# Technology to prevent the suicides of women in the US
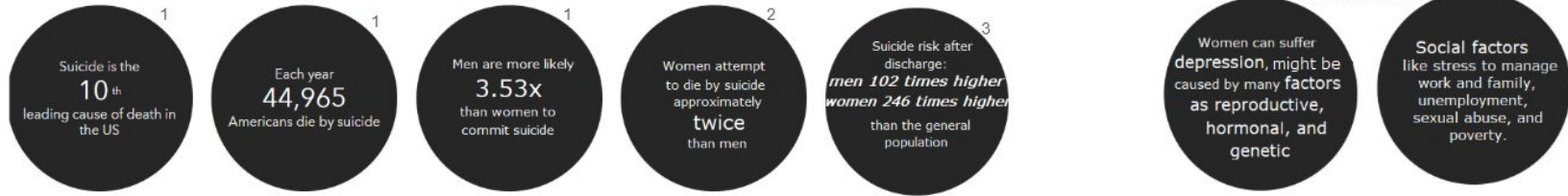
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# Female suicides in the US

Suicide is the **10th** leading cause of death in the US [1]

Each year **44,965** Americans die by suicide [1]

Men are more likely **3.53x** than women to commit suicide [1]

Women attempt to die by suicide approximately **twice** than men [2]

Suicide risk after discharge: *men 102 times higher women 246 times higher* than the general population [3]

**Women's Risk factors** [2]

Women can suffer **depression**, might be caused by many **factors** as reproductive, hormonal, and genetic

**Social factors** like stress to manage work and family, unemployment, sexual abuse, and poverty.

**Research Question:** How can we use modern health information to prevent women's suicides?
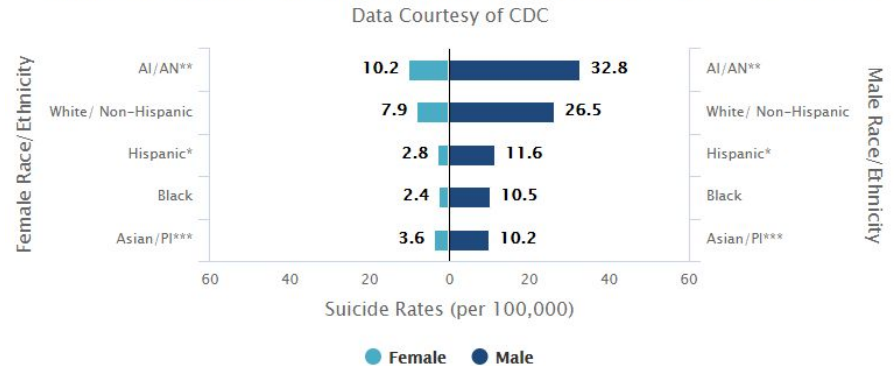
**Hypothesis:** Evidence of the effectiveness of Technology to prevent suicides of women in the U.S.

**Scope for analysis:**
- Crisis telephone helpline and intervention services
- Electronic Health Records (EHRs)
- Suicide Implicit Association Test (IAT)

**Methods of Analysis:** Exploratory Analysis

Suicide Rates for Males and Females by Race/Ethnicity in the United States (2016)

Data Courtesy of CDC

| Female Race/Ethnicity | Female | Male | Male Race/Ethnicity |
|---|---|---|---|
| AI/AN** | 10.2 | 32.8 | AI/AN** |
| White/ Non–Hispanic | 7.9 | 26.5 | White/ Non–Hispanic |
| Hispanic* | 2.8 | 11.6 | Hispanic* |
| Black | 2.4 | 10.5 | Black |
| Asian/PI*** | 3.6 | 10.2 | Asian/PI*** |

Suicide Rates (per 100,000)

● Female  ● Male

Source: Table 3-Suicides Rates.(9)

# Crisis telephone helpline

## National Suicide Prevention Lifeline network across U.S-2009-2011 (5)

**Initial crisis call clients' Gender (N = 550)**

Male
36.7%

Female
63.3%
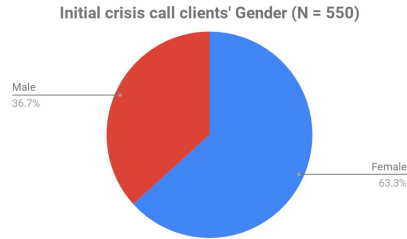
Source: Table 1-Follow-up with Callers to the National Suicide Prevention Lifeline: Evaluation of Callers' Perceptions of Care.(5)

According to the pie chart, more than half of the people who participated in the first call were women.

The same report(5) presents that women are more likely to evaluate the first call and to answer the follow-up questionnaires than men. It means that women received more support sessions than men.
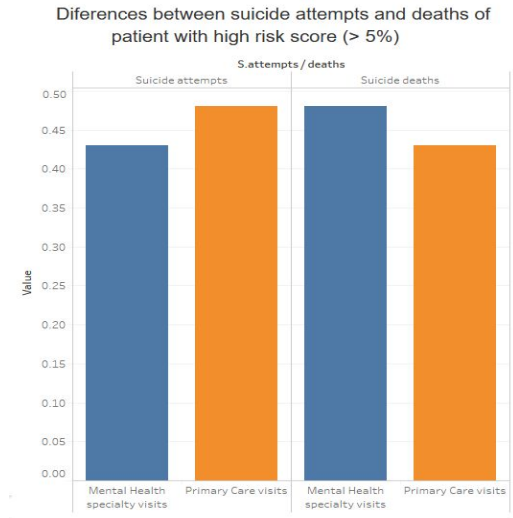Specifically, for every four men, five women believe the call stopped her suicide. Also, for every two men, three women think the follow-up keep them safe.

# Electronic Health Records (EHRs)

## Kaiser Permanente network among CO, HI, OR, CA, WA, Henry Ford health system (Detroit), and HealthPartners Institute (Minneapolis) - 2009-2015 (6)

The model predicts suicide attempts and suicide deaths within the next 90 days after the patient's visit.
The research included 2,960,929 patients older than 13 years old, and highlights a high percentage of women- 62%.

**Diferences between suicide attempts and deaths of patient with high risk score (> 5%)**

S.attempts / deaths

Suicide attempts | Suicide deaths

Value

Mental Health specialty visits | Primary Care visits | Mental Health specialty visits | Primary Care visits

Source: Results-Predicting Suicide Attempts and Suicide Deaths Following Outpatient Visits Using EHRs.(6)

A visit to either a mental health specialist or a primary care physician with a risk score higher than 5%, represents a stronger predictor of suicide, as shown in the bar chart above.

# Suicide Implicit Association Test (IAT)

Suicide IAT answers rate among patients with high risk of suicide attempts
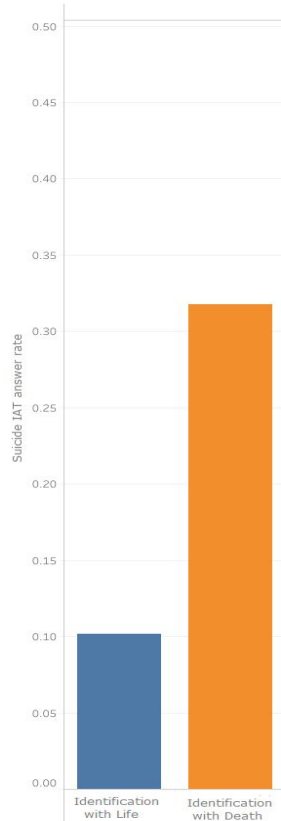
Suicide Implicit Association Test analyzes subconscious thoughts linked to suicidal behavior, using words referred to life and death as well. For accurate results short time responses are crucial to avoid filter thoughts.

Results of Suicide IAT in patients discharged from psychiatric emergency departments can be observed in the bar graph.

Patients with faster responses to death words have three times higher rate of suicide attempts within the next six months, being this time period of higher risk for such patients.

**Conclusions:** The analyzed research papers are useful and hopeful tools to predict Suicide. Allowing to confirm our hypothesis. Technology helps to predict women's Suicide in the US, however the time gap to predict Suicide is still too long, between 3 months, 6 months and 1 year.

**Future actions:** Due to time constraints, further investigation regarding Mobile Treatment Apps couldn't be conducted. The interest in such subject relays in its potential effectivity to complement better and more effective ways of combating situation compromising the integrity of women's health.

**Data constraints:** Despite being a relevant topic for public interest, the publicly available data for this project is very limited. There are few studies and data collectors in the field and most of them are relatively recent and private. The sensitive nature of the subject restrains the openness to share the data to preserve anonymity and avoid premature or biased findings. In consequences, access is only limited to very few sources willing to share some data, in most cases for a fee.

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# Works Cited

1) American Foundation for Suicide Prevention, *Suicide Statistics;* 08/03/2018; https://goo.gl/UnKPG7

2) Mental Health America, *Depression In Women;* 08/03/2018; https://goo.gl/aBYQP8

3) National Suicide Prevention Lifeline, *Crisis Center Guidance: Follow-up with Callers and Those Discharged from Emergency Department and Inpatient Settings;* 08/03/2018; https://goo.gl/k6hxRk

4) Centers for Disease control and prevention, *Underlying Cause of Death 1999-2016;* 08/03/2018; https://goo.gl/D1B4cH

5) Madelyn S. Gould PhD, MPH et al. ;Follow-up with Callers to the National Suicide Prevention Lifeline: Evaluation of Callers' Perceptions of Care; 08/04/2018; https://goo.gl/qdqcdL

6) Gregory E. Simon, M.D., M.P.H. et al. ;*Predicting Suicide Attempts and Suicide Deaths Following Outpatient Visits Using Electronic Health Records*; 08/04/2018; https://goo.gl/NqwSy7

7) Matthew Nock et al.; *Suicide and Self-Injury-Related Implicit Cognition: A Large-Scale Examination and Replication;* 08/04/2018; https://goo.gl/he5DUu

8) Matthew Nock ; *Computing in Mental Health Workshop, CHI 2016;* 08/04/2018; https://goo.gl/jTiUvw

9) National Institute of Mental Health, *Suicides rates;* 08/05/2018; https://goo.gl/mZyn1G

**Tools used:**  MS Excel, Python - Pandas and Numpy, and Tableau.