



U.S. Army Public Health Command (Provisional)

**USAPHC**



# Symptoms, Stressors, and Health Care Utilization of Army Suicides 2005-2010

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## Outline

- Background on Army Suicide Surveillance and Reporting
- Overview of Army Suicide Trends
- Summary of Suicide Characteristics 2005-2010
- Summary of Non-fatal Suicide Characteristics 2005-2010
- Selected Underlying Factors
- Clinical Correlates/Discussion





## Background

- In 2008, the Behavioral and Social Health Outcomes Program (BSHOP) was established at US Army Public Health Command (Provisional).
- BSHOP's mission is to apply the Public Health process to behavioral health issues by
  - Conducting systematic surveillance and in-depth analysis of suicide and other behavioral health outcomes
  - Deploying behavioral health epidemiological consultation (EPICON) teams to evaluate and characterize outcomes through population-based studies
  - Disseminating information regarding behavioral health threats and providing the basis for preventive action and future research in the areas of behavioral and social outcomes





## Suicide Surveillance Data

- In late 2008, BSHOP began development of the Army Behavioral Health Integrated Data Environment
- The ABHIDE includes a registry of all Army suicides and suicidal behaviors, as well as a compilation of relevant data from 2001 forward, and is in the process of acquiring comparison populations
  - Data from a variety of Army and Department of Defense sources have been integrated into the ABHIDE
  - Ongoing confirmation of suicide deaths obtained from the Armed Forces Medical Examiner's Office (AFME)
- Information contained within the ABHIDE is currently being used to develop and report suicidal behavior findings both at the DA and installation level
- Data for this presentation were drawn from published surveillance reports and analyses of ABHIDE data





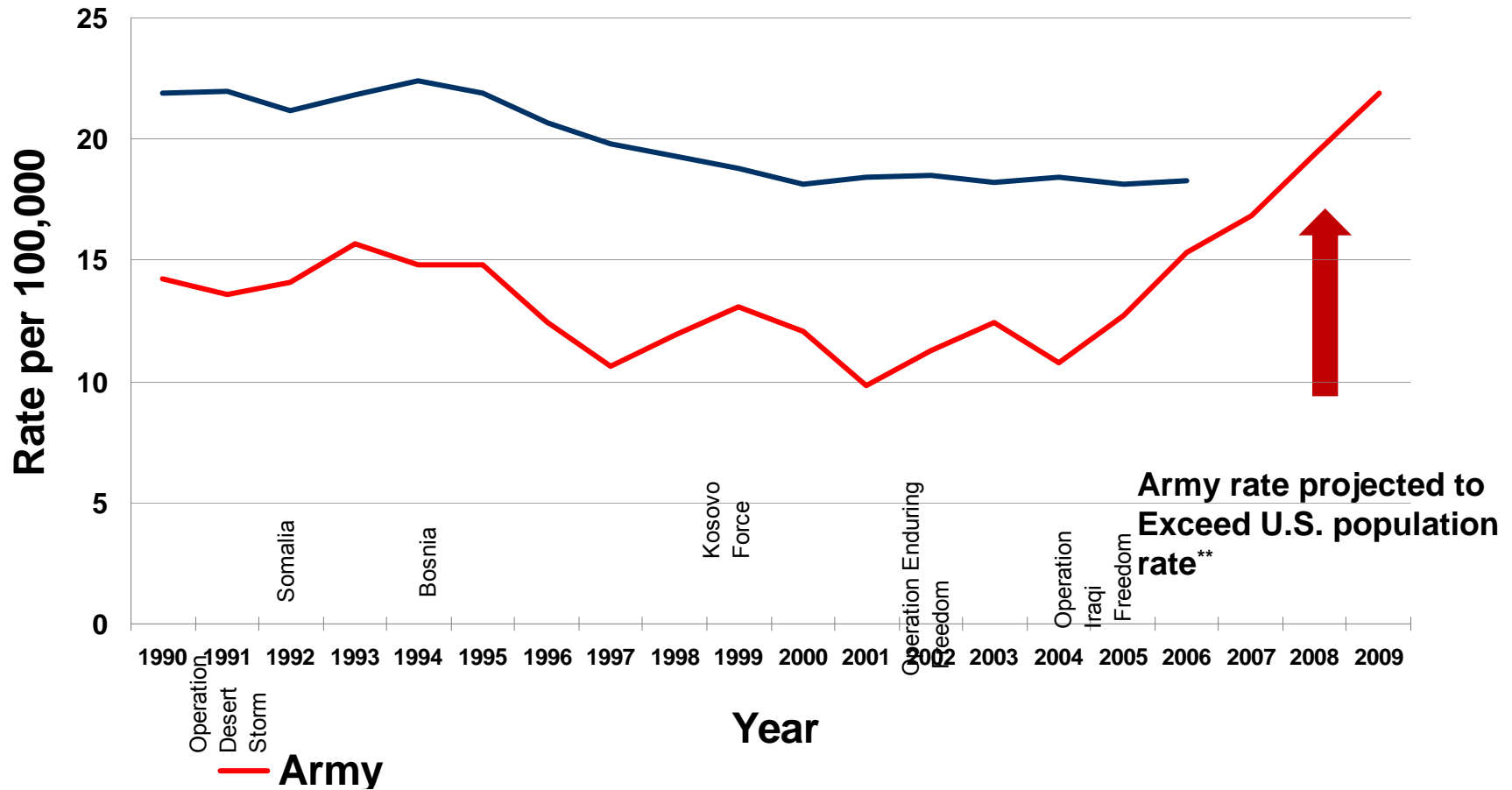
## Limitations

- Small numbers = unstable rates
- Misclassification
- Loss to follow-up
- Obtaining appropriate control data
- Deployment denominator data
- Access to deployment medical records and other risk factor data
- Most data was collected for other purposes





## Suicide Rates from 1990-2009



SOURCE: CDC/NCHS. National Vital Statistics System (civilian data). G1 (Army data)

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

Prepared by: USAPPHC-P BSHOP





## Demographics of Army Suicide Cases

NUMBER OF SUICIDE CASES		2005–2010 <sup>b</sup>	OVERALL
		684 n (%)	Army <sup>a</sup> %
<b>MALE</b>		646(94.4)	81.8
<b>FEMALE</b>		38 (5.6)	18.2
<b>AGE (YRS)</b>	<b>MEAN</b>	28	25
	<b>MODE</b>	23	43.9
	18–24	303(44.3)	37.9
	25–34	242(35.4)	18.2
	35–60	139(20.3)	
<b>RACE-ETHNICITY</b>			
Caucasian/White		498(72.8)	74.5
African-American		91(13.3)	16.3
Hispanic and Other		95(13.9)	9.2
<b>MARITAL STATUS</b>			
Single		297(43.4)	40.9
Married		351(51.3)	52.5
Other		36 (5.3)	6.6
<i>Widowed</i>		1 (0.1)	na
<i>Separated</i>		9 (1.3)	na
<i>Divorced</i>		26 (3.8)	na

Legend: na – not available. Notes: <sup>a</sup>Based on 2005–2009 data





## Demographics of Army Suicide Cases (2)

NUMBER OF SUICIDE CASES		2005–2010 <sup>b</sup>	OVERALL
		684	ARMY <sup>c</sup>
		n (%)	%
<b>COMPONENT</b>			
	Regular Army	577 (84.4)	78.0
	National Guard	75 (11.0)	16.0
	Reserves	28 (4.1)	6.0
	Cadet	4 (0.6)	0.1
<b>RANK</b>			
	E1–E4	397 (58.0)	62.1
	E5–E9	222 (32.5)	31.7
	O1–O3/Cadets/W1–W3	42 (6.1)	3.7
	O4–O9/W4–W5	23 (3.4)	2.4
<b>NEVER DEPLOYED</b>		207 (30.3)	
<b>NUMBER OF DEPLOYMENTS</b>			
	1	298 (43.6)	
	2	121 (17.7)	
	3	41 (6.0)	
	4+	17 (2.5)	
<b>LOCATION OF DEATH</b>			
	USA	485 (70.9)	
	In theater	160 (23.4)	
	Other	39 (5.7)	
<b>METHOD</b>			
	Gunshot Wound	466 (68.1)	
	Hanging/Asphyxiation	137 (20.0)	
	Drug/Alcohol Overdose	38 (5.6)	
	Other	43 (6.3)	

Source: ABHIDE

Legend: E – Enlisted, O – Officer, W – Warrant Officer.

Notes: <sup>a</sup> Suicide cases in this and subsequent tables include those confirmed by the Armed Forces Medical Examiner or pending such confirmation and thus may differ from counts published by G-1.

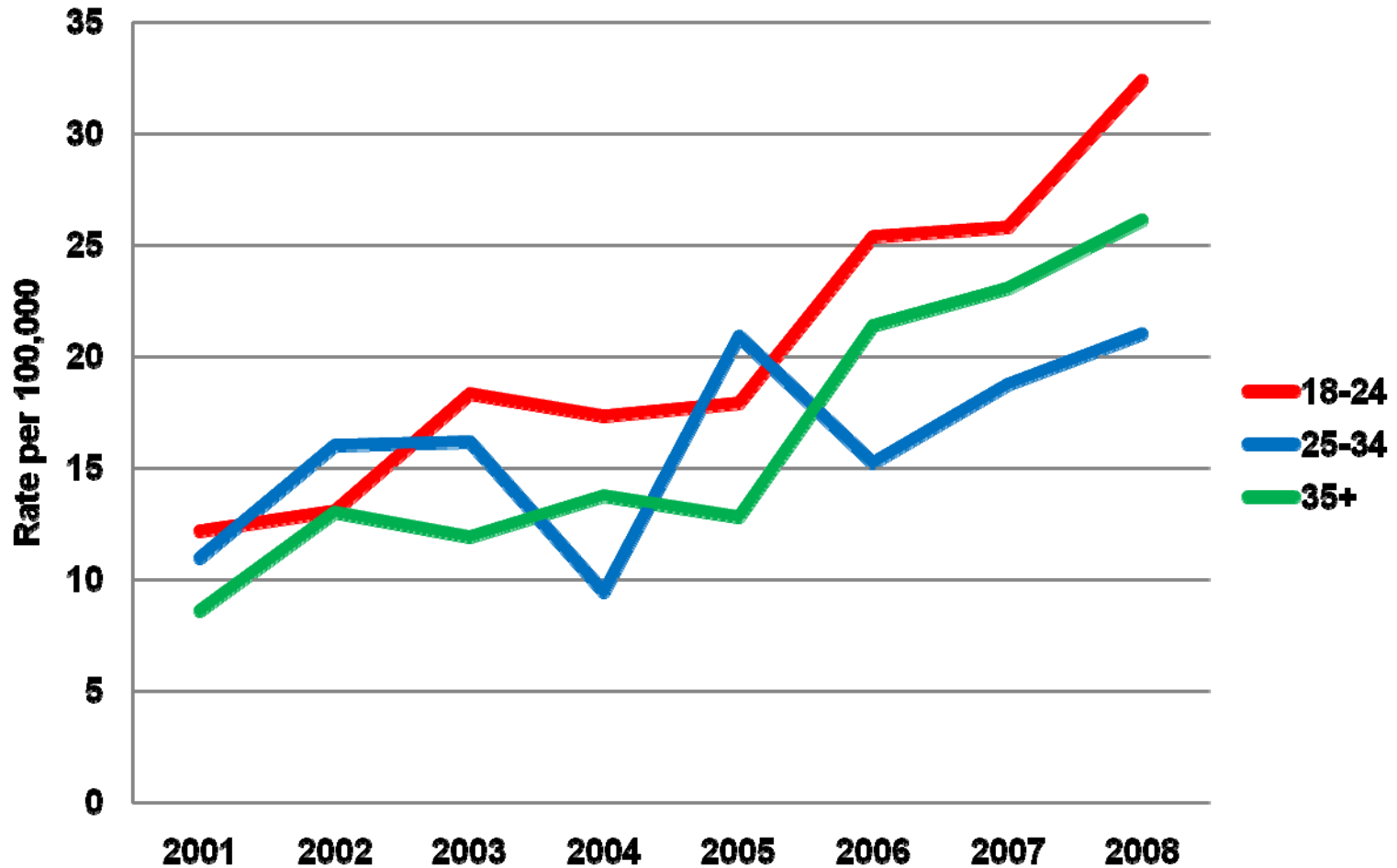
<sup>b</sup> Jan-Jun 2010. <sup>c</sup> Based on 2005–2009 data. <sup>d</sup> Two-sided Pearson chi-square test or Fisher's Exact test,  $\alpha=0.05$ .







## Army Suicide Rates by Age Group



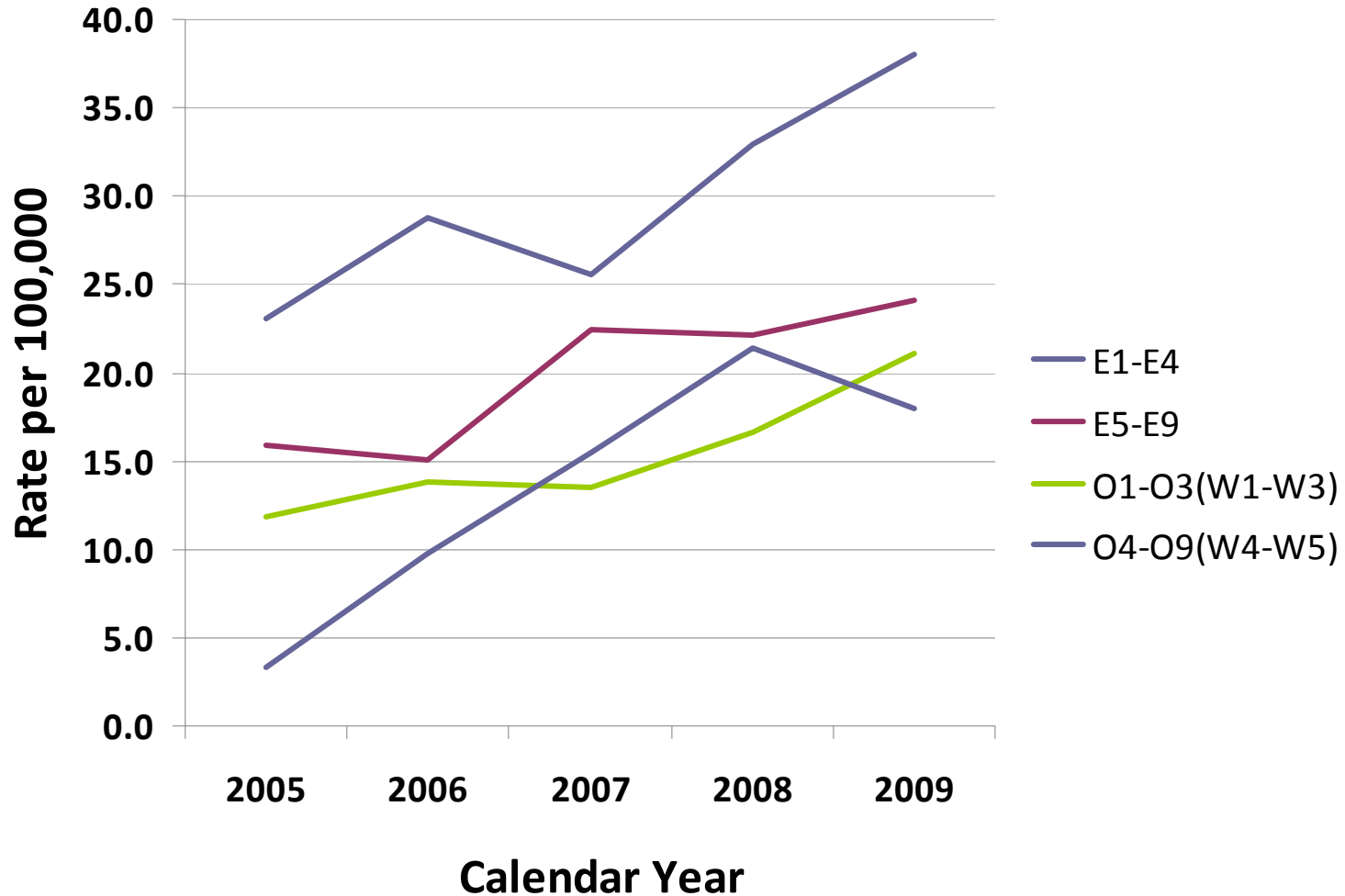
Source: ABHIDE

Prepared by: USAPHC-P BSHOP





## Army Suicide Rates by Rank 2005-2009



Source: ABHIDE

U.S. Army Public Health Command





## Estimated Rates of Suicide per 100,000 Soldiers by Military Occupational Specialty (MOS), 2004-2008<sup>a</sup>

MOS Group	Suicides 2004–2009 n (%)	Population <sup>a</sup> 2004–2009 n	Unadjusted Rate <sup>b</sup> per 100,000 (95% CI)	Adjusted Rate <sup>b,c</sup> per 100,000 (95% CI)
<b>OVERALL</b>	<b>564 (100)</b>	<b>3,003,824</b>	<b>18.8 (17.2–20.3)</b>	<b>18.6 (14.8–22.4)</b>
Infantry	<b>117 (20.7)</b>	399,609	<b>29.3 (24.0–34.6)</b>	21.8 (10.8–32.7)
Mechanical Maintenance	43 (7.6)	176,135	24.4 (17.1–31.7)	<b>33.6 (0.0–69.0)</b>
Communications	34 (6.0)	210,647	16.1 (10.7–21.6)	<b>23.2 (0.0–61.6)</b>
Supply	34 (6.0)	320,615	10.6 (7.0–14.2)	15.0 (0.0–30.3)
Armor	34 (6.0)	138,700	24.5 (16.3–32.6)	19.3 (2.8–35.7)
Medical <sup>b</sup>	33 (5.9)	185,577	17.8 (11.7–23.8)	13.3 (1.3–25.2)
Field Artillery	32 (5.7)	171,992	18.6 (12.1–25.1)	16.9 (0.9–32.9)
Aviation	26 (4.6)	170,082	15.3 (9.4–21.2)	17.5 (0.1–34.8)
Military Intelligence	25 (4.4)	150,968	16.6 (10.0–23.1)	16.7 (0.0–33.3)
Engineers	24 (4.3)	127,832	18.8 (11.3–26.3)	14.9 (0.1–29.7)
Military Police	22 (3.9)	113,998	19.3 (11.2–27.4)	18.3 (0.0–38.4)
Ordnance	20 (3.6)	131,404	15.2 (8.6–21.9)	<b>37.3 (0.0–92.1)</b>
Transport	17 (3.0)	132,866	12.8 (6.7–18.9)	12.0 (0.0–28.1)
Air Defense	15 (2.7)	65,134	23.0 (11.4–34.7)	20.2 (0.0–45.7)
Chemical–Biological	11 (2.0)	50,260	21.9 (9.0–34.8)	<b>22.2 (0.0–55.9)</b>
Other	77 (13.7)	443,097	17.4 (13.4–21.3)	<b>24.6 (6.6–42.7)</b>

Legend: CI – confidence interval. Notes: <sup>a</sup> Reliable data on the sex, age, and racial group distribution of Army Functional Groups were not available prior to 2004; <sup>b</sup> Population numbers exclude soldiers for whom age or grade are unknown. <sup>c</sup> Adjusted for gender, age, race/ethnicity, grade, and year (as if each year had the same distribution the Army as a whole had in 2008).

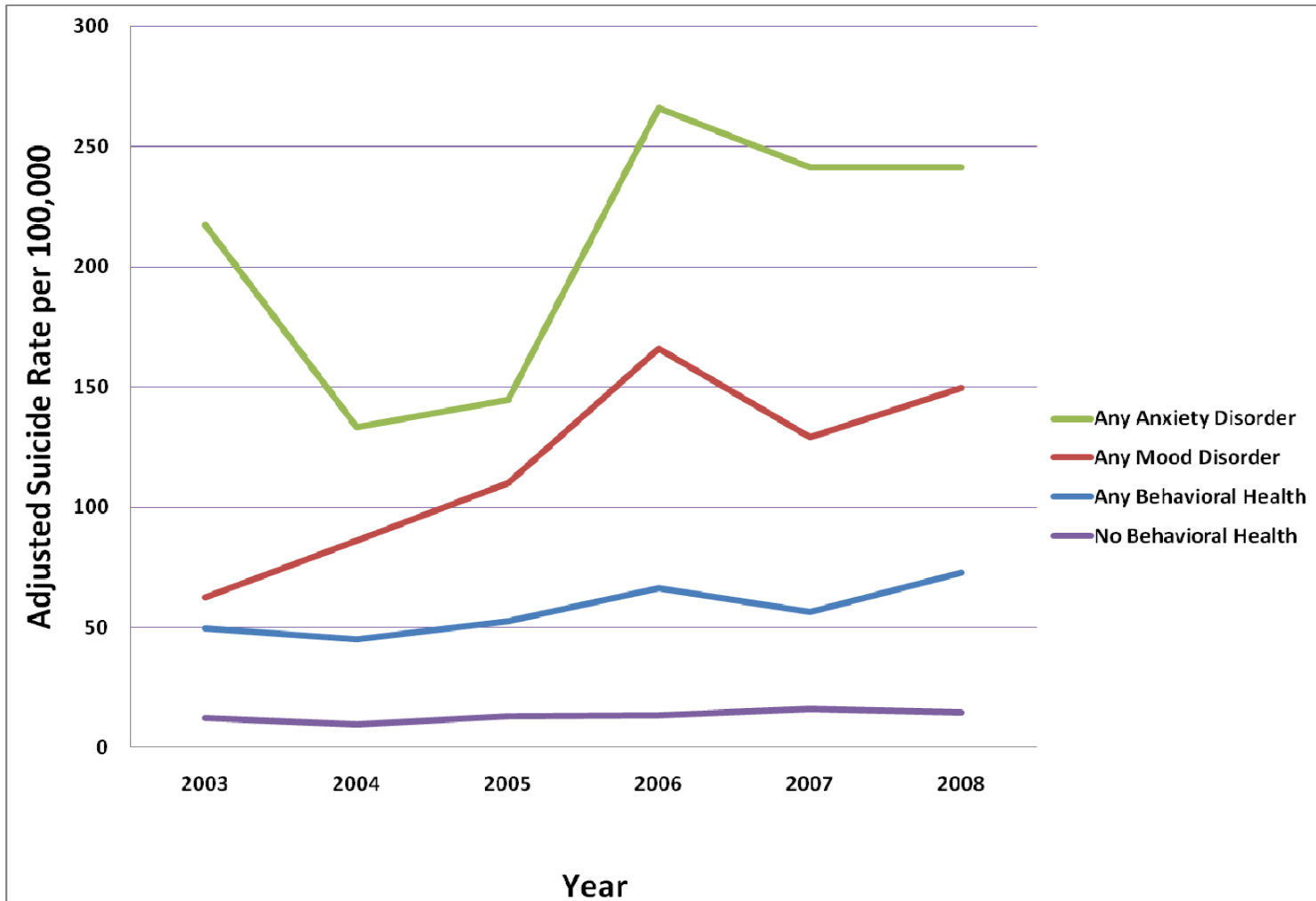
Source: ABHIDE

Prepared by: USAPHC-P BSHOP





## Adjusted Army Suicide Rates by Diagnosis 2003-2008



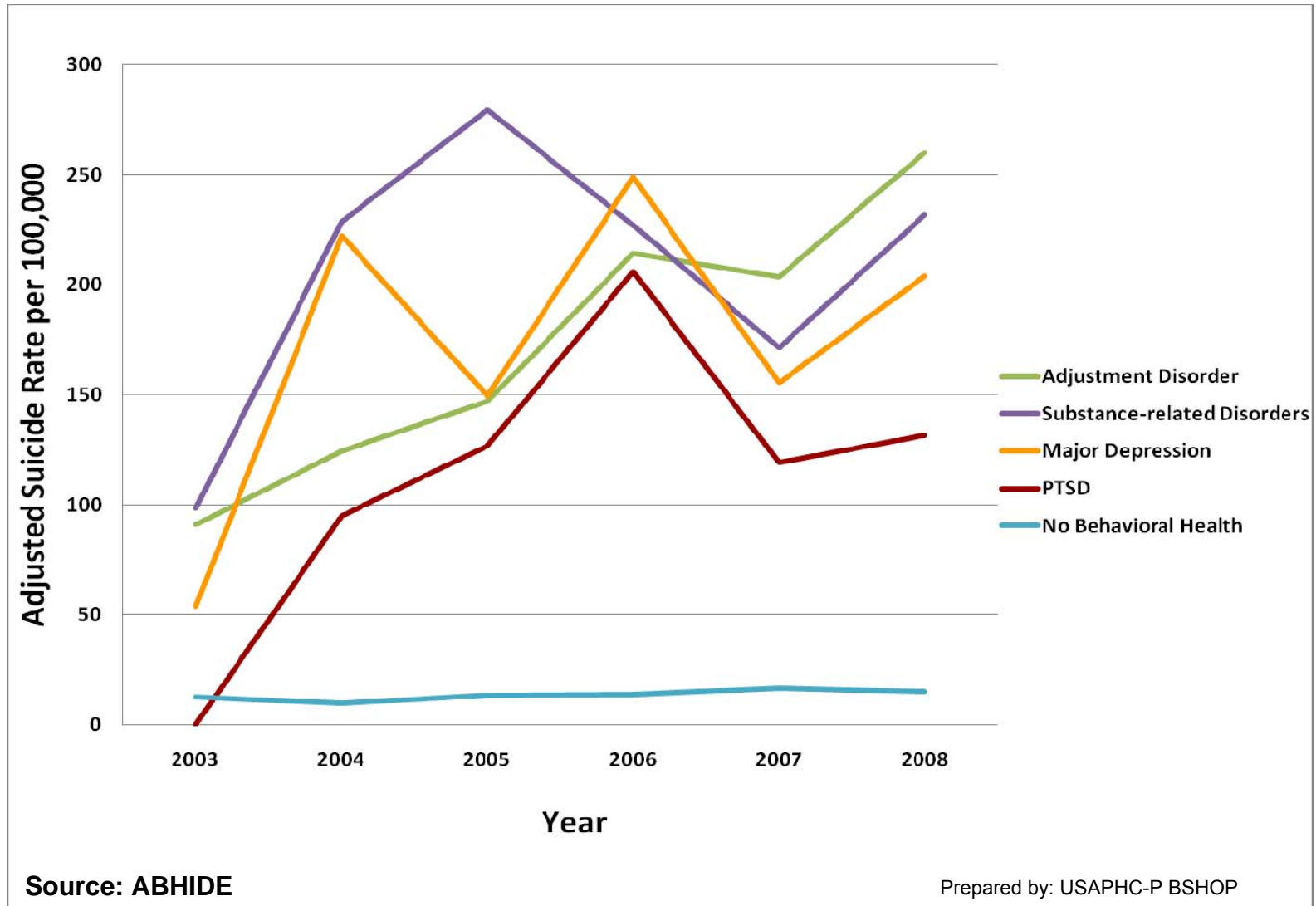
Source: ABHIDE

Prepared by: USAPHC-P BSHOP



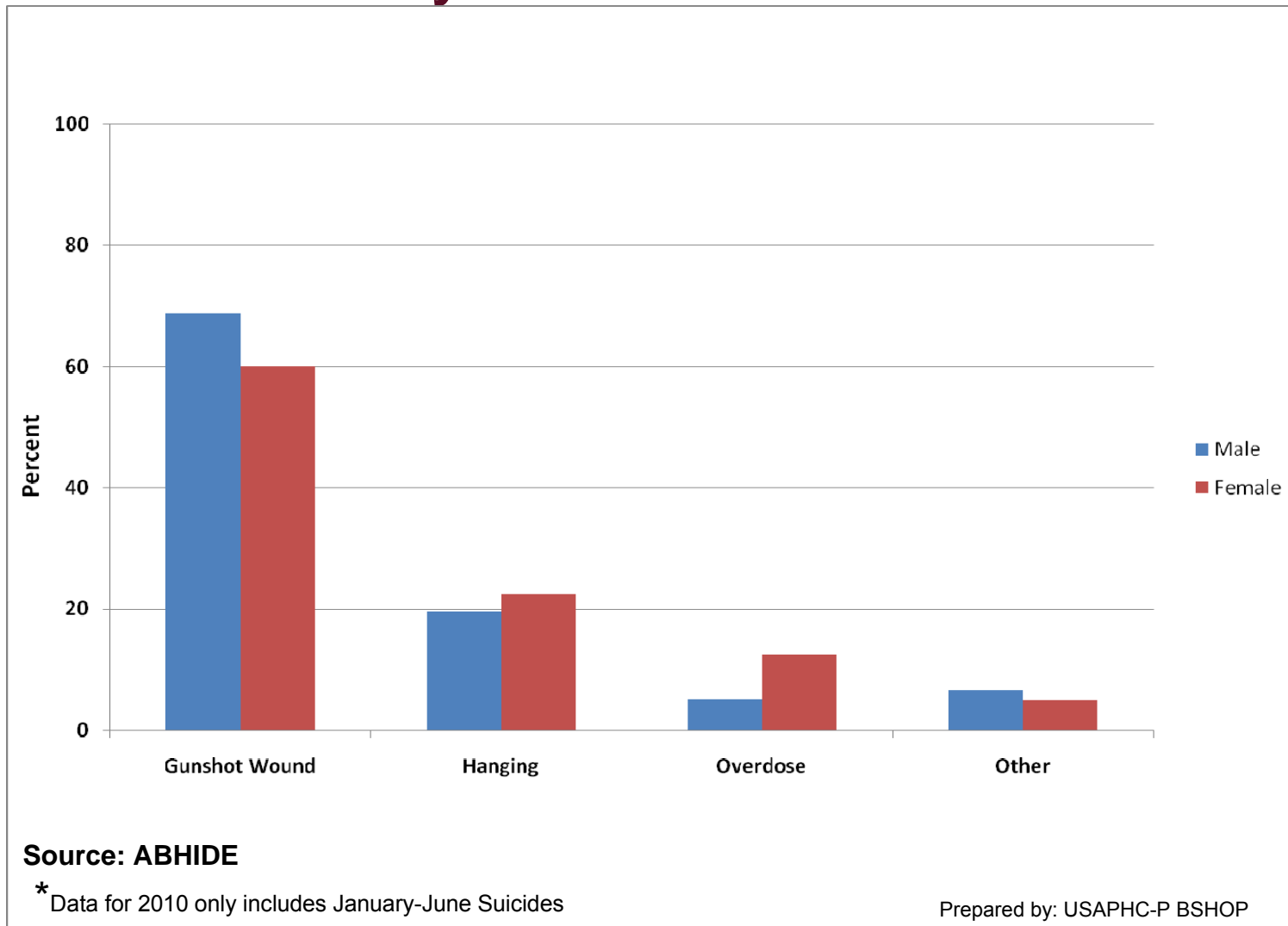


## Adjusted Army Suicide Rate by Diagnosis 2003-2008



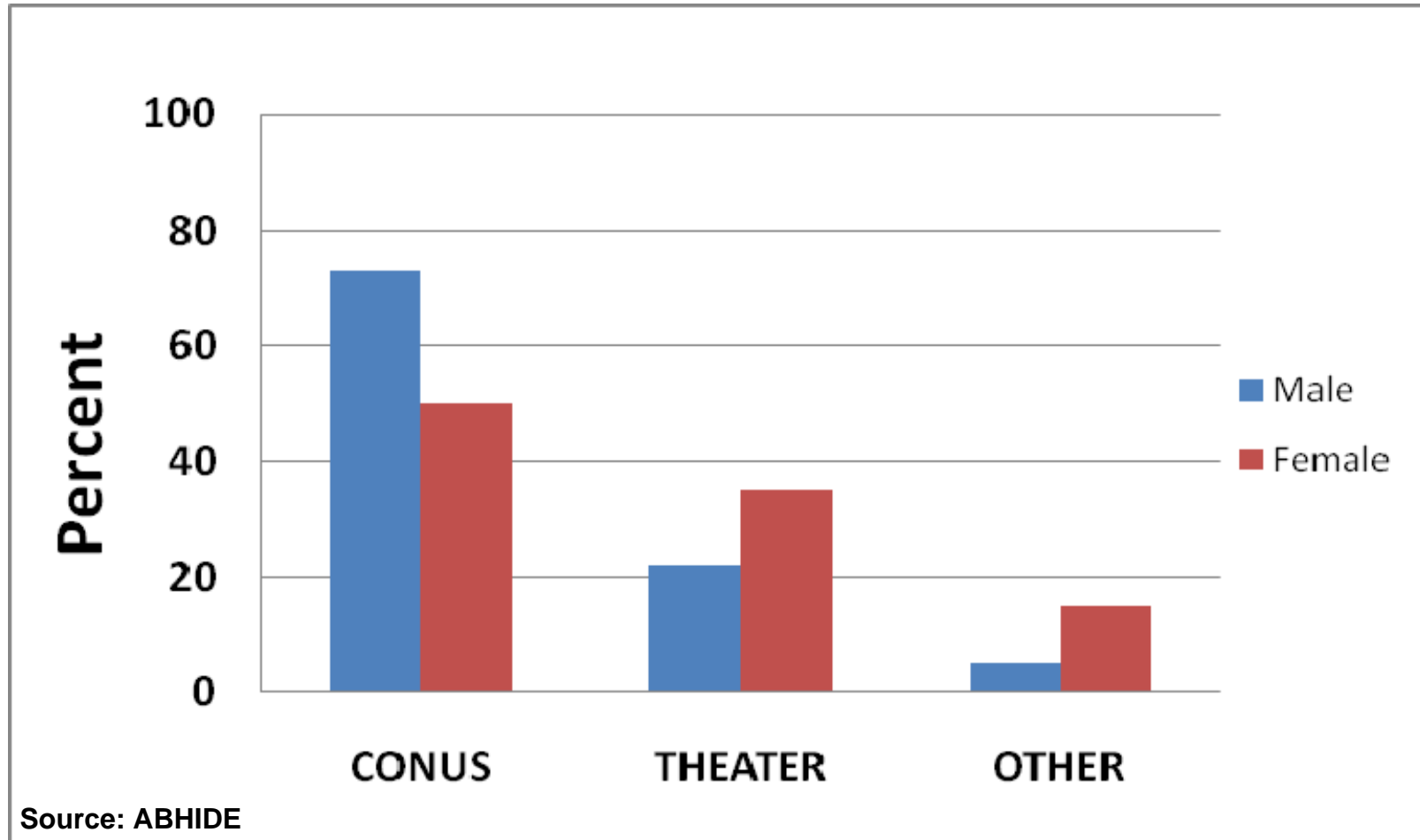


## Gender Differences in Method Army Suicides 2005-2010\*





## Gender Differences in Location of Death Army Suicides 2005-2010\*

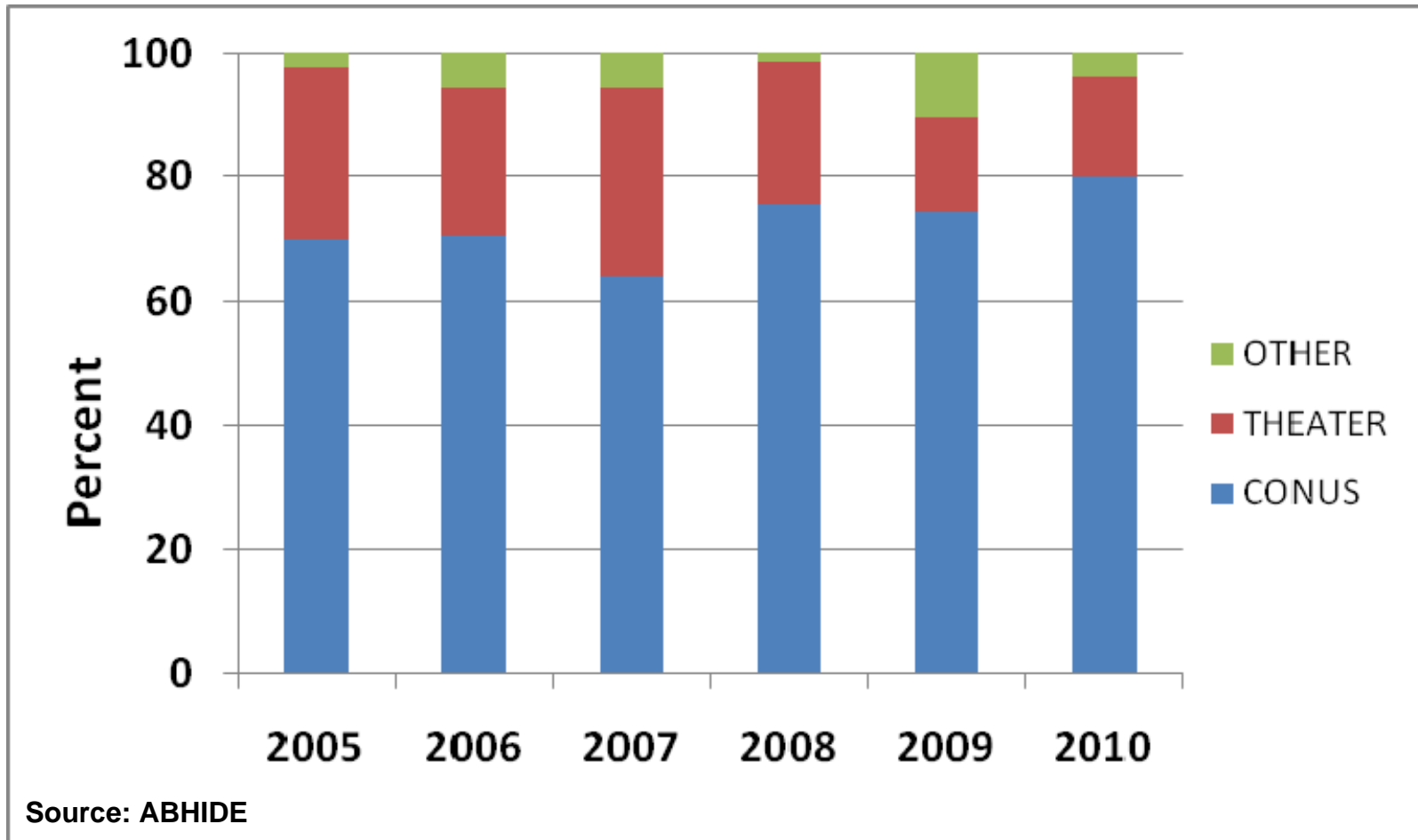


\*Data for 2010 only includes January-June Suicides





# Location of Army Suicide (Males) 2005-2010\*



Source: ABHIDE

\*Data for 2010 only includes January-June Suicides

Prepared by: USAPHC-P BSHOP







## Behavioral Risk Factors Among Suicide Cases

- Demographics: Gender, Age, Rank, Military Specialty
- Mood and Adjustment disorders, Substance Abuse common
  - Psychotic disorders and Personality Disorders relatively uncommon
- Relationship Problems
- Legal/Occupational Problems
- Pain/Disability
- Access to lethal means
  - Almost 70% with firearm
- Recent Trends
  - Older, higher rank, more females





# Behavioral Health Utilization Among Army Suicide Fatalities 2005-2010\*\*

13.5% (103/763) of soldiers who died by suicide between 2005 and 2010 had an inpatient hospitalization with a primary diagnosis code of ICD-9 290-319

## Inpatient Behavioral Health Utilization by Year of Suicide - Overall

Characteristic	Year of Suicide (N%)					
	2005 (N = 87)	2006 (N = 102)	2007 (N = 116)	2008 (N = 140)	2009 (N = 163)	2010 (N = 155)
Utilization (N%)						
Yes	6 (7)	13 (13)	8 (7)	25 (18)	32 (20)	19 (12)
No	81 (93)	89 (87)	108 (93)	115 (82)	131 (80)	136 (88)

\*The Cochran-Armitage Trend Test *showed a significant difference* between inpatient hospitalizations by year

Source: ABHIDE; \*\*Includes all suicides for 2010

Prepared by: USAPHC-P BSHOP





# Behavioral Health Utilization Among Army Suicide Fatalities 2005-2010\*\*

## Days Between Last Hospitalization Admission Date and Death Date

Characteristic	N (%)	Mean	Median
Overall	103(100)	509	162
Male	98(95)	445	158
Female	5(5)	1753	170

## Number of Behavioral Health Hospitalizations

Characteristic	N (%)	1	2	3+
Overall	103(100)	70 (67)	17 (16)	17 (16)
Male	98(95)	64 (65)	17 (17)	17 (17)
Female	5(5)	5 (100)	---	---

Overall, the mean number of total BH/MH related visits was 1.63; median 1.

Source: ABHIDE; \*Includes all suicides for 2010

Prepared by: USAPHC-P BSHOP





# Demographic Comparison of Nonfatal vs. Fatal Suicide Cases

Characteristic	Nonfatal Cases		Suicide Cases		Distribution of Characteristic in Overall Army	Significant Difference <sup>a</sup> of Nonfatal Cases	
	2005–2008		2005–2008		2008	vs. Suicides	vs. Army
	n (%)	n (%)	n (%)	n (%)	%		
NUMBER OF EVENTS	4491 (100.0)		449 (100.0)				
MALE	3334 (74.2)		419 (93.3)		86.0	Yes	Yes
FEMALE	1157 (25.8)		30 (6.7)		14.0		
AGE (YRS)	MEAN	24	28		25	Yes	No
	18–24	3002 (66.8)	202 (45.0)		46.0		
	25–34	1197 (26.7)	134 (29.8)		33.2	Yes	Yes
	35–60	292 (6.5)	113 (25.2)		20.8		
RACE-ETHNICITY							
	Caucasian/White	3208 (71.4)	330 (73.5)		74.6		
	African-American	627 (14.0)	63 (14.0)		15.7	No	Yes
	Hispanic and Other	656 (14.6)	56 (12.5)		9.7		
MARITAL STATUS							
	Single	2528 (56.3)	202 (45.0)		39.1		
	Married	1736 (38.7)	240 (53.5)		53.4	Yes	Yes
	Other	227 (5.1)	7 (1.6)		7.5		

Notes: <sup>a</sup> Two-sided Pearson chi-square test,  $\alpha=0.05$ ; Satterthwaite t test of means with unequal variances,  $\alpha=0.05$ .





# Demographic Comparison of Nonfatal vs. Fatal Suicide Cases

Characteristic	Nonfatal Cases		Suicide Cases		Distribution of Characteristic in Overall Army 2008 %	Significant Difference <sup>a</sup> of Nonfatal Cases	
	2005–2008		2005–2008			vs.	vs.
	n (%)	n (%)	n (%)	n (%)	%	Suicides	Army
NUMBER OF EVENTS	4491 (100.0)		449 (100.0)				
COMPONENT							
Regular Army	4286	(95.4)	365	(81.3)	77.0		
National Guard	103	(2.3)	58	(12.9)	16.9	Yes	Yes
Reserves	94	(2.1)	24	(5.4)	6.0		
Cadet	8	(0.2)	2	(0.5)	0.1		
RANK							
E1–E4	3763	(83.8)	256	(57.0)	61.4		
E5–E9	630	(14.0)	148	(33.0)	32.7	Yes	Yes
O1–O3/Cadets/W1–W3	71	(1.6)	29	(6.5)	3.5		
O4–O9/W4–W5	27	(0.6)	16	(3.6)	2.4		
NEVER DEPLOYED	2676 (59.6)		136 (30.3)				
NUMBER OF DEPLOYMENTS							
1	1178	(26.2)	203	(45.2)		Yes	
2	458	(10.2)	80	(17.8)			
3+	179	(4.0)	30	(6.7)			
LOCATION OF EVENT							
USA	3912	(87.1)	311	(69.3)			
In Theater	238	(5.3)	120	(26.7)		Yes	
Other	341	(7.6)	18	(4.0)			
METHOD <sup>b</sup>							
Gunshot Wound	164	(5.3)	309	(68.8)			
Hanging/Asphyxiation	122	(3.9)	82	(18.3)			
Drug/Alcohol Overdose	1690	(54.3)	29	(6.5)		Yes	
Poison/Carbon Monoxide	58	(1.9)	6	(1.3)			
Exsanguination	320	(10.3)	6	(1.3)			
Other	760	(24.4)	17	(3.8)			

Source: ABHIDE

Prepared by: USAPHC-P BSHOP





# Behavioral Health Utilization Comparison of Nonfatal vs. Fatal Suicide Cases

Behavioral Health Conditions	Nonfatal Cases	Suicide Cases	Significant Difference <sup>a</sup> Nonfatal Cases vs. Suicides
	2005–2008 n (%)	2005–2008 n (%)	
Number of Events	4491 (100.0)	449 (100.0)	
Received INPATIENT CARE for BH	759 (16.9)	66 (14.7)	No
Received OUTPATIENT CARE for BH	2935 (65.4)	207 (46.1)	Yes
DIAGNOSES <sup>b</sup>			
Any BH Diagnosis	2964 (66.0)	211 (47.0)	Yes
More Than One Diagnosis	2092 (46.6)	134 (29.8)	Yes
ANY MOOD DISORDER <sup>c</sup>			
Major Depression	663 (14.8)	40 (8.9)	Yes
Bipolar	141 (3.1)	14 (3.1)	No
Dysthymia	308 (6.9)	21 (4.7)	No
Depression NOS	1249 (27.8)	70 (15.6)	Yes
Any Anxiety Disorder (not PTSD)	760 (16.9)	60 (13.4)	No
PTSD	453 (10.1)	34 (7.6)	Yes
Adjustment Disorder	1983 (44.2)	109 (24.3)	Yes
Substance-related Disorders	780 (17.4)	81 (18.0)	No
Personality Disorders	399 (8.9)	25 (5.6)	Yes
Psychoses	125 (2.8)	12 (2.7)	No

Source: ABHIDE

Prepared by:  
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# Selected Underlying Factors





## Impact of Battle Injury on PTSD and Depression

- Grieger et al (2006), Posttraumatic Stress Disorder and Depression in Battle-Injured Soldiers.
  - Evaluated the rates and predictors of PTSD and Depression among seriously injured Soldiers during and following hospitalization
  - High levels of physical problems at 1 month predicted
    - PTSD at 7 months (OR 9.1)
    - Depression at 7 months (OR 5.7)
    - Compared to lower levels of physical problems at 1 month (After controlling for demographics, combat exposure, and duration of deployment)
  - Physical problem severity at 1 month was predictive of PTSD and depression severity at 7 months even when the analysis controlled for severity of BH symptoms at 1 month
  - The severity of PTSD and Depression at 7 months was not related to age, gender, marital status, combat exposure, or deployment length

*(Am J Psychiatry 2006; 163:1777–1783)*







## PTSD as an Independent Risk Factor for Suicidality

- Guerra and Calhoun (2010), Examined the relation between PTSD, Major Depressive Disorder (MDD), Alcohol Use Disorder (AUD), and suicidal ideation in an OEF/OIF veteran sample
  - After controlling for combat exposure and history of prior suicide attempts:
    - PTSD (+)/MDD(-) AOR = 5.6
    - PTSD(-)/MDD(+) AOR = 5.7
    - PTSD(+)/MDD(+) AOR = 8.9
    - PTSD(+)/AUD(-) AOR = 5.1
    - PTSD(-)/AUD(+) AOR = 2.3 (NS)
    - PTSD(+)/AUD(+) AOR = 6.1
  - Identified symptom clusters predicting suicidality among PTSD diagnosed participants
    - DTS Numbing AOR 3.8
    - DTS Re-experiencing, avoidance, and hyper-arousal NS
    - BDI-II Cognitive-affective AOR 2.0
    - BDI-II Somatic-vegetative NS





## Clinical Predictors of Suicidal Acts After A Major Depressive Episode

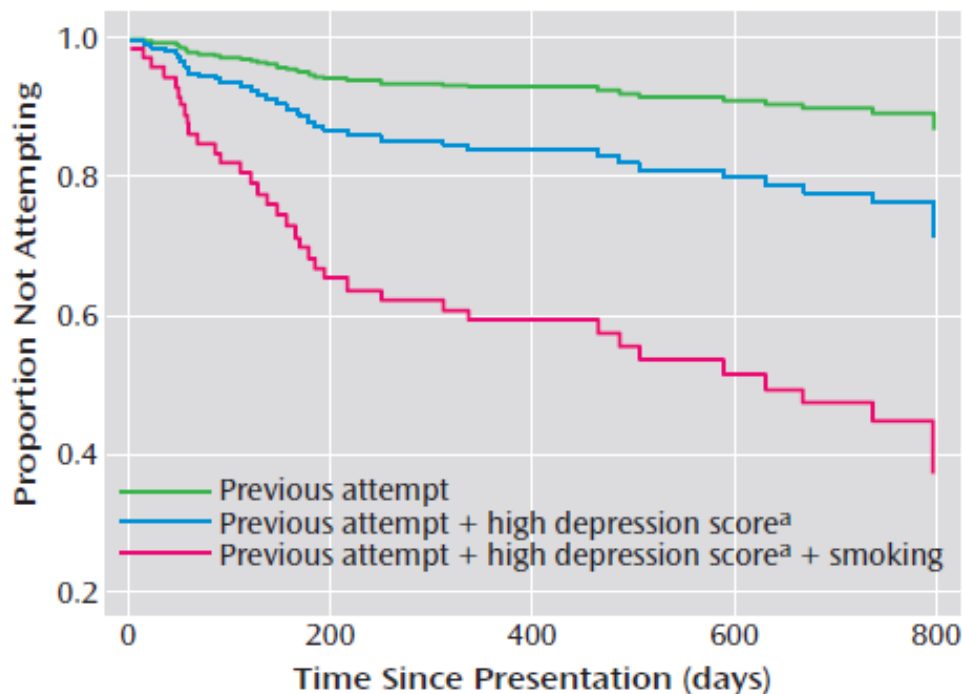
- Oquendo et al (2004), Conducted a two year follow-up of 308 patients who presented for treatment of a major depressive episode at 2 major psychiatric referral centers
  - Three most powerful predictors of future suicidal acts
    - History of a suicide attempt
    - **Subjective** rating of severity of depression
    - Cigarette smoking
    - Each had an additive effect on future risk
  - Personality Factors most associated with future suicidal acts
    - Aggression/impulsivity
    - Pessimism





## Clinical Predictors of Suicidal Acts After A Major Depressive Episode

FIGURE 1. Cumulative Proportion of 308 Patients Who Did Not Attempt Suicide Over a 2-Year Follow-Up Period After Presentation With a Major Depressive Episode, by Baseline Presence of Three Major Predictors of Suicidal Acts



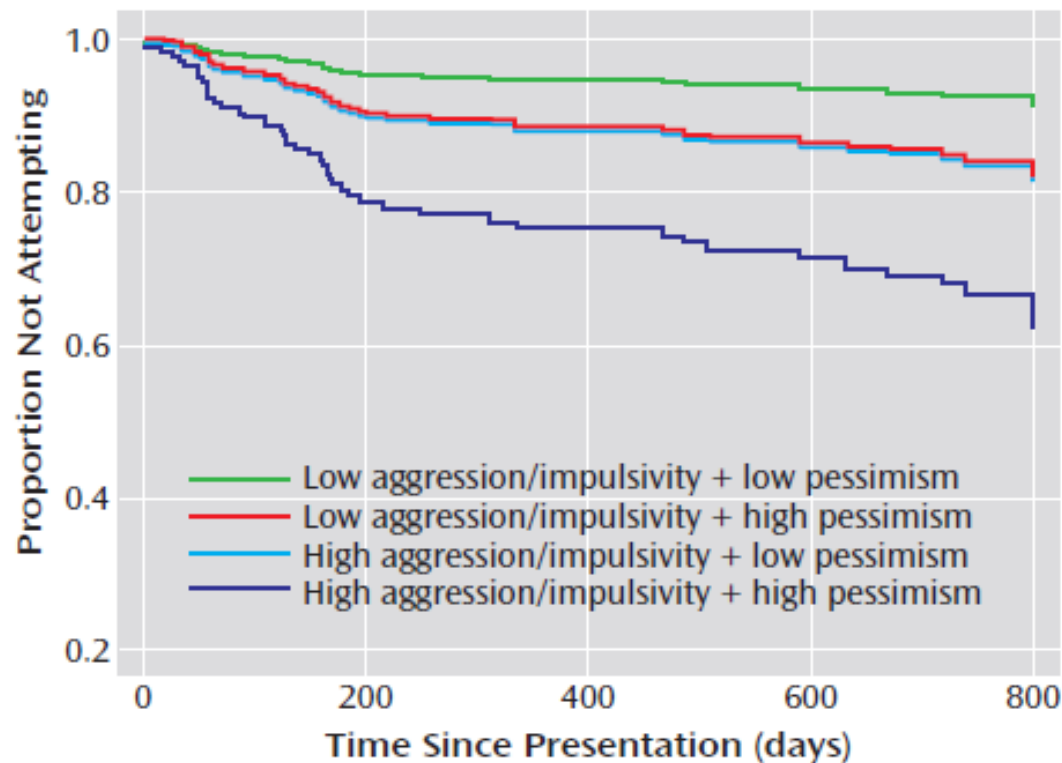
<sup>a</sup> Measured with the self-report Beck Depression Inventory (32). Scores were dichotomized as high or low by median split.





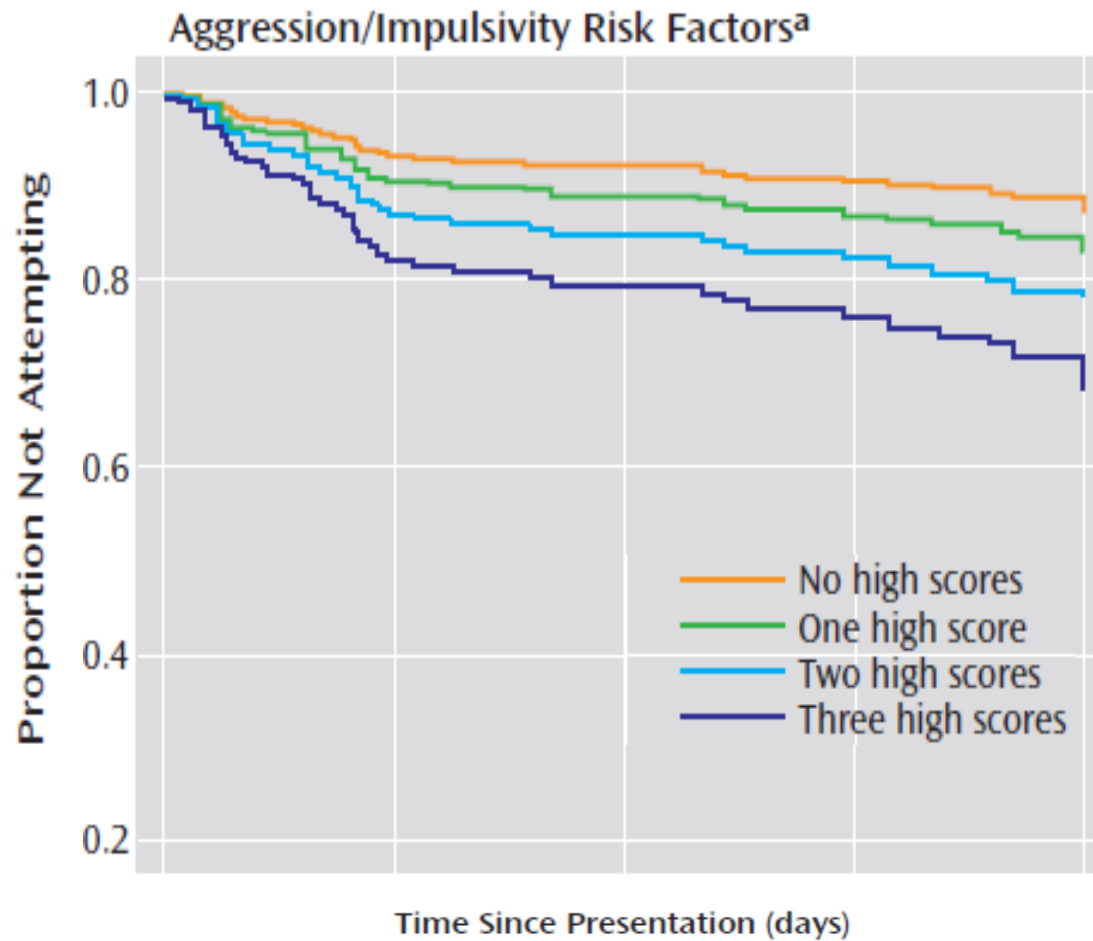
## Clinical Predictors of Suicidal Acts After A Major Depressive Episode

FIGURE 3. Cumulative Proportion of 308 Patients Who Did Not Attempt Suicide Over a 2-Year Follow-Up Period After Presentation With a Major Depressive Episode, by Baseline Scores on Aggression/Impulsivity and Pessimism Factors<sup>a</sup>





# Clinical Predictors of Suicidal Acts After A Major Depressive Episode

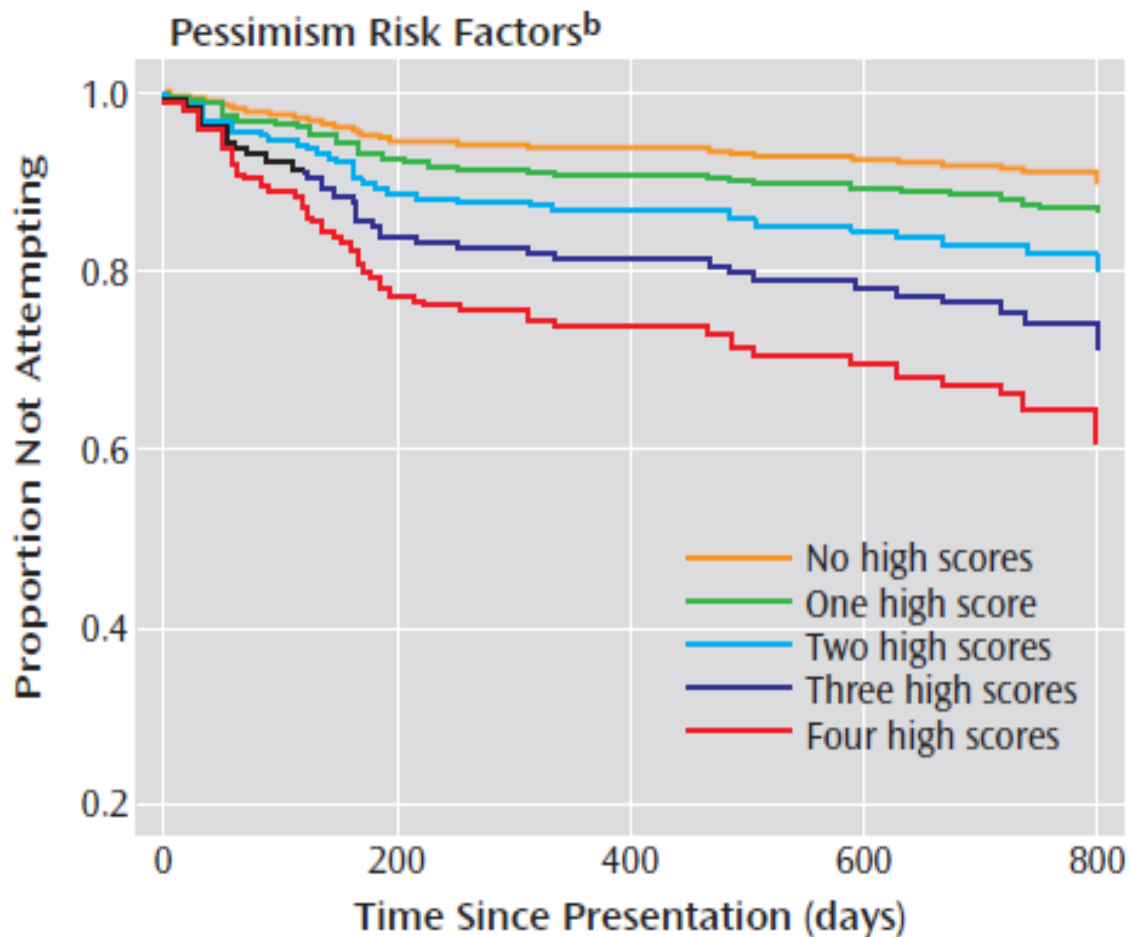


Am J Psychiatry 161:8, August 2004





## Clinical Predictors of Suicidal Acts After A Major Depressive Episode



*Am J Psychiatry* 161:8, August 2004





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# **Analysis From A Recent Field Evaluation That Examined Possible Associations Between Deployment, Combat Intensity, Combat Injury, Aggression, and Behavioral Health Problems**





## Possible Associations Between Combat Injury and Behavioral Health Problems

- During a recent EPICON we conducted a cohort study of over 10,000 Soldiers from 2 Brigade Combat Teams in order to examine the potential relationship between combat injury and Behavioral Health (BH) problems
- Specific Study Questions
  1. Are combat injuries associated with increased risk for developing a BH problem?
  2. Are BH problems associated with risk for combat-related injuries?
  3. Are multiple deployments a risk factor for subsequent BH diagnosis?







## Study Question #1: Is combat injury associated with subsequent BH diagnosis?

	Diagnosed		nDiagnosed		MULTIVARIATE MODEL		
		%		%	OR	95%CI	p-value
	N=3309		N=7476				
No injury	2974	90.7	7088	95.2	1.00	--	--
Injured- no evac.	185	5.6	244	3.3	1.73	1.51-1.97	<0.0001
Injured-evac.	121	3.7	114	1.5	2.46	2.06-2.94	<0.0001

- Soldiers injured (evacuated or not) had a significantly greater risk of being diagnosed with a mental health disorder (ICD-9 range: 290-319)





## Study Question #1a: Is combat injury associated with subsequent specific BH diagnoses?

						MULTIVARIATE MODEL		
		Diagnosed		Not Diagnosed		OR	95%CI	p-value
			%		%			
Depression	No injury	570	91.2	9492	94.0	1.00	--	--
	Injured- no evac.	28	4.5	401	4.0	1.21	0.93-1.57	0.3500
	Injured-evac.	27	4.3	208	2.0	2.16	1.63-2.85	0.0004
Anxiety	No injury	643	90.2	9419	94.1	1.00	--	--
	Injured- no evac.	38	5.3	391	3.9	1.39	1.11-1.75	<0.0001
	Injured-evac.	32	4.5	203	2.0	2.23	1.73-2.88	<0.0001
PTSD	No injury	612	84.8	9450	94.5	1.00	--	--
	Injured- no evac.	54	7.5	375	3.8	2.10	1.72-2.56	<0.0001
	Injured-evac.	56	7.8	179	1.8	4.36	2.89-6.52	<0.0001

- Combat injuries resulting in evacuation were significantly more likely to be associated with a subsequent diagnosis of depression, anxiety, or PTSD
- PTSD had the strongest association with combat injury (evacuated or not)





## Study Question #2: Are Soldiers with previous BH diagnoses more likely to be injured in combat?

		Injured		Not Injured		OR	95% CI	p-value
		n	%	n	%			
<b>Prior BH Diagnosis</b>	No	497	6.2	7530	93.8	1.00	--	--
	Yes	167	6.2	2532	93.8	0.99	0.83-1.20	0.9940
<b>Prior Depression</b>	No	638	96.1	9548	94.9	1.00	--	--
	Yes	26	3.9	514	5.1	0.76	0.51-1.13	0.1800
<b>Prior Anxiety</b>	No	634	95.5	9441	93.8	1.00	--	--
	Yes	30	4.5	621	6.2	0.72	0.50-1.05	0.0900
<b>Prior PTSD</b>	No	644	97.0	9912	98.5	1.00	--	--
	Yes	20	3.0	150	1.5	2.05	1.28-3.30	0.0020

- Soldiers with a prior PTSD diagnosis were significantly more likely to be injured (evacuated or not)
- Overall, Soldiers with a BH diagnosis were not more likely to be injured





## Study Question #3. Is there an association between multiple deployments and subsequent BH diagnosis?

						MULTIVARIATE MODEL		
		Previously Deployed		nPreviously Deployed		OR	95% CI	p-value
		n	%	n	%			
<b>BH Diagnosis</b>	No	2960	67.8	4516	70.4	1.00	--	--
	Yes	1406	32.2	1903	29.6	1.34	1.26-1.42	<0.0001
<b>Depression</b>	No	4073	93.3	5992	93.3	1.00	--	--
	Yes	293	6.7	427	6.7	0.85	0.72-1.01	0.0600
<b>Anxiety</b>	No	4131	94.6	6018	93.8	1.00	--	--
	Yes	235	5.4	401	6.2	1.23	1.10-1.38	0.0200
<b>PTSD</b>	No	4038	92.5	6009	93.6	1.00	--	--
	Yes	328	7.5	410	6.4	1.20	1.08-1.35	0.0400

- Soldiers with at least one deployment prior to the index deployment were significantly more likely to be diagnosed with an anxiety disorder or PTSD





## Possible Associations Between Combat, Aggression, and Behavioral Health Problems

- In the same population, an anonymous, self-report survey was administered to assess associations between combat intensity, aggression, and negative BH outcomes (n=2,532)
- Combat exposure was assessed with a 15-item scale previously used to measure combat intensity in military populations (developed by WRAIR, Hoge et al.)
- A metric was developed to estimate the level of individual combat intensity based on responses
- Additional questions about BH status allowed correlation of behavioral health outcomes with varying levels of combat intensity and aggression



## Aggression: Minor Types % of BCT (n=2,532)

Based on personal experiences in the past year (not including combat or training experiences):

	Never	1-2 times	3+ times
I threw something at someone that could hurt	68.9	19.6	10.1
I twisted someone's arm or hair	78.6	12.2	7.9
I grabbed someone	57.8	26.2	14.8
I slapped someone	81.8	9.8	6.8
I slammed someone against a wall	74.6	15.7	8.5

- Most commonly reported: grabbing someone, throwing something
- Less commonly reported: twisted arm/hair, slapped someone, or slammed someone against a wall

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## Aggression: Severe Types % of BCT (n=2,532)

Based on personal experiences in the past year (not including combat or training experiences):

	Never	1-2 times	3+ times
I pushed or shoved someone	54.9	26.9	16.7
I used a knife or gun on someone	94.0	3.0	1.3
I punched or hit someone with something that could hurt	74.3	14.4	10.0
I choked someone	82.5	9.7	6.5
I beat up someone	77.7	12.9	7.9
I burned or scalded someone on purpose	96.7	1.1	0.8
I kicked someone	77.2	13.1	7.9

- Most commonly reported: pushed/shoved someone, punched/hit someone
- Least commonly reported: used gun/knife on someone, burned/scalded someone, choked someone

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## Minor Aggression: Associated Factors

- After multi-variate modeling, the factors most significantly associated with minor aggression included:

(Higher)

- Physical altercations w/significant other
- Alcohol misuse
- Anger issues
- High combat intensity
- Being lower Enlisted

(Lower)

- Officers

	OR	95% CI	p-value
MS: Single	1.74	1.37-2.22	<0.0001
MS: Separated	1.13	0.72-1.78	0.64
MS: Divorced	1.15	0.71-1.85	0.55
O1-O5	0.21	0.10-0.45	0.04
E1-E4	2.50	1.53-4.07	0.0002
E5-E6	1.67	1.02-2.74	0.04
CI: Low	1.23	0.87-1.73	0.24
CI: Moderate	1.31	0.95-1.80	0.09
CI: High	2.75	2.03-3.75	<0.0001
Depression	2.05	1.59-2.64	<0.0001
Anger	2.78	1.08-7.16	0.03
Physical Altercation	3.81	2.74-5.29	<0.0001
Alcohol Misuse	3.09	2.50-3.81	<0.0001







## Severe Aggression: Associated Factors

- After multi-variate modeling, the factors most significantly associated with severe aggression included:

(Higher)

- Anger Issues
- Alcohol misuse
- Physical Altercation
- High combat intensity
- Lower Enlisted
- Single

(Lower)

- College Degree or higher

	OR	95% CI	p-value
MS: Single	1.69	1.34-2.13	<0.0001
MS: Separated	1.25	0.80-1.93	0.33
MS: Divorced	1.48	0.95-2.30	0.09
<High school	0.46	0.12-1.86	0.28
GED	1.11	0.83-1.49	0.47
Some College	0.93	0.74-1.16	0.50
College Degree or higher	0.42	0.23-0.74	0.002
E1-E4	3.50	2.20-5.58	<0.0001
E5-E6	2.15	1.34-3.44	0.001
CI: Low	0.92	0.67-1.27	0.61
CI: Moderate	0.94	0.70-1.26	0.67
CI: High	1.97	1.46-2.66	<0.0001
PTSD	1.46	1.09-1.95	0.01
Depression	1.39	1.06-1.82	0.02
Anger	3.53	1.35-9.20	0.01
Physical Altercation	3.00	2.15-4.19	<0.0001
Alcohol misuse	3.14	2.57-3.83	<0.0001

Prepared by: USAPHC-P BSHOP



## Combat Intensity

- Survey results suggested an association between increasing combat intensity\* and self-report of negative behavioral health outcomes

Adjusted\*\* odds ratios for the association between combat intensity<sup>5</sup> and behavioral outcomes

	Minor Aggression <sup>1</sup>	Major Aggression <sup>1</sup>	Problematic Alcohol Use <sup>2</sup>	Criminal Conviction <sup>3</sup>	Self-Reported BH Problem <sup>4</sup>	Physical Altercation w/Sig Other <sup>4</sup>
<b>Never Deployed</b>	-	-	-	-	-	-
<b>Low Intensity</b>	1.29	1.07	1.25	1.79	1.57 <sup>†</sup>	1.81 <sup>†</sup>
<b>Moderate Intensity</b>	1.57 <sup>†</sup>	1.39 <sup>†</sup>	1.57 <sup>†</sup>	1.81	2.14 <sup>†</sup>	1.36
<b>High intensity</b>	3.40 <sup>†</sup>	3.07 <sup>†</sup>	2.88 <sup>†</sup>	3.01 <sup>†</sup>	4.00 <sup>†</sup>	2.30 <sup>†</sup>

<sup>†</sup>p<0.05

\*Combat intensity based on number of events encountered on deployments as reported 15-item Combat Exposure Scale (adapted from Hoge et al.): low (0-4), moderate (5-8), high (9-15); \*\*Adjusted for race/ethnicity, grade/rank, education, marital status, and served in infantry battalion

<sup>1</sup> CTS2© 2003 by Western Psychological Services, within past 12 months; <sup>2</sup>RAPS4 2+; <sup>3</sup> Any after joining Army; <sup>4</sup> Any in lifetime;  
Data Source: Aggression Risk Factors Survey



## Discussion

- Combat injured Soldiers were more likely to have a subsequent BH diagnosis than Soldiers without combat injuries
- Although PTSD was the most likely subsequent diagnosis, anxiety and depression diagnoses are also more likely among combat injured Soldiers
- There was no relationship between prior BH diagnosis and subsequent combat injuries overall, but Soldiers with a prior PTSD diagnosis did experience greater likelihood of subsequent combat injury





## Discussion (2)

- The observed association between combat injuries and subsequent BH diagnoses could reflect the following factors, alone or in combination:
  - A direct relationship between physical injury and risk for developing a BH disorder
  - The intensity of combat experienced, as reflected by injury severity, and subsequent BH disorders
  - Factors related to re-integration of combat-injured/evacuated Soldiers into their social (family, community) and professional environments (unit, career progression)





## Discussion (3)

- After multi-variate regression modeling, the factors most significantly associated with both minor and severe aggression included physical altercations with a significant other, alcohol misuse, anger issues, high combat intensity, and being lower Enlisted
  - Deployment was only significantly associated with the highest levels of minor/severe aggression among Soldiers who experienced highest combat intensity
  - Soldiers with the highest levels of minor/severe aggression were significantly more likely to be associated with other BH issues than Soldiers with lower levels of aggression
  - Higher ranking Soldiers and/or Soldiers with higher education were typically less likely to be associated with the highest levels of aggression





## Summary

- Combat injury appeared to be associated with subsequent BH diagnosis, particularly PTSD.
- The observed associations may represent multiple factors, including the injury itself, combat intensity, and social/professional reintegration.
- Quantifying the association between combat deployment and behavior is extremely difficult; any true association likely reflects multiple factors, including the duration, frequency, and intensity of the exposure to combat. Outcomes are likely to be modified by individual and unit-related factors.





## Limitations

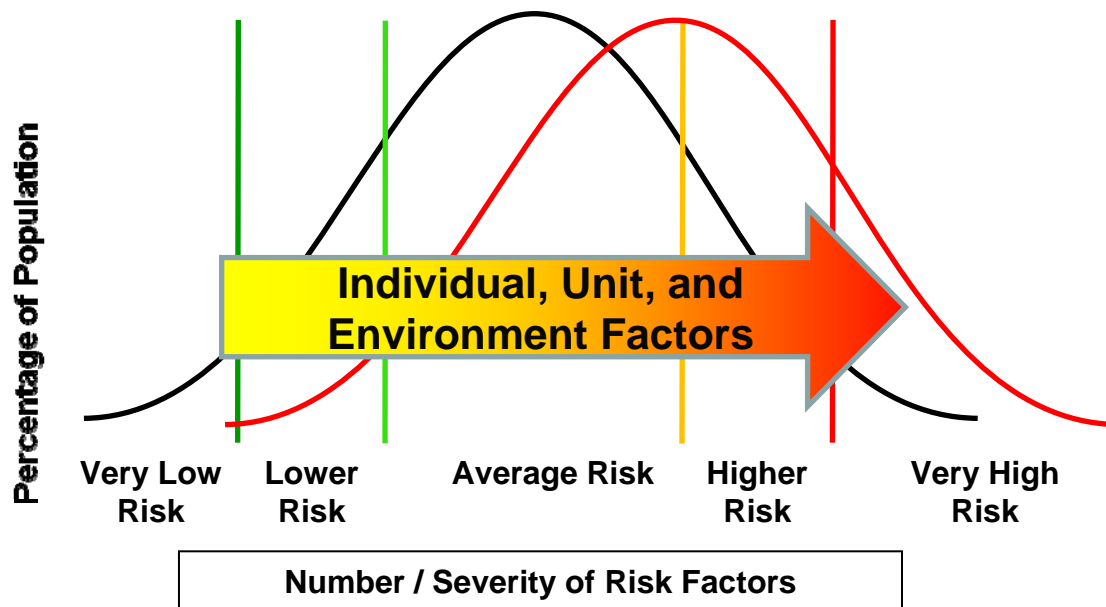
- Data used in the field studies described are based on findings from Soldiers in two BCTs and may not be representative of all Army Soldiers
- Injuries included were either combat-related or severe enough to warrant a medical evaluation; less severe injuries, therefore, are not represented and may limit the analysis of prior BH as a risk factor for overall injury
- Temporal relationships and causality cannot be established between combat intensity, aggression, and behavioral outcomes based on data from a cross-sectional survey





## Multi-factorial Risk Model

- Multiple individual, unit, and environmental factors may converge to shift the population risk to the right
- This would put more Soldiers in the Very High Risk category making increased numbers of adverse outcomes more likely



### Hypothesized Risk Factors

#### Individual

- Adverse Childhood Events
- Prior history of Mental Illness
- Alcohol / Drugs
- Behavioral Health Issues (untreated/under-treated)

#### Unit

- Turnover
- Leadership (Stigma)
- Training / Skills

#### Environment

- Turbulence
- Family Stress / Deployment
- Community
- Stigma







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# Clinical Correlates/Discussion

