Public Health Approaches to Suicide Prevention

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“Rose’s Theorem”: “...a large number of people at small risk may give rise to more cases of disease than a small number who are at high risk” (Rose 1989)
Intervention Strategies
(Kellam and Langevin, 2003)

- Developmental epidemiology – understand antecedent risk factors and epidemiology for populations bearing risk – implement programs to alter course and outcome (multiple levels)
- Immediate risk factor reduction (high risk individuals)
- Change societal norms (Rose’s theorem applicable)
- Change laws and policies (Rose’s theorem applicable)
Population-Oriented versus High-Risk Reduction

- Prevention of disease expression is the ultimate desired outcome of population-oriented approaches (not well supported by our methods off episode-based health care)
- Shifting the population average requires distinctive approaches in comparison to treating high risk individuals
- Physicians typically treat signs of illness, symptoms and signs, not ‘distal’ risk factors – prevention thus can be a challenge to the medical model
Behavioral and Social Implications of Rose’s Theorem

- Focus on shifting common ("normative") behaviors that are present in the general population
- "Disease" and "illness" may not be easily applied to targets for preventive interventions
- Examples of common or "normative" conditions: Frequent intoxication and binge drinking, "recreational" drug use, domestic "distress" and "disputes," pain in the context of medical disorders
- Potential "marker conditions": Work performance problems, DWIs, domestic disputes that come to legal attention, reduced involvement in physical activities
Risk of Suicide and Related Adverse Outcomes After Exposure to a Suicide Prevention Program in the US Air Force: Cohort Study

Kerry L. Knox, David A. Litts, G.W. Talcott, Jill Catalano Feig and Eric D. Caine
“Tip of the Iceberg”

- Family Violence
- Homicide
- Accidental Death
- DUI
- Stress at work
- Relationship problems
- Legal Problems
The USAF Suicide Prevention Program: A Multi-Layered Approach

• **Public health-community orientation:** “The Air Force Family”

• **Broad involvement of key leaders:** Medics-Mental Health, Public Health, Personnel, Command, Law Enforcement, Legal, Family Advocacy, Child & Youth, Chaplains, CIS; Walter-Reed Army Inst. Of Research; CDC

• **Consistent leadership involvement**

• **11 initiatives clustering in four areas**
  – Increase awareness and knowledge
  – Increase early help seeking
  – Change social norms
  – Change selected policies

• **Common Risk Model**
<table>
<thead>
<tr>
<th>Initiatives and Mandated Policy</th>
<th>Action</th>
<th>Tracking Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Leadership, involvement AFI 44-154, <em>Suicide and Violence Awareness and Education Training</em></td>
<td>Leader awareness education and training (squadron Commander Courses)</td>
<td>Messages from the USAF Chief of Staff delivered every 3-6 months to all installation commanders reminding them of the importance of suicide prevention and encouraging them to actively promote protective factors, identify risk factors and encourage airmen not to fear seeking help.</td>
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<td>II. Addressing suicide through professional military education AFI-44-154, <em>Suicide and Violence Awareness and Education and Training</em></td>
<td>Incorporate suicide prevention into Professional Military Education curricula through required training.</td>
<td>Tracking of training, assessment of skills and knowledge of basic suicide and violence risk factors, intervention skills and referral procedures for people potentially at risk.</td>
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<td>III. Guidelines for commanders: use of mental health services AFPAM 44-160 <em>The Air Force Suicide Prevention Program</em></td>
<td>Improve referrals of active duty members for mental health evaluation through emphasizing that commanders and mental health professionals are partners in improving duty performance</td>
<td>Annual briefings to commanders included resources for referral to Mental Health, Substance Abuse, Family Advocacy or Emergency Evaluation (as of 2003, resources accessible through an AF website for commanders).</td>
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<tr>
<td>IV. Community preventive services, AF Manual 168-695</td>
<td>Increase preventive functions performed by mental health personnel</td>
<td>Provide one full-time equivalent for community-based preventive services at every mental health work center.</td>
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<tr>
<td>V. Community education and training AFI 44-154 <em>Suicide Prevention Education and Community Training</em></td>
<td>Required training at two levels for non-professionals in basic suicide factors, intervention skills, and referral procedures for people potentially at risk.</td>
<td>Non-supervisory &quot;buddy care&quot; training for all personnel and leadership/supervisory training for unit gatekeepers</td>
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<td>VI. Investigate interview policy (hand-off policy)</td>
<td>Changes in policies to ensure individuals under investigation for legal problems (a risk for suicide) are assessed for suicide potential.</td>
<td>AF Chief of Staff signed a policy letter in 1996; no suicides have resulted since due to agencies failing to comply.</td>
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### Critical Incident Stress Management (CISM) AFI 44-153, *Critical Incident Stress Management*

- **Initiatives and Mandated Policy:** CISM Team to respond to traumatic events, including completed suicides.
- **Action:** Establishment of a multidisciplinary CISM Team to respond to traumatic events, including completed suicides.
- **Tracking Indicators:** All installations now have multi-disciplinary CISM teams composed of mental health providers, medical providers, and chaplains.

### Integrated Delivery System (IDS) for human services prevention, chartered as a standing subcommittee of AF CAIB AFI 90-500, *Community Action Information Boards*

- **Initiatives and Mandated Policy:** Seamless system of services across multidisciplinary human-services prevention activities which functions to provide centralized information (I) and referral (R) and collaborative marking of IDS I and R and preventive services.
- **Action:** Establishment of a seamless system of services across multidisciplinary human-services prevention activities which functions to provide centralized information (I) and referral (R) and collaborative marking of IDS I and R and preventive services.
- **Tracking Indicators:** Increase protective factors and decrease behavioral risk factors through eliminating duplication, overlap and gaps in delivering prevention services. Core membership includes but not limited to Family Advocacy Program, Family Support, Health Promotion/Health and Wellness Centers, Mental Health clinics, Child and Youth Programs and Chaplains.

### Limited patient privilege AFI 44-109, *Mental Health, Confidentiality and Military Law*

- **Initiatives and Mandated Policy:** Psychotherapist-patient privilege for individuals at risk for suicide as a means to promote help-seeking behavior.
- **Action:** Established psychotherapist-patient privilege for individuals at risk for suicide as a means to promote help-seeking behavior.
- **Tracking Indicators:** Confidentiality encourages help seeking behavior; especially in cases undergoing disciplinary action where information revealed to a mental health provider is not used in judicial action.

### Behavioral health survey

- **Initiatives and Mandated Policy:** Tool for assessing behavioral health aspects of a unit available to any commander.
- **Action:** Tool for assessing behavioral health aspects of a unit available to any commander.
- **Tracking Indicators:** In a 1999 survey 73% of commanders reported suicide was the top item of interest to understand how to promote behavioral health strengths and respond to the needs of their units.

### Suicide Event Surveillance System

- **Initiatives and Mandated Policy:** Central surveillance database.
- **Action:** Central surveillance database.
- **Tracking Indicators:** Tracks psychological, social, and behavioral risk factors.
Analysis

**Conceptual framework for evaluation**

- Trend analyses were carried out on data routinely collected for other purposes.
  - These included de-identified data collected in mortality databases for death due to all causes as well as data on judicial actions and family violence.

- To address the question of whether implementation of the program was associated with improved outcomes:
  - The 1990-1996 population was designated as the “unexposed” cohort
  - The population in 1997-2002 was considered to be the “exposed” cohort.
Analysis

• Although the program was begun in 1996, it did not attain full implementation until 1997.
  – Therefore, conservatively, any intervention effects in 1996 were attributed to the pre-intervention time period.

• Relative risk reductions (or the prevented fraction) in suicide and other related outcomes were established as an indication of the program’s overall effectiveness.
Analysis

• Declines in the suicide rate were investigated to determine:
  – whether declines could be ascribed to changes in USAF demographics from 1990-2002
  – whether there had been an increase in the proportion of cases reported as homicides, accidental or undetermined deaths;
  – and whether there was a greater proportion of individuals disabled due to a mental disorder associated with risk of suicide
Analysis

- Implementation of AFIs service wide was used as a measure that changes in practice occurred.
- Data on one performance related indicator, metrics of suicide and violence training and education, were examined between 1997-2002.
Analysis

*Relative risk of suicide and related outcomes*

- Chi-square test for trend ($\chi^2_{trend}$) using the Mantel-Haenszel statistic was computed to test whether the rates for the main outcomes in each n level (year) were increasing or decreasing in a linear fashion;
  - Two sided $p$ values were used to test the null hypothesis of no difference over the decade.
  - The 95% confidence intervals were calculated for each yearly rate to assess the precision of the rates.
  - Relative risks (RR) were calculated as the ratio of the outcome of interest in the group exposed to the intervention after it was fully implemented (1997-2002) to the outcome of interest in the group not exposed to the intervention (1990-1996)
Analysis

• If exposure to the prevention program had a protective effect (indicated by a RR < 1.0) the percentage of risk reduction (or preventive fraction) was calculated as $1 - RR$ multiplied by 100.
Analysis

Population characteristics that might confound the analysis

• Suicide rates could be expected to decrease independent of the intervention if over the course of the study period
  – There were an increased proportion of females
  – African-Americans
  – Individuals younger than 25 or older than 34
  – Higher rank individuals (rank is considered a proxy for socioeconomic status)
  – Married personnel
  – An increase in those discharged for a disability due to mental illness.

• A $z$-test statistic and the 95% confidence intervals was used for determining whether there were significant differences in these population characteristics in the unexposed versus the exposed cohorts.
Analysis

Changes in Practice

• Policy in the Air Force is governed by Air Force Instructions and compliance with these instructions, at the installation level, is assessed regularly by the Air Force Inspection Agency.

• A historical document review was conducted to investigate the extent to which the Eleven Initiatives were mandated by a specific policy.

• Metrics on training of all Air Force personnel in suicide awareness and prevention were examined as an example of a performance objective.
Results

*Trend analysis of rates of suicide and related outcomes*

- Linear trend for a reduction in:
  
  Suicide
  
  Homicide/Accidents
  
  Severe Family Violence
  
  Moderate Family Violence
Results

• Analysis of the family violence data found evidence:

    For an increase in mild family violence
Fig 1 Number of suicides, suicide rates, and three year moving average for rates of suicide, US Air Force, 1990-2002
Fig 2 Proportion of Air Force personnel trained in suicide prevention (1997-2002)
# Table 3: Comparison of effects of risk for suicide and related adverse outcomes in US Air Force population before (1990-6) and after implementation of programme (1997-2002)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Relative risk (95% CI)</th>
<th>Risk reduction (1-relative risk)</th>
<th>Excess risk (relative risk-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide</td>
<td>0.67 (0.57 to 0.80)</td>
<td>33%</td>
<td>—</td>
</tr>
<tr>
<td>Homicide</td>
<td>0.48 (0.33 to 0.74)</td>
<td>51%</td>
<td>—</td>
</tr>
<tr>
<td>Accidental death</td>
<td>0.82 (0.73 to 0.93)</td>
<td>18%</td>
<td>—</td>
</tr>
<tr>
<td>Severe family violence</td>
<td>0.46 (0.43 to 0.51)</td>
<td>54%</td>
<td>—</td>
</tr>
<tr>
<td>Moderate family violence</td>
<td>0.70 (0.69 to 0.73)</td>
<td>30%</td>
<td>—</td>
</tr>
<tr>
<td>Mild family violence</td>
<td>1.18 (1.16 to 1.20)</td>
<td>—</td>
<td>18%</td>
</tr>
</tbody>
</table>

Knox et al., BMJ 2003
A key issue to address is the unique nature of the USAF as a population for study.

One might question the generalizability of any finding to other communities.

While this is a concern there is substantial value examining such a setting.

While there is substantial diversity or heterogeneity within the USAF community, based upon educational level, financial resources, rank, job description, and installation assignment, the year-to-year variations in composition of the population as a whole are minimal, thus allowing the type of cohort analysis used.
Discussion

• Risk reductions of this magnitude observed in a clinical trial of a novel medication would attract immediate attention.

• The fundamental goal of this population-based risk reduction strategy was to decrease the mean population risk for a family of risk factors that confer vulnerability for a variety of adverse behavioral and physical events or outcomes.

• That this shift occurred is unequivocal.
Discussion

• Community-based approaches to health promotion present methodological challenges to study design and evaluation.

• The “noise” of real world environments often results in smaller-than-expected effect sizes.

• In contrast, reductions in risk similar to community interventions for HIV prevention that also have targeted changing social norms.
Discussion

• These results call for replication in other populations

• Key lessons derived from this community based intervention may be particularly adaptable in selected workplace contexts or settings with naturally occurring social networks
  – Police and fire fighters, elements of armed services worldwide, larger corporations, states or smaller countries, schools and universities
Discussion

• The results also indicate that for smaller preventive studies, examination of other theoretically related adverse outcomes can potentially yield important data regarding prevention of suicide and the array of events that appear to be tied to it.