WOMEN VETERANS IN THE WOMEN’S HEALTH INITIATIVE

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Women Veterans in the Women’s Health Initiative

Today’s Order

- Overview
- Healthy Aging
- Diseases and Conditions
- Mortality

The Gerontologist, February 2016

https://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:
- 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
- Begin clinical and research preparation for the projected 83% increase in older women Veterans between 2014-2025
WHI Components and Primary Outcomes

- **Hormone Therapy Trials:**
  - Coronary Heart Disease and Fractures
  - Adverse effect for Breast Cancer?
  - (16,608 E+P; 10,739 E-Alone)

- **Calcium/Vitamin D Trial:**
  - Fractures and Colorectal Cancer

- **Dietary Modification Trial:**
  - Breast and Colorectal Cancers and Coronary Heart Disease

1 Observed Study

- 

3 Controlled Trials

- 

161,808 women total

Figure 3. Women Veterans aging well life course model (adapted from Seeman & Crimmins, 2001).
Women Veterans in the WHI

Women enrolled in Women’s Health Initiative
(N = 161,808)

- Observational study (n = 93,676)
- Clinical trial* (n = 68,132)
  - Hormone trial (n = 27,347)
  - Diet trial (n = 48,835)
  - Calcium + vitamin D trial (n = 36,282)

*participants could be enrolled in more than one trial

Missing Veteran exposure 16,287

Women’s Health Initiative participants eligible for analyses in our supplement (n = 145,521)

<table>
<thead>
<tr>
<th>Veterans</th>
<th>Non-Veterans</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=3,719</td>
<td>n=141,802</td>
</tr>
</tbody>
</table>
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

Women Veterans in the WHI:
Military Service Roles and Military Generation

- Majority (50%) are age consistent with eligibility for military service during WWII.
- About 20% age consistent with eligibility for service during the Korean war, 30% age consistent with eligibility for military service during the Vietnam War.
- Served in All Military Branches
- Diverse roles
Objectives

1. Determine whether prior military service affects the probability of living to age 80 years without disease and disability.

2. Determine whether the factors affecting survival to age 80 without major diseases or disability are the same or different among women Veteran and non-Veterans.

3. Among women who survive to age 80, compare measures of “aging well” (successful, effective, and optimal aging) among women Veterans and non-Veterans.
Results

Predictors of survival to age 80 without major disease or disability

Risk factors the same in women Veterans and non-Veterans.

Factors associated with better odds of healthy survival included:

- Older age at baseline
- Being married
- Moderate alcohol consumption vs. non-drinkers
- Not smoking
- Higher physical activity levels
- Lower levels of depressive symptoms
- Healthy body weight vs. underweight or obese
Results
Aging Well Indicators Among Women Surviving to Age 80

Women Veterans compared to non-Veterans:

• 85% vs. 87% reported at least good perceived health
• 32% vs. 22% lived in a place with services for older people
• Physical function scores were lower (Rand-36 scores of 53 vs. 60)
• Lower scores on satisfaction with life, social support, quality of life and purpose in life scales
• No differences in several measures of “effective” and “optimal aging” including resilience, self and environmental mastery, self-control, emotional well-being, happiness, enjoyment of life, or personal growth scores.

Special thanks to: Gayle Reiber, PhD, MPH, Andrea LaCroix, PhD, MPH, & Erica Ma, BA
Trajectories in Physical Activity

<table>
<thead>
<tr>
<th></th>
<th>Year:</th>
<th>Non-Veterans</th>
<th>Veterans</th>
<th>Interaction p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-0.02 (-0.03, -0.005)</td>
<td>-0.19 (-0.27, -0.12)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

†adjusted for baseline age, race/ethnicity, education, income, marital status, social support, smoking status, Healthy Eating Index 2005, BMI, and study assignment

Trajectories in Sedentary Time

<table>
<thead>
<tr>
<th></th>
<th>Year:</th>
<th>Veterans</th>
<th>Non-Veterans</th>
<th>Interaction p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-0.19 (-0.42, 0.03)</td>
<td>-0.49 (-0.53, -0.46)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

†adjusted for baseline age, race/ethnicity, education, income, marital status, social support, smoking status, Healthy Eating Index 2005, and BMI
Background

• Age related cognitive decline in older, post-menopausal women Veterans has received little empirical attention to date.

• There are several compelling reasons to believe that there may be a distinctive pattern of cognitive decline.
  
  – Healthy soldier effect (military selection bias)
  – Protective factors (education, occupation) may buffer against decline
  
  Vs.
  
  – Health Risk Exposures Associated with Military Service
  – Health Risk Behaviors (CVD risk factors)
Results

Mean 3MSE Scores Over Time

![Graph showing mean 3MSE scores over time for different groups with p=0.002]
Results

- Veterans evidenced a greater burden of cardiovascular risk (smoking, hypertension) and disease at baseline.

- Veterans and non-Veterans evidenced similar cognitive functioning at baseline.

- Trajectories of decline were more rapid/precipitous in Veterans relative to non-Veterans, even after controlling for age, socio-demographic and health risk confounds.

Interpreting the Precipitous Decline

1) Rapid Decline Signifies Insidious Symptom Onset
   - Undetected health/mental health event
   - Latent, cumulative, synergistic effect of military/civilian life health risk exposures
   - Veteran/Non-Veteran cross over effect (Health Paradox)

2) Women Veterans True Burden of Cognitive Impairment at Baseline went Undetected
   - Ceiling Effect of 3MSE
   - Cognitive Reserve Theory
     - Protective Factors Mask Onset of Symptoms
Research Article

Association Between Chronic Conditions and Physical Function Among Veteran and Non-Veteran Women With Diabetes

Kristen E. Gray, PhD, MS,\(^{1,2}\) Jodie G. Katon, PhD, MS,\(^{1,3}\) Eileen Rillamas-Sun, PhD, MPH,\(^{1,4}\) Lori A. Bastian, MD, MPH,\(^{1,4}\) Karin M. Nelson, MD, MSHS,\(^{1,5}\) Andrea Z. LaCroix, PhD,\(^{1,6}\) and Gayle E. Reiber, PhD, MPH\(^{1,2,11}\)

Unadjusted prevalence of chronic conditions

![Graph showing unadjusted prevalence of chronic conditions among veteran and non-veteran women with diabetes.](image)
Adjusted association between number of chronic conditions and physical function

Adjusted for baseline age, race, education, smoking status, BMI, physical activity, use of pills for hypertension, use of pills for hypercholesterolemia, follow-up duration, and physical function

Research Implications

- Chronic conditions common
- Burden of conditions associated with decreased physical function larger among Veteran women
- Declines associated with each condition more pronounced among Veterans
- Root cause(s)?
Fracture Rates and Bone Density Among Postmenopausal Veteran and Non-Veteran Women From the Women’s Health Initiative

Joanne LaFleur, PharmD, MSPH,1,2,4 Eileen Rillamas-Sun, PhD,3 Cathleen S. Colón-Emeric, MD, FACP, MHS,4,5 Kristin A. Knippenberg, MFA,1,2 Kristine E. Ensrud, MD, MPH, FACRP6,7 Shelly L. Gray, PharmD, MS,6 Jane A. Cauley, DrPH,7 and Andrea Z. LaCroix, PhD8

Methods

WHL enrollment
N=161,808

Reported Veteran status
N=145,521 (89.1%)

Fracture cohort
3,719 Veterans (2.3%)
141,802 non-Veterans (87.6%)

BMD cohort
186 Veterans (0.1%)
7,611 non-Veterans (4.7%)

BMDs were measured by dual-energy x-ray absorptiometry (DXA) at Pittsburgh, PA; Phoenix and Tucson, AZ; and Birmingham, AL.
Results

No significant differences were observed in BMD levels for Veterans compared to non-Veterans over the 6 years of observation.
Discussion

• Veteran status appears to be a marker for other exposures that increase rate of hip fractures but not other osteoporotic fractures

• Although we controlled for baseline frailty, frailty could explain our findings in part, if…
  - Frailty and fall risk may have increased in women Veterans at a greater rate than in non-Veterans as they aged
  - Our measures of frailty (physical activity, self-rated health, prior falls) inadequately controlled for this multidimensional phenotype

• Future work should examine the relationship between frailty, Veteran status, and other unknown risk factors for hip fracture

Clinical Implications

• Programs may be needed to improve screening and treatment of osteoporosis and decrease higher rates of falls and functional decline in older women Veterans to prevent hip fracture.

• Counseling topics might include calcium, Vitamin D intake, and fall prevention measures including wearing proper footwear, removing throw rugs, and installing banisters, shower bars and other protective devices.

• Assess women's bone density and if low, consider prescribing an effective medication for fracture prevention.
Research Article

Association of Pain With Physical Function, Depressive Symptoms, Fatigue, and Sleep Quality Among Veteran and non-Veteran Postmenopausal Women

Kushang V. Patel, PhD, MPH,1,2,* Barbara B. Cochrane, PhD, RN,3,4 Dennis C. Turk, PhD,1 Lani A. Bastian, MD, MPH,3,6 Sally G. Haskell, MD, MPH,7,8,9 Nancy F. Woods, PhD, RN,4,10 Oleg Zaslavsky, PhD, RN,10 Robert B. Wallace, MD, MSc,10 and Robert D. Kems, PhD10,13,14

Objectives

• To determine whether the prevalence of pain, both severity and interference with activity, varies according to military service history in the WHI

• To characterize the impact of pain among older Veteran and non-Veteran women
  • Physical functioning
  • Depression
  • Fatigue
  • Insomnia
Results

Table 4. Incidence of Limited Physical Function, Depressive Symptoms, Fatigue, and Insomnia According to Pain Interference Among Veteran and Non-Veteran Participants in the Women’s Health Initiative Observational Study

<table>
<thead>
<tr>
<th></th>
<th>Limited physical function</th>
<th>Depressive symptoms</th>
<th>Fatigue</th>
<th>Insomnia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Risk ratio (95% CI)</td>
<td>Risk ratio (95% CI)</td>
<td>Risk ratio (95% CI)</td>
<td>Risk ratio (95% CI)</td>
</tr>
<tr>
<td>Veterans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all-to-a little bit of pain</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Moderate-to-extreme pain</td>
<td>1.79 (1.37–2.33)</td>
<td>1.77 (1.03–2.99)</td>
<td>1.48 (1.08–2.03)</td>
<td>1.00 (1.21–2.22)</td>
</tr>
<tr>
<td>p Value</td>
<td>.001</td>
<td>.032</td>
<td>.016</td>
<td>.001</td>
</tr>
<tr>
<td>Non-Veterans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all-to-a little bit of pain</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Moderate-to-extreme pain</td>
<td>1.78 (1.69–1.86)</td>
<td>1.82 (1.68–1.97)</td>
<td>1.64 (1.52–1.69)</td>
<td>1.35 (1.29–1.42)</td>
</tr>
<tr>
<td>p Value</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Notes: CI = confidence interval. All eight models were performed in study participants who did not have the outcome at baseline and adjusted for age, ethnicity, marital status, education, family income, smoking history, body mass index, physical activity, alcohol intake, hormone therapy use, arthritis, cancer diabetes, hypertension, angina, heart failure, myocardial infarction, and stroke.

Implications

• Moderate-to-severe pain is common among postmenopausal women Veterans

• Women with pain have a clinically significant reduction in physical function and a high burden of depressive symptoms, fatigue, and insomnia

• As the population of women Veterans ages and the number of women exposed to physically demanding jobs and combat operations grows, there will be increased need for health care services that address not only pain but also the disabling symptoms that are often comorbid with pain
**Research Article**

Differences in Active and Passive Smoking Exposures and Lung Cancer Incidence Between Veterans and Non-Veterans in the Women’s Health Initiative

Lori A. Bastian, MD, MPH, Kristen E. Gray, PhD, MS, Eric DeRycke, MPH, Shireen Mirza, MD, Jennifer M. Giersch, PhD, MPH, Sally G. Haskell, MD, MS, Kathryn M. Magruder, PhD, Heather A. Wakelee, MD, Ange Wang, BSE, Gloria Y. Ho, PhD, MPH, and Andrea Z. LaCroix, PhD

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**Active Smoke Exposure: Pack Years**

<table>
<thead>
<tr>
<th>Differences in active smoke exposure between Veterans and non-Veterans</th>
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</thead>
<tbody>
<tr>
<td><strong>Non-Veteran</strong></td>
</tr>
<tr>
<td><strong>N</strong></td>
</tr>
<tr>
<td>Pack years of smoking</td>
</tr>
<tr>
<td>Among all women</td>
</tr>
<tr>
<td>Among former or current smokers</td>
</tr>
</tbody>
</table>
Passive Smoke Exposures

<table>
<thead>
<tr>
<th>Differences in passive smoke exposure between Veterans and non-Veterans</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Any Exposure</td>
</tr>
<tr>
<td>Any passive exposure</td>
</tr>
<tr>
<td>Childhood exposure</td>
</tr>
<tr>
<td>Adult home exposure</td>
</tr>
<tr>
<td>Workplace exposure</td>
</tr>
</tbody>
</table>

Lung Cancer Rates

<table>
<thead>
<tr>
<th>Difference in lung cancer rates between Veterans and non-Veterans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Age adjusted</td>
</tr>
<tr>
<td>140,952</td>
</tr>
<tr>
<td>Age and smoking adjusted</td>
</tr>
<tr>
<td>Age, smoking, and region adjusted</td>
</tr>
<tr>
<td>Age, smoking, region, race, income, education, and study arm adjusted</td>
</tr>
</tbody>
</table>
Mortality & Military Generation

• Elevated rate of all-cause mortality was found among WHI women Veterans relative to non-Veterans, even after adjustment for age & common health risks (Weitlauf et al., 2015)
  • Women Veterans’ elevated mortality rates are in stark contrast to findings from studies of Vietnam women Veterans of a younger age

• Generational differences in Veteran mortality may exist
  • Women Veterans' sociodemographic characteristics, military roles and exposures, & associated health risks have changed over time

• Identifying causes of mortality, particularly if they differ by generation, is essential for informing prevention, clinical practice and policy

Methods

• WHI participants – both Veterans (n=3,719) and non-Veterans (n=141,800) categorized into military generation based on their birth cohort

<table>
<thead>
<tr>
<th>Military generation</th>
<th>Birth year</th>
<th>Age consistent with service during</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Vietnam</td>
<td>1913-1931</td>
<td>WWII &amp; Korean War</td>
</tr>
<tr>
<td>Vietnam/After</td>
<td>1932-1948</td>
<td>Vietnam War &amp; early post-Vietnam era</td>
</tr>
</tbody>
</table>

• Mean follow-up 15.2 years, with semi-annual or annual outcomes questionnaires

• Cause of death ascertained through physician adjudication, NDI and coded using ICD-9-CM

• Cox proportional hazards models for each generation, adjusted for: model 1: demographics and WHI study arm; model 2: model 1 + health behaviors and health risks; model 3: model 2 + hypertension & number of comorbidities
### All-cause Mortality Rates by Generation and Veteran Status

<table>
<thead>
<tr>
<th></th>
<th>Pre-Vietnam</th>
<th>Vietnam and After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of deaths</td>
<td>1,051</td>
<td>20,430</td>
</tr>
<tr>
<td>Age-adjusted rate / 1000 person-years</td>
<td>21.7</td>
<td>18.9</td>
</tr>
<tr>
<td>Adjusted HR*</td>
<td>Model 1</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>1.16 (1.09 - 1.23)</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>Model 2</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>1.14 (1.07 - 1.21)</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>Model 3</td>
<td>Ref.</td>
</tr>
<tr>
<td></td>
<td>1.08 (0.98 - 1.19)</td>
<td>Ref.</td>
</tr>
</tbody>
</table>

*HR = Hazard Ratio;
Co-variates – Model 1: age, race/ethnicity, education, study assignment;
Model 2: model 1 + smoking, physical activity, alcohol use, BMI, depression;
Model 3: model 2 + hypertension, medical comorbidities

### Cause-specific Mortality Rates for Pre-Vietnam Generation by Veteran Status

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Cardiovascular Disease</th>
<th>Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age-adjusted rate / 1000 person-years</td>
<td>6.8</td>
<td>5.6</td>
<td>6.9</td>
</tr>
<tr>
<td>Adjusted HR for Veterans*</td>
<td>Model 1</td>
<td>Ref.</td>
<td>Model 2</td>
</tr>
<tr>
<td></td>
<td>1.13 (1.00 - 1.29)</td>
<td>Ref.</td>
<td>1.12 (1.00 - 1.25)</td>
</tr>
<tr>
<td></td>
<td>Model 3</td>
<td>Ref.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.02 (0.84 - 1.24)</td>
<td>Ref.</td>
<td>1.11 (0.94 - 1.30)</td>
</tr>
</tbody>
</table>

*HR = Hazard Ratio, non-Veterans are the reference group;
Co-variates – Model 1: age, race/ethnicity, education, study assignment;
Model 2: model 1 + smoking, physical activity, alcohol use, BMI, depression;
Model 3: model 2 + hypertension, medical comorbidities
Cause-specific Mortality Rates for Vietnam/After Generation by Veteran Status

<table>
<thead>
<tr>
<th></th>
<th>Cancer</th>
<th>Cardiovascular Disease</th>
<th>Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>2.9</td>
<td>3.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Adjusted HR for Veterans*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>1.07 (0.84 - 1.37)</td>
<td>0.98 (0.68 - 1.42)</td>
<td>2.93 (1.64 - 5.23)</td>
</tr>
<tr>
<td>Model 2</td>
<td>1.00 (0.78 - 1.29)</td>
<td>0.81 (0.54 - 1.22)</td>
<td>2.90 (1.58 - 5.31)</td>
</tr>
<tr>
<td>Model 3</td>
<td>0.98 (0.69 - 1.38)</td>
<td>0.82 (0.47 - 1.46)</td>
<td>3.93 (1.83 - 8.43)</td>
</tr>
</tbody>
</table>

*HR = Hazard Ratio;
Co-variates – Model 1: age, race/ethnicity, education, study assignment;
Model 2: model 1 + smoking, physical activity, alcohol use, BMI, depression;
Model 3: model 2 + hypertension, medical comorbidities

Research Article
Mortality in Postmenopausal Women by Sexual Orientation and Veteran Status
Keren Lebavot, PhD,1 Eileen Rillamas-Sun, PhD, MPH,2 Julie Weitlauf, PhD,3,4 Rachel Kimarling, PhD;5 Robert B. Wallace, MD, MSc,6 Anne G. Sadler, PhD, RN,7 Nancy Fugate Woods, PhD, RN, FAAN,8 Jillian C. Shipherd, PhD,9,10 Kristin Mattocks, PhD, MPH,11,12 Dominic J. Cirillo, MD, PhD,13 Marcia L. Stefanick, PhD, FAHA,14 and Tracy L. Simpson, PhD16

Special thanks to: Gayle Reiber, PhD, MPH, Andrea LaCroix, PhD, MPH, & Erica Ma, BA
Lesbian & Bisexual (LB) Women’s Health

- **LB women identified as at risk for health disparities**¹
  - Poorer mental health
  - Higher rates of health risk behaviors

- **Similar patterns for older LB women**²
  - WHI study found that compared to heterosexual women, LB women reported:
    - Poorer mental health
    - ↑ alcohol use and smoking
    - ↑ disability and chronic health conditions
    - ↓ social support

¹ Institute of Medicine, 2011; ² Valanis et al., 2000

Mortality among Sexual Minorities

- **Limited research with varied results**
  - Two U.S. studies found no differences in all-cause mortality¹,²
  - Others have shown increased mortality from breast cancer¹,³ and suicide¹,²

¹ Cochran & Mays, 2012; ² Cochran & Mays, 2015; ³ Boehmer, Ozonoff, & Miamo, 2013
What about LB Veterans?

25% of LB women served in military, compared to 6% of heterosexual women

Adjusted All-Cause Mortality

<table>
<thead>
<tr>
<th></th>
<th>HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB Orientation</td>
<td>1.20</td>
<td>1.07-1.36</td>
</tr>
<tr>
<td>Veteran status</td>
<td>1.14</td>
<td>1.06-1.22</td>
</tr>
<tr>
<td>LB x Veteran</td>
<td>1.03</td>
<td>0.73-1.47</td>
</tr>
</tbody>
</table>

LB women (vs. heterosexual women) and Veteran women (vs. non-Veteran women) higher all-cause mortality
### Adjusted Cancer-Specific Mortality

<table>
<thead>
<tr>
<th></th>
<th>HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB Orientation</td>
<td>1.25</td>
<td>1.03-1.51</td>
</tr>
<tr>
<td>Veteran status</td>
<td>1.01</td>
<td>0.89-1.16</td>
</tr>
<tr>
<td>LB x Veteran</td>
<td>1.70</td>
<td>1.01-2.85</td>
</tr>
</tbody>
</table>

Significant interaction, indicating that the association between LB-status and cancer mortality varies by Veteran status.

### Stratified Models for Cancer Mortality

<table>
<thead>
<tr>
<th>Group Comparison</th>
<th>HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB vs. hetero among Veterans</td>
<td>2.09</td>
<td>1.26-3.47</td>
</tr>
<tr>
<td>LB vs. hetero among non-Veterans</td>
<td>1.25</td>
<td>1.03-1.51</td>
</tr>
<tr>
<td>Veterans vs. non-Veterans among hetero</td>
<td>1.01</td>
<td>0.89-1.16</td>
</tr>
<tr>
<td>Veterans vs. non-Veterans among LB</td>
<td>1.61</td>
<td>0.96-2.73</td>
</tr>
</tbody>
</table>

LB Veterans more likely than hetero Veterans and LB non-Veterans more likely than hetero non-Veterans, but *association is stronger for the former*
Research Implications

• Higher **all-cause mortality** among LB women relative to heterosexual women (and among Veterans relative to non-Veterans)
  • No interaction effects

• Despite protective factors for premature death, such as higher income, education, and professional occupation!

• Other factors may need to be considered
  • Stigma, poorer quality of care, nulliparity

Clinical Implications

• Both VA and non-VA clinicians need to be aware that older women Veterans have unique risk factors to address. Thus clinicians in non-VA settings should elicit women’s military service status when taking a history

• Women Veterans would benefit from targeted programs promoting physical activity, weight management, social connections, smoking cessation (as needed) and treatment for depressive symptoms. Group activities for women Veterans may be helpful offering both structure and support
Clinical Implications

• Screening is indicated for specific conditions e.g. alcoholism, osteoporosis, insomnia and sleep disordered breathing and for prior smokers, lung cancer screening

• Sexual minority women (regardless of VA status) are at higher mortality risk and may benefit from additional health promotion and tighter cardiovascular disease risk management

• Anticipatory planning is indicated for the large cohort of aging women Veterans from Korean and Vietnam Wars who will be requiring long term care at levels not previously seen in VA

Research Needs

• Identify predictors of positive physical activity trajectories and physical activity maintenance
• Design more sensitive measures of cognitive decline to more fully explain the relationship of risk and resilience
• Include robust and repeated measures of sleep disturbance in future studies
• Conduct research on trends in the indications for and route of hysterectomy in Veteran VA users. Assess CVD and dementia in women undergoing hysterectomy before age 40
Research Needs

- Programs may be needed to improve screening and treatment of osteoporosis and decrease higher rates of falls and functional decline in older women Veterans to prevent hip fracture.

- Research is needed to identify trajectories and time to loss of activities of daily living, and placement in residential facilities comparing women Veterans and non-Veterans.

- More geriatrics and palliative care researchers are needed in VA to focus on gender differences and older women Veterans’ needs.

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Healthy Aging Research Findings

- LaCroix and colleagues found that women Veterans aged 80 and older reported significantly lower perceived health, physical function, life satisfaction, social support, quality of life, and purpose in life compared with non-Veterans. Also, among WHI participants who were aged 80 and older, women with prior military service were more likely to reside in a place with special services for the elderly.

- Washington and colleagues compared longitudinal trajectories of physical activity and sedentary behavior between Veteran and non-Veteran women. Although Veterans had higher baseline physical activity than non-Veterans, they had greater declines in physical activity over time.

- Padula and colleagues found Veteran status was associated with higher prevalence of protective factors that may have helped preserve cognitive functioning initially. However, findings ultimately revealed more pronounced cognitive decline among women Veterans.

Mortality Findings

- Washington and colleagues found Veterans compared to non-Veterans displayed significantly higher all-cause mortality rate ratios in the Pre-Vietnam, but not in the Vietnam/after generation.

- Simpson and colleagues identified that for alcohol consumption, women Veterans relative to non-Veterans were less likely to be lifelong abstainers and more likely to be former or moderate drinkers. Former drinkers experienced higher mortality than lifelong abstainers and moderate drinkers; heavy drinkers had higher mortality than moderate drinkers.

- Lehavot and colleagues found a 20% heightened risk of all-cause mortality among sexual minority women relative to heterosexual women Veterans. Sexual minority women were at greater risk of death from any cancer, and this relationship was stronger among Veterans than non-Veterans.
Disease and Condition Findings

- Bastian and colleagues found Veterans compared to non-veterans had higher rates of both tobacco use and exposure to passive smoking and higher risk for lung cancer compared with non-Veterans as a result of this exposure.

- Gray and colleagues examined the impact of chronic conditions on physical function among Veterans and non-Veteran women with diabetes. Among women with diabetes, having any additional chronic condition accelerated the decline in physical function – an effect that was even more pronounced among Veterans.

- LaFleur and colleagues found that the age-adjusted rate of hip fracture was significantly higher for Veterans compared with non-Veterans. After adjustment for fracture risk factors, the hazard ratio of hip fracture was about 20% higher for Veterans relative to non-Veterans.

Pain Findings

- Patel and colleagues identified approximately one in six women reported moderate-to-extreme pain interference. Women with moderate-to-extreme pain interference compared to women with less interference reported substantially worse physical function and greater symptoms of depression, fatigue, and insomnia.