



Gulf War Veteran Research Activities

Presentation to the Research Advisory Committee on Gulf War Veterans' Illnesses

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VA HEALTH CARE | Defining EXCELLENCE in the 21st Century

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VA | U.S. Department of Veterans Affairs
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Office of Public Health

Outline

- Introductions
- Overview of Post Deployment Health Service Epidemiology Program
- Post Deployment Health Surveillance Report
- Results from GW Survey
- Ongoing analyses from GW Surveys
- Proposed Migraine and Early Markers of Neurological Disorders Study
- Questions/Discussion

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Post Deployment Health Epidemiology Service

- Epidemiology is the study of the distribution and determinants of disease frequency and health related states. It is the basic science of public health
- While epidemiologic studies are useful to answer questions about associations between exposures and disease in large populations, they cannot establish causation.
- The Post Deployment Health Epidemiology Service conducts epidemiologic studies of Veteran cohorts defined by period of service

Post Deployment Surveillance Report

- Bi-annual report from the Post Deployment Health Epidemiology Program
- It contains information on new and ongoing health conditions among VA health care users.
 - Includes data on Veterans who were deployed in support of the Vietnam War, 1990-1991 Gulf War, and Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND)
 - Also includes data on all users of VA health care services
 - Interested in what other types of analyses with this administrative data that committee thinks will be useful
 - Available on our website:
<http://www.publichealth.va.gov/epidemiology/reports/surveillance/index.asp>

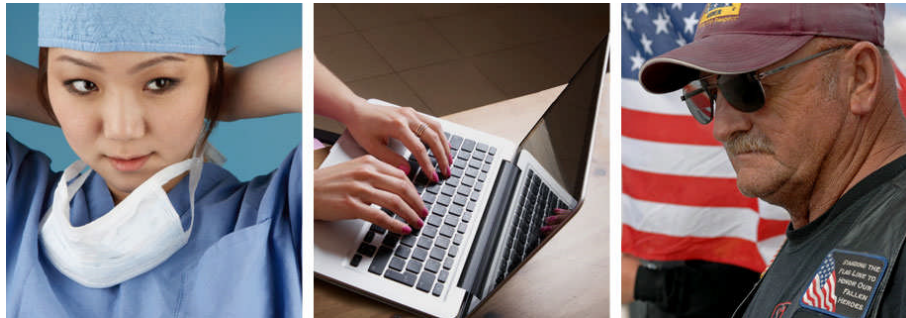
Post Deployment Surveillance Report

Prevalence of Selected Health Conditions Among Vietnam, Gulf War and OEF/OIF/OND Veterans Using the VA Health Care Between April 1, 2014 and March 31, 2015

| Diagnosis | Vietnam Veterans (%) | Gulf War Veterans (%) | OEF/OIF/OND Veterans (%) |
|--------------|----------------------|-----------------------|--------------------------|
| Arthritis | 19.98 | 26.42 | 22.07 |
| COPD | 6.73 | 1.85 | 1.20 |
| Diabetes | 28.09 | 14.54 | 3.42 |
| Hypertension | 30.59 | 23.09 | 8.99 |
| Sleep Apnea | 4.05 | 5.75 | 3.87 |
| Migraine | .36 | 2.21 | 3.30 |
| PTSD | 18.29 | 20.46 | 26.85 |



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Longitudinal Gulf War Cohort Study: History, Results, and Future Direction



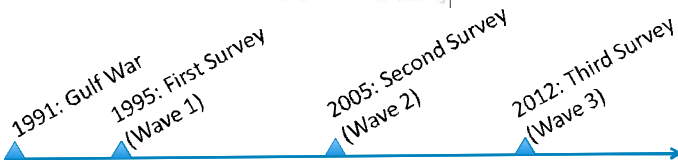
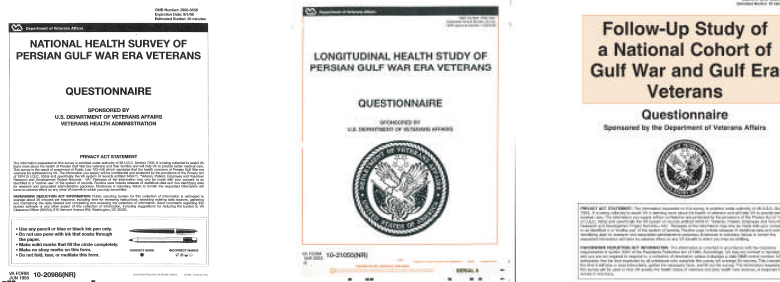
Gulf War Longitudinal Cohort Study

- Study began in 1995 in response to Gulf War Veterans' concern that their health problems they were experiencing related to their service in the 1991 Gulf War
- Population based sample of 15,000 Gulf War Veterans (deployed) and 15,000 Gulf War-era Veterans (non-deployed)
- Sampled from the known population of Gulf War Veterans and Gulf War-era Veterans (50% of the total known non-deployed veterans during this time period)

| Unit Component | Male | Female | Total |
|----------------|--------|--------|--------|
| Active | 4,800 | 1,200 | 6,000 |
| Reserve | 4,000 | 1,000 | 5,000 |
| Guard | 3,200 | 800 | 4,000 |
| Total | 12,000 | 3,000 | 15,000 |



Gulf War Longitudinal Cohort Study



Gulf War Longitudinal Cohort Study

- Overarching research question: Is the health of Veterans who deployed to the 1991 Gulf War better, worse or the same as those who did not deploy?
 - Health includes several domains: physical (such as neurologic, immunologic and respiratory), mental, women's health, functional, and social
- Provide a population-level assessment of overall health and wellness of this group at different points in time
- Describe the natural histories of disease and other health conditions in this Veteran population over time

Gulf War Longitudinal Cohort Study (2012)

Follow-Up Study of a National Cohort of Gulf War and Gulf Era Veterans

- Data Collection (May 2012-December 2013)
 - Multimodal health survey - mail, Web, and Computer Assisted Telephone Interview (CATI)
 - Phase I: Veterans mailed a letter inviting them to take the survey on the Web using a unique personal identification number
 - Phase II: Veterans who did not respond to the Web survey were mailed a paper survey, 2 copies of the consent form, a benefits and healthcare information sheet, Veterans Crisis Line information sheet, and pre-addressed postage paid return envelope
 - Phase III: Veterans who did not respond to the Web or paper survey were called and invited to participate in a Computer Assisted Telephone Interview

Gulf War Longitudinal Cohort Study (2012)

- Survey Questionnaire
 - Military service
 - General health
 - Chronic multisymptom illness
 - Cancers
 - Liver dysfunction
 - GI disturbance
 - Endocrine disorders
 - Autoimmune conditions
 - Neurological conditions
 - Amyotrophic lateral sclerosis
 - Functional health
 - Post traumatic stress disorder
 - Exercise
 - Alcohol use
 - Tobacco use
 - Complementary and alternative medicine (CAM)
 - Women's health
 - Demographics
 - Health care utilization
 - Medication use

Gulf War Longitudinal Cohort Study (2012)

- Weights were applied to produce estimates that reflect what we would expect in entire population of Gulf War and Gulf Era Veterans
 - Reflect the stratified sampling design used to draw the original sample in the baseline study
 - Adjust for non-response encountered in the field
 - Correct known inconsistencies in the original frame information

Gulf War Longitudinal Cohort Study (2012)

- 50% response rate (N=14,252)
 - 68% (n=9,643) responded by mail survey
 - 26% (n=3,808) responded by Web
 - 6% (n=801) responded by CATI
- Non-response analyses indicated that the following groups were over-represented in the 2012 follow up
 - Air Force and Army vs. Marines and Navy
 - Deployed vs. Non-deployed
 - Older vs. Younger
 - Officer vs. Enlisted
 - White vs. African American

Gulf War Longitudinal Cohort Study (2012)

- Twenty-five years after the war, Gulf War Veterans continue to report poorer health than Gulf Era Veterans:
 - Report a significantly higher prevalence of chronic illnesses including COPD, tachycardia, coronary heart disease, hypertension, asthma, neuralgia, seizures, migraine headaches, irritable bowel syndrome, chronic fatigue syndrome, fibromyalgia, and dermatitis
 - More likely to screen positive for mental health conditions
 - Reported more health care utilization (doctor's visits and hospitalizations)

Dursa et al, 2016

Gulf War Longitudinal Cohort Study (2012)

- The study population as a whole (Gulf War Veterans *and* Gulf Era Veterans) has a high burden of disease, suggesting the military service, not just deployment, may have long term health consequences
 - 79% of the study population reported at least one chronic medical condition (82% in Gulf War Veterans, 78% in Gulf Era Veterans)
 - 45% screened positive for a mental health condition (52% in Gulf War Veterans and 39% in Gulf Era Veterans)
 - Average number of self-reported chronic medical conditions was 3.5 (3.7 in Gulf War Veterans and 2.9 in Gulf Era Veterans)
 - Average BMI was 29.8 (29.8 in Gulf War Veterans and 29.7 in Gulf Era Veterans)
 - 54% are current or former smokers (55.5% in Gulf War Veterans and 52.9% in Gulf Era Veterans)
- Underscore the important of public health interventions

Ongoing Analyses

- Morbidity and Mortality among Gulf War and Gulf Era Veterans meeting the Centers of Disease Control and Prevention (CDC) and Kansas Criteria for GWI in the 1995 Gulf War Cohort Study
 - The survey administered in 1995 collected information on over 40 symptoms that allow for case ascertainment of Gulf War Illness by both the CDC definition and the Kansas definition
 - Includes onset: during or after Gulf War
 - Includes duration: persistence in the last 12 months (slightly different than 6 month time frame used by CDC and Kansas definition)
 - Strength of this data is that it was collected within 5 years of the Gulf War on a large national population based study
 - Unit component
 - Branch
 - Gender

Ongoing Analyses

CDC Case Definition (Fukuda, 1998)

- Must have 2 symptoms from 3 of the following domains:
 1. **Fatigue**
 2. **Mood and Cognition**
 3. **Musculoskeletal**
- Symptoms must have first started either during or after Gulf War
- Symptoms were assessed by the following question, "In the past year have you had persistent or recurring problems with..."

Kansas Case Definition (Steele, 2000)

- Must have symptoms in 3 of following domains:
 1. **Fatigue and Sleep**
 2. **Pain**
 3. **Neurological/Mood/Cognition**
 4. **Gastrointestinal**
 5. **Respiratory**
 6. **Skin**
- Exclusionary Conditions:
 - Cancer
 - Diabetes
 - Heart Disease
 - Liver Disease
 - Stroke



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Ongoing Analyses

Preliminary Results: % Gulf War Veteran respondents to the 1995 Gulf War Cohort Study meeting the criteria for GWI by the Kansas and CDC case definitions (N=11,441)

| | Kansas Case Definition | CDC Case Definition |
|----------------|------------------------|---------------------|
| Overall | 41.44% | 50.62% |
| Male | 40.46% | 48.89% |
| Female | 45.71% | 58.19% |
| Active Duty | 39.93% | 44.35% |
| Reserve | 42.15% | 56.77% |
| National Guard | 42.48% | 52.36% |



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Ongoing Analyses

- Determine vital status among Gulf War Veterans who did and did not meet the criteria for GWI at the 1995 survey
- Determine cause of death among Gulf War Veterans who did and did not meet the criteria for GWI at the 1995 survey
- Compare mortality rates (all cause and cause specific) between Gulf War Veterans who did and did not meet the criteria for GWI at the 1995 survey
- VA/DoD Suicide Data Repository
 - NDI data for Veterans are available through the Suicide Data Repository (SDR), which is administered jointly by VHA and DOD. The SDR contains records for deaths occurring between January 1, 1979, and December 31, 2011, for Veterans who used VHA between 2000 and 2011 and those who separated from active duty military service between January 1, 1974 and December 31, 2011.

Study in Planning: Migraine and Early Markers of Neurological Disorders in Pre and Post 9/11 Gulf War Veterans

Migraine and Early Markers of Neurologic Disorder in Pre and Post 9/11 Gulf War Veterans

- 2015 Report by the Institute of Medicine entitled, “Considerations for Designing an Epidemiologic Study for Multiple Sclerosis and Other Neurologic Disorders in Pre and Post 9/11 Gulf War Veterans” concluded the following:
 - In examining the burden of illness, the committee found that the existing data suggests that Gulf War deployed Veterans do not have a higher prevalence of the disease of interest than the non-deployed Gulf War Veterans, with the exception of headache and migraine
 - Disease specific challenges
 - Not enough time has elapsed since service in the Gulf to assess the prevalence and incidence Parkinson’s Disease.

Migraine and Early Markers of Neurologic Disorder in Pre and Post 9/11 Gulf War Veterans

- Team of VA, DoD, and academic neurologists, epidemiologists, and biostatisticians are in the early stages of developing a comprehensive epidemiologic and clinical study to answer the following research questions:
 - What is the prevalence of various types of headache / migraine in the deployed and non-deployed pre and post 9/11 Veteran populations?
 - In addition to standard headache classification, what are other phenotypic features of headaches related to deployment / head trauma and do they differ from other headaches?
 - Do neurologic disorders (e.g. parkinsonism, dementia) or potential early markers (e.g. subtle differences in balance, olfactory differences, cognitive impairment) develop differentially in those with headache / migraine? Are there differences depending on whether headaches are related to military deployment or injury?
- Interested in hearing from neurologists and SME’s on the RAC on what other research questions we need to address

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QUESTIONS