Suicide and Attempted Suicide Among the Elderly in the United States

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Butler Hospital
Brown University Department of Psychiatry and Human Behavior
Age Specific Rates of Suicide per 100,000 2000-2004
### Male to Female Ratio of Suicide by Age 2000-2004

<table>
<thead>
<tr>
<th>Age</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>10-19</td>
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<td>25-44</td>
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<tr>
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<tr>
<td>70+</td>
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<tr>
<td>Total</td>
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## Ethnicity and Suicide by Age 2000-2004, Total

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Age and Methods Used in Suicide Total 2000-2004
Age and Methods Used in Suicide Female 2000-2004
Ratio of Male:Female
Methods Used in Suicide
2000-2004 Age 70+
## Correlation Coefficients Suicide Trend, 1990-2004

<table>
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<tr>
<td>Female</td>
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Suicide Epidemiology in the Elderly

- Over age 75 the risk rises progressively with age
- Unmarried white males highest risk
- Older suicide victims are more likely to suffer from physical illness
- Older suicide victims are less likely to have co-morbid substance use disorders
Suicide in Elderly Mental Illness

- Psychiatric disorders are present in 71-95% of the elderly who commit suicide
- Frequently non-psychotic first episode depression
- Higher rates of psychiatric disorders are found compared to matched elderly controls
  - Depression
  - Anxiety disorders
  - Bipolar disorder
  - Psychotic disorders
Suicide in Elderly Mental Illness II

- Disorders with a smaller role for the elderly compared to younger suicides
  - Primary psychotic disorders
  - Personality disorders
  - Anxiety disorders
  - Alcohol and substance use disorders

- Personality disorders
  - An association with obsessional and anxious personality traits in 16%
Suicide in Elderly Means

- Elderly have a greater intent than younger individuals
  - Avoiding intervention
  - Not communicating intent
  - Taking measures against discovery
- Death by firearms is the most common method
  - True of all age groups
- Elderly are less likely than younger adults to have utilized mental health services
  - Approximately 50 - 70% have seen a primary health care provider within one month of their death.
Suicide in Elderly Factors

- Role of physical illness is controversial
- Poorer perceived health
- Social isolation
- Caregiver burden
- Stressful life events
- Family discord
- Factors that are less important in elderly suicide
  - Interpersonal conflict
  - Financial issues
  - Occupational problems
Suicide Attempts in the Elderly

- Little data until now
- 1980’s Epidemiological Catchment Area study
  - Lower rates for the elderly
    - 1.1% for those over age 65
    - 4% for age 25-44
- Spicer and Miller 1989 - 1997 (eight states)
  - Rate of suicide acts (completed plus attempts)
    - 63/100,000 among those over the age of 65
    - 96/100,000 for those 45-64 years old
    - 201/100,000 for those 25-44 years old
  - The rates for elderly males and females was similar
Mortality From Suicide Attempt

- USA 1970’s study
  - Elderly had a higher attempt to completion ratio, 4 to 1
  - All adults 8 or 20 to one

- Europe the ratio of attempts to completion of suicide
  - Elderly is estimated to be two to one
  - Decrease with age

- USA emergency room records in eight states from 1989-1997
  - Men age 65 and older there was a fatality rate of 45%
  - Females 14%
  - Both genders 31%
Elderly Suicide Attempt Risk Factors

- **Depression**
  - 8.7% of elderly who are depressed attempt suicide

- **Social isolation**
  - Live alone

- **Being unmarried**
  - Widowers

- **Not impaired physical health**

- **Drug ingestion as primary means of attempts**
Suicide Attempts and Depression

- Incomplete remission
- History of attempts
- Familial interpersonal strain period
Risk of Attempt to End in Suicide

- 13 year follow-up study attempters
  - Being male
  - Living in a lower socio-economic group
  - Using more violent means at the index episode

- Self-harm among the elderly has a higher lethality
  - Most die as a consequence of their first suicide attempt

- The WHO/EURO Mulicentre study in a three-year follow-up of attempters age 60 and older
  - 11.1% were re-attempters
  - 12.7% had successfully taken their lives
Objectives

- Examine the epidemiology of elderly suicide attempts in the United States
- Examine the relationship between successful suicides and attempts
Methods I

- 2000 - 2003 Centers for Disease Control (CDC) injury surveillance data from USA hospital emergency rooms
  - 123,072 suicides in the USA
  - 1,446,031 suicidal acts (suicide plus attempts)

- CDC self-harm data obtained from 66 nationally representative hospitals
  - Data is weighted to the USA national census
  - Data does not distinguish lethal intent
Methods II

- Three age groups are analyzed
  - 25 - 59: Adults
  - 60 - 74: Old
  - 75+: Old-old
Suicide 2000 - 2003: Key Findings I

- Suicide crude rate
  - Old-old: 17.47/100,000
  - Old: 12.66/100,000
  - Adult: 14.24/100,000

- Men across all age groups had markedly higher rates than women

- Rate of suicide among women decreased from the adult to old to old-old age groups

- Rate of suicide increased dramatically among men with age, in particular among the old-old age groups
Suicide 2000 - 2003: Key Findings II

Methods

- Men firearms were the highest across the three age groups
- Females for both the old-old and old age groups firearms was the most common method, while among the adult age group poisoning resulted in the most deaths from suicide
- For both the old-old and old among males suffocation was the second most common method
- Poisoning was the second most common method for women
Suicide crude rates per 100,000, USA, 2000-2003 ranked by suicide method in Old-Old

<table>
<thead>
<tr>
<th></th>
<th>Old-Old</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Old</th>
<th></th>
<th></th>
<th></th>
<th>Adult</th>
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<tbody>
<tr>
<td></td>
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<td>Female</td>
<td>Both</td>
<td>Male</td>
<td>Female</td>
<td>Both</td>
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<td></td>
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<tr>
<td>Firearm</td>
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<td>8.90</td>
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<td>2.08</td>
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</table>

† Less than 20 suicide cases in 4 years. These are flagged as unstable by CDC.
Self Harm 2000 - 2003: Key Findings I

☐ Self-harm rates
   - Old-old: 15.98/100,000
   - Old: 21.02/100,000
   - Adult: 138.14/100,000

☐ Self harm was markedly lower among the two elderly groups compared to the adult group

☐ Among the old-old unlike the old or adult age groups men had higher rates than women for self-harm
Self Harm 2000 - 2003: Key Findings II

- For all three age groups poisoning was the most common method for both men and women.

- Except for men among the old-old cutting was the next most common means of self-harm.
  - For the old-old men it was the use of firearms.

- Among the old-old and old men the rate of suicide was higher than the rate of self-harm.
  - Suggesting that more of their attempts were fatal.
## Self-harm nonfatal injury crude rate per 100,000, USA, 2000-2004 ranked by method

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<th>Age:60-74</th>
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<tr>
<td><strong>Poison</strong></td>
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<tr>
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<tr>
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<tr>
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<td><strong>Total</strong></td>
<td>18.52</td>
<td>13.14</td>
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</tbody>
</table>

† Less than 20 self-harm cases in 4 years. These are flagged as unstable by CDC.
Suicidal Acts 2000 - 2003: Key Findings I

- Suicidal act are the totality of suicide attempts both fatal and non-fatal (self-harm plus suicide)

- Suicidal act rates
  - Old-old: 32.61/100,000
  - Old: 33.78/100,000
  - Adult: 162.57/100,000.

- Among old-old the rate of suicidal acts was double the rate of attempts
Suicidal Acts 2000 - 2003: Key Findings II

- Females across all the age groups poisoning and cutting were the two most common methods.
- Men for the old-old and old age groups firearms followed by poisoning and cutting were the prevalent methods.
  - Among the adult age group poisoning and cutting followed by firearms were the most frequent methods of suicidal acts.
  - For the old-old men, firearm use predominated over any other method by 2.8 fold.
Suicidal acts crude rates per 100,000, USA, 2000-2003 ranked by method

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<td>Male</td>
<td>Female</td>
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<tr>
<td>Fire</td>
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<td>0.77</td>
</tr>
<tr>
<td>Fire</td>
<td>0.07</td>
<td>0.29</td>
<td>0.21</td>
<td></td>
<td>0.17</td>
<td>0.03</td>
<td>0.09</td>
<td>0.88</td>
<td>0.44</td>
<td>0.66</td>
</tr>
<tr>
<td>All Transportation</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02</td>
<td></td>
<td>0.33</td>
<td>0.39</td>
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<td>0.74</td>
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<tr>
<td>Total</td>
<td>58.62</td>
<td>0.30</td>
<td>32.61</td>
<td></td>
<td>42.25</td>
<td>26.53</td>
<td>33.78</td>
<td>149.32</td>
<td>155.66</td>
<td>152.57</td>
</tr>
</tbody>
</table>

† The sum of self-harm plus suicides where there are less than 20 cases in four years. These are flagged as unstable by CDC.
Mortality in the Suicidal Population 2000 - 2003: Key Findings I

- Mortality being the proportion of suicides among the population who commit a suicidal act.
  - It provides the probability of death from a suicidal act.

- Mortality
  - Old-old: 52%
  - Old: 37%
  - Adult: 9%

- For both men and women mortality markedly increased with increasing age

- Among the old-old drowning and suffocation resulted in 100% mortality,
  - Also hidden methods that could not be categorized
Mortality (death probability) in the suicidal population ranked by method, USA, 2000-2003

<table>
<thead>
<tr>
<th></th>
<th>Old-Old</th>
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<th>Old</th>
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<th>Adult</th>
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<tbody>
<tr>
<td></td>
<td>Age: 75-85+</td>
<td></td>
<td>Age: 60-74</td>
<td></td>
<td>Age: 25-59</td>
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<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Both</td>
<td>Male</td>
<td>Female</td>
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<td>Drowning</td>
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<td>1.00</td>
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<tr>
<td>Suffocation</td>
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<td>1.00</td>
<td>1.00</td>
<td>0.77</td>
<td>0.95</td>
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<td>1.00</td>
<td>1.00</td>
<td>0.17</td>
<td>1.00</td>
</tr>
<tr>
<td>Fire</td>
<td>1.00</td>
<td>0.05</td>
<td>0.17</td>
<td>0.42</td>
<td>1.00</td>
</tr>
<tr>
<td>All Transportation</td>
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<td>1.00</td>
<td>1.00</td>
<td>0.11</td>
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<td>Firearm</td>
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<td>0.87</td>
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<td>Fall</td>
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<td>0.81</td>
<td>0.85</td>
<td>0.47</td>
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<td>Poison</td>
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<td>0.15</td>
<td>0.15</td>
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<tr>
<td>Total</td>
<td>0.68</td>
<td>0.22</td>
<td>0.52</td>
<td>0.53</td>
<td>0.16</td>
</tr>
</tbody>
</table>

† The number of suicides was less than 20 in four years. These are flagged as unstable by CDC.
Mortality in the Suicidal Population 2000 - 2003: Key Findings II

In examining mortality across the entire age spectrum, from age 5 to 74 the mortality values fit an exponential function of age

- (Mortality = 0.016e^{0.2634(Age group)}; R^2 = 0.979)
- The growth slowed down after age 75, when end-of-life issues emerge
- After age 75, the mortality values no longer followed the exponential trend, but continued to grow from 50% to 75% for men and from 13% to 25% for women
Mortality among the population that commits suicidal acts by age and gender, USA 2000-2003
Discussion: Data Limitations I

- Suicide data are underreported
  - To avoid socio-cultural stigma
  - Escape police enquiries and legal harassment
  - Misclassified as accident
  - To benefit from the insurance sector

- The self-harm injury data are also underreported
  - Not every nonfatal attempt arrives at a hospital
  - Injury data is somewhat over reported because re-attempters are identified and tracked by type of injury
  - Misclassifications as an accident instead of self harm
Discussion: Data Limitations II

- Current surveillance of suicide and self-harm fail to capture behaviors specific to the elderly
  - Voluntary starvation
  - Medication refusal

- This data from the CDC represents the only current source of systematic surveillance on a representative sampling of the United States
Among the old-old men the rate of self-harm was less than that of suicide.

The only other study conducted in the USA examining the rate of suicide acts in the mid 1990’s but limited to data from eight states also found that the number of suicide attempts was lower among those 65 and older, and among men only slightly surpassed the number of suicides.

This study did not examine rates among the old-old.

Similarly, in an investigation in Israel between 1996-2000 the ratio of suicide attempts to suicide dropped markedly among the elderly.
Discussion: Striking Findings II

- What is known as the “gender paradox” that suicide is more common among males and suicide attempts are more common among females was not found for the old-old.
  - Among the old-old males had both the highest rates of self-harm and suicide.
  - The “gender paradox” was also not present for those over the age of 65 in the eight state USA report and for those over age 75 in the Israeli study.
Discussion: Striking Findings III

- The existence of an exponential function for mortality with age
  - Using the eight state study and Israeli study data an exponential function for mortality with age was reproduced
  - The frailty argument to explain increased mortality among the elderly therefore is difficult to make.
  - The most compelling explanation is with age and especially the elderly suicidal acts are more lethal in nature resulting in lower rates of attempts or self-harm.
- This is illustrated by mortality for old-old at 50%
- An elderly survivor should be considered at high risk and require aggressive treatment to forestall future re-attempts for both men and women
The See-Saw Between Self-Harm and Suicide
There are few prevention programs designed specifically for the elderly

The PROSPECT protocol

- Randomized control study in the primary care setting for those screened with depressive symptom compared to care as usual for individuals over the age of 60
- Decreased suicidal ideations were found among those who received psychotherapy and psychopharmacologic intervention with a trained master-level clinician working in close collaboration with the primary care physician
- The effect of this program on preventing suicidal acts or on those who attempt suicide in preventing re-occurrence is not known
Elderly Suicide Prevention II

- Mental health outreach in the community has been shown to reduce elderly suicides in Japan.
- Elderly who have depression or psychological distress are as likely to have a firearm at home as those without emotional distress.
  - Screening for the availability of firearms and education about safe storage, although not empirically tested, is clinically indicated.
  - The most common cause of suicide in the elderly and the most common form of a suicidal act among elderly males are with firearms.
Elderly Suicide Prevention III

- Recently instruments to evaluate suicidal ideations among the elderly have been developed
  - Whether they are effective in assisting clinicians to reduce suicidal acts among the elderly needs to be demonstrated
The Need for More Research in Elderly Suicide I

- Research on suicide in the elderly, and in particular on suicide attempts, is lacking in comparison to investigations on the youth

  During 2000-2003 there were 17,063 suicides among those under age 25 suicides compared to 21,495 over the age of 65
The Need for More Research in Elderly Suicide II

- This study which includes suicide attempts suggests a number of areas of focus for future research
  - One, why is the mortality, among elder attempters over 50% when the finding of the exponential mortality curve argues against the frailty explanation?
  - Two, why does the "gender paradox" for the old-old not hold?
  - The definition of what constitutes suicide and an act of self-harm in the elderly continues to be a challenge for those who conduct surveillance and examine risk factors meriting re-examination