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***Impact and Risk of Moral Injury among Deployed Veterans: Implications for Veterans and Mental Health***

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***Mental Health Disorders, Suicide Risk, and Treatment seeking among Formerly Deployed National Guard and Reserve Service Member seen in Non-VA Facilities***

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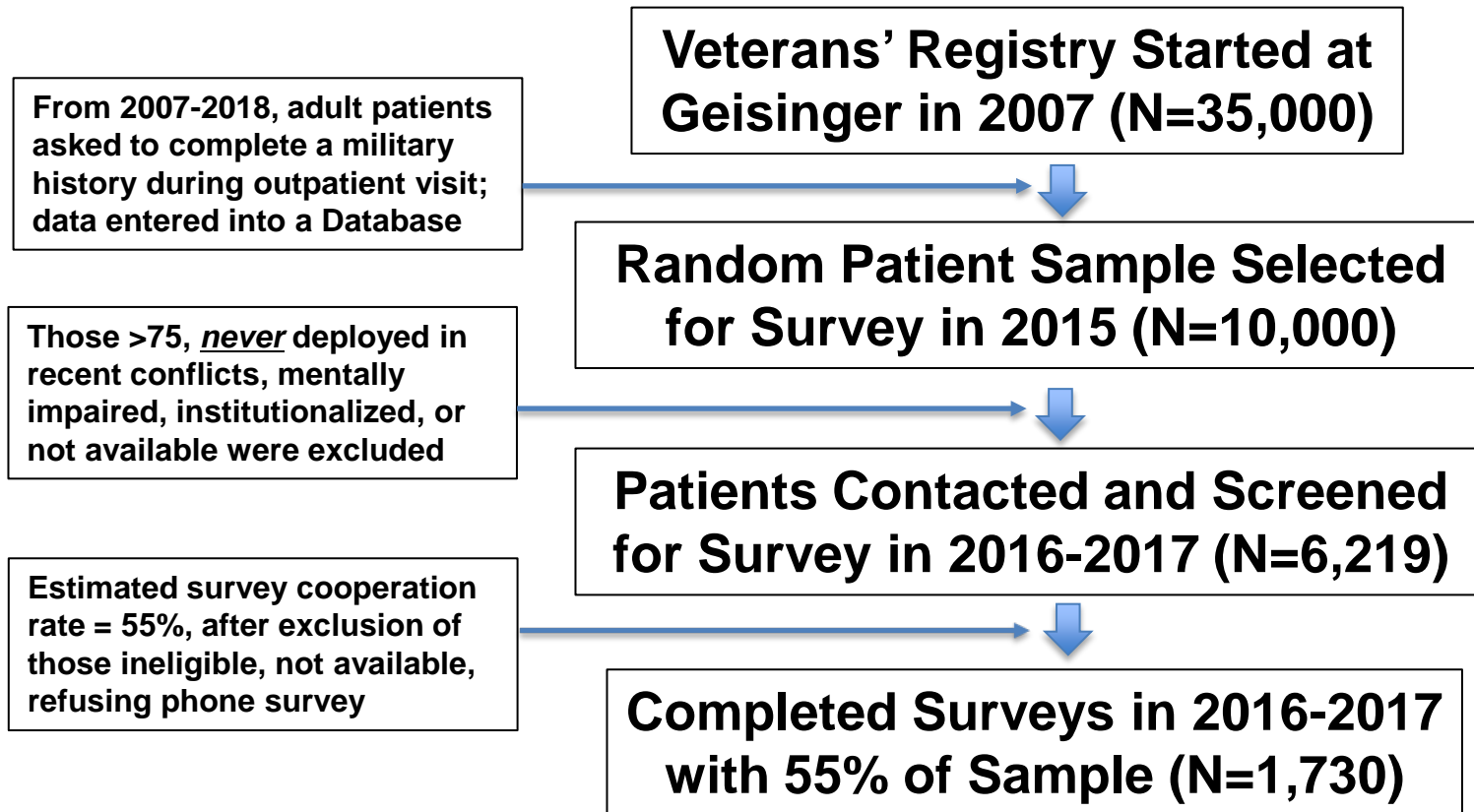
**Award Period: September/2015 - August/2020**

## Joseph – Home Before Deployment - Summer, 1965



From Personal Files  
of Joseph Boscarino

# Consort Diagram



# DoD Study Background/Rationale

- The post-deployment health of service members has been a concern.
- Rural areas may have fewer resources and access to services may be more difficult. Thus, poorer deployment outcomes were expected.
- Service members were recruited through Geisinger Clinic, the largest healthcare system in Central PA. Military records were used to confirm deployments/combat exposure status.
- Study included deployed veterans from multiple conflicts: Vietnam, Persian Gulf, Iraq/Afghanistan, GWOT.
- ***Military relevance: Study collected medical, psychosocial and trauma data, as well as genetic information, to study key deployment Outcomes and risks.***

# Overall DoD Study Objectives

- To assess the prevalence of mental health outcomes and treatment seeking among deployed service members seen in non-VA Facilities.
- To assess the risk and protective factors for the onset of post-deployment health problems, including PTSD, substance use disorders, suicide, and Moral Injury among veterans.

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# Methods

- ✓ Study included 2+ hour cross-sectional diagnostic health survey by telephone of 1,730 veterans.
- ✓ Also included Geisinger's electronic health record (EHR) and laboratory data back to 2001, 15 years.
- ✓ Based on US census data, also included distance to VA facilities, rural vs. urban neighborhood; DoD provide data on deployment/combat exposure.

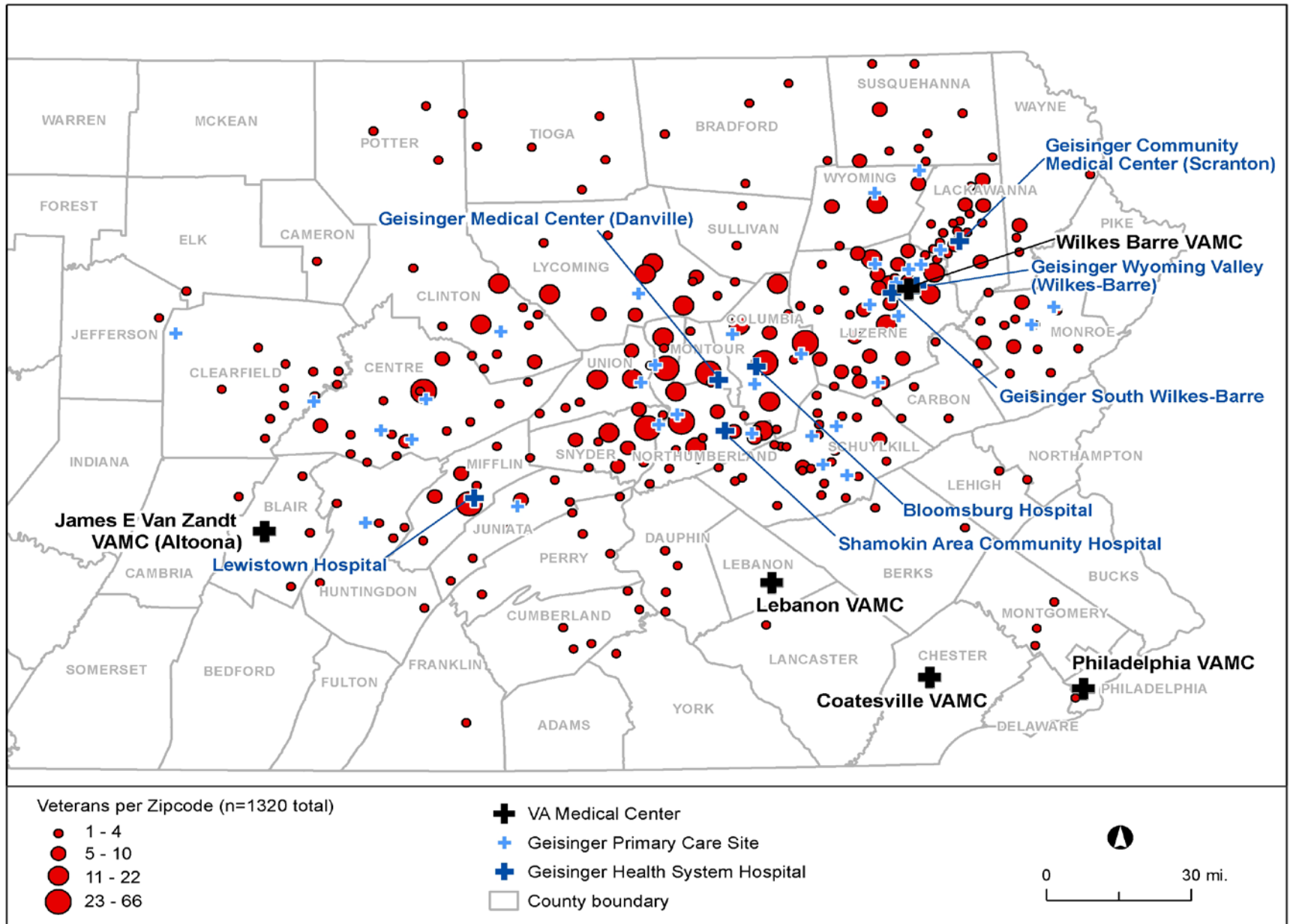
# Methods

## Main Study Measures

- **Combat exposure & trauma history**
- **Health service & medication use**
- **VA service use/VA Disability history**
- **PTSD, substance misuse, suicidal behaviors, moral Injury**
- **Concussion history; burn-pit exposure**
- **DNA collected on 39 genetic variants**
- **Included psychosocial & social support factor, unit support**
- **BMI and lab values also assessed:**
  - ✓ **Neurocognitive values/tests**
  - ✓ **Lipid, immune status, etc.**
  - ✓ **Chronic disease history**



# Veterans Studied and Geisinger/VA Facilities in Service Area



# Main DoD Study Findings

- Guard/Reserve service members had better outcomes.
- Veterans from rural areas had better outcomes.
- Female veterans had poorer outcomes than males.
- Veterans with low homecoming support had poor outcomes.
- PTSD genetic risk scores predicted PTSD and interacted with combat and lifetime trauma exposures.
- Suicide genetic risk scores predicted suicide attempts.
- Veterans were at high risk for alcohol misuse disorders.
- In-service traumatic brain injury (TBI) was common and associated with poorer health outcomes.
- ***Study team published 15 paper over 5 years***

# Moral Injury (MI)

- Defined as the consequences of warzone exposures that violate the veteran's moral beliefs and result in severe psychological distress.
- **Involves killing enemy, civilians, leaving wounded on the battlefield, etc.**
- Occurs when there is heavy combat (e.g., Khe Sanh, Tet Offense, Fallujah, etc.). Clinician challenges in working with moral injury include coping with reported atrocities, etc.
- A trustworthy clinical team provide protection for clinicians and are a factor in successful outcomes with morally injured combat veterans.

# John - Hue City Tet Offensive (1968)

From Personal Files  
of Joseph Boscarino



# Moral Injury (MI)

- MI is “Complex PTSD,” but more than fear-based PTSD or trauma. Veteran is in crisis; feelings of guilt, shame, despair are common. Personality change may occur, as do changes in spiritual beliefs.
- The clinical team is factor in successful outcomes with morally injured combat veterans.
- Spiritual and peer counseling are also important.
- However, character deterioration is common and may be permanent.
- ***In DoD study, 26% of veterans had high Moral Injury (MI) based on the MI event scale used.***

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**Lance Cpl. James Vooris, Second Battle of Fallujah, Released by the US Marine Corps, ID 041108-M-8205V-003**



**Table 1. High moral injury score vs. low score by study independent/control variables, based on Col. % (N=1,032)**

Variable	Study Variable (totals) [n(%)]	Moral Injury		OR	P=
		Yes (%)	No (%)		
<b>Combat High</b>	Yes [252(24.4)]	103 (38.6)	149 (19.5)	2.56	<0.001
	No [780(75.6)]	164 (61.4)	616 (80.5)	1.00	-
<b>Low Unit Support/Morale</b>	Yes [211(20.4)]	88 (33.0)	123 (16.1)	2.57	<0.001
	No [821(79.6)]	179 (67.0)	642 (83.9)	1.00	-
<b>High Stress Past Year</b>	Yes [209(20.3)]	83 (31.1)	126 (16.5)	2.29	<0.001
	No [823(79.7)]	179 (67.0)	642 (83.9)	1.00	-
<b>High Lifetime Trauma</b>	Yes [207(20.1)]	75 (28.1)	132 (17.3)	1.83	<0.001
	No [825(79.9)]	192 (71.9)	633 (82.7)	1.00	-
<b>Low Homecoming Support</b>	Yes [298(28.9)]	114 (42.7)	184 (24.1)	2.35	<0.001
	No [734(71.1)]	153 (59.8)	581 (74.5)	1.00	-
<b>High Fear of Death</b>	High [273(26.5)]	109 (40.8)	164 (21.4)	2.53	<0.001
	Low [759(73.5)]	158 (59.2)	601 (78.6)	1.00	-
<b>High Neuroticism</b>	Yes [466(45.2)]	163 (61.0)	303 (39.6)	2.39	<0.001
	No [566(54.8)]	104 (39.0)	462 (60.4)	1.00	-
<b>Low Self-esteem</b>	Yes [222(21.5)]	104 (39.0)	118 (15.4)	3.50	<0.001
	No [810(78.5)]	163 (20.1)	647 (84.6)	1.00	-
<b>Repression to Cope</b>	Yes [289(28.0)]	118 (44.2)	171 (22.4)	3.50	<0.001
	No [743(72.0)]	149 (55.8)	594 (77.6)	1.00	-
<b>High Anomie</b>	High [274(26.6)]	120 (44.9)	154 (20.1)	3.24	<0.001
	Low [758(73.4)]	147 (55.1)	611 (79.9)	1.00	-
<b>Used Alc./Drugs to Cope</b>	Yes [157(15.2)]	72 (27.0)	85 (11.1)	2.95	<0.001
	No [875(84.8)]	195 (73.0)	680 (88.9)	1.00	-
<b>Anti-social Personality</b>	Yes [271(23.6)]	94 (35.2)	177 (23.1)	1.81	<0.001
	No [761(73.7)]	173 (64.8)	588 (76.9)	1.00	-
<b>Concussion Hx</b>	Yes [291(28.2)]	110 (41.2)	181 (23.7)	2.26	<0.001
	No [741(71.8)]	157 (58.8)	584(76.3)	1.00	-
<b>Pain Interferes</b>	Yes [357 (34.6)]	118 (44.2)	239 (31.2)	1.74	<0.001
	No [675 (65.4)]	149 (55.8)	526 (68.8)	1.00	-
<b>Sleep problems</b>	Yes [582(56.4)]	182(68.3)	400 (52.3)	1.95	<0.001
	No [450(43.6)]	85 (31.8)	365 (47.7)	1.00	-

## Table 2. Logistic Regression Predicting High vs. Low MI

Variables	OR†	z	95% CI	p-Value
Age (years)*	0.98	-1.30	0.96-1.01	0.193
Female sex*	0.97	-0.08	0.41-2.25	0.935
High Neuroticism	1.46	2.24	1.05 -2.02	0.025
High Combat Exposure	2.01	3.97	1.42 -2.84	0.001 
Low Self-esteem	2.07	3.90	1.43-2.96	<0.001 
Used Alc./Drugs to Cope	1.57	2.16	1.04-2.37	0.031
Vietnam War Service	2.31	2.56	1.22-4.38	0.010
Low Unit Deploy. Support	2.04	3.86	1.42-2.92	<0.001 
High Fear of Death	1.75	3.22	1.24-2.46	0.001 
High Anomie	2.21	4.63	1.58-3.09	<0.001 
Antisocial Disorder	1.45	2.11	1.03-2.05	0.035
Lifetime Marijuana Use**	1.27	1.98	0.047	1.00-1.61
High Repressive Coping	1.48	2.20	1.04-2.11	0.028









\*Age and Sex forced into to the model at the first step. Results based on backwards stepwise elimination.

\*\* For logistic regression marijuana use was coded as an ordinal variable classified as: never used, ever used occasionally, but less than 50 times, and ever used 50 or more times.

‡Area under ROC = 0.78; Hosmer-Lemeshow  $\chi^2 = 7.93$ , df=8, p=0.440.



# Table 3. Cluster Analysis Results.

Study Variables*	Cluster One (n=745)	Cluster Two (n=287)
Age (in years)	68.22 	44.56 
High Combat Exposure vs. Low	0.25	0.23
Vietnam Veteran vs. Not Vietnam Veteran	0.89 	0.00
Low Unit Support During Deployment vs. Not	0.21	0.19
High Stressful Life Event Past Year vs. not	0.16	0.32 
High Lifetime Trauma vs. Not High	0.17	0.29 
Low Homecoming Support vs. Not Low	0.40 	0.01
High Childhood Abuse/Neglect vs. Not High	0.15	0.17
High Fear of Death vs. Not High	0.24	0.32
High Neuroticism vs. Not High	0.44	0.49
Low Self-esteem vs. Not Low	0.20	0.26
Used Repression to Cope vs. Not Use	0.27	0.30
High Anomie vs. Not High	0.30 	0.17
Used alcohol/Drugs Cope post deployment	0.14	0.17
Antisocial Personality vs. Not	0.23	0.34
Pain Interfered in Past Year vs. not Interfered	.0.34	.0.36
Problems Sleeping Past Year vs. No Prob.	0.55	0.60
Ever had Major Depressive Disorder vs. not	0.15	0.32 
Had Concussion during Deployment vs. not	0.29	0.27

# Conclusion

- About 26% of veterans had high Moral Injury (MI) based on the MI event scale used.
- MI was associated with mental health disorders and a range of psychopathology.
- MI was much more common among:
  - ✓ Those with Vietnam service
  - ✓ Those with low home support
  - ✓ Those with low unit support/morale
  - ✓ Those with high combat exposure
  - ✓ Those with low self-esteem
  - ✓ Those with high fear of death/high anomie
  - ✓ Those with any substance misuse of alcohol or drugs

# Study Limitations

- The clinical cut-off for MI is still not defined. We used 75<sup>th</sup> percentile or greater, but this needs validation.
- Most data in the current study were based on survey “self-report” using measurement scales.
- The study design was primarily cross-sectional.
- The study was limited to veterans who were alive and receiving care in central Pennsylvania.
- Survey completion rate was 55% and this may have biased the study results.
- **Study was done in 2015, many MI cases were likely deceased by then.**

# John – Arlington National Cemetery - 2014



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