



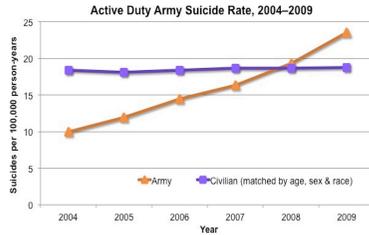
Suicidal Behavior in the U.S. Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)



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Background

- U.S. Army suicide rates were historically lower than those of the U.S. general population, adjusting for demographic differences.
- The suicide rate among Soldiers began rising in 2004, surpassing the adjusted civilian rate since 2008.
- The Army engaged the National Institute of Mental Health (NIMH) for help in addressing this issue.



- Army STARRS is a direct response to the Army's request that NIMH enlist the most promising scientific approaches to better understand psychological resilience, mental health, and risk for self-harm among Soldiers.¹
- The study was supported under a 5-year NIMH Cooperative Agreement (U01)* mechanism, providing for substantive NIMH involvement in the execution of the study and the inclusion of Army scientists as partners.
- The consortium brings together an interdisciplinary team of researchers with expertise in military health, psychiatric epidemiology, survey methodology, genetics & neurobiology, and suicidal behaviors.

Methods & Results

Historical Administrative Data Study (HADS)

- Longitudinal retrospective cohort study of all active duty Regular Army Soldiers during 2004–2009 (N=975,057 Soldiers) using de-identified health & administrative records. Person-month records for 569 suicide deaths and 9,791 suicide attempters were compared to an equal-probability sample of control person-months.

HADS Results – Suicides:

- Suicide risk increased for those never, currently, & previously deployed (see figure to the right). Risk was higher among currently & previously deployed soldiers than those never deployed.
- The rise in suicides was NOT associated with increased use of accession waivers in any category (e.g., medical, substance use, conduct), length of time since return from most recent deployment, total number of deployments, or the interval between the 2 most recent deployments (dwell time).²

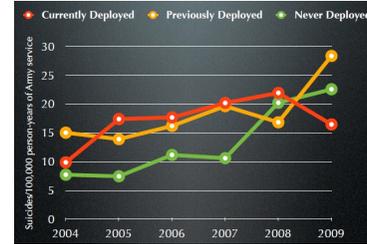


Table 1. Suicide Rates among Enlisted Soldiers in the HADS.

	Deployment Status			Total
	Never Deployed	Currently Deployed	Previously Deployed	
Time in Service				
First 4 Years	18.4	31.3	29.4	23.6
More than 4 Years	12.1	13.1	20.8	16.8
Total	16.3	21.8	23.1	20.1

- The mean suicide rate was 18.5/100,000 person-years.
- 90.9% of Regular Army suicides were completed by enlisted soldiers.
- Currently and previously deployed enlisted soldiers in their first 4 years of service had rates meaningfully higher than this mean (31.3–29.4/100,000 person-years) (Table 1).³

HADS Results – Suicide Attempts:

- Enlisted soldiers accounted for 98.6% (N=9,650) of all suicide attempt cases during 2004–2009, with an overall rate of 377.0/100,000 person-years.
- Among enlisted Soldiers, suicide attempts risk was highest for those who were in their first 2 years of service (particularly in the first few months – see figure below), never or previously deployed, and recently diagnosed with a mental disorder (Table 2).⁴

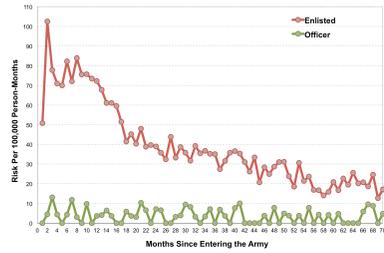


Table 2. Multivariate Associations with Suicide Attempts among Enlisted Soldiers in the HADS.⁵

DSM-IV Mental Disorders	Suicidal Ideation		Suicide Attempt	
	OR (95% CI)	Standardized Risk (per 100,000 Person-Years)	OR (95% CI)	Standardized Risk (per 100,000 Person-Years)
I. Time in Service				
1–2 Years	2.4 (2.2–2.6)*	585.6		
3–4 Years	1.5 (1.4–1.6)*	369.7		
5–10 Years	1.0 –	245.1		
> 10 Years	0.5 (0.4–0.5)*	106.3		
		589.3*		
II. Deployment Status				
Never Deployed	2.8 (2.6–3.0)*	443.9		
Currently Deployed	1.0 –	165.7		
Previously Deployed	2.6 (2.4–2.8)*	423.8		
		839.3*		
III. Time Since Most Recent Mental Health Diagnosis				
No Diagnosis	1.0 –	191.0		
1 Month	18.2 (17.4–19.1)*	3,490.7		
2–3 Months	5.8 (5.4–6.3)*	1,127.7		
4–12 Months	2.9 (2.7–3.1)*	552.6		
≥ 13 Months	1.4 (1.3–1.6)*	276.4		
		15,255.6*		

*Results in each section above (I–III) are based on separate multivariate logistic regression models that adjusted for sex, age at entry into the Army, current age, race-ethnicity, education, and marital status.
⁵p<0.05

All Army Study (AAS)

- Representative cross-sectional survey of 5,428 active duty Regular Army Soldiers who completed a self-administered questionnaire (SAQ).

AAS Results:

- Lifetime prevalence estimates of suicidal ideation, suicide plans, and suicide attempts are 13.9%, 5.3%, and 2.4%.
- Among ideators, 38.5% had developed suicide plans and 17.1% had attempted suicide.
- 62.4% of transitions from ideation to plans and 58.3% of transitions from ideation to attempts occurred within 1 year of the onset of suicide ideation.⁵

Table 3. Bivariate Associations of Lifetime DSM-IV Mental Disorders with Post-Enlistment First Suicide Attempts in the AAS.

DSM-IV Mental Disorders	Lifetime Prevalence of Mental Disorders		Bivariate Associations with Post-Enlistment First Suicide Attempts	
	Pre-Enlistment Disorders	Post-Enlistment Disorders	Pre-Enlistment Disorders	Post-Enlistment Disorders
	% (SE)	% (SE)	OR (95% CI)	OR (95% CI)
Internalizing Disorders				
Major Depressive Disorder	11.6 (0.5)	10.3 (0.7)	1.9 (0.6–6.3)	6.5 (2.3–18.8)*
Bipolar Disorder	1.9 (0.3)	1.8 (0.3)	–	4.1 (1.4–11.8)*
Panic Disorder	3.1 (0.4)	8.3 (0.5)	0.1 (0.0–0.7)*	3.8 (1.2–11.8)*
Generalized Anxiety Disorder	13.5 (0.8)	18.9 (0.9)	1.3 (0.5–3.3)	3.5 (1.1–11.1)*
Posttraumatic Stress Disorder	11.2 (0.6)	22.7 (1.0)	0.3 (0.1–1.3)*	3.3 (1.6–6.8)*
Obsessive-Compulsive Disorder	4.3 (0.4)	7.7 (0.4)	4.1 (1.1–15.7)*	4.0 (1.4–11.7)*
Specific Phobia	9.6 (0.7)	4.1 (0.3)	0.5 (0.2–1.7)	6.1 (1.8–21.4)*
Social Phobia	12.2 (0.8)	6.1 (0.6)	1.7 (0.6–4.6)	2.8 (1.0–8.0)
Externalizing Disorders				
Attention Deficit/Hyperactivity Disorder	7.0 (0.6)	–	4.3 (2.3–8.1)*	–
Intermittent Explosive Disorder	15.5 (0.7)	4.8 (0.5)	3.9 (2.1–7.3)*	5.9 (2.2–15.4)*
Substance Use Disorder	6.7 (0.5)	8.1 (0.4)	1.2 (0.3–4.8)	3.9 (1.4–10.8)*

*p<0.05

New Soldier Study (NSS)

- Representative survey of 38,237 new Soldiers during Reception Week (just prior to entering Basic Training) at Ft. Jackson, Ft. Benning, & Ft. Leonard Wood, who completed a self-administered questionnaire.

NSS Results:

- Pre-enlistment prevalence estimates of lifetime suicidal ideation, suicide plans, and suicide attempts are 15.1%, 2.3%, and 1.9%.
- Among pre-enlistment ideators, 16.6% had developed a suicide plan and 13.0% had made a suicide attempt prior to enlistment, whereas 44.2% of pre-enlistment ideators with a plan had made an attempt.
- 81.5% of the transitions from ideation to plans and 80.4% of the transitions from ideation to unplanned attempts occurred within 1 year of onset of ideation, whereas 73.3% of the transitions from plans to attempts occurred within 1 year of onset of plans.⁶
- 59% of new soldiers with a pre-enlistment history of suicide attempt report having a mental disorder that began before their first attempt. The rate of temporally prior mental disorders is slightly lower among those with suicide ideation (41%) or plan (57%).⁷

Table 4. Bivariate Associations of Prior DSM-IV Mental Disorders with Pre-Enlistment Suicidal Ideation and Suicide Attempts in the NSS.

DSM-IV Mental Disorders	Bivariate Associations in the Total Sample		Bivariate Association Among Lifetime Suicidal Ideators	
	Suicidal Ideation	Suicide Attempt	Attempt among those with a plan	Attempt among those without a plan
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Internalizing Disorders				
Major Depressive Disorder	4.3 (3.8–4.9)*	8.6 (6.7–11.0)*	1.7 (1.2–2.4)*	1.9 (1.2–3.0)*
Bipolar Disorder	4.3 (3.5–5.2)*	8.1 (5.9–11.2)*	1.3 (0.7–2.3)	2.6 (1.5–4.5)*
Panic Disorder	3.6 (3.0–4.3)*	7.3 (5.3–9.9)*	2.1 (1.2–3.8)*	1.6 (0.9–2.8)*
Generalized Anxiety Disorder	3.8 (3.2–4.5)*	7.6 (5.7–10.1)*	1.6 (1.1–2.4)*	2.0 (1.3–3.1)*
Posttraumatic Stress Disorder	2.9 (2.6–3.3)*	5.4 (4.2–7.0)*	1.5 (1.0–2.2)	2.0 (1.4–2.9)*
Externalizing Disorders				
Attention Deficit/Hyperactivity Disorder	4.0 (3.5–4.6)*	6.1 (4.7–8.0)*	1.5 (0.9–2.5)	2.0 (1.2–3.1)*
Intermittent Explosive Disorder	3.0 (2.7–3.2)*	4.0 (3.3–4.8)*	1.2 (0.9–1.7)	1.2 (0.9–1.7)
Substance Use Disorder	2.6 (2.2–3.1)*	5.1 (3.5–7.3)*	1.7 (1.0–2.9)*	1.3 (0.8–2.3)
Conduct Disorder	3.1 (2.7–3.5)*	5.8 (4.6–7.3)*	1.6 (1.1–2.5)*	2.4 (1.8–3.3)*
Oppositional Defiant Disorder	3.6 (3.3–3.9)*	5.6 (4.7–6.7)*	1.2 (0.9–1.6)	2.0 (1.5–2.6)*

*p<0.05

Discussion

- Taken together, these findings support prevention efforts focused on enlisted soldiers who are in the early phases of their first tour of duty and those with a history of mental disorders.
- Army STARRS is guided by this *concentration of risk* approach, which aims to produce actionable findings regarding when, where, and for whom risk of suicidal behaviors is greatest within the Army population.

References

- Ursano, R. J., Colpe, L. J., Heeringa, S. G., Kessler, R. C., Schoenbaum, M., & Stein, M. B. (2014). The Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Psychiatry*, 77(2), 107–119.
- Schoenbaum, M., Kessler, R. C., Gilman, S. E., Colpe, L. J., Heeringa, S. G., Stein, M. B., et al. (2014). Predictors of suicide and accident death in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *JAMA Psychiatry*, 71(5), 493–503.
- Gilman, S. E., Bonnet, E. J., Cox, K. L., Colpe, L. J., Fullerton, C. S., Gruber, M. J., et al. (2014). Socio-demographic and career history predictors of suicide and suicide mortality in the United States Army 2004–2009. *Psychological Medicine*, 44(12), 2579–2592.
- Ursano, R. J., Kessler, R. C., Heeringa, S. G., Cox, K. L., Naifeh, J. A., Fullerton, C. S., et al. (2015). Nonfatal suicidal behaviors in U.S. Army administrative records, 2004–2009: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Psychiatry*, 78, 1–21.
- Nock, M. K., Stein, M. B., Heeringa, S. G., Ursano, R. J., Colpe, L. J., Fullerton, C. S., et al. (2014). Prevalence and correlates of suicidal behavior among soldiers: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *JAMA Psychiatry*, 71(5), 514–522.
- Ursano, R. J., Heeringa, S. G., Stein, M. B., Jain, S., Raman, R., Sun, X., et al. (2015). Prevalence and correlates of suicidal behavior among new soldiers in the US Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Depression and Anxiety*, 32, 3–12.
- Nock, M. K., Ursano, R. J., Heeringa, S. G., Stein, M. B., Jain, S., Raman, R., et al. (in press). Mental disorders, comorbidity, and pre-enlistment suicidal behavior among new soldiers in the U.S. Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Suicide and Life-Threatening Behavior*.

• Website: www.Armystarrrs.org

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