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Study to Assess Risk and Resilience in Servicemembers - Longitudinal Study

Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)

ARMY STARRS

Army Study to Assess Risk and Resilience in Servicemembers

and

Study to Assess Risk and Resilience in Servicemembers – Longitudinal Study (STARRS-LS)

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Disclaimer

The opinions and assertions expressed herein are those of the author(s) and do not reflect the official policy or position of the Uniformed Services University of the Health Sciences or the Department
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Why Was STARRS Needed?

- Starting in 2004, there was a rapid & persistent rise in the Army suicide rate.

- In 2009, something unusual happened: the suicide rate in the Active Duty Army exceeded the rate in the demographically-adjusted civilian population.

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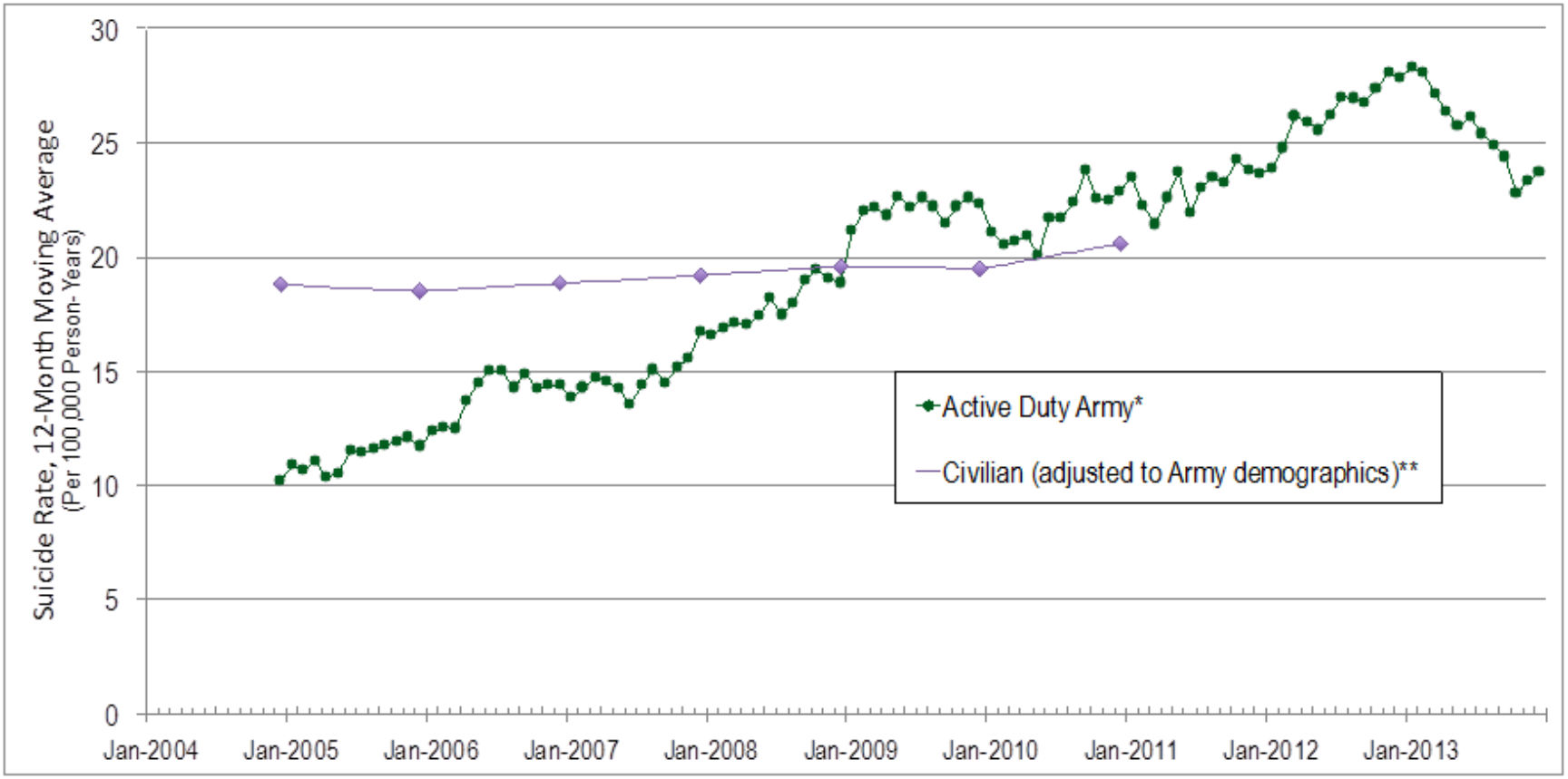
Suicide Trends: Active Duty Army & Matched Civilians



* Crude suicide rates, using data from Army STARRS (2004-2009) and Army Active Duty Strength reports (2010-2013)

** Civilian data from Centers for Disease Control, adjusted by Army STARRS to 2004 Army distribution of age, sex and race/ethnicity

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Was it due to the Wars?

- The increase in the suicide rate coincided with the wars in Afghanistan and Iraq.
  - Operation Enduring Freedom (OEF)
  - Operation Iraqi Freedom (OIF)
- Some hypothesized the increase was simply due to the wars.

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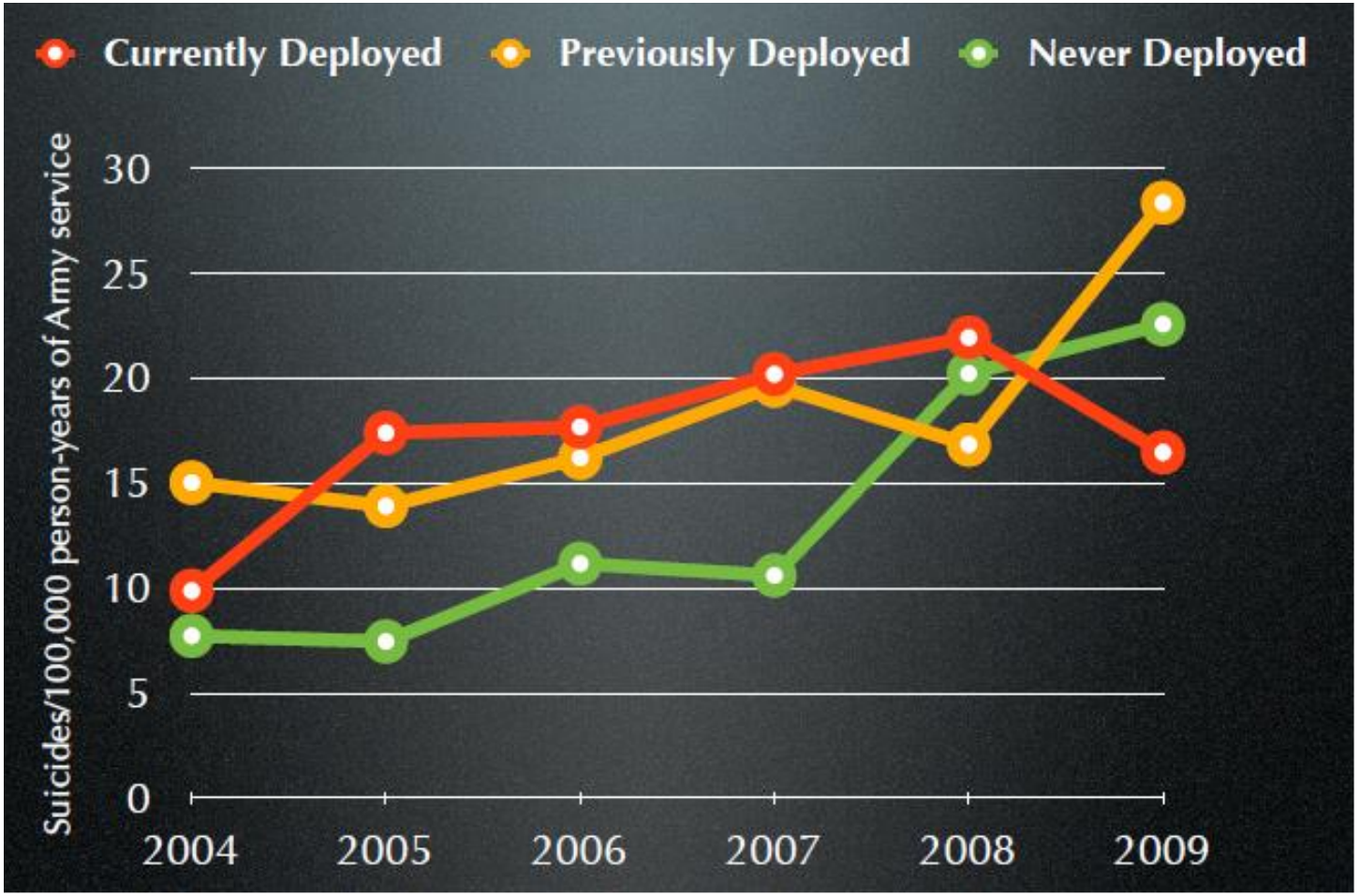
Active Duty Army Suicide Rates by Deployment Status



Source: Army STARRS calculations

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What Was Needed?

To address this complicated problem, the Army needed research that was sufficiently:

- large (suicide is a rare event)
- creative (using state-of-the-art methodologies)
- comprehensive (attack problem from multiple angles)

The Army approached NIMH to find academic scientists with the expertise and experience to design and conduct an independent research program to investigate the problem.

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Competitively Awarded Grant

- NIMH issued a request for grant applications to design & implement the necessary research
- The winning submission was from a consortium of multi-disciplinary investigators at the Uniformed Services University (USU); the University of California, San Diego (UCSD); Harvard Medical School (HMS); and the University of Michigan (UM)
    - Robert J. Ursano, MD (USU): PI
    - Murray B. Stein, MD, MPH (UCSD): Co-PI
    - Ronald C. Kessler, PhD (Harvard): Site PI
    - Steve Heeringa, PhD then James Wagner, PhD (UM): Site PI

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Goals of Army STARRS (2009-2015)

- To identify risk & protective factors for suicide & suicide-related behavior for the Army to use to revise existing risk reduction programs & efforts and/or develop new risk reduction programs.
- To deliver “actionable” findings to the Army rapidly (during the course of the research; not wait until the end)
- To establish Army cohorts for future follow-up studies & continued benefit to the Army & DoD

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Design of Army STARRS

- Not a single study
- Integrated multi-study design
- Involves 8 separate but integrated epidemiologic studies (incl. cross-sectional, historical cohort, prospective cohort, case-control, methodologic & neurobiologic studies) to comprehensively & creatively investigate risk factors & protective factors for:
  - Suicide
  - Suicide-related behavior
  - Related mental & behavioral health

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Army STARRS: 8 Component Studies

1	Historical Admin. Data Study (HADS)	• >1.6 million active duty Soldiers from 2004 to 2009 • Integrated >1.1 billion de-identified records (from 38 Army/DoD sources)
2	New Soldier Study (NSS)	• 57,269 Soldiers attended survey sessions (at 3 sites) • 35,002 Soldiers provided a blood sample
3a	All Army Study (AAS)	• 34,633 Soldiers attended survey sessions (>50 sites CONUS & OCONUS)
3b	AAS In-Theater (in Kuwait)	• "Outbound" & "inbound" Soldiers during R&R processing in Kuwait • 10,255 Soldiers attended survey sessions
4	SHOS-A (case-control)	• Interviewed in-patient suicide attempters (cases) at 5 sites & controls • 561 Soldiers enrolled (186 cases, 375 controls) & 296 blood samples
5	SHOS-B (case-control)	• Interviewed Army supervisors & next-of-kin of suicide cases & controls • 603 interviews completed for 150 cases & 276 controls
6	Pre/Post Deployment Study (PPDS)	Longitudinal study with 4 waves of data collection (4 time-points) at 3 sites • 1 mo pre-deployment (T0): 9,488 Soldiers participated; 8,090 gave blood • 1 mo post-deployment (T1): 10,116 Soldiers participated; 8,822 gave blood • 3 mos post-deployment (T2): 9,193 Soldiers participated • 9 mos post-deployment (T3): 6,977 Soldiers participated
7	Criminal Investigation Division Study (CID)	• Systematic review & abstraction of Army death reports from 2005 to 2009 • Reviewed, abstracted, thematically-coded 1,311 CID case files
8	Clinical Reappraisal Study (CRS)	• To calibrate clinical survey measures used in AAS and NSS • Conducted clinical interviews with 460 Soldiers

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Army STARRS Data Collection Summary: Soldiers, Surveys, Biosamples

For Studies with Data Collection from Soldiers (HADS, CID, CRS not included)

Studies		Number of Soldiers Who Participated*	Number of Surveys Collected	Number of Biosamples		
				Soldiers Who Provided Blood	Blood Tubes Collected	Vials in Frozen Storage
Cohort Studies						
NSS (2 survey sessions/Soldier)		55,814	111,628	34,986	34,986	37,477
AAS (including Guard & Reserve)		32,272	32,272	-	-	-
AAS in-theater (Kuwait)		8,938	8,938	-	-	-
PPDS	Pre-deployment Time 0	10,116	9,488	8,090	23,791	53,966
	Post-deployment Time 1		10,116	8,822	17,542	55,136
	Post-deployment Time 2		9,193	-	-	-
	Post-deployment Time 3		6,977	-	-	-
Total Participants in Cohort Studies		107,140				
Case-Control Studies						
SHOS-A		186	756	296	592	873
SHOS-B		150	603	-	-	-
Total for All Studies		107,476	189,971	52,194	76,911	147,452

*Participation is defined as starting a survey. For SHOS-A and SHOS-B, number of participants includes only cases (because controls are already counted in AAS) but number of surveys includes cases and controls. For SHOS-B cases (deceased) and controls (living), surveys were administered to Army supervisors and/or next-of-kin.

NOTE: NSS blood collection started 6 months after data collection began and about 80% of Soldiers who were asked gave blood.

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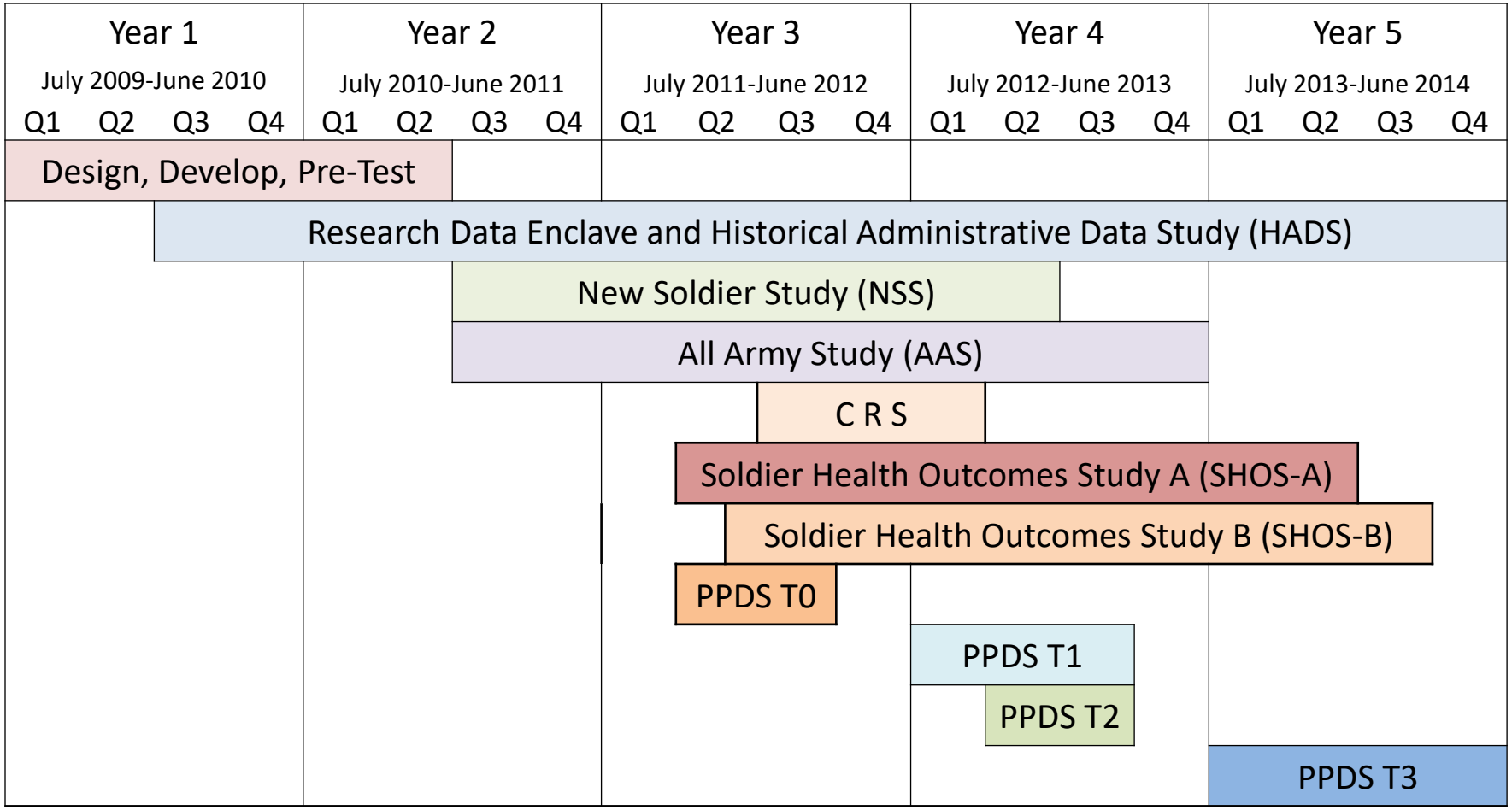
Army STARRS: Data Collection Timeline



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Study to Assess Risk and Resilience in Servicemembers – Longitudinal Study (STARRS-LS)

Continuation of the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)

2015 to present

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STARRS-LS: 3 Cohorts being followed across time

1. ~3 million in expanded HADS cohort: total Army 2004-2019
   - Following with many Army/DoD datasets including National Death Index (NDI)
2. ~72K in STARRS cohort (subset of above)
   - Army STARRS survey data (NSS 2011-2012, AAS 2011-2013, PPDS 2011-2014)
   - Army/DoD admin data thru 2019 linked to survey data
   - NDI data (currently thru 2020) with date of death & all causes of death
   - Research Team will continue requesting updated NDI data from CDC annually
3. ~14.5K in STARRS cohort sample (subset of STARRS cohort)
   - Army STARRS survey data (NSS 2011-2012, AAS 2011-2013, PPDS 2011-2014)
   - STARRS-LS follow-up survey data: Wave 1 (2016-2017), Wave 2 (2018-2019), Wave 3 (2020-2022)
   - Army/DoD admin data thru 2019 linked to survey data
   - NDI data thru 2020 with date of death & all causes of death (will update annually)
   - Wave 4 follow-up survey data collection in-progress (2022-2024)

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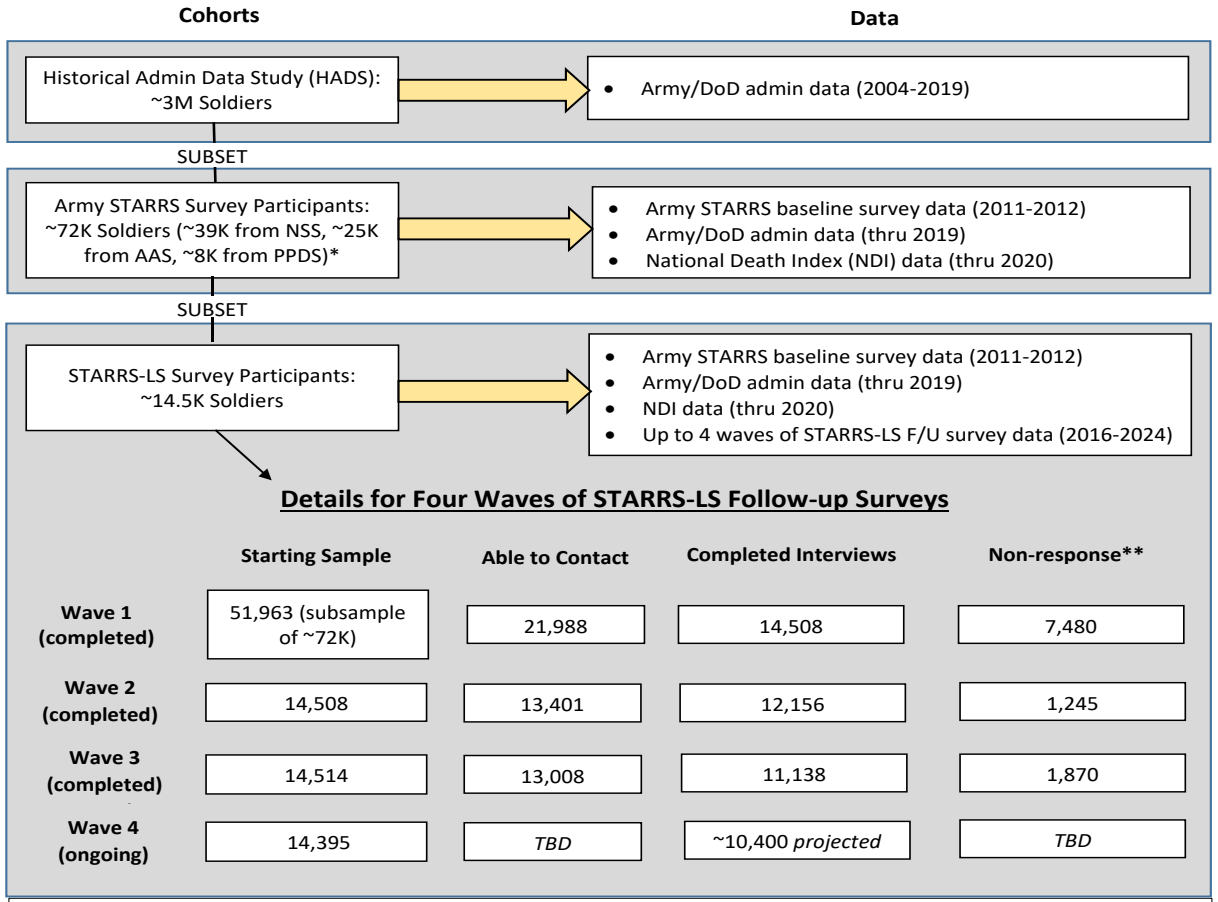
STARRS-LS: Diagram of Cohorts



Details for Four Waves of STARRS-LS Follow-up Surveys

	Starting Sample	Able to Contact	Completed Interviews	Non-response**
Wave 1 (completed)	51,963 (subsample of ~72K)	21,988	14,508	7,480
Wave 2 (completed)	14,508	13,401	12,156	1,245
Wave 3 (completed)	14,514	13,008	11,138	1,870
Wave 4 (ongoing)	14,395	*TBD*	~10,400 *projected*	*TBD*

*NSS = New Soldier Study; AAS = All Army Study; PPDS = Pre/Post Deployment Study

**Non-response details for each Wave:

Wave 1: 254 refused, 149 deceased, 7,077 other non-response

Wave 2: 63 refused, 10 deceased, 1,172 other non-response

Wave 3: 153 refused, 53 deceased, 1,664 other non-response

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Progress Analyzing Data & Producing Findings

Research Team continues to be highly productive at analyzing data, producing potentially actionable findings & writing-up the findings

A total of 127 studies published, accepted, or submitted

- 120 studies published
- 1 study accepted for publication (in-press)
- 6 studies submitted for publication (waiting for decision)

- Summary of published studies: https://www.cstsonline.org/whats-new/wn-armystarrs

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STARRS Family of Studies
(and Studies Based on STARRS Public Data)

STARRS Funded:

1) Army STARRS studies: baseline - analysis ongoing
2) STARRS-LS studies: continuation & new follow-up surveys
   a) Waves 1 & 2 - data collection completed; analysis ongoing
   b) Waves 3 & 4 - Wave 3 data collection underway; Wave 4 planned

Non-STARRS Funded (collaborations using STARRS data):

1) Sexual trauma study (Harvard) - completed
2) Workplace violence study (Harvard) - completed
3) SOF collaboration (USU & SOCOM) - completed
4) GWAS of risk tolerance & risky behaviors (UCSD & SSGAC) - completed
5) PTSD & sleep disorders study (USU & WRNMMC) - ongoing
6) Whole genome sequencing studies (USU APG Dept.) - ongoing
7) PTSD genetic studies (UCSD & NIMH-PGC) - ongoing
8) Other genetic & epigenetic studies (UCSD) - ongoing
9) Firearms behavioral practices & suicide risk (USU & CDC) – ongoing

(Non Family Members: Studies by 49 approved users of STARRS public data at ICPSR)

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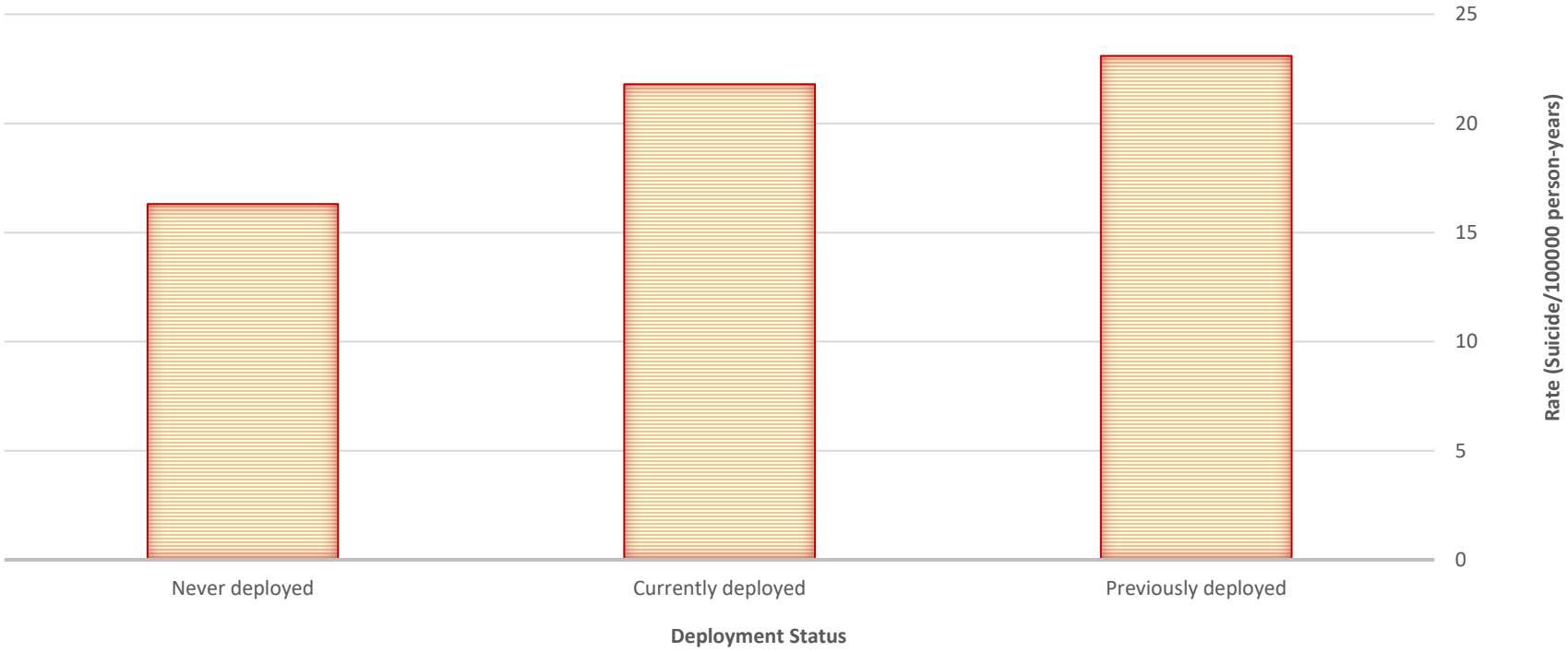
Suicide Rates

(Enlisted Regular Army, 2004-2009)

CRUDE RATES OF **SUICIDE** BY DEPLOYMENT HISTORY AMONG ENLISTED, REGULAR ARMY SOLDIERS IN THE ARMY STARRS 2004–2009 HADS



Gilman, et al. Psychological Medicine, 2014

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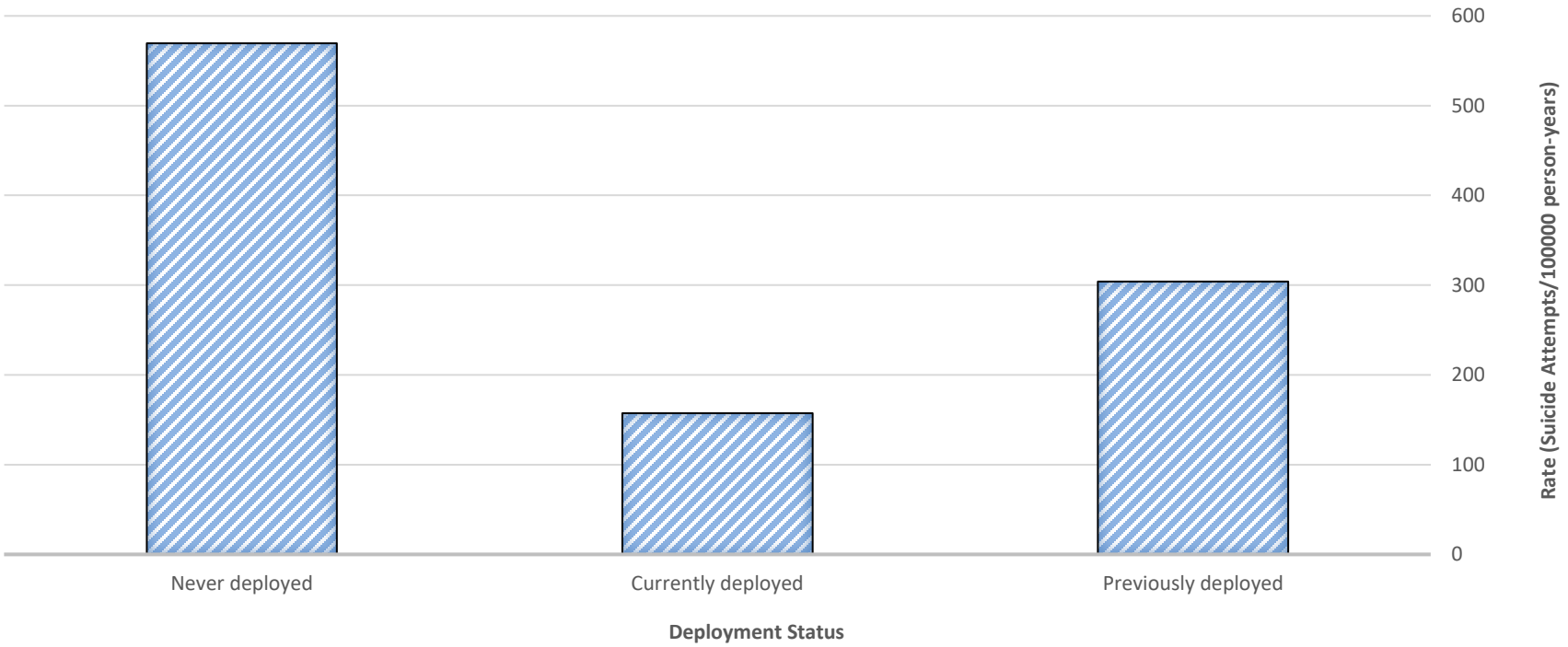
Suicide Attempt Rates

(Enlisted Regular Army, 2004-2009)

CRUDE RATES OF **SUICIDE ATTEMPT** BY DEPLOYMENT HISTORY AMONG ENLISTED, REGULAR ARMY SOLDIERS IN THE ARMY STARRS 2004–2009 HISTORICAL ADMINISTRATIVE DATA (HADS)



Ursano, et al. JAMA Psychiatry, 2016

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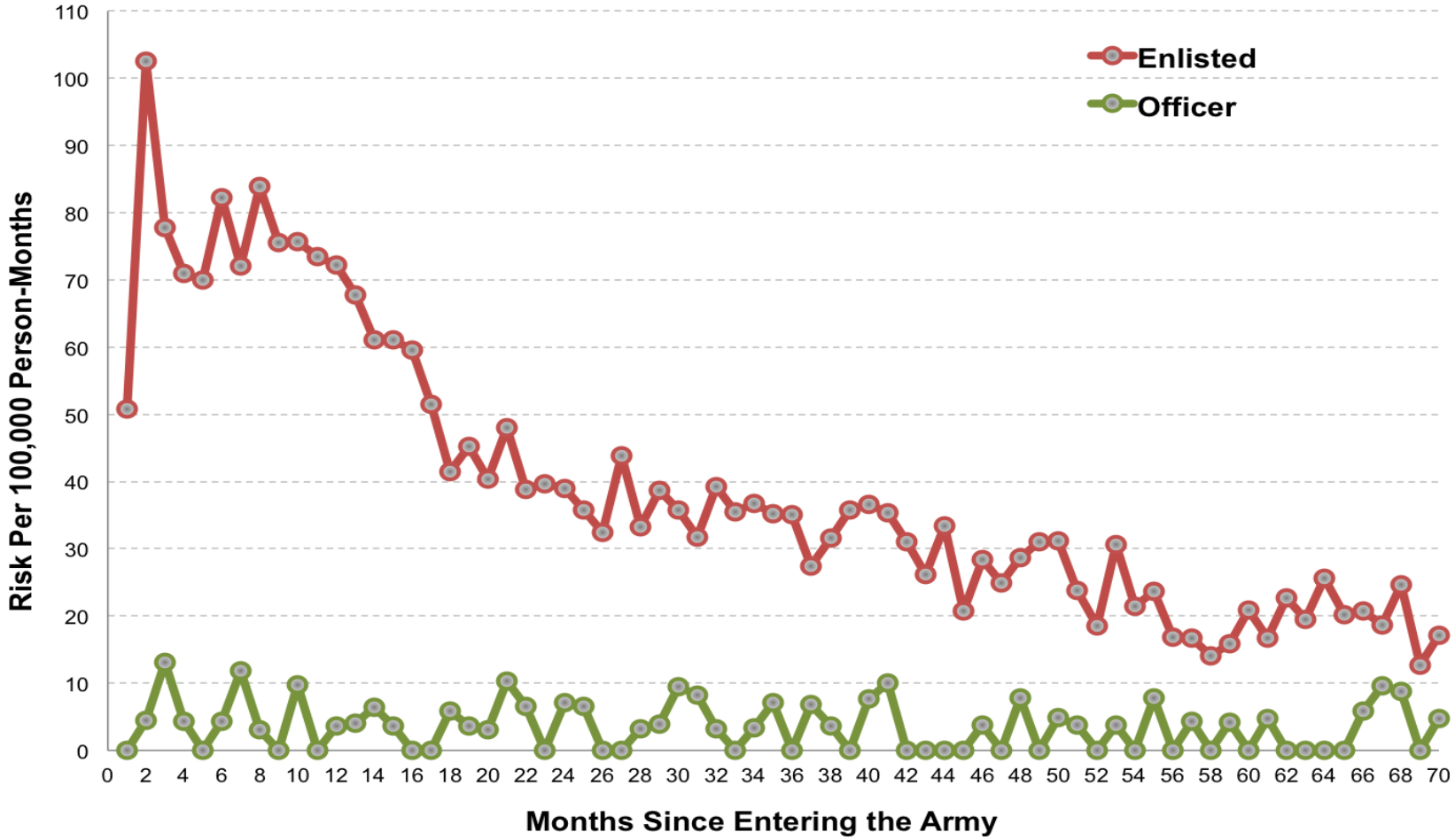
WHEN:…Suicide Attempt Risk by Time in Service (HADS 2004-2009)



Ursano et al. (2015). *JAMA Psychiatry*

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- Hay Stacks…

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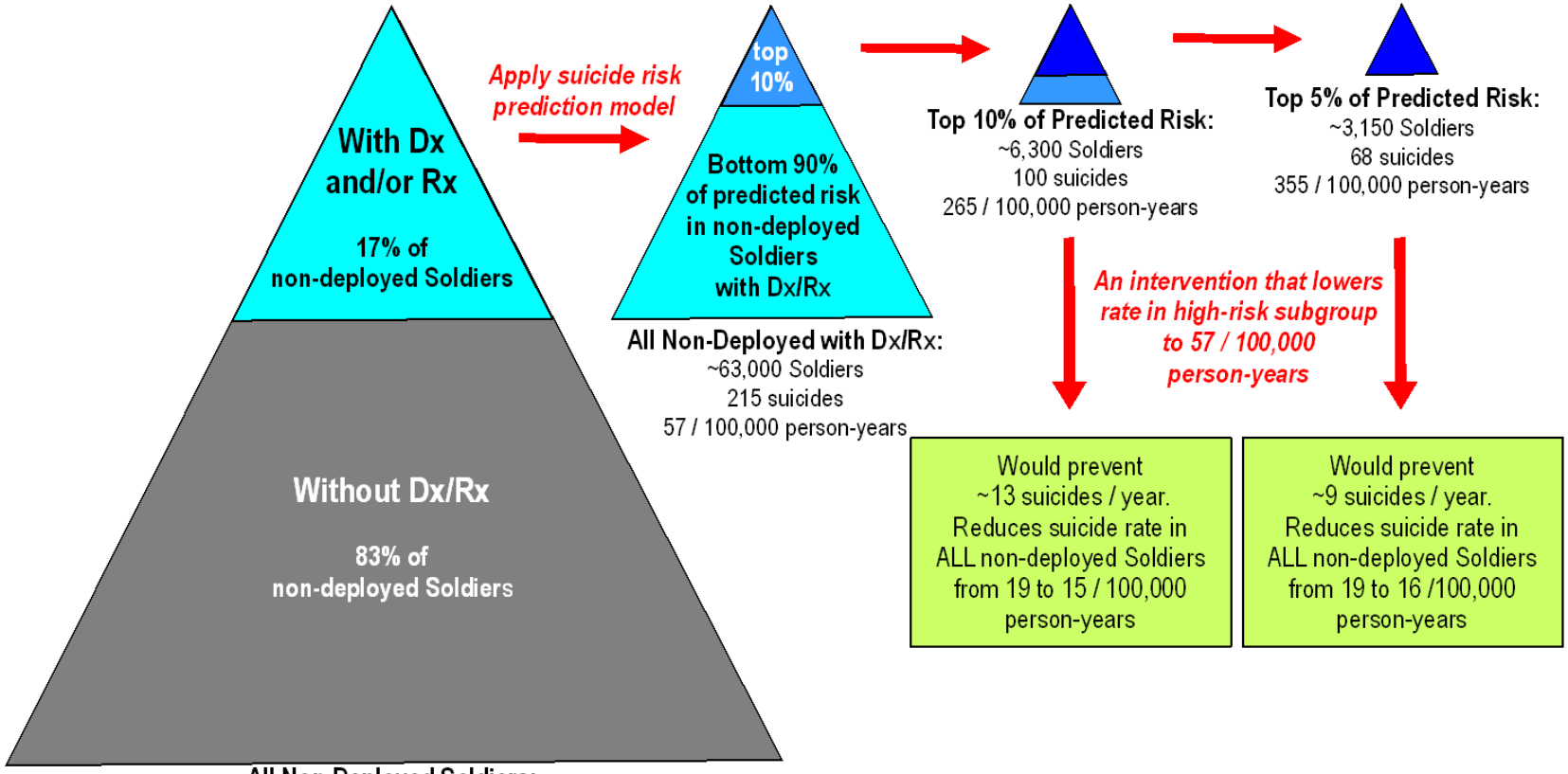
Concentration of Risk

Risk Models Can Help Lower Army Suicide Rate

Example: Non-Deployed Regular Army Soldiers with
Psychiatric Diagnosis (Dx) and/or Psychotropic Prescription (Rx) in the Previous 3 Months, (2004-2009)



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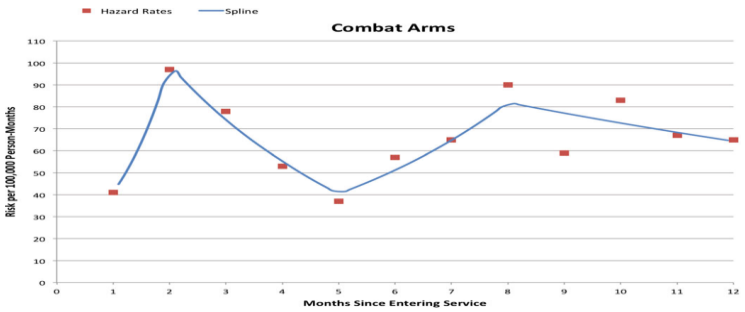
WHO:…Suicide Attempt (S.A.) Risk: Combat Arms, Special Forces & Combat Medics (HADS 2004-2009)

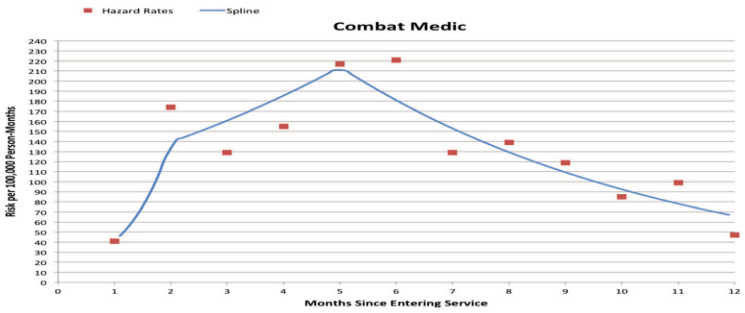
Overall: Combat Arms & Combat Medics had higher odds of S.A. (1.2, 1.4), & Special Forces had lower odds (0.3), than other MOSs. MOS associated with S.A. in first 10 years of service, but not beyond.

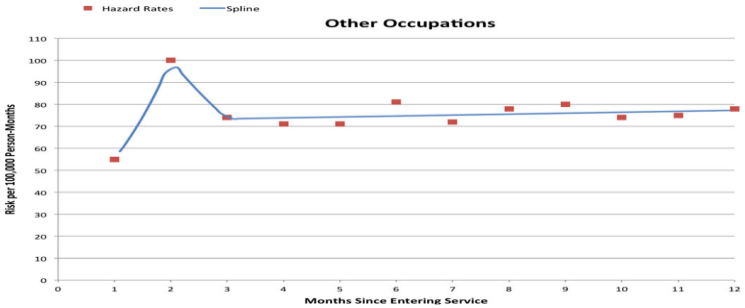
First year of service: Combat Medics had higher odds of S.A. than Combat Arms & other occupations.

Deployment: Combat Arms & Combat Medics had higher odds of S.A. than other occupations among those never deployed and those previously deployed. Combat Medics also had higher odds of S.A. among deployed.

Military occupation can inform the understanding of S.A. risk.







Ursano, et al. (2017) *BMC Psychiatry*

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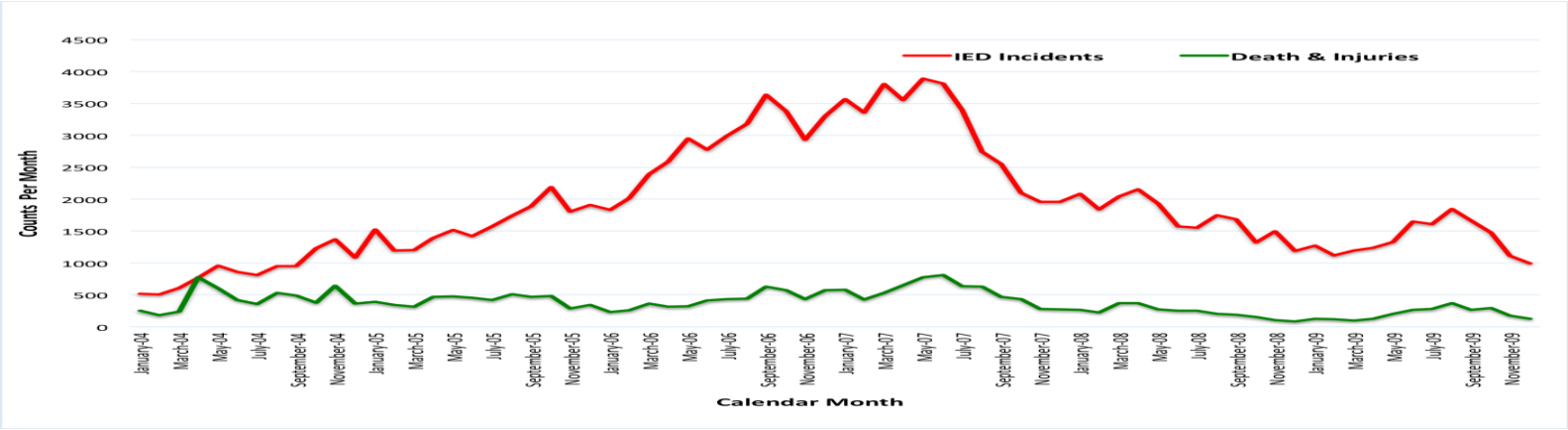
Frequency of IEDs & Suicide Attempts (HADS 2004-2009)

BLUF: Threat of new weapons may increase stress burden as measured by suicide attempt rate among Soldiers. Targeting risk perception & perceived preparedness, particularly early in a Soldier's career, may improve psychological resilience & reduce suicide risk.

- Examined association of monthly IED rates with suicide attempt risk in deployed & non-deployed for all active duty Regular Army suicide attempters (n=9,791) & equal-probability sample of control person-months (n=183,826).
- Soldiers' suicide attempt risk increased with increasing numbers of IEDs.
- Suicide attempt was 26% more likely for each 1,000 IED increase in monthly frequency.
- Association of IED frequency with suicide attempt was greater for Soldiers in first 2 years of service than for those with 3+ years of service.
- Among Soldiers in 1st two years of service, association was constant for all 3 deployment statuses.
- Among Soldiers with 3+ years of service, association was higher for those never deployed & currently deployed, than for those previously deployed.



Ursano, et al. (2017) *Military Med*

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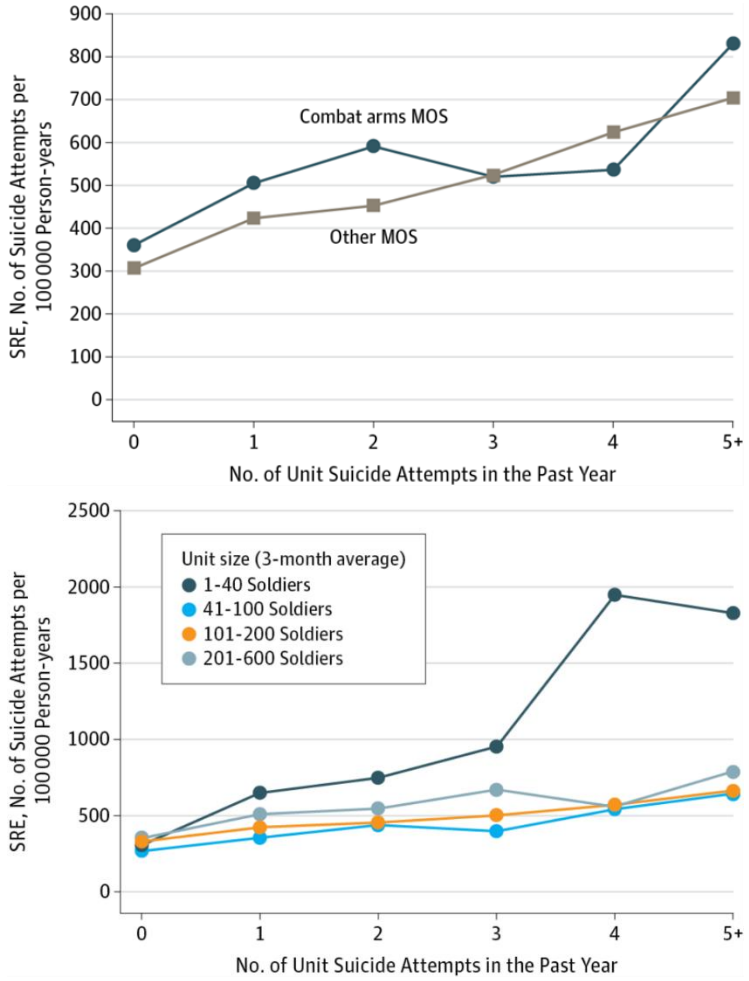
Risk of Suicide Attempt (SA) among Soldiers in Army Units with a History of Suicide Attempts (HADS 2004-2009)

- SA risk increased if 1 S.A. in unit in past yr
- Odds increased with # of SAs in unit (OR=1.4 with 1 SA; OR=2.3 with 5+ SAs)
- Association true in combat arms & other MOS
- Highest risk in small units (1-40 Soldiers)
- If risk reduced to 0 SAs in unit in past yr, number of SAs would decrease 18.2%

Conclusion:

- **Units with a history of SAs are important targets for preventive interventions**

Study included all SAs in enlisted Regular Army Soldiers 2004-2009 (n=9,650) and an equal-probability sample of control person-months (n=153,528)



Ursano, et al. (2017) *JAMA Psychiatry*

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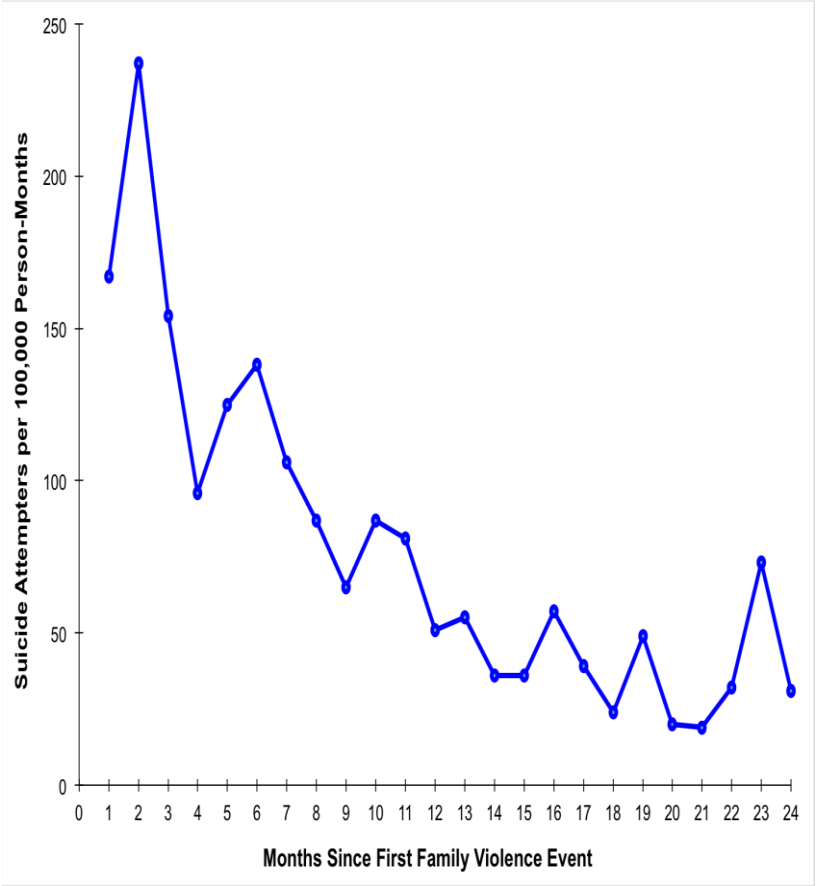
Documented Family Violence (FV) and Risk of Suicide Attempt (HADS 2004-2009)

- Active duty Regular Army enlisted Soldiers (n=9,650 with medically documented SA; n=153,528 control person-months)
- Odds of SA were higher for those with a FV history
- Odds increased as number of FV events increased
- Past-month FV had SA odds ~5 times higher than those with no FV history
- SA odds elevated for both perpetrators and victims
- For males, higher SA risk in perpetrators than victims
- For females, SA risk did not differ between perpetrators & victims
- SA risk highest in initial months after 1st FV event
- **Conclusion:** FV is an important consideration in understanding risk of SA among Soldiers



Ursano, et al. (2017) *Psychiatry Research*