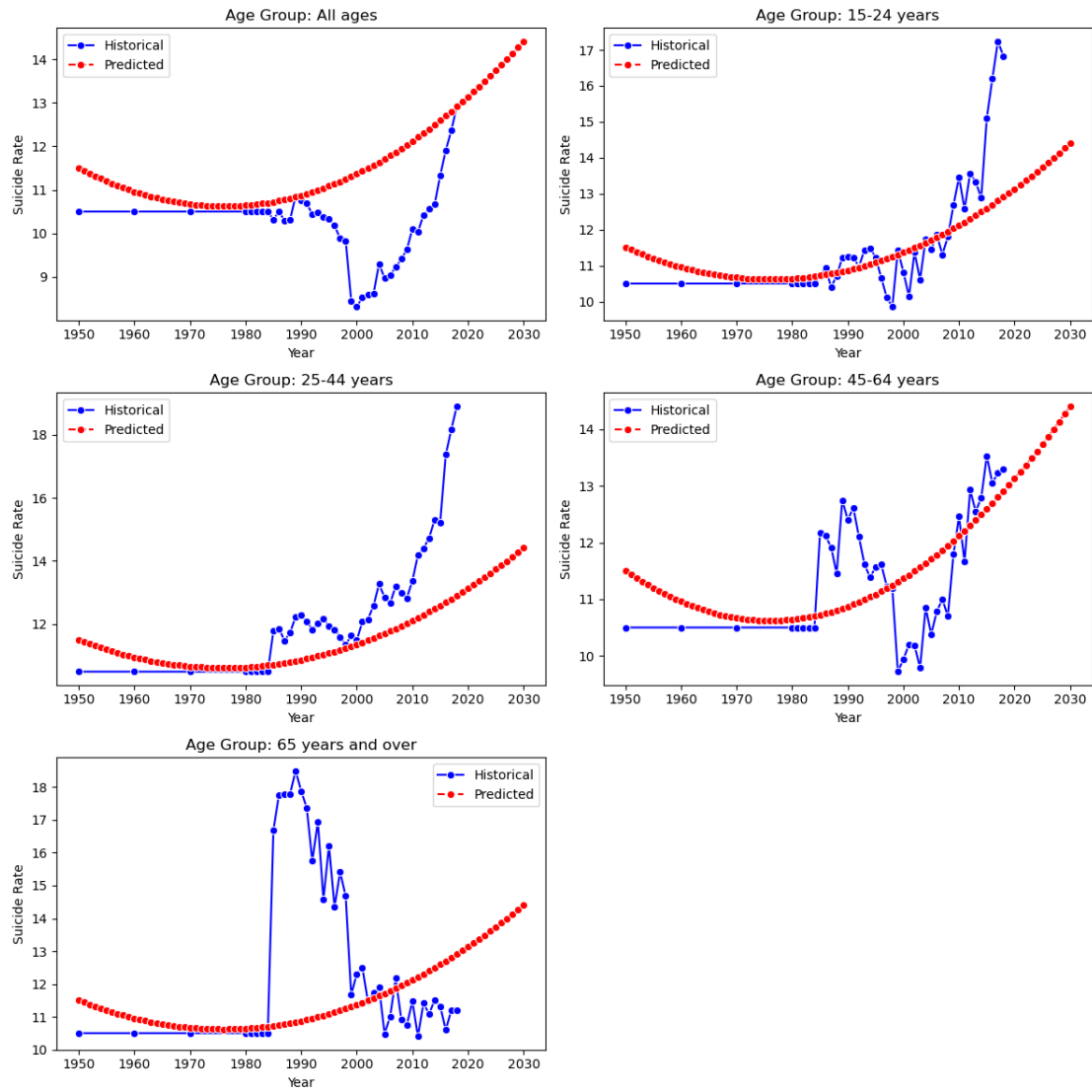
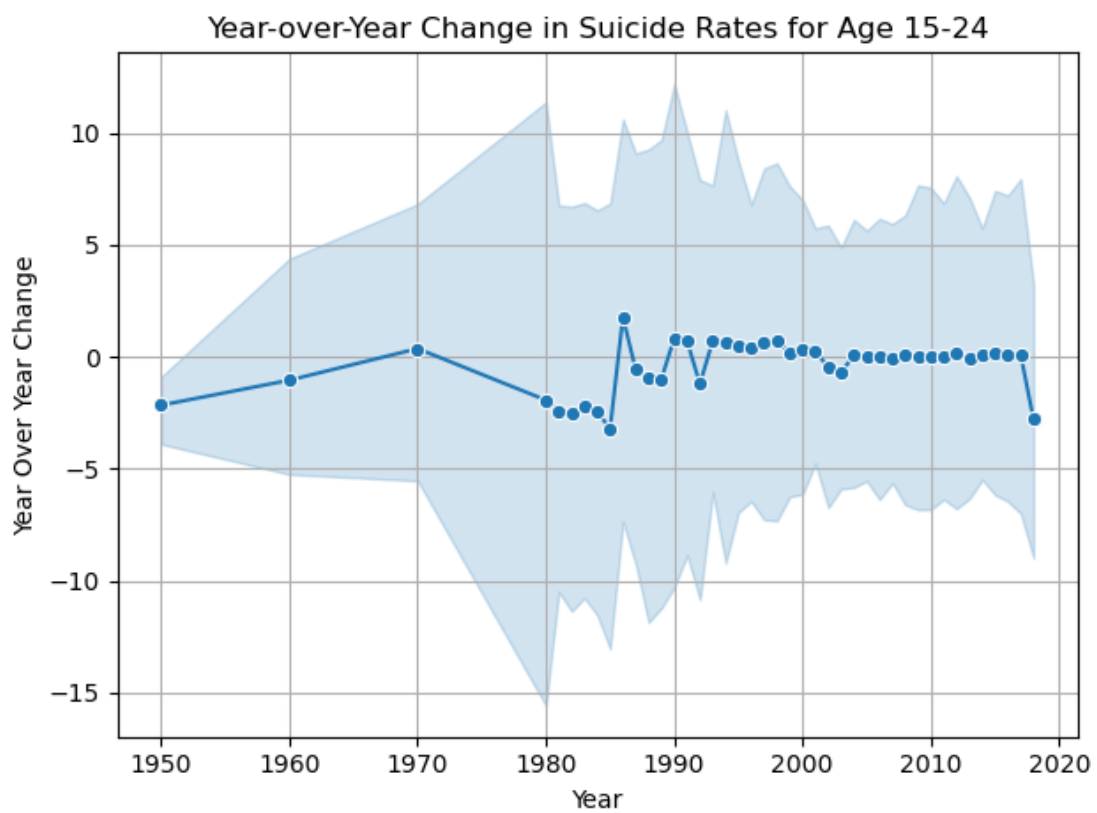Figure 1: Suicide Rates across all age groups
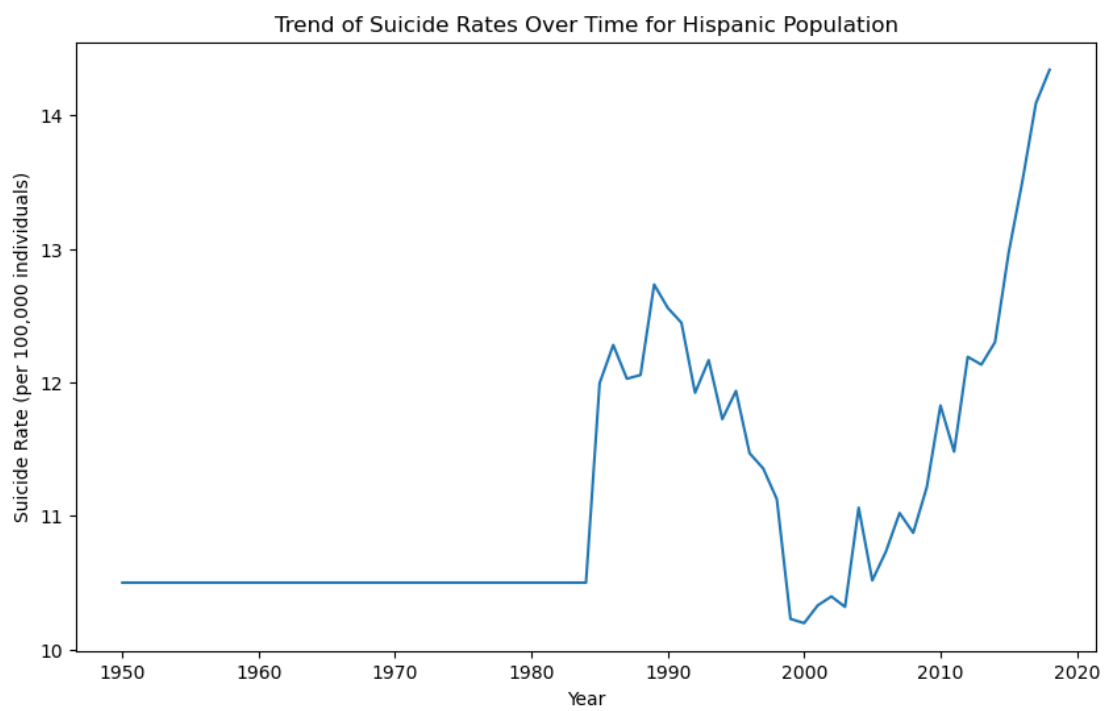
Figure 2: Change in Suicide Rates for Age 15-24

Figure 3: Trend of Suicide Rates over time for Hispanic Population
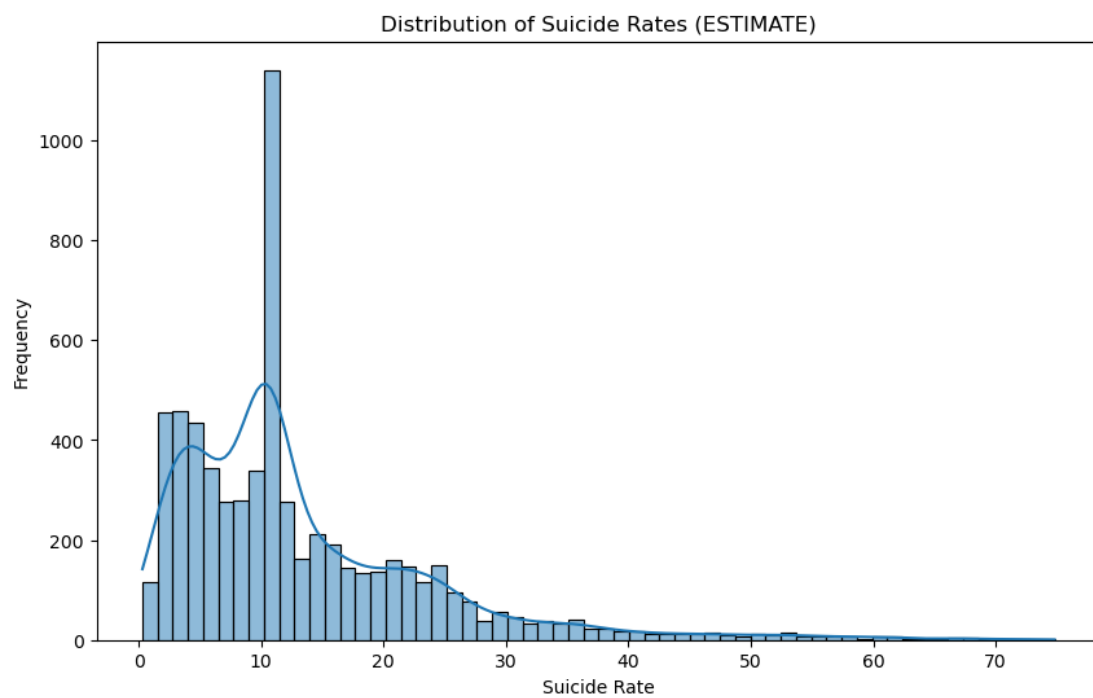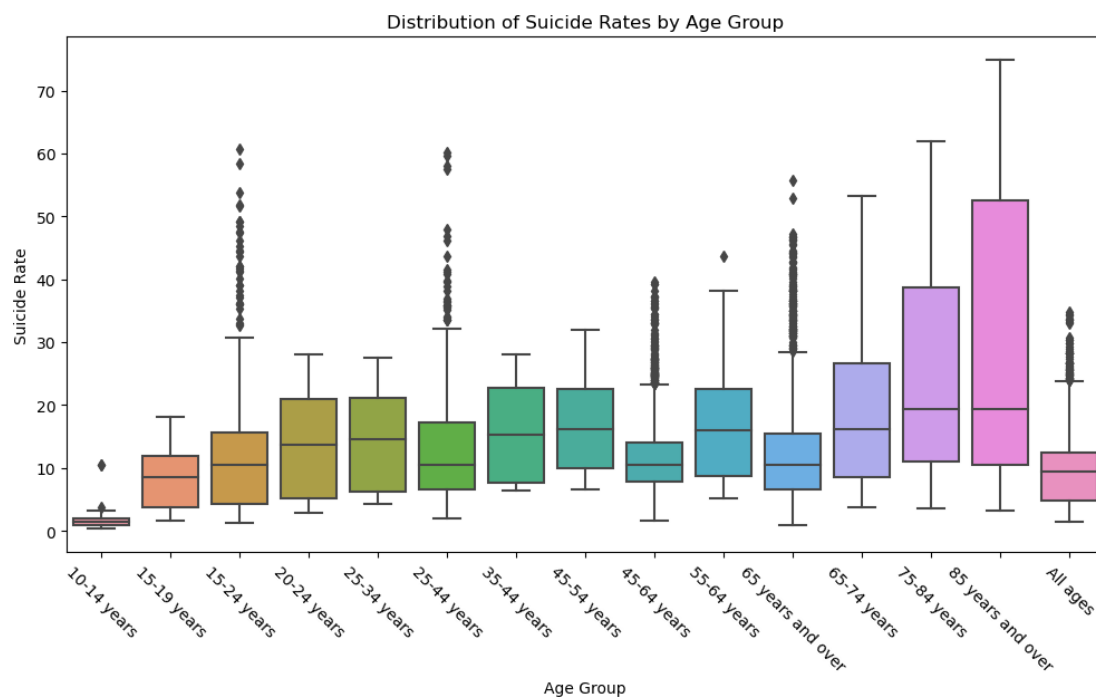
Figure 4: Distribution of Suicide Rates (estimate)

Figure 5: Distribution of Suicide Rates by Age Group