Visualizing Global Suicide Trends

A Data-Driven Exploration of Patterns Across Time, Gender, and Geography

Authors

- Qianyue Jiao: Data sourcing & preprocessing (FAIR, CARE principles).
- Yifei Yang: Exploratory analysis & statistical modeling.
- Zixuan Li: Interactive dashboard design & UX integration.

Acknowledgement

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1 Introduction

- Context: Suicide is a pressing global public health issue, with over 700,000 deaths annually (WHO). It's shaped by cultural, economic, and demographic factors.
- Motivation: Stigma and underreporting hinder understanding. Clear visualizations can guide policy and prevention efforts.
- SDG Link: Contributes to UN SDG Goal 3: Good Health and Well-being.

2 Research Questions

This project investigates the temporal trends in suicide occurrences and seeks to identify the underlying patterns and fluctuations over time. The central research question is: How has the total number of suicides evolved over the observed time period, and what factors might explain significant changes in these trends?

3 Methodology

- Data Sources: WHO Suicide Data (1950–2021), CDC, OECD.
- Tools Used: Python (Pandas, Seaborn, Matplotlib), Plotly for interactivity.
- Approach:
  - Data preprocessing using groupby, melt, filter.
  - Visualization design based on visual encoding theory (color, position, size).
  - Created interactive dashboards to allow dynamic user engagement.

4 Results

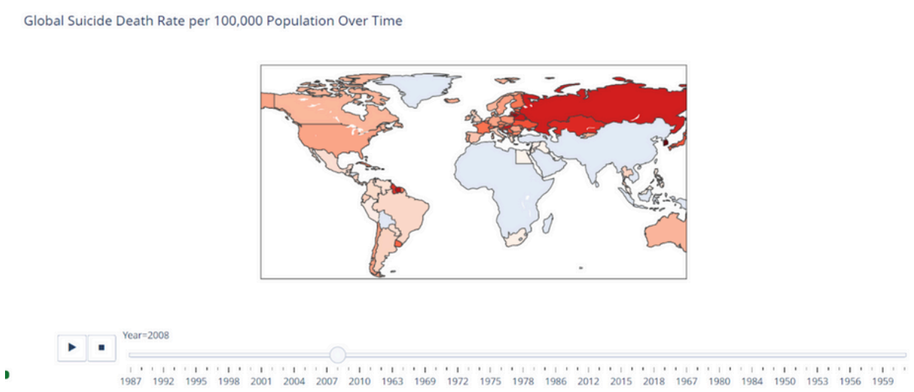

Figure 1. Global Suicide Death Rate Over Time

- **Line chart reveals rise from the 1980s to early 2000s, then a decline.**
- **Tied to sociopolitical changes, mental health policy improvements.**

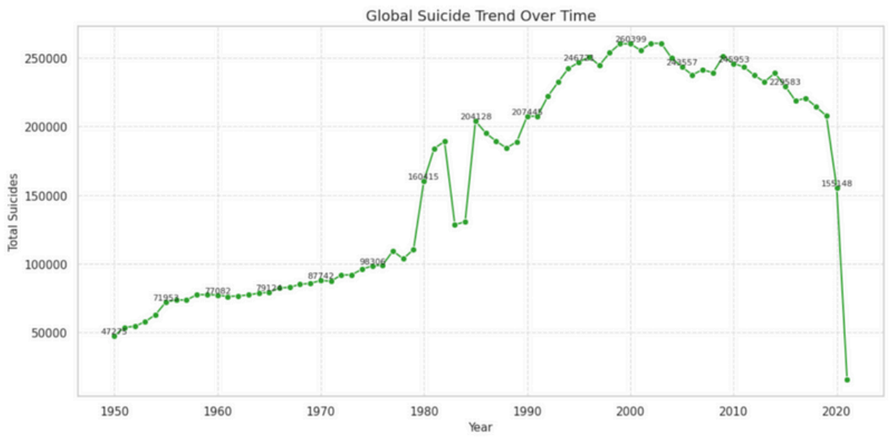

Figure 2. Global Suicide Trends Over Time

- **Temporal chart illustrates that aggregated trends hide disparities.**

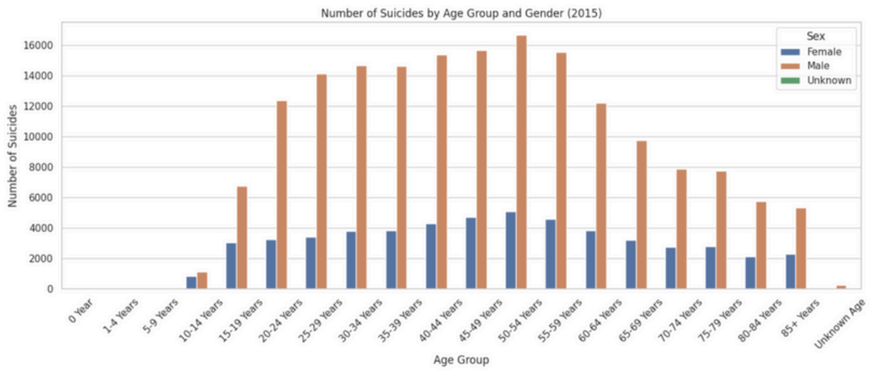

Figure 3. Suicide by Age & Gender (2015)

- **Stacked plot: Elderly have higher rates, but youth suicides are rising in some regions.**
- **Gender disparities remain wide: males consistently have higher rates.**

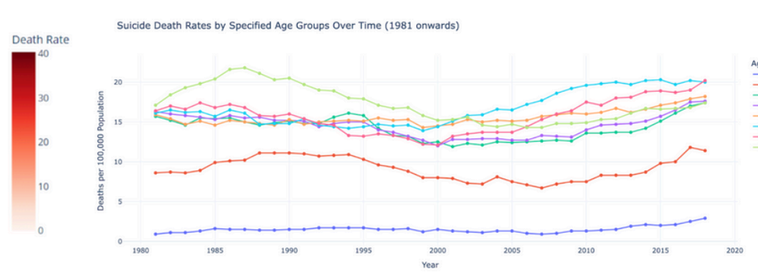

Figure 4. U.S. Suicide Trends by Age (1981–2018)

- **Initially highest in 65+ age group, now rising fastest in middle-aged adults (45–64).**
- **Contributing factors: economic pressure, caregiving stress.**

Figure 5. U.S. Suicide Trends by Gender(1981–2018)

- **Male suicide rate >3x higher than female. Men's rates rising faster.**
- **Cultural norms around masculinity and method choice (e.g., firearms) may explain the gap.**

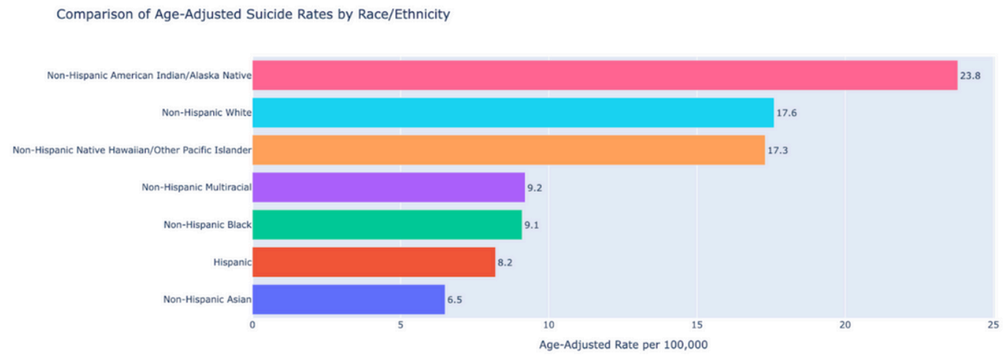

Figure 6. Suicide by Race in the U.S. (2022)

- **Highest among Native Americans and non-Hispanic whites.**
- **Socioeconomic marginalization, historical trauma, and healthcare inaccessibility contribute.**

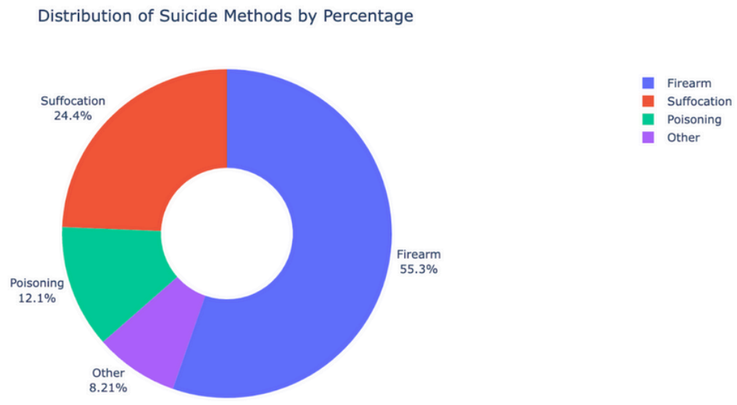

Figure 7. Suicide Methods

- **Firearms are the leading cause, followed by suffocation and poisoning.**
- **Gender differences in method selection impact lethality and prevention options.**

5 Innovation & Interactivity

- Transitioned from static graphs to interactive dashboards (Plotly).
- Added time sliders, tooltips, and geographic filters for deeper exploration.
- Developed a visual storytelling flow to help users uncover layered insights.

6 Future Work

- Integrate with socio-economic indicators (GDP, education, happiness index).
- Use explainable AI (XAI) to pinpoint high-risk countries and determinants.
- Expand interactive features for mobile and public use.

Github link:
https://github.com/PadparadschaNero/Infosci301-Final/blob/main/README.md#-data-sources