

# WOMEN VETERANS IN THE WOMEN'S HEALTH INITIATIVE



---

**Jodie Katon, PhD, MS**, Health Services Research and Development (HSR&D)  
Center of Innovation (COIN), VA Puget Sound Health Care System  
Women's Health Services, VA Office of Patient Care Services

**Julie Weitlauf, PhD**, Center for Innovation to Implementation and Sierra  
Pacific MIRECC, VA Palo Alto Health Care System  
Department of Psychiatry and Behavioral Sciences, Stanford University

**Lisa Callegari, MD, MPH**, HSR&D Center of Innovation, VA Puget Sound Health  
Care System  
Department of Obstetrics and Gynecology, University of Washington School of  
Medicine

# Disclaimer

---

The views expressed in this presentation are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs

# Women Veterans in the Women's Health Initiative

---

- Overview
- Healthy Aging
- Diseases and Conditions
- Menopause Related
- Mortality



The Gerontologist, February 2016

[http://gerontologist.oxfordjournals.org/content/56/Suppl\\_1.toc](http://gerontologist.oxfordjournals.org/content/56/Suppl_1.toc)

<http://gerontologist.oxfordjournals.org/content/56/1/115.full.pdf+html>

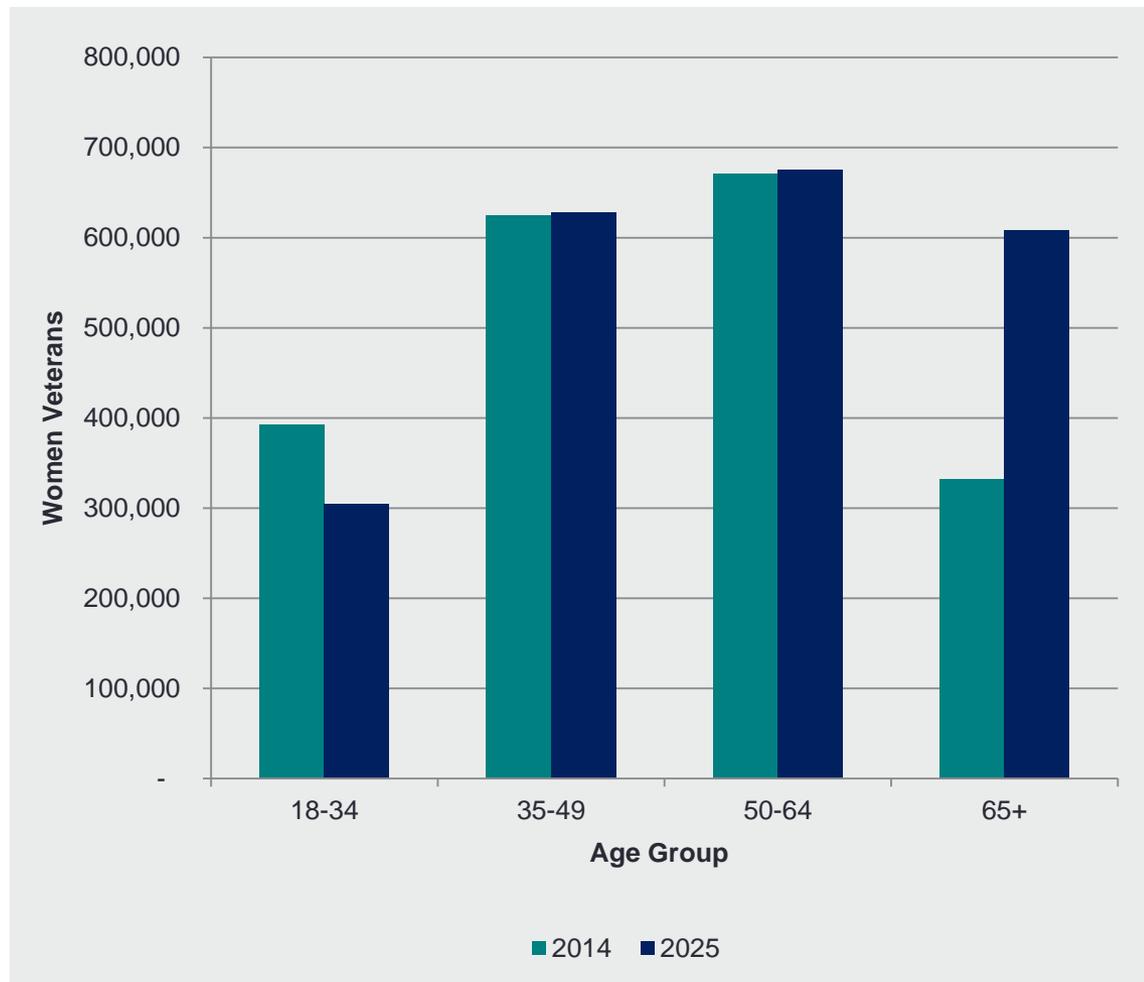
# What Motivated This Research in Older Women Veterans?

## Unique opportunity to:

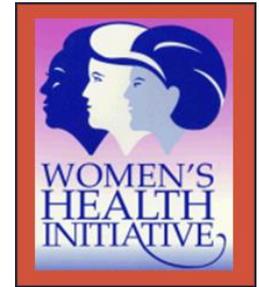
Begin clinical and research preparation for the projected 83% increase in older women Veterans between 2014-2025

Examine positive and negative associations of military exposure

Address health behaviors and increased risk for disease in later life between women Veterans and non-Veterans



# Women's Health Initiative (WHI)



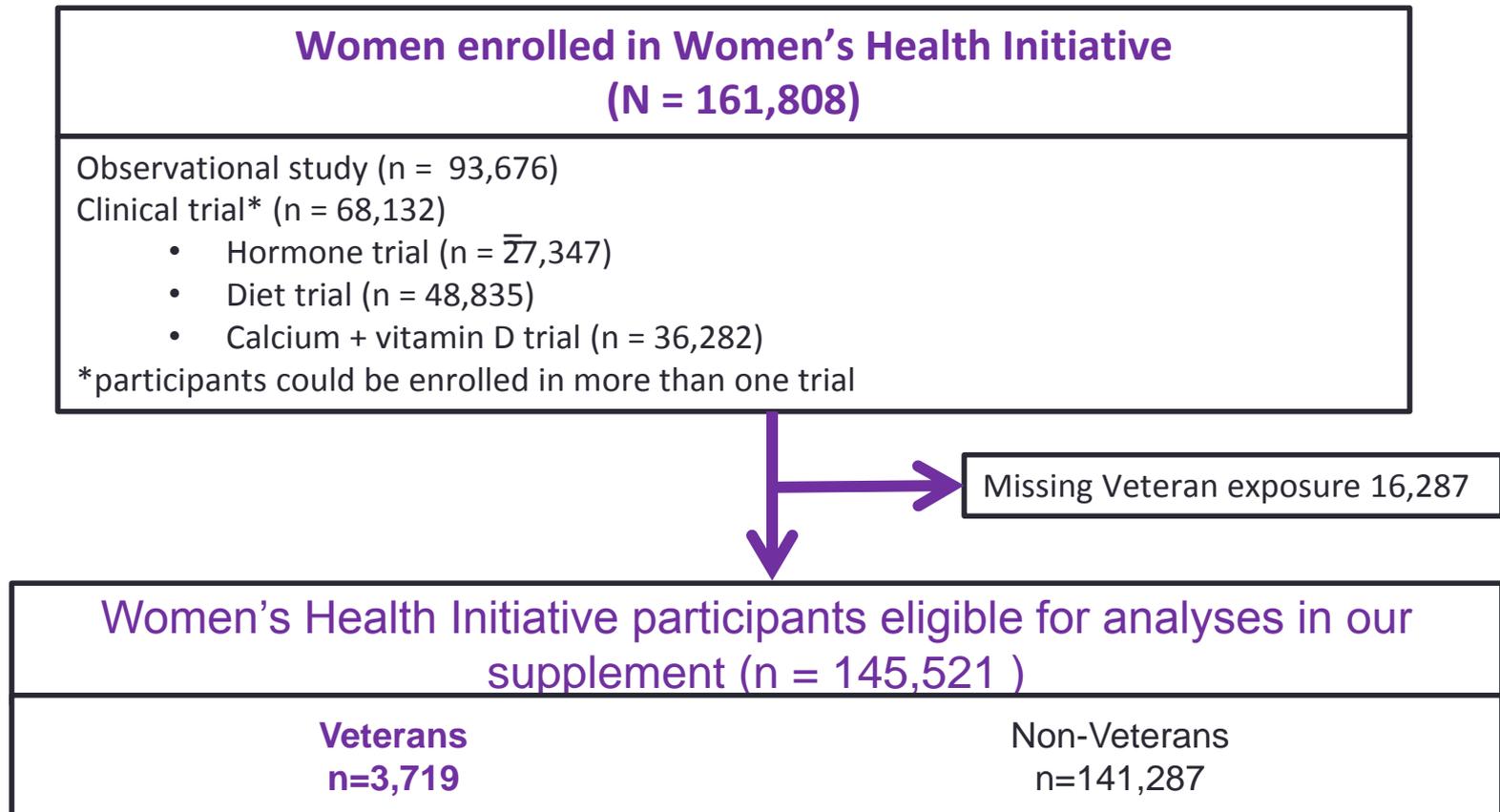
- Goal: Answer major questions about postmenopausal women's health (cancers, heart disease, osteoporosis-related bone fractures)
- Vast scientific undertaking
  - 161,808 participants from 40 U.S. centers followed up to 12 years in main study (1993-2005)
  - 115,403 participants enrolled in WHI Extension Study 2005-2010
  - 93,500 participants enrolled in WHI Extension Study 2010-2015

# WHI Eligibility Criteria

---

- General inclusion criteria
  - Aged 50 to 79 years
  - Postmenopausal
  - Planning to reside in the area for at least 3 years
  - Able/willing to provide written informed consent
- Additional eligibility criteria specific to each study component, related to:
  - Safety
  - Competing risk
  - Adherence/retention

# Women Veterans in the WHI



# Who are the Women Veterans in the WHI?



- 3,719 women Veterans in WHI  
~ 3% of total WHI Recruits
- Health similar to non-Veterans
- Demographically distinct from non-Veterans—
  - Older
  - Highly Educated
  - Disproportionately Caucasian
  - Less Likely to be Married



# Poll Question

---

Do you provide any medical care for women Veterans struggling with menopausal symptoms?

- a) Yes
- b) No, but I do provide care for women Veterans
- c) No, I do not provide care for women Veterans
- d) No, I do not provide any patient care

---

Research Article

## **Vasomotor Symptoms and Quality of Life Among Veteran and Non-Veteran Postmenopausal Women**

Jodie G. Katon, PhD, MS,<sup>\*,1,2</sup> Kristen E. Gray, PhD, MS,<sup>1,3</sup> Megan R. Gerber, MD, MPH,<sup>4</sup> Laura B. Harrington, MPH,<sup>5</sup> Nancy F. Woods, PhD,<sup>6</sup> Julie C. Weitlauf, PhD,<sup>7,8</sup> Bevanne Bean-Mayberry, MD, MPH,<sup>9,10</sup> Karen M. Goldstein, MD, MSPH,<sup>11,12</sup> Julie R. Hunt, PhD,<sup>13</sup> Wayne J. Katon, MD,<sup>14</sup> Sally G. Haskell, MD, MPH,<sup>2,15</sup> Susan J. McCutcheon, RN, EdD,<sup>2</sup> Margery L. Gass, MD, NCMP,<sup>16</sup> Carolyn J. Gibson, MPH, MS,<sup>17</sup> and Laurie C. Zephyrin, MD, MBA, MPH, FACOG<sup>2,18</sup>

# State of the Art/Gap in Knowledge

---

- Vasomotor symptoms (VMS) are common menopausal symptoms associated with
  -  medical care utilization
  -  impairment of activities of daily living
- Women Veterans have high prevalence of factors that may make them more vulnerable to VMS

Little is known about women Veterans' experience of menopausal symptoms such as VMS

# Methods

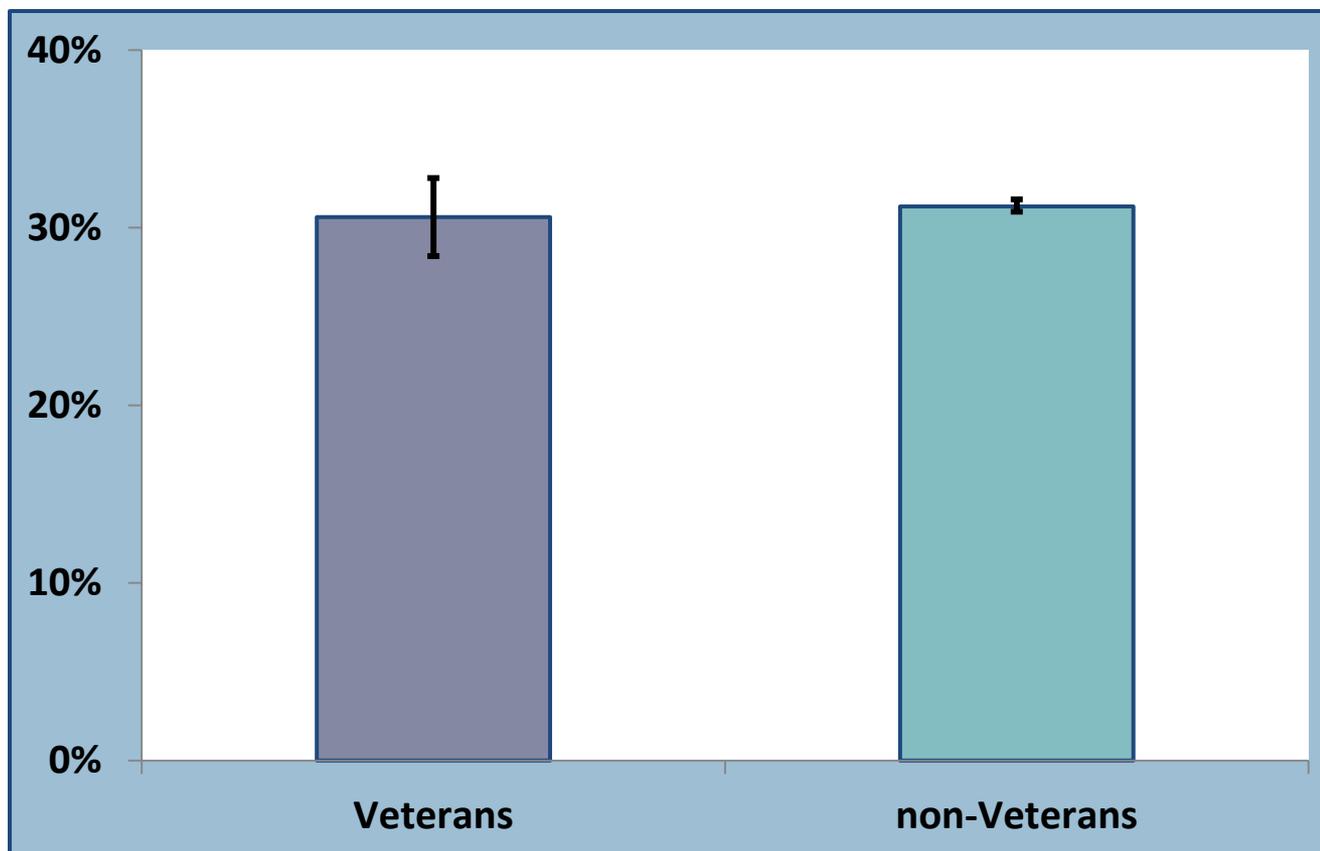
---

- Women's Health Initiative (WHI) Observational Study (OS)

N = 2,004 Veterans, N = 75,149 non-Veterans

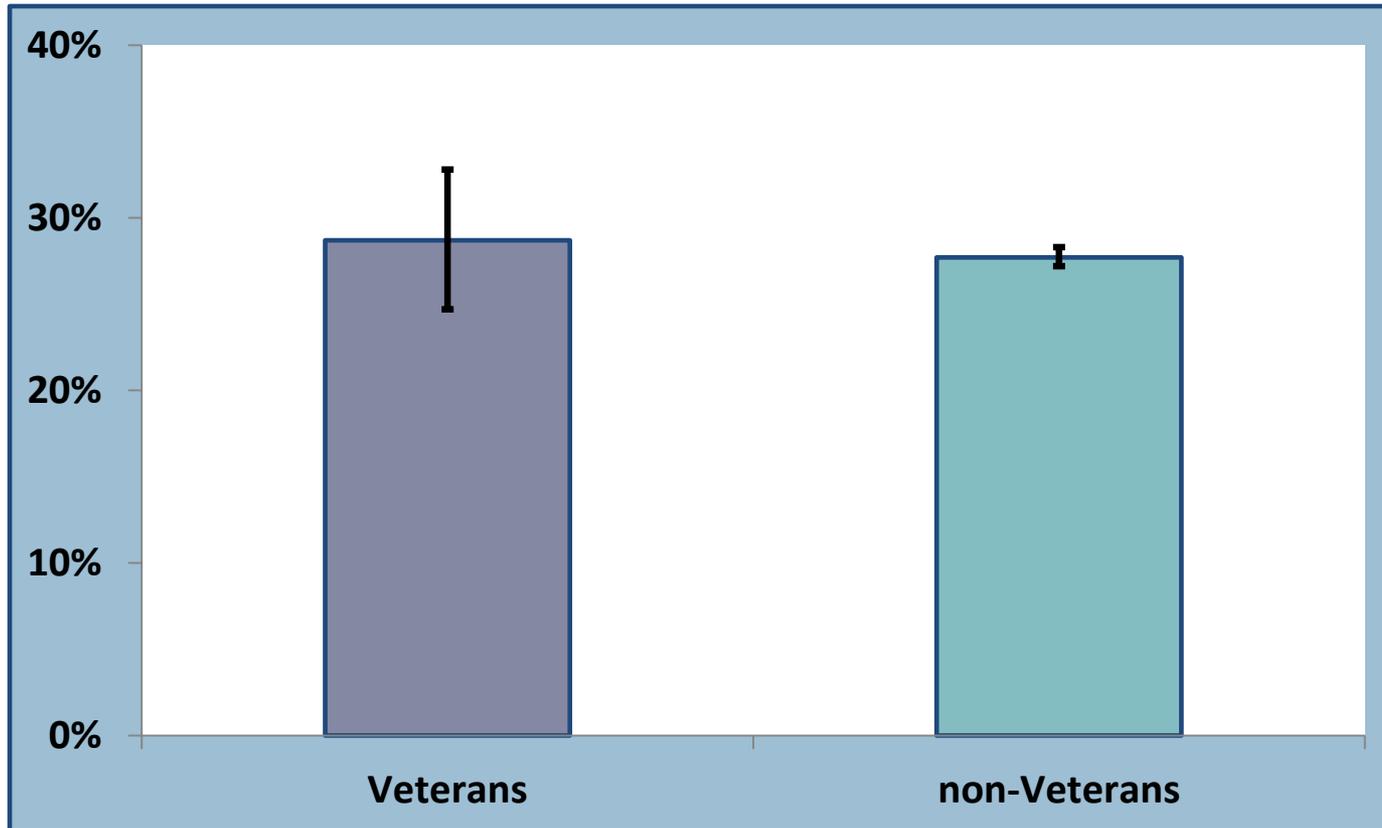
- Statistical analysis:
  - Generalized linear models to examine differences in VMS among Veterans and non-Veterans
  - Linear regression to examine the impact of VMS on health related quality of life among Veterans and non-Veterans.

# Adjusted<sup>1</sup> prevalence of any VMS at baseline among Veterans and non-Veterans



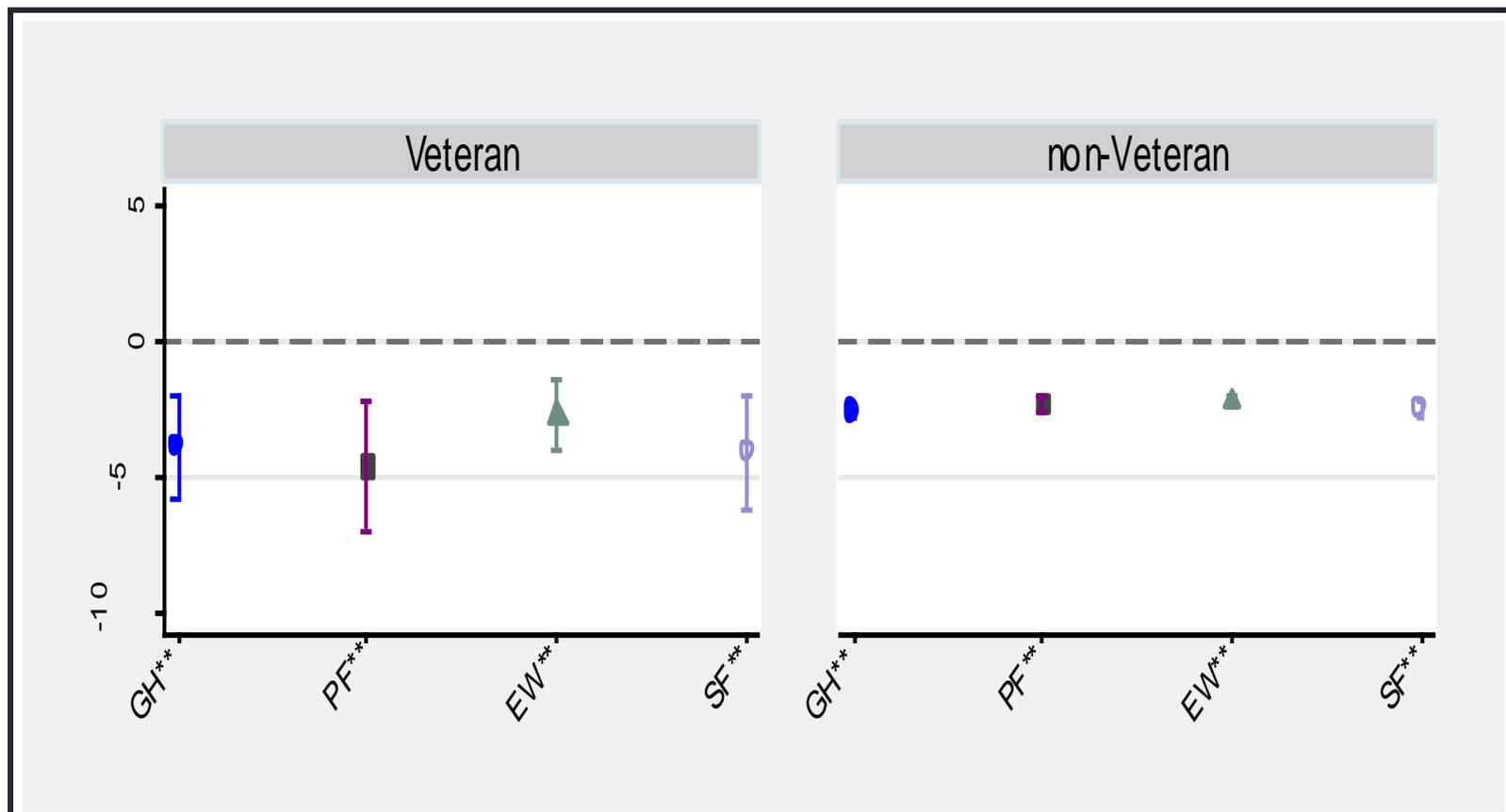
<sup>1</sup>Adjusted for age, race, education, time since menopause, obesity, pack years of smoking, depression, diabetes, hypertension and physical activity

# Adjusted<sup>1</sup> prevalence of moderate to severe VMS at baseline among Veterans and non-Veterans



<sup>1</sup>Adjusted for age, race, education, time since menopause, obesity, pack years of smoking, depression, diabetes, hypertension and physical activity

# Difference in HRQOL subscales associated with presence of any VMS at baseline<sup>1</sup>



GH = general health, PF = physical function, EW = emotional well-being, SF = social function

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

<sup>1</sup>Adjusted for age, race, education, overall QOL at baseline, obesity, pack years of smoking, depression, diabetes, hypertension and physical activity

# Clinical Implications

---

- Women Veterans may struggle with menopausal symptoms more than non-Veterans
- Menopausal symptoms may impact management of other health issues such as obesity or depression
- VA and non-VA clinicians need to be aware of women Veterans' increased vulnerability to the negative effects of menopausal symptoms

# Research Implications

---

- Need to understand why women Veterans have a more difficult time with menopausal symptoms such as VMS
- Develop effective interventions to help women Veterans manage menopausal symptoms
- Understand the potential role of mental health in the experience of menopausal symptoms

---

Research Article

## **Sleep Disturbance, Diabetes, and Cardiovascular Disease in Postmenopausal Veteran Women**

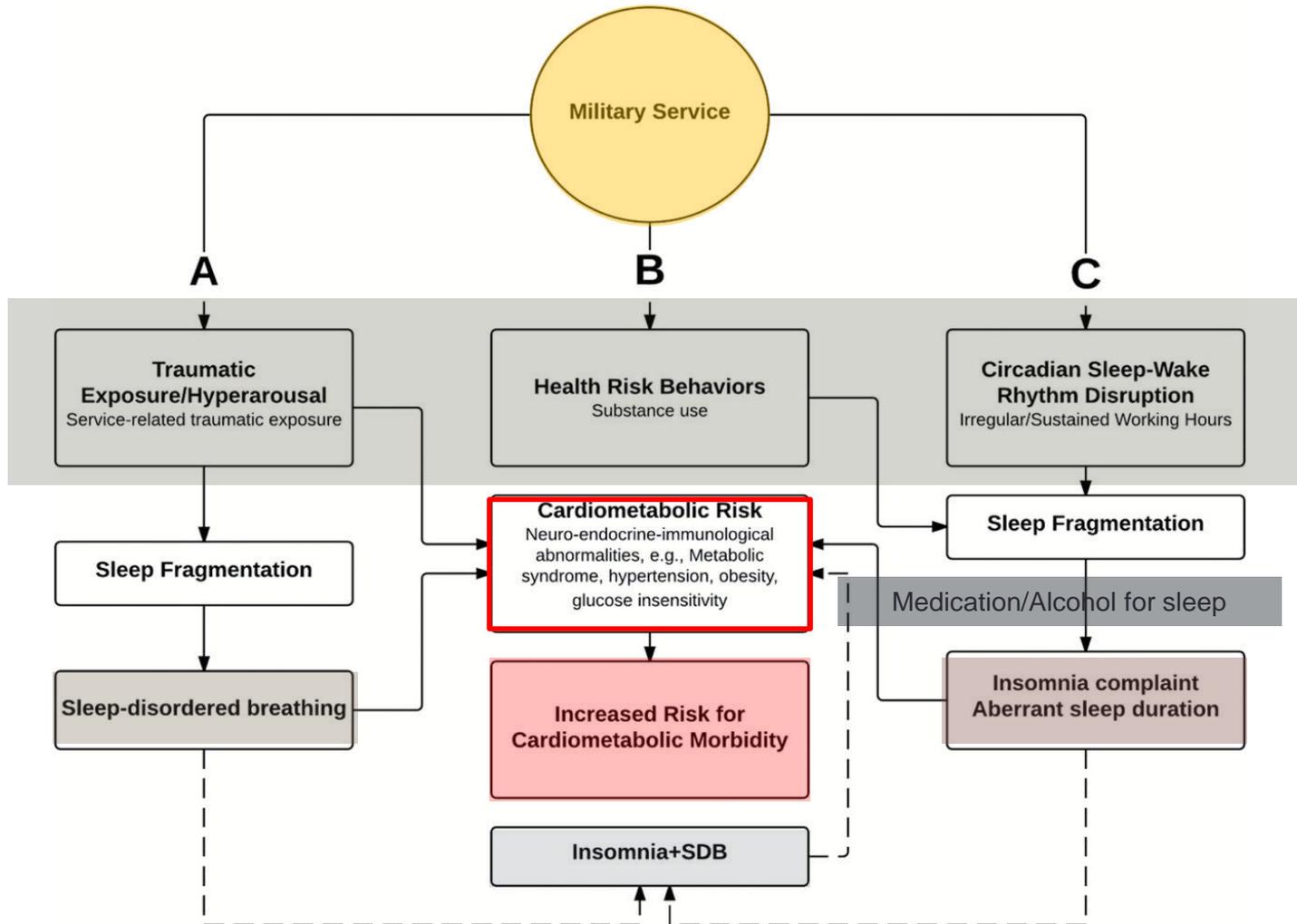
Michelle B. Rissling, PhD,<sup>1,\*</sup> Kristen E. Gray, PhD,<sup>2,3</sup> Christi S. Ulmer, PhD, CBSM,<sup>4,5</sup> Jennifer L. Martin, PhD,<sup>6,7</sup> Oleg Zaslavsky, PhD,<sup>8</sup> Shelly L. Gray, PharmD, MS,<sup>9</sup> Lauren Hale, PhD,<sup>10</sup> Jamie M. Zeitzer, PhD,<sup>11,12</sup> Michelle Naughton, PhD,<sup>13</sup> Nancy F. Woods, PhD, RN, FAAN,<sup>14</sup> Andrea LaCroix, PhD,<sup>15</sup> Patrick S. Calhoun, PhD,<sup>1,5</sup> Marcia Stefanick, PhD,<sup>16</sup> and Julie C. Weitlauf, PhD<sup>17,18</sup>

# Background

---

- Prior work suggests that Veterans have heightened risk for sleep disturbances relative to non-Veterans.
- Several compelling theories as to why this may be the case.
  - Mental health sequelae of military occupational health exposures (trauma) can disrupt sleep.
  - Military duty is on 24 hour clock, can lead to disruption of circadian rhythms leading to sleep disturbance.
  - Health sequelae of high prevalence health risks (cardiometabolic risk factors, smoking, hypertension) can lead to sleep disturbances.
- Sleep disturbances may be an important risk factor for cardiometabolic disease among older Veterans.

# Conceptual Framework



# Background

---

- Majority of prior research on sleep disturbance among Veterans has focused on males.
- Research that characterizes the prevalence of treatable sleep disturbances in women Veterans is critical to planning effective women's preventive health programs.
- Research that examines the association of sleep disturbances and cardiometabolic health among the growing population of older, post-menopausal women Veterans is also urgently needed.
- Nevertheless, no prior studies have examined this association among older, post menopausal women Veterans.

# Objectives

---

1. Characterize sleep disturbance at baseline and follow-up in Veterans and non-Veterans
2. Evaluate the association of baseline sleep disturbance with incident cardio-metabolic disease (diabetes cardiovascular disease) in Veterans and non-Veterans

# Methods

---

## Participants

132,812 non-Veterans

3,462 Veterans

## Descriptive Outcomes

### I. Prevalence of five categories of sleep disturbance by Veteran Status:

- Medication/alcohol use for sleep
- Risk for insomnia
- Risk for sleep disordered breathing
- Risk for comorbid insomnia and SDB (insomnia + SDB)
- Aberrant sleep duration

### II. Adjudicated health outcomes:

- Cardiovascular Disease
- Diabetes

## Covariates

age, education, race/ethnicity, education, partner/marital status, vasomotor symptoms, BMI, smoking, physical activity, depression, and WHI study assignment

# Findings

---

- Veteran women had greater baseline prevalence of risk for Comorbid Insomnia + SDB.
- Risk for SDB & Comorbid Insomnia + SDB were both linked to heightened risk of CVD and diabetes.
- Aberrant Sleep Duration was linked with greater risk of CVD and diabetes in non-Veterans, but less strongly and consistently in women Veterans.

# Clinical Implications

---

- Women Veterans would benefit from targeted screening of and treatment of sleep disturbances.
- Improving the availability of multidisciplinary team approaches and evidence-based treatment should be a high priority during the post-military life course.
  - Increase access to behavioral health.
  - Develop effective combination therapies, i.e., CBT for Insomnia and Positive Airway Pressure (PAP) Therapy.

# Research Implications

---

- More attention on the factors leading to the observed risks is needed.
  - Comorbid insomnia + SDB in women Veterans.
- Studies with more information on etiologic factors, including pre-military and occupational exposures during military service are needed.
- Are premenopausal women veterans at risk?

---

Research Article

## **Hysterectomy and Bilateral Salpingo-Oophorectomy: Variations by History of Military Service and Birth Cohort**

Lisa S. Callegari, MD, MPH,<sup>\*,1,2</sup> Kristen E. Gray, PhD, MS,<sup>2,3</sup> Laurie C. Zephyrin, MD, MBA, MPH,<sup>4,5,6,7</sup> Laura B. Harrington, MPH, PhD,<sup>8</sup> Megan R. Gerber, MD, MPH,<sup>9,10</sup> Barbara B. Cochrane, PhD, RN, FAAN,<sup>11,12</sup> Julie C. Weitlauf, PhD,<sup>13,14</sup> Bevanne Bean-Mayberry, MD, MHS,<sup>15,16</sup> Lori A. Bastian, MD, MPH,<sup>17,18</sup> Kristin M. Mattocks, PhD, MPH,<sup>19,20</sup> Sally G. Haskell, MD, MPH,<sup>4,21</sup> and Jodie G. Katon, PhD, MS<sup>2,3,4</sup>

# Background

---

- Hysterectomy +/- BSO have risks as well as benefits
- Potential long-term risks:
  - Cardiovascular disease, urinary incontinence, dementia
  - All-cause & CHD mortality (procedures done < 40)
- Veterans may be more likely to have had a hysterectomy +/- BSO

*Research question: Is Veteran status associated with hysterectomy +/- BSO in WHI data?*

# Methods

---

- Sample: 3,626 Veterans; 138,328 non-Veterans

- Measures:

Exposure	Outcomes
<b>Veteran</b> Yes/No	<b>Hysterectomy +/- BSO</b> 1) Neither 2) Hysterectomy without BSO 3) Hysterectomy with BSO
	<b>Early Hysterectomy &lt;40</b> Yes/No

- Analysis:

- ✓ Multinomial logistic regression for 3-category outcome
- ✓ Modified Poisson regression for dichotomous outcome

# Stratification by Birth Cohort

Age at enrollment	Year of birth	Year when 18
<65	1929-1949	1947-1967
65+	1912-1933	1930-1951

- <65 cohort
  - Veterans of Vietnam War or later conflicts
  - 18 y.o. after 1948 Women's Armed Services Integration Act
- 65+ cohort
  - WWII or Korean War Veterans

# Results

## Veteran Status and Hysterectomy: <65 Cohort

	<i>Non-Vets</i>	<i>Vets</i>	<b>Odds Ratio (95% CI)</b>	<b>p-value</b>
<b>Hysterectomy +/- BSO</b>				
<i>None</i>	60%	56%	Ref	-
<i>Hysterectomy (-BSO)</i>	21%	22%	<b>1.18 (1.02, 1.37)</b>	<b>0.03</b>
<i>Hysterectomy (+BSO)</i>	19%	22%	<b>1.28 (1.10, 1.48)</b>	<b>0.001</b>
<b>Early Hysterectomy*</b>	16%	21%	<b>1.29 (1.16, 1.44)</b>	<b>&lt;0.001</b>

\*Among women with hysterectomy, adjusted relative risk

Both models adjusted for age, race, education, BMI, parity, age at menarche, and hormone replacement therapy

# Results

## Veteran Status and Hysterectomy: 65+ Cohort

	<i>Non-Vets</i>	<i>Vets</i>	<b>Odds Ratio (95% CI)</b>	<b>p-value</b>	
<b>Hysterectomy +/- BSO</b>					
<i>None</i>	58%	58%	Ref	-	
<i>Hysterectomy (-BSO)</i>	21%	22%	1.09 (0.97, 1.22)	0.15	
<i>Hysterectomy (+BSO)</i>	21%	21%	0.98 (0.87, 1.10)	0.72	
<b>Early Hysterectomy*</b>	11%	9%	0.90 (0.79, 1.03)	0.13	

\*Among women with hysterectomy, adjusted relative risk  
Both models adjusted for age, race, education, BMI, parity, age at menarche, and hormone replacement therapy

# Research Implications

---

- Data are needed on long-term health impacts of hysterectomy +/- BSO in Veterans
- Research needed to investigate current hysterectomy patterns in Veterans compared to non-Veterans
- If hysterectomy rates still higher among Veterans, what are the factors driving this association?

# Research Implications

---

- Data needed on long-term health impacts of hysterectomy +/- BSO in Veterans
- Additional studies needed on current hysterectomy patterns in Veterans compared to non-Veterans
- What are the individual or system factors driving this apparent association (e.g. sexual trauma, mental health disorders such as PTSD, provider factors)?

# Enjoy all the articles on Women Veterans in the WHI

---

[http://gerontologist.oxfordjournals.org/content/56/Suppl\\_1.toc](http://gerontologist.oxfordjournals.org/content/56/Suppl_1.toc)  
<http://gerontologist.oxfordjournals.org/content/56/1/115.full.pdf+html>

## Cyber Seminar 1

Reiber G, LaCroix A. Overview

LaCroix A et-al. Using the Women's Health Initiative to  
Answer Key Questions

Weitlauf J, et-al. Who are the Women Veterans?

Bastian L, et-al. Research Results

# Cyber Seminars 2, 3

## Healthy Aging – Session 2

Lacroix A, et-al. Aging Well Among Women Veterans Compared to Non-Veterans in the Women's Health Initiative

Washington D, et-al. Trajectories in Physical Activity and Sedentary Behavior among Women Veterans in the Women's Health Initiative

Padula C, Weitlauf J, et-al. Longitudinal Cognitive Trajectories of Women Veterans from the Women's Health Initiative Memory Study

## Diseases and Conditions – Session 3

Gray K, et-al. Association between chronic conditions and physical function among Veteran and non-Veteran women with diabetes

LaFleur J, et-al. Fracture rates and bone density among postmenopausal Veteran and non-Veteran women from the Women's Health Initiative

Patel K , et-al. Association of Pain with Functional Outcomes, Fatigue, and Sleep Quality among Veterans and non-Veterans: Findings from the WHI

Bastian L, et-al. Differences in Active and Passive Smoking Exposures and Lung Cancer Incidence between Veterans and non-Veterans in the WHI

# Cyber Seminars 4, 5

## Menopause Related Findings – Session 4

Katon J, et-al. Vasomotor Symptoms and Quality of Life Among Veteran and Non-Veteran Postmenopausal Women

Rissling M, et-al. Sleep Disturbance, Diabetes and Cardiovascular Disease in Postmenopausal Women Veterans

Callegari L, et-al. Hysterectomy and bilateral salpingo-oophorectomy: variations by history of military service and birth cohort

## Mortality Findings – Session 5

Washington D, et-al. Military generation and its Relationship to Mortality in Women Veterans in the Women's Health Initiative

Simpson T, et-al. All-cause Mortality and Alcohol Consumption among Women Veterans and non-Veterans Enrolled in the Women's Health Initiative

Lehavot K, et-al. Mortality in Postmenopausal Women by Sexual Orientation and Veteran Status



# Acknowledgements



## NIH Funding:

National Heart, Lung,  
and Blood Institute,  
National Institutes of  
Health, U.S. Department  
of Health and Human  
Services

\*\*\*\*\*

The Women  
Veterans  
in the WHI



## VA Funding:

VA Office of Women's Health

VA Health Services Research and  
Development

## Emails for investigators presenting today:

[Jodie.katon@va.gov](mailto:Jodie.katon@va.gov)

[Julie.weitlauf@va.gov](mailto:Julie.weitlauf@va.gov)

[Lisa.callegari@va.gov](mailto:Lisa.callegari@va.gov)

\*\*\*\*\*

## Analysts:

Kristen Gray, PhD

Eileen Rillamas-Sun, PhD

## Administrative Support

Erica Ma



# Acknowledgements



**Jodie Katon** is supported by the Office of Women's Health Services, VA Office of Patient Care Services, the VA Puget Sound HSR&D COIN for Veteran-Centered and Value Driven Care, and a HSR&D Career Development Award (CDA 13-266).

**Lisa Callegari** is supported by the VA Puget Sound HSR&D COIN for Veteran-Centered and Value Driven Care, and a HSR&D Career Development Award (CDA 14-412).

**Michelle Rissling** was supported by the Department of Veterans Affairs Office of Academic Affiliations Advanced Fellowship Program in Mental Illness Research and Treatment and the Department of Veterans Affairs Sierra-Pacific Mental Illness Research, Education, and Clinical Center (MIRECC)

# Questions?

