Epidemiological and Public Health Perspectives in Military Suicide Research:

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Pre-OIF/OEF (1990-2000): What Did We Know?

• Rate of suicide for entire military averaged 11.8/100,000/year (adjusted 8.3), with apparent service differences.

• Service differences in rates were entirely explained by differences in demographics and death classification biases:

<table>
<thead>
<tr>
<th></th>
<th>Crude</th>
<th>Adjusted</th>
<th>Suicides + Undetermined</th>
<th>Adjusted Suicides + Undetermined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army</td>
<td>12.4</td>
<td>8.7</td>
<td>12.9</td>
<td>9.0</td>
</tr>
<tr>
<td>Marines</td>
<td>14.1</td>
<td>8.9</td>
<td>15.0</td>
<td>9.5</td>
</tr>
<tr>
<td>Navy</td>
<td>10.7</td>
<td>6.5</td>
<td>13.4</td>
<td>9.5</td>
</tr>
<tr>
<td>Air Force</td>
<td>11.4</td>
<td>9.1</td>
<td>12.0</td>
<td>9.6</td>
</tr>
</tbody>
</table>

• Annual fluctuations in rates of 24-38% (depending on service) were determined to be within normal statistical variation using the Poisson rare events vs. expected events test.

* Eaton KM, Messer SC, Wilson ALG, Hoge CW. Suicide and Life Threatening Behavior 2006; 36:182-191
Civilian vs. Military Suicide Rates, 1990-2000

Direct method of adjustment standardized to U.S. 2000 census population

Crude Rate
Adjusted Rate (for age, gender, race)
Suicide + Undetermined Crude Rate
Suicide + Undetermined Adjusted Rate
OIF/OEF: What’s Happening Now?

- Rates have significantly increased over the last several years to (or above) demographically matched civilian levels in Army and Marines, but **not** in Air Force and Navy.
- Statistically significant clusters at several posts.
- Most consistent factors identified in reports:
  - Deployment length, multiple deployments
  - Relationship problems
  - Legal or financial problems
  - Increased use of alcohol or drugs/ alcohol/drug offenses
  - Increased family violence
  - Access to weapons
  - BH problems / previous gestures or attempts
Historically, the US Army rate has been lower than the US population rate. The U.S. population rate was age and gender adjusted to the Army population.

**Comparable civilian rates were only available from 1990-2006.**

**Army rate projected to Exceed U.S. population rate**

Correlation with Mental Disorders

- Of all Army suicides from JAN 2003-JUL 2009, 45% had received one or more behavioral health diagnoses, 15% had inpatient treatment, and 7% had a history of a prior attempt:

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total N=696</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any BH Diagnosis (n=313)</td>
<td>45.0%</td>
</tr>
<tr>
<td>Adjustment Disorder</td>
<td>23.2%</td>
</tr>
<tr>
<td>Mood Disorder</td>
<td>19.6%</td>
</tr>
<tr>
<td>Substance Related</td>
<td>16.4%</td>
</tr>
<tr>
<td>Any Anxiety Disorder (not PTSD)</td>
<td>12.7%</td>
</tr>
<tr>
<td>PTSD</td>
<td>7.2%</td>
</tr>
<tr>
<td>Personality Disorder</td>
<td>5.3%</td>
</tr>
<tr>
<td>Acute Stress</td>
<td>3.0%</td>
</tr>
<tr>
<td>Psychosis</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Increased Suicide Rate: Hypotheses

- Increased population prevalence of mental disorders due to high levels of combat exposure (e.g. PTSD, depression, anxiety, substances)
- Multiple deployments involving ground combat operations with relatively short dwell times
- Increased Use of SSRIs and other psychotropic medications (FDA Black Box Warning).
- Stigma / barriers have increased. Preventive interventions to date are not efficacious.
- The resilience of the population is changing due to changes in recruitment standards or accession of a less fit force.
Increased Suicide Rate: Evidence Related to Hypotheses

• 1. Increased population prevalence of mental disorders due to combat operations (e.g. PTSD, depression, anxiety, substances)
  – A large percentage of force has deployed (including unit leaders).
  – PTSD, depression, suicide rates are significantly higher in personnel with h/o of deployment to OIF and OEF.
  – Frequency/intensity of combat is most important BH predictor.
  – Relative rates of suicide by occupation is being assessed.

• 2. Multiple deployments involving ground combat operations with relatively short dwell times
  – Differences in rates between services.
  – Multiple deployment effect for BH problems documented in MHATs.
  – 12 months “reset” time has been documented to be insufficient.
    Optimal length of dwell time is being assessed.
  – Attrition is a likely confounder.

References: Millennium Cohort Study, Land Combat Study (e.g. Hoge, et. al. 2004, 2007), MHATs
OIF Behavioral Health Status:
PTSD (Acute Stress) /Depression/Anxiety

MHAT IV 2006 (OIF)
MHAT V 2007 (OIF)

Percent Scoring Positive

- Depression: 8.2% (MHAT IV), 6.9% (MHAT V)
- Anxiety: 8.3% (MHAT IV), 7.3% (MHAT V)
- Acute Stress: 16.5% (MHAT IV), 15.2% (MHAT V)
- Any Problem: 19.1% (MHAT IV), 17.9% (MHAT V)
OEF Behavioral Health Status (MHAT5)

- Depression: 3.3% (MHAT IIb 2005), 8.8% (MHAT V 2007)
- Anxiety: 3.8% (MHAT IIb 2005), 8.3% (MHAT V 2007)
- Acute Stress: 6.6% (MHAT IIb 2005), 13.3% (MHAT V 2007)
- Any Problem: 8.9% (MHAT IIb 2005), 17.0% (MHAT V 2007)
Prevalence of PTSD by Number of Firefights During Deployment

From WRAIR Land Combat Study, 3 months post-deployment
Multiple Deployments (NCOs) (MHAT5)

- First Deployment: 11.9%
- Second Deployment: 18.5%
- Third/Fourth Deployment: 27.2%

Any Mental Health Problem
Percent Scoring Positive

- 0%
- 5%
- 10%
- 15%
- 20%
- 25%
- 30%
- 35%
- 40%
- 45%
Increased Suicide Rate: Evidence Related to Hypotheses

3. Increased Use of SSRIs and other psychotropic medications (FDA Black Box Warning). SSRIs are commonly prescribed by primary care and BH professionals; commonly used in theater.

   - However,
     - Only involves ideation/behaviors, not completed suicides.
     - No evidence of increased risk in adults.
     - Evidence indicates that black box warning may have actually led to decrease in prescribing and increase in suicides nationally.
     - Analysis among veterans in VA indicates that SSRIs are protective.
     - Overall consensus is that benefits far outweigh theoretical risks.
Increased Suicide Rate: Evidence Related to Hypotheses

4. Stigma / barriers have increased. Preventive interventions are not efficacious.
   - No evidence exists that stigma/barriers or effectiveness of programs has changed.
   - Multiple stigma reduction efforts are underway.

5. The resilience of the population is changing due to changes in recruitment standards or accession of a less fit force.
   - No evidence exists that there are significant population changes to explain the increased rate of suicide (e.g., HS diploma, Armed Forces Qualification Test, etc.)
Prevention / Intervention Strategies

• Education / Stigma Reduction / Resiliency Training
• Post-Deployment Screening (PDHA/PDHRA)
• Surveillance
• Treatment
Prevention / Intervention Strategies

• 1. Education / Stigma Reduction / Resiliency Training.
  – No education effort has been proven to be effective in reducing suicidal behaviors, although there are outstanding efforts to codify best practices using consensus processes:
    • CDC, American Foundation for Suicide Prevention, SAMHSA, American Association of Suicidology
      http://mentalhealth.samhsa.gov/suicideprevention/default.asp

• 2. Post-Deployment Screening (PDHA/PDHRA)
  – The PDHA/PDHRA process has gotten increasingly complicated
  – Benefits remain uncertain
  – There is little or no evidence that it has reduced stigma
  – Risks include labeling and stigma to individuals who don’t have deployment-related mental disorder (many false positives) and draining scarce BH resources away from treatment.
### Program Evaluation of PDHA Screening for PTSD, Army (JAMA 2007) (N=56,350)

<table>
<thead>
<tr>
<th>PTSD Screen Positive (PC-PTSD ≥ 3) N=3474</th>
<th>Number (%) Who Received Mental Health Treatment and Number of MH Sessions</th>
<th>Number (%) Recovered 6 Months Post-Iraq (PC-PTSD &lt; 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referred to Mental Health n=804</td>
<td>None, 349 (43.4)</td>
<td>205 (58.7)</td>
</tr>
<tr>
<td></td>
<td>1 Session, 128 (15.9)</td>
<td>69 (53.9)</td>
</tr>
<tr>
<td></td>
<td>2 Sessions, 70 (8.7)</td>
<td>36 (51.4)</td>
</tr>
<tr>
<td></td>
<td>≥3 Sessions, 257 (32.0)</td>
<td>96 (37.3)</td>
</tr>
<tr>
<td>Not Referred to Mental Health n=2670</td>
<td>None, 1721 (64.5)</td>
<td>1181 (68.6)</td>
</tr>
<tr>
<td></td>
<td>1 Session, 419 (15.7)</td>
<td>254 (60.6)</td>
</tr>
<tr>
<td></td>
<td>2 Sessions, 129 (4.8)</td>
<td>67 (51.9)</td>
</tr>
<tr>
<td></td>
<td>≥3 Sessions, 401 (15.0)</td>
<td>150 (37.4)</td>
</tr>
</tbody>
</table>
**Example of Population Screen for PTSD**

**Conditions:**
- Population = 1000
- Weighted Sensitivity = 80%
- Weighted Specificity = 80%

- 30 (20%) of 150 Soldiers with PTSD will not be identified.
- 29% of the population will screen positive.
- Only 120 of 290 (41%) of those who screen positive will actually have PTSD (PPV).

<table>
<thead>
<tr>
<th></th>
<th>PTSD (+)</th>
<th>PTSD (-)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen (+)</td>
<td>120</td>
<td>170</td>
<td>290</td>
</tr>
<tr>
<td>Screen (-)</td>
<td>30</td>
<td>680</td>
<td>710</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>850</td>
<td>1000</td>
</tr>
</tbody>
</table>
Prevention / Intervention Strategies

• 3. Surveillance
  – The epidemiology of completed suicides is different than behaviors (rare events vs. common impulsivity/attention seeking behaviors)
  – Accurate reporting is likely for completed suicides
  – For serious attempts (hospitalizations, evacuations), DoDSER is a passive surveillance system.

• 4. Treatment
  – CBT for suicidal ideation or behaviors shows promise. Dissemination of best practices recommended.
  – Primary care interventions (RESPECT-MIL) are promising.
  – Case/Care management, continuity of care
Recommendations

• Critically reevaluate PDHA and PDHRA processes to ensure that the potential benefits outweigh the risks and clinicians have clear guidance on what to do with screening results.

• Program evaluation, research, and evidence should guide interventions.

• More attention needs to be given to dissemination of evidence-based CBT modalities.

• Primary care interventions is likely to be of benefit in reducing stigma (e.g. RESPECT-MIL)

• Analyses of risk factors (e.g. combat vs. non-combat arms, deployed vs. non-deployed) should always adjust for age (or rank) and gender. Attrition is a likely confounder.

• Existing programs will not likely address the ongoing effects of high deployment frequency/duration or short dwell time.